

YRCN79F7028-TB

R20AN0221CC0100

示例程序

Rev.1.00

Nov 12, 2012

介绍

示例程序包括以下函数和功能:

- 微控制器的初始化
 - a. I/O端口初始化
 - b. A/D模块及A/D端口初始化
 - c. 外部震荡器功能初始化
- 主应用循环
 - a. 程序按按钮(SW1, SW2)状态, 控制LED灯自动点亮, 自动闪烁
 - b. 按SW1状态, 自动选择使用外部/内部震荡器

目标器件

78K0/uPD79F7028

当应用此示例程序于其他微控制器时, 请根据目标微控制器规格修改程序, 并对修改的程序充分进行评估。

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1. 执行示例程序

示例按以下顺序执行：

- (1) 打开工程” tb_sampleprogram.mtpj”;
 - (2) 连接YRCN79F7028-TB 板到仿真器;
 - (3) 连接仿真器到PC上;
 - (4) 连接CS+内设硬件仿真器(E1 或 EZ Emulator);
 - (5) 下载程序;
 - (6) 从新执行(Restart)程序;
 - (7) 用户通过按钮SW1和SW2操作, 控制LED灯自动点亮, 自动闪烁。
- 在使用仿真器仿真前, 请先明确E1/EZ-CUBE硬件设置和与目标连接是否正确。
 - 具体细节请参见E1/EZ-CUBE用户手册。并请检查E1/EZ-CUBE是否使用了最新固件。

2. 操作环境

工作频率	内部时钟
综合开发环境	瑞萨电子综合开发环境 CubeSuite+ V1.02.01
示例工程	tb_sampleprogram.mtpj

3. 函数说明

此节描述示例程序中的各个函数。

[函数名称] External_OSC_Init	
概要	外部震荡器功能初始化
头文件	无
声明	void External_OSC_init(void)
说明	
返回值	无
备注	无

[函数名称] ADC_Init	
概要	ADC初始化
头文件	无
声明	void ADC_init(void)
说明	- 8-bit转换 - Vref = VDD - AIN0(P20)为模拟电压输入端口 - 软件触发, 连续转换模式 - 启动转换
返回值	无
备注	无

[函数名称] ADC_Read	
概要	读ADC转换值
头文件	无
声明	void ADC_Read(void)
说明	把转换结果保存至数据指针的内存.
返回值	无
备注	无

[函数名称] ADC_Interrupt	
概要	ADC中断服务程序
头文件	无
声明	void ADC_Interrupt(void)
说明	没有操作
返回值	无
备注	无

[函数名称] Main	
概要	主应用循环
头文件	无
声明	void main(void)
说明	- 判断使用外部/内部震荡器 - 判断是用ADC - 逐一点亮LED - 判断闪烁LED - 判断停止闪烁
返回值	无
备注	无

4. 设置选项字节 (Option Byte)

uPD79F7028 闪存的00C0H、00C1H、00C2H 和00C3H 为选项字节区域。打开电源或从复位状态重启器件时，器件将自动参考选项字节设置指定功能。使用本产品时，必须使用选项字节设置下列功能。

选项字节在CS+上, CA78K0R(Built Tool)里, Link Options选项卡上,'Device'选项里, 'Use on-chip debug'和'User option byte'中设置, 用户可按需求自行更改设置.以下是本示例使用的设置.

User option byte

00C0	60H	; 看门狗定时器不操作
00C1	7AH	; 中断及上电复位,上升电压值2.92V, 下降电压值2.75V
00C2	0EAH	; 内部高速振荡时钟频率 8 MHz

Use on-chip debug

00C3	84H	; On-chip 调试允许操作。 On-chip 调试安全ID 认证失败 ; 时, 清除闪存数据。
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备注:

有关选项字节详情, 请参考微控制器的使用手册, 第十六章 选项字节

5. 示例程序操作

5.1 使用内部时钟工作:

- i. 上电后, MCU使用内部时钟工作;
- ii. LED灯 D2~D7逐一点亮;
- iii. 当LED灯全亮后, 可按SW1;
- iv. 按下SW1后, D2, D4, D6 和D3, D5, D7分两组闪烁;
- v. 按SW2停止.

5.2 使用外部时钟工作真:

- vi. 上电前, 先按SW1, 在上电;
- vii. 此时, MCU转用外部时钟工作, 并对ADC初始化;
- viii. LED灯 D2~D7逐一点亮 (点亮速度跟内部时钟不一样);
- ix. 当LED灯全亮后, 可按SW1;
- x. 按下SW1后, D2, D4, D6 和D3, D5, D7分两组闪烁;
- xi. 此时可以调节可调电阻, LED灯的闪烁频率会有改变;
- xii. 按SW2停止.

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修订记录

版本	日期	描述	
		页	概要
1.00	Nov 12, 2012	—	第一版发行

产品使用时的注意事项

本文对适用于单片机所有产品的“使用时的注意事项”进行说明。有关个别的使用时的注意事项请参照正文。此外，如果在记载上有与本手册的正文有差异之处，请以正文为准。

1. 未使用的引脚的处理

【注意】将未使用的引脚按照正文的“未使用引脚的处理”进行处理。

CMOS产品的输入引脚的阻抗一般为高阻抗。如果在开路的状态下运行未使用的引脚，由于感应现象，外加LSI周围的噪声，在LSI内部产生穿透电流，有可能被误认为是输入信号而引起误动作。

未使用的引脚，请按照正文的“未使用引脚的处理”中的指示进行处理。

2. 通电时的处理

【注意】通电时产品处于不定状态。

通电时，LSI内部电路处于不确定状态，寄存器的设定和各引脚的状态不定。通过外部复位引脚对产品进行复位时，从通电到复位有效之前的期间，不能保证引脚的状态。

同样，使用内部上电复位功能对产品进行复位时，从通电到达到复位产生的一定电压的期间，不能保证引脚的状态。

3. 禁止存取保留地址（保留区）

【注意】禁止存取保留地址（保留区）

在地址区域中，有被分配将来用作功能扩展的保留地址（保留区）。因为无法保证存取这些地址时的运行，所以不能对保留地址（保留区）进行存取。

4. 关于时钟

【注意】复位时，请在时钟稳定后解除复位。

在程序运行中切换时钟时，请在要切换成的时钟稳定之后进行。复位时，在通过使用外部振荡器（或者外部振荡电路）的时钟开始运行的系统中，必须在时钟充分稳定后解除复位。另外，在程序运行中，切换成使用外部振荡器（或者外部振荡电路）的时钟时，在要切换成的时钟充分稳定后再进行切换。

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Renesas Electronics America Inc.

2880 Scott Boulevard Santa Clara, CA 95050-2554, U.S.A.
Tel: +1-408-588-6000, Fax: +1-408-588-6130

Renesas Electronics Canada Limited

1101 Nicholson Road, Newmarket, Ontario L3Y 9C3, Canada
Tel: +1-905-898-5441, Fax: +1-905-898-3220

Renesas Electronics Europe Limited

Dukes Meadow, Millboard Road, Bourne End, Buckinghamshire, SL8 5FH, U.K.
Tel: +44-1628-651-700, Fax: +44-1628-651-804

Renesas Electronics Europe GmbH

Arcadiastrasse 10, 40472 Düsseldorf, Germany
Tel: +49-211-65030, Fax: +49-211-6503-1327

Renesas Electronics (China) Co., Ltd.

7th Floor, Quantum Plaza, No.27 ZhiChunLu Haidian District, Beijing 100083, P.R.China
Tel: +86-10-8235-1155, Fax: +86-10-8235-7679

Renesas Electronics (Shanghai) Co., Ltd.

Unit 204, 205, AZIA Center, No.1233 Lujiazui Ring Rd., Pudong District, Shanghai 200120, China
Tel: +86-21-5877-1818, Fax: +86-21-6887-7858 / -7898

Renesas Electronics Hong Kong Limited

Unit 1601-1613, 16/F., Tower 2, Grand Century Place, 193 Prince Edward Road West, Mongkok, Kowloon, Hong Kong
Tel: +852-2886-9318, Fax: +852 2886-9022/9044

Renesas Electronics Taiwan Co., Ltd.

13F, No. 363, Fu Shing North Road, Taipei, Taiwan
Tel: +886-2-8175-9600, Fax: +886 2-8175-9670

Renesas Electronics Singapore Pte. Ltd.

80 Bendemeer Road, Unit #06-02 Hyflux Innovation Centre Singapore 339949
Tel: +65-6213-0200, Fax: +65-6213-0300

Renesas Electronics Malaysia Sdn.Bhd.

Unit 906, Block B, Menara Amcorp, Amcorp Trade Centre, No. 18, Jln Persiaran Barat, 46050 Petaling Jaya, Selangor Darul Ehsan, Malaysia
Tel: +60-3-7955-9390, Fax: +60-3-7955-9510

Renesas Electronics Korea Co., Ltd.

11F., Samik Laviel' or Bldg., 720-2 Yeoksam-Dong, Kangnam-Ku, Seoul 135-080, Korea
Tel: +82-2-558-3737, Fax: +82-2-558-5141