AP08081

XC878CM-16FF

XC878 Easy Kit: "Cookery Book" for a hello world application. Using DAvE (Code Generator) and DAvE Bench (Open Platform for Free Tools: IDE, Compiler, Debugger, Utility Tools).

Microcontrollers



Never stop thinking

Edition 2010-02-25 Published by Infineon Technologies AG 81726 München, Germany © Infineon Technologies AG 2010. All Rights Reserved.

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2010-03	V2.0
none	
Subjects (major changes since last revision)	
	none

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mcdocu.comments@infineon.com



Table of Contents

Note: Table of Contents see page 8.

Page

Introduction:

This "Application Note / Appnote" is a Hands On Training / Cookery Book / step-by-step book. It will help inexperienced users to get the XC878 Easy Kit up and running.

With this step-by-step book you should be able to get your first useful program in less than 2 hours.

The purpose of this document is to gain know-how of the microcontroller and the tool-chain. Additionally, the "hello world example" can easily be expanded to suit your needs. You can connect either a part of - or your entire application to the XC878 Easy Kit. You are also able to benchmark any of your algorithms to find out if the selected microcontroller fulfils all the required functions within the time frame needed.

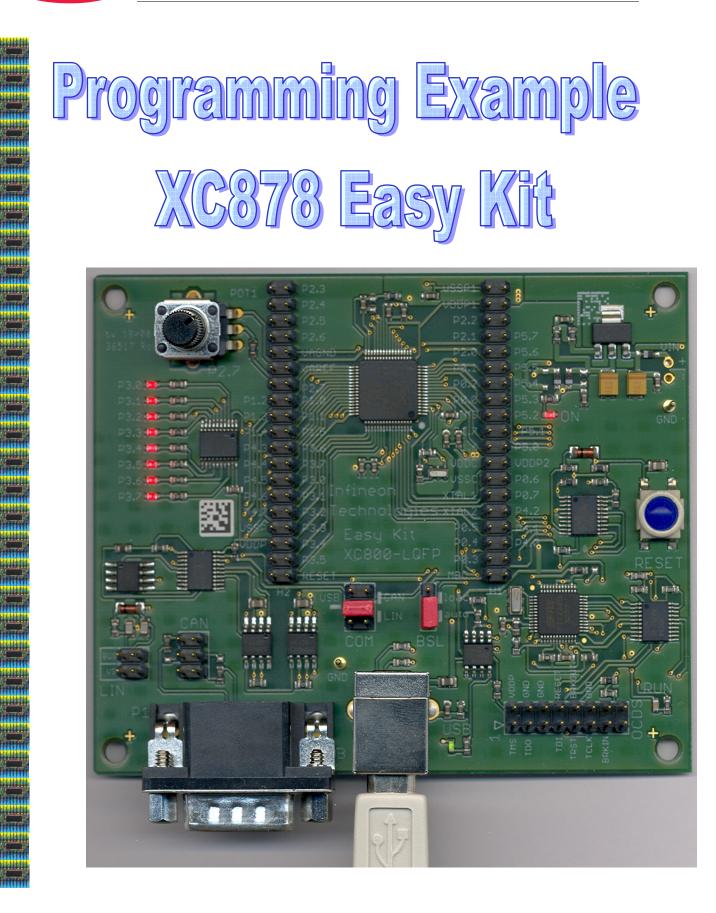
Note:

The style used in this document focuses on <u>working through</u> this material as fast and easily as possible. That means there are full screenshots instead of dialog-window-screenshots; extensive use of colours and page breaks; and listed source-code is not formatted to ease copy & paste.

Have fun and enjoy the XC878 Easy Kit!

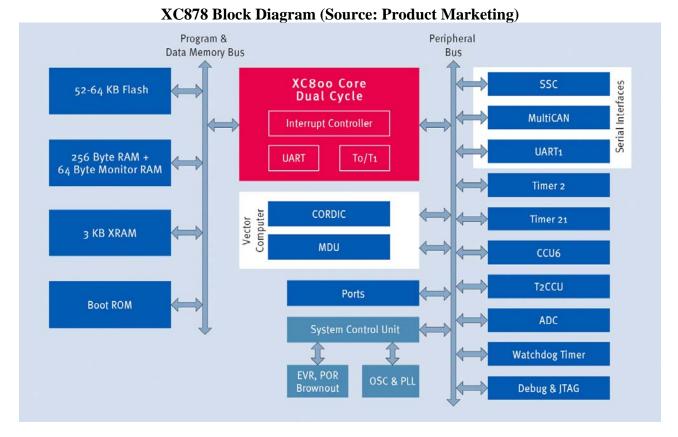




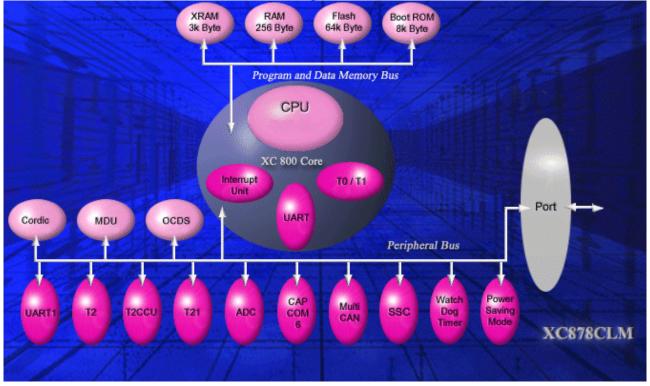




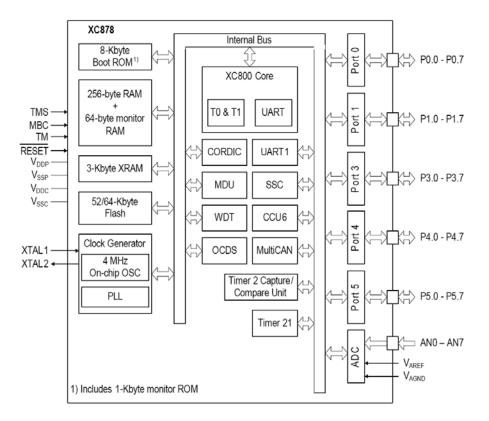
Used/selected microcontroller:



XC878 Block Diagram (Source: DAvE)







XC878 Block Diagram (Source: User's Manual)

XC878 functional units (Source: User's Manual)

							6
Flash 52K/64K x 8 On-Chip Debug Support		UART	SSC	Port 0	8-bit Digital VO		
Boot ROM 8K x 8					ompare Unit -bit	Port 1	8-bit Digital VO
XRAM 3K x 8		XC800 Core		Compare Unit 16-bit		Port 3	8-bit Digital VO
RAM 256 x 8	Timer 0 16-bit	Timer 1 16-bit	Timer 21 16-bit	Timer 2 Capture/ Compare Unit 16-bit		Port 4	8-bit Digital VO
MDU	CORDIC	MultiCAN	Watchdog Timer	UART1	ADC 10-bit 8-channel	Port 5	8-bit Digital VO
		1		8-	bit Analog Inp	ut	

Note:

Just by comparing the different sources of block diagrams, you should be able to get a complete picture of the product and to answer some of your initial questions.



"Cookery book"

For your first programming example for the XC878 Easy Kit:

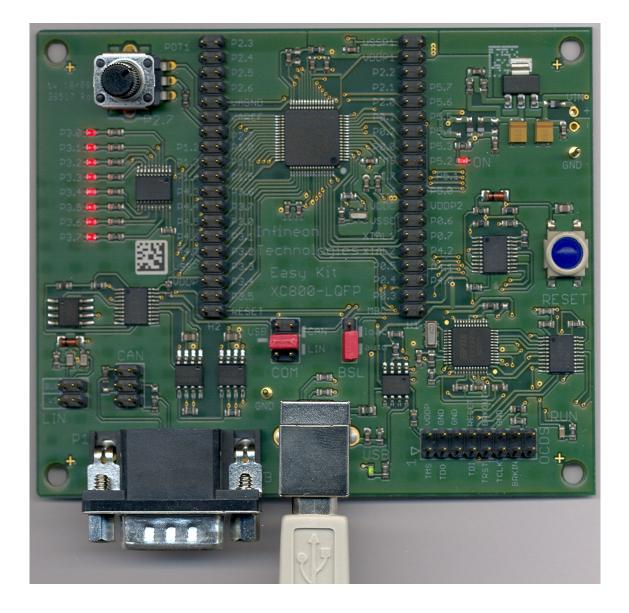
Your program:	U-SPY - COM Window - Enabled File Edit View Config Tools Window Help COM 2 8 8 8 8 8 8 7 10 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1				
Chapter/ Step	*** Recipes ***				
1.)	DAS Installation + Connecting the XC878 Easy Kit				
2.)	DAvE (program generator) DAvE Installation (mothersystem) + DAvE Update Installation (XC878.DIP) for XC878				
3.)	Using DAvE Microcontroller initialization for your programming example				
4.)	<u>Using DAvE Bench</u> <u>Programming of your application (hello world) with the DAvE Bench tool chain</u>				
5.)	Using the debugger (DAvE Bench)				

Feedback:

6.)	Feedback



1.) DAS Installation + Connecting the XC878 Easy Kit:





Screenshot of the XC878 Easy Kit Homepage:

http://www.infineon.com/cms/en/product/channel.html?channel=db3a304319c6f18c0119ebe345f15 325

Easy Kit XC878 - Infineon Technol Edit View Favorites Tools Help			- J.		
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asy Kit XC878				Download-Service	
CU Derivatives: SAX-XC878CM-16FFA PU Clock: 24 MHz				XC878 Easy Kit CD, V1.0 for download zip [185.72 MB]	
n-Chip Mernory: 3 KByte RAM, 52/64 KByte Flash (incl. up to 4kByte data flash)				20 [100.1 2 MD]	
terfaces: SB Connector for power supply, UART communication, and flash downloading, JN via Header, ZANUM via Header and via 9 Pin (male) D-Sub, TAG via Header or via USB with built inmini wiggler,					
Undings: SB Cable, CD, Evaluation Board, feachrical Documentation ca, user manuals (CD), res unihated source code debugger (CD), valuation Versions of development Tools: e.g. Compiler, Debugger, DAVE (CD) valuation Versions of development Tools: e.g.					
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Downloads 🗐 XC878 Easy Kit CD - Version 1.0 for download (XC878_easykit_CD_V1.0.zip)	05 Jun 2008 V1.0	^ 185.7 MB			
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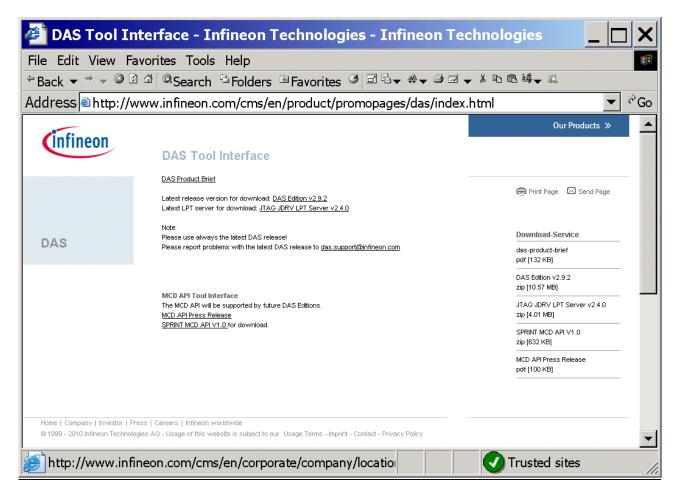
Note:

For further information, please refer to the XC878 Easy Kit Board Manual V1.0, April 2008.



Install the Infineon DAS (DeviceAccessServer) Server:

Go to <u>www.infineon.com/DAS</u>:





Note:

The DAS Server must be installed on your host computer!

The goal of the DAS software is to provide one single interface for all types of tools.

The USB Device driver communicates with the XC878 Easy Kit when connected to the host computer.

The USB Device driver for the XC878 Easy Kit USB interface is included in the DAS software. A virtual COM port driver is also included.



Download "The latest release version for download: DAS Edition v2.9.2" (- or any higher version !!!):

3,37 MB of dgdl?folderId=db3a3 💶 🔲 🗙
Saving: das_edition_v292.zip from www.infineon.com
Estimated time left: Not known (Opened so far 3,37 MB) Download to: H:\DVD-128\Software-To\das_edition_v292.zip Transfer rate: 1,12 MB/Sec
Close this dialog box when download completes
Open Open Folder Cancel

Unzip das_edition_v292.zip and

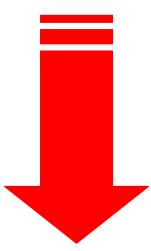


execute "DAS_v292_setup.exe" to install the DAS Server.

InstallShield Wizard	
	Preparing to Install
	DAS Setup is preparing the InstallShield Wizard, which will guide you through the program setup process. Please wait.
2	Configuring Windows Installer
	Cancel

🞼 DAS - InstallShield W	/izard	X
	Welcome to the InstallShield Wizard for DAS	
DAS any tool any wire any device	The InstallShield(R) Wizard will install DAS on your computer. To continue, click Next. WARNING: This program is protected by copyright law and international treaties.	
InstallShield	< Back Next > Cancel	



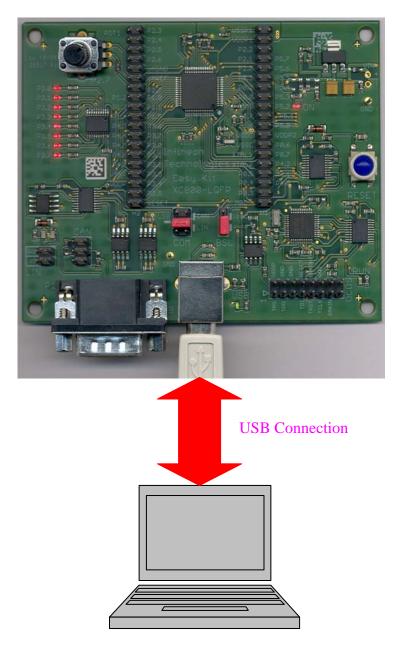


🐻 DAS - InstallShield	d Wizard 🗙
	InstallShield Wizard Completed
	The InstallShield Wizard has successfully installed DAS. Click Finish to exit the wizard.
	< <u>B</u> ack <u>Einish</u> Cancel

Click Finish



Connect the XC878 Easy Kit to the host computer:



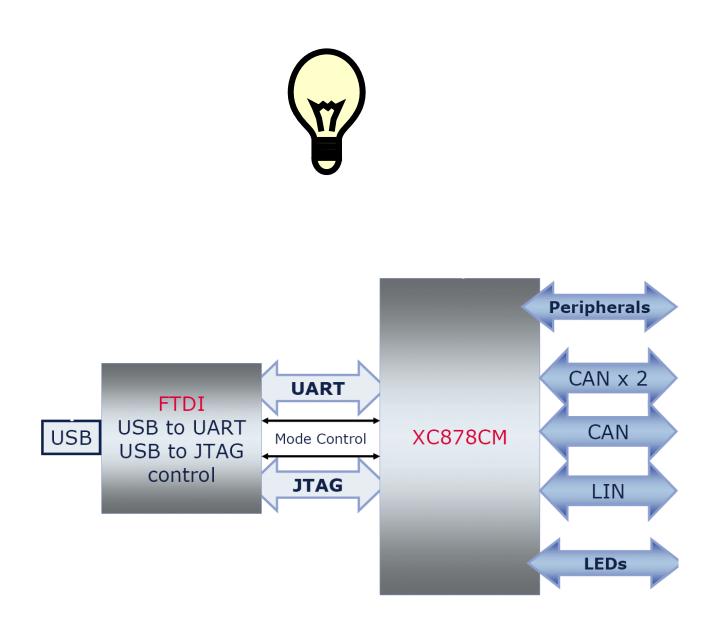
USB Connection:

.) used for: UART communication (the UART/RS232/serial interface is available via USB as a virtual COM port of the second USB channel of the FTDI FT2232 Dual USB to UART/JTAG interface).

.) used for: On-Chip-Flash-Programming and Debugging (first USB channel of the FTDI FT2232 Dual USB to UART/JTAG interface).

.) the USB connection works also as the power supply.







Found New Hardware



DAS JTAG over USB XC878 EK



Note:

A USB driver is installed the first time while connecting the XC878 Easy Kit via USB to your host computer.

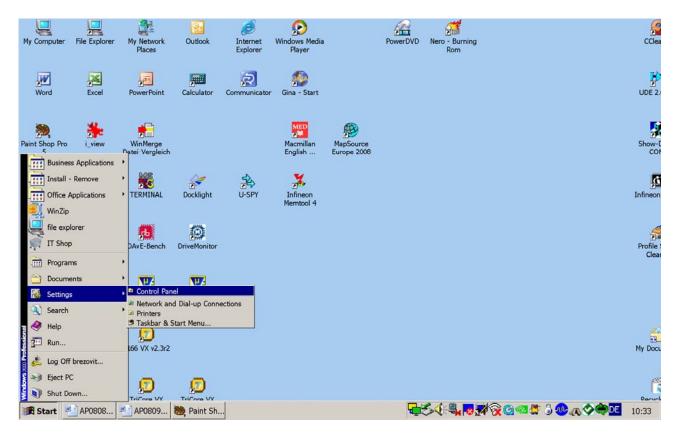
Note:

A default virtual COM Port is generated.



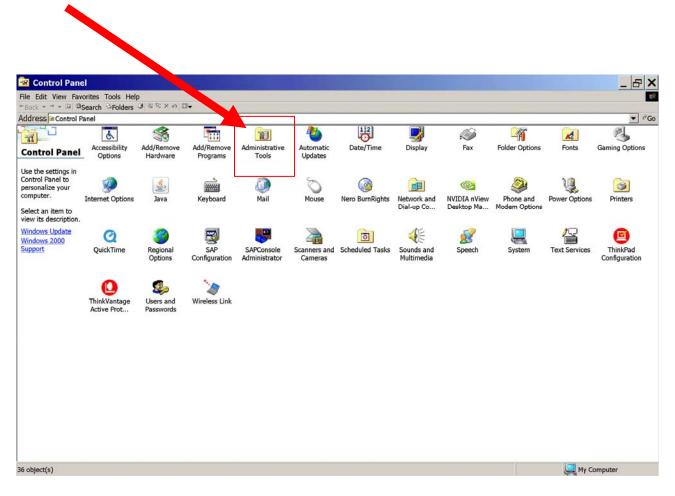
Using a Windows 2000 operating system, we are now going to search for the virtual COM Port which was generated after connecting our XC878 Easy Kit:

Start – Settings – Control Panel





Double click: Administrative Tools





Double click: Computer Management

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ools	Plata Sources (ODBC)	2 KB Shortcut	12.11.2007 13:40		
	Bevent Viewer Cocal Security Policy	2 KB Shortcut 2 KB Shortcut	12.11.2007 13:40 12.11.2007 13:40		
Computer	Microsoft .NET Framework 1.1 Configuration	1 KB Shortcut	12.11.2007 14:58		
lanagement	Microsoft .NET Framework 1.1 Wizards	1 KB Shortcut	12.11.2007 14:58		
hortcut	Microsoft .NET Framework 2.0-Konfiguration	2 KB Shortcut	20.11.2007 16:30		
lanages disks and	Microsoft .NET Framework Configuration	1 KB Shortcut	12.11.2007 14:56		
provides access to	Microsoft .NET Framework Wizards	1 KB Shortcut	12.11.2007 14:56		
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emote computers.	^{all} Telnet Server Administration	2 KB Shortcut	12.11.2007 13:40		
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Click: Device Manager

Computer Management		_ B :
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Expand: Ports (COM & LPT): Expand: Universal Serial Bus controllers:



Note:

As we can see: our virtual COM Port for UART/RS232 communication with the XC878 Easy Kit via USB is COM12!



2.) DAvE – Installation for XC878 microcontrollers:



Install DAvE (mothersystem):

Title	Date	Version	Size
Tool Package			^
顰 DAvE - Mothersystem (DAvE_Mothersystem_v2_2r1.zip)	14 Dec 2009	V2.2	8.8 MB
🗎 DAvE - Mothersystem (setup.exe)	14 Dec 2009	V2.2	8.9 MB

Note:

Abort the installation of Acrobat Reader.





Install the XC878 microcontroller support/update (XC878 DIP file):

1.)

Download DAvE_XC878CLM_v2_1.zip (- or any higher version !!!) - the DAvE-update-file (.DIP) for the required microcontroller @ http://www.infineon.com/DAvE

Title	Date	Version	Size
Development Tools			^
XC864 DIP file for DAvE (Microcontroller Configuration Tool)-latest version (DAvE_XC864_v1_2.zip)	14 Dec 2009	v1.2	5.6 ME
XC878 DIP file for DAvE (Microcontroller Configuration Tool)-latest version (DAvE_XC878CLM_v2_1.zip)	14 Dec 2009	v2.1	9.4 ME
(DAvE_XC866_v2_2.zip)	14 000 2005	Y2.2	S MID
anticolumna and the terration of the terration and terration	08 Jul 2008	v1.1	9.1 ME
XC888CLM DIP file for DAvE (Microcontroller Configuration Tool)-latest version (DAvE_XC888CLM_v1_6.zip)	14 Dec 2009	v1.6	7.6 ME
XC886CLM DIP file for DAvE (Microcontroller Configuration Tool)-latest version (DAvE_XC886CLM_v1_8.zip)	14 Dec 2009	v1.8	7.6 ME
顰 XC866 DIP file for DAvE (Microcontroller Configuration Tool) (XC866_v2.0.zip)	08 Feb 2008	v2.0	4.9 ME
XC888CLM DIP file for DAVE (Microcontroller Configuration Tool), V1.3 (XC888CLM_v1.3.zip)	14 Jan 2008	V1.3	7.6 ME
製 XC866 DIP file for DAvE (Microcontroller Configuration Tool) (XC866_v1.9.zip)	14 Jan 2008	V1.9	4.9 MB
XC886CLM DIP file for DAVE (Microcontroller Configuration Tool), V1.5 (XC886CLM_v1.5.zip)	14 Jan 2008	V1.5	7.5 ME
XC888CLM DIP file for DAVE (Microcontroller Configuration Tool), V1.1 (DAVE_XC888CLM_v1.1.zip)	01 Mar 2007		7.5 ME
XC886CLM DIP file for DAVE (Microcontroller Configuration Tool), V1.3 (XC886CLM_v1.3.zip)	22 Mar 2007		7.5 ME
🔁 DAVE XC888 RELEASE NOTES (DAVE_XC888_RELEASE_NOTES.pdf)	24 May 2007		351 KI
XC886CLM DIP file for DAVE (Microcontroller Configuration Tool), V1.1 (XC886CLM_V1.1.zip)	01 Sep 2006		6.4 ME

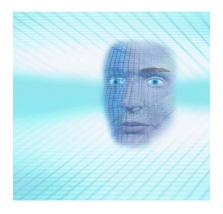
Unzip the zip-file "XC878CLM_v2_1.zip" and save " XC878CLM_v2.1.dip " @ e.g. D:\DAvE\XC878CLM_v2.1.dip.



2.) Start DAvE - (click DAvE)
3.)
View Setup Wizard Default: • Installation Forward> Select: • I want to install products from the DAvE's web site Forward> Select: D:\DAvE Forward> Select: Available Products click XC878CLM Forward> Install End
4.) DAvE is now ready to generate code for the XC878 microcontroller.

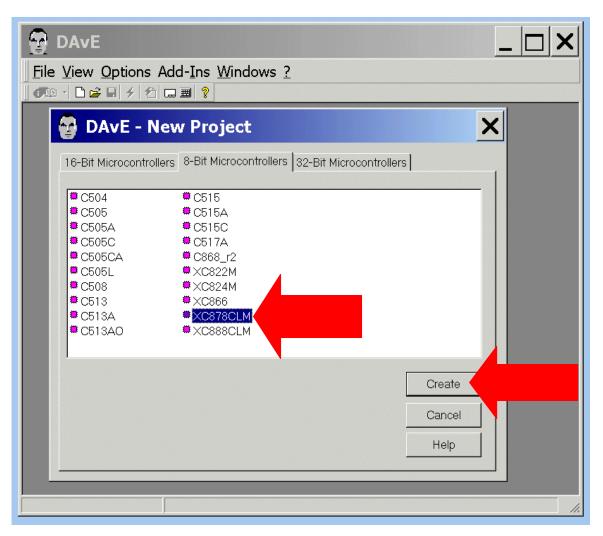


3.) DAvE - Microcontroller Initialization after Power-On:



Start the program generator DAvE and select the XC878 microcontroller:

File New 8-Bit Microcontrollers select XC878CLM Create





Choose the Project Settings as you can see in the following screenshots:

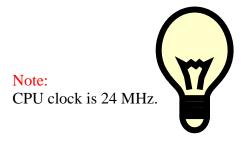
General: Controller Details: Device: check/select XC878CM-16FF General: Compiler Settings: For DAvE-Bench check/choose • SDCC (DAvE Bench)

DAVE	×
File View Options Add-Ins Windows ? ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ●	
DAVE XC878CLM (Release v2.1) Project Settings Project Settings Controller Details Device XC878CM-16FF Device Type FLASH Flash Memory 64 K Size Max. System Clock Ifeo MHz ROM Size	
Main Source File File name MAIN.C Main Header File File name MAIN.H	
Compiler Settings Ckeil Enable Startup File Generation Memory Model: SMALL CTasking SDCC IAR	
XC878CLM (new project)	1.



System Clock: (do nothing)

DAVE	
File View Options Add-Ins Windows ?	
🙀 DAvE XC878CLM(Release v2.1)	<
C Drainat Cattings	
Project Settings	
General System Clock External Bus Interface Global Settings Notes	1
Clock Source Control	on
Direct Drive (PLL Bypass Mode) OnChip OSC	C External OSC
PLL Mode	fOSC [MHz] 4,00
fSYS = fOSC x NF /(NR x OD)	SYS
NR(P) = 2 V NF(N) = 72 V OD(K) = 1 V	fSYS [MHz]
Clock Output Control	
Use Pin P0.0 as CLKOUT Clock divider (CMCC	DN.CLKREL) FSYS/6
Use Pin P0.7 as CLKOUT PCLK, SCLK, CCLK	[MHz] 24,00
C CLKOUT= f0SC	tiCAN 48,00
CLKOUT= fPCLK CLKOUT is Selected by COREL and TLEN bits FCLK [MHz] for CCL	J6 48,00
Clock Divider (COCON.COREL) [5YS/3 FCLK [MHz] for T2C	CU 48,00
Enable Toggle Latch(COCON.TLEN)	
C878CLM (new project)	





External Bus Interface: (do not change configuration)

DAVE	
File View Options Add-Ins Windows ?	
DAVE XC878CLM (Release v2.1)	
Project Settings	×
General System Clock External Bus Interface Global Settings Notes	
External Interface Disabled Flag (EINTCON.GLOBEN)	
C Enable external interface	
Disable external interface	
Data Direction Control (EINTCON.DDIR)	
C Input (Data Read)	
Output (Data Write)	
Generate Data Read / Write Macro	
External Address Lines Control (EINTCON.ENAx)	
Enable External Address High Byte(Address Lines A8-A15)	
Enable External Address Line A16	
Enable External Address Line A17	
Enable External Address Line A18	
Enable External Address Line A19	
XC878CLM (new project)	1.



Global Settings: (do not change configuration)

File View Options Add-Ins Windows ?
Ave XC878CLM (Release v2.1) Project Settings Project Setings Project Settings Project Settings Project Setti
Image: Enable shared interrupt message box * (%) Image: Start st

Note (Source: DAvE): * + =

- // You have two choices for interrupt type select in Project Settings Page
- // under Global Settings Section.
- // If you select CHOICE 1 then ISR will be generated with push and pop.
- // If you select CHOICE 2 then ISR will be generated without push and pop.
- // Default choice is CHOICE 2.
- // Current selection is CHOICE 2

Note:

** = There is a slightly different behavior between MODE=0 and MODE=1 in setting/clearing the pending interrupt request bit.

 $* \circledast =$ If an interrupt node is shared with another interrupt node, the ISR code will be generated in the SHARED_INT.C file.

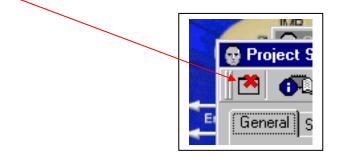




Notes: If you wish, you can insert your comments here.

DAVE	
File View Options Add-Ins Windows ? Image:	
DAVE XC878CLM (Release v2.1)	
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General System Clock External Bus Interface Global Settings Notes	
Consert Notes:	
XC878CLM (new project)	

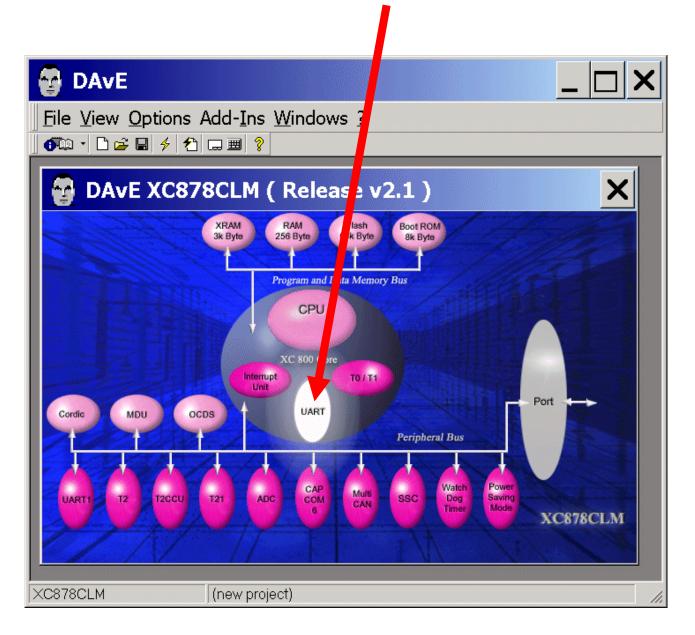
Exit and Save this dialog now by clicking the close button:





Configuration of the UART:

The configuration window/dialog can be opened by <u>clicking</u> the specific block/module (UART).





- UART: Transmitter: click ^(c) Use pin P1.1 (TXD_0)
- UART: Receiver: click Use pin P1.0 (RXD_0)
- UART: Receiver Enable: tick \checkmark Enable receiver (REN)

UART: Mode Control: click • Mode 1: 8-bit shift UART, variable baud rate (see BRG or Timer1)

😨 DAvE		
File ⊻iew Options Add-Ins Windo	ows ?	
DAVE XC878CLM (Rela	Elsen Dass DOLL	×
UART BRG Interrupts Functions		
C Mode 2: 9-bit shift UART, fixed	Receiver No pins are selected Use pin P1.0 (R×D_0) Use pin P0.1 (R×D_1) Use pin P5.2 (R×D_2) d baud rate (fPCLK/2) ble baud rate (see BRG or Timer1) baud rate (fPCLK/32 or fPCLK/64) ble baud rate (see BRG or Timer1)	Receiver Enable Enable receiver (REN) Baudrate Source BRG Timer 1 Interrupts Enable interrupt (ES) Receive interrupt will only be
Options Double baud rate (SMOD) (Note: Only in Mode 2) XC878CLM (new project)	RXDO Pin Selection No pins are selected Use pin P1.5 (RXDO_0) Use pin P0.0 (RXDO_1) Use pin P5.4 (RXDO_2)	Activated if a valid stop bit was received (SM2) Multiprocessor Enable multiprocessor communication (SM2)



Note:

The RS232 serial interface (UART pins P1.0 and P1.1) is available via the USB port as virtual COM port (e.g. COM12) which converts the TTL-UART-signals to USB-signals.



BRG: BRG Run Control: check/tick ✓ Enable BRG

BRG: Fractional Divider Control: tick ✓ Enable Fractional Divider

BRG: BRG Settings: Required baud rate [kbaud] insert 9,600 <ENTER>

DAVE	_ 🗆 X
File View Options Add-Ins Windows ? Image:	
DAVE XC878CLM (Release v2.1) Vote Vote <th>×</th>	×
BRG Settings Prescaler (BRPRE) fDIV = fPCLK STEP Value 0xD5 Required baud rate 9,6000 Actual baud rate 9,6004 [kbaud] 9,6004	
Min. baud rate 22,8882 Percentage of deviation [%]	
Max. baud rate 747,0703 Reload Value 0x81 [kbaud] (BG)	

Note:

Validate each alphanumeric entry by pressing ENTER.





Interrupts: (do nothing)

	<mark>∮ 원 ⊑ ᅖ </mark>		×		
	T (Serial Interface)				>
🖄 🕠 🕅 Uart Bri	Interrupts Functions Parameters Notes	Pr	<mark>iority (U</mark>	<mark>ser)</mark>	
Level	Interrupt Source	Priority 0	Priority 1	Priority 2	Priority 3
Level 0	Non Maskable Interrupt (NMI)	Hig	hest Priority	can't be char	nged)
Level 1	External Interrupt 0	o	0	0	0
Level 2	Timer 0 Interrupt	0	0	O	c interna
Level 3	External Interrupt 1	0	0	ntern	nterna
Level 4	Timer 1 Interrupt	0	0		
Level 5	UART Interrupt	®	0	С	C
Level 6	T2 / T2CCU / BRG / MCAN SRN 0	e	0	C	C
Level 7	ADC/MCAN SRN 1 and SRN 2	୍	0	c	0
Level 8	SSC Interrupt	۲	0	0	C
Level 9	External 2 / T21 / UART1 / BRG1 Intrpts	e	C	C	O
Level 10	External[6:3] / T2CCU[5:0] / MCAN SRN 3	®	C	C	0
Level 11	CCU6 Node 0 / MCAN SRN 4	0	0	C	0
Level 12	CCU6 Node 1 / MCAN SRN 5	୍	0	С	0
Level 13	CCU6 Node 2 / MCAN SRN 6	C	0	C	o
Level 14	CCU6 Node 3 / MCAN SRN 7	0	C	C	C



Note:

For the serial communication with a terminal program (e.g. U-SPY) running on your host computer the (printf) / printf_small() / printf_fast_f() - function is used. The "printf" function uses Software-Polling-Mode therefore we do not need to configure any interrupts.





Note: (printf) / printf_small() / printf_fast_f():

Release Notes SDCC Compiler Tool chain for XC800

Known Issues (Other than open bugs):

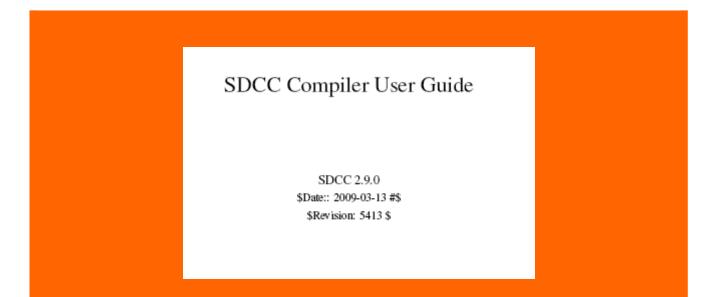
The built-in printf() provided in the package does not work with XC878. Alternatively, other print formats like printf_small(), printf_fast_f() are recommended to be used with XC878.

At the time this document was written, there was no printf (see above) for the XC878 microcontroller. Therefore we are going to use printf_small().





Additional information: printf(), printf_small(), printf_fast_f():



3.17.2 Stdclib functions (puts, printf, streat etc.)

3.17.2.1 <stdio.h>

getchar(), putchar() As usual on embedded systems you have to provide your own getchar() and putchar() routines. SDCC does not know whether the system connects to a serial line with or without handshake, LCD, keyboard or other device. And whether a lf to crlf conversion within putchar() is intended. You'll find examples for serial routines f.e. in sdcc/device/lib. For the mcs51 this minimalistic polling putchar() routine might be a start:

```
void putchar (char c) {
   while (!TI) /* assumes UART is initialized */
   ;
   TI = 0;
   SBUF = c;
}
```





printf(), printf_small(), printf_fast_f() (continuation):

printf() The default printf() implementation in printf_large.c does not support float (except on ds390), only <NO FLOAT> will be printed instead of the value. To enable floating point output, recompile it with the option -*DUSE_FLOATS=1* on the command line. Use --*model-large* for the mcs51 port, since this uses a lot of memory. To enable float support for the pic16 targets, see 4.6.8.

If you're short on code memory you might want to use printf_small() *instead* of printf(). For the mcs51 there additionally are assembly versions printf_tiny() (subset of printf using less than 270 bytes) and printf_fast() and printf_fast_f() (floating-point aware version of printf_fast) which should fit the requirements of many embedded systems (printf_fast() can be customized by unsetting #defines to *not* support

long variables and field widths). Be sure to use only one of these printf options within a project.

mcs51	printf	printf	printf_small	printf_fast	printf_fast_f	printf_tiny
		USE_FLOATS=1				
filename	printf_large.c	printf_large.c	printfl.c	printf_fast.c	printf_fast_f.c	printf_tiny.c
"Hello World"						
size	1.7k / 2.4k	4.3k / 5.6k	1.2k / 1.8k	1.3k / 1.3k	1.9k / 1.9k	0.44k / 0.44k
small / large						
code size	1.4k / 2.0k	2.8k / 3.7k	0.45k/	1.2k / 1.2k	1.6k / 1.6k	0.26k / 0.26k
small / large	1. IK / 2.0K	2.0K/ 5.7K	0.47k (+	1.2K / 1.2K	1.0k / 1.0k	0.20K7 0.20K
			_ltoa)			
formats	cdiopsux	cdfi <i>o</i> psux	cdosx	cdsux	cdfsux	cdsux
long (32 bit)	v	X	v	v	v	
support	Х	λ	Х	Х	Х	-
byte arguments	b	b	_	-	_	_
on stack						
float format	-	%f	-	-	%f ⁹	-
float formats	_	-	_	-	_	_
%e %g						
field width	Х	Х	-	Х	Х	-
string speed ¹⁰ ,	1.52 / 2.59 ms	1.53 / 2.62	0.92/0.93	0.45 / 0.45 ms	0.46/0.46	0.45 / 0.45 ms
small / large		ms	ms		ms	
int speed ¹¹ ,	3.01 / 3.61 ms	3.01 / 3.61	3.51 /	0.22 / 0.22 ms	0.23 / 0.23	0.25 / 0.25 ms ¹²
small / large	5.017 5.01 ms	3.017 5.01 ms	18.13 ms	0.227 0.22 ms	0.2370.23 ms	0.257 0.25 ms
long speed ¹³ ,						
small / large	5.37 / 6.31 ms	5.37 / 6.31	8.71 /	0.40 / 0.40 ms	0.40 / 0.40	-
_		ms	40.65 ms		ms	
float speed ¹⁴ ,	_	7.49/22.47	-	-	1.04 / 1.04	_
small / large		ms			ms	
<u> </u>						

Feature matrix of different *printf* options on mcs51.





Priority 0 Priority 1 Priority 2 Priority 3

Note: Interrupt Priorities (User):

Note (Source: Application Note AP08053):

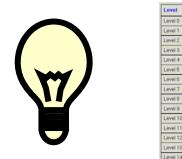
There could be six interrupt priorities. These priorities, with 6 beeing the highest, are as follows:

Interrupt	Priority:	
6		NMI
5		Interrupt Priority 3
4		Interrupt Priority 2
3		Interrupt Priority 1
2		Interrupt Priority 0
1		Main

Main refers to routines that run prior to any interrupt and can be interrupted by any interrupt. Each interrupt source can be programmed to any of the four interrupt priorities (0-3).

An interrupt that is currently being serviced can only be interrupted by a higher-priority interrupt, but not by another interrupt of the same or lower priority.

Hence, an interrupt of the highest priority cannot be interrupted by any other interrupt request. In any case, the NMI always has the highest priority (above level 3) and its priority cannot be programmed.



Note: Interrupt Priorities (internal, Source: User's Manual):

An interrupt that is currently being serviced can only be interrupted by a higher-priority interrupt, but not by another interrupt of the same or lower priority.

Hence, an interrupt of the highest priority cannot be interrupted by any other interrupt request. If two or more requests of different priority levels are received simultaneously, the request with the highest priority is serviced first. If requests of the same priority are received simultaneously, an **internal** polling sequence determines which request is serviced first. Thus, within each priority level, there is a second priority structure determined by a polling sequence as shown in the User's Manual and above.



Functions: Initialization Function: tick ✓ UART_vInit Functions: Miscellaneous Functions: tick ✓ UART_bRxReady Functions: Miscellaneous Functions: tick ✓ UART_bTxReady Functions: 8-Bit Data Units: tick ✓ UART_ubGetData8 Functions: 8-Bit Data Units: tick ✓ UART_vSendData8

DAVE	
File View Options Add-Ins Windows ?	
DAVE XC878CLM (Release v2.1)	×
UART (Serial Interface)	×
UART BRG Interrupts Functions Parameters Notes	
Initialization Function	Source File
	File name UART.C
Miscellaneous Functions	8-Bit Data Units
UART_vilsr UART_vilsr UART_vRxEnable UART_vRxEnable	☑ UART_ubGetData8 UART_ubGetData8 ☑ UART_vSendData8 UART_vSendData8
UART_vRxEnable UART_vRxEnable	UART_vSendData8 UART_vSendData8
UART_bRxReady UART_bRxReady	9-Bit Data Units
UART_bTxReady UART_bTxReady	UART_uwGetData9 UART_uwGetData9
	UART_vSendData9
	Multiprocessor Communication
	UART_vSendAddr UART_vSendAddr
	UART_bOwnAddress UART_bOwnAddress
	UART_vWakeUp UART_vWakeUp UART_vGotoSleep UART_vGotoSleep
×C878CLM (new project)	

Note:

You can change function names (e.g. UART_vInit) and file names (e.g. UART.C) anytime.





Parameters: (do nothing)

DAVE	
Eile <u>V</u> iew <u>O</u> ptions Add- <u>I</u> ns <u>W</u> indows <u>?</u> ■ ● ■ ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ●	
DAVE XC878CLM (Release v2.1)	
UART (Serial Interface)	×
Header File File name UART.H	
XC878CLM (new project)	

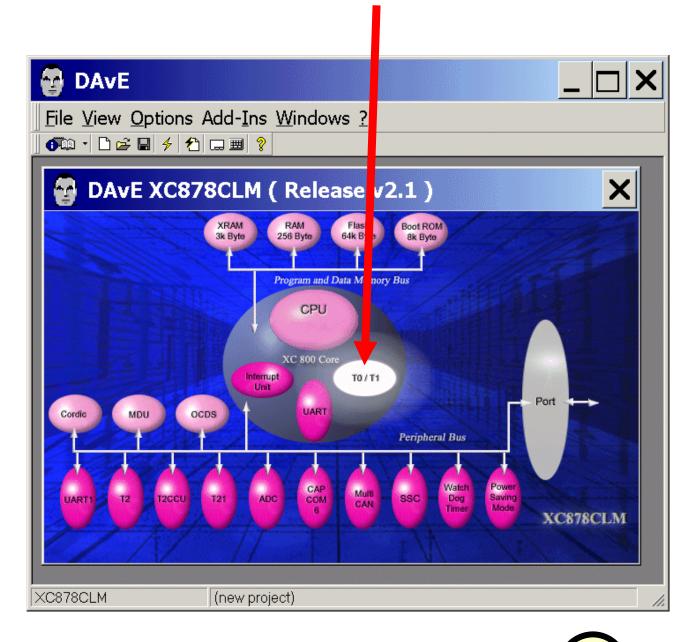
Notes: If you wish, you can insert your comments here.

Exit and Save this dialog now by clicking the close button.



Configure Timer TO:

The configuration window/dialog can be opened by <u>clicking</u> the specific block/module (T0/T1).



Note:

The LEDs on Port_3 will be blinking (if selected in the main menu) with a frequency of about 1 second (done in the Timer_0-Interrupt-Service-Routine). Therefore we have to configure Timer_0.



Timer0: Timer Mode: click ⊙ Mode 1: 16-bit timer Timer0: Timer Options: tick ✓ Turn on timer (TR0) Timer0: Interrupt Control: tick ✓ Enable interrupt of timer (ET0)

😨 DAvE	
File View Options Add-Ins Windows ? Image:	
DAVE XC878CLM (Release v2.1)	×
Timer 0/1 ™ Image: 1	×
Timer 0 Timer 1 Interrupts Functions Parameters Notes	
Timer Mode (TMOD.T0M)	- Timer Options
Mode 0: 8-bit timer (TH0) with a divide-by-32 prescaler (TL0)	Enable counter operation on Pin P4.4 (T0_0)
Mode 1: 16-bit timer (TH0/TL0)	• Pin P1.1 (T0_1)
Mode 2: 8-bit timer (TL0) with 8-bit auto-reload (TH0)	Enable Gating Control: Timer 0 is enabled only while pin EXINT0 is high. (GATE0)
Mode 3: 8-bit timer (TL0) and second 8-bit timer (TH0)	☑ Turn on timer (TR0)
Timer Registers	
Lower byte of 16-bit timer (TL0) 0×00	Interrupt Control
Higher byte of 16-bit timer (TH0)	Enable interrupt of timer (ET0)
Timer overflow [µs] (TF0) 5461,333	
XC878CLM (new project)	

Note:

We need 183 Timer_0 overflows to achieve an approximate 1 second delay. This will be handled in the Timer_0 interrupt function. $183 * 5461,333 \ \mu s = 0.9994 \ s.$



Timer1: do nothing (not used)

DAVE	
File View Options Add-Ins Windows ? ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ●	
DAVE XC878CLM (Release v2.1)	×
Timer 0 Timer 1 Interrupts Functions Parameters Notes	
Timer Mode (TMOD.T1M)	Timer Options
 Mode 0: 8-bit timer (TH1) with a divide-by-32 prescaler (TL1) Mode 1: 16-bit timer (TH1/TL1) 	 Enable counter operation on Pin P4.5 (T1_0) Pin P1.5 (T1_1)
C Mode 2: 8-bit timer (TL1) with 8-bit auto-reload (TH1)	Enable Gating Control: Timer 1 ☐ is enabled only while pin EXINT1 is high. (GATE1)
Mode 3: Timer holds its count Timer Registers	□ Turn on timer (TR1)
5-bit prescaler (TL1)	Interrupt Control
8-bit timer (TH1) 0x00 Timer overflow [µs] (TF1) 682,667	Enable interrupt of timer (ET1)
XC878CLM (new project)	



Interrupts: (do nothing)

Level 0 Non Maskable Interrupt (NMI) Image: Im	N786772AN876N68475	mer 1 Interrupts Functions Parameters Notes		Priority	(User)	
Level 1 External Interrupt 0 c	Level	Interrupt Source	Priority 0	Priority 1	Priority 2	Priority 3
Level 2 Timer 0 Interrupt C <lic< li=""> <lic< li=""> <li< td=""><td>Level 0</td><td>Non Maskable Interrupt (NMI)</td><td>Hig</td><td>hest Priority</td><td>(can't be chai</td><td>nged)</td></li<></lic<></lic<>	Level 0	Non Maskable Interrupt (NMI)	Hig	hest Priority	(can't be chai	nged)
Level 3 External Interrupt 1 Image: Constraint of the second of the	Level 1	External Interrupt 0	۲	0	0	0
Level 4 Timer 1 Interrupt Image: Constraint of the second se	Level 2	Timer 0 Interrupt		•	0	•
Level 5 UART Interrupt c	Level 3	External Interrupt 1				E o
Level 5 UART Interrupt c	Level 4	Timer 1 Interrupt	•			erna
Level 7 ADC / MCAN SRN 1 and SRN 2 6 C	Level 5	UART Interrupt	୍	- o		- o
Level 8 SSC Interrupt 6 C C C Level 9 External 2 / T21 / UART1 / BRG1 Intrpts 6 C C C Level 10 External[6:3] / T2CCU[5:0] / MCAN SRN 3 6 C C C C Level 11 CCU6 Node 0 / MCAN SRN 4 6 C C C C Level 12 CCU6 Node 1 / MCAN SRN 5 6 C C C C Level 13 CCU6 Node 2 / MCAN SRN 6 6 C C C C Level 14 CCU6 Node 3 / MCAN SRN 7 6 C C C C	Level 6	T2 / T2CCU / BRG / MCAN SRN 0	୍	0	0	0
Level 9 External 2 / T21 / UART1 / BRG1 Intrpts 6 C C C Level 10 External[6:3] / T2CCU[5:0] / MCAN SRN 3 6 C C C C Level 11 CCU6 Node 0 / MCAN SRN 4 6 C C C C C C Level 12 CCU6 Node 1 / MCAN SRN 5 6 C	Level 7	ADC/MCAN SRN 1 and SRN 2	ତ	o	0	0
Level 10 External[6:3] / T2CCU[5:0] / MCAN SRN 3 © C <t< td=""><td>Level 8</td><td>SSC Interrupt</td><td>୍</td><td>C</td><td>0</td><td>0</td></t<>	Level 8	SSC Interrupt	୍	C	0	0
Level 11 CCU6 Node 0 / MCAN SRN 4 © C C C Level 12 CCU6 Node 1 / MCAN SRN 5 © C C C Level 13 CCU6 Node 2 / MCAN SRN 6 © C C C Level 14 CCU6 Node 3 / MCAN SRN 7 © C C C	Level 9	External 2 / T21 / UART1 / BRG1 Intrpts	୍	C	0	0
Level 12 CCU6 Node 1 / MCAN SRN 5 © C <t< td=""><td>Level 10</td><td>External[6:3] / T2CCU[5:0] / MCAN SRN 3</td><td>©</td><td>C</td><td>C</td><td>0</td></t<>	Level 10	External[6:3] / T2CCU[5:0] / MCAN SRN 3	©	C	C	0
Level 13 CCU6 Node 2 / MCAN SRN 6 C C C C C C C C C C C C C C C C C C	Level 11	CCU6 Node 0 / MCAN SRN 4	©	O	C	0
Level 14 CCU6 Node 3 / MCAN SRN 7 6 C C C	Level 12	CCU6 Node 1 / MCAN SRN 5	©	C	C	0
	Level 13	CCU6 Node 2 / MCAN SRN 6	ତ	C	0	0
LM (new project)	Level 14	CCU6 Node 3 / MCAN SRN 7	e	C	C	0
LM (new project)						
	_M	(new project)				



Functions: Initialization Function: tick ✓ T01_vInit

👻 DAVE	
File View Options Add-Ins Windows ?	
🛛 😨 DAvE XC878CLM(Release v2.1)	
Timer 0/1	×
Timer 0 Timer 1 Interrupts Functions Parameters Notes	
Initialization Function T01_vInit T01_vInit T01_vInit T01_vInit	
Function Library	
T01_vStartTmr T01_vStartTmr	
T01_vStopTmr T01_vStopTmr	
T01_vClearTmr T01_vClearTmr	
T01_vLoadTmr T01_vLoadTmr	
T01_viTmr0	
TO1_viTmr1 TO1_viTmr1 Interrupt of Timor 0	
Image: To1_vStartTmr1 To1_vStartTmr1 Interrupt of Timer_0 Image: To1_vStopTmr1 To1_vStopTmr1 Is enabled, ET0 = 1	
T01_vStopTmr1 T01_vStopTmr1 is enabled, ET0 = 1	
XC878CLM (new project)	



Note:

Timer_0 has a dedicated interrupt vector address ($000B_H$), interrupt node and its own interrupt status flag TF0.

The vector is used to service the corresponding interrupt node request – when enabled (ET0=1), which means: the interrupt system will hardware-generate an LCALL to the appropriate service routine at $000B_{\rm H}$.

TF0 will be automatically cleared by hardware (the core) once its pending interrupt request is serviced.





Additional information: Interrupt Handling (Source: User's Manual):

The processor acknowledges an interrupt request by executing a hardware generated LCALL to the appropriate service routine (interrupt vector address).

In some cases, hardware also clears the flag that generated the interrupt, while in other cases, the flag must be cleared by the user's software (e.g. see DAvE Source Code).

The hardware-generated LCALL pushes the contents of the Program Counter (PC) onto the stack (but it does not save the PSW) and reloads the PC with an address that depends on the source of the interrupt being vectored to (interrupt vector addresses see User's Manual).

Program execution returns to the next instruction after calling the interrupt when the RETI instruction is encountered. The RETI instruction informs the processor that the interrupt routine is no longer in progress, then pops the two top bytes from the stack and reloads the PC. Execution of the interrupted program continues from the point where it was stopped. Note that the RETI instruction is important because it informs the processor that the program has left the current interrupt priority level.

A simple RET instruction would also have returned execution to the interrupted program, but it would have left the interrupt control system on the assumption that an interrupt was still in progress. In this case, no interrupt of the same or lower priority level would be acknowledged.



Parameters: (do nothing)

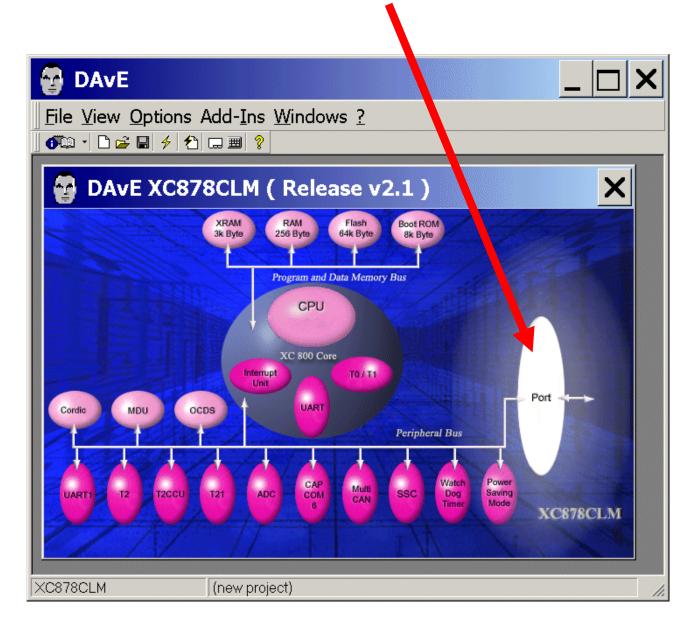
😨 DAvE		
_ <u>File View O</u> ptions Ad		
DAVE XC8780	CLM (Release v2.1)	
🚭 Timer 0/1		×
Timer 0 Timer 1 Inter Header File File name	errupts Functions Parameters Notes	
Parameters T01_TIMER_0 T01_TIMER_1 T01_MODE_0 T01_MODE_1 T01_MODE_2	T01_TIMER_0 T01_TIMER_1 T01_MODE_0 T01_MODE_1 T01_MODE_2	
XC878CLM (r	(new project)	

Notes: If you wish, you can insert your comments here. Exit this dialog now by clicking the close button.



Configure Port 3 to Output:

The configuration window/dialog can be opened by <u>clicking</u> the specific block/module (Port).

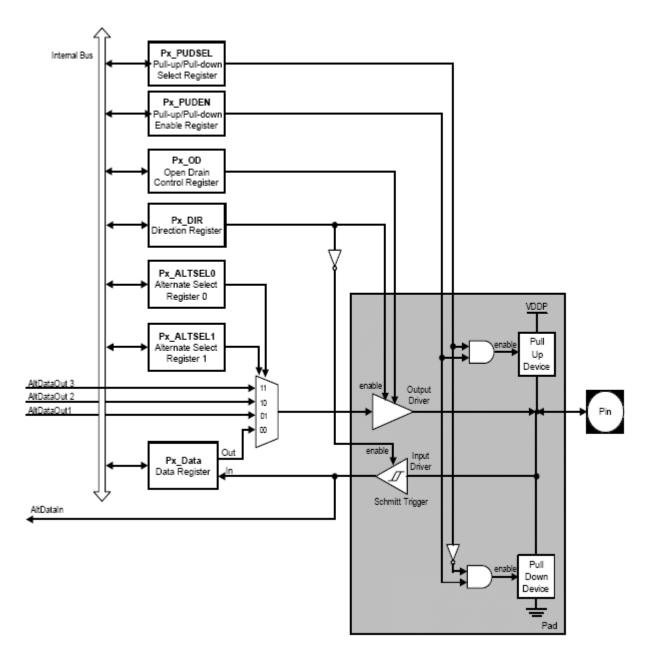








Additional information: Parallel Ports – General Structure (Source: User's Manual):





Ports: click "Configure Port 3"

DAVE	
File View Options Add-Ins Windows ? ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ●	
DAVE XC878CLM(Release v2.1)	×
XRAM RAM Flash Boot ROM 3k Rvtn 256 Rvtn 64k Rvtn 8k Rvtn	
Ports Functions Parameters Notes	1
	Confirme Dart 1
Configure Port 0	Configure Port 1
Configure Port 3	Configure Port 4
Configure Port 5	
XC878CLM (new project)	<i>I</i> .



Port 3: Port Function: tick ✓ Use P3.0 as GPIO - Port Direction: click ⊙ Out
Port 3: Port Function: tick ✓ Use P3.1 as GPIO - Port Direction: click ⊙ Out
Port 3: Port Function: tick ✓ Use P3.2 as GPIO - Port Direction: click ⊙ Out
Port 3: Port Function: tick ✓ Use P3.3 as GPIO - Port Direction: click ⊙ Out
Port 3: Port Function: tick ✓ Use P3.4 as GPIO - Port Direction: click ⊙ Out
Port 3: Port Function: tick ✓ Use P3.5 as GPIO - Port Direction: click ⊙ Out
Port 3: Port Function: tick ✓ Use P3.6 as GPIO - Port Direction: click ⊙ Out
Port 3: Port Function: tick ✓ Use P3.7 as GPIO - Port Direction: click ⊙ Out

😨 DAvE				
File <u>View</u> Options Add- <u>I</u> ns <u>W</u> indo	ows <u>?</u>			
] ❹☜ ㆍ ☞ 묘 彡 ᢓ				
骨 DAvE XC878CLM (Rele	ease v2.1)	×		
XRAM RAM 3k Rvtn 256 Rvtn	Flash Boot ROM	144		
🛱 GPIO				×
	-1			
Ports Functions Parameters Notes	5			
Configure Port 3	3			×
Port 3 Pull Device Parameter	s Notes			
	-11			
Port Function:	Port Direction:	Push Pull / Open Drain:	Output Value:	Drive Strength:
Use P3.0 as GPIO	🗢 In 🖸 Out	🗖 Open drain	🗖 High	🗷 Strong
Use P3.1 as GPIO	🗢 In 🖸 Out	🗖 Open drain	🗖 High	🗷 Strong
Use P3.2 as GPIO	🔿 In 🖸 Out	🗖 Open drain	🗖 High	🗷 Strong
Use P3.3 as GPIO	🔿 In 🖸 Out	🗖 Open drain	🗖 High	🗷 Strong
Use P3.4 as GPIO	🗢 In 🖸 Out	🗖 Open drain	🗖 High	🗷 Strong
Use P3.5 as GPIO	🗢 In 🖸 Out	🗖 Open drain	🗖 High	🗷 Strong
Use P3.6 as GPIO	🗢 In 🖸 Out	🗖 Open drain	🗖 High	🗷 Strong
Use P3.7 as GPIO	🔿 In 🖸 Out	🗖 Open drain	🗖 High	🗷 Strong
XC878CLM (new project)				



Pull Device: (do nothing)

DAVE	_ 🗆 X
File View Options Add-Ins Windows ? ● ● ● ● ★ 10 □ ■ ?	
😭 DAvE XC878CLM (Release v2.1)	
XRAM RAM Flash Boot ROM 3k Rvtn 256 Rvtn 64k Rvtn 8k Rvtn	
📄 🙀 GPIO	X
Ports Functions Parameters Notes	
Configure Port 3	×
Port 3 Pull Device Parameters Notes	
P3.0 pull device Tristate	
P3.1 pull device Tristate	
P3.2 pull device Tristate	
P3.3 pull device Tristate	
P3.4 pull device Tristate	
P3.5 pull device Tristate	
P3.6 pull device Tristate P3.7 pull device Tristate	
P3.7 pull device Tristate	
XC878CLM (new project)	



Parameters: (do nothing)

DAVE	_ 🗆 X
File View Options Add-Ins Windows ? Image:	
DAVE XC878CLM (Release v2.1)	
XRAM RAM Flash Boot ROM 3k Rute 256 Rute 64k Rute Bk Rute	
GPIO	×
Ports Functions Parameters Notes	
Configure Port 3	×
Port 3 Pull Device Parameters Notes	
Parameters	
P3_0 P3_0	
P3_1 P3_1 P3_2 P3_2	
P3_3 P3_3	
P3_4 P3_4	
P3_5 P3_5 P3_6 P3_6	
P3_7 P3_7	
XC878CLM (new project)	1.

Notes: If you wish, you can insert your comments here. Exit this dialog now by clicking the close button.



Functions: Initialization Functions: tick ✓ IO_vInit Functions: Function Library: tick ✓ IO_ubReadPin Functions: Function Library: tick ✓ IO_vSetPin Functions: Function Library: tick ✓ IO_vResetPin Functions: Function Library: tick ✓ IO_ubReadPort Functions: Function Library: tick ✓ IO_vWritePort Functions: Function Library: tick ✓ IO_vTogglePin

DAVE		_ 🗆 X
File View Options Add-Ins Windows ?		
骨 DAvE XC878CLM (Release v2	2.1)	
XRAM RAM Flash 3k Rvtn 256 Rvtn 64k Rvtn	Boot ROM Rk Rufe	
GPIO		×
Ports Functions Parameters Notes		
□ Initialization Function □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □		
Function Library IO_ubReadPin IO_ubReadPin		
IO_ubReauPin IO_ubReauPin IO_ubReauPin IO_ubReauPin IO_vSetPin		
IO_vResetPin IO_vResetPin		
IO_ubReadPort IO_ubReadPort		
IO_vWritePort IO_vWritePort □ IO_vSetInput IO_vSetInput		
□ IO_vSetInput IO_vSetInput □ IO_vSetOutput IO_vSetOutput		
IO_vTogglePin IO_vTogglePin		
XC878CLM (new project)		1



Parameters: (do nothing)

OAVE	_ 🗆 X
File View Options Add-Ins Windows ?	
🙀 DAvE XC878CLM (Release v2.1)	
XRAM RAM Flash Boot ROM 3k Rvta 256 Rvta 64k Rvta 8k Rvta	
🚰 🚰 GPIO	×
Ports Functions Parameters Notes	
Header File	
File name IO.H	
XC878CLM (new project)	1.

Notes: If you wish, you can insert your comments here. Exit this dialog now by clicking the close button.





Note:

Before we save the DAvE Project we are going to create a suitable directory structure with Windows File Explorer (see next page!).



Create a suitable directory structure for DAvE-Bench (Eclipse IDE, SDCC compiler):



Start Windows File Explorer

Create directory/folder C:\XC8xx

Create directory/folder C:\XC8xx\XC878

C:\XC8xx			
File Edit View Favorites Tools Help			
⇔Back ▼ → ▼ 🖻 @Search 📴 Folders 🧭 🕾 № ∞ 💷 ▼			
Address C: \XC8xx			▼ 🖉 Go
Folders	×	Name 🔺	Size Type
	^	. [□] XC878	File Folder
	-		
1 object(s) selected		Ļ	My Computer



Save the project:

File Save

Save project: Save in select C:\XC8xx\XC878 File name: insert XC878

DAVE	×
File <u>V</u> iew <u>O</u> ptions Add-Ins <u>W</u> indows ?	
P DAvE XC878CLM (Release v2.1)	
XRAM 3R Byte Program and Data Memory Bus CPU	
Save Project As	
Save in: 🛱 XC878	
Codic MDU UNART T2 T2 T2 My Documents My Computer My Network Pla	
File name: XC878 Save	
Save as type: DAvE project file (*.dav) Cancel	
3878CLM (new project)	1.

Save



Generate Code:

File	or	click
Generate Code		*



DAvE will show you all the files he has generated (File Viewer opens automatically).



🔂 DA	vE		
	ew Options Add-Ins	<u>W</u> indows <u>?</u>	
		iles in 'C:\XC8XX\XC878'	
	DAvE's Project	Documentation	
	Project:	XC878.dav	
	Controller:	XC878CM-16FF SDCC	
	Compiler: Memory Model:	SMALL	
Cordic	Date:	09.02.2010 17:01:18	
UART1	Please read this de the red-colored hir	ocument carefully and note hts.	
	maybe you have fo	the generated files list orgotten to select the on of the related module.	
	Generated Files:		
		MAIN.H MAIN.C STARTUPXC878.S IO.H	
		IO.C Generated files	
		UART.C T01.H	
		T01.C XC878.ASM	
	Project Setting	<u>8</u>	-
XC878CLM	1 C:\XC8xx{	XC878\XC878.dav	

File - Exit

Save changes?



Application Note



4.) Using DAvE Bench:



Download and install DAvE Bench (<u>http://www.infineon.com/DAvE-Bench</u>):

Double-click

Insta	llAware Wizard 🗙
	The InstallAware Wizard is recomposing the data that will install this application. Please wait.
	Cancel



👪 Infineon DAvE-Bench-100 - InstallAware Wizard			
	Infineon	Welcome	
DAve Bench	i.	Welcome to the InstallAware Wizard for Infineon DAvE-Bench-100 Setup. This wizard will install release 01.00.0000 on your computer.	
it's Free, it's Easy, it's Pov Your first program for XC runs in less than 15 min	0080	You may navigate through the pages in this wizard by clicking the Back and Next buttons below. Click Cancel at anytime to exit the	
	ompiler ebugger Loader U-SPY		
		© Cancel Next ☑	



Infineon DAvE-Bench-011 - InstallAware Wizard			
Cinfineon	License Text		
DAvE Bench	Please carefully read the license agreement below. You must accept the license agreement to continue with setup.		
for XC800 it's Free, it's Easy, it's Serious Your first program for XC800 runs in less than 15 minutes.	IMPORTANT NOTICE AND TERMS OF USE Please read the following important notice as well as the following terms and conditions carefully. The installation of this software requires that you click the acceptance button below. By clicking the acceptance button "I accept" you agree to have read		
Compiler	the important notice set forth below and to be bound by the following terms of use. If you do not agree to the terms and conditions below, click the button "I do not accept" and the installation procedure will not be started. If you change your mind later, stop using the Software and delete all copies of the Software in your possession or control. Any copies of the Software that you have already distributed, where permitted, and do not destroy will continue to be governed by these Terms of Use. Your prior use will also continue to be governed by these Terms of Use.		
Loader U-SPY	☐ I have read, understand, and <u>a</u> ccept the license agreement displayed above.		
	Cancel		

Tick \square I have read, understand...





d Infineon DAvE-Bench-	011 - InstallAware Wizard
Infineon	User Info
DAvE Bench for XC800 it's Free, it's Easy, it's Serious Your first program for XC800 runs in less than 15 minutes.	Please personalize your copy of Infineon DAvE-Bench-011 below. All fields must be entered to proceed. Image: Name: Wilhelm Brezovits Company: Infineon Technologies Austria AG
Compiler Debugger Loader U-SPY	© Cancel Next ☑

Insert Name: Your name Insert Company: Your company







Select a suitable directory and





👪 Infineon DAvE-Bench-100 - InstallAware Wizard			
Infineon	Program Shortcuts		
DAve Bench for X0800 it's Free, it's Easy, it's Powerful Your first program for X0800 runs in less than 15 minutes.	Please specify the Program Group for the a created on your client machine. Infineon DAvE-Bench-100 Create icons for: All Users Current User Only	pplication sho	rtcuts to be
	© Cancel	⊠ <u>B</u> ack	Next 🛛





Înfineon	Final Confirmation	
DAvE Bench	You are now ready to install Infineon DAvE-Bench-011. Please click Next to install or Back to change your settings Selected features for installing:	
t's Free, it's Easy, it's Serious		
Your first program for XC800 runs in less than 15 minutes.	Server: DAS 2.9.2 or later, already installed. Features of DAvE-Bench for XC800: - ECLIPSE based IDE - SDCC compiler for XC800 - Debugger for XC800	
Compiler Debugger Loader U-SPY	- FLOAD (Flash load utility for XC800) -U-SPY (UART terminal)	_
11111-53	© Cancel	Next ≥

Click

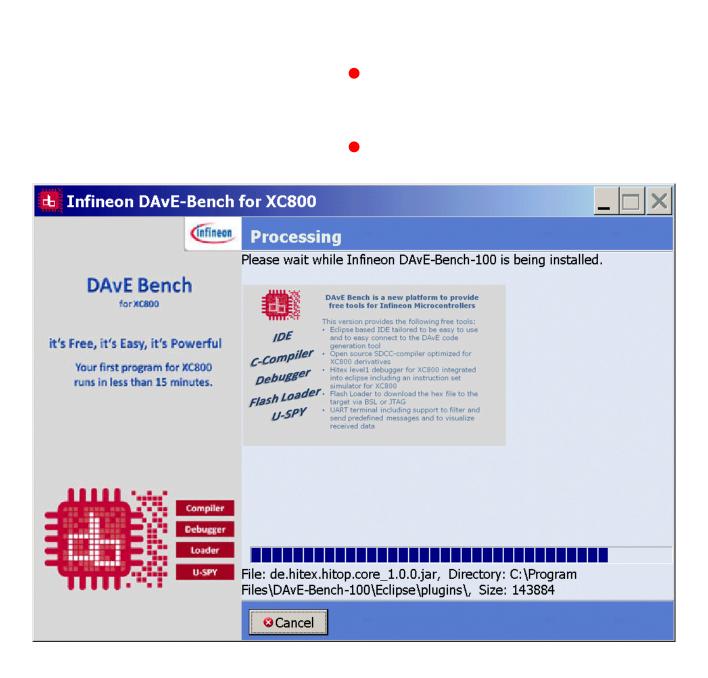
Next 🛯



🔒 Infineon DAvE-Bench-100 - InstallAware Wizard		
Infineon	Processing	
DAve Bench for XC800 it's Free, it's Easy, it's Powerful Your first program for XC800	Please wait while Infineon DAvE-Bench-100 is being installed.	
runs in less than 15 minutes.	Updating component registration	









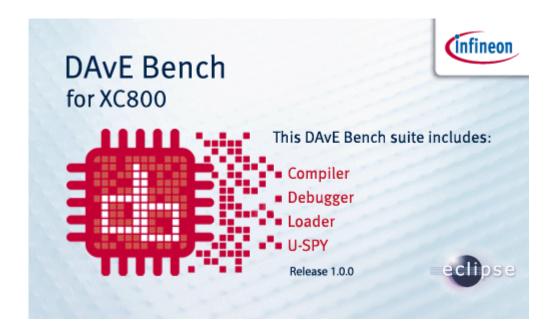
🔒 Infineon DAvE-Bench-100 - InstallAware Wizard		
Infineon	Done	
DAvE Bench	Infineon DAvE-Bench-100 has been successfully installed.	
it's Free, it's Easy, it's Powerful	Infineon DAvE-Bench-100 requires at least Java Runtime Environment 6 (JRE 1.6). Please select one of the install options below:	
Your first program for XC800 runs in less than 15 minutes.	^C Offline - internet connection is not required	
	J2SE Runtime Environment(JRE) 6, Update17, provided together with Infineon DAvE-Bench-100.	
	Online - internet connection required	
	Java home page http://www.java.com is opened.The connected host may be checked for current installed JRE and updated to the latest one.	
Compiler	◦ Install Java Runtime Environment later.	
Loader U-SPY		
	Einish 🛛	







Start/Launch DAvE Bench and open/add the DAvE Project:

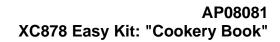




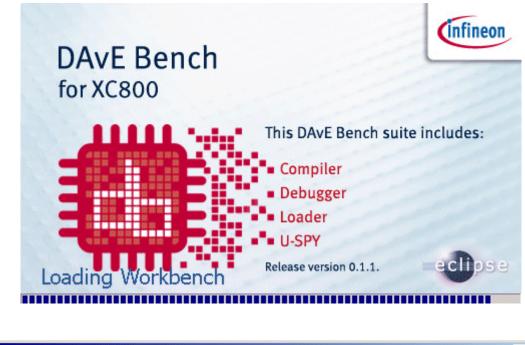
👫 Workspace Launcher 🗙 🗙
Select a workspace
DAvE-Bench for XC800 stores your projects in a folder called a workspace. Choose a workspace folder to use for this session.
Workspace: cuments and Settings\brezovit\workspace Srowse
□ Use this as the default and do not ask again OK Cancel
Click Browse and select C:\XC8xx:

👫 Wyrkspace Launcher	×
Select a workspace	
DAvE-Bench for XC800 stores your projects in a folder called a workspace. Choose a workspace folder to use for this session.	
Workspace: C:\XC8xx	
Use this as the default and do not ask again	
OK Cancel	

OK - OK



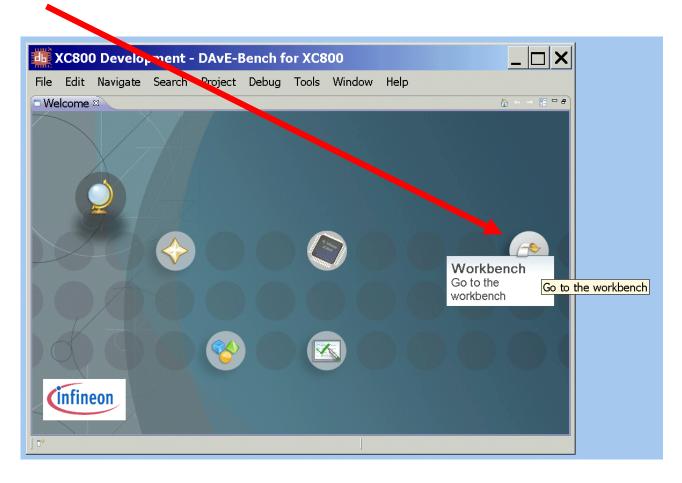




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Click "Go to the workbench":





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□ C/C++	Projects 🛛					- 8
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File – New – Existing DAvE Project

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	Add Existing DAvE Pr	-		
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	DAvE project file			Browse
	🗵 Use DAvE start up fi			
	Exclude asm files fro	m build		
	Silicon bugs list			
	0	Γ	Finish	
	🗈 Problems 🛛 📮 Console 🗖	Properties		▽
	0 items			
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Add DAvE Project: Add Existing DAvE Project: DAvE project file: click Browse...



Open: Look in: select C:\XC8xx\XC878 Open: File name: select XC878.dpt

XC800 Developme	ent - DAvE-Bench for XC800)		
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← → ⊚ ⊟ ∻ ▼	👪 Add DAvE Project			
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KC800 Development - DAvE-Bench for XC800	
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C/C++ Projects 3 CS78 [Active - Debug] Solutions Includes Includes Includes MAIN.C MAIN.C MemInitxc878_16FF.s Bastartupxc878.s Incl.C WART.C WART.C WART.H SC678.asm XC878.rtf Includes Incl	on Type
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Note:

Check that the active project is
 XC888 [Active - Debug] and NOT XC888 [Active - Release].



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Note:

The DAvE created files can be directly accessed in the IDE (DAvE Bench) or in DAvE.

The user has to make sure that no conflicts or data losses happen.

This can be avoided by saving the files before switching from the IDE to DAvE or vice versa.



Note:

The following pages/screenshots exist for documentation purposes only.

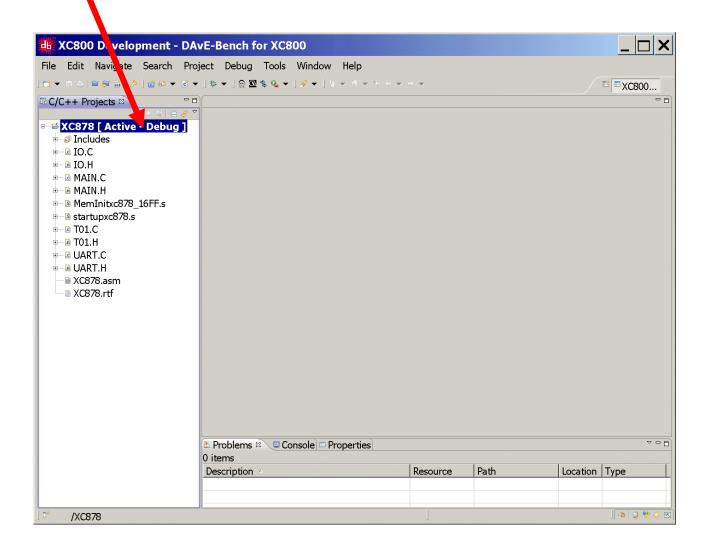
There is nothing to do!

If you are in a hurry, we suggest you jump to <u>page 138</u> (Insert your application specific program) and continue working there.



Configure Compiler, Assembler, Linker, Locater, Hex-Converter, Build – Control, Debugger and Utilities:

Click/Mark (left mouse click on) XC888 [Active - Debug]





Project - Properties

KC800 Development	DAvE-Bench for XC800				_ 🗆 X
File Edit Navigate Search File Edit Navigate Search C/C++ Projects C/C++ Projects C/C	Project Debug Tools Window Hel Image: Build Active Project Image: Build Active Project Image: Build All Ctrl+B Build All Ctrl+B Build Project Image: Build Working Set Image: Build Automatically Image: Build Automatically Image: Active Project Properties Image: Build Automatically Image: Build Automatically Image: Properties Image: Build Automatically Image: Build Automatically Image: Build Automatically Image: Properties Image: Build Automatically Image: Build Automatically Image: Build Automatically Image: Properties Image: Build Automatically Image: Build Automatically Image: Build Automatically Image: Properties Image: Build Automatically Image: Build Automatically Image: Build Automatically Image: Properties Image: Build Automatically Image: Build Automatically Image: Build Automatically Image: Build Automatically Image: Build Automatically Image: Build Automatically Image: Build Automatically Image: Build Automatically Image: Build Automatically Image: Build Automatically Image: Build Automatically Image: Build Automatically Image: Build Automatically Image: Build	ties			×C800
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/XC878					 [< <u>a</u>] < <u>o</u> < <u>o</u> < <u>a</u>]



Project – Properties: Resource:

Properties for XC878	B	
type filter text	Resource	> ▼ ⇒ ▼ ▼
Resource -Builders C/C++ Build -Build Variables Discovery Options -Environment -MCU Selection Page -Memory Settings Page -Segment Location Page -Settings -Tool Chain Editor C/C++ General -Project References -Refactoring History -Run/Debug Settings	Path: /XC378 Type: Project Location: C:\XCSxX\XC378 Last modified: 10. Februar 2010 14:49:24 Text file encoding ° Inherited from container (Cp1252) ° Other: Cp1252 New text file line delimiter ° Inherited from container ° Other: Restore Defaults	Apply
Ø	ОК	Cancel



Project – Properties: Builders:

Properties for XC878		
type filter text	Builders	$\Leftrightarrow \bullet \bullet \bullet \bullet \bullet$
Resource Builders C/C++ Build Build Variables Discovery Options Environment MCU Selection Page Segment Location Page Segment Location Page Settings Tool Chain Editor C/C++ General Project References Refactoring History Run/Debug Settings	Configure the builders for the project: □ □ CDT Builder □ □ Scanner Configuration Builder	New Import Edit Remove Up Down
Ø	ОК	Cancel



Project – Properties: C/C++ Build: Builder Settings:

Properties for XC878	s - La constante de la constant	X
type filter text	C/C++ Build 🗘 🗸 🗠	• •
Resource Builders C/C++ Build Build Variables Discovery Options Environment	Configuration: Debug Manage Configuration	<u>ıs</u>
 MCU Selection Page Memory Settings Page Segment Location Page Settings 	Builder Builder type: External builder IF Use default build command Build command: \${SDCC_UTILS}\make	•
Tool Chain Editor C/C++ General Project References Refactoring History Run/Debug Settings	Makefile generation Image: Control of the second	
	Build directory: \${workspace_loc:/XC878/Debug} Workspace File system Variables	
	Restore Defaults Apply	
Ō	OK Cancel	



Project – Properties: C/C++ Build: Behaviour:

Properties for XC878			
type filter text	C/C++ Build		$\Leftrightarrow \bullet \bullet \bullet \bullet$
Resource Builders C/C++ Build Build Variables Discovery Options Environment MCU Selection Page Memory Settings Page Segment Location Page Settings	Configuration: Debug	▼ Manage C	Configurations
	 ■ Builder Settings ● Behaviour Build settings ✓ Stop on first build error 	□ Use parallel build □ Use optimal jobs number □ Use parallel jobs: 1	
Tool Chain Editor	Workbench Build Behavior Workbench build type: □ Build on resource save (Auto build) Note: See Workbench automatic build IP Build (Incremental build) IP Clean	,	Variables Variables Variables
		Restore Default	s Apply
0		ОК	Cancel



Project – Properties: C/C++ Build: Build Variables:

Properties for XC878	;					
type filter text	Build Variables					
 Resource Builders C/C++ Build Build Variables Discovery Options Environment MCU Selection Page Segment Location Page Settings Tool Chain Editor C/C++ General Project References Refactoring History Run/Debug Settings 	Configurat	ion: Debu	Jg		▼ Manage Confi	gurations
	Name	Туре	Value Value			Add Edit Delete
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Project – Properties: C/C++ Build: Discovery Options:

Properties for XC878		
type filter text	Discovery Options	$\Leftrightarrow \checkmark \rightarrow \checkmark \checkmark$
- Resource - Builders ⊖ C/C++ Build - Build Variables	Configuration: Debug	▼ Manage Configurations
Discovery Options Environment	Discovery profiles scope	
MCU Selection Page	Per Language	
 Memory Settings Page Segment Location Page Settings Tool Chain Editor C/C++ General Project References Refactoring History Run/Debug Settings 	Tools: No profiles found	
		Restore Defaults Apply
0		OK Cancel



Project – Properties: C/C++ Build: Environment:

ype filter text	Environment			$\Leftrightarrow \bullet \bullet$
Resource				
−Builders +C/C++ Build – Build Variables	Configuration:	Debug	▼ Manage	e Configurations.
Discovery Options	Environment va	ariables to set		Add
 Environment MCU Selection Page 	Variable	Value	Origin	Select
	CWD	C:\XC8xx\XC878\Debug	BUILD SYSTEM	
Memory Settings Page	PWD	C:\XC8xx\XC878\Debug	BUILD SYSTEM	Edit
-Segment Location Page	SDCC_HOME	C:/Program Files/DAvE-Bench-011\SDCC_XC800	USER: PREFS	Delete
Settings Tool Chain Editor	SDCC_UTILS	C:/Program Files/DAvE-Bench-011\SDCC_UTILS	USER: PREFS	
C/C++ General				Undefin
		bles to native environment re environment with specified one	Restore Defa	ults Apply



Project – Properties: C/C++ Build: MCU Selection Page (part 1 of 2):

Properties for XC878		
type filter text	MCU Selection Page	\$ ▼ → ▼ ▼
Resource Builders C/C++ Build Build Variables Discovery Options Environment MCU Selection Page Segment Location Page Settings Tool Chain Editor C/C++ General Project References Refactoring History Run/Debug Settings	ProcessorsInfo XC820 XC822-1F XC822M-1F XC866-1FR XC866-1FR XC866-2FR XC866-4FR XC866-4FR XC866 \ XC888	Restore Defaults Apply
0		OK Cancel



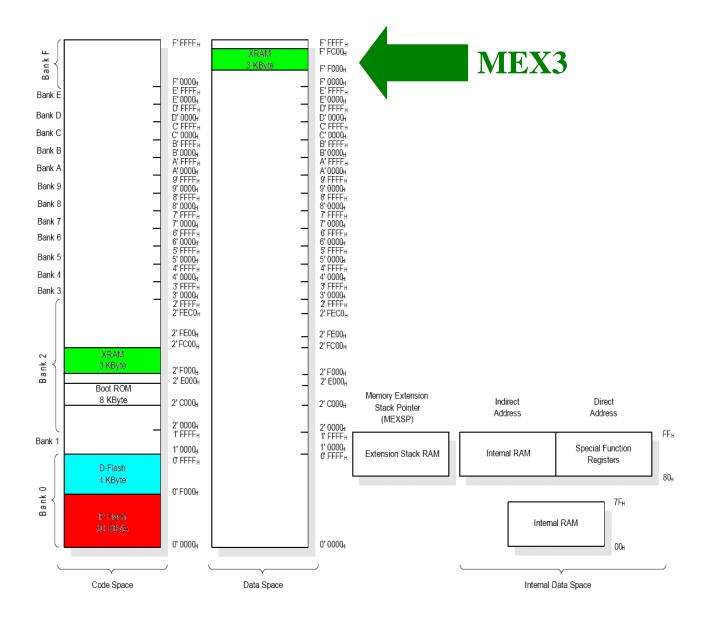
Project – Properties: C/C++ Build: MCU Selection Page (part 2 of 2):

Properties for XC878			$-\Box \mathbf{X}$
type filter text	MCU Selection Page		$\Leftrightarrow \bullet \bullet \bullet \bullet \bullet$
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0		ОК	Cancel





Note: On-chip Memories, Additional information: Memory Map (Source: User's Manual):







Additional information: Memory Map (Source: User's Manual):

Note (Source: User's Manual):

The standard amount of addressable program or external data memory (or a Bank) in an 8051 system is 64 Kbytes. The XC800 core supports memory expansion of up to 1 Mbyte and this is enabled by the availability of a Memory Management Unit (MMU) and a Memory Extension Stack. The MMU adds a set of Memory Extension registers (MEX1, MEX2, and MEX3) to control access to the extended memory space by different addressing modes.

External Data Memory:

The 3-Kbyte XRAM is mapped to both the external data memory area and the program memory area. It can be accessed using both 'MOVX' and 'MOVC' instructions.

The bank where the memories resides must also be selected with the 4-bit XRAM Bank pointer in MEX3.MX (XRAM bank) or the 4-bit Current Bank pointer in MEX1.CB (current bank), depending on bit MXM.

MEX3 Memory E	xtension R	Register 3	3			Reset	Value: 00 _H
7	6	5	4	3	2	1	0
MCB19	C)	MXB19	МХМ		MXB[18:16]	
rw	'n	N	rw	rw	1	rw	

Field	Bits	Туре	Description
MXB[19:16]	4, [2:0]	rw	XRAM Bank Number
МХМ	3	rw	 XRAM Bank Selector MOVX access data in the current bank MOVX access data in the Memory XRAM bank
MCB19	7	rw	Memory Constant Bank Number MSB
0	[6:5]	rw	Reserved Returns 0 if read; should be written with 0.



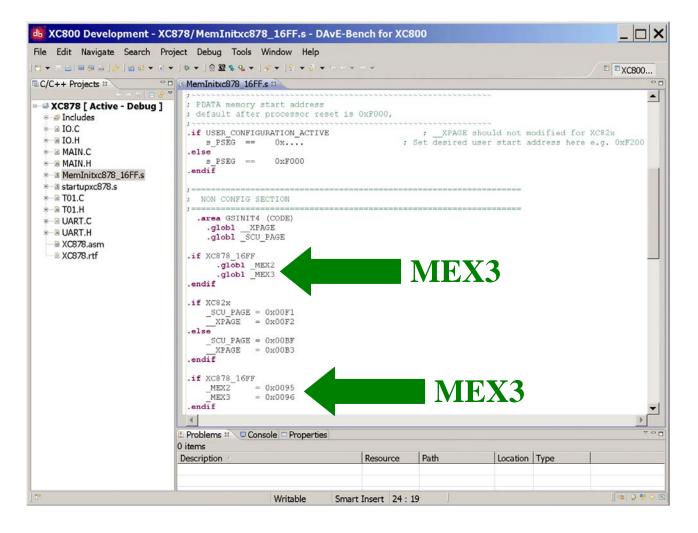


Additional information: Memory Map (Source: MemInitxc878_16FF.s):

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XC878 [Active - Debug] Includes Includes Includes Includes Includes Includes MAIN.C MAIN.C MAIN.H MemInitxc878_16FF.s Startupxc878.s To1.C IO1.H UART.C UART.C UART.H XC878.asm XC878.rtf	<pre>> MemInitxc8xx.s > User defined Power-On Initializat > CONFIG SECTION > Device configuration - for experi > XC82x> XC822, XC8 > XC86x> XC964, XC86 > XC878_13FF > XC878_13FF > XC878_16FF > only one can be active (= 1) USER_CONFIGURATION_ACTIVE = 0 XC82x = 0 XC82x = 0 XC878_13FF = 0 XC878_13FF = 0 XC878_13FF = 1</pre>	.enced users 24, XC825, X 36 5, XC888)11 ; ;	, IDE uses d C826	efault value: default, 1 - s selected s not selecte	= user conf	igures
	<pre>; .if USER_CONFIGURATION_ACTIVE s_PSEG == 0xelse s_PSEG == 0xF000 .endif Problems Console Properties 0 items Description · </pre>	, Resource	;XPAGE Set desired	should not mu user start ad		XC82x e.g. 0xF200

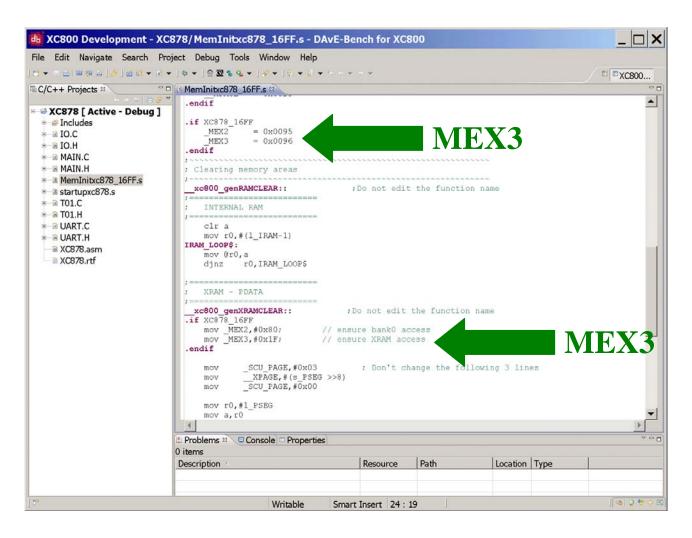








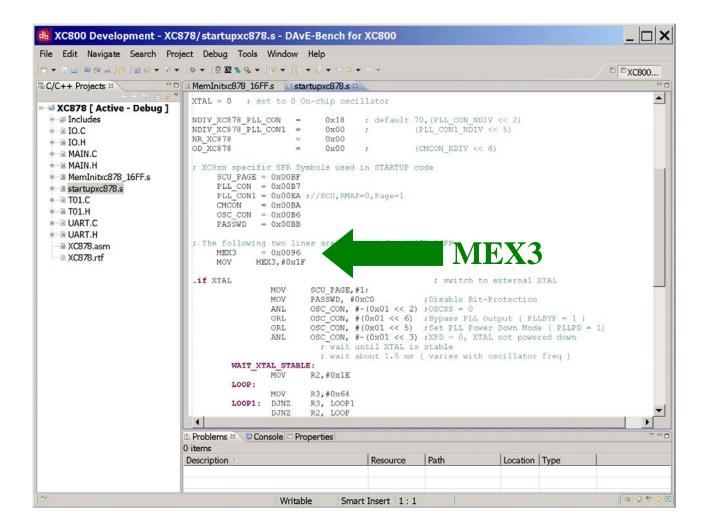








Additional information: Memory Map (Source: startupxc878.s):





Project – Properties: C/C++ Build: Memory Setting Page:

Properties for XC878		
type filter text	Memory Settings Page	$\Leftrightarrow \checkmark \Rightarrow \checkmark \checkmark$
type filter text Resource Builders C/C++ Build Build Variables Discovery Options Environment MCU Selection Page Segment Location Page Settings Tool Chain Editor C/C++ General Project References Refactoring History Run/Debug Settings	Memory Settings Page Memory Settings Internal RAM start address Internal RAM end address Bit segment start address Bit segment end address XRAM start address in hex (0xNNNN) XRAM end address in hex (0xNNNN) Flash/ROM1 start address in hex (0xNNNN) Flash/ROM2 start address in hex (0xNNNN) Flash/ROM2 end address in hex (0xNNNN) Flash/ROM3 start address in hex (0xNNNN) Flash/ROM3 end address in	0x00 0xFF 0x20 0x2F 0xF000 0xFBFF 0x0000 0xFFFF
		Restore Defaults Apply
0		OK Cancel



Project – Properties: C/C++ Build: Segment Location Page:

Properties for XC878	;					
type filter text	Segment L	ocation Page				↓ → ▼ ▼
Resource Builders C/C++ Build	Note: This Code Seg	function may not wo	ork correctly in all	scenarios		
Build Variables	File	Segment Name	Segment Locati	on		
Discovery Options						Add
-MCU Selection Page						Remove
Memory Settings Page						
Segment Location Page		Segments				
Tool Chain Editor	File	Segment Name	Segment Locati	on		
						Remo
- Refactoring History						<u>_Kento</u>
Run/Debug Settings	-Memory ·	segment location				
		AM) start location in	hex (0xNN):	0x00		
	ISEG (IR/	AM) start location in l	hex (0xNN):	0x80		
	SSEG stat	ck pointer start locati	on in hex (0xNN):	0x80		
	PSEG (XR	AM) start location in	hex (0xNNNN):	0xF000		
					Restore Defaults	Apply
Ø					ОК	Cancel



Project – Properties: C/C++ Build: Settings:

Properties for XC878		×
type filter text	Settings $\diamond \star \to \star$	•
Resource Builders C/C++ Build Build Variables	Configuration: Debug	
 Build Variables Discovery Options Environment MCU Selection Page Memory Settings Page Segment Location Page Settings Tool Chain Editor C/C++ General Project References Refactoring History Run/Debug Settings 	 Tool Settings Build Steps Build Artifact Binary Parsers Cror Parsers Global Options SDCC Compiler Preprocessor Optimization Warnings Miscellaneous SDCC Linker Library Miscellaneous 	
Ð	OK Cancel	



Project – Properties: C/C++ Build: Settings: Tool Settings: Global Options:

Properties for XC878			$-\Box \mathbf{X}$
type filter text	Settings		↓ → ▼ ▼
type filter text Resource Builders Build Variables Discovery Options Environment MCU Selection Page Segment Location Page Settings Tool Chain Editor BC/C++ General Project References Refactoring History Run/Debug Settings	Settings Configuration: Debug Tool Settings Build Steps Build Artifact Binary Parsers Fror Parsers SDCC Compiler SDCC Compiler SDCC Compiler SDCC Compiler SDCC Compiler SDCC Compiler Memory Model Small Small	Manage Cont	¢ • • • • •
		Restore Defaults	Apply
0	_	ОК	Cancel



Project – Properties: C/C++ Build: Settings: Tool Settings: SDCC Compiler (1/2):

Properties for XC878	3	
type filter text	Settings	Ø.▼
 Resource Builders C/C++ Build Build Variables Discovery Options Environment MCU Selection Page Memory Settings Page Segment Location Page Settings Tool Chain Editor C/C++ General Project References Refactoring History Run/Debug Settings 		Manage Configurations
	SDCC Compiler All opti Preprocessor Directories Optimization Warnings Expert	Command: "\${SDCC_HOME}\bin\sdcc" All options: -mXC800 -pXC878_16FFmodel-small -I"C:/Program Files/DAvE-Bench-011\SDCC_XC800\include" -I"C:/Program Files/DAvE-Bench-011\SDCC_XC800\include\xc800" -I"C:/Program Expert settings:
	Miscellaneous General	Command line pattern: \${COMMAND} \${FLAGS} -S \${OUTPUT_FLAG} \${OUTPUT} \${INPUTS}
		Restore Defaults Apply
æ		OK Cancel



Project – Properties: C/C++ Build: Settings: Tool Settings: SDCC Compiler (2/2):

Properties for XC878	3		
type filter text	Settings		\$ • •
type filter text Resource Builders C/C++ Build Discovery Options Environment MCU Selection Page Memory Settings Page Segment Location Page Tool Chain Editor C/C++ General Project References Refactoring History Run/Debug Settings	Configuration: Debug	eps Build Ar Command: All options: Expert settin Command line pattern:	
			Restore Defaults Apply
2			OK Cancel



Project – Properties: C/C++ Build: Settings: Tool Settings: SDCC Compiler: Preprocessor:

Properties for XC878		
type filter text Resource	Settings	
Resource Builders C/C++ Build Build Variables Discovery Options Environment MCU Selection Page Memory Settings Page Segment Location Page Settings Tool Chain Editor C/C++ General Project References Refactoring History Run/Debug Settings	Configuration: Debug Tool Settings Build Steps Build Artifact Binary Parsers Error Parsers Global Options Do not include the standard include directory in the sea SDCC Compiler Define macro Preprocessor SDCC Optimization Warnings Miscellaneous Undefine macro SDCC Linker Library Miscellaneous Additional options	Manage Configurations arch path হ এ ও যা প্রা হা প্রা
0	Rest	ore Defaults Apply
U		



Project – Properties: C/C++ Build: Settings: Tool Settings: SDCC Compiler: Directories

Properties for XC878	3	
type filter text	Settings	$\Leftrightarrow \bullet \bullet \bullet \bullet$
type filter text Resource Builders C/C++ Build Build Variables Discovery Options Environment MCU Selection Page Segment Location Page Settings Tool Chain Editor C/C++ General Project References Refactoring History Run/Debug Settings		A A A A A A A A A A A A A A A A A A A
		Defaults Apply
0	0	Cancel



Project – Properties: C/C++ Build: Settings: Tool Settings: SDCC Compiler: Optimization:

Properties for XC878	
type filter text	Settings 🗢 👻 + 🗸 👻
 Resource Builders C/C++ Build Build Variables Discovery Options Environment MCU Selection Page Memory Settings Page Segment Location Page Settings Tool Chain Editor C/C++ General Project References Refactoring History Run/Debug Settings 	Configuration: Debug Manage Configurations Tool Settings Build Steps Build Artifact Binary Parsers Error Parsers Global Options Optimize for Code size Preprocessor Enable overlaying leaf function auto variables Preprocessor Enable label optimization Enable label optimization Enable label optimization Enable label optimization Enable loop variable induction Enable loop reverse optimization SDCC Linker Enable peephole optimization SDCC Linker Enable peephole optimization Browse for extra peephole file Browse
	Restore Defaults Apply
0	OK Cancel



Project – Properties: C/C++ Build: Settings: Tool Settings: SDCC Compiler: Warnings:

Properties for XC878			
type filter text	Settings	-	
Resource Builders C/C++ Build Build Variables Discovery Options Environment MCU Selection Page Segment Location Page Settings Tool Chain Editor C/C++ General Project References Refactoring History Run/Debug Settings	Configuration: Debug Tool Settings Build Steps Build Artifact Binary Parsers Error Parsers Global Options SDCC Compiler Preprocessor Optimization Warnings Miscellaneous SDCC Linker Miscellaneous Miscellaneous	▼ <u>Manage Config</u>	jurations
		Restore Defaults	Apply
Ø	-		Cancel



Project – Properties: C/C++ Build: Settings: Tool Settings: SDCC Compiler: Miscellaneous:

Properties for XC878	3	
Image: Properties for XC878 type filter text Resource Builders C/C++ Build Build Variables Discovery Options Environment MCU Selection Page Segment Location Page Settings Tool Chain Editor C/C++ General Project References Refactoring History Run/Debug Settings	Settings Configuration: Debug Tool Settings Build Steps Global Options Allocate parameters and local variables on the stack SDCC Compiler Do not include c-code as comments in the asm file Directories Do not include peephole optimizer comments in the asm file Optimization Enable debugging symbol output Warnings Miscellaneous SDCC Linker Directorias Directorias Display complexity of compiled functions SDCC Assembler Additional options	Configurations
	Restore Defaul	ts Apply
0	ОК	Cancel



Project – Properties: C/C++ Build: Settings: Tool Settings: SDCC Assembler:

Properties for XC878			
type filter text Resource Builders C/C++ Build Build Variables Discovery Options Environment MCU Selection Page Segment Location Page Segment Location Page Settings Tool Chain Editor C/C++ General Project References Refactoring History Run/Debug Settings	Command: Co	tifact Binary Parsers Parsers "\${SDCC_HOME}\bin\as-xc800" X	Manage Configurations
0		Resto	OK Cancel



Project – Properties: C/C++ Build: Settings: Tool Settings: SDCC Assembler: General:

Properties for XC878			
type filter text	Settings		$\Leftrightarrow \bullet \bullet \bullet \bullet \bullet$
Resource Builders C/C++ Build Discovery Options Environment MCU Selection Page Segment Location Page Segment Location Page Settings Tool Chain Editor C/C++ General Project References Refactoring History Run/Debug Settings		▼ Manage Con	figurations
		estore Defaults	Apply
0		OK	Cancel



	Manage Configurations		-loc 0xF000xram-size 0xc00	Restore Defaults Apply	OK Cancel
		🕸 Tool Settings 🎤 Build Steps 🔮 Build Artifact 🗟 Binary Parsers 🛛 e Error Parsers	Command: "\${SDCC_HOME}\bin\edac" All options:		
Cattinue	Configuration: [Debug	🛞 Tool Settings 🎤 Build Steps 🕆 🧐 Buil	 Global Options SDCC Compiler SDCC Compiler All options: Preprocessor Directories Optimization Optimization Marnings Command Marnings Command Marnings Command Miscellaneous Library Miscellaneous 		
Properties for XC878		su	 MCU Selection Page Memory Settings Page Segment Location Page Settings Tool Chain Editor Tool Chain Editor Refactoring History Run/Debug Settings 		C

Project – Properties: C/C++ Build: Settings: Tool Settings: SDCC Linker:



Project – Properties: C/C++ Build: Settings: Tool Settings: SDCC Linker: Library:

Properties for XC878		
type filter text	Settings	$\Leftrightarrow \bullet \Rightarrow \bullet \bullet$
- Resource - Builders ⊖ C/C++ Build - Build Variables	Configuration: Debug	Manage Configurations
 Discovery Options Environment 	© Tool Settings ≥ Build Steps = Build Artifact = Binary Parsers © Error Parsers	
MCU Selection Page Memory Settings Page Segment Location Page Settings Tool Chain Editor	 Blobal Options Blobal Options Blobal Options Do not include standard library directory in the set Elibraries Directories Optimization 	arch path 원 원 원 한 한
	Warnings Wiscellaneous SDCC Assembler General SDCC Linker With the second s	ରି ଲ ି ଛ ଚି ହା
	Miscellaneous	
		Restore Defaults Apply
0		OK Cancel



Project – Properties: C/C++ Build: Settings: Tool Settings: SDCC Linker: Miscellaneous:

Properties for XC878			$_{-}$ \square \times
type filter text	Settings		$\Leftrightarrow \bullet \bullet \bullet \bullet \bullet$
Resource Builders C/C++ Build Build Variables Discovery Options Environment MCU Selection Page Segment Location Page Settings Tool Chain Editor C/C++ General Project References Refactoring History Run/Debug Settings	Configuration: Debug Tool Settings Build Steps Build Artifact Binary Parsers F Use Linker Script file Linker script file Additional options Build Artifact Additional options Build Artifact Additional options Build Artifact Binary Parsers Configuration Binary Parsers Configuration Binary Parsers Configuration Binary Parsers Configuration Configuration Configuration Configuration Binary Parsers Configuration Configuration Binary Parsers Configuration Configuration Binary Parsers Configuration Configuration Configuration Configuration Binary Parsers Configuration Configuration Configuration Configuration Binary Parsers Configuration Configur	Manage Coni	figurations
	Re	store Defaults	Apply
0		ОК	Cancel



Project – Properties: C/C++ Build: Settings: Build Steps:

Properties for XC878	3	
type filter text	Settings	$\diamondsuit \bullet \bullet \bullet \bullet \bullet$
Resource Builders C/C++ Build Build Variables Discovery Options		Configurations
Environment	 Tool Settings Build Steps Build Artifact Binary Parsers Error Parsers 	
 MCU Selection Page Memory Settings Page 	Command:	
-Segment Location Page Settings	Description:	
— Tool Chain Editor ⊕-C/C++ General	Post-build steps	
Project References Refactoring History	Command:	
Run/Debug Settings	Description:	•
	Restore Defau	Ilts Apply
Ø	ОК	Cancel



Project – Properties: C/C++ Build: Settings: Build Artifact:

type filter text Settings	⇔ ▼ → ▼ ▼
Resource Builders Configuration: Debug Configuration: Debug Build Variables	Manage Configurations
Discovery Options Tool Settings P Build Steps	😤 Build Artifact 🗟 Binary Parsers 🛛 Error Parsers
 Environment MCU Selection Page Memory Settings Page Segment Location Page Settings Tool Chain Editor C/C++ General Project References Refactoring History Run/Debug Settings 	
2	Restore Defaults Apply



Project – Properties: C/C++ Build: Settings: Binary Parsers:

Properties for XC878		_		×
type filter text	Settings	¢ •	• • •	-
type filter text Resource Builders C/C++ Build Build Variables Discovery Options Environment MCU Selection Page Memory Settings Page Segment Location Page Settings Tool Chain Editor BC/C++ General Project References Refactoring History Run/Debug Settings		Anage Configur	e Up	
0	Restor	,	Apply ncel	



Project – Properties: C/C++ Build: Settings: Error Parsers:

Properties for XC878		
type filter text	Settings	$\Leftrightarrow \bullet \bullet \bullet \bullet \bullet$
Resource Builders C/C++ Build Build Variables Discovery Options Environment MCU Selection Page Segment Location Page Settings Tool Chain Editor C/C++ General Project References Refactoring History Run/Debug Settings		Move Up Move Down Check all Uncheck all
	Restore Default	s Apply
Õ	ОК	Cancel



Project – Properties: C/C++ Build: Tool Chain Editor:

Properties for XC878		
type filter text	Tool Chain Editor	$\Leftrightarrow \bullet \bullet \bullet \bullet \bullet$
Resource Builders C/C++ Build Build Variables	Configuration: Debug	▼ Manage Configurations
 Discovery Options Environment 	☞ Display compatible toolchains only Current toolchain: XC800 Application Tool Chain	_
-MCU Selection Page Memory Settings Page		
- Segment Location Page - Settings - Tool Chain Editor	Current builder: XC800 Builder	<u> </u>
Gol Chain Editor C/C++ General Project References Refactoring History Run/Debug Settings	SDCC Compiler SDCC Assembler SDCC Linker	Select Tools
		Restore Defaults Apply
Q		OK Cancel

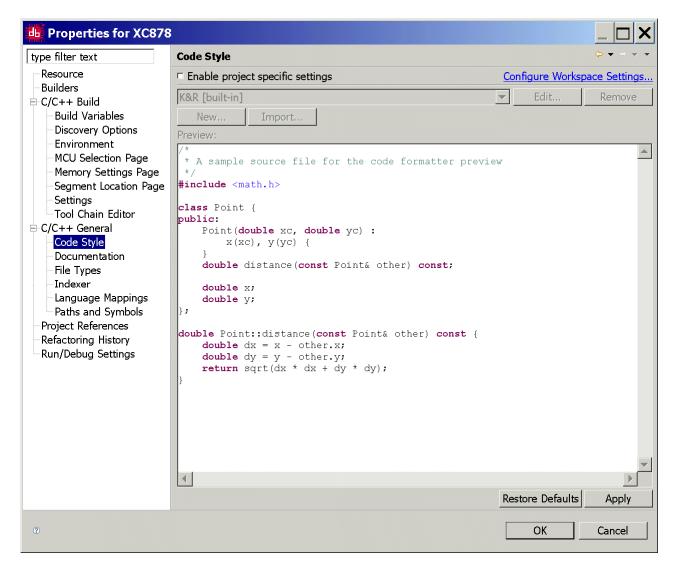


Project – Properties: C/C++ General:

type filter text	C/C++ General	$\Leftrightarrow \checkmark \Rightarrow \checkmark$
type filter text Resource Builders C/C++ Build Build Variables Discovery Options Environment MCU Selection Page Memory Settings Pa Segment Location P Settings Tool Chain Editor C/C++ General Code Style Documentation File Types Indexer Language Mappings Paths and Symbols Project References Refactoring History Run/Debug Settings	Enable project specific settings Documentation tool comments Select the documentation tool to be used to detern Documentation tool: None	Configure Workspace Settings mine editor behaviors in this project
0		OK Cancel



Project – Properties: C/C++ General: Code Style:





Project – Properties: C/C++ General: Documentation:

Properties for XC878		
type filter text	Documentation	$\Leftrightarrow \bullet \bullet \bullet \bullet \bullet$
Resource Builders C/C++ Build Build Variables Discovery Options Environment MCU Selection Page Segment Location Page Settings Tool Chain Editor C/C++ General Code Style Documentation File Types Indexer Language Mappings Paths and Symbols Project References Refactoring History Run/Debug Settings	Help books	Check All Uncheck All
	Restore	Defaults Apply
Ø	0	K Cancel



Project – Properties: C/C++ General: File Types:

type filter text	File Types			⇔ ▼ ⇒ ▼
Resource	 Use worksp 	ace settings		
Builders	© Use project	_		
⊟-C/C++ Build	 Use project 	t setungs		
– Build Variables	Filename	Description	Status 🔺	New
Discovery Options	*.asm	Assembly Source File	Locked	
- Environment	*.c	XC800 Source	Locked	Remove
MCU Selection Page	*.c	C Source File	Locked	
Memory Settings Page	*.C	C++ Source File	Locked	
Segment Location Page	*.c++	C++ Source File	Locked	
Settings	*.cc	C++ Source File	Locked	
Tool Chain Editor	*.cpp	C++ Source File	Locked	
C/C++ General	*.cxx	C++ Source File	Locked	
Code Style	*.h	C Header File	Locked	
- Documentation	*.h	C++ Header File	Locked	
	*.hh	C++ Header File	Locked	
- <mark>File Types</mark>	*.hpp	C++ Header File	Locked	
Indexer	*.hxx	C++ Header File	Locked	
-Language Mappings	*.s	Assembly Source File	Locked	
Paths and Symbols	algorithm	C++ Header File	Locked	
Project References	bitset	C++ Header File	Locked	
Refactoring History	cassert	C++ Header File	Locked	
Run/Debug Settings	cctype	C++ Header File	Locked	
	cerrno	C++ Header File	Locked	
	cfloat	C++ Header File	Locked	
	ciso646	C++ Header File	Locked	
	climits	C++ Header File	Locked	
	clocale	C++ Header File	Locked	
	cmath	C++ Header File	Locked	
	complex	C++ Header File	Locked	
	csetjmp	C++ Header File	Locked	
	csignal	C++ Header File	Locked	
	cstdarg	C++ Header File	Locked	
	cstddef	C++ Header File	Locked	
	cstdio	C++ Header File	Locked	
	cstdlib	C++ Header File	Locked	
	cstring	C++ Header File	Locked	
	ctime	C++ Header File	Locked	
	cwchar	C++ Header File	Locked 🚽	
	Jairrah ma	Cul Hander Ela	Laskad -	



Project – Properties: C/C++ General: Indexer:

Properties for XC878		
type filter text	Indexer	$\Leftrightarrow \bullet \bullet \bullet \bullet \bullet$
min:	Indexer Enable project specific settings Configure Workspace Settings Select indexer Fast C/C++ Indexer (recommended) 	
 Language Mappings Paths and Symbols Project References Refactoring History Run/Debug Settings 	Restore Defaults	Apply



Project – Properties: C/C++ General: Language Mappings:

type filter text	Language Mappings			\$ ▼ ⇒ ▼
Resource Builders C/C++ Build Build Variables Discovery Options Environment MCU Selection Page Segment Location Page Settings Tool Chain Editor C/C++ General Code Style Documentation File Types Indexer Language Mappings Paths and Symbols Project References Refactoring History Run/Debug Settings	mappings. Configuration	content Type	Language	a language
	(All) (All) (All) (All)	Assembly Source File C Header File C Source File C++ Source File	XC800 ASM Language XC800 Source Language XC800 Source Language XC800 Source Language	Remove
	Content Type		uage Restore Defaults	Apply



Project – Properties: C/C++ General: Paths and Symbols: Includes:

Properties for XC878		$-\Box \mathbf{X}$
type filter text	Paths and Symbols	↓ ↓ ▼ ▼
Resource Builders C/C++ Build Build Variables Discovery Options Environment MCU Selection Page Segment Location Page Settings Tool Chain Editor C/C++ General Code Style Documentation File Types Indexer Language Mappings Paths and Symbols Project References Refactoring History Run/Debug Settings	Configuration: Debug ▼ Manage Configuration: Includes # Symbols ■ Libraries ● Library Paths ● References ● Source Location Languages Include directories ● ● ● ● -c,C ● \${SDCC_HOME}\include ● ● ● *\${SDCC_HOME}\include\asm\xc800 ● ● ● ● ●	Add Edit Delete Export Move Up Move Down
	Restore Defaults	Apply
0	ОК	Cancel



Project – Properties: C/C++ General: Paths and Symbols: Symbols:

Properties for XC878	:			$-\Box \mathbf{X}$
type filter text	Paths and Symbols			$\Leftrightarrow \bullet \bullet \bullet \bullet \bullet$
Resource Builders ⊖C/C++ Build Build Variables	Configuration: Debug		Manage Conf	igurations
 Discovery Options Environment 			Paths	
- MCU Selection Page - Memory Settings Page	Languages —c,C	Symbol Value #SDCC		Add
– Segment Location Page – Settings – Tool Chain Editor				Delete
C/C++ General Code Style Documentation File Types Indexer Language Mappings Paths and Symbols Project References Refactoring History Run/Debug Settings	□ Show built-in values			
			Restore Defaults	Apply
0			ОК	Cancel



Project – Properties: C/C++ General: Paths and Symbols: Libraries:

Properties for XC878		
type filter text	Paths and Symbols	
 Resource Builders C/C++ Build Build Variables Discovery Options 	Configuration: Debug	ifigurations
– Environment – MCU Selection Page		Add
Memory Settings Page		Edit
-Segment Location Page -Settings		Delete
Tool Chain Editor		Export
⊟-C/C++ General —Code Style		Move Up
 Documentation File Types 		Move Down
Indexer		
 Language Mappings Paths and Symbols 		
Project References		
Refactoring History Run/Debug Settings		
	□ Show built-in values	
	Restore Defaults	Apply
Ø	ОК	Cancel



Project – Properties: C/C++ General: Paths and Symbols: Library Paths:

Properties for XC878		
type filter text	Paths and Symbols	$\Leftrightarrow \bullet \bullet \bullet \bullet \bullet$
Resource −Builders ⊖C/C++ Build −Build Variables −Discovery Options	Configuration: Debug	figurations
 Environment MCU Selection Page 		Add
Memory Settings Page		Edit
-Segment Location Page -Settings		Delete
- Tool Chain Editor ⊡-C/C++ General		Export
Code Style		Move Up
– Documentation – File Types – Indexer		Move Down
- Indexer - Language Mappings Paths and Symbols		
Project References		
 Refactoring History Run/Debug Settings 		
	□ Show built-in values	
	Restore Defaults	Apply
0	ОК	Cancel



Project – Properties: C/C++ General: Paths and Symbols: References:

Properties for XC878		
type filter text	Paths and Symbols	$\Leftrightarrow \bullet \bullet \bullet \bullet \bullet$
 Resource Builders C/C++ Build Build Variables Discovery Options Environment MCU Selection Page Memory Settings Page 	Configuration: Debug	nfigurations
0	Restore Defaults	Apply Cancel



Project – Properties: C/C++ General: Paths and Symbols: Source Location:

type filter text	Paths and Symbols	$\Leftrightarrow \bullet \bullet \bullet \bullet \bullet$
type filter text Resource Builders C/C++ Build Build Variables Discovery Options Environment MCU Selection Page Segment Location Page Segment Location Page Settings Tool Chain Editor C/C++ General Code Style Documentation File Types Indexer Language Mappings Paths and Symbols Project References Refactoring History Run/Debug Settings	Paths and Symbols Configuration: Debug Includes # Symbols ■ Libraries ■ Library Paths ■ Refe Source folders on build path: Filter (XC878 Filter (XC878.asm)	Manage Configurations rences © Source Location Add Folder Edit Filter Delete
		Restore Defaults Apply
Ø		Restore Defaults Apply



Project – Properties: Project References:

Properties for XC878		
type filter text	Project References	\$ ▼ ⇒ ▼ ▼
Resource Builders C/C++ Build Build Variables Discovery Options Environment MCU Selection Page Segment Location Page Settings Tool Chain Editor C/C++ General Code Style Documentation File Types Indexer Language Mappings Paths and Symbols Project References Refactoring History Run/Debug Settings	Projects may refer to other projects in the workspace. Use this page to specify what other projects are referenced by the project. Project references for XC878:	
0	ОК	Cancel



Project – Properties: Refactoring History:

Properties for XC878		
type filter text	Refactoring History	$\Leftrightarrow \bullet \bullet \bullet \bullet \bullet$
type filter text Resource Builders C/C++ Build Build Variables Discovery Options Environment MCU Selection Page Segment Location Page Segment Location Page Segment Location Page Settings Tool Chain Editor C/C++ General Code Style Documentation File Types Indexer Language Mappings Paths and Symbols Project References Refactoring History Run/Debug Settings	Refactorings affecting project 'XC878':	Remove All
	Details:	
Q	ОК	Cancel



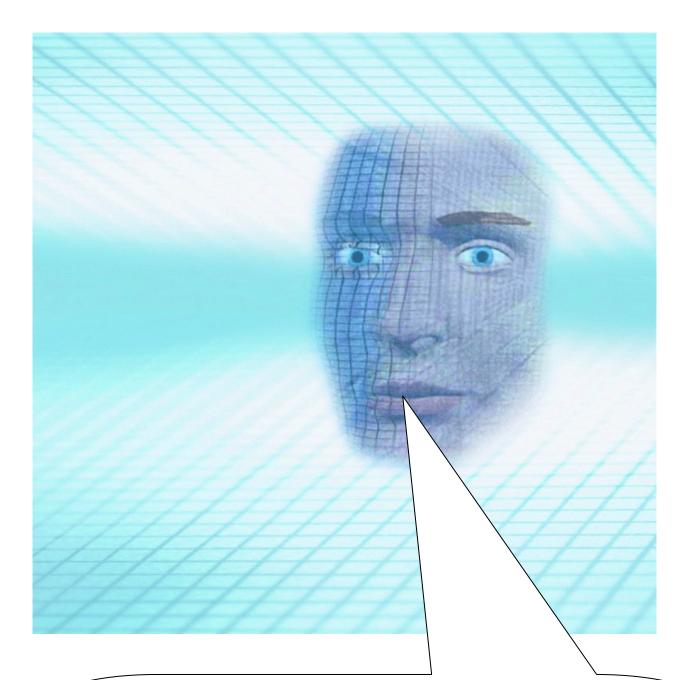
Project – Properties: Run/Debug Settings:

	Run/Debug Settings	
type filter text Resource Builders C/C++ Build Build Variables Discovery Options Environment MCU Selection Page Segment Location Page Segment Location Page Settings Tool Chain Editor C/C++ General Code Style Documentation File Types Indexer Language Mappings Paths and Symbols Project References Refactoring History Run/Debug Settings	This page allows you to manage launch configurations associated with the currently resource. Launch configurations for 'XC878':	selected New Duplicate Edit Delete
	' Restore Default	s Apply

OK



Insert your application specific program:



Note:

DAVE doesn't change code which is inserted between '// USER CODE BEGIN' and '// USER CODE END'. Therefore, whenever adding code to DAVE's generated code, write it between '// USER CODE BEGIN' and '// USER CODE END'. If you wish to change DAVE's generated code or add code outside these 'USER CODE' sections you will have to insert/modify your changes each time after letting DAVE regenerate code!



Double click MAIN.C and insert Global Variables:

```
code char menu[] =
^{\prime\prime}n^{n}
"1 ... LEDs P3 ON\n"
"2 ... LEDs P3 OFF\n"
"3 ... LEDs P3 blinking\n"
" \n";
code char question[] =
"your choice: ";
code char message1[] =
"\n*** LEDs P3 ON ***\n";
code char message2[] = 
"\n*** LEDs P3 OFF ***\n";
code char message3[] = 
"\n*** LEDs P3 BLINKING ***\n";
volatile int RS232_wait=183; // 183 * Timer_0-overflow = 183 * 5461,333 µs = 0,9994 s
bit blinking=ON;
char select=' ';
```

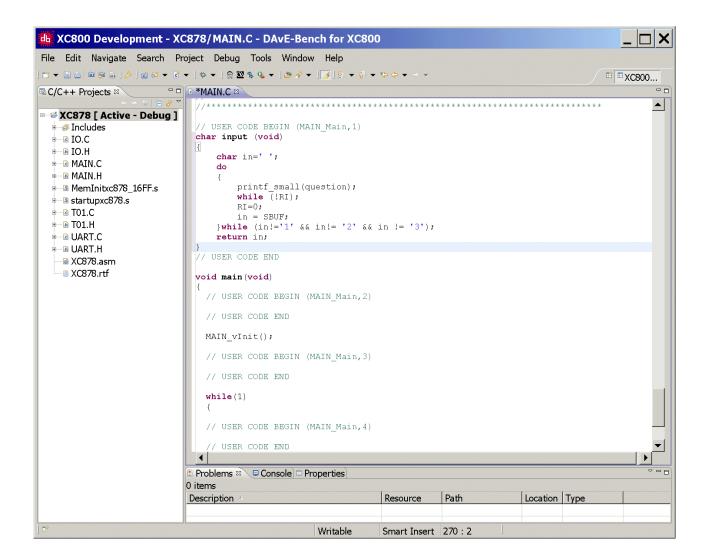


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File Edit Navigate Search Pro		-					
] <u>≱</u>]⊻ ▼ ŷ ▼ ′	$\diamond \diamond \bullet \bullet \bullet \bullet$				XC800
	■ *MAIN.C ×						
XC878 [Active - Debug] Includes <th><pre>//***********************************</pre></th> <th><pre>'\n" ''; n"; =183; // 183 '************************************</pre></th> <th>3 * Timer_0-</th> <th><pre>************************************</pre></th> <th>* 5461,3</th> <th>****</th> <th>994 s</th>	<pre>//***********************************</pre>	<pre>'\n" ''; n"; =183; // 183 '************************************</pre>	3 * Timer_0-	<pre>************************************</pre>	* 5461,3	****	994 s
	0 items						
	Description 🔺		Resource	Path	Location	Туре	
		Writable	Smart Insert	98 : 17			



Double click MAIN.C and insert the function input():

char input (void) {





Double click MAIN.C and insert the following code in the main function:

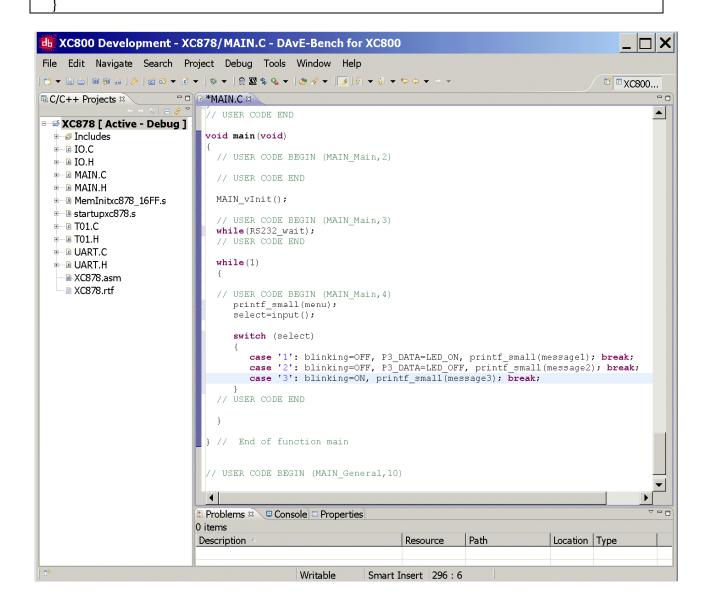
while(RS232_wait);

KC800 Development - XC	878/MAIN.C - DAvE-Bench for XC800
File Edit Navigate Search Pro	ject Debug Tools Window Help
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	• *MAIN.C ≈
XCS78 [Active - Debug] XCS78 [Active - Debug] XCS78 [Active - Debug] XCS78 [Active - Debug] Active - De	<pre>char input (void) { char in=' '; do { printf_small(question); while (!RI); RI=0; in = SBUF; }while (in!='1' && in!= '2' && in != '3'); return in; } // USER CODE END void main(void) {</pre>
XC878.rtf	<pre>// USER CODE BEGIN (MAIN_Main,2) // USER CODE END MAIN_vInit(); // USER CODE BEGIN (MAIN_Main,3) while(RS232_wait); // USER CODE END</pre>
	<pre>while(1) { // USER CODE BEGIN (MAIN_Main,4) // USER CODE END }</pre>
	} // End of function main
	Writable Smart Insert 282 : 21



Double click MAIN.C and insert the following code in the main function into the while(1) loop:

```
printf_small(menu);
select=input();
switch (select)
{
    case '1': blinking=OFF, P3_DATA=LED_ON, printf_small(message1); break;
    case '2': blinking=OFF, P3_DATA=LED_OFF, printf_small(message2); break;
    case '3': blinking=ON, printf_small(message3); break;
```





Double click Main.h and insert the following Defines:

#define OFF 0 #define ON 1 #define LED_ON 0xFF #define LED_OFF 0x00

👪 XC800 Development - XC	C878/MAIN.H - DAvE-Bench for XC800
File Edit Navigate Search Pr	oject Debug Tools Window Help
] 📬 🕶 📄 🖆 🖗 🖬] 🤌] 🗃 😂 🕶 🔮	▼] ☆ ▼] ☆ ⊠ \$ % ▼] <i>≫ A</i> ▼] <i>▲</i>] ∲ ▼ ∲ ▼ ∲ ▼ → ▼
	© *MAIN.C
	<pre>#define MAIN_vUnlockProtecReg() PASSWD = 0x9B #define MAIN_vlockProtecReg() PASSWD = 0xAB</pre>
Includes	
Includes	// Macros used for push and pop operation of SYSCONO
IO.H	<pre>#define pushsyscon() { asm push SDCC SYSCON0 endasm;}</pre>
MAIN.C	<pre>#define popsyscon() { _asm pop SDCC_SYSCON0 _endasm;}</pre>
MAIN.H	
MemInitxc878_16FF.s Startupxc878.s	
T01.C	// USER CODE BEGIN (MAIN_Header,3)
• • • • • • • • • • • • • • • • • • •	// USER CODE END
UART.C	
B UART.H	//***********************
■ XC878.asm	// @Defines
C878.rtf	//*************************************
	// USER CODE BEGIN (MAIN_Header,4)
	#define OFF 0 #define ON 1
	#define LED_ON 0xFF
	#define LED_OFF 0x00
	77 USER CODE END
	#define bool bit
	#define ulong unsigned long #define uword unsigned int
	#define ubyte unsigned char
	#ifdefC51
	<pre>#define KEIL // not really necessary to define sinceC51 is created by KEIL #endif</pre>
	▼ 1
	🗜 Problems 🛛 📮 Console 🗆 Properties
	0 items
	Description / Resource Path Location Type
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Double click Main.h and insert extern-declarations "Global Variables":

extern bit blinking; extern volatile int RS232_wait;

File Edit Navigate Search Project Debug Tools Window Help Image: Search Project Debug Image: Search Projecties Imag		C878/MAIN.H - DAvE-Bench for XC800
<pre>© C/C++ Projects X1</pre>	-	· · ·
<pre>SCS78 [Active - Debug]</pre>		
<pre>> XC378 [Active - Debug]</pre>		⊡ *MAIN.C) ⊡ *MAIN.H ≈
<pre>>> Includes </pre>	- 1	//************************************
<pre>Part IO.C Part IO.H Part MAIN.C Part MAIN.C Part MAIN.H Part Main.H Part</pre>		
<pre>MAIN.C MAIN.H MAIN.H MemInitxc878_16FF.s MemInitxc878_16FF.s Tot.C MAIN.H USER CODE END //***********************************</pre>		//*************************************
<pre>MAIN.C MAIN.H Main.H Meminixc678_16FF.s Startupxc978.s Tol.H USER CODE END V************************************</pre>	IO.H	// USER CODE BEGIN (MAIN Header.6)
<pre>identified if MeminitudeS78_16FF.s is startupxc878.s i</pre>	■— 🖻 MAIN.C	· · · · · · · · · · · · · · · · · · ·
<pre>startupxC878.s G TO1.C G TO1.C G TO1.H G UART.C G O UART.H G UART.H G VC878.sm G XC878.rtf // USER CODE BEGIN (MAIN_Header, 7) // USER CODE END // ***********************************</pre>	🗉 🔤 MAIN.H	// USER CODE END
<pre>* B TOI.C * B TOI.H * B UART.C * B UART.H * XCS78.asm * XCS78.rtf // USER CODE EEGIN (MAIN_Header, 7) // USER CODE END //***********************************</pre>	_	
<pre>In TO1.H In UART.C In UART.C In ACOST8.asm In XCS78.asm In XCS78.rtf // USER CODE BEGIN (MAIN_Header, 7) // USER CODE END // totatile int RS232_wait; // USER CODE END // totatile int RS232_wait; // USER CODE BEGIN (MAIN_Header, 9) // USER CODE END</pre>		//*************************************
<pre>v a foln v UART.C v USER CODE BEGIN (MAIN_Header, 7) v USER CODE END v XC878.rtf // USER CODE END //***********************************</pre>		
<pre>// USER CODE BEGIN (MAIN_Header, 7) // USER CODE END // USER CODE END // USER CODE BEGIN (MAIN_Header, 8) extern bit blinking; extern volatile int RS232_wait; // USER CODE END //***********************************</pre>		//*************************************
<pre>XC878.asm</pre>		// USER CODE BEGIN (MAIN Header,7)
<pre>XCS78.rtf // USER CODE EEGIN (MAIN_Header, 8) extern volatile int RS232_wait; // USER CODE END //***********************************</pre>		-
<pre>//***********************************</pre>		// USER CODE END
<pre>// @Global Variables //***********************************</pre>		
<pre>//***********************************</pre>		
<pre>// // USER CODE BEGIN (MAIN_Header,8) extern bit blinking; extern volatile int RS232_wait; // USER CODE END //***********************************</pre>		
<pre>extern bit blinking; extern volatile int RS232_wait; // USER CODE END //***********************************</pre>		
<pre>extern volatile int RS232_wait; // USER CODE END //***********************************</pre>		
<pre>// USER CODE END //***********************************</pre>		
<pre>// @Prototypes Of Global Functions //***********************************</pre>		
<pre>// @Prototypes Of Global Functions //***********************************</pre>		
<pre>// @Prototypes Of Global Functions //***********************************</pre>		/ / + + + + + + + + + + + + + + + + + +
<pre>//***********************************</pre>		
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// USER CODE END ✓ ✓ Problems ²³ © Console © Properties		(/ HCED CODE DECIN (WAIN Harden 0)
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Double click Main.h and insert include files:

#include <stdio.h>
#include <ctype.h>

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KC800 Development - X	C878/MAIN.H - DAvE-Bench for XC800	
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	■ MAIN.C ■ MAIN.H 🛛	
C/C++ Projects × • XC878 [Active - Debug] • Includes • I O.C • I O.H • MAIN.C • MAIN.H • MemInitxc878_16FF.s • Startupxc878.s • TO1.C • TO1.H • UART.C • UART.H • XC878.asm • XC878.rtf	<pre>#ifdefC51_ #include <intrins.h> #endif #include <stdbool.h> #endif #include "IO.H" #include "UART.H" #include "UART.H" #include "T01.H" #include "T01.H" #endif // SDCC // USER CODE BEGIN (MAIN_Header,11) #include <ctype.h> // USER CODE END #endif // ifndef _MAIN_H_ #endif // ifndef _MAIN_H_</ctype.h></stdbool.h></intrins.h></pre>	
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Double click UART.C

Insert code into the UART_vInit function: [to start printf_small()]:

TI=1;

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	*MAIN.C 🗈 *MAIN.H 🗈 *UART.C 🛛	-
XC878 [Active - Debug] Includes IO.C MAIN.C MAIN.H MemInitxc878_16FF.s startupxc878.s TO1.C VART.C VART.C XC878.asm XC878.rtf	<pre>///</pre>	out saving unction register 0 unction register 1 out saving input select register reload register ontrol register
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Double click T01.C

Insert the following global variable:

```
unsigned char Timer_0_interrupt_counter=0;
```

XC800 Development -)	C878/T01.C - DAvE-Bench for XC800
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	□ @ *MAIN.C (
← → ☆ □	
XC878 [Active - Debug] Includes	// USER CODE DEGIN (IUI_General, 5)
	// USER CODE END
∎— 🖻 MAIN.C	//*************************************
⊪—	// @Imported Global Variables
■ MemInitxc878_16FF.s	// ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~
startupxc878.s	// USER CODE BEGIN (TO1_General,6)
e— I T01.C e— I T01.H	// USER CODE END
I UART.H	//*************************************
— 🗟 XC878.asm	// @Global Variables
🗎 XC878.rtf	//*************************************
	// USER CODE BEGIN (T01 General,7)
	unsigned char Timer_0_interrupt_counter=0;
	// USER CODE END
	//*************************************
	// @External Prototypes
	//*************************************
	// USER CODE BEGIN (TO1_General,8)
	// USER CODE END
	//*************************************
	// @Prototypes Of Local Functions //***********************************
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Double click T01.C

Insert code for T0 interrupt service routine:

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□ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □	- 🌣 - 🗟 🗟 🗞 🤹 - 🕭 🛷 -	· 😼 🔄 🗣 🤤 🕈 🗢 🗢 🔶			[™] XC800
	*MAIN.C •*MAIN.H	*UART.C • *T01.C =>			
XC878 [Active - Debug] Includes I IO.H MAIN.C MAIN.H MemInitxc878_16FF.s startupxc878.s TO1.C TO1.H UART.C UART.H XC878.asm XC878.rtf	<pre>// If you select CHO // If you select CHO // Default choice is // Current selection // USER CODE BEGIN (TO // USER CODE END void TO1_viTmr0(void) { // USER CODE BEGIN (++ Timer_0_interru if(RS232_wait) RS232_wait: / if(Timer_0_interru { Timer_0_interru { Timer_0_interru { Timer_0_interru if(Dlinking) { } } }</pre>	<pre>Ings Section. ICE 1 then ISR will be ICE 2 then ISR will be CHOICE 2. is CHOICE 2 1_ISrTmr0,1) interrupt TOINT TO1_ISrTmr0,2) pt_counter; / 183 * Timer_0-overflow pt_counter==103) // 100 pt_counter==0; 3_DATA^0xFF; TO1_viTmr0</pre>	generated wit w = 183 * 546	hout push and pop.	
	Problems 🕷 📮 Console 🗆 Pr	roperties			
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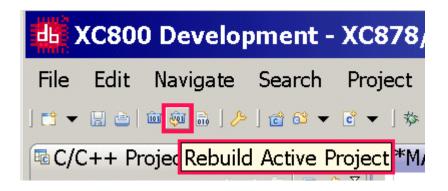


Generate your application program:

Project - Rebuild Active Project

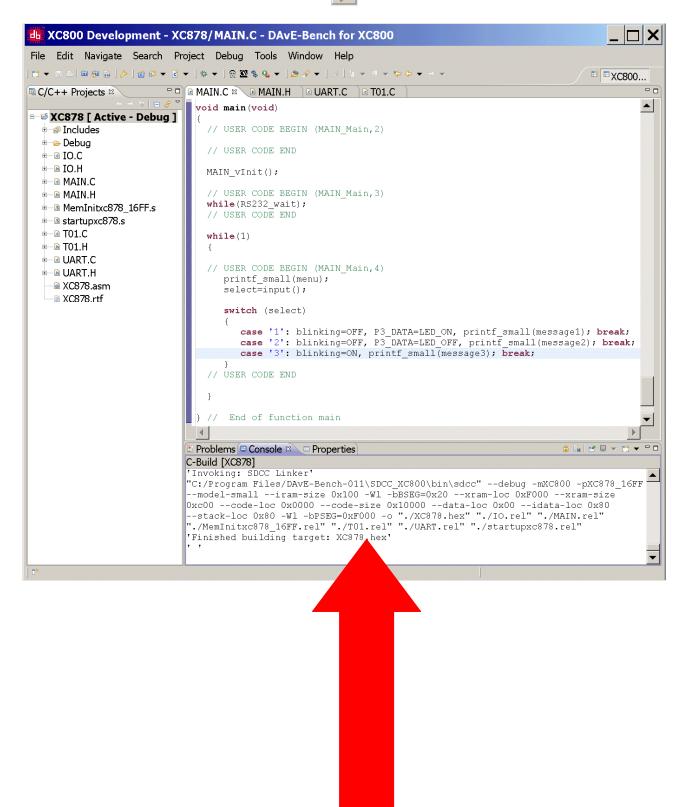
KC800 Development -	XC878/	MAIN.	C - DA	vE-Benc	h for X
File Edit Navigate Search	Project	Debug	Tools	Window	Help
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```
**** Build of configuration Debug for project XC878 ****
C:\Program Files\DAvE-Bench-011\SDCC_UTILS\make all
'Building file: ../IO.C'
'Invoking: SDCC Compiler'
"C:/Program Files/DAvE-Bench-011\SDCC_XC800\bin\sdcc" -mXC800 -pXC878_16FF -
-model-small -I"C:/Program Files/DAvE-Bench-011\SDCC_XC800\include" -
I"C:/Program Files/DAvE-Bench-011\SDCC_XC800\include\xc800" -I"C:/Program
Files/DAvE-Bench-011\SDCC_XC800\include\asm\xc800" --opt-code-size --
nooverlay --noinduction --debug -S -o "IO.s" "../IO.C"
'Finished building: ../IO.C'
'Building file: IO.s'
'Invoking: SDCC Assembler'
"C:/Program Files/DAvE-Bench-011\SDCC_XC800\bin\as-xc800" -plosgffcx "IO.s"
-0 "IO.rel"
'Finished building: IO.s'
'Building file: ../MAIN.C'
'Invoking: SDCC Compiler'
"C:/Program Files/DAvE-Bench-011\SDCC_XC800\bin\sdcc" -mXC800 -pXC878_16FF -
-model-small -I"C:/Program Files/DAvE-Bench-011\SDCC_XC800\include" -
I"C:/Program Files/DAvE-Bench-011\SDCC_XC800\include\xc800" -I"C:/Program
Files/DAvE-Bench-011\SDCC_XC800\include\asm\xc800" --opt-code-size --
nooverlay --noinduction --debug -S -o "MAIN.s" "../MAIN.C"
'Finished building: ../MAIN.C'
1 1
'Building file: MAIN.s'
'Invoking: SDCC Assembler'
"C:/Program Files/DAvE-Bench-011\SDCC_XC800\bin\as-xc800" -plosgffcx
"MAIN.s" -0 "MAIN.rel"
'Finished building: MAIN.s'
'Building file: ../MemInitxc878_16FF.s'
'Invoking: SDCC Assembler'
"C:/Program Files/DAvE-Bench-011\SDCC XC800\bin\as-xc800" -plosqffcx
"../MemInitxc878 16FF.s" -O "MemInitxc878 16FF.rel"
'Finished building: ../MemInitxc878_16FF.s'
'Building file: ../T01.C'
'Invoking: SDCC Compiler'
"C:/Program Files/DAvE-Bench-011\SDCC_XC800\bin\sdcc" -mXC800 -pXC878_16FF -
-model-small -I"C:/Program Files/DAvE-Bench-011\SDCC_XC800\include" -
I"C:/Program Files/DAvE-Bench-011\SDCC_XC800\include\xc800" -I"C:/Program
Files/DAvE-Bench-011\SDCC_XC800\include\asm\xc800" --opt-code-size --
nooverlay --noinduction --debug -S -o "T01.s" "../T01.C"
'Finished building: ../T01.C'
'Building file: T01.s'
'Invoking: SDCC Assembler'
"C:/Program Files/DAvE-Bench-011\SDCC_XC800\bin\as-xc800" -plosgffcx "T01.s"
-0 "T01.rel"
```



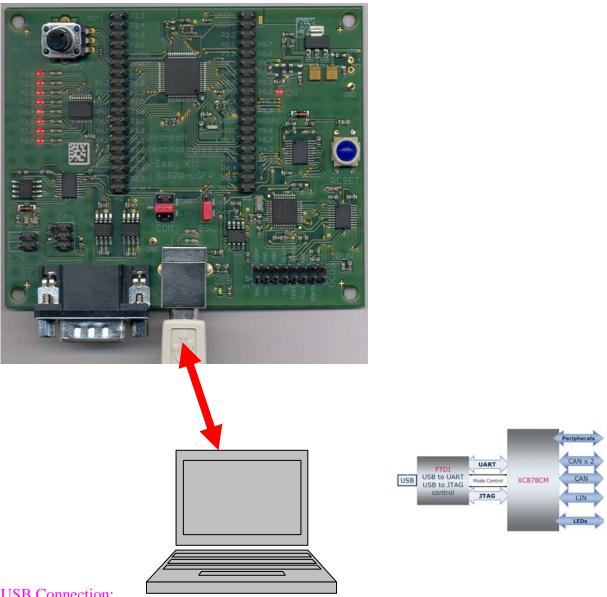
```
'Finished building: T01.s'
'Building file: ../UART.C'
'Invoking: SDCC Compiler'
"C:/Program Files/DAvE-Bench-011\SDCC_XC800\bin\sdcc" -mXC800 -pXC878_16FF -
-model-small -I"C:/Program Files/DAvE-Bench-011\SDCC_XC800\include" -
I"C:/Program Files/DAvE-Bench-011\SDCC_XC800\include\xc800" -I"C:/Program
Files/DAvE-Bench-011\SDCC_XC800\include\asm\xc800" --opt-code-size --
nooverlay --noinduction --debug -S -o "UART.s" "../UART.C"
'Finished building: ../UART.C'
1 1
'Building file: UART.s'
'Invoking: SDCC Assembler'
"C:/Program Files/DAvE-Bench-011\SDCC_XC800\bin\as-xc800" -plosgffcx
"UART.s" -0 "UART.rel"
MOV dir(0x82), dir(0x99) found at 1638 of UART.s
'Finished building: UART.s'
1 1
'Building file: ../startupxc878.s'
'Invoking: SDCC Assembler'
"C:/Program Files/DAvE-Bench-011\SDCC_XC800\bin\as-xc800" -plosgffcx
"../startupxc878.s" -0 "startupxc878.rel"
'Finished building: ../startupxc878.s'
1 1
'Building target: XC878.hex'
'Invoking: SDCC Linker'
"C:/Program Files/DAvE-Bench-011\SDCC_XC800\bin\sdcc" --debug -mXC800 -
pXC878_16FF --model-small --iram-size 0x100 -Wl -bBSEG=0x20 --xram-loc
0xF000 --xram-size 0xc00 --code-loc 0x0000 --code-size 0x10000 --data-loc
0x00 --idata-loc 0x80 --stack-loc 0x80 -Wl -bPSEG=0xF000 -o "./XC878.hex"
"./IO.rel" "./MAIN.rel" "./MemInitxc878_16FF.rel" "./T01.rel" "./UART.rel"
"./startupxc878.rel"
'Finished building target: XC878.hex'
```





5.) Using the debugger (DAvE Bench):

Make sure that the XC878 Easy Kit is still connected to the host computer:



USB Connection:

.) used for: UART communication (the UART/RS232/serial interface is available via USB as a virtual COM port of the second USB channel of the FTDI FT2232 Dual USB to UART/JTAG interface).

.) used for: On-Chip-Flash-Programming and Debugging (first USB channel of the FTDI FT2232 Dual USB to UART/JTAG interface).

.) the USB connection works also as the power supply.



<u>U-SPY:</u>

Note:

Now we need a terminal program which is able to handle our virtual COM port (COM12)! As an example of "any terminal program" we are going to use U-SPY.

U-SPY can be found either on the XC878 Easy Kit CD (USPY_install.exe)





or in DAvE-Bench (already installed!):

Tools – U-SPY:

主義 >	KC800 Development - XC878/MAIN.C - DAvE-Bench for XC8								
File	Edit	Navigate	Search	Project	Debug	Tools	Window	Help	
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or: click

KC800 Development - X0	C878/MAIN.C - DAvE-Bench for XC800
File Edit Navigate Search Pr	oject Debug Tools Window Help
C/C++ Projects 2 C	■ MAIN.C ∞ U-SPYH I UART.C I TO1.C □
B≝XC878 [Active - Debug]	void main (void)
ncludes	{ // USER CODE BEGIN (MAIN Main,2)
e Debug ∎ IO.C	
B−−™ IO.C	// USER CODE END
MAIN.C	MAIN_vInit();
B MAIN.H	// USER CODE BEGIN (MAIN_Main,3)
 MemInitxc878_16FF.s startupxc878.s 	<pre>while(RS232_wait); // USER CODE END</pre>
T01.C	// USER CODE END
	while(1)
XC878.asm	<pre>// USER CODE BEGIN (MAIN_Main,4) printf small(menu);</pre>
XC878.rtf	select=input();
	switch (select)
	<pre>{ case '1': blinking=OFF, P3 DATA=LED ON, printf small(message1); break;</pre>
	<pre>case '2': blinking=OFF, P3_DATA=LED_OFF, printf_small(message2); break;</pre>
	<pre>case '3': blinking=ON, printf_small(message3); break; }</pre>
	// USER CODE END
	}
) // End of function main
	<pre>} // End of function main</pre>
	// USER CODE BEGIN (MAIN General,10)
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Now, start U-SPY: click

⁺→ U-SPY	
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Config – U-SPY Config

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File View	Config Help		
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	Transmit/Receive Editor		
		-	
	un tie e		
USPY Configu	Iration	Disconne	ec HE HE 🥢



COM Port check/insert COM12 Baudrate check/insert 9600 Flow Control check/insert Off Stop Bits check/insert 1 Data Bit check/insert 8 Parity check/insert None

U-SPY Configuration	
COM PortCOM12Baudrate9600BpsFlow ControlOffImage: Compare the second seco	Stop Bits1Data Bit8ParityNoneAuto Save Every0Line
Logfilename	Browse
Read Interval Timeout Read Total Timeout Multiplier Read Total Timeout Constant	0 ms 0 ms 100 ms
Hardware Flow Control	DSR Output Control DTR Control Disable
Software Flow Control	'
XON Limit: Image: Constrainty enterpoint XON Char 0x	XOFF Limit: 0 XOFF Char 0x 00
Set Configuration	Cancel

Click Set Configuration



Config – Transmit/Receive Editor

⁺→ U-SPY		
File View Config Help		
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Transmit/Receive Editor		
	-	
Open Transmit / Receive List Editor Window		Disconnec HE HE //



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Transmit Receive	
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DATA (HEX) 0 Bytes	TRANSMIT OPTION
	Send 1 times
	Interval 0 (ms)
	Set Black
	Display Transmitted Frame
	Next Transmitted Index
_Update List Delete Clo	se / Cance



With the Transmit/Receive Editor configure the Transmit Window so that it appears like the Transmit windows below:

Transmit: Transmit Name: insert LED_ON

Click	DATA (HEX)	to change to:	DATA (ASCII)
CHOIL 1		to enange to.	

Insert 1:

Transmit / Receiver	Editor X			
Transmit Receive				
Transmit Name LED_ON	✓ Index 0			
DATA (ASCII) 1 Bytes	TRANSMIT OPTION			
1	Send 1 times			
	Interval 0 (ms)			
	Set Black Color			
	Display Transmitted Frame			
	Next Transmitted Index			
Update List Delete Clo	ose / Cance			

Click Update List



Transmit: Transmit Name: insert LED_OFF



Insert 2:

🗘 U-SPY - Transmit	
U-SPY - Transmit File Edit View Config Tools Window Help COM COM COM File Edit View Config Tools Window Help Transmit Transmit / Receive Editor Transmit Receive Transmit	. ×
Ready Disconnec	HEHE

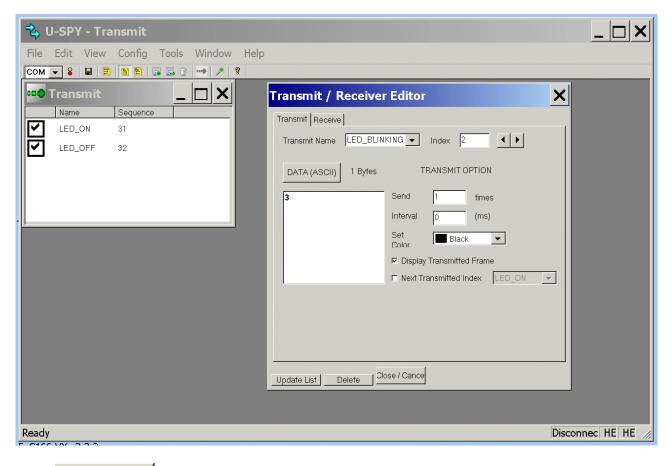
Click Update List



Transmit: Transmit Name: insert LED_BLINKING

Click DATA (HEX) to change to: DATA (ASCII)

Insert 3:



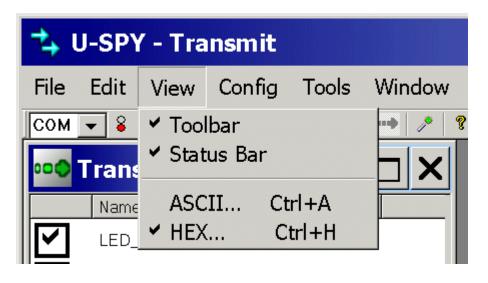
Click Update List



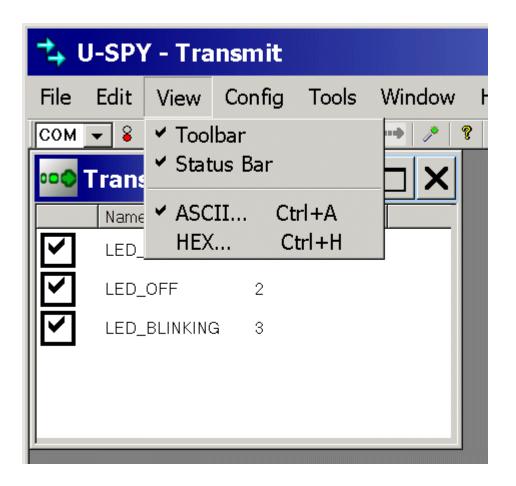
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File Edit View Config Tools Window Help
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Close / Cance



View – select ASCII...









File – Open COM Window

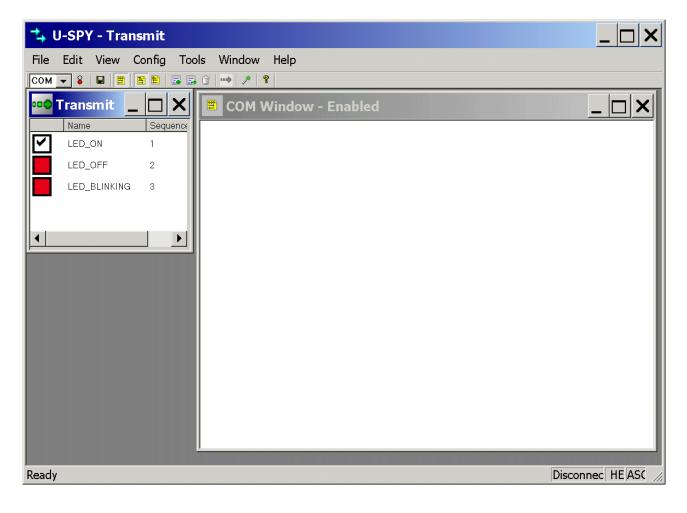
📬 U-SPY - Transmit	
File Edit View Config Tools Window Help	
Open COM Window Ctrl+0 Image: Ctrl+R Open Transmit List Ctrl+R Open Receive List Ctrl+R Save Setting Save Setting As Open Setting	
Exit	
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🕇 U-SPY - COM Window	- Enabled	<u> </u>
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👓 Transmit 💶 🗖 🗙	COM Window - Enabled	
Name Sequence		
LED_ON 1		
LED_OFF 2		
LED_BLINKING 3		
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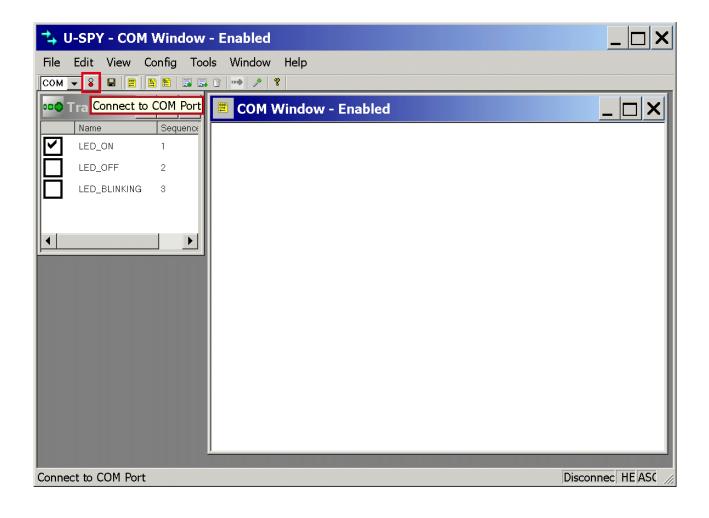


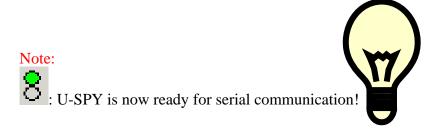
Click ☑ LED_OFF to untick/unselect □ LED_OFF Click ☑ LED_BLINKING to untick/unselect □ LED_BLINKING





Click

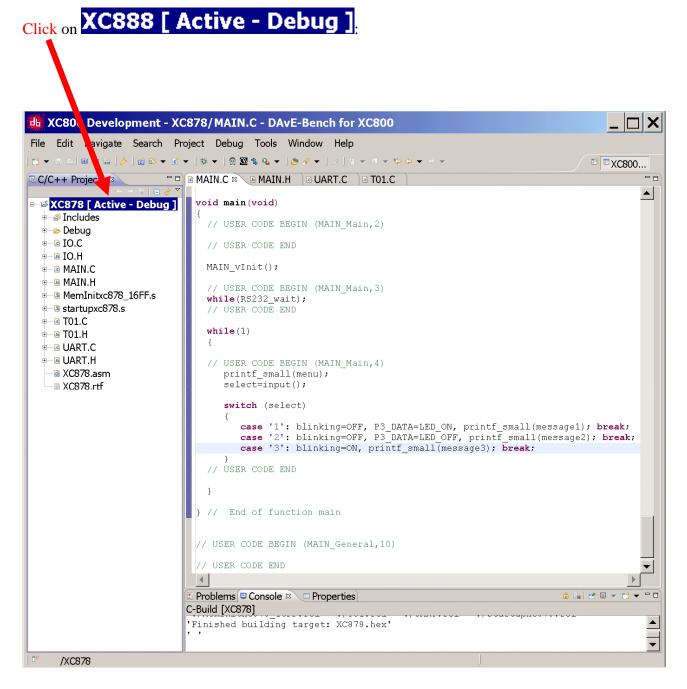








Go back to DAvE Bench and configure the debugger:





Debug – Debug Configurations...

👪 XC800 Develo	pment - XC878/MAIN.C - DAvE-Bench for XC800
File Edit Navigate	Search Project Debug Tools Window Help
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[®] C/C++ Projects ≈	Debug Configurations
or click 🏇 💌 Debug C	Configurations
KC800 Development - X	878/MAIN.C - DAvE-Bench for XC800
File Edit Navigate Search Pr	
C → R △ @ @ /> @ @ → @ · [C/C++ Projects □ □ □	Image: Second
- → @ = & ▼ =-≝XC878 [Active - Debug]	void main (void)
e → Debug	{ // USER CODE BEGIN (MAIN_Main,2)
∎–le IO.C	// USER CODE END
e BIO.H ■ BIO.H	MAIN_vInit();
e—⋒ MAIN.H e—≌ MemInitxc878_16FF.s e—≌ startupxc878.s	<pre>// USER CODE BEGIN (MAIN_Main,3) while(RS232_wait); // USER CODE END</pre>
■—	while(1)
	<pre>{ // USER CODE BEGIN (MAIN_Main,4) printf_small(menu); select=input(); </pre>
	switch (select)
	<pre>{ case '1': blinking=OFF, P3_DATA=LED_ON, printf_small(message1); break; case '2': blinking=OFF, P3_DATA=LED_OFF, printf_small(message2); break; case '3': blinking=ON, printf_small(message3); break;</pre>
	} // USER CODE END
	}
	} // End of function main
	// USER CODE BEGIN (MAIN_General,10)
	// USER CODE END
	🗄 Problems 🖻 Console 🛛 🕞 Properties 🔹 🗧 🗖
	C-Build [XCS78] 'Finished building target: XC878.hex'
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] ^{1°} /XC878	



Double click	HiTOP Application	HiTOP Application:
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		 Press the 'Duplicate' button to copy the selected configuration. Press the 'Delete' button to remove the selected configuration. Press the 'Filter' button to configure filtering options. Edit or view an existing configuration by selecting it. Configure launch perspective settings from the <u>Perspectives</u> preference page.
	Filter matched 4 of 4 items	
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Debug Configurations				
reate, manage, and run configurati Run a HiTOP debugger	ons			Ŕ
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Mandatory Parameters: Device: select EasyKitXC800 or Universal Device Acess

Debug Configurations		>
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Filter matched 5 of 5 items Apply Debug

Revert

Close

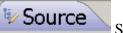


🗇 Debugger

Debugger, Main: (do nothing)

Debug Configurations		×
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Source: (do nothing)

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Common Co

Common: (do nothing)

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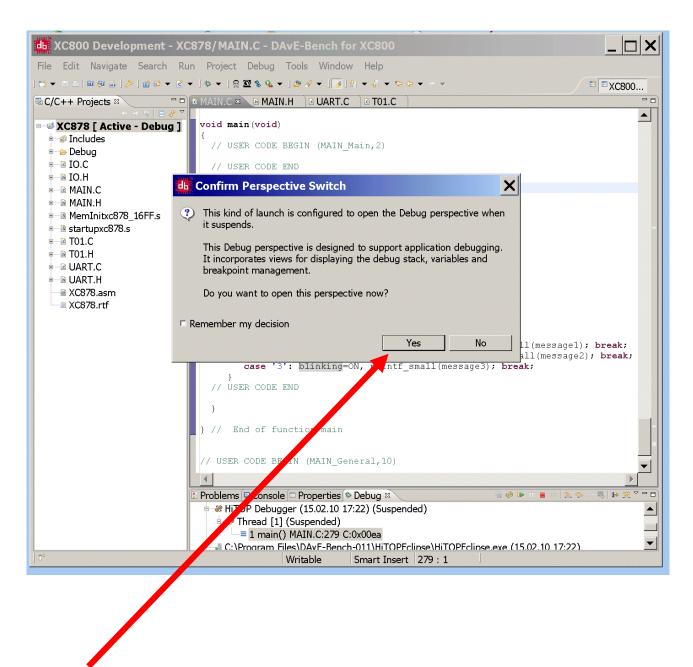




Start/Launch the debugger:

Click 🏂:	
🎂 XC800 Developi. ont - X	C878/MAIN.C - DAvE-Bench for XC800
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■ 🔊 Includes ■ 👝 Debug	// USER CODE BEGIN (MAIN_Main,2)
	// USER CODE END
■—IO.H ■—III.C	MAIN_vInit();
e—≌ MAIN.H e—≌ MemInitxc878_16FF.s e—≌ startupxc878.s	<pre>// USER CODE BEGIN (MAIN_Main,3) while(RS232_wait); // USER CODE END</pre>
	while(1)
■ T01.H ■ © UART.C	{
e−	<pre>// USER CODE BEGIN (MAIN_Main,4) printf_small(menu); select=input();</pre>
	switch (select)
	<pre>{ case '1': blinking=OFF, P3_DATA=LED_ON, printf_small(message1); break; case '2': blinking=OFF, P3_DATA=LED_OFF, printf_small(message2); break; case '3': blinking=ON, printf_small(message3); break;</pre>
	} // USER CODE END
	3
	} // End of function main
	// USER CODE BEGIN (MAIN_General,10)
	E Problems Console Properties Find Console Co
ē ¢	Writable Smart Insert 296 : 19 Launching XC878 Debug: (57%) 🎟 🖾





Click Yes



Debug - XC878/MAIN.C - DAvE-Bench for XC800				
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	1			
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{ // USER CODE BEGIN (MAIN Main, 2)		while(RS232_wait);		
		C:0x00ef <main+5>:</main+5>		
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<pre>while(RS232_wait); // USER CODE END</pre>		C:0x00f9 <main+15>: C:0x00fb <main+17>:</main+17></main+15>		
		C:0x00fd <main+19>:</main+19>		
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{		while(RS232_wait);
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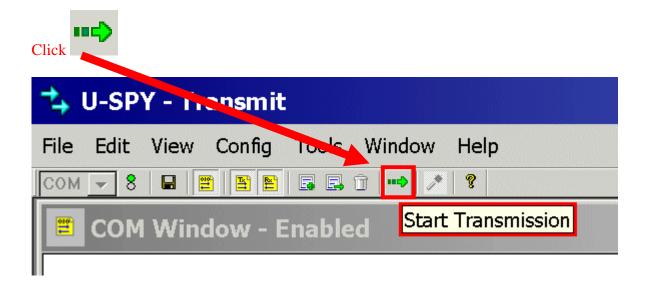


Go back to U-SPY and see the result:

COM Window - Enabled		
1 LEDS P3 ON		
2 LEDs P3 OFF		
3 LEDs P3 blinking		
your choice:		
		-



000	Transi	nit	<u> </u>
	Name	Sequence	
\square	1	31	
	2	32	
	3	33	



See the result:



🕇 U-SPY - Transmit	
File Edit View Config Tools Window Help	
COM 🔽 8 🖬 🔛 🖺 🗟 🗔 û 👐 🖍 ?	
📕 COM Window - Enabled	
your choice: 16:03:20.733 TX > 1 16:03:20.795 RX >	
*** LEDs P3 ON ***	
1 LEDS P3 ON	
2 LEDS P3 OFF	
3 LEDs P3 blinking	
your choice:	_
Transmit _ 🗆 🗙	
Name Sequence	Name Sequence
Ready	

And also check the result on your XC878 Easy Kit:







Conclusion:

In this step-by-step book you have learned how to use the XC878 Easy Kit together with the DAvE-Bench tool chain.

Now you can easily expand our "hello world" program to suit your needs!

You can connect either a part of - or your entire application to the XC878 Easy Kit.

You are also able to benchmark any of your algorithms to find out if the selected microcontroller fulfils all the required functions within the time frame needed.

Have fun and enjoy working with the XC878 Easy Kit!

Note:

There are step-by-step books for 8 bit microcontrollers (e.g. XC866 and XC88x), 16 bit microcontrollers (e.g. C16x, XC16x, XE16x) and 32 bit microcontrollers (e.g. TC1796 and TC1130).

All these step-by-step books use the same microcontroller resources and the same example code.

This means: configuration-steps, function-names and variable-names are identical.

This should give you a good opportunity to get in touch with another Infineon microcontroller family or tool chain!

There are even more programming examples using the same style available [e.g. ADC-examples, CAPCOM6-examples (e.g. BLDC-Motor, playing music), Simulator-examples, C++ examples] based on these step-by-step books.



6.) Feedback (XC878 Easy Kit, DAvE-Bench): Your opinion, suggestions and/or criticisms

Contact Details (this section may remain blank should you wish to offer feedback anonymously):

If you have any suggestions please send this sheet back to:

E-mail: mcdocu.comments@infineon.com FAX: +43 (0) 4242 3020 5783

Your suggestions:

http://www.infineon.com