

LPC122X 开发板使用手册



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1 概述

1.1 核芯片介绍

LPC122X 开发板使用的是 NXP 公司(恩智普半导体)的 LPC122X 芯片,这个芯片使用 高性能、低功耗的 ARM® Cortex[™]-M0 内核,这是市场上现有的最小、能耗最低、最节能的 ARM 处理器。该处理器能耗非常低、门数量少、代码占用空间小,使得 MCU 开发人员能够以 8 位处理器的价位获得 32 位处理器的性能。超低门数还使其能够用于模拟信号设备和混合 信号设备及 MCU 应用中,可望节约系统成本,同时保留功能强大的 Cortex-M3 处理器的工具 和二进制兼容能力。

ARM® Cortex[™]-MO 产品功耗性能优异,带有睡眠、深度睡眠和深度掉电三种省电模式。 通过唤醒中断控制器(Wake-up Interrupt Controller)轻松整合电源管理单元(PMU, Power Management Unit),把能耗在睡眠、深度睡眠和深度掉电模式下降至最小;此外,集成的 CGU(Clock Generation Unit)结合一个 DLL,可从主晶体震荡器、内部 RC 震荡器或低功耗 看门狗震荡器中提供系统时钟生成提供多种封装选项。

1.2 开发板简介

LPC122X 开发板是北京胜创特电子科技有限公司新推出的一款基于 NXP 公司(恩智普 半导体)LPC122X 处理器(Cortex-M0 内核)开发板。主频高达 33MHz,该开发板含有 UART 接口,支持 RS485 和 EIA-485 模式,包含 8 通道 10 位 ADC,四个定时器,包含 SSP、I2C 等丰富的接口。LPC122X 开发板是一个用于应用开发的很好的平台,也是学习者的首选。配 合调试工具 ULINK2 一起使用,可为大家提供一个良好的开发环境,从而为自己的应用开发 节省时间,提高效率。产品提供有例程和资源,可以帮助您快速的进行项目开发和个人学习。

1.3 硬件资源列表

1.3.1 LPC122x * 201 处理器内置有:

- ▶ 1个32/48KB FLASH
- ▶ 1个4KB RAM
- ▶ 1个 SSP/SPI 接口,两个 UART
- ▶ 4个通用的计时器 (2个 32-bit Timers, 2个 16-bit Timers)
- ▶ 8路10位的ADC
- ➢ 2 个 Comparators
- ▶ 39/55 个通用 I/0 引脚
- ▶ 1个 IIC 总线接口
- ▶ 1个看门狗定时器
- ▶ 1个 DMA 控制



- ▶ 1个 CRC 引擎
- ▶ 1个32位的RTC
- ▶ 1个内部振荡器

1.3.2 开发板外围器件

- ▶ LPC122X (32 位低功耗系列 MCU) 32 位 ARM
- ▶ 4个 LED 发光管
- ▶ 5个按键
- ▶ 1个 RESET 按键
- ▶ 1个mini 型USB 插座, 仅供电
- ▶ 1个 SSP 接口
- ▶ 3个 ADC
- ▶ 2个 UART 支持 RS-485/EIA-4
- ▶ 39/55pin I/0 用户扩展接口
- ▶ 1个 JTAG/SWD 调试接口
- ▶ 供电方式: USB 5V 供电

1.4 软件资源列表

例程名称	测试功能描述
adc	使用 ADC 数模转换,并通过串口输出
led	实现 LED 灯闪烁
key	通过按键控制对应的 LED
rtc	通实时时钟控制 LED 灯闪烁
Timer32	Timer32 捕获事件功能的使用实例
uart	开发板通过 UART 传输数据



2 开发板详细介绍

2.1 引脚信息



2.2 硬件接口一览表

接口	名称
P1	POWER2.5
P2	USB_MINI_OTG 接口
P3	PORT
P4	PORT
Р5	PORT
P6	PORT
P7	JTAG PORT
P8	DB8
P9	DB9
P10	SWD PORT



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2.3 跳线设置

跳线	状态	功能
J1	0FF	VBAT 电源连接
J2	ON	LED1 灯显示控制
J3	ON	LED2 灯显示控制
J4	ON	LED3 灯显示控制
J5	ON	LED4 灯显示控制
J6	ON	按键 S1 控制/ INTO 中断控制
J7	ON	按键 S2 控制/ INT1 中断控制
J8	ON	按键 S3 控制/ INT2 中断控制
J9	ON	按键 S4 控制/ INT3 中断控制
J10	ON	按键 S5 控制/ WAKEUP 控制
J11	ON	ADO 控制
J12	ON	AD1 控制
J13	ON	AD3 控制
J14	ON	RST 控制
J15	ON	ISP 使能控制



2.4 硬件接口介绍

2.3.1 JTAG 调试接口

LPC122X 开发板采用标准的 20 针脚 JTAG 连接器,以实现与任意 ARM JTAG 仿真器的连接,如 ULink2、JLink、CoLink 等。

2.3.2 UART 接口

通用同步接收器 UART 通过一个9 针 D型的 RS-232 接口进行通信,使用的是 MAX232 控制芯片。除了用于通信和跟踪调试外,此 UARTO 接口还可用于 ISP 下载。

2.3.3 USB Mini 接口

LPC122X 开发板使用一个 USB Mini AB 接口给开发板提供 5V 的电压。

2.3.4 LED 接口

LPC122X 开发板提供了 4 个 LED 灯 D1…4, 它们分别与 IO 引脚 PIOO_19…22 相连, 可用于用户输出。

3 软件资源介绍

3.1 LED 测试

- ▶ 源码位置: code\ led
- ▶ 测试说明:此例程展示了 LED 灯的闪烁
- ▶ 测试现象:LED 灯闪烁

3.2 ADC 测试

- ▶ 源码位置: code\adc
- ▶ 测试说明:此例程展示了 LPC122X 开发板 ADC 模数转化,通过 UART 将转换结果输出
- ▶ 测试现象:如下图所示:



1 SSC0■3.2(作者:聂小猛(丁丁),	主页http://www.mcu5	il.com, Email:	
AD通道1输入电压是:7089mV AD通道1输入电压是:7089mV AD通道1输入电压是:7089mV AD通道1输入电压是:7089mV AD通道1输入电压是:7089mV AD通道1输入电压是:7076mV AD通道1输入电压是:7035mV AD通道1输入电压是:7025mV AD通道1输入电压是:7089mV AD通道1输入电压是:7105mV AD通道1输入电压是:7180mV AD通道1输入电压是:7180mV AD通道1输入电压是:7192mV AD通道1输入电压是:7199mV AD通道1输入电压是:7199mV AD通道1输入电压是:7199mV AD通道1输入电压是:7199mV			
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波特率 9600 ▼ DTR F 数据位 8 ▼ C 定时发送 100 停止位 1 ▼ HEX发送 2 校验位 None ▼ 字符串输入框: 流控制 None ▼ abcdefg	RTS ★★使用"I 0 ms/次 ★点击这里) 支送新行 ★2层全包54 发送 ★PCB打样板 发送 ★欢迎访问)	2CB打样计价器",价 进入,网上计价,支持; *5cm最低50元!10*100 联系QQ:1563289095 大虾论坛! 国内人气力	格从此心中有雾 甸宝和网银付款 m只要100元!省 5 (状态:在线: 最旺的单片机技
www.mcu51.com S:0 R:416	COM1 已关闭 96	00bps 8 1 CTS=0 D	SR=0 RLSD=0

3.3 RTC 测试

- ▶ 源码位置: code\rtc
- ▶ 测试说明:此例程展示了 LPC122X 开发板通过 RTC 控制 LED 闪烁
- ▶ 测试现象: LED 闪烁

3.4 KEY 测试

- ▶ 源码位置: code\key
- ▶ 测试说明:此例程展示了 LPC122X 通过 KEY 控制 LED 灯
- ▶ 测试现象:按键按下对应的 LED 灯亮

3.5 UART 测试

- ▶ 源码位置: code\uart
- ▶ 测试说明:此例程展示了 LPC122X 开发板通过 UART 发送数据。
- ▶ 测试现象:如下图:

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www.strong-ic.com

SSC0=3.2	(作者:	: 聂小猛 (TT),	主页htt	p://www	r. neu5	1.com,	- Real	ail: m.	-	
LPC12XX开发板。 LPC12XX开发板。 LPC12XX开发板。 LPC12XX开发板。 LPC12XX开发板。 LPC12XX开发板。 LPC12XX开发板。 LPC12XX开发板。 LPC12XX开发板。 LPC12XX开发板。 LPC12XX开发板。	2011-5- 2011-5- 2011-5- 2011-5- 2011-5- 2011-5- 2011-5- 2011-5- 2011-5-	-25 -25 -25 -25 -25 -25 -25 -25 -25 -25									
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www.mcu51.com	S:0	1	R:264	C	OM1 已关	闭 960)Obps (8 1 CI	S=O DSR	=0 RLSI	0=0

3.6 Timer 测试

- ▶ 源码位置: code\timer0-32
- ▶ 测试说明:此例程展示了 LPC122X 开发板通过 Time0 来控制 LED 灯
- ▶ 测试现象:发光二极管灯亮,过三秒钟,发光二极管灯灭。

4 软件资源测试

4.1 MDK 介绍

RealView MDK 开发套件是 ARM 公司目前最新推出的针对 ARM MCU 嵌入式处理器 的软件开发工具。RealView MDK 集成了业内最领先的技术, MDK4.14包括 µVision4 集成开发环境与 RealView RVCT 编译器。支持 ARM7、ARM9 、Cortex-M0 和 Coretx-M3 核处理器,自动配置启动代码,集成 Flash 烧写模块,强大的 Simulation 设备模拟,性能分析等功能。MDK 软件可在在资料包的 tool 里找到或者从 Keil 网站 www. keil. com 中下载最新版本。双击安装文件 setup. exe, 出现如下的安装界面,根据界面安装向导的提示,完成 Keil uVision 的安装。

Welcome to Keil µ Vision Release 12/2010	
This SETUP program installs:	
MDK-ARM V4.14	
This SETUP program may be used to updat However, you should make a backup copy	e a previous product installation. before proceeding.
It is recommended that you exit all Windows	programs before continuing with SETUP.
Follow the instructions to complete the prod	uct installation.

4.2 编译例程

4.2.1 打开例程

打开 software\Examples 中对应例程文件夹 project 目录下的*.uvproj 工程文件。 以下以 uart 例程为例。

4.2.2 新建工程

1) 点击桌面上的 Keil uVision4 图标,出现启动画面:



2) 点击 "project --- New uVision Project" 新建一个工程

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🔣 🛛 Vision4				
<u>Eile E</u> dit <u>View</u>	Broj	eet Flash Debug Perjpherals Teels SVCS M	<u>indew Help</u>	
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1		<u>C</u> lose Project		
		Export	•	
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		Select Device for Target		
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	N.	Options	Alt+F7	
		Clean <u>t</u> arget		
	(-1-1-1) ()	<u>B</u> uild target	F7	
		<u>R</u> ebuild all target files		
	0	Batch Build		
	3	Tr <u>a</u> nslate	Ctrl+F7	
		Stop b <u>u</u> ild		
		<u>1</u> C:\Documents and Settings\Administrator\桌面\adc_v	/1\adc.uvproj	
		2C:\Documents and Settings\Administrator\桌面\adc\a	idc.uvproj	
		3_C:\Documents and Settings\Administrator\桌面\uart\	uart_test.uvproj	
		<u>4</u> C:\Documents and Settings\Administrator\桌面\新建	文件夹\3\uart.uvproj	

3) 在对话框,选择放在刚才建立的"company"文件夹下,给这个工程取个名 uart 后保存,不需要填后缀,默认的工程后缀为 uvpor j:



4) 弹出一个框,在 CPU 类型下我们找到并选中 NXP 下的 LPC122x * 201

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Select Device for Target '1	arget 1'	×
CPU		
Device:		
Toolset:		
<u>D</u> ata base	Description:	
NXP (founded by Philips) EM773 EM773 LH75400 LH75401 LH75410 LH75411 LH7520 LH79522 LH79525 LH79525 LH7400 LH74404 LPC1111x101 LPC1111x101 LPC1111x201		
	OK Cancel	Help

Device: LPC1224x201 Toolset: ARM	
Data base	Des <u>c</u> ription:
LPC1114x302 LPC11C12x301 LPC11C12x301 LPC11C22x301 LPC11C24x301 LPC1224x301 LPC1225x301 LPC1225x301 LPC1225x301 LPC1225x301 LPC1225x301 LPC1225x301 LPC1227x301 LPC1311 LPC1313 LPC1342 LPC1342	ARIM Cortex-MU processor: - running at frequencies of up to 33 MHz. - Nested Vectored Interrupt Controller (NVIC). - Serial Wire Debug and Serial Wire Trace port. - System tick timer. Memory: - Up to 128 kB on-chip Flash (ISP and IAP via on-chip bootloader softwar - Up to 128 kB on-chip SRAM. Clock generation unit: - On-chip crystal oscillator (operating range of 1 MHz to 25 MHz). - 12 MHz Internal RC oscillator (IRC). - On-chip PLL allows CPU operation up to the maximum CPU rate. - Clock output function that can reflect various clocks. - Real-time clock.



6) 在下面空白区域写入一个完整的 C 程序

🔣 C:\Documents and S	Settings\Administrator\桌面\b\uart.uvproj - #Vision4
Eile Edit Yiew Project	: Fl <u>a</u> sh <u>D</u> ebug Peripherals <u>T</u> ools <u>S</u> VCS <u>Wi</u> ndow <u>H</u> elp
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Project 4 ×	Text2*
E Target 1	/*File InformationFile Information
	#include "lpc12xx.h" #include "uart.h"
	#define FOSC 12000000 /* 外部晶振频率*/ #define FCCLK (FOSC * 8) /* 主时钟频率<=100Mhz*/ #define FCCO (FCCLK * 2) /* PLL频率(156Mhz~320Mhz)*/ #define FPCLK (FCCLK / 4) /* 外设时钟频率, FCCLK的1/4*/ #define UART0_BPS 9600 /* 串口通信波特率*/ #define UART1_BPS 115200 /* 串口2通信波特率*/
	<pre>/**Function name: UARTO_Init ** Descriptions: 初始化串口0的引即和通讯参数。设置为8位数据位,1位停止位,无奇偶枚验 ** output parameters: 无 ** output parameters: 无 ** Returned value: 无 void UARTO_Init (void) { uint16_t usFdiv; }</pre>
	LPC_IOCON->PIO0_9 = (1<<1); /* Pin PIO0_9 used as TXD1*/ LPC_IOCON->PIO0_8 = (1<<1); /* Pin PIO0_8 used as RXD1*/
	LPC_UARTO->LCR = 0x83; /* 1-bit stop, 8-bit charater,DLAB=1可设置波特率*/ UsFdiv = (FPCLK / 16) / UARTO_BPS; /* 设置波特率 */ LPC_UARTO->DLM = USFdiv / 256; LPC_UARTO->DLL = USFdiv % 256;
	LPC_UART0->LCR = 0x03; /* 锁定波特率*/ LPC_UART0->FCR = 0x06; }

7) 输入源程序文件名名称,在这里输入"uart",这个名称,同样大家可以随便命 名。注意:如果您想用汇编语言,要带后缀名一定是"test.asm",如果是C语言,则 是"uart.c",然后保存:

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Add Files to Group 'Source Group 1'...

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🔣 C : \Documen	ts a	nd Settings\Administrator\桌面\b\uart.	avproj - µVision4
<u>File E</u> dit <u>V</u> iew	Pr	roject Fl <u>a</u> sh <u>D</u> ebug Peripherals <u>T</u> ools <u>S</u> VCS	<u>W</u> indow <u>H</u> elp
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		Add Group	9600
		Add Files to Group 'Equires Group 1'	115200
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		Manage Components	Æ
			— 无
	\checkmark	Show Include File Dependencies	七
		023 void UARTO_Init (void) 025 { 026 uint16_t usFdiv; 027	******

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Add Files to Group 'Source Group 1'		<u>? ×</u>
查找范围 (I): C b	•	+ 🗈 📸 🖬 -
🗐 uart. c		
文件名(N): luart.c		
文件类型(I): C Source file (*. c)		

9) 最后还要有设置一下,按下图设置晶振,修改成12M,因12MHZ方便计算指令时

间

NXP (founded by Philips) LPC1224x201	evice Ta	arget 0	utput Lis	ting Vser	C/C++ A	lsm I	inker De	bug Util:	ities	
∠tal (MH2) Image: Code Generation Operating system: None Image: Use Cross-Module Optimization Image: Use Cross-Module Optimization Image: Use MicroLIB Big Endian Image: Use Cross-Module Optimization Image: Use Link-Time Code Generation Read/Only Memory Areas Generation default off-chip Start Size Image: Image	NXP (found	ded by Ph	ilips) LPC122	4x201						
Operating system: None Image: Construction of the system: Image: Construction of the system: <				∐tal (MHz):	2.0	-Lode b	eneration -			
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on-chip on-chip on-chip		ROM3:		-	0		RAM3:			
▼ IROM1: 0x0 0x8000 ● IRAM1: 0x10000000 0x1000 □ □ IROM2: □ □ IRAM2: □ □		on-chip					on-chip			
		ROM1:	0x0	0x8000	•		IRAM1: 0	x10000000	0x1000	
		ROM2:			0		IRAM2:			
										-0
							-			

10) 在 Output 栏选中 Create HEX File, 使编译器输出需要的 HEX 文件:

vice Target Output Listing User	C/C++ Asm Linker Debug Utilities
Select Folder for Objects	Name of Executable: uart
 Create Executable: .\uart Debug Information Create HEX File Browse Information Create Library: .\uart.LIB 	🗖 Create Batch File

11) Debug 中选择 Use 里的 ULINK Cortex Debugger

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evice Target Output	Listing User C/	/C++ A:	m Linker	Debug Utiliti	es	
C Use <u>S</u> imulator ☐ Limit Speed to Real-Tim	e	ettings	C Use ULINK	Cortex Debugger	•	Settings
Load Application at Star Initialization File:	tup 🔽 Run to main	n()	 Load Applica Initialization File: 	tion at Startup	Run to	main()
	E	Edit	[Edit
Restore Debug Session S	ettings		Restore Debug	Session Settings		
I ■ Breakpoints	Toolbox		I Breakpoin	ts 🔽 Too	box	
☑ Watch Windows & F	Performance Analyzer		Vatch W	indows		
Memory Display			Memory D	isplay		
CPU DLL: Paramete	r.		Driver DLL:	Parameter:		
SARMCM3.DLL			SARMCM3.DLL			
Dialon DI I Paramete	r		Dialog DLL:	Parameter		
DARMP1.DLL -pLPC12	24	-	TARMP1.DLL	pLPC1224		
, ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,				1		
			10			

12) 在 Utilities 里选中 Use Target Driver for Flash Programming 里的 ULINK Cortex Debugger

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Configure Flash Me	enu Command	<i>.</i>				
• Use Larget Dr	IVER FOR Flash Program		Cottingo	🔽 Undata Ta	raat bafara Dabuaain	-
Init File:	INK Correx Debugger		Seturigs		dit	y
🔿 Use External 1	ool for Flash Program	ming				
Command:						
Arguments:						_
Ē	Run Independent					

13) 工程项目创建和设置全部完成! 点击保存并编译(下图):

🔣 C:\Documents and Se	ttings\Administrator\\$	面\b\uart.	uvproj - µ¥
<u>Eile E</u> dit <u>V</u> iew Project	Flash <u>D</u> ebug Pe <u>r</u> ipherals	Tools SVCS	<u>W</u> indow <u>H</u> elp
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🕸 🗃 🔛 🙀	Target 1	x 🛔 🗟	
Project Rebuild	art.c		-
E Tari Rebuild all tar	get files / *		
🖻 😋 Source Grou	002 ** Author	:	zhangxiao
startup_	003 ** File name	:	uart.c
t uart.c	004 ** Creat Date	:	2011-05-25
	005 ** Version	:	V1.00
	006 ** Description:	з:	example co
	007		
	008 #include "lpc1:	2xx.h"	
	009 #include "uart	.h"	
	010		

4.2.3 编译例程

1) 如果需要 hex 格式文件,则配置 MDK 生成 hex 文件,点击 Select Folder for Objects…指定 hex 文件的输出目录,否则跳过此步

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vice Target Output		T T	1 K	Concerning the Concerning State	
	Listing User	C/C++ Asm L	inker Debug U	tilities	
Calcat Falder (a. O		Nama at Europeanda	uart test		-
	Jects	Manie of Executable			
Create Executable	: .\uart_test				
Debug Informati	on			🗖 Create	Batch File
Create HEX File					
Browse Informat	ion				
C Create Library: .\u	art_test.LIB				
	200000		1000 C	1 1	120040
	OK	Cancel	Defaults		Help
如果需要 bin 格	 	Cancel 置 MDK 生成 bin	Defaults 格式文件,否	 	Help 步。
如果需要 bin 格	OK 式文件,则配	Cancel 置 MDK 生成 bin	Defaults 格式文件,否	则跳过此步	Help F.
如果需要 bin 格 ions for Target '	OK 式文件,则配 [arget 1]	Cancel 置 MDK 生成 bin	Defaults 格式文件,否	 	Kelp 步。
如果需要 bin 格 ions for Target ': evice Target Output	OK 式文件,则配 Target 1' Listing Vser	Cancel 置 MDK 生成 bin C/C++ Asm L	Defaults 格式文件,否 inker Debug V	】	Help ⊬.
如果需要 bin 格 ions for Target ' evice Target Output - Run Vser Programs B	OK 式文件,则配 [arget 1] [Listing User efore Compilation	Cancel 置 MDK 生成 bin C/C++ Asm L a of a C/C++ File	Defaults 格式文件, 否 inker Debug V	 则跳过此才 tilities	Kelp 步。
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如果需要 bin 格 ions for Target ' wice Target Output -Run User Programs B Run #1: Run #2: -Run User Programs B	OK 式文件,则配 Target 1' Listing User efore Compilation	Cancel 置 MDK 生成 bin C/C++ Asm L a of a C/C++ File	Defaults 格式文件, 否 inker Debug V	」 「则跳过此去 tilities」	Help
如果需要 bin格 ions for Target ' evice Target Output -Run User Programs B □ Run #1: □ Run #2: -Run User Programs B □ Run #1:	OK 式文件, 则配 [arget 1] [Listing User efore Compilation	Cancel 置 MDK 生成 bin C/C++ Asm L a of a C/C++ File	Defaults 格式文件, 否 inker Debug V	 则跳过此才 tilities 	Help Kelp Dosi6 Dosi6 Dosi6
如果需要 bin 格 ions for Target ' wice Target Output -Run User Programs B Run #1: Run #2: -Run User Programs B Run #1: Run #2:	OK 式文件, 则配 [arget 1] Listing User efore Compilation	Cancel 置 MDK 生成 bin C/C++ Asm L a of a C/C++ File	Defaults 格式文件, 否 inker Debug V	(「则跳过此去 tilities ((Help
如果需要 bin 格 ions for Target ' wice Target Output Run User Programs B Run #1: Run #2: Run User Programs B Run #1: Run #1:	OK 式文件, 则配 [arget 1] [Listing User efore Compilation	Cancel 置 MDK 生成 bin C/C++ Asm L a of a C/C++ File	Defaults 格式文件, 否 inker Debug V	 则跳过此才 tilities 	Help Kelp Dosi6 Dosi6 Dosi6 Dosi6 Dosi6
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如果需要 bin 格 ions for Target ' wice Target Output -Run User Programs B Run #1: Run #2: Run Wser Programs B Run #1: Run #2: -Run User Programs A ▼ Run #1: frome1	OK 式文件, 则配 [arget 1'] Listing User efore Compilation efore Build/Rebuil fter Build/Rebuil	Cancel 置 MDK 生成 bin C/C++ Asm L a of a C/C++ File .1d .1d uart_test.bin uart_	Defaults 格式文件, 否 inker Debug V	i则跳过此去 tilities	Help
如果需要 bin 格 ions for Target ' evice Target Output -Run User Programs B □ Run #1: □ Run #2: -Run User Programs B □ Run #1: □ Run #2: -Run User Programs A ▼ Run #1: frome1 □ Run #2:	OK 式文件, 则配 [arget 1] [Listing User efore Compilation efore Build/Rebuil fter Build/Rebuil	Cancel 置 MDK 生成 bin C/C++ Asm L a of a C/C++ File 1d uart_test.bin uart_	Defaults 格式文件, 否 inker Debug V	 「则跳过此才 tilities 「	Help Help Dosi6 Dosi6 Dosi6 Dosi6 Dosi6 Dosi6 Dosi6 Dosi6

fromelf --bin --output uart_test.bin uart_test.axf 表示:利用 Keil 自带的 fromelf.exe 生成 bin 文件, uart_test 是工程名

3) 使用微库 MicroLIB,在使用 printf 语句通过串口打印调试信息时需要点上
 ADD: 北京市海淀区中关村大街 32 号新中发电子市场 5007 室
 18
 TEL: 010-82675858 FAX: 010-82638586



这个。点击菜单 Project->Options for Target,在 Target 选项卡中右侧选 中 Use MicroLIB 即可。

tions f	or Tar	get 'Targ	et 1'						
Device 7	[arget	Output Lie	sting User	C/C++ A	sm I	inker]	Debug Vtil:	ities	
NXP (four	nded by P	'hilips) LPC12;	24x201						
			⊻tal (MHz): 1	2.0	Code	ieneration			
Operatio		None	-	-		se Cross-N	4odule Optimiza	ition	
operau	ng system	. Jivone			V	se MicroLl	в	Big Endian	
					U	se Link-Ti	me Code Gener	ation	
Read/0	Only Mem	ory Areas	2000 M		- Read/	Write Men	nory Areas		
default	off-chip	Start	Size	Startup	default	off-chip	Start	Size	Nolnit
	ROM1:			C		RAM1:			
	ROM2:			- C		RAM2:			
	ROM3:			- c		RAM3:			
	on-chip					on-chip			
	IROM1:	0x0	0x8000	۲		IBAM1:	0x10000000	0x1000	
	IROM2:			C		IRAM2:			
		Γ		1 -	- 1	200	1	-	
			UK	L'an	Cel		aults		Help

4) 点击 project->Build target 编译,或者点快捷按钮

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Edit	⊻iew	Proj	ect F	=l <u>a</u> sh	Debug	Peripherals	<u>T</u> ools	<u>s</u> vcs	Window	Help		
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t			Open	Projec	:t							
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	tuar		Remo	ve Ite	m							
		*	Optior	ns for	Target 'Ta	arget 1'						Alt+F7
			Clean	i <u>t</u> argel	t							
			<u>B</u> uild t	target								F7
			<u>R</u> ebuil	ild all ta	arget files	;						
		0	Batc <u>h</u>	Build.								
		۲	Tr <u>a</u> nsl	late C:	:\uart\mai	in.c						Ctrl+F7
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4.3 使用仿真器调试和下载程序

以下步骤的基础是您购买或已经拥有相应的硬件仿真器。

4.3.1 使用 ULINK2 调试程序

1) 选择仿真器

C Use <u>S</u> imulato □ Limit Speed t	r Settings o Real-Time	• Use ULIN	K Cartex Debugger 👱 Settings
 Load Applica Initialization File: 	tion at Startup 🔽 Run to main()	Load Applic Initialization File:	ation at Startup 🗖 Run to main()
Restore Debug	Session Settings Its IV Toolbox indows & Performance Analyzer isplay	Restore Debu Breakpo Watch V Memory	ng Session Settings ints I⊄ Toolbox √indows Display
CPU DLL:	Parameter:	Driver DLL:	Parameter:
SARMCM3.DLL		SARMCM3.DLI	
Dialog DLL:	Parameter.	Dialog DLL:	Parameter:
DARMP1 DU	-pLPC1224	TABMP1.DLL	oLPC1224

2) 检查 ULINK2 的好坏,此步骤可以选择 如果 ULINK2 通过 USB 线连接到开发板后,上面的 RUN 和 COM 指示灯先变为 蓝色再熄灭,而 USB 指示灯一直为红色,则说明 ULINK2 没问题。 另外还是可以点击 Debug 选项卡中右边的 Settings 按钮,出现下图红色标 记的部分,则说明 ULINK2 是好的

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ortex-B Target Driver Setup	×
Debug Trace Flash Download	,
NK_USB - JTAG/SW Adapter SW Device	
Serial No: V0VV123 V IDCODE Device Name	Move
SWDIO Ox0BB11477 ARM CoreSight SW-DP	Up
	Down
Device Family: [Lortex-M	
Firmware Version: V1.42 C Automatic Detection ID CODE:	
SWJ Port: SW C Manual Configuration Device Name:	
Max Clock: 1MHz Add Delete Update IR len:	
Debug	
Connect & Reset Options Cache Options Download Options	ions
Connect: Normal Preset: Autodetect IV Cache Lode IV Verify Cod Reset after Connect: V Stop after Rootloader V Cache Memory Download	to <u>F</u> lash
OK Cancel	Help
OK Cancel Defaults	Help
) 位值 ULINKZ 肥百位测到开反似	X
Debug IFace Flash DownLoad	1
ULINK USB - JTAG/SW Adapter SW Device	
Serial No: V0VVV123 IDCODE Device Name	Move
ULINK Version: ULINK2	Up
Device Family: Cortex-M	Down
Firmware Version: V1.42	_
SWJ Port SW C Manual Configuration Device Name	
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Debug Cache Options Download Options Connect & Reset Options Image: Cache Options Image: Cache Options Connect: Normal Image: Reset: Autodetect Image: Cache Options Image: Reset after Connect Image: Stop after Bootloader Image: Cache Memory Image: Download Image: OK Cancel Image: OK Cancel Image: Defaults	ions e Download to <u>F</u> lash Help Help

4) 设置 Flash 编程器, 先配置 Utilities 选项卡里的内容



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evice Target Output Listing User C/C++ Asm Linker Debug Utilities	-				
Configure Flash Menu Command					
 Use Target Driver for Flash Programming 					
ULINK Cortex Debugger 🗾 Settings 🔽 Update Target before Debugging					
Init File <mark>: ULINK Cortex Debugger Edit</mark>					
Cortex-M/R J-LINK/J-Trace					
VUSe Extern NULink Debugger					
Command:					
Arguments:					
E Run Independent					
OK Cancel Defaults He	lp				
击 Settings 按钮,出现下图:					
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rtex-M Target Driver Setup	×				
rtex-M Target Driver Setup ebug Trace Flash Download	2				
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Image: Target Driver Setup ebug Trace Flash Download Download Function RAM for Algorithm Control Erase Full Chip Program Erase Sectors Verify O not Erase Reset and Run					
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Target Driver Setup Jebug Trace Plash Download Download Function Erase Full Chip ✓ Program ⓒ Erase Sectors ✓ Verify ○ Do not Erase ✓ Reset and Run Programming Algorithm Device Type Description Device Type Image: PC11xx/122x/13xx IAP 32k. On-chip Flash Start: Dx0000000 Size: 0x0000000 Size: 0x00000000					
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Iter Target Driver Setup Trace Flash DownLoad Download Function					
Iterce Trace Flash Download Download Function Erase Full Chip Program Erase Sectors Verify Do not Erase Reset and Run Start: 0x10000000 Size: 0x0800 Programming Algorithm Device Type Device Size Address Range LPC11xx/122x/13xx IAP 32k On-chip Flash 32k 000000000H - 00007FFFH Start: 0x00000000 Size: 0x00000000H 0x00000000H Add Remove Item output Item outpu	P				

如果上面的 Programming Algorithm 框中为空,则点击上面的 Add 按钮来 添加相应的 Flash 编程算法,如下



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Description	Device Type	Device Size	
ATSAM3X 128kB Flash	On-chip Flash	128k	
ATSAM3X 256kB Flash	On-chip Flash	256k	
ATSAM3X 512kB Flash	On-chip Flash	512k	
ATSAM3X GPNVM bits	On-chip Flash	16	-
EFM32G	On-chip Flash	128k	
K8P5615UQA Dual Flash	Ext. Flash 32-bit	64M	
LM3Sxxx 128kB Flash	On-chip Flash	128k	
LM3Sxxx 16kB Flash	On-chip Flash	16k	
LM3Sxxx 256kB Flash	On-chip Flash	256k	
LM3Sxxx 32kB Flash	On-chip Flash	32k	
LM3Sxxx 64kB Flash	On-chip Flash	64k	
LM3Sxxx 8kB Flash	On-chip Flash	8k	
LPC122x IAP 128kB Flash	On-chip Flash	128k	
LPC11xx/13xx IAP 16kB Flash	On-chip Flash	16k	
LPC11xx/13xx IAP 24kB Flash	On-chip Flash	<u>24k</u>	
LPC11xx/122x/13xx IAP 32k	On-chip Flash	32k	

5) 点击^④快捷按钮或点击 Debug->Start/Stop Debug Session 开始调试程,

调试状况如下图所示:

[] C:\uart\uart_test.uvproj = # Vision []	n4	_ 8 ×
Elle Edit View Project Flash Debug Per	ijpherals Iools SVCS Window Help	
🗋 🚰 🖬 🖉 👌 🛍 🚨 🕾 🗠 🕬	 ● 微 微 微 律 滞 /// // // // // // // // // // // //	
😂 🎬 🎬 🥥 📑 🙀 Target 1	· 🕺 着 🔁	
Project	a x 🕑 mainc 🗄 uart. 🕅 uart. h	▼ ×
Tarati Taratian Ta	<pre>19 (20 uint32_t 1; 21 i = 0; 22 vhile (Time) (23 vhile (Time) (24 for (i = 0; i < 5000; i++); 25) 27 / 28 ** Descriptions: main 29 ** Descriptions: 主函数 30 ** input parameters: vold 31 ** couput parameters: 无 32 ** Returned value: 无 33 **********************************</pre>	-
Build Output		ų×
Build target 'Target 1' assembling startup_LPC122x.s compiling monemolec compiling main.c compiling system_LPC122x.c creating Library User command #1: fromelfbin - "uart_test.lib" - 0 Error(s), 0	output wart_test.bin wart_test.axf Warning(s).	×
1		F
	ULINK Cortex Debugger L:10 C:12 CAP NUM 5C	RL OVR R/W

4.3.2 使用 ULINK2 下载程序

1) 核对 Flash 编程器设置

ADD: 北京市海淀区中关村大街 32 号新中发电子市场 5007 室 TEL: 010-82675858 FAX: 010-82638586

北京胜创特电子科技有限公司
www.strong_ic.com

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Device Target Output Listing User C/C++ Asm Linker Debug Utilities						
Configure Flash Menu Command						
Use Target Driver for Flash Programming						
ULINK Cortex Debugger Settings Update Target before Debugging						
Init File:						
C Use External Tool for Flash Programming						
Command:						
Arguments:						
Run Independent						
UK Uancel Defaults Help						
ortex-I Target Driver Setup						
Debug Trace Flash Download						
Download Function						
Cload C Erase Full Chip IV Program C Erase Sectors IV Verify Start: 0x10000000 Size: 0x0800						
C Do not Erase Reset and Run						
Programming Algorithm						
LPC11xx/122x/13xx IAP 32k On-chip Flash 32k 00000000H - 00007FFFH						
Start: 0x00000000 Size: 0x00008000						
Add Remove						
Add Remove OK Cancel Help						

2) 点击 Flash->Download 或如下图的快捷按钮开始下载



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🔣 C:\uart\uart_test.uvproj - #Vision4						
<u>Eile Edit Yiew Project</u>	Flash Debug Peripherals	<u>Tools S</u> VCS <u>W</u> indow <u>H</u> elp				
i 🗋 😂 🛃 🥥 🔥 🛍	Download	1四、1四、1二、1三、11日 (四) FPCLK				
1 🕸 🖾 🕮 🖓 层 🙀	Erase	1 📥 🔁				
Project	Configure Flash Tools	🔒 main.c 🔝 uart.c 📄 uart.h				
Target 1 Source Group 1 Source Group 1 Startup_LPC1 System_LPC12 System_LPC12 System_LPC12 System_LPC12 Source_cm0. Substart.c Substart.c	22x. 5 22x. c h	<pre>19 { 20 uint32_t i; 21 22 i = 0; 23 while (Time) { 24 for (i = 0; i < 50 25) 26 } 27 /********************************</pre>				