COP8™ Development Tools

QUICKSTART FOR THE FLASH BASED COP8 WA

MetaLink Corporation

Analog Micro Controllers

June 2000

REVISION RECORD

REVISION	RELEASE DATE	SUMMARY OF CHANGES
A	06/2000	FIRST RELEASE

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Introduction

The Quickstart document contains a guide through software installation, hardware installation and a small tutorial, which tests that the software tools, the hardware and development environment are operating correctly.

Installing the COP8-WA Software

1. **What you will need**

   - Computer and monitor: 486 or higher PC™ with at least 16 MB RAM, a hard disk with at least 32MB of free disk space and a mouse.

   - Windows 95, Windows 98, Windows NT, or Windows 3.11 running in enhanced mode (The descriptions in the document will assume a Windows 95 environment)

   - (Optional) Printer

   - Adobe Acrobat Reader installed. If you do not have Acrobat Reader installed, the installation files can be found on the CD-ROM.

Get started!

2. Begin by clearing the memory and exiting all tasks:

Identify any running programs by moving the mouse cursor to the taskbar and close all open programs.

3. Installation of the COP8-NSDEV software package

1. Insert the CD-ROM labeled *"Technical Documentation Tools + Software"* into the CD-ROM drive.
2. If the PC has the CD-ROM "auto run" feature enabled, a small welcome program will be launched. Proceed to step 4.
3. If the PC does NOT have the CD-ROM "auto run" feature enabled then locate the SETUP.EXE program in the root directory of the CD-ROM and launch it. When done, a small welcome program will be shown.
4. Press the "Install Tools" button to start the software installation.
5. Read the InstallShield® Welcome text and click **N**ext > to proceed.
6. Read the license agreement and click **Y**es to accept the terms.
7. Read the information text and click **N**ext > to proceed.
8. Enter your name and company in the dialog box and click **N**ext > to proceed.
9. On the InstallShield menu you can select between different installation options:

   A) **Standard** (default): all tools will be installed into one user defined location.
   B) **Custom**: only the tools selected by the user will be installed into one user defined location.
   C) **Special**: Launch of each individual COP8 tools own installation program.
   D) **Floppies**: This entry enables you to create a set of floppy disks for each COP8 tool package. This would enable installation of each COP8 tool package on PC's without access to a CD-ROM drive.
10. Select the **Standard** installation and click **N**ext > to proceed.
11. Browse to your preferred directory for installation or just accept the default value of "`c:\cop8`". Click **N**ext > to proceed.
12. Either type in a new name for the COP8 tools program folder, select an existing group in the list or just accept the default value of "**COP8 Development Platform**". Click **N**ext > to proceed.
13. Your choices will be shown in an information window. If every thing is OK then click **N**ext > to proceed.
14. All files will now be installed to the directory you selected. After the files have been installed, you can select whether to launch WCOP8 IDE immediately, or whether to close the installation. Click on **F**inish to exit the InstallShield.

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Now the COP8 Development Platform is installed on your PC and ready for use.
At the end of the installation you can verify that the correct tools have been installed by
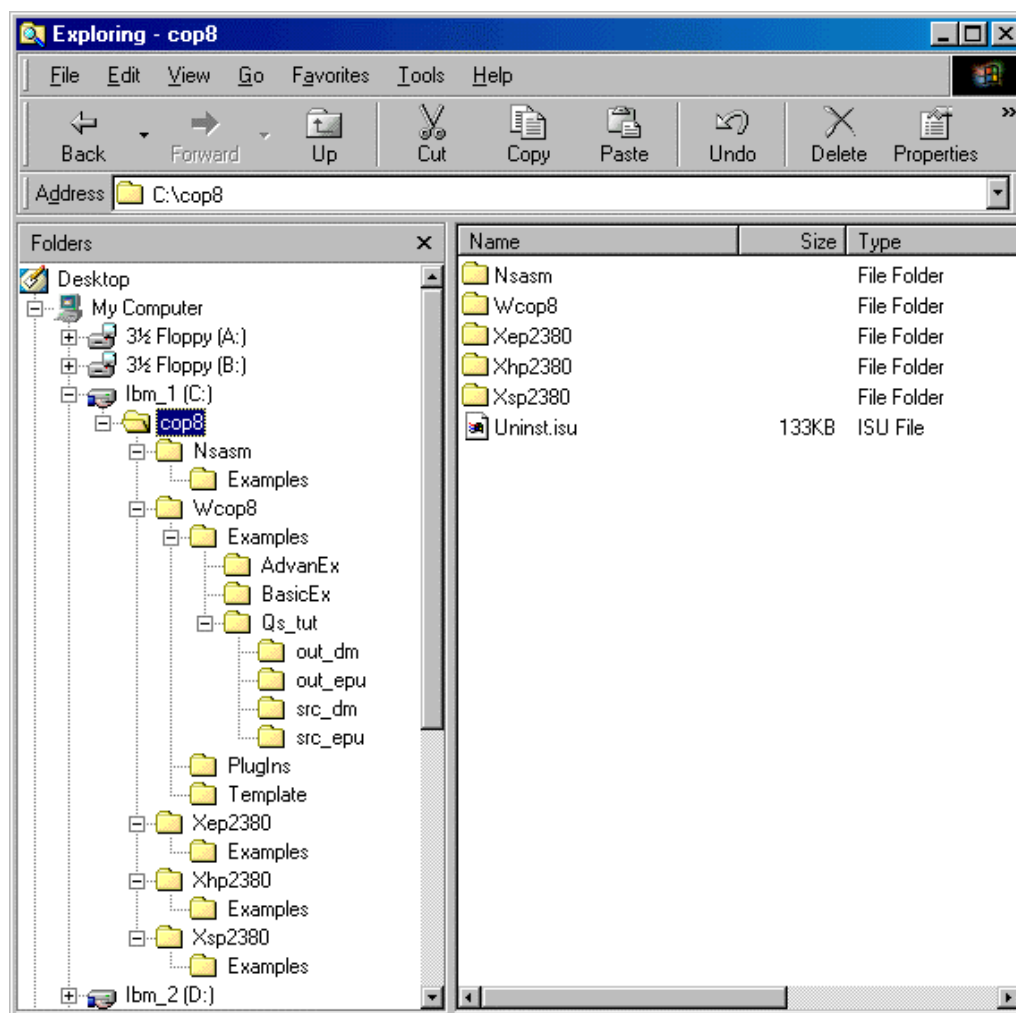using Windows Explorer and comparing your installation to that shown in Fig 1.
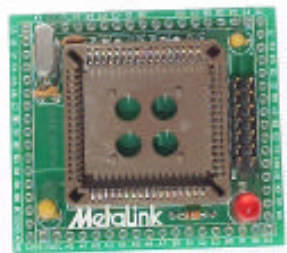

Figure 1.

Note: The exact names of the MetaLink EPU, Emulator DM/ WA/ AD and Simulator
directories could be ***Wep2380, Whp2380*** and ***Wsp2380*** instead of the names shown
above. If the Standard installation has been used, the COP8-NSDEV InstallShield
automatically determines your operating system and installs the 16-bit version of the
software if you run under Win3.x and the 32-bit versions if you run under Windows
95/98/NT.

The MetaLink debug tool naming legend is as follows:
Xep2380 – EPU s/w, 32-bit   Wep2380 – EPU s/w, 16-bit
Xhp2380 – DM/WA/AD s/w, 32-bit Whp2380 – DM/WA/AD s/w, 16-bit
Xsp2380 – Simulator s/w, 32-bit   Wsp2380 – Simulator s/w, 16-bit

Installing the COP8 WA Hardware

1. Begin by identifying all the components of the system:

✓ COP8 WA base unit
✓ Null-target including COP8CDR9 Chip for "stand-alone" operation (NT-WACOP8)
✓ RS-232-C Cable (25 pin)
✓ Software CD (Diskettes optional)
✓ National Semiconductor Corporation COP8 Assembler
✓ On-line User's Manual
✓ One 110 Volt Power supply
✓ One 200 Volt Power supply

← Connect 2 x 7 ribbon cable

Figure 2. Null target

2 x 7 Ribbon cable

Power connector

← Serial connector

← OFF / ON switch
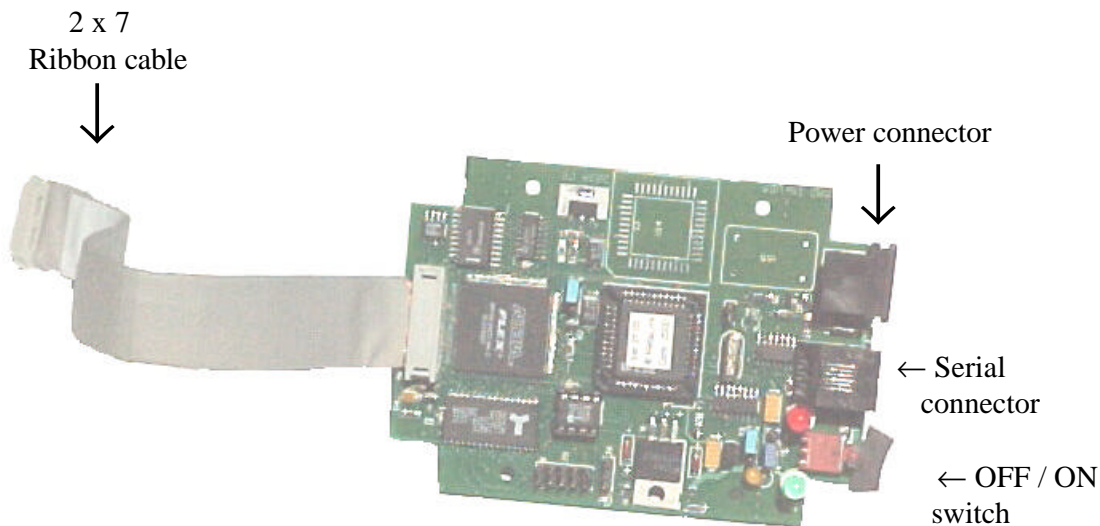
Figure 3. COP8 WA (Model 100)

2. Connect the power supply module (100–240V) to AC Main and to the COP8 WA. Make the connection but do not turn the COP8 WA on yet.

3. Connect the serial cable to a 9-pin serial port connector (may be COM1-COM4) at the PC and to the COP8 WA at its RJ11 connector. Connection is 1-1; a null modem adapter is not required.

4. Depending on which COP8 WA target accessory you are using (see list below), connect it to the COP8 WA emulation tool via the 2x7 ribbon cable.
    *   Null target
    *   Probe card
    *   Target 2x7 header

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The Quick Start Exercise

The sections that follow demonstrate the typical steps and procedures to
- Start and Configure the Emulator
- Load the Demo Program
- Setup a Watch Window
- Set Breakpoints
- Run Emulations

After the exercise, there is also a short section describing the demo program's use of PORTD.

Step 1. Start and Configure the Emulator

First turn on power to the COP8 WA and then click on the *COP8 Emulator-DM* icon to start the COP8 WA debugger software. As soon as the software starts, the *Select Current Project/Working Directory* dialog box will appear to ask you to select a project directory. The first time the software is started, the default directory shown will be the directory in which the software was installed. You should probably select a different directory as your project directory. After you have chosen a directory, click *OK* to continue.
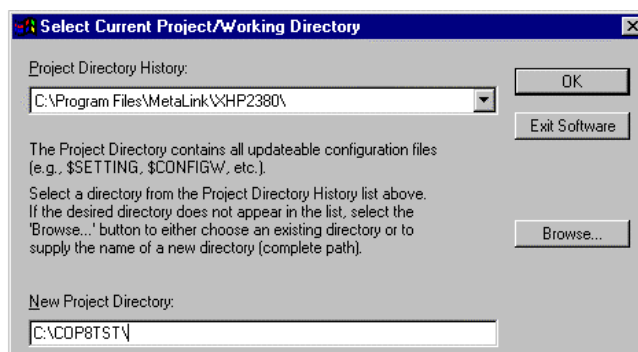
Figure 4.

After the project directory is selected, the *Select Chip* dialog box will appear for you to select the emulation device. Set the *Emulator Base* to *WA: National COP8-EM/DM/IM-Flash*. Once you have selected the emulator base, open the *Emulation Device* list box and select the device that matches your COP8 WA. Note that this information will be saved in

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the project directory so you will not have to repeat this step when this project directory is used. After you have selected the emulation device, click *OK* to continue.
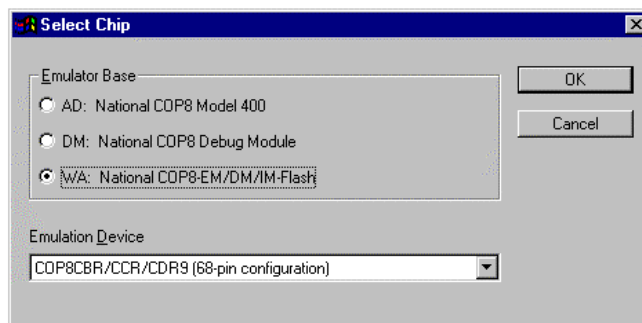

Figure 5.

After the emulation device is selected, the *Select Communication Port* dialog box will appear for you to select the *Communications Port* to which your COP8 WA is connected. Note that this information will be saved in the project directory so you will not have to repeat this step when this project directory is used. After the communication port is selected, click *OK* to continue. The software will now establish communication with the COP8 WA. If the PC has problems communicating with the emulator, then please review the README.TXT file in the software installation directory.
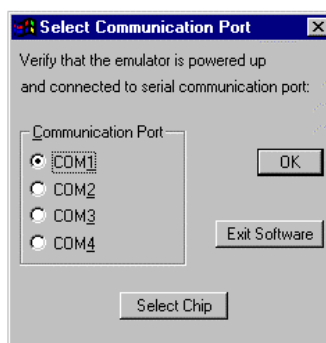
Figure 6.

Once communication has been established, the *Configure Emulator* dialog box will appear where you can change the *Baud Rate*. From this dialog box you also have access to the *Flash Configuration Options* dialog box via the *Flash Configuration* button. No changes are required for this exercise so click *Cancel* to continue.
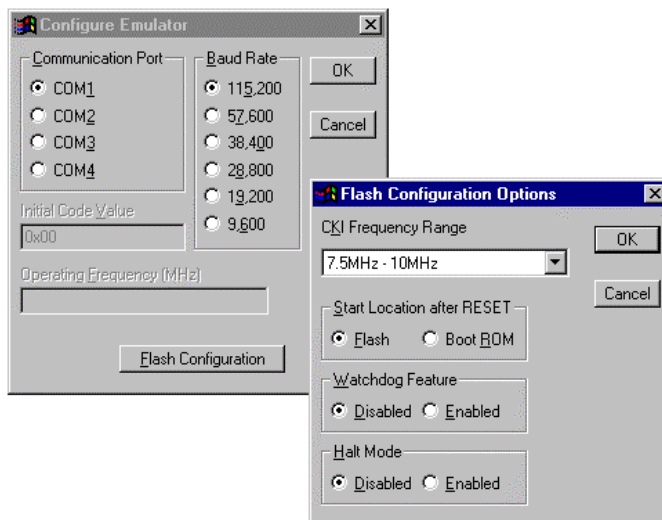
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Figure 7.

Step 2. Load the Demo Program

Now load the demo program using the ***File/Load*** command from the main window menu, above the toolbar. The demo program is called TD.DBG and is located in the EXAMPLES directory in the software installation directory. In a default installation the full file path would be **C:\PROGRAM FILES\METALINK\XHP2380\EXAMPLES\TD.DBG**. After you select the file for loading you will be asked if you want to merge the file into the current environment. This is not applicable in this exercise so click ***No*** to continue.

Figure 8.

Then you will be asked if you want to write the code memory bytes from the load file into the flash memory in the chip. Click ***Yes*** to continue.

Figure 9.

Step 3. Setup a Watch Window

Now that the demo program is loaded let's open a *Watch Window* and enter some variables into it to watch. To open a Watch Window, select the *Window/Watch* command from the Main Window menu, above the toolbar. Once the Watch Window is displayed, to add a variable select the *Watch-Expression/Add* command from the Watch Window menu.

Use the Add command three times to add the following variables to the Watch Window: **iteration**, **main_loop_factor**, and **node**. Once they are entered, the Watch Window should look as follows. Note that the variables will appear "grayed-out" because they are not yet active.
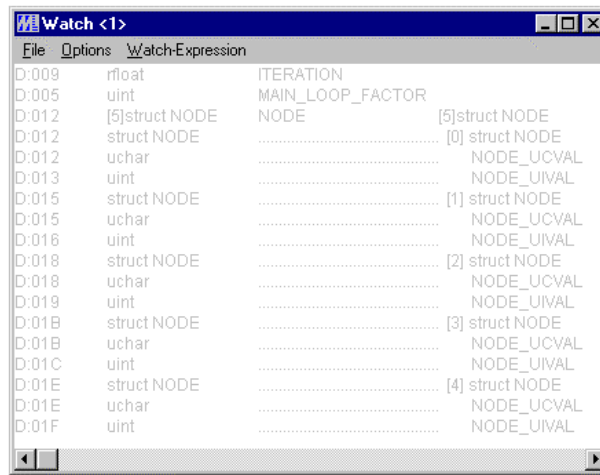
Figure 10.

Step 4. Set Breakpoints

There are several ways of setting breakpoints, but we will use the easiest method, which is to go to the line in the *Source Window* where you want the breakpoint and just double-click on that line. First click on the title bar of the Source Window to make it the active window and then select the *View/Change Module* command from the Source Window menu. Select the **TDM** module from the list and then click *OK* to continue.
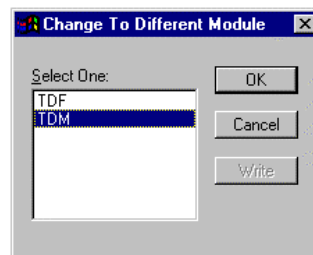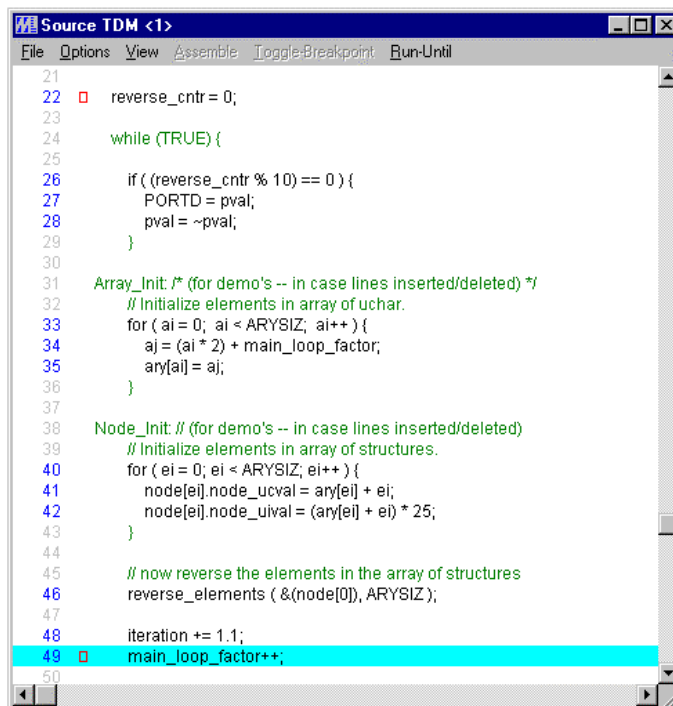

Figure 11.

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The Source Window will now be redisplayed with source code from the TDM module. First set a break on line number 22 by double-clicking on that line and then scroll down in the window and set a break on line number 49 by double-clicking on that line. Note that a small red square will be displayed on both lines to indicate that breakpoints are set there.

Figure 12.

Step 5. Run Emulations

Now we can run some emulations. Note that when starting a debugging session it is always a good idea to reset the microcontroller. Do this by clicking on the *Res E* button on the toolbar. This command resets the microcontroller and starts emulation. The breakpoint at line number 22 should be reached very quickly and the windows will be updated. Note that the variables in the Watch Window are now active, however, the values shown for the variable **node** are random, as it has not been initialized yet.

Now click on the *Go* button on the toolbar. This will start an emulation starting at the current PC address. The breakpoint at line number 49 should be reached very quickly and the windows will be updated. Now click on the *Go* button two more times. It should break at line number 49 each time and the Watch Window should look as follows.
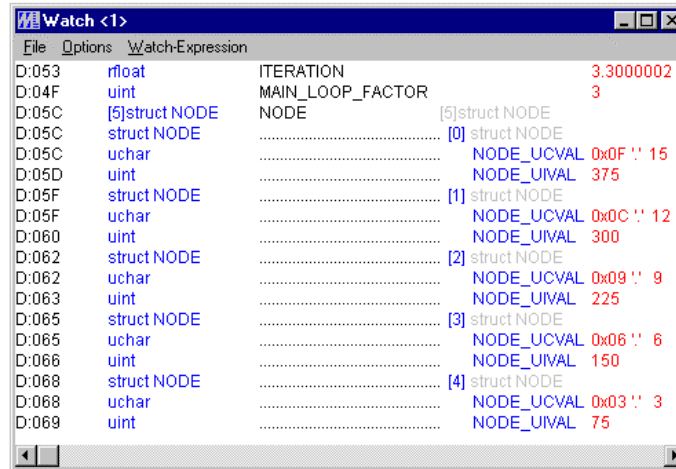
Figure 13.

PORTD Notes

Note that the demo program TD.DBG also toggles bits in PORTD. First remove both breakpoints. You can do this by double-clicking on each one or just use the ***Break/Trace|Clear All*** command from the Main Window menu. Now click on the ***Res E*** button on the toolbar to start another emulation. Since there are no breakpoints set, emulation should not stop. Initially, the value 0x55 is written to PORTD and every 10 times through the main loop of the demo program, each bit will be toggled.

If you have a scope you can use it to probe the PORTD bits. If you are using the Null Target, each pin is conveniently available for probing on the edge of the board.

When you are finished you can stop the emulation by clicking on the ***Stop*** button on the toolbar.

Conclusion

This concludes the quick start exercise.
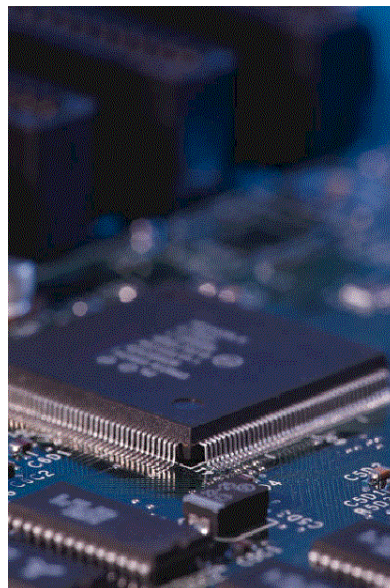
For additional infromation please refer to the User's Manuals and Help Files of the tool in question.