

Keil C Compiler Manual

Rev A

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This application note can apply to most Lumissil MCU CS89XX series products.

1. Creating Projects

1.1 Setup the project

Project / New uVision Project :

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Select the microcontroller (MCU) from the device Database. Lumissil MCU is compatible with Digital Core Design DR80390.





1.2 Create a new project

Click the "File" tab for New....



Add a new file to the project.



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Select File / Save As and type the file name, and then press Save.

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6	Project • 0 ×	main.c	
Books 😅 Tempi	Source Group 1	1 #include "CS89693FR.h" 3 #include "CS89693FR.h" 4 5 void main (void) 7 (8 while(1); 9)	
lates		Add Files to Group 'Source Group 1'	×
		Look in: src Name CS8969_IOSC.c main.c	 Date modified 4/24/2019 4:43 PM 6/22/2022 2:41 PM
		File name: main.c Files of type: C Source file (*.c)	Add Close

Include files with extension file name c and h: Add Files to Group 'Source Group 1'.

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2. Set Tool Options

2.1 MCU(Target) option page and its

parameter

Click the **"Options for Target**" toolbar button or the menu **Project** — **Options for Target "Target 1"**.



Then comes up the below window.



Options for Target 'I	Target 1'	×
Device Target O	Dutput Listing User C51 AX51 LX51 Locate LX51 Misc Debug Utilities	
Digital Core Design D)R80390	
	⊻tal (MHz): 50.0	
Memory Model:	Large: variables in XDATA	
Code Rom Size:	Large: 64K program	
Operating system:	None	
	Use multiple DPTR registers	
Off-chip Code men	mory Off-chip Xdata memory	
	Start: Size: Start: Size:	
	Eprom 0x0000 0x7000 0x0400	
	Eprom Ram	
	Eprom Ram	
Code Banking	Start: End:	
Panker D		
	Bank Area: 10x0000 10x1111 1 0000 00000 10x1111 100000	
	OK Cancel Defaults Help	

The options depend on the device and the selected toolchain. All settings are captured in a project target. For example: CS8969 Code memory starts at address 0x0000 and code size is 0x7000. It must retain 4K data size for boot code. Xdata memory address starts at 0x0100 with Ram size 0x0400.

For other Lumissil MCU parts, please refer to the following table for code memory and Xdata memory setting. Users can also check the memory map of our product datasheets for reference. Please note there are 8-byte code security keys located at the last of the user program space for protection from pirate access to information.

	Eprom Start add.	Eprom Size	Xdata Start add.	Xdata Size
CS8973	0x0000	0x7000	0x0100	0x0400
CS8974	0x0000	0x7000	0x0100	0x0400
CS8975	0x0000	0x3000	0x0100	0x0800
CS8977	0x0000	0xF000	0x0100	0x0800

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2.2 Output configure

The user needs to input "**Name of Executable**" output file name with folder location. And choose a few options after clicking "**Create Executable**" checkbox as the below figure.

Options for Target 'Target 1'									
Device Target Output Listing User C51 AX51 LX51 Locate LX51 Misc Debug Utilities									
Select Folder for Objects									
Create Executable:\release\CS8969_IOSC									
☑ Debug Information									
Create HEX File HEX Format: HEX-80									
Offse <u>t</u> :									
C Create Library:\release\CS8969_IOSC.LIB									
OK Cancel Defaults Help									

Click "LX51 Locate" tab and check the checkbox "Use Memory Layout from Target Dialog".



Options for Target 'Target 1'
Device Target Output Listing User C51 AX51 LX51 Locate LX51 Misc Debug
☑ Use Memory Layout from Target Dialog
<u>R</u> eserve
Casses CODE (C:0x0-C:0x6FFF), HDATA (X:0x100-X:0x4FF), CODE (C:0x0-C:0x6FFF), CONST (C Classes CODE (C:0x0-C:0x6FFF), HCONST (C:0x0-C:0x6FFF))
liser



3. Build Project

3.1 Select Project / Rebuild all target files

As below figure, choose "Rebuild all target files" from the "Project" tab.

Build Output window explains the build commands and how errors and warnings can be tracked.

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Eil	e <u>E</u> dit	⊻iew	Pro	ject Fl <u>a</u> sh	<u>D</u> ebug	Peripherals	<u>T</u> ools	<u>s</u> vcs	<u>W</u> indow	Help	
1	🗋 💕			New µ⊻isior	Project						
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	Project			Open Proje	ct						
1		Target 1		<u>⊂</u> lose Proje	ct						
Book	<u> </u>	Sour		Export							•
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U.,				Select Devic	ce ror iarç	jet Target I					
lemp			s.	Options for	Target 'Ta	raet 1'					OF+E7
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				Clean <u>t</u> arge	t						
				<u>B</u> uild target							F7
				<u>R</u> ebuild all t	arget files						
			9	Batc <u>h</u> Build.							
				Tr <u>a</u> nslate D	:\myson\le	:on\24.CS896!	9(CM526	6)\IOS(=\src\main.(c	Ctrl+F7
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	Build Ou	tput									
	Build	i tarç	get	'Target	1'						
	linki	iling	ma:	in.c							
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	creat	ing b	nex	file fr	om "	\release\	CS896	59_IO	SC″		
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	📰 Build	d Output	-	Find in Files	Brov	vser					
Reb	uild all ta	rget files	5								Simulation



4. Tips and Tricks

4.1 Insert assembly code into C language

The user can insert assemble code into C language, but it won't succeed unless assemble LIB is included.



Choose main.c and click with mouse right-button. Then select Options for File 'xxxx.c' like main.c, and check the checkboxes "Generate Assembler SRC File" and "Assemble SRC File".



Project 💌 🕈 🗙	main.c	69 IOSC.c CS8969XRAM.H
Target 1 Source Group 1 main.c	01 02 #include "CS8969 03 #include "CS8969	
Options for File 'main.c'		×
Properties C51		
Path: D:\myson	leon\24.CS8969(CM5266)\IOSC\:	rc\main.c
File Type: C Source	ile 💌	🖂 Include in Target Build
Size: 414 Bytes		🖂 Always Build
last change: Tue Nov 1	3 15:20:10 2018	Generate Assembler <u>S</u> RC File
		✓ Assemble S <u>R</u> C File
		🔽 Link Publics Only
Code <u>B</u> ank:	V	
Stop on Exit Code: Not specif	ed	<u> </u>
Select Modules		
to Always Include:		
Custom Arguments:		
	OK Cancel	Defaults Help

Include C51 Library by choosing "Add Files to Group 'Source Group 1'".



Include the example LIB C51S.LIB at folder C:\Keil\C51\Lib.

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Add Files to Group	o 'Source Group 1'			? 🛛					
捜尋位置①: 📄 LIB 🔹 🗘 🖽 🖬 🗸									
C51BC.LIB	C51L LIB	C51NS.LIB	CH51FPS.LIB	CX51FPL.LI					
C51BFPC.LIB	🛐 c51 mc.lib	C51S.LIB	CH51L.LIB	CX51FPS.LII					
C51BFPL.LIB	🛐 c51 mfpc.lib	CALLOC.C	CH51S.LIB	CX51L.LIB					
C51BFPS.LIB	🛐 c51 mfpl.lib	CD51C.LIB	🖻 CONF151.A51	CX51S.LIB					
C51BL.LIB	🛐 c51 mfps.lib	CD51FPC.LIB	🛐 CS51C.LIB	G FREE.C					
C51BS.LIB	🔰 c51 ml.lib	CD51FPL LIB	CS51FPC.LIB	GETKEY.C					
C51C.LIB	🔰 c51 ms.lib	CD51FPS.LIB	CS51FPL LIB	📷 INIT.A51					
C51DS2A.LIB	C51NC.LIB	CD51L.LIB	CS51FPS.LIB	🖸 INIT_MEM.(
C51DS2T.LIB	C51NFPC.LIB	CD51S.LIB	CS51L.LIB	📷 INIT_MX.A5					
C51FPC.LIB	C51NFPL.LIB	CH51C.LIB	CS51S.LIB	📷 INIT_TNY.A					
C51FPL.LIB	C51NFPS.LIB	CH51FPC.LIB	CX51C.LIB	🗟 L51_BANK./					
C51FPS.LIB	C51NL.LIB	CH51FPL LIB	CX51FPC.LIB	MALLOC.C					
<				>					
檔案名稱(N): C51	檔案名稱(11): C51SLIB Add								
檔案類型(I): All f	檔案類型(I): All files (*.*)								

4.2 Creating Library file

Create a new file and save as gpio.c





Create a new file and save as gpio.h



Select "Options for Target - Target 1".



Choose the "**Output**" tab as below figure and choose to generate a CS8969_IOSC.lib. And press **OK**.



🔣 Options for Target 'Target 1'	Х
Device Target Output Listing User C51 A51 BL51 Locate BL51 Misc Debug Utilities	
Select Folder for Objects Name of Executable: CS8969_IOSC	
C Create Executable: .\Objects\CS8969_IOSC	
Debug Information IV Browse Information	
Create HEX File HEX Format: HEX-80	
.\Objects\CS8969_IOSC.LIB Create Batch File	
OK Cancel Defaults Help	

Press Rebuild and create Library



Copy Library file and head file gpio.h as a new project source file.



📕 🗹 📕 = src		- 🗆 X
File Home Share View		\sim
\leftarrow \rightarrow \checkmark \uparrow \blacksquare $<$ DATA (D:) $>$ CS8969 $>$ IOSC $>$ src	✓ ひ	
-	^ Name	Date modified Type
J Music	CS8969_IOSC.c	4/24/2019 4:43 PM C File
E Pictures	CS8969_IOSC.LIB	7/8/2015 4:02 PM PSpic
Videos	agpio.h	5/11/2015 5:44 PM H File
🐛 Windows (C:)	main.c	6/22/2022 2:41 PM C File
📕 \$AV_AVG		
\$WinREAgent		
📕 Cadence		
📕 hp		
📙 hpswsetup		
📜 inetpub		
📕 Intel		
📕 Keil_v5		
📕 C51		

Add Library file and head file gpio.h to group Source Group1.





Add Files to Group 'Source Group 1'				
Look in:	src 💌	(-	ず ⊞▼	
Name	^	Date mo	dified	
CS8969_I	OSC.c	4/24/201	9 4:43 PM	
CS8969_I	OSC.LIB	7/8/2015	4:02 PM	
gpio.h		5/11/201	5 5:44 PM	
ain.c 🧾		6/22/202	2 2:41 PM	
<				>
File name:	CS8969_IOSC.LIB		Add	
Files of type:	All files (*.*)	•	Close	

Press Rebuild and create Hex file.

Eil	e <u>E</u> dit <u>V</u> iew <u>P</u> roject Fl <u>a</u> sh <u>D</u> ebug F	eripherals <u>I</u> ools <u>S</u> VCS <u>W</u> indow <u>H</u> elp					
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2 Cooks Of Templates	Project ▼ 4 ×	GLOBAL.H GLOBAL.H	CS89695FR				
		30 delay_ms(); 31 } 32 }					
	Build Output						
	<pre>Build target 'Target 1' compiling CS8969_IOSC.c assembling\release\CS8969_IOSC.src linking Program Size: data=9.0 xdata=124 const=0 code=61 creating hex file from "\release\CS8969_IOSC" "\release\CS8969_IOSC" - 0 Error(s), 0 Warning(s).</pre>						
	El Build Output Le Find in Files Browser						
			Simulation				



REVISION HISTORY

Revision	Detailed Information	Date
А	First Formal Release	2022.06.22