

R7F0C80212ESP

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按键调节方波输出示例程序

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. 定时器输出方波功能初始化
 - c. 按键中断功能初始化
 - d. 设置选项字节(Option Byte)
- 主应用循环
 - a. MCU中断启动
 - b. 按键检查
 - c. 定时器输出

目标器件

RL78 / R7F0C80212ESP

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“ sample.mtpj”;
 - (2) 连接CS+内设GUI软件仿真;
 - (3) 下载程序;
 - (4) 重新执行(Restart)程序;
 - (5) 用户可以在软件仿真视窗里的“I/O Panel1”, 对按键进行操作, 作为方波频率输入;
 - (6) 用户可以在软件仿真视窗里的“Timing Chart1”, 观察TO00对应的I/O口状态.
- 软件仿真具有一定的局限性。用户程序发布前, 请使用仿真器进行测试确认。
 - 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+ V1.03.00
示例工程	Sample.mtpj

3. 函数说明

此节描述示例程序中的各个函数。

[函数名称] IO_Init	
概要	I/O端口初始化
头文件	无
声明	void IO_init(void)
说明	
返回值	无
备注	无

[函数名称] R_TAU0_Create	
概要	定时器初始化
头文件	无
声明	void R_TAU0_Create (void)
说明	设置P03为TO00方波输出
返回值	无
备注	无

[函数名称] R_TAU0_Channel0_Start	
概要	启动定时器
头文件	无
声明	void R_TAU0_Channel0_Start (void)
说明	
返回值	无
备注	无

[函数名称] R_TAU0_Channel0_Stop	
概要	停止定时器
头文件	无
声明	void R_TAU0_Channel0_Stop (void)
说明	
返回值	无
备注	无

[函数名称] R_KEY_Create	
概要	按键中断初始化
头文件	无
声明	void R_KEY_Create (void)
说明	- 设置KR0, KR2, KR3, KR5作为按键 - 使用按键中断
返回值	无
备注	无

[函数名称] R_KEY_Start	
概要	启动按键中断
头文件	无
声明	void R_KEY_Start (void)
说明	
返回值	无
备注	无

[函数名称] R_KEY_Stop	
概要	停止按键中断
头文件	无
声明	void R_KEY_Stop (void)
说明	
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	- I/O端口, 定时器, 按键中断初始化 - 按键中断启动, 定时器启动, MCU中断允许 - 判断按键读取值, 设置TO00的方波输出频率 KEY1: 100Hz KEY2: 500Hz KEY3: 1KHz KEY4: 10KHz
返回值	无
备注	无

[函数名称] interrupt_intkr	
概要	按键中断服务程序
头文件	无
声明	void interrupt_intkr (void)
说明	-
返回值	无
备注	无

[函数名称] interrupt_intsr0	
概要	SAU接收完毕中断服务程序
头文件	无
声明	void interrupt_intsr0 (void)
说明	
返回值	无
备注	无

[函数名称] interrupt_intsre	
概要	SAU接收错误中断服务程序
头文件	无
声明	void interrupt_intsre (void)
说明	
返回值	无
备注	无

4. 设置选项字节 (Option Byte)

R7F0C80212ESP 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。

选项字节以汇编码格式保存在“optionbyte.asm”汇编文档, 用户可按需求自行更改设置. 以下是本示例使用的设置.

OPT	CSEG	OPT_BYTE	
	DB	0E0H	; 看门狗定时器不操作 ; 看门狗定时器的溢出时间: 64/fIL, ; 禁止使用软件停止内部振荡电路不能通过软件。
	DB	0EBH	; P125/RESET脚为端口功能 ; 上电复位,上升电压值2.55V, 下降电压值2.50V
	DB	0FAH	; 内部高速振荡时钟频率 10 MHz
	DB	85H	; On-chip 调试允许操作。 On-chip 调试安全ID 认证失败 ; 时, 禁止清除闪存数据。

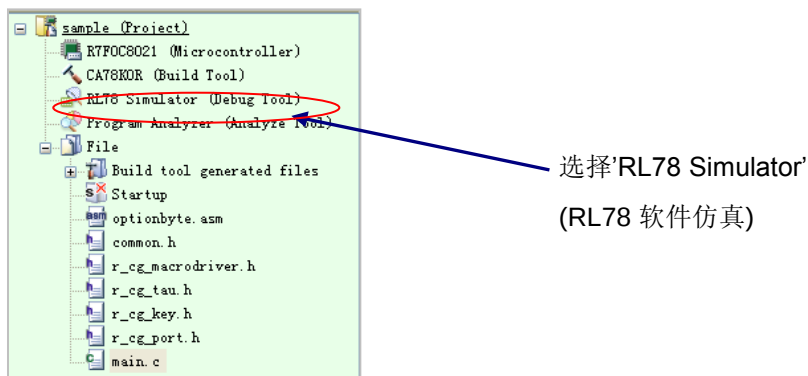
备注:

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. 使用 CS+ 内设 GUI 软件仿真器

5.1 启动 CS+ 内设 GUI 软件仿真:

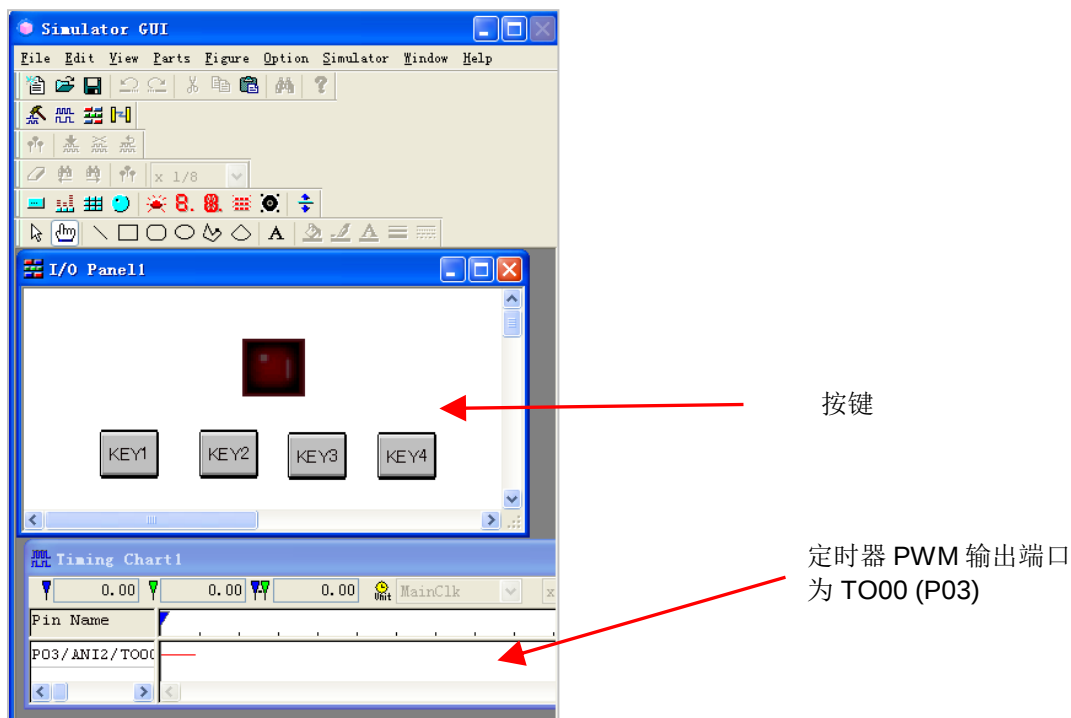
1. 打开工程后, 在 'Project Tree' 视窗里的 (Debug Tool), 按鼠标右键, 选择 'RL78 Simulator' (RL78 软件仿真).



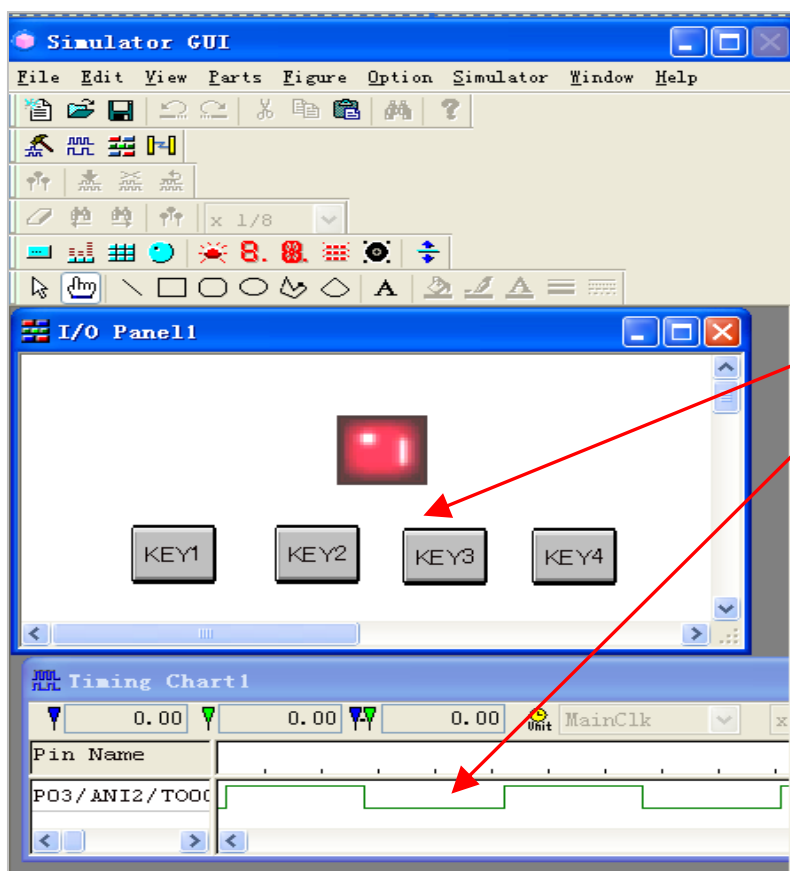
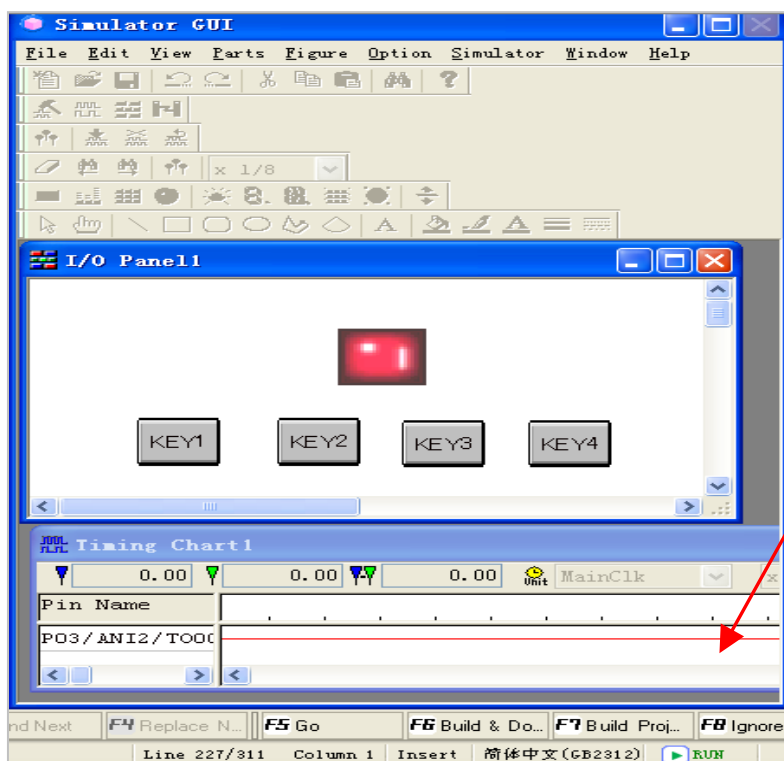
2. 选择点击“编译下载”进行 RL78 软件仿真.



3. 连接成功后, 软件仿真 GUI 视窗启动操作界面



5.2 示例程序操作:



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修订记录

版本	日期	描述	
		页	概要
1.00	Dec 5, 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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