



**XEMICS**

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# ***XE8000HaCE***

## ***User's Guide***

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### ***Hardware core emulator for CoolRISC and the XE8000 series***

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## **Overview of the emulator capabilities**

The emulator is a processor with extended observation capabilities. It can be used to accelerate simulation time or to debug programs in a real environment. The emulation speed can be up to 10 or 20 times faster than the simulation speed (depending on the emulation speed and the speed of the machine on which the simulation is being run).

The emulator allows specifying break conditions that are evaluated in real-time so that the emulated system continues to run at full speed until a break condition is met. This is important for a system which changes its behavior when the processor does not run at full speed. Breakpoints will cause the processor to stop when a given condition based on instruction and data is encountered.

The trace subsystem allows recording of events while the processor is running, and then analyzes the trace that has been recorded.

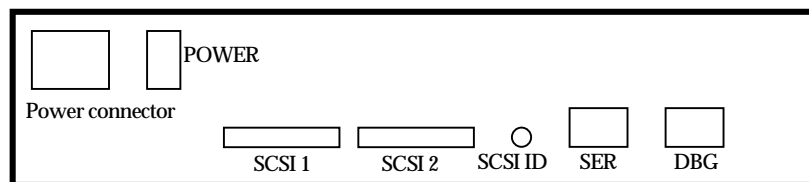
The trace can be examined on the host computer as the processor continues to run.

## **System needs**

- Computer: 486 or higher PC with at least 8MB RAM, 40 MB hard disk space and a mouse.
- System: Windows™ 95 or Windows™ NT
- Interface: A serial cable
- Other interface: If you want to use the SCSI interface, you need a SCSI cable, a SCSI ADAPTEC™ interface into your computer and the specific ASPI DLL for ADAPTEC™ products.

**Installing the emulator**

- 1) Look at the back of the emulator. Connect the power supply module (110V or 220V) to the power connector (see the figure below). Plug in the power supply but do not turn on the power yet!
- 2) Connect the serial cable to the PC and then connect the other end to the emulator in the plug named SER.
- 3) Connect a second serial cable to the second port of the PC and the other end to the emulator in the plug named DBG. This connection is not necessary for the functionality of CoolRIDE and the emulator (see at chapter UTILITY OF THE CONNECTION NAMED DBG).
- 4) You can also connect a SCSI cable. In order to do this you must install a SCSI card in your computer. You must also install WnASPI.DLL file from ADAPTEC™. On the emulator, you have two SCSI connectors (see the figure below). You connect the cable in one of these connections and in the other you connect a SCSI terminator.
- 5) Now turn on the power. You can see on the front panel several LED. The emulator is ready after about 20 seconds when the LED named Run/break is red and the LED named HALT is green. The emulator is ready to work.

**BACK of the emulator****Direct terminal connection**

Two RS232 host ports are provided to connect the emulator to the host computer.

Port named DBG allows you to talk directly to the board operating system using a vt100 terminal. This port is used to diagnose the board as well as to display the results of the trace subsystem.

To test if the emulator is working properly, connect the emulation system to the host computer using communication port named DBG. Plug the DB9 RS232 serial cable in the left connector on the main board as well as in a free serial connector on the host computer. Configure any terminal emulator to work with the chosen port (Hyperterm is available in Windows 95 and NT environment). Use the following data to configure the port:

|                     |                |
|---------------------|----------------|
| Transmission speed: | 57600 bits/sec |
| Data bits:          | 8              |
| Stop bits:          | 1              |
| Parity bits:        | 0              |
| Flow control:       | XON/XOFF       |

Once everything is in place, start the terminal emulator on the PC and power-on the system. The leds will blink shortly and after about 20 seconds the system will come up with the following message (Windows 95

default terminal emulator has control flow problems and may lose some characters, don't be alarmed by that):

```
Xemics SA
CR8x HARDWARE EMULATOR, 16-bit Flash EEPROM boot

Firmware revision: V2.03, build Sep 15 1998 17:37:13

Emulator is SCSI device #0

Default emulated processor family is CR816
Initializing the processor... done

EmulMon>
```

At the prompt type the following command :

```
Emulmon> sdiags
```

The system should respond by the following message :

```
Emulator firmware:

    XEMICS SA, CR8x hardware emulator
    V2.03, SEP-15-1998 (C)

Emulator hardware:
    Board revision: 0
    Board option: 0
    SCSI bus ID: 0

Peripherals hardware:
    No peripherals board detected

System resources:

    Boot eprom          00000000..00010000
    Boot flash         0e000000..0e004000
    Log flash          0e004000..0e006000
    Param. flash 0e006000..0e008000
    BIOS flash        0e008000..0e020000
    Main 1 flash      0e020000..0e040000
    Main 2 flash      0e040000..0e060000
    Main 3 flash      0e060000..0e080000
    External sh7032 ram 09000000..09040000
    CoolRISC data ram 0a100000..0a140000
    CoolRISC prog. ram 0a000000..0a040000
    CoolRISC periph. ram 02300000..02310000
    CoolRISC trace ram 0a280000..0a28000b
    Config. register   0a20000a
    SCSI controller    03000000..0300000f
    sh7032 internal ram 0f000000..0f002000

Monitor resources used:

    mon rom          0e008758..0e01e8f6, ram 09000000..090161a0
    vect ram         0f000000..0f000400
    bss ram          090161a0..090272dc
    data rom         0e01e8f6..0e01ed5a, ram 090272dc..09027740

Free sh7032 memory starts at:
```

```
boot eprom 0e01ed5a
sh7032 ram 0f000d90
external ram 09027760
```

**Checking RAM:**

```
sh7032 internal (0f000d90..0f002000): memory ok
sh7032 external (09027760..09040000): memory ok
CoolRISC prog mem (0a000000..0a040000): memory ok
CoolRISC data mem (0a100000..0a140000): memory ok
```

**Checking Flash memory:**

```
Boot block (0e000000..0e004000): content ok (fri-jun-05-1998)
BIOS block (0e008000..0e020000): content ok (EMULSCSI-v2.03)
Main block 1 (0e020000..0e040000): not ready, (no signature found)
Main block 2 (0e040000..0e060000): not ready, (no signature found)
```

```
Main block 3 (0e060000..0e080000): content ok (thu-dec-10-1997)
```

**CoolRISC programs, memory block content:**

Number of program files: 1

**CoolRISC Program #0:**

```
Program ID:      mon816
P Start Address: 0x0e000020
P Reloc Address : 0x00100000
P Length:        0x0000017a
D Start Address: 0x0e000608
D Reloc Address: 0x00000000
D Length:        0x0000004f
```

**FPGA configurations, memory block content:**

Number of FPGA configuration files: 2

**FPGA configuration #0:**

```
Configuration ID: cr816
Start Address:    0x0e060024
Length:          0x00007914
```

**FPGA configuration #1:**

```
Configuration ID: cr88
Start Address:    0x0e067938
Length:          0x00007914
```

EmulMon>

Pay attention to the section shown in dark gray above. Check that all four RAM sections have passed the test and that the flash content is "ok" (except block 1 and 2 that remain empty).

If the diagnostic is "ok", you can switch the serial cable to port named SER and quit the terminal emulator program.

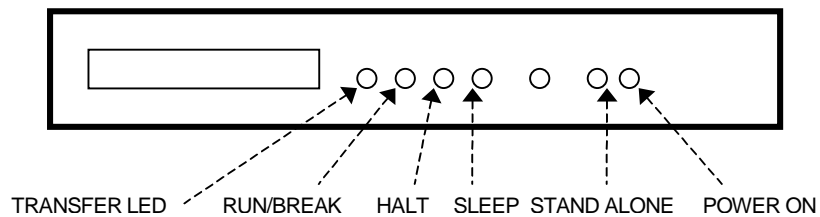
YOU CAN CHANGE THE SERIAL SPEED (19200 OR 56700) OF THE EMULATOR CARD WITH THE FOLLOWING COMMAND:

```
EmulMon>sercom 1 19200 (enter)
```

THE NUMBER "1" REPRESENTS THE PORT NAMED SER.  
THEN YOU MUST SAVE THIS CONFIGURATION. TYPE THE FOLLOWING COMMAND:

```
EmulMon>save (enter)
```

## LED signification

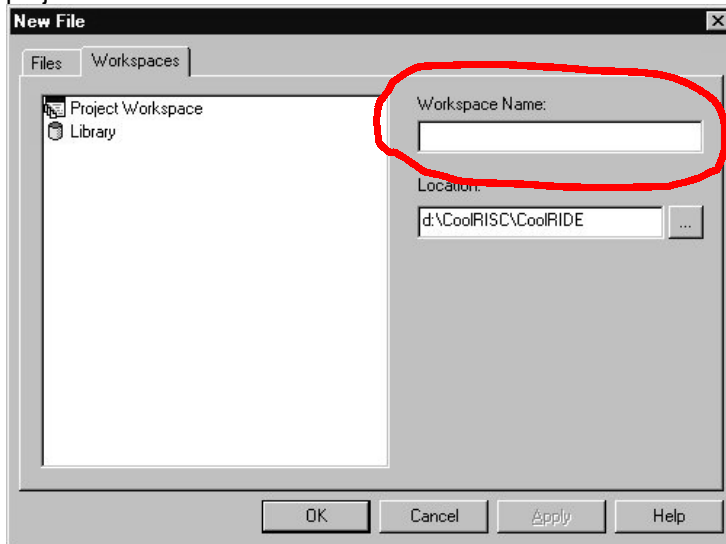


### Front

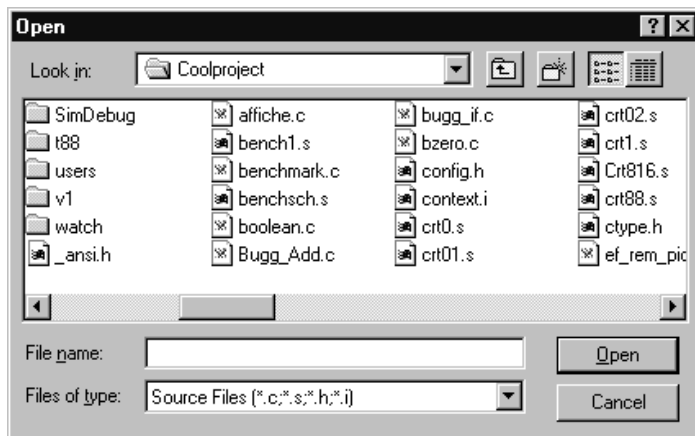
- The TRANSFER LED blinks (orange), as your computer is exchanging data with the emulator.
- If RUN/BREAK LED is red, the emulator is stopped. If RUN/BREAK LED is green, the emulator is running.
- If HALT LED is on (orange), the emulator is halted.
- If SLEEP LED is on, the emulator is in sleep mode.
- If STAND ALONE LED is on, a hyperterminal or GDB has sent a command to the emulator.
- If POWER LED is on, the emulator is connected to the power supply.

**Quick start**

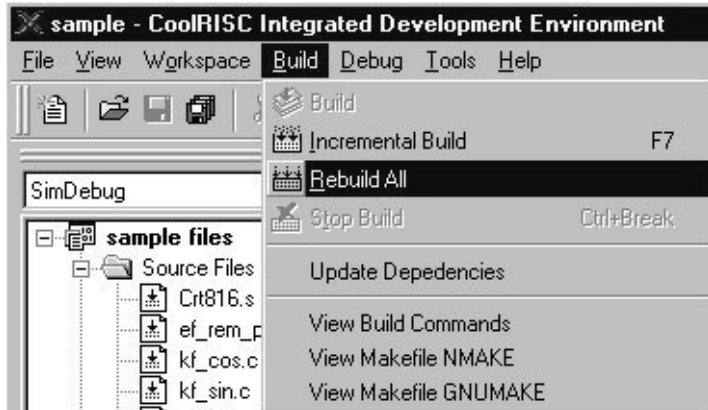
The sections which follow demonstrate the typical steps and procedures for running a program with the emulator. Launch the CoolRIDE. Select **FILE/NEW** then choose workspace and enter the name of your project.



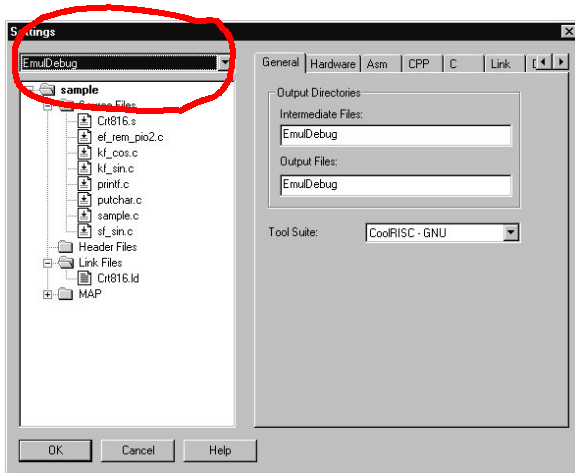
Select **WORKSPACE/INSERT FILES INTO WORKSPACE**, add your files by clicking on their icon.



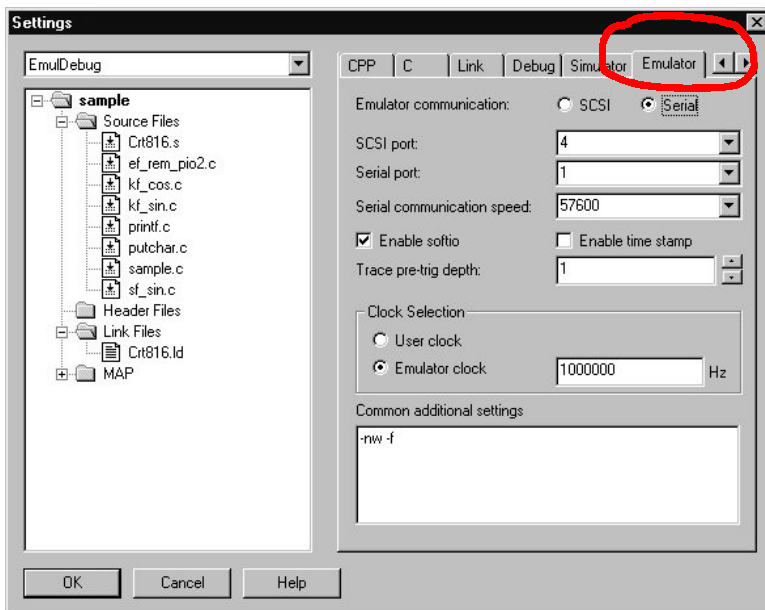
When all files are selected, you can build the project. Select **BUILD/REBUILD ALL**.



Then select **WORKSPACE/SETTINGS** and then choose the EmulDebug configuration.

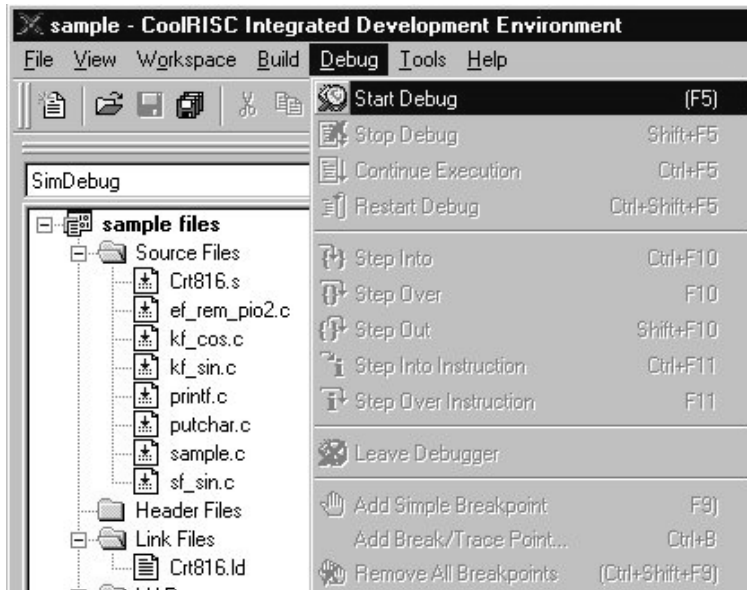


You must configure the serial communication. Select **WORKSPACE/SETTINGS/Emulator**.





Choose the correct serial port and configure the right speed (the same as the emulator card). When all those settings are done, you can launch the debugger. Select **DEBUG/START DEBUG**, the **TRANSFER LED** will blink.



When the program is charged, the **TRANSFER LED** will stop blinking and a little arrow marks the line where the processor is stopped (generally the beginning of the main routine).

## Conclusion

Now you are ready to start using the emulator. At this point you can debug your program. See the manual named CoolRIDE tutorial for more information on the CoolRIDE environment.

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