Hi-Tronic

Keil µVision IDE ASM compile tutorial

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Hi-Tronic Keil µVision IDE ASM compile tutorial. A How-To Guide.

http://www.hi-tronic.ca/

- 1. To run the IDE, Click Start \rightarrow Programs \rightarrow Keil uVision2.
- 2. Click Project→New Project, and then choose a working directory where you will save all your work. The default path is C:\HiTronic.
- 3. Name your project. The default name is HT.Uv2. Click on Save to save the file.

Create New P	roject	<u>?</u> ×
Save jn: 🔁	HiTronic 🔽 🗲 🗈 💣 🎫	
HT.Uv2		
' File name:	HT.Uv2	•
2		
Save as <u>t</u> ype:	Project Files (*.uv2)	

4. Once you have clicked on Save, a pop-up window will ask you what chip you would like to use. For example, if you would like to use the CC1010 from Chipcon, you must select Chipcon→CC1010. Ensure that the "Use extended Linker" option is not checked off, and click OK to continue.



5. A new pop-up window will appear. It will ask whether you would like to copy the standard 8051 startup code to the project folder. Unless you are an advanced user, you should click No. If you click Yes, you will be faced with code and options too advanced for beginners.



Page 3 of 17 © Hi-Tronic Inc. 2005. This document may not be reproduced with any alterations without the prior written consent from Hi-Tronic Inc. 6. You have now created a project, but there is no source code. The program should look like this:

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Eile Edit View Project Debug Flash Peripherals Tools SVCS Window Help	
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🖉 🏝 🚟 👗 🐺 🔉 Target 1 💽	
Target 1 Source Group 1 F D B	
Build Command Find in Files	•
	R, //

- 7. To create new source code, go to File \rightarrow New.
- 8. Save your work. Go to File→Save As and then name your file. It should have a .asm extension, like HiTronic.asm. You must save your file in the working directory where you have saved your project.
- 9. You can now enter code into the text editor. To save time, copy the code found in the appendix at end of this document and paste it into the text editor. When you have done so, you will notice that the instructions are in blue, while the comments are in green. Don't worry if you don't understand the code. What's important is that you are learning how to use the tools.

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10. Now you have source code, but it has not been added to the project. To add the source code to the project, right-click on Source Group 1 and select Add files to Group 'Source Group 1'.



11. A pop-up window will appear. Select the file you created. In this example, the file is HiTronic.asm. Click on Add to add the file to the group.

Add Files to G	Group 'Source Group 1'	<u>?</u> ×
Look jn: 🔂	HiTronic 🗾 🖛 🗈 💣 🏢 🕇	
HiTronic.a	sm	
File <u>n</u> ame: Files of <u>type</u> :	Ad Ad Asm Source file (*.s*; *.src; *.a*) Clos	d :e

12. Now right-click on Target 1, and select Options for Target 'Target 1'



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13. A new window will open. Check Create HEX File to enable the program to create hex files. Click OK to finish.

Options for Target 'Target 1'	<u>?</u> ×
Device Target Output Listing C51 A51 BL51 Locate BL51 Misc Debug Utilities	
Select Folder for Objects Name of Executable: rcc	
Create Executable: .\rcc	
I Debug Information I Browse Information I Merge32K Hexfile	
Create HEX File HEX Format: HEX-80 ▼	
O Create Library: .\rcc.LIB □ Create Batch File	
After Make	
☑ Beep When Complete □ Start Debugging	
Run User Program #1: Browse	
Run User Program #2: Browse	
OK Cancel Defaults	

14. You can now compile the code. Go to Project→Rebuild All Target Files. Your code will be rebuilt and compiled into a HEX file.

👿 HT - µ¥ision2 - [C:\HiTronic\HiTronic.asm]	
Eile Edit View Project Debug Flash Peripherals Tools SVCS Window	Help _ 6
Image: Section of the section of th	
Image: Target 1 Image: Ima	
Build target F7 Rebuild all target files Translate C:\HiTronic\HiTronic.asm Stop build Tigsh Download	; Disable the watchdog ; Set P1 as output ; send 0XF0 to PORT 1 ; Call the loop delay
↓ C:\HI ronc\HI.UV2 2 G:\Pronounce\test\rcc.uv2 3 G:\Pronounce\test\EDGE.Uv2 ↓ G:\Pronounce\test\test.uv2 5 C:\Keil\C51\INC\CHIPCON\FD.uv2	; repeat flash the port 1 e dalay is around R5*R6*R7*2*1us
Build targi 6 G:\Pronounce\aduc841.Uv2 assembling 7 G:\wireless\nrf9e5_WK\h.Uv2 linking 8 G:\wireless\nrf9e5_WK\ex2c-tx.Uv2 Program Si: 9 G:\wireless\nrf9e5_WK\ex2c-tx.Uv2 Incating 10 G:\wireless\nrf9e5_WK\pwrDown.Uv2	
Rebuild all target files	L:8 C:1 NUM R/

- 15. You are now able to download the .hex file to the hardware by using third-party software like Hi-Tronic's Microcontroller programmer. This software is available for download from the Hi-Tronic website.
- 16. Go to <u>http://www.hi-tronic.ca/index.php?site=software</u> and click on the link for the USB Programmer Software v2.1. Use this program to download the .hex file to your hardware.

Appendix:	HiTronic.asm	source	code
-----------	--------------	--------	------

;DATA Definition area WDT DATA 0XD2 P1DIR DATA 0XA5	
;VECTOR AREA ORG 00H SJMP MAIN	
;MAIN CODE AREA ORG 040H MAIN:	
ORL WDT, #0X10	; Disable the watchdog
MOV P1DIR, #0X00	; Set P1 as output
HiTronic:	
MOV P1, #0XF0	; send OXFO to PORT 1
ACALL DL Mov P1, #0x0f acalı dı	; Call the loop delay
SJMP HiTronic	; repeat flash the port 1
DL: MOV R5, #20 DL0: MOV R6, #120 DL1: MOV R7, #200 DL2: DJNZ R7, DL2 DJNZ R6, DL1 DJNZ R5, DL0 RET	; time delay is around R5*R6*R7*2*1us
END	

END

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How to debug the ASM file.

1. If you want to debug, go to Debug→Start/Stop Debug Session to enable the debug mode.



🌉 HT - µ¥ision2 - [C:\HiTronic\HiTronic.a	asm]		<u>_8</u>
Eile Edit View Project Debug Flash	Peripherals Tools SVCS y	⊻indow <u>H</u> elp	_ 8
1 🎦 🚅 🖬 🗿 🐰 🖻 💼 🖸 🕰	<mark>RST</mark> Reset <u>⊂</u> PU	🙀 📭	#
	Interrupt		
	I/O- <u>P</u> orts ►	Port 0	
] 🏽 🖾 👗 📮 🛪 Target 1	<u>S</u> erial •	✔ Port 1 ● </td <td>◇ ☆ & @ ◎ ◎ ● ● ● ● ● ●</td>	◇ ☆ & @ ◎ ◎ ● ● ● ● ● ●
	Timer •	Port <u>2</u>	
Register Value	<u>Clock Control</u>	Port <u>3</u>	
	:VECTOR AREA	Darallel Dort 1	X
	ORG OOH	Port 1	
r2 0x00 ₽	SJMP MAIN	P1: OxFE Determined	
	MAIN CODE AREA		
r5 0x00 ▼	MAIN: ORL WDT,		atchdog
	ANL WDT, MOV P1DTR	#0X00 · Set P1 as o	uit.muit.
			<u> </u>
Load "C:\Hi	C:0X40		Name
	IO· 43 D2 10 53 I	12 F7 75 A5 00 75	
C:0x004	A: 90 FO 11 55 3	75 90 OF 11 55 80	
C:0x005	54: F4 7D 14 7E 3	78 7F C8 DF FE DE	
C:0x005	5E: FA DD F6 22 (
C:0x002	72: 00 00 00 00 00 0		
C:0x007	'C: 00 00 00 00 0	00 00 00 00 00 00	
C:0x008	36: 00 00 00 00 0	0 00 00 00 00 00	
C:0x009	90: 00 00 00 00 (22: 00 00 00 00 00	JU UU OO OO OO OO OO	
ASM ASSIGN - C:0x009			
	Memory #1 Memory #2	Memory #3 Memory #4	Locals (Watch #1)
			LIG CIT

2. Go to Peripherals and select the appropriate IO port.

Page 11 of 17 © Hi-Tronic Inc. 2005. This document may not be reproduced with any alterations without the prior written consent from Hi-Tronic Inc. 3. To debug the program go to Debug→Step or Debug→Step Over. The Step command will debug the program one line at a time. The Step Over command will debug a single line or an entire subroutine, depending on where the pointer is pointing. If the pointer is pointing to a single instruction, only one instruction will be executed. If the pointer is pointing to a subroutine, the entire subroutine will be executed.



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🌉 HT - µ¥ision2 - [C:\HiTro	nic\HiTronic.asm]		_ 8
Eile Edit View Project	Debug Flash Peripherals Tools SVCS Window Help		_ 8
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1 4 0	告 旁 慎 管		
© II II 🛎 👗 🛒 🚿	Target 1 🔄 🔛 🖓 🖓 🕆 🏌	} \$ ₩\$ 0€ @	R 🖾 🏡 🗛 🖾 🖻 🕹 🖉
	; VECTOR AREA ORG 00H SJMP MAIN ; MAIN CODE AREA ORG 040H MAIN: ORL WDT, #0X10 ; Disable the watch ANL WDT, #0XF7 MOV P1DIR, #0X00 ; Set P1 as output HiTronic: MOV P1, #0XF0 ; send 0XF0 to PORT	dog	
	MOV P1,#0X0F ACALL DL ; Call the loop def MOV P1,#0X0F ACALL DL SJMP HiTronic ; repeat flash the	port 1	
<u>∎.</u> ₽ №.	DL: MOV R5,#20 ; time dalay is around R5 DL0: MOV R6,#120 DT1: MOV P7 #200	*R6*R7*2*1us	
▲ Load "C:\\Hi▲	Address: D:0×0	▲ × Name	
> ASM ASSIGN V	D:0x00: 00		► ► Locals 🗸 Watch #1 入 1
Ready		L:16 C:1	CAP NUM R/

Page 13 of 17 © Hi-Tronic Inc. 2005. This document may not be reproduced with any alterations without the prior written consent from Hi-Tronic Inc. 5. You do not have to activate the disassembly window to step through the code. However, can view the source code and OP-Code in the same place by going to View→Disassembly Window.



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👿 HT - μVision2 - [Disassembly]	- 8
Eile Edit View Project Debug Flash Peripherals Tools SVCS Window Help	. 8
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]	ë 🤈
14:	_
Register Value C:0x0046 75A500 MOV P1DIR(0xA5),#0x00	
Bens 15: HiTronic:MOV P1,#0XF0 ; send 0XF0 to PORT 1	
10 0x00 C:0x0049 7590F0 MOV P1(0x90),#B(0xF0)	
ACALL DL ; Call the loop delay	
$1 \sim 2$ 0.00 $C:UXU4C$ HISS ACALL DL(C:UUSS)	
X Losd POLSSHink XI ALL FORM	
C:0x0040: 43 D2 10 53 D2 F7 75 A5 00 75	
C:0x004A: 90 F0 11 55 75 90 0F 11 55 80	
C:0x0054: F4 7D 14 7E 78 7F C8 DF FE DE	
C:0x005E: FA DD F6 22 00 00 00 00 00 00	
C:0x0068: 00 00 00 00 00 00 00 00 00 00	
C:0x00A4: 00 00 00 00 00 00 00 00 00	
C:0x00AE: 00 00 00 00 00 00 00 00 00	
C:0x00B8: 00 00 00 00 00 00 00 00 00 00	
ASM ASSIGN - C:0x00C2: 00 00 00 00 00 00 00 00 00 00 00 00	
Memory #1 Memory #2 Memory #3 Memory #4	ŧŊι
Ready	R(

7. To view the code memory, data memory or external memory, go to View→Memory Window.

To view the **CODE** memory, go to the Address box and type **C**: and the line at which you would like to start. For instance, to begin from 0x40, type **C:0X40**.

To view the **DATA** memory, go to the Address box and type **D**: and the line at which you would like to start. For instance, to begin from 0x40, type **D:0X40**.

To view the **EXTERNAL** memory, go to the Address box and type **X**: and the line at which you would like to start. For instance, to begin from 0x40, type **X:0X40**.

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8. To debug the serial port, go to Peripherals→Serial. You will then see the following pop-up window:

Serial Channel 0 🛛 🗙
Mode: 8-Bit Shift Register
SCON0: 0x00 SADDR0: 0x00
SBUF0: 0x00 SADEN0: 0x00
□ SM2_0 □ TB8_0 □ RB8_0
SMODO 🗖 FE_O 🗖 REN_O
Baudrate
SMOD_0 RCLK TCLK
Transmit Baudrate: 2000000
Receive Baudrate: 2000000

9. To debug the timer, go to Peripherals→Timer. You will then see the following pop-up window:

Timer/Counter 0	×
Timer/Counter 0	
0: 13 Bit Timer/Counter 💌	
Timer	
TCON: 0x00 TMOD: 0x00	
TH0: 0x00 TL0: 0x00	
TO Pin TFO	
Status: Stop	
TRO TGATE FINTO#	
<u></u>	

- Interrupt System X Int Source Vector Mode Req Ena Pri ٠ P3.2/Int0 0003H 0 0 0 0 Timer 0 000BH 0 0 0 P3.3/Int1 0013H 0 0 0 0 Timer 1 001BH 0 0 0 Serial Rov.0 0023H 0 0 0 Serial Xmit.0 0023H 0 0 0 Timer 2 002BH 0 0 0 P1.1/T2EX 002BH 0 0 0 0 Power Fail 0033H 0 0 Serial Rov.1 003BH 0 0 0 Serial Xmit.1 003BH 0 0 0 P1.4/Int2 0043H 0 0 0 Selected Interrupt-EA 🗌 🗖 (110) □ IEO EX0 Pri.: 0
- 10. To watch the interrupt table, go to Peripherals→Interrupt. You will then see the following pop-up window:

11. To exit the debug mode, go to Debug \rightarrow Stop Debug Session.