

**How to develop assembly programs using the Metrowerks CW12 with the Tech Arts 9S12C32 board**

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First, you need to install Metrowerks CodeWarrior for HC(S)12. You can go to the Metrowerks web site <http://www.metrowerks.com/MW/download/default.asp> get the CodeWarrior for the 6812 (you can download it or request a CD in the mail). Follow the Metrowerks instructions about downloading, installing and registering the application. Second, you put the 12K learning edition “**license.dat**” file in your Metrowerks folder. The first few lines look like the following. In particular, look for the phrase “**C code up to 12K**”.

```
FEATURE Win32_CWIDE_Limited metrowerks 5.5 permanent uncounged 2589EF7E8174 HOSTID=ANY
#####
# ( 436): HC12 Special Edition for V3.x
# IDE: learning edition (max 32 files, no subprojects).
# Build/Debug: Unlimited Assembly/Hex/S19. C code up to 12K. ELF/Dwarf object file format.
```

**A) To open an existing Metrowerks project**

- 1) Start Metrowerks CW12 3.0
- 2) Execute File->Open, navigate to an existing \*.mcp file, and click "OK"

**B) Creating a new 9S12C32 assembly project**

First, you will execute **File->New**, select **HC(S)12 NewProjectWizard**, and choose a name and place for the project, as shown in Figure 1.

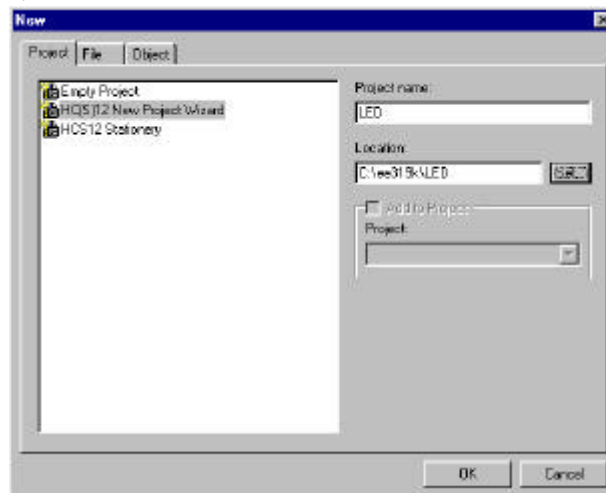


Figure 1. First dialog creating a new project.

Next, choose the 9S12C32 microcontroller, as shown in Figure 2.

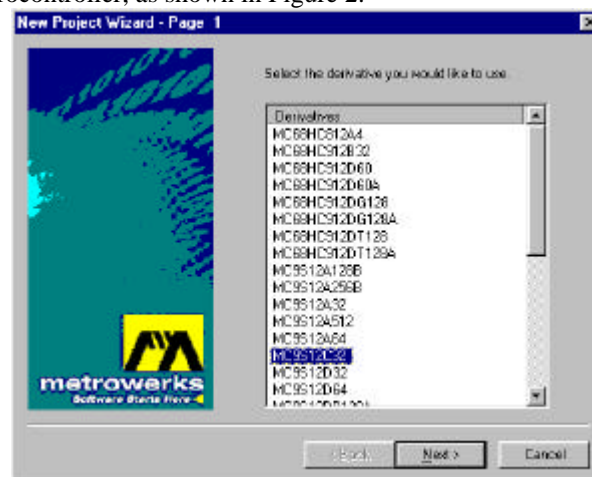


Figure 2. Second dialog creating a new project.

Next, you will select **Assembly** and deselect **C** and **C++**

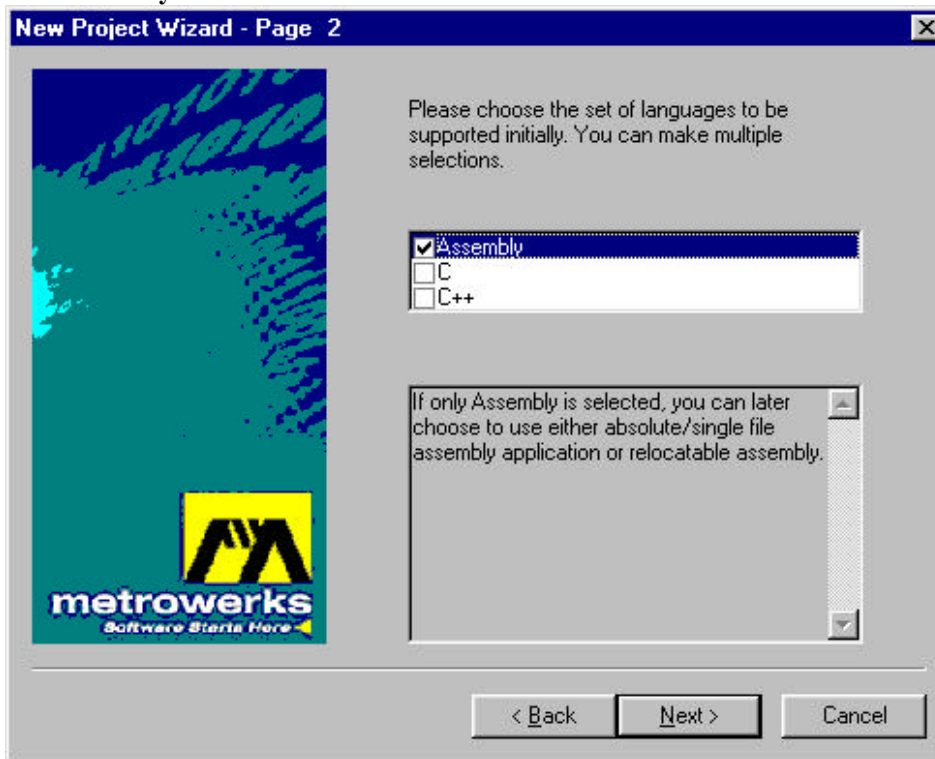


Figure 3. Third dialog creating a new project.

For simple programs, you should select **Absolute Assembly**, as shown in Figure 4.

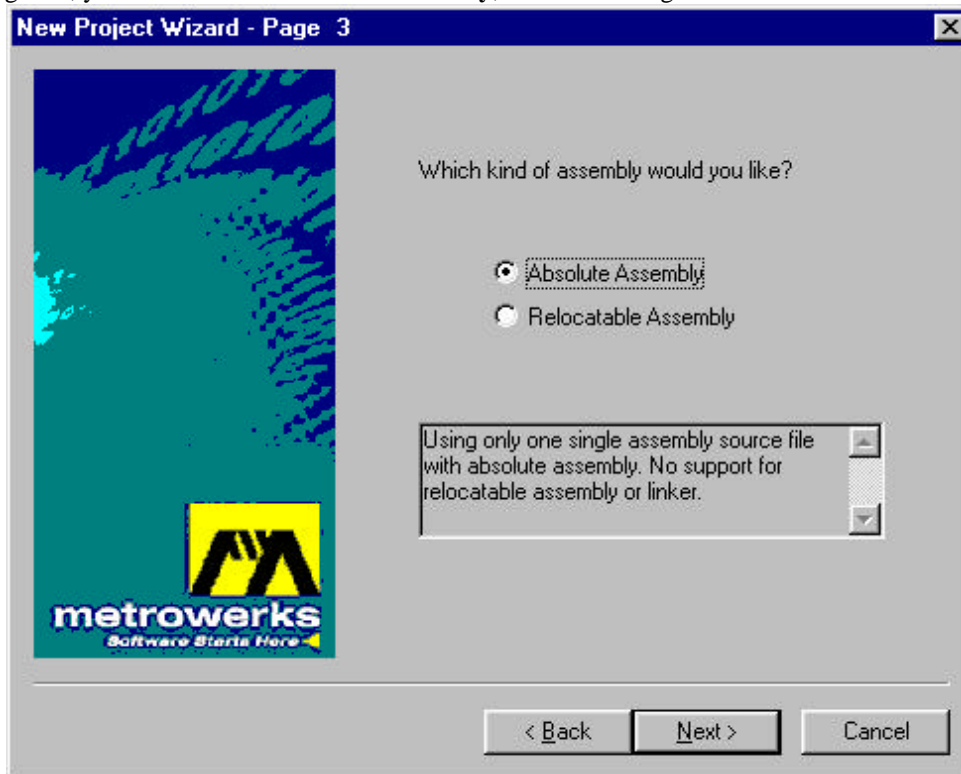


Figure 4. Fourth dialog creating a new project.

Because we have no BDM hardware, you should select **Motorola Serial Monitor Hardware Debugging**, as shown in Figure 5.

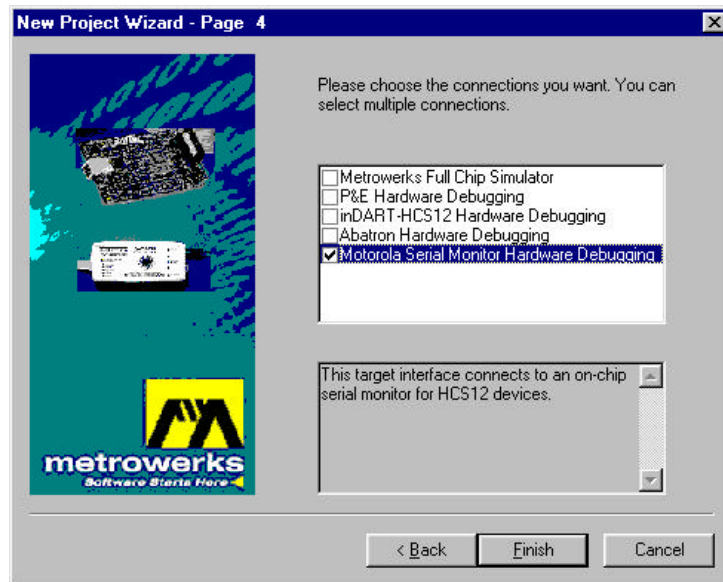


Figure 5. Fifth dialog creating a new project.

In the project window, double click the **main.asm** name to open the source file. Notice that the **ROMstart** address is correct, but the **RAMstart** address is not.

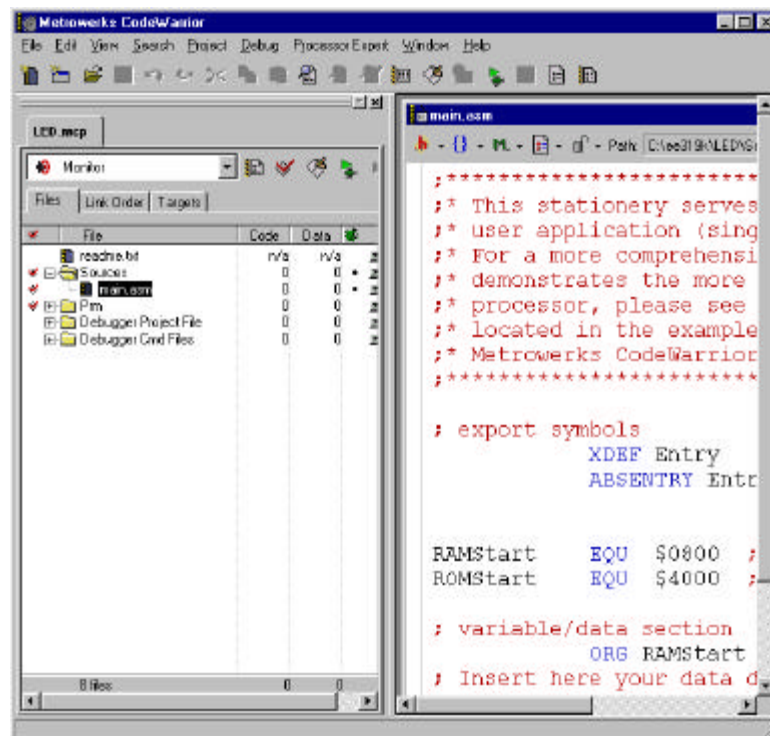


Figure 6. Metrowerks project window.

Change the **RAMstart** to match the RAM address on our board from  
**RAMstart EQU \$0800 ; absolute address to place my variables**  
to  
**RAMstart EQU \$3800 ; absolute address to place my variables**

### C) How to run Metrowerks on the Real 9S12C32 board

*Do this once*

- 1) Connect PC-COM1 to the 9S12C32 docking station (any PC COM port will be ok),
- 2) Place the Run/Boot switch on the 9S12C32 board in Boot mode
- 3) Connect power to 9S12C32 docking station.
- 4) Touch the reset switch on the docking station

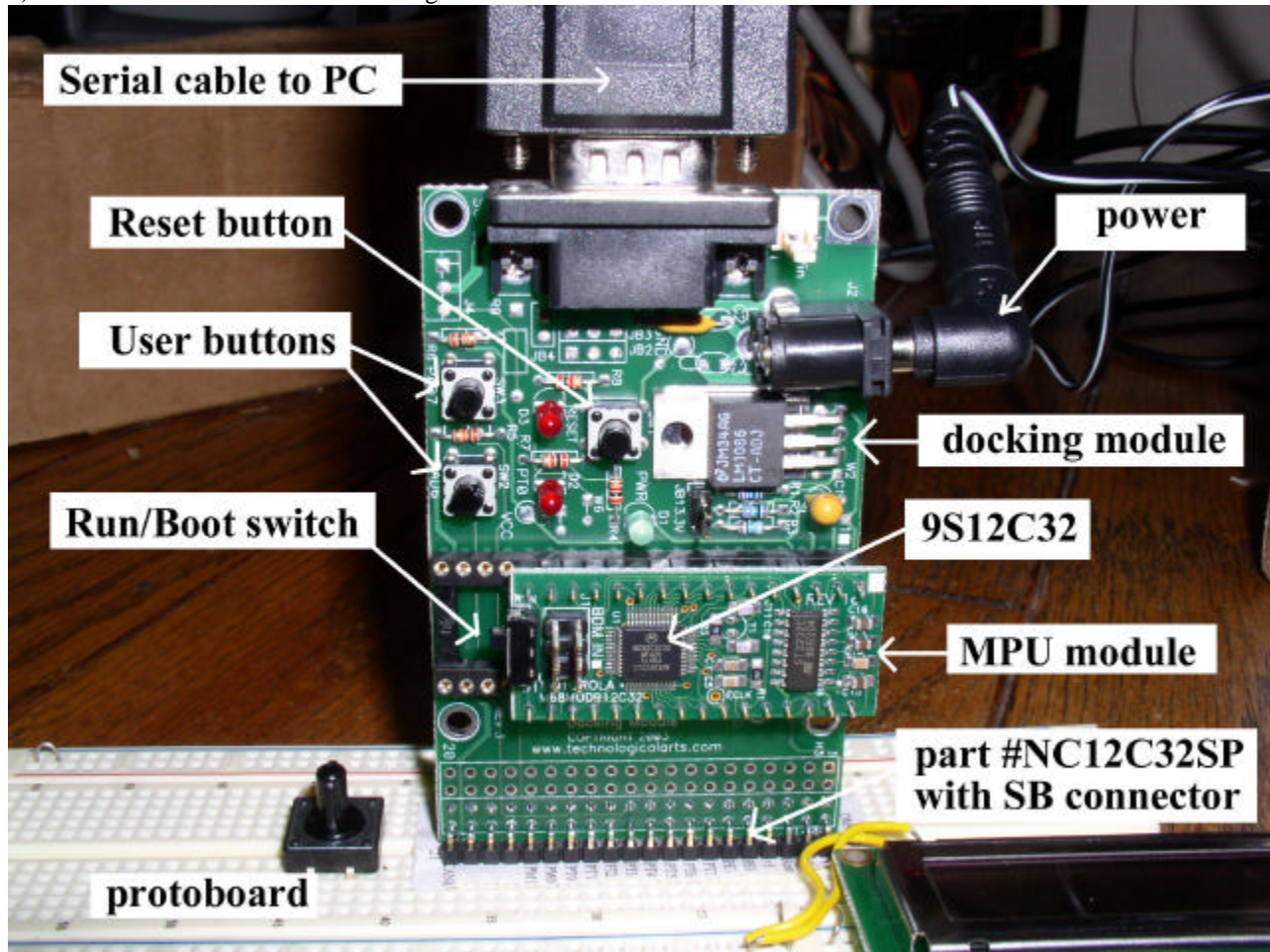


Figure 7. Photograph of the TechArts 9S12C32 hardware setup.

*For each edit/compile/run cycle for software that does not use the SCI*

- 1) In Metrowerks, perform editing to source code
  - 2) In Metrowerks, compile/Link/Load
- Execute **Project->Debug**
- 3) Click the green arrow in the debugger to start. Runs at 24 MHz.

*For each edit/compile/run cycle for software that does use the SCI*

- 1) set the Run/Boot switch to Boot mode, push the reset button on the 9S12C32 docking station
  - 2) execute Project->Debug (compiles and downloads code to 9S12C32)
  - 3) quit MW debugger once programming complete. Quitting the debugger will release the COM port.
  - 4) start a terminal program (like HyperTerminal)
- specify proper COM port, 19200 bits/sec, no flow control
- 5) set the Run/Boot switch to Run mode and push the reset button on the 9S12C32 docking station. Runs at 4 MHz.
  - 6) when done, quit terminal program. Quitting the terminal program will release the COM port.