MR-2313
User Manual

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PART1: MR-2313

1. Introduction

MR-2313 is a small pre-assembled CPU board, which has an ISP(In-System Programming) port, reset button, 10 MHz X-tal, and 15 I/O port pins. The MR-2313 uses an AT90S2313(Atmel AVR series) CPU chip as a controller. The AT90S2313 has 2K bytes In-System Programmable Flash memory, 128 bytes SRAM, 128 bytes EEPROM and many other peripherals. The user can download a program to the board without a ROM Writer using the ISP function. A free C-compiler (Microrobot AVR GCC) is provided.

2. Features

- AT90S2313 (Atmel AVR series, 10 MHz(10 MIPS))
- 2Kbyte ISP flash, 128 bytes SRAM, 128 bytes EEPROM, two Timers, UART
- ISP port
- SPI Serial Interface for In-System Programming
- ISP download indicating LED
- 15 I/O port pins
- Reset button
- Free Windows C compiler(Microrobot AVR GCC)
- ISP downloader(Optional)
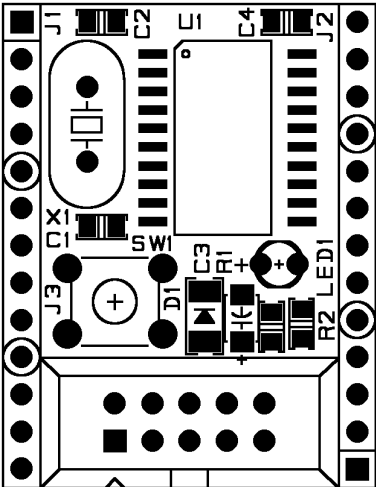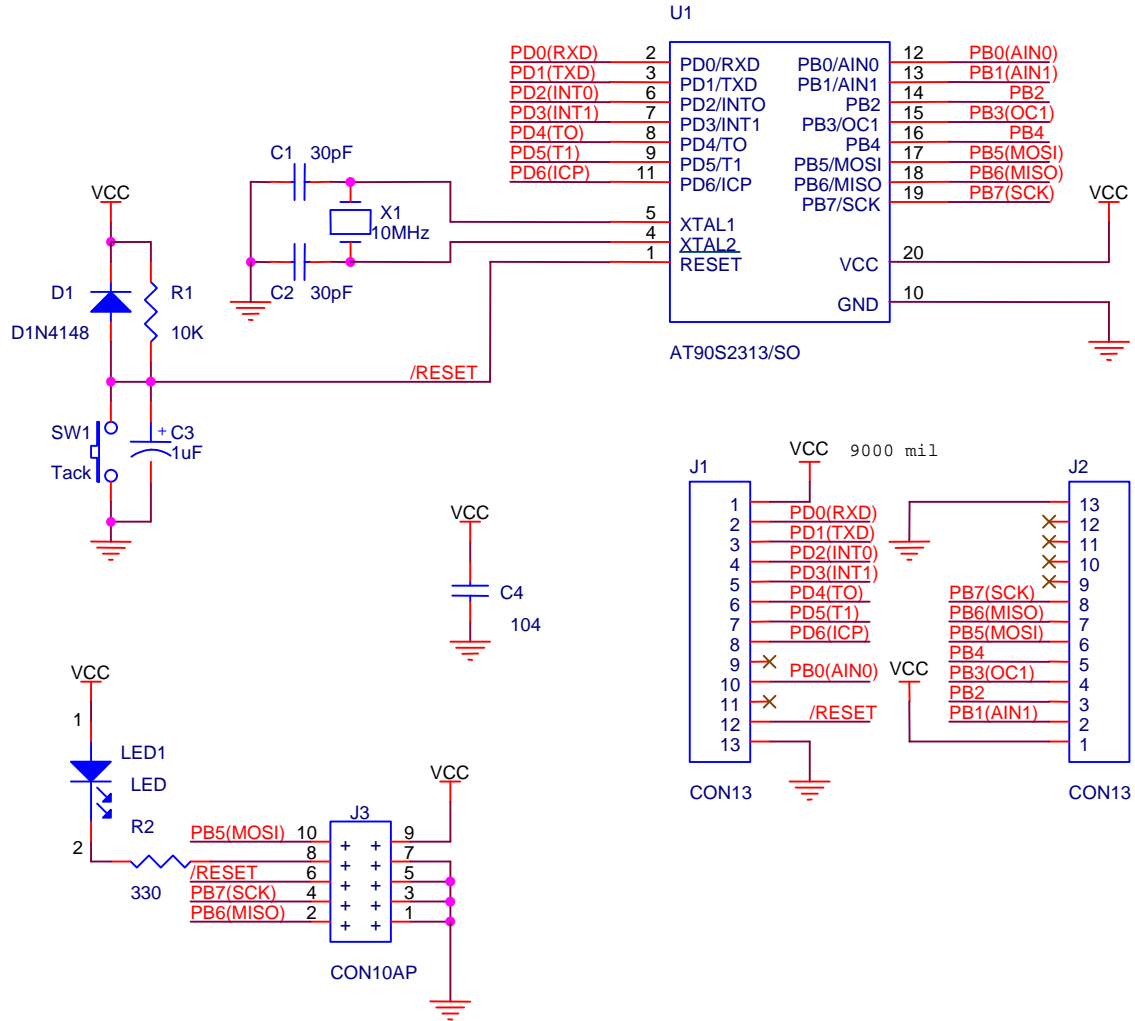
PART 2: BOARD

1. Placement Diagram(Silkscreen)

Fig 1.1 MR-2313 CPU board silkscreen

2. Circuit Diagram

3. Parts List

NO	Reference	Parts name	Value	Qty.	Remark
1	C1, C2	Capacitor	30pF	2	Ceramic Condenser
2	C3	"	1uF	1	Chip Tantal Condenser (A type)
3	C4	"	104	1	Chip Ceramic Condenser (2012)
4	D1	Diode	D1N4148	1	Can type (SMD)
5	LED1	LED	RED 3ø	1	
6	J1, J2	Connector	CON13	1	1Line Header (male)
7	J3	"	CON10AP	1	HIF3F/10PIN
8	R1	Resistor	10KΩ	1	2012(SMD)
9	R2	"	330Ω	1	2012(SMD)
10	SW1	S/W	Tack S/W(Small)	1	
11	U1	MCU	AT90S2313/TQFP	1	AVR Microcontroller
12	X1	X-TAL	10MHz	1	ATS type
13		PCB		1	Main PCB
14		Downloading Adapter		1	Option
15		Ribbon Cable		1	Option(1m)

Fig 2.1 Downloading Adapter

Fig 2.2 Ribbon cable

PART 3 : Software Tools

1. AVR Development Program Installation

AVR Development Tools

There are many different kinds of development tools for AVR microcontrollers. Atmel, the AVR CPU manufacturer, provides some AVR development tools free. Microrobot Co. Ltd. also provides a free Windows C-compiler.

Wavrasm : AVR assembler, Atmel.

AVR Studio : AVR Emulator/Simulator, Atmel.

AVR ISP : ISP downloading program, Atmel.

Microrobot AVR GCC : C-compiler, Microrobot.

System requirements for AVR development tools

- Windows 9X/ME or NT/2000
- Pentium-133 or higher
- At least 4 Mbytes of RAM
- CD-ROM Drive

AVR ISP installation:

Run setup.exe in the CD's avr_isp folder.

Microrobot AVR GCC installation

Refer to the 'Microrobot AVR GCC User Guide.pdf' file in the CD's MaroGcc0.9C folder.

2. How to use Microrobot AVR GCC

Refer to the 'Microrobot AVR GCC User Guide.pdf' file in the CD's MaroGcc0.9C folder.

3. How to use AVR ISP(In-System Programming)

Refer to the 'AVR ISP Manual for Microrobot AVR Products.pdf' file.

PART 4 : Compile and Download

Compile the source file and download the executable file in the following order.

- Supply DC 5V to the J1's (or J2's) #1 pin and GND to the #13 pin.
- Connect the downloading adapter to the PC printer port. Then connect the downloading adapter and the CPU board by using the ribbon cable.
- Run the Microrobot AVR GCC.
- Open your source file.
- Select 'Build → Build Option …→ General tab'. The Build Option window appears.
  Select 'Intel hex' as a Hex format, 'at90s2313' as a microcontroller. Check 'Object file' and 'Rom file' boxes in the Generation menu. Type the folder you want as an Output Directory and click on OK.
- Select 'Build → Build Option …→ Compiler tab'. Click on the 'Default' button and select 'Size' radio button in the Optimization box. Do not use 'Speed' optimization.
- Select 'Build → Build Option …→ Linker tab'. Click on the 'User Link script' radio button and select 'C:\Program Files\Microrobot\Microrobot AVR GCC\Avr\lib\ldscripts\avr23xx.x' and click on OK.
- Press F7 or select 'Build → Build' menu to build.
  (The source-editing window you want to be built must be selected before building it when if there are more than two source-editing windows.)
- If you see the following message: 'warning: asm operand1 probably doesn't match constraints' in the output message window, press F7 again.
- 'Create ROM file. Build complete!' message appears in the output message window.
- Run the Atmel AVR ISP.
- Select 'Project → New Project' menu. Select a device.
- Click on the Program Memory window. Select 'File → Load' menu load the *.rom(or *.hex) file.
- Select 'Project → Save Project' menu and save the project.
- Select 'Options → Advanced...', Check 'ð Disable Signature Check' box in the Advanced Options message box.
- Select 'Program → Auto-Program Options' menu. Check boxes properly.
- Press F5 for the 'Auto Programming'.
- Take a look at the downloading error messages in the output message window. If there is no 'verify error', uncheck the 'Verify Device check' box in Auto-Program Options.

- Remove the ribbon cable from the CPU board and restart the board.