OVERVIEW

Creating applications with the Keil 8051 development tools and debugging those applications with the MetaLink IceMASTER-PE is easy. There are only a few items you need to consider. The following application note describes what to do and shows you what results you should get.

We will create an example program that blinks the LEDs and we will download it to the IceMASTER for debugging.

CREATING A PROJECT WITH µVISION

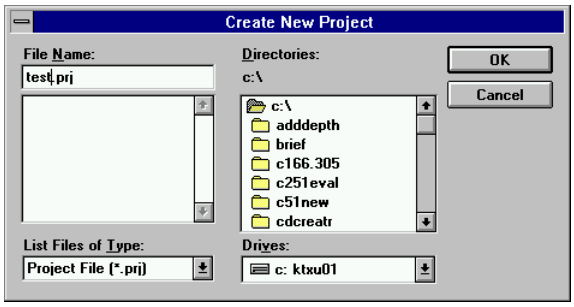
You must create a project with the Keil µVision IDE. A project encapsulates your source files and lets you easily **make** your target program.

First, you should create a source file to add to your project. Select the New command from the File menu and enter the following program.

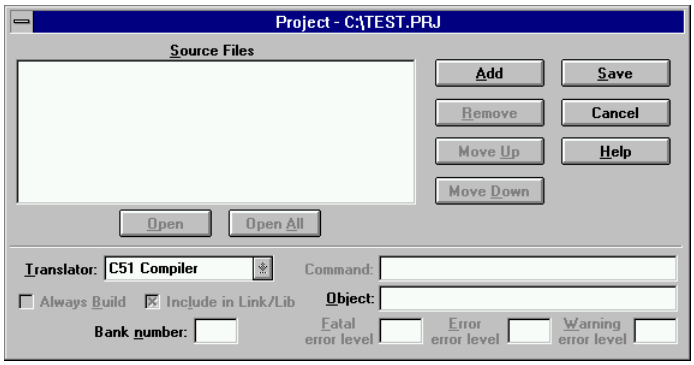
```
sfr P1 = 0x90;                          /* SFR declaration for Port 1 */

void main (void)
{

for (;;)                                /* main must loop forever */
  {
  unsigned char j;                      /* Loop variable */

  for (j = 1; j < 0x80; j <<= 1)        /* Loop thru bits 0,1,2...7 */
    {
    P1 = j;                             /* Copy loop var to Port 1 */
    }


  for (j = 0x80; j > 1; j >>= 1)        /* Loop thru bits 7,6,5... */
    {
    P1 = j;                             /* Copy loop var to Port 1 */
    }
  }                                     /* Repeat for(;;) loop */
}
```

Save the file with the name TEST.C.

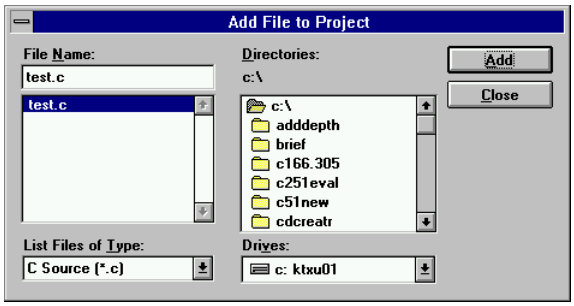
Next, select the New Project... command from the Project menu. When prompted, enter a name for the project. We chose the name TEST.PRJ.



Then, when prompted with the Project dialog box, click on the Add button to add source files to the project.



And...select the file TEST.C that you just created.



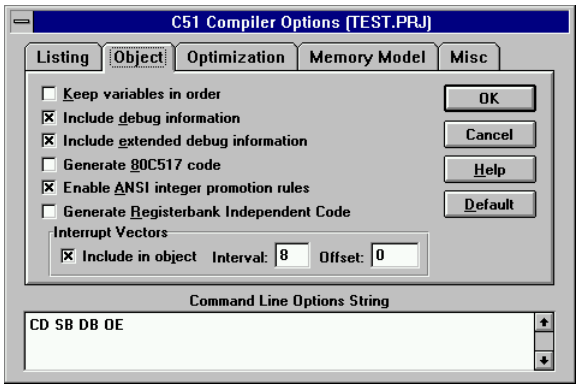
Make sure you click the Save button to exit the Project dialog box.

SETTING THE OPTIONS

Once you have created your project, you need to set a few options.

C51 COMPILER OPTIONS

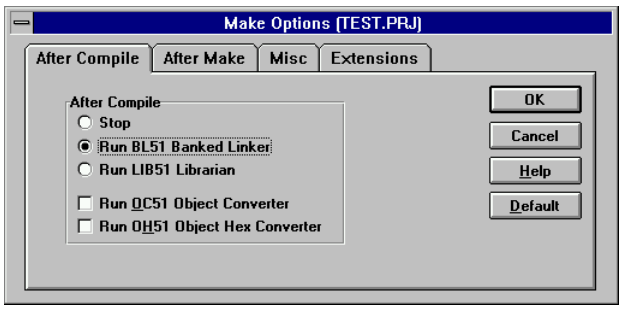
You should enable the Debug and Extended Debug information for the C51 Compiler. Select the C51 Compiler command from the Options menu. Then, select the Object tab as shown below.



Make sure the **Include Debug Information** and the **Include Extended Debug Information** checkboxes are checked.

MAKE OPTIONS

The Make Options determine what µVision does when it makes your project. Set these options so that the BL51 Linker runs after compiling the source files. Select the **Make...** command from the Options menu to open this dialog box.

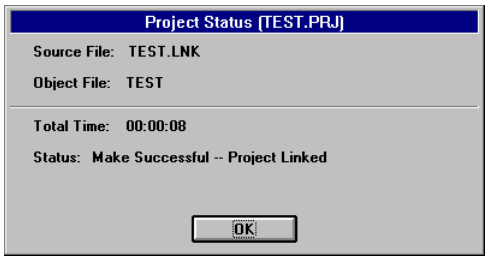


Note that the linker creates an absolute object file automatically. The absolute object file is created using the name of the project without an extension. For our example, the absolute object file is named TEST.

If you need a HEX file generated (for programming an EPROM), make sure you check to checkbox for **Run OH51 Object Hex Converter**.

BUILDING THE PROJECT (AND MAKING AN ABSOLUTE OBJECT FILE)

To make the project, all you need to do is select the Make: Build Project command from the Project menu. When the files are compiled and linked, µVision displays the following prompt. If errors were detected, µVision prompts you with a list of the errors or warnings.



STARTING THE METALINK EMULATOR

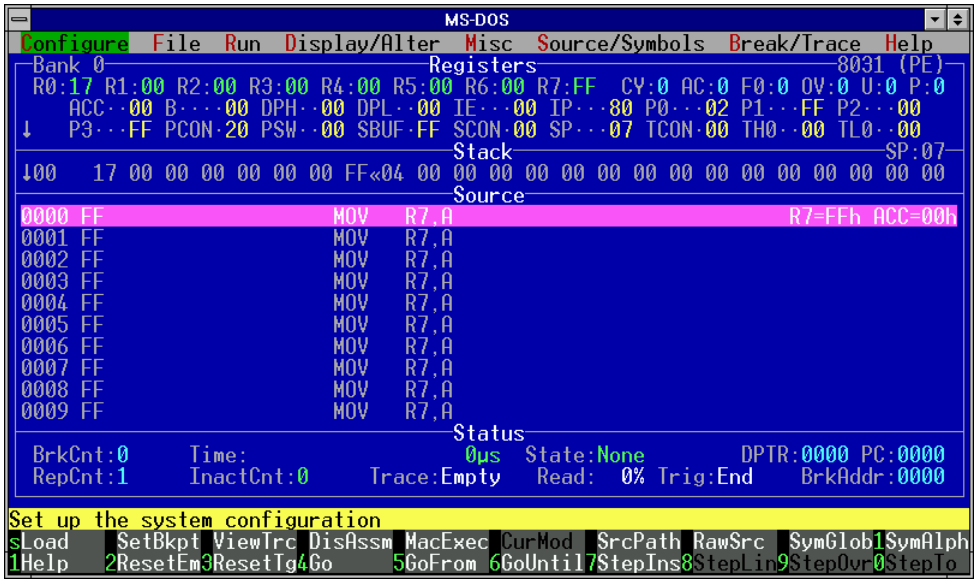
To start running the IceMASTER-PE, you must open a DOS window and switch to the C:\IM51 directory. From there, you will run the ICE.EXE program which is the MetaLink interface to the emulator. For example:

```
C:\IM51>ICE
```

starts the emulator software. You may be prompted to select the serial port that connects to the emulator.

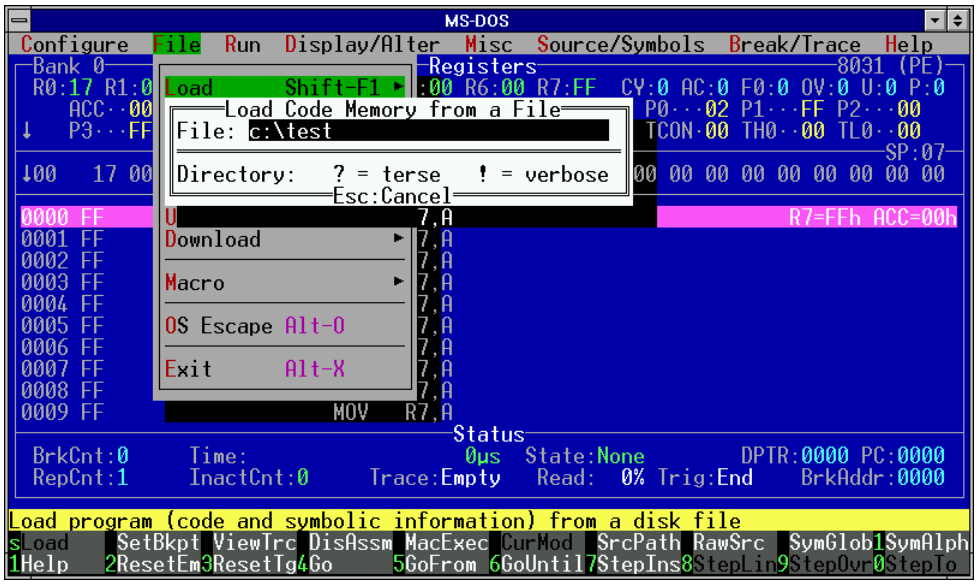
Select the appropriate COM port to continue.

Once the MetaLink ICE interface loads, your screen will appear as follows:



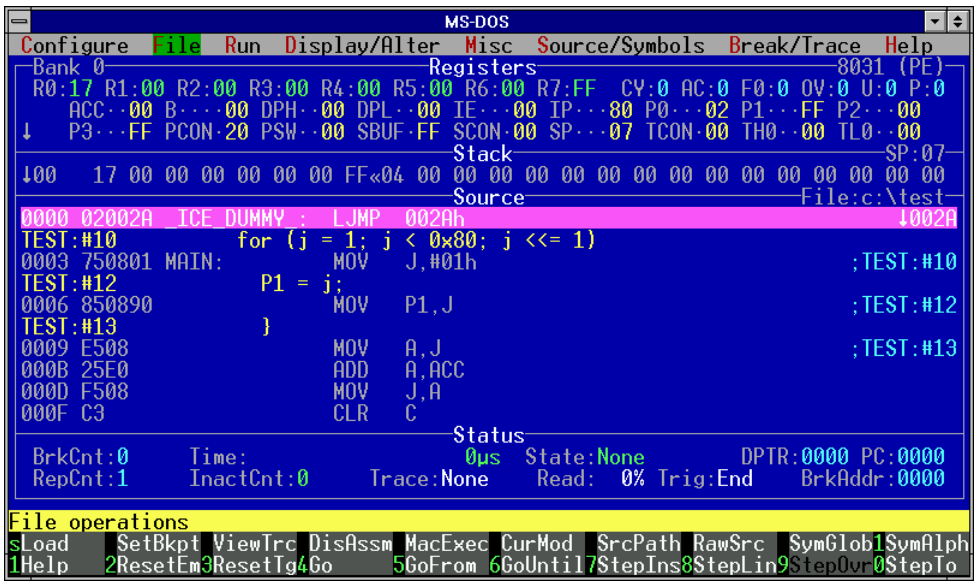
LOADING THE ABSOLUTE OBJECT FILE

To load the TEST program you just created, select the Load command from the File menu and type the complete path name to the absolute object file. For our example, this will be C:\TEST.



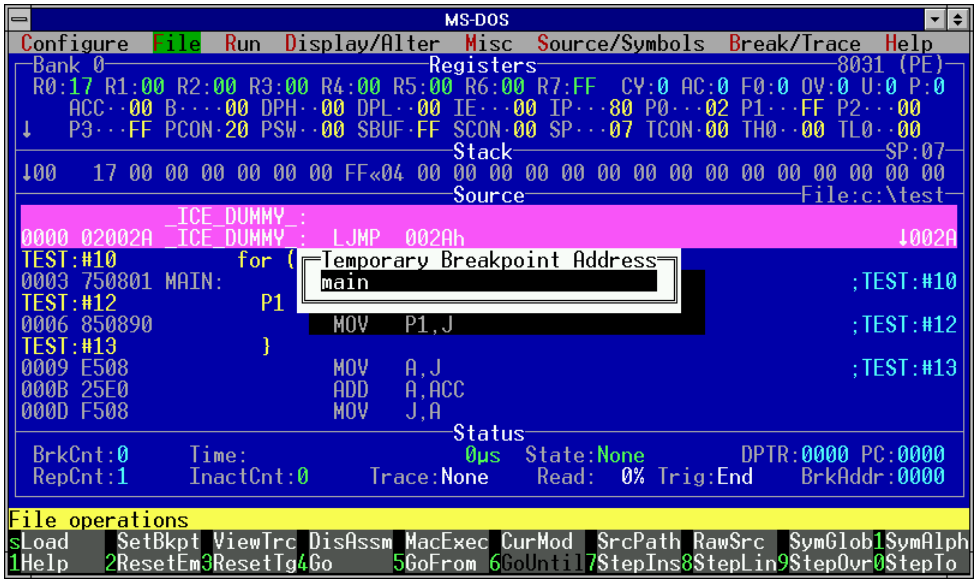
If you are prompted to **Merge into current application environment**, select YES.

After the TEST program loads, the ICE interface appears as follows:

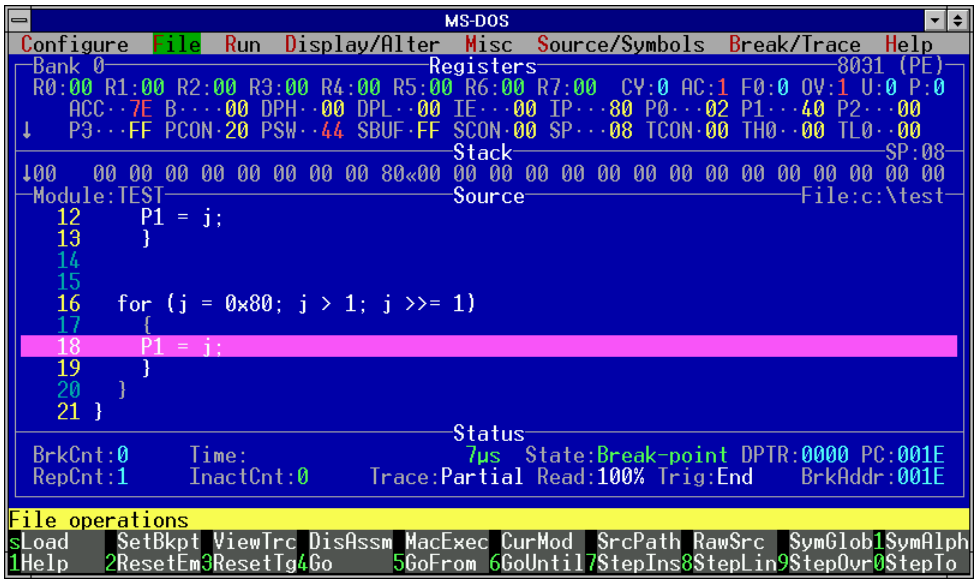


You are now ready to begin debugging your program with the emulator.

Begin by pressing F6. This opens the Go Until dialog box where you can set a temporary breakpoint at the beginning of the **main** C function. This lets you skip over all of the startup code and get straight to your program.



Next, press F9 to step over each C instruction in your program. This way, you can single-step through your program.



CONCLUSION

The MetaLink IceMASTER-PE in-circuit emulator is easy to use with the Keil development tools for the 8051. There are only a few controls you must configure to generate object files that include full symbolic and source-level information for the emulator.

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