# NXP M0 Demo 板













# Demo Code 的介绍

1,	"UP"	进入 ADC 演示模式
		通过电位器 VR1 改变 AD 的值并在 LCD 上显示
2、	"DWON"	进入 Timer 演示模式
		通过 SW1~4 改变 LED 闪烁方式
3、	"RIGHT"	进入 GPIO 演示模式
		检测 SW1~4 的状态并在 LCD 上显示
4、	"LEFT"	进入 PWM 演示模式
		通过电位器改变蜂鸣器的发声频率
5、	"Enter"	返回主菜单界面

# 安装 Keil 及 M0 EVM 的驱动

.X.

# LPC1100 Tool Solutions

CASEP				Availability
	LPC PRESSO		NXP's Low cost Development Tool Chain	December 2009
	mbed		Rapid Prototyping Online Tool	In Development
	SYSTEMS	ed (	Traditional Feature Rich Tools (third party)	December 2009
	► KEIL™ An ARM® Company	Embedded Artists		

#### **Preparations**

1, Install Keil uVision4

MDK412.exe



2, Install Colink driver

ColinkExUsbDriver-1.1.0.exe

SColinkExUsbDriver-1.1.0.exe

CoMDKPlugin-1.2.3.exe

# CoMDKPlugin-1.2.3. exe

3, DownCable 和 EVM board 分别连上 USB, 板间用排线连接起来

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You can find "CooCox ColinkEx Debug Interface" in DeviceManager

## Keil 环境下工程的建立

#### 创建工程

首先,新建一个文件夹用于存放工程文件,此处文件名为"Cortex-M0",放在 C 盘(盘符可自行选择);

然后,把"Common"文件夹拷贝到"Cortex-M0"目录下(Common 文件夹在拷给各位的 U 盘文件中的"05 Hands On"文件夹下)

接着,在 Cortex-M0 文件夹下新建名为 "Blinkly" 的文件夹( 此文件夹用来存放我们的 工程文件, 工程路径中建议不要有中文和空格 )

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#### 选择 Device, 在 NXP (founded by Philips) 中找到 LPC1114x301, 单击 ok

单击"是"选择 Keil 自动为工程添加启动代码

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#### 看到初始化的工程界面



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#### 在 Text1 中输入需要编写的代码 ( 复制下页中的代码 )

#### 把代码复制到 Text1 中

```
#include "LPC11xx.h"
#include "clkconfig.h"
#include "gpio.h"
void delay(uint32_t ms){
  uint32 t i;
  for( i=0; i<ms; i++);
}
int main (void) {
  SystemInit();
  /* Enable AHB clock to the GPIO domain.
  //LPC SYSCON->SYSAHBCLKCTRL |= (1
  /* Set port 2 2 to output */
  GPIOSetDir( 2, 2, 1 );
  while (1)
                                                 /* Loop forever */
  {
       GPIOSetValue(2, 2, 1);
                                       // Set port 2 2 to high
       delay(200000);
       GPIOSetValue( 2, 2, 0 );
                                       // Set port 2_2 to low
       delay(200000);
```

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点击 Files ——> Save, 输入文件名 "Blinky.c" 保存为 .C 文件

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双击 Source Group 1, 继续添加文件到工程中

1, clkconfig.c; 2, core\_cm0.c 3, gpio.c 4, system\_LPC11xx.c



在 Project ——> Options for Target "Target 1" ——> Target ——> 勾选 Use Miro LIB, 点击 ok

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#### 在 Project ——> Rebuild all target files



#### 确认硬件连接

使用 USB 线给 Download Cable 供电 使用 USB 线给 M0 EVM Board 供电 使用排线连接 Download Cable & M0 EVM Board





#### 选择仿真器 Coocox Debugger

 $\label{eq:project} \begin{array}{c} \text{Project} & \longrightarrow \end{array} \\ \begin{array}{c} \text{Options for Target ``Target 1'' } & \longrightarrow \end{array} \\ \begin{array}{c} \text{Debug} & \longrightarrow \end{array} \\ \begin{array}{c} \text{Use CooCox Debugger} \end{array} \\ \end{array}$ 

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Project ——〉 Options for Target "Target 1" ——〉 Debug ——〉 Use CooCox Debugger — —〉 点击 Settings, 可识别 IDCODE 0x0BB11477, 表示硬件已连接, "Reset Options" 下 拉选中 "SYSRESETREQ" 点击 ok

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下载, 仿真

编译程序 Project → Rebuild all target files
下载程序 Flash → à Download
仿真 Debug → à Start/Stop Debug Session

现象: 红色侧光 LED2 闪烁

#### 生成 bin 文件

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"user" -->> "Run User Programs After Build /Rebuild"

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	OK Cancel Defaults Help	

### 常用的 GPIO 库函数

void GPIOInit( void );

```
void GPIOSetDir( uint32_t portNum, uint32_t bitPosi, uint32_t dir );
void GPIOSetValue( uint32_t portNum, uint32_t bitPosi, uint32_t bitVal );
void LEDToggle( uint32_t portNum, uint32_t bitPosi);
GPIO 程序示例
Pin: PIO2 2
int main (void) {
  SystemInit();
  /* Enable AHB clock to the GPIO domain. */
  LPC SYSCON->SYSAHBCLKCTRL |= (1<<6);
  /* Set port 2 2 to output */
  GPIOSetDir( 2, 2, 1 );
                                               /* Loop forever */
  while (1)
  Ł
      GPIOSetValue( 2, 2, 1 );
                                    // Set port 2 2 to high
      delay(1000);
      GPIOSetValue(2, 2, 0);
                                        // Set port 2_2 to low
      delay(1000);
  }
}
```

# 修改程序点亮 LED7 ( PIO1\_11)

## 常用的 Timer 库函数

void delay32Ms(uint8\_t timer\_num, uint32\_t delayInMs);

void TIMER32\_0\_IRQHandler(void); void TIMER32\_1\_IRQHandler(void);

void enable\_timer32(uint8\_t timer\_num); void disable\_timer32(uint8\_t timer\_num);

void reset\_timer32(uint8\_t timer\_num); void init\_timer32(uint8\_t timer\_num, uint32\_t timerInterval);

# Timer 程序示例

```
int main (void) {
 SystemInit();
  init_timer32(1, TIME_INTERVAL);
  enable_timer32(1);
 LPC_SYSCON->SYSAHBCLKCTRL |= (1<<6); /* Enable AHB clock to the GPIO domain. */
  GPIOSetDir( 2, 2, 1 );
                                 /* Set port 2 0 to output */
  while (1)
                                  /* Loop forever */
  {
   /* I/O configuration and LED setting pending. */
   if ( (timer32_1_counter > 0) && (timer32_1_counter <= 50) )</pre>
   -{
     GPIOSetValue(2, 2, 0);
   3
   if ( (timer32 1 counter > 50) && (timer32 1 counter <= 100) )
   {
    GPIOSetValue(2, 2, 1);
   }
   else if ( timer32_1_counter > 100 )
   - {
     timer32_1_counter = 0;
   3
  }
}
void TIMER32 1 IRQHandler(void)
£
                               /* clear interrupt flag */
  LPC_TMR32B1->IR = 1;
  timer32_1_counter++;
  return;
3
```

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## 使用 Timer32\_1 控制 LED7 闪烁频率

#### 常用的 ADC 库函数

```
void ADC_IRQHandler( void );
```

void ADCInit( uint32\_t ADC\_Clk );

uint32\_t ADCRead( uint8\_t channelNum );

void ADCBurstRead( void );

```
int main(void){
    uint32_t ADC_value;
    unsigned char buf[4];
    SystemInit();
    ini_lcd();
    CLR(1);
    Open_LCD_Light();
    CLR(1);
    ADCInit(ADC_CLK);

while (1){
    ADCGetValue_Average();
    ADC_value = ADCGetValue_Average();
    buf[0] = ADC_value/100%10+'0';
    buf[1] = ADC_value/100%10+'0';
    buf[2] = ADC_value/10%10+'0';
    buf[3] = ADC_value%10+'0';
    Show_English(" ADC Demo ", 0, 0);
    Show_English(" ADC Demo ", 0, 0);
    Show_English(" MV ", 7, 6);
    }

void ADCInit (unt32_t ADC_CLK)
{
    LPC_SYSCON->PDRUNCEG 4= ~(0x1<4);
</pre>
```

```
uint32_t ADCGetValue_Average ( void )
Ł
  uint32_t ADC_Data_5_Average = 0;
  uint32_t ADC_Data_5_Sum = 0;
  uint32_t Sampling_times= 0;
      for (Sampling times = 0; Sampling times < 5; Sampling times++)
    ADCGetValue();
11
      LPC ADC->CR |= (1 << 24) | (1 << 5);
       while (( LPC ADC->DR[5] & 0x80000000) == 0);
       ADC_Data_5 = LPC_ADC->DR[5];
ADC_Data_5 = (ADC_Data_5 >> 6) & 0x3fe;
//ADC_Data_5_Sum += ADC_Data_5;
//ADC_Data_5_Sum += ADCGetValue();
       ADC_Data_5_Sum += ADC_Data_5;
       //Delay(200);
       3
       ADC_Data_5_Average = ADC_Data_5_Sum / 5;
ADC_Data_5_Average = (ADC_Data_5_Average * 3300) / 1024;
       //Delay(200);
 return ( ADC Data 5 Average );
}
```

# Flash Magic 工具的使用

# Flash Magic

Flash Marie - NON PRODUCTION USE ONLY			
File ISP Options Fools Malo			
Step 1 - Communications Step 2 - Erase			
Select Device LPC1114/301 Erase block 0 (0x000000 0x000FFF)	🎲 Flash Ia	gic - NON PRODUCTION USE ONLY	
COM Port: COM 1	<u>F</u> ile <u>I</u> SP <u>Op</u> t	ions <u>T</u> ools <u>H</u> elp	
Baud Rate: 9600	🦻 🗖 🔍 🕻	) 🐗 🗸 🎩 🔌 國 😵 😂	
Interface: None (ISP)	Step 1 - Commun	ications Step 2 - Erase	
Oscillator (MHz): 12 Erase blocks used by Hex File	Select Device	LPC1768 Erase block 0 (0x000000-0x000FFF)	
	COM Port:	COM 1	
Step 3 - Hex File	Baud Bate:	9600	
Hex File: V03-Sortware Embest V01-Blinky Vproject VD0/Embest_LPC1100.nex Browse Modified 足期一 人目 23, 2010 15:09! more info	Interface:	Linase block 4 (0x004000-0x004FFF)	
Step 5. Start	intenace.	Erase all Flash+Code Rd Prot	
Verify after programming	Uscillator (MHz):	Erase blocks used by Hex File	
✓ Fill unused Flash	<b></b>	Device Signature	
Gen block checksums	Step 3 - Hex F		
Technical on-line articles about 8051 and XA programming	Hex File: D:\(	Manufacturer ID: 0x	
www.esacademu.com/fan/docs	Modi	Device ID 1: 0x	
0	Step 4 - Option	Device ID 2: 0x	
		Device ID: 0x 26013F37	
	Fill unused F		
	🗌 Gen block c	Bootloader Ver: 4.1	
	Execute	,	
	Rotating, fully c	Serial Number: 421072387 1398086215 1256696476 4110417927	
	application!		
		Close	
	$\sim$		
_ X\\\			
~'			