SONiX 8-Bit MCU

SN8ICE 2K

USER MANUAL

General Release Specification

SONiX 8-Bit Micro-Controller Development Tools

USER MANUAL REVISION HISTORY

Version	Date	Description
VER 0.1	Aug. 2004	V0.1 first issue

HARDWARE REVISION HISTORY

Part	Version	Date	Description
Kernel chip	S8KE	Jul. 2004	S8KE first issue.
ICE board	1.2	Jul. 2004	First release. PCB V1.2
ICE board	1.3	Aug. 2004	1. PCB V1.3 2. Adjust the positions of some components. 3. Change the CON1 (I/O port interface) to male type socket.

SN8ICE 2K User Manual

FIGURE INDEX

1 INTRODUCTION

SONiX 8-bit micro-controller development system includes two major parts. One is In-circuit emulator named SN8ICE 2K and the other is the integrated development environment, M2IDE. SN8ICE 2K provides powerful and reliable emulation environment. SN8ICE2K is a totally new generation of SONiX development tool. It supports all the SN8P2xxx series MCU. Because the new architecture, new digital function can add and emulate at the time real chip is still under development. **Also, SN8ICE 2K is no necessary to set any jumper or switch for code option changes.** The M2IDE is window based integrated development environment including editor, assembler, debugger and writer driver. Using these two powerful tools will save the time of any project.

2 SN8ICE 2K SONIX IN-CIRCUIT EMULATOR

In this Chapter, you will learn how to connect and to install the SN8ICE 2K to your computer.

2.1 PACKAGE CHECK LIST

Figure 2-1 SN8ICE 2K set

- SN8ICE 2K

  Main circuit to provide the emulator function
- DC power adaptor (+7.5V DC)

  Provide the power source for emulator
- Parallel printer cable

  Connect to PC by the printer port.

2.2 CONNECTION PROCEDURE

Follow the steps in this section to connect your SN8ICE 2K:

Both SN8ICE 2K and PC should not have the power be turned ON at this time.

Step 1: Attach the DC adaptor to SN8ICE 2K

Step 2: Turn on PC

Step 3: Locate an unused LPT port of PC

Step 4: Attach SN8ICE 2K to the LPT port using a parallel cable

Now, go to the next section to install your M2IDE.

3 INSTALLING M2IDE

3.1 SYSTEM REQUIRMENT

- Windows NT/95/98/2000/ME/XP
- 32MB of available hard drive space
- 32MB RAM or greater

3.2 FILE DESCRIPTION

- M2IDE_Vxxx.exe: M2IDE software package, xxx represents the version.

3.3 INSTALLATION PROCEDURE

3.3.1 Install M2IDE

Follow the steps in this section to install your M2IDE:

- Download the setup file from SONiX's website http://www.sonix.com.tw, or contact the local agent for this file.
- Run the setup file and an introduction window shows like

Figure 3-1 Description of the setup file

- Click “Next>” to the next step, the License Page. Choose “I agree to the terms of this license agreement” and click “Next> “ button to next page.

Figure 3-2 License page

- This page Select the installation folder. You can change the installation folder just click the “Change…” button. Then click “Next>” button to next step.

Figure 3-3 Select directory for M2IDE

- This step adds the M2IDE shortcut assigning to the application program in the drop-down dialog box.

Figure 3-4 Select M2IDE shortcut

- After all information is selected, here show the setting. Just re-check it to see anything wrong.

Figure 3-5 Check again the installation setting

- Finally, this window indicates the M2IDE is successfully installed into your system.

Figure 3-6 Finish installation

4 QUICK START

In this Chapter, you will learn how to emulate the program using SN8ICE 2K.

4.1 START M2IDE

The first time start M2IDE, a welcome dialog window shows and the SN8Readme file opened. Checked the checkbox in the welcome window will close the SN8Readme file when launch the M2IDE in next time. SN8Readme file describe the difference from the previous version of IDE.

Figure 4-1 Welcome dialog window

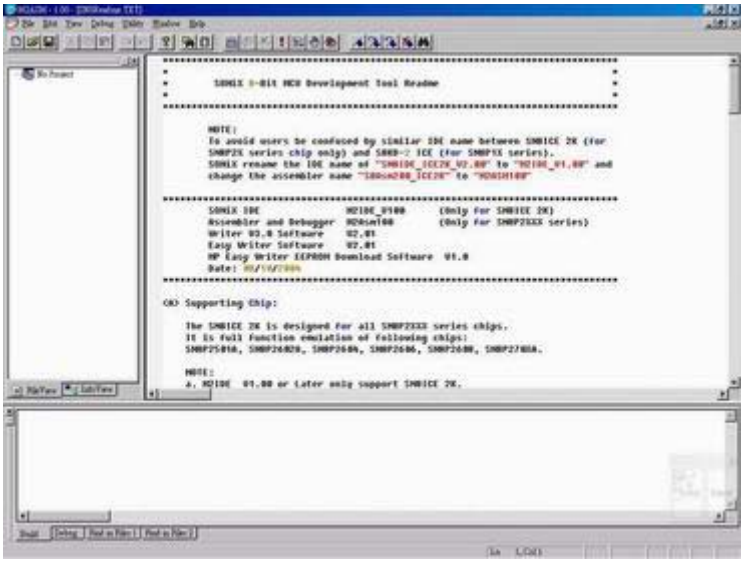

Figure 4-2 SN8Readme page

Then start a new project form the menu, “File-> New Project”

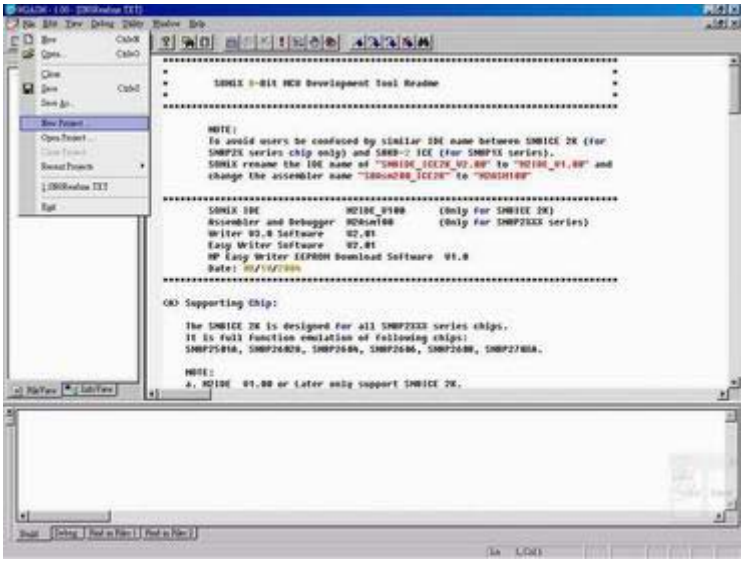

Figure 4-3 Start a new project

Browse the file tree to the M2IDE directory. Choose the “Samples” directory and select “2501A_TEMPLATE.asm” for the main program of this project

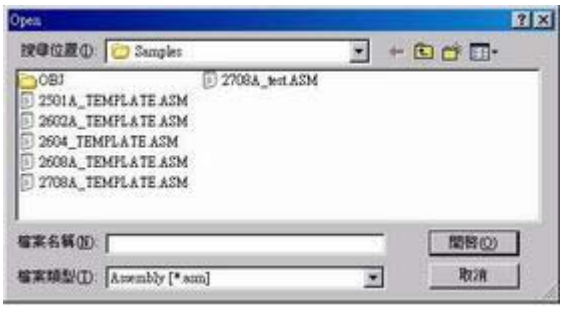

Figure 4-4 Select the main file for project

The main file displays at the edit window. Project file tree listed at the left of the edit window.

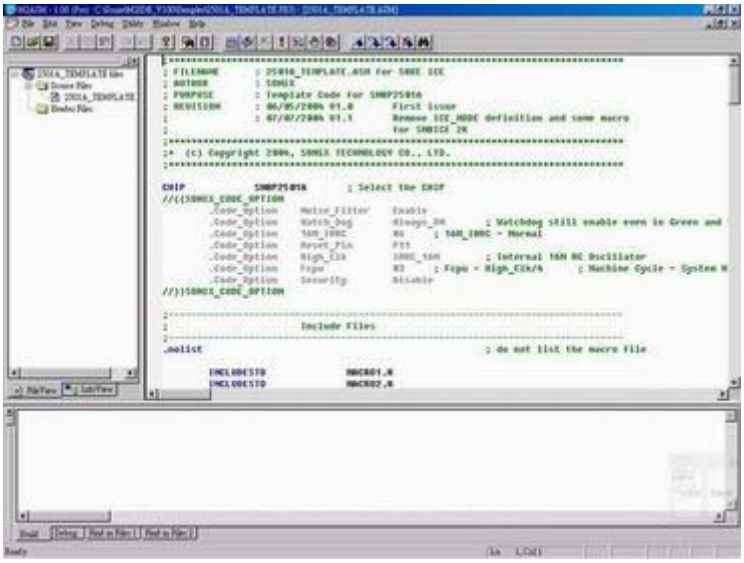

Figure 4-5 Edit window

4.2 DEBUG A PROJECT

Finish editing the code, start the assembler by pressing the “F7” function key, or select from the “Debug-> build” menu. A code option window shows to select the correct code option configuration. Code option is a hard-coding option to choose which part of circuit is used. The detail code option description is written in each MCU’s datasheet.

Figure 4-6 Code option table example

The complier message shows at the Build window, including the warning messages, error messages, resource status. Program status, like the ROM, RAM usage, is also reported at this stage.

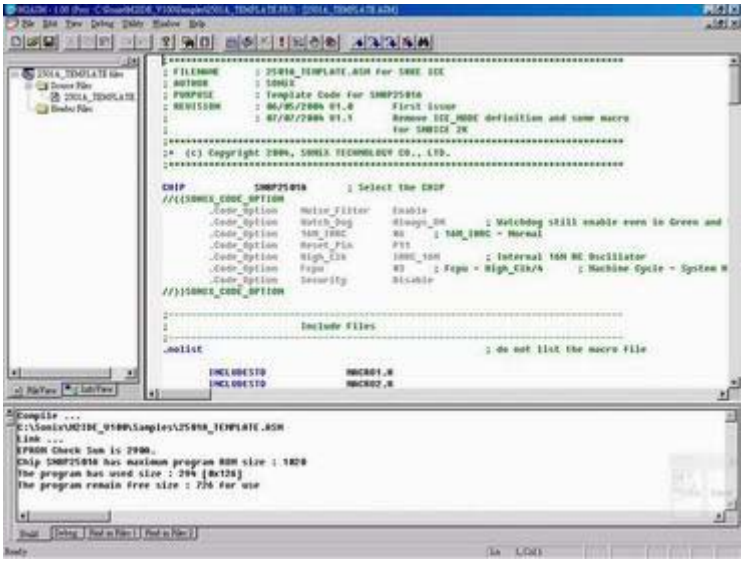

Figure 4-7 Complier message

The program halts at the reset vector if it's first time to run. A yellow arrow indicates where the program counter (PC) is. An "ICE" keyword in the status bar indicates that IDE is in the debug mode.

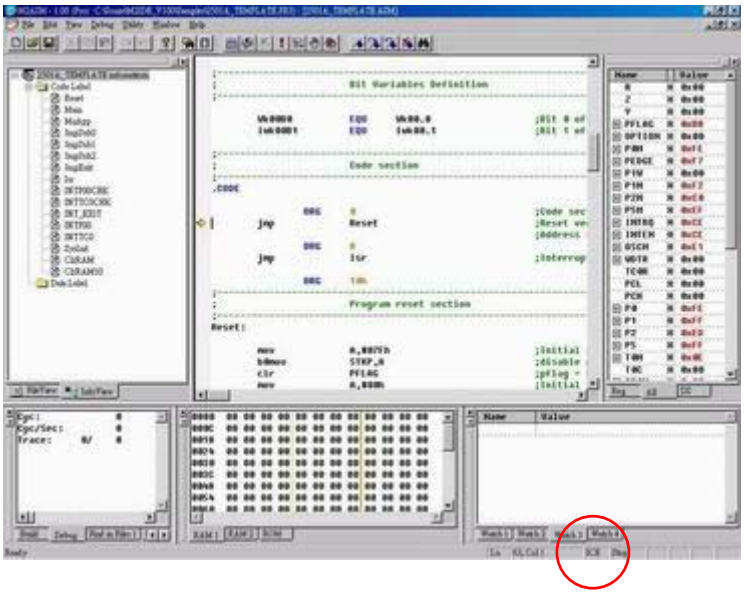

Figure 4-8 Debug window

Click “Debug -> Step Over” (F10) from the menu, you could trace Macro or Subroutine of the program in one step. When finished “Step Over” function, the yellow arrow goes to the next program flow and stops. In this case, the program jumps to the “Reset” label. The PCL’s value is in red because the “JMP” instruction changes the PCL value.

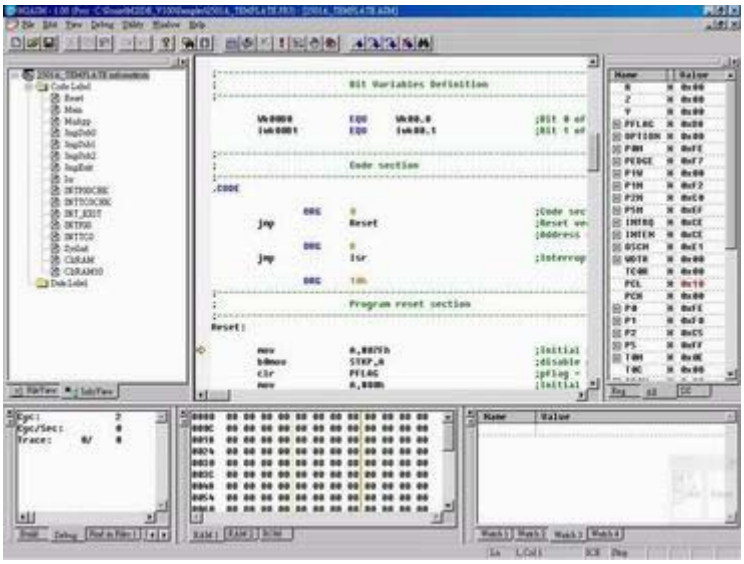

Figure 4-9 Step

To set a breakpoint, simply move the cursor to the line where you wish the program to be stopped. Then, click “Debug-> Break” (F9) from the menu. The red dot represents successful breakpoint setting.

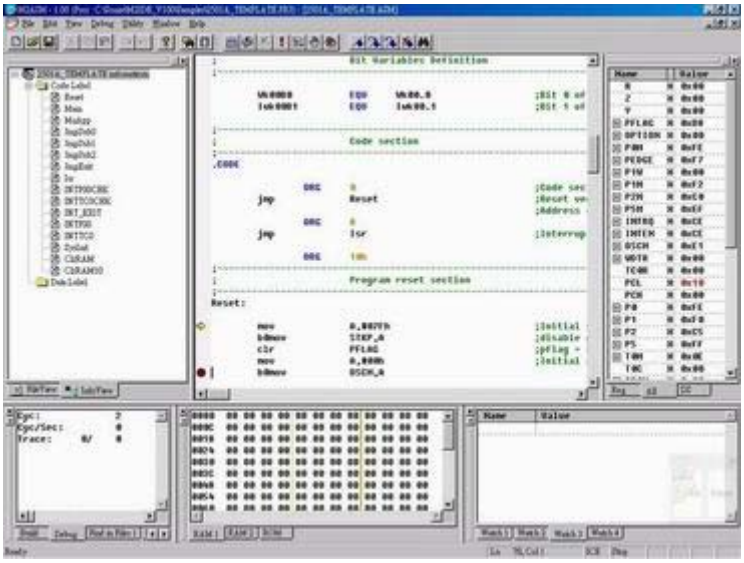

Figure 4-10 Set breakpoint

To continue running the program, click “Debug-> Go” (F5). Program runs and the yellow arrow stops at the breakpoint.

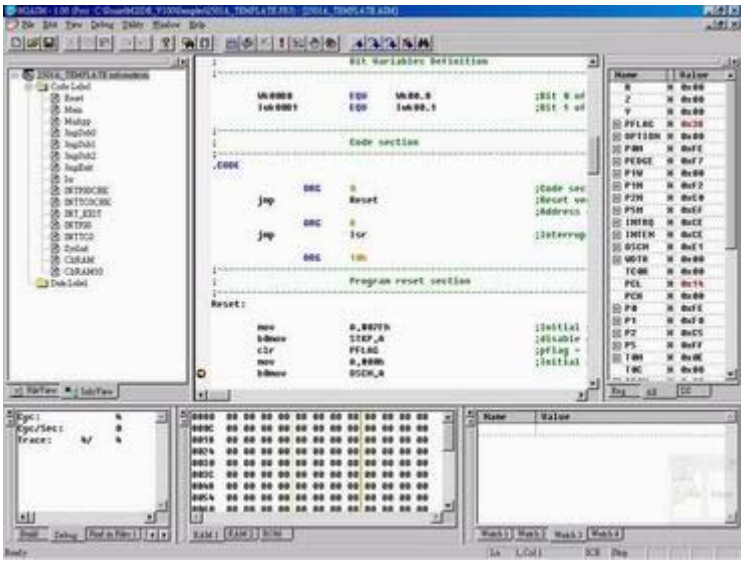

Figure 4-11 Run to breakpoint

Remove all break points by click “Remove all breakpoints” icon (Ctrl+Shift+F9) then “ Click “Debug-> Go” from the menu or press “F5” to continue program execution. The RUN dialogue indicates the program status and a “Run…” shows in the status bar.

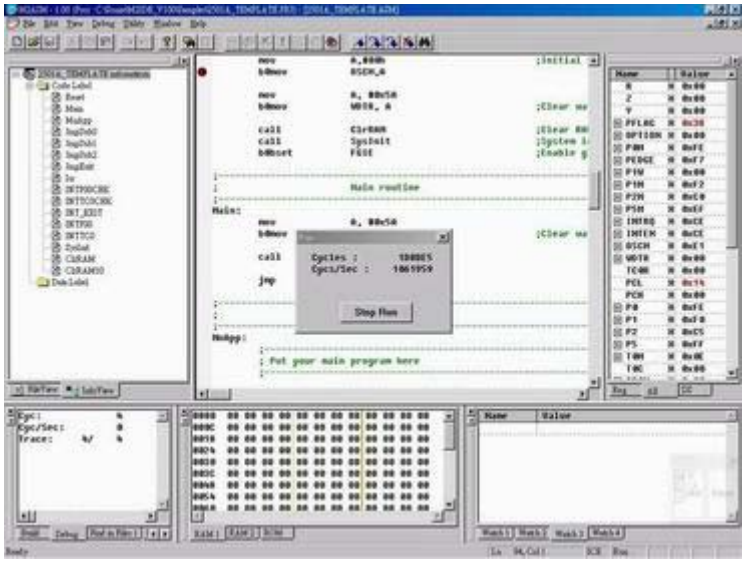

Figure 4-12 Free Run

Press “F5” to stop the program execution.

Any time the program stops, “Watch” function could be set to monitor the variable. Select one of the empty edit box of each page of “Watch” page, and enter the variable name you want to monitor.

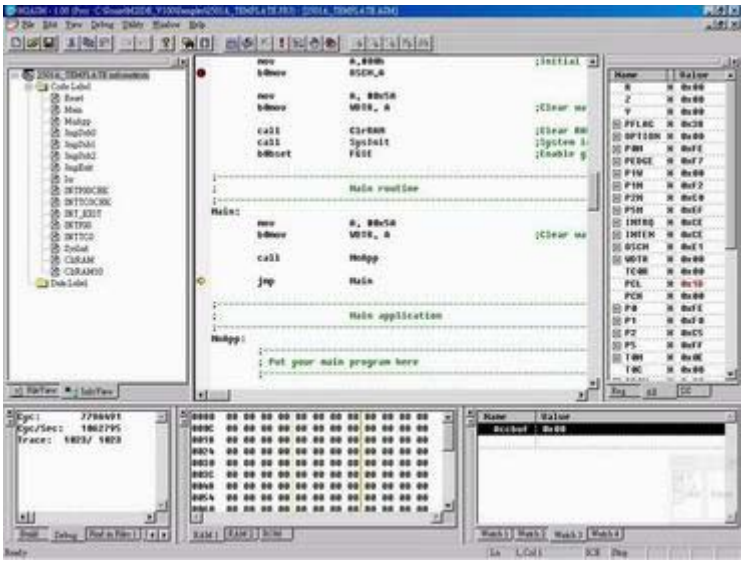

Figure 4-13 Program stops and watch variable

Click “Debug-> Reset” from the menu or press “Ctrl+F5” to reset the program. Then, you may emulate again starting from the program reset vector.

4.3 CONNECT TO TARGET BY TRANSITION BOARD

The CON1 is the generic I/O port including all I/O of SN8P2xxx series. Connect different transition board to CON1 to meet each MCU’s pin assignment. After ICE board V1.3, the CON1 is male socket. Please populate 60 pins **female** socket on transition board and connect transition board to SN8ICE 2K as following figure:

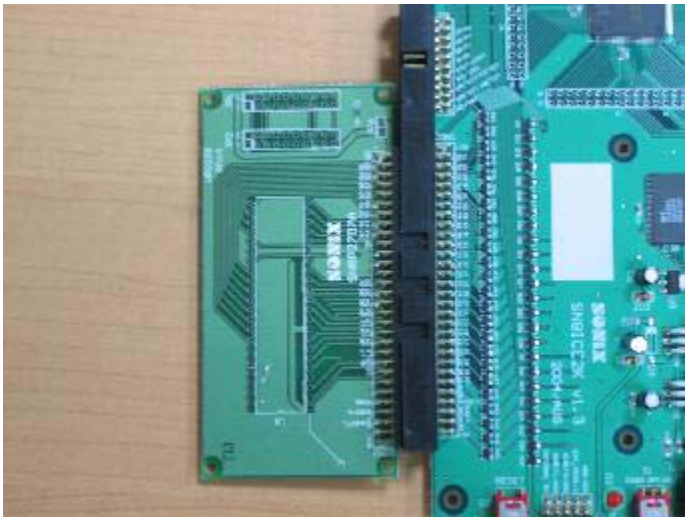

Figure 4-14 The 60 pins socket of transition board is **female** type

If users populate the 60 pins **male** socket on transition board. Please connect to SN8ICE 2K through two 60 pins cables as following figure:

Figure 4-15 The 60 pins socket of transition board is **male** type

The following figure show how to connect Easy-Writer with SN8ICE 2K:

Figure 4-16 Connect Easy-Writer to SN8ICE 2K

Make sure connect Easy-Writer to SN8ICE 2K **through the 60 pins cable.**

5 TROUBLE SHOOTING

Q The ICE is reset spontaneously sometimes in ICE mode.

A It occurs when the user maps his network printer to the LPT1 that is connected to the ICE system. To solve it, just map the network printer to LPT2.

Q ICE can't work under Windows 2000.

A When ICE works under Windows 2000/ Windows XP, LPT port should be set in the BIOS. Please check the BIOS about the LPT configuration. It must be EPP, ECP, or Bi-direction.

Q Could ICE work emulate the 3.3 voltage supply?

A Yes. Just remove the "INTERNAL 5V" jumper (near the RESET button) and supply the 3.3V DC power to the VDD and VSS pin of CON1 (I/O port interface) by target board.

6 APPENDIX A

6.1 SN8ICE LIMITATION

- Does not support SN8P1X series chip emulation.
- Maximum guarantee MIPS:
  - 8 MIPS at 5V (e.g. 16 MHz crystal and Fcpu = High_Clk / 2)
  - 6 MIPS at 3V
- P5.2 open drain function shift to P5.0
  Solution: Add open-drain transistor in P5.2 and add pull-up resistor in P5.0
- Can't emulate the ADCKS2 bit for SN8P270XA series chip.
  Solution: Always set ADCKS = "0" in SN8ICE 2K emulation.
- 12-bit ADC missing code is about 8LSB (9-bit resolution in half AVREFH input voltage, 12-bit resolution in other input voltage)

6.2 COMPONENTS PLACEMENT

Follow is the SN8ICE 2K PCB board, named SN8ICE2K version 1.3 and its components placement.

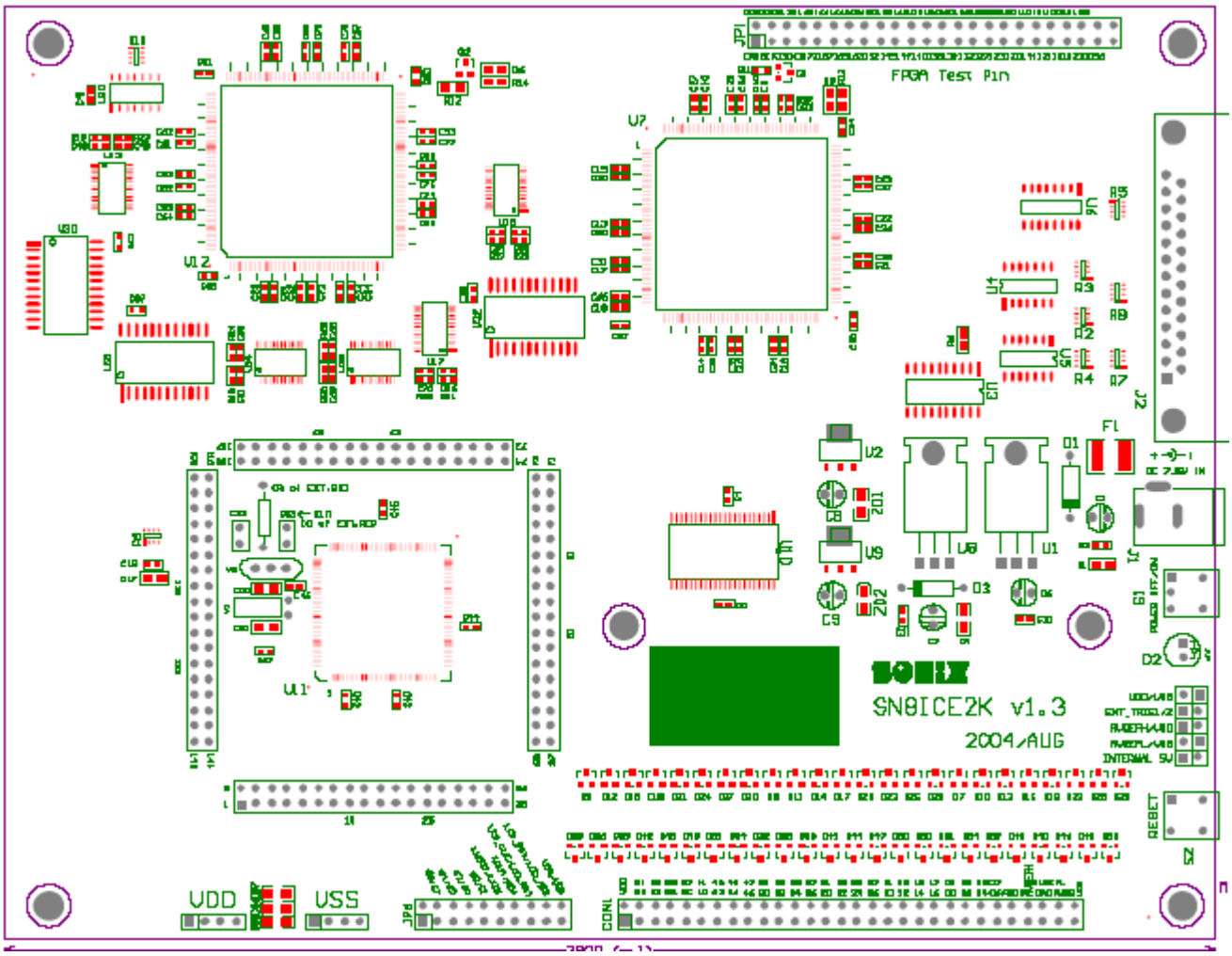

Figure 6-1 Component placement

6.3 SOCKET and JUMPER DESCRIPTION

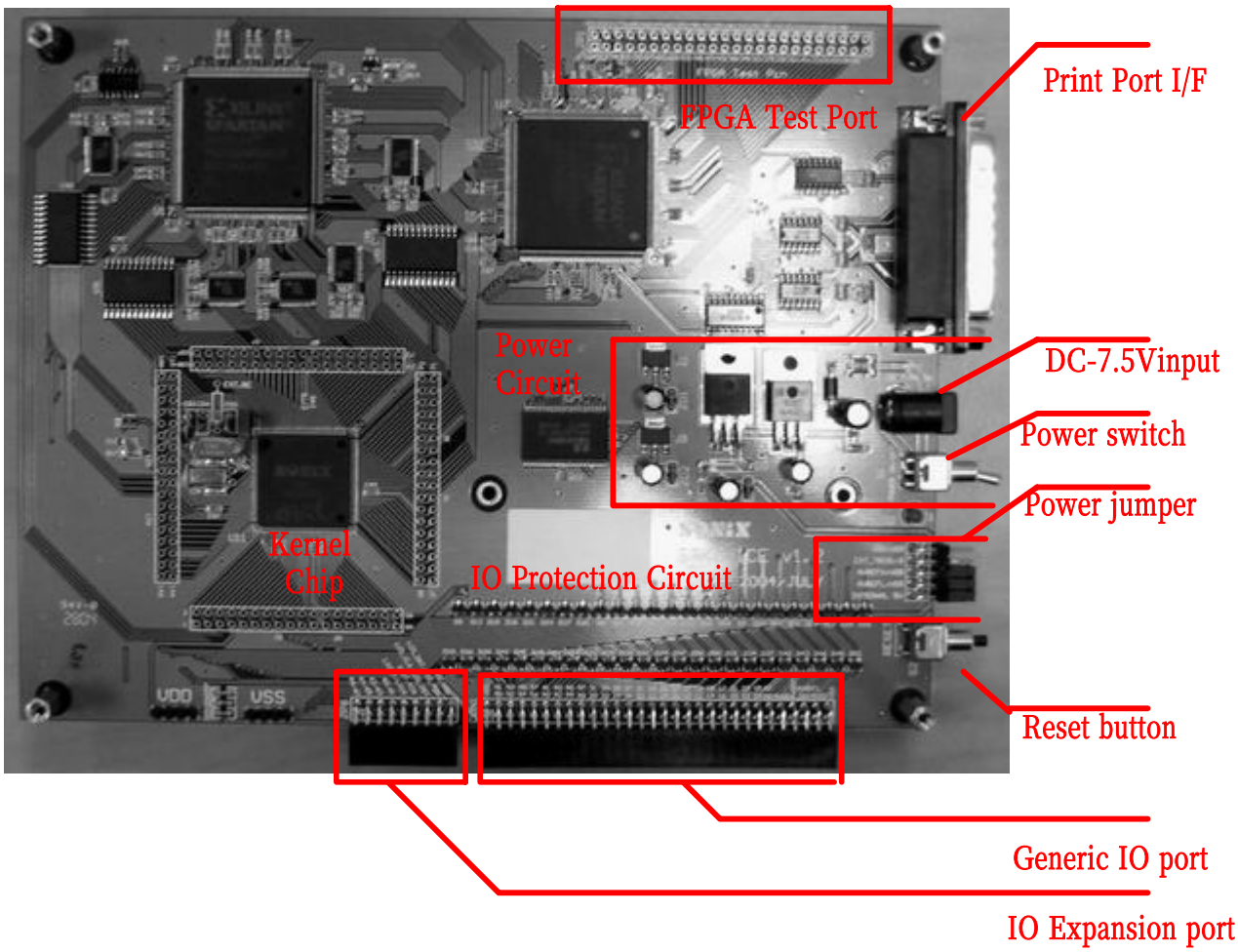

Figure 6-2 SN8ICE 2K socket and jumper position

J1: 7.5V DC power supply input.

J2: Printer port socket. Connect to PC.

S1: Power switch

S2: Reset button. Press S2 resets the SN8ICE 2K. The program restarts from address 0.

D5: FPGA(U7) successful configuration indicator

D6: FPGA(12) successful configuration indicator

CON1: Generic IO port, including all SN8P2xxx series I/O

JP1: FPGA Test Pin, reserved for internal usage.

JP6: IO expansion port, reserved for future usage

Power Jumper:

INTERNAL 5V: Short this jumper to provide 5V by SN8ICE 2K power circuit

AVREFH/VDD: AVREFH is the ADC high reference voltage. Short this jumper will connect the AVREFH to VDD. Remove this jumper and connect external reference

voltage to AVREFH pin of CON1 to provide user define ADC high reference voltage.

AVREFL/VSS: AVREFL s the ADC low reference voltage. Short this jumper will connect the AVREFL to VSS. Remove this jumper and connect external reference voltage to AVREFL pin of CON1 to provide user define ADC low reference voltage..

EXT_TRIG1/2: reserved for future usage

VDD/VSS: reserved for future usage

When the SN8ICE 2K connect to Easy Writer, these two jumpers, AVREFH/VDD and AVREFL/VSS should be shorted

6.4 CON1 and JP6: IO Port interface Circuit Schematic

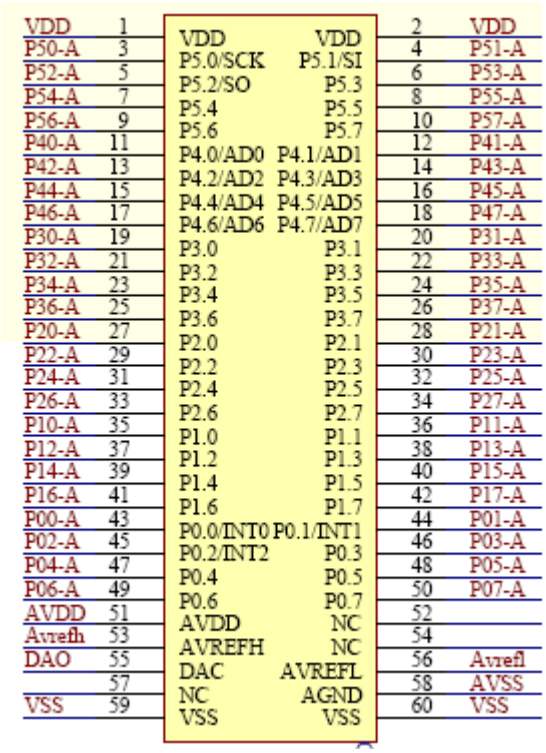

Figure 6-3 CON1: Generic IO Port

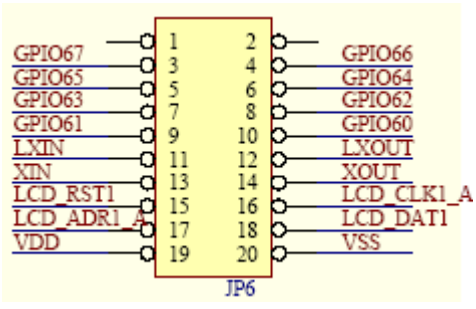

Figure 6-4 JP6: IO Expansion Port

Figure 6-5 listed the Generic IO port (CON1) pin assignment. All the IO action could be measured from this port. The JP6 is IO expansion port reserved for future usage.

6.5 CLOCK INPUT CIRCUIT

SN8ICE 2K provides two kind of circuit for the clock input. One is RC oscillator and the other is Crystal oscillator. Following is the picture of how the circuit connected.

6.5.1 Install Crystal/Resonator oscillator circuit

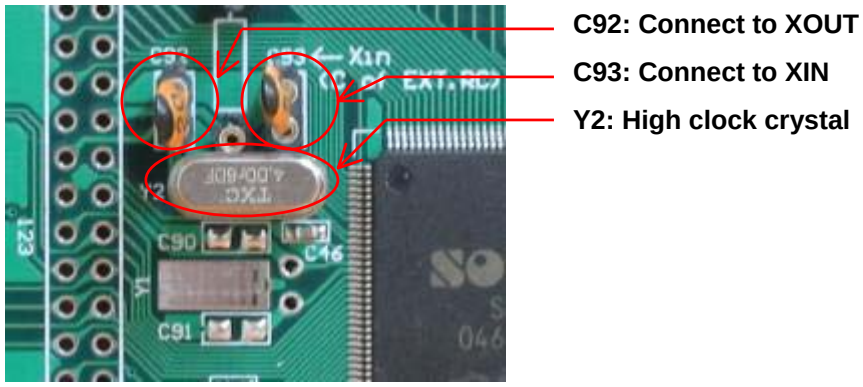

Figure 6-5 Install Crystal/Resonator oscillator

- Select High_Clk code option = 4M_X'tal, 12M_X'tal or 32K_X'tal in assembler
- The factory default installation is 4MHz crystal

6.5.2 Install RC oscillator circuit

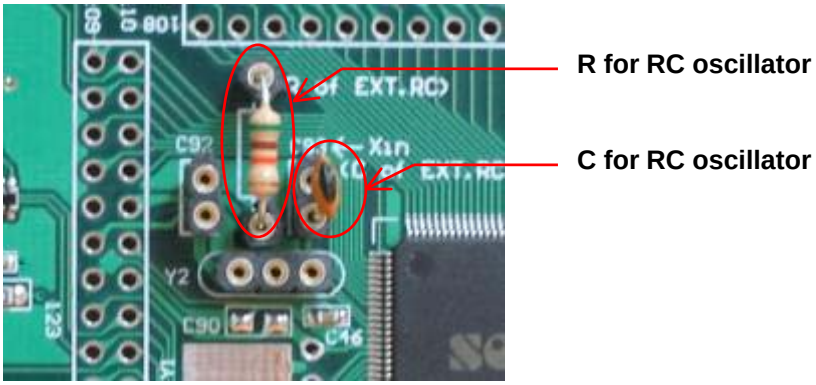

Figure 6-6 Install RC oscillator

- Remove the crystal/resonator in Y2
- Select High_Clk code option = RC in assembler
- SN8ICE 2K RC oscillator frequency table. The following table is for design guidance only.

VDD = 5V	R = 3.3K	R = 5.1K	R = 10K	R = 100K
C = 20 pF	3.333 MHz	2.275 MHz	1.190 MHz	125 KHz
C = 100 pF	1.439 MHz	954 KHz	491 KHz	50 KHz
C = 300 pF	735 KHz	487 KHz	247 KHz	25 KHz

VDD = 3V	R = 3.3K	R = 5.1K	R = 10K	R = 100K
C = 20 pF	2.939 MHz	2.041 MHz	1.103 MHz	124 KHz
C = 100 pF	1.322 MHz	899 KHz	472 KHz	49 KHz
C = 300 pF	698 KHz	470 KHz	245 KHz	24 KHz

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