TYX Corporation

Productivity Enhancement Systems

Reference	TYX_0051_3
Revision	1.1
Document	MSDebug.doc
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How to debug with MSVC++6.0

1. Studio Version:

This document is for the Studio version prior to **1.17.0** (not included) and earlier. The Subset used for the Atlas is **IEEE716.89/Paws**.

This document assumes that the user has some knowledge of Studio and **MSVC++6.0**.

2. How to debug the Wcem.dll from the MS compiler:

We can utilize Microsoft Visual C++ and debug our drivers.

The first step is to have an Atlas program and a device database.
We are going to walk through an example in order to make this easier to understand. Here is the source file for a small Atlas and device database example:

---------- Atlas1.atl ----------

```
 000000 BEGIN, ATLAS PROGRAM 'Simple Dynamic'      $
E900000 OUTPUT, C'START TEST'                      $
     10 SETUP, AC SIGNAL,
        VOLTAGE MAX 5 V,
        CNX HI                                     $
 999999 TERMINATE, ATLAS PROGRAM 'Simple Dynamic'  $
```

---------- end of Atlas1.atl ----------

---------- Ddb1.ddb ----------

```
configuration Wcem_debugtest;
def, fnc, Dsp   ==      45;     ** Display
*****************************************************
begin dev FNG;
  cnx hi virtualpin;
  begin FNC = 10;
    control{
           voltage range 0 v to 140 v;
           }
    source ac signal;
  end;
end;
```

---------- end of Ddb1.atl ----------

The busconfi file should be as follows:

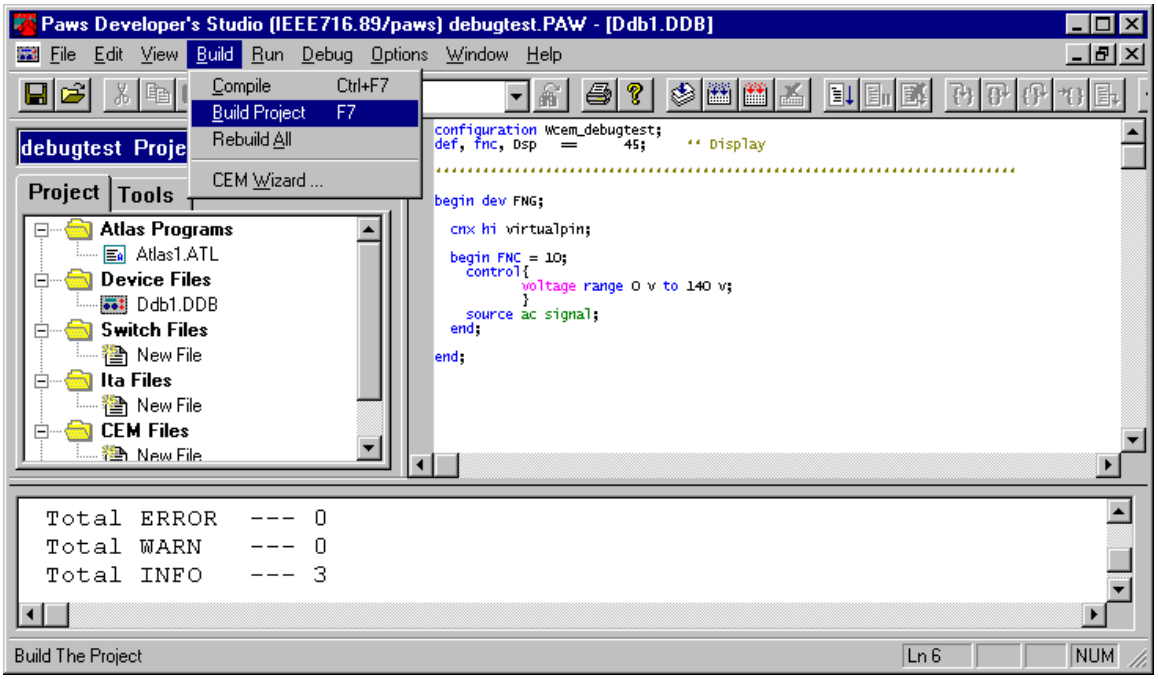
---------- busconfi ----------

```
;       IEEE-488 Bus Configuration File -

"Channel"        2

FNG     BUS 2   MLA 11  MTA 11
```

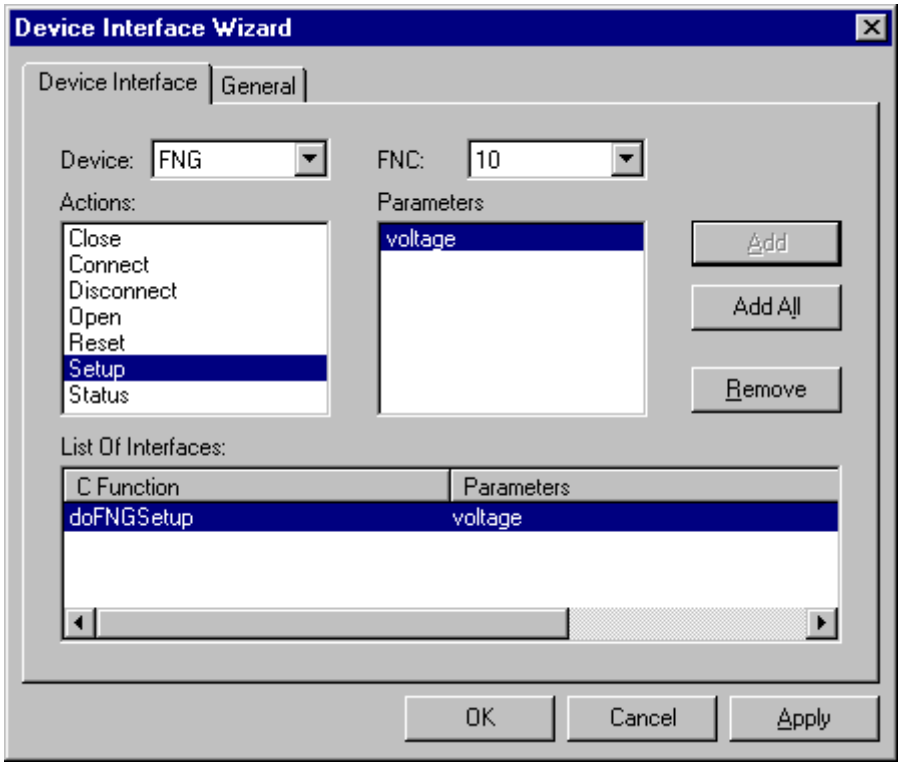
---------- end of busconfi----------

Put those files in a Paws project called **debugtest**. In our case, we will put the project under **C:\usr\paws\debugtest**.
You may place the **Busconfi** either in the local directory or you may place it in the station subdirectory in your Station.

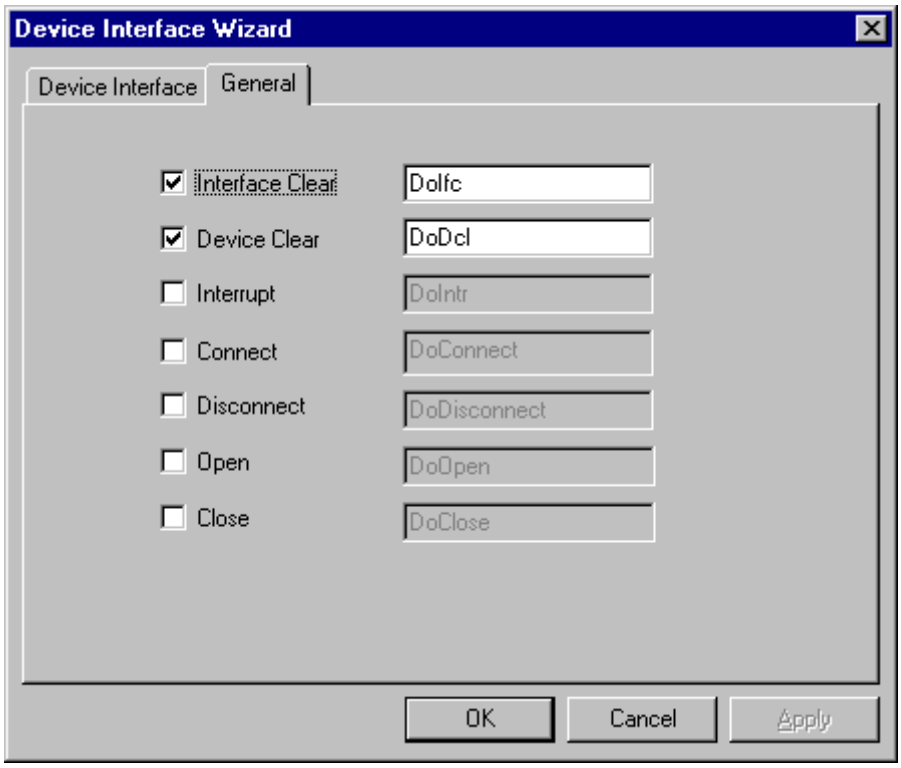
- Build the project, as shown below, under the TYX Studio.



- Now that the device database is built, you have access to the **Wcem Wizard** in order to create the source files that will allow us to build the **Wcem.dll**
- Using the **Wcem Wizard** under **Build**, create the proper setup function associated to the Atlas **Setup** function:



- You may wish to add some features under **General** such as shown below. This will be responsible for an additional **C++** file generated by the **Wcem Wizard** called **ctlr.c**.



- Once all the functions have been mapped properly, you should click on **OK**. The Wizard will generate a list of source files in the TYX studio. In this case, the list of files is the following: **Wrapper.c**, **key.h**, **defaults.h**, **error.c**, **ctlr.c** and **FNG.c**.
- The file that will include the driver code that you might want to debug will be in this case **FNG.c**. We will add a Display function in the **doFNGSetup** function in **FNG.c** as shown below:

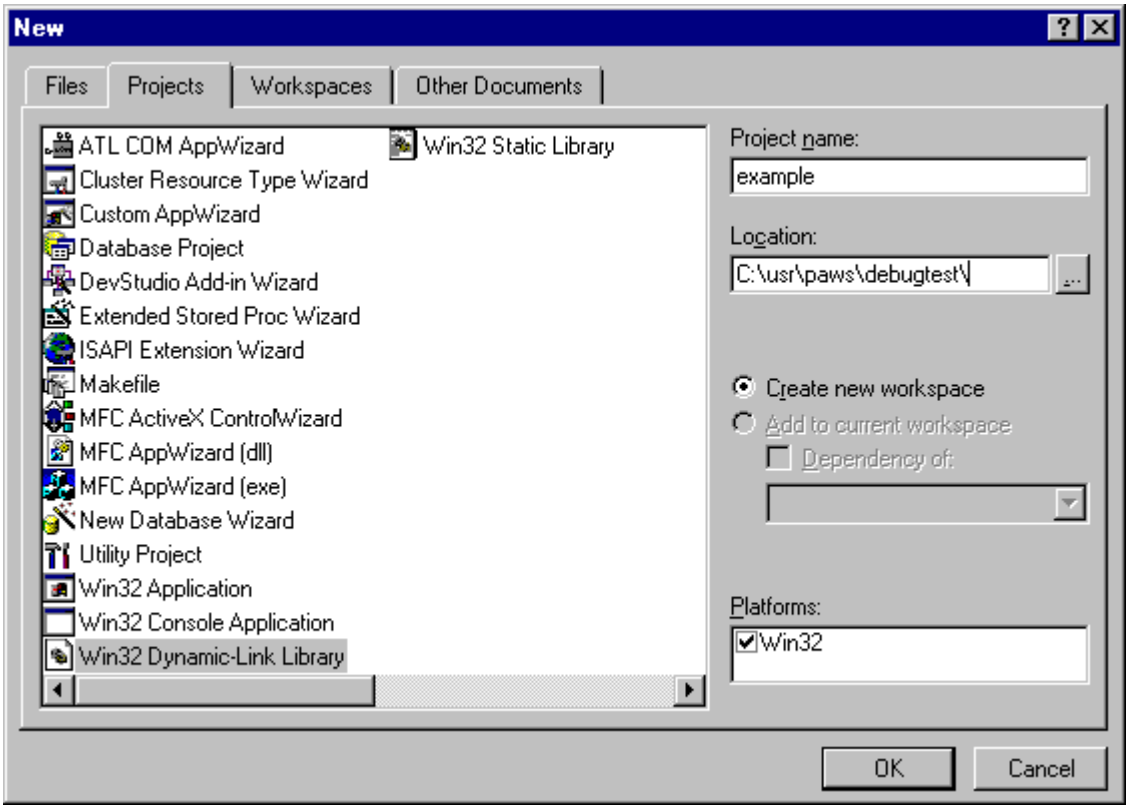
```
---------------------------------------------------------------------
int doFNGSetup (double VOLT)
//END{DFW}
{
      Display("Entering doFNGSetup\n");
      return (int) 0;
}
---------------------------------------------------------------------
```

Note: If you build the Wcem.dll from the Paws Studio, make sure that you either delete it or overwrite it with **Wcem.dll** generated by the MS Studio, or it might cause some problems when debugging the **dll** generated by the MS Studio.

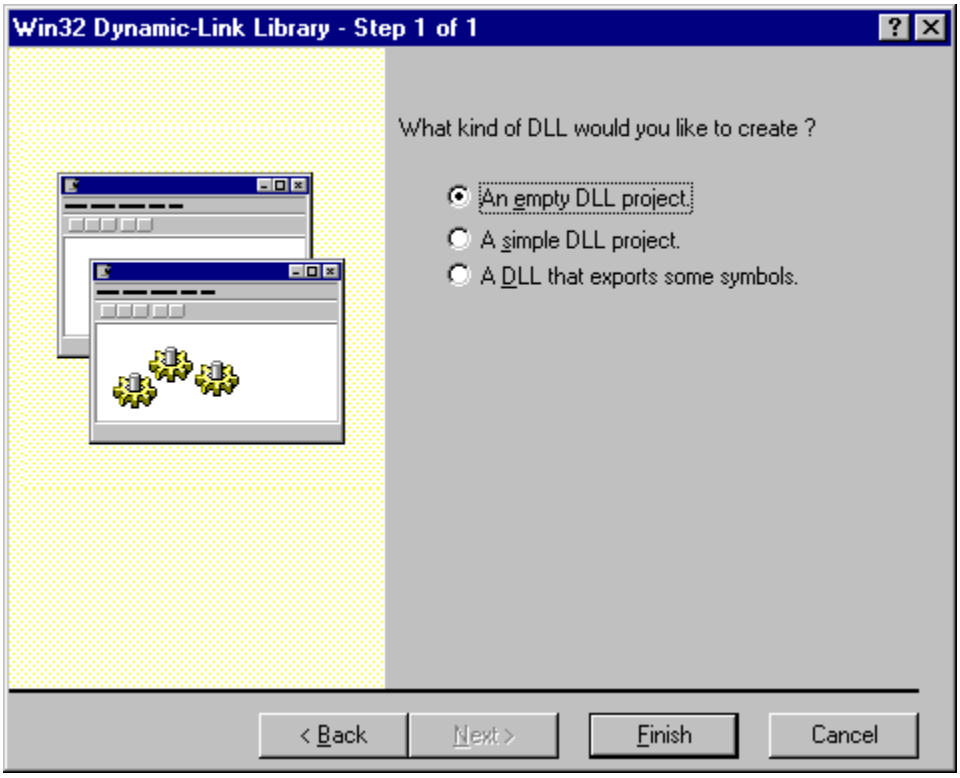
3. The MSVC environment:

Now, we are ready to move on to the MS environment. This example uses the support of **MSVC 6.0**.

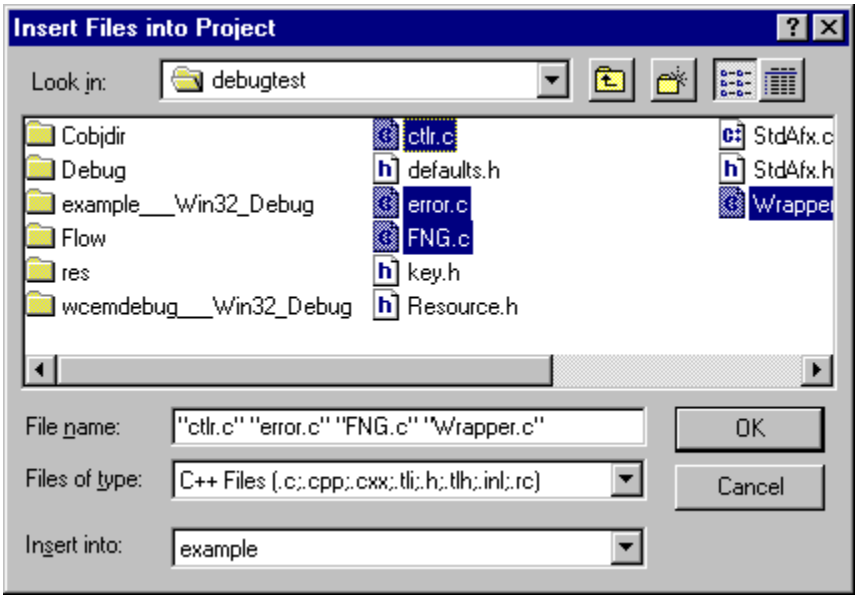
- From the **MSVC++6.0** under **File**, chose **New…** and select **Projects**. Fill in the **Project name** Project type and **Location** as shown below.



- After pressing **OK**, select **An empty DLL project**. As shown below.

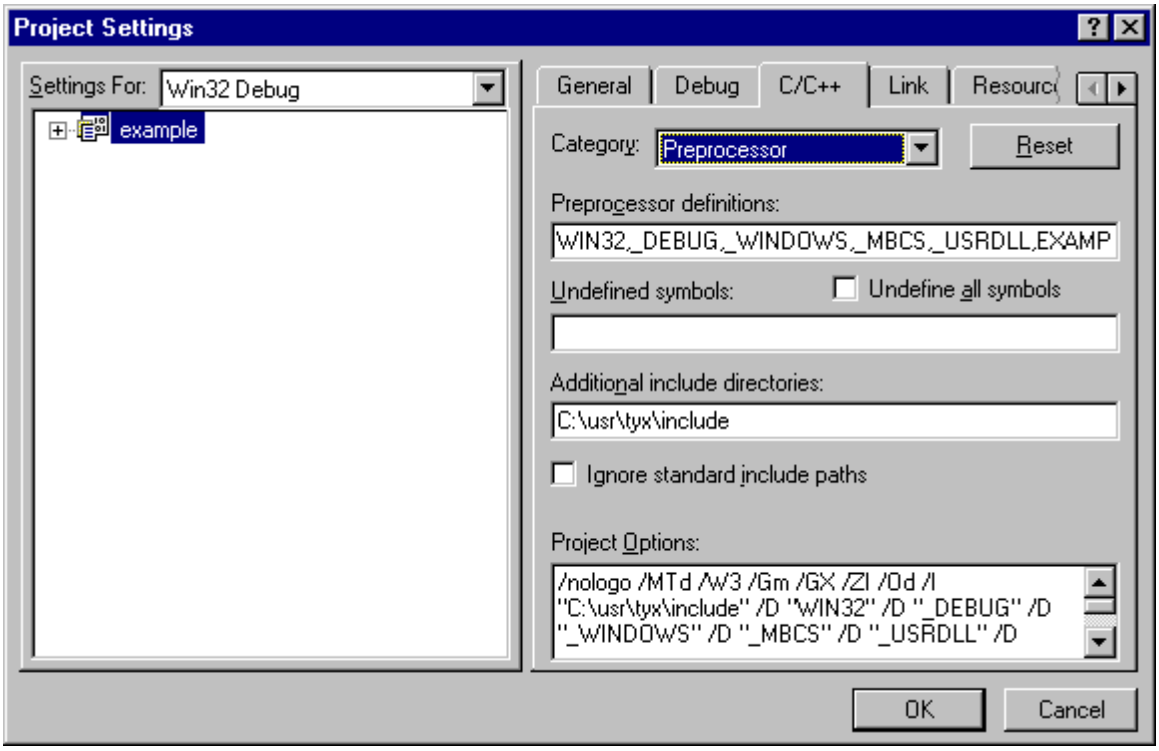


- Press **Finish** and then **OK**.
- Now, select **Project**, **Add to Project** and **Files….** This will open the window below. Select the TYX Cem C files one after another. Here, we will select **Wrapper.c**, **error.c**, **ctlr.c** and the **FNG.c** files.

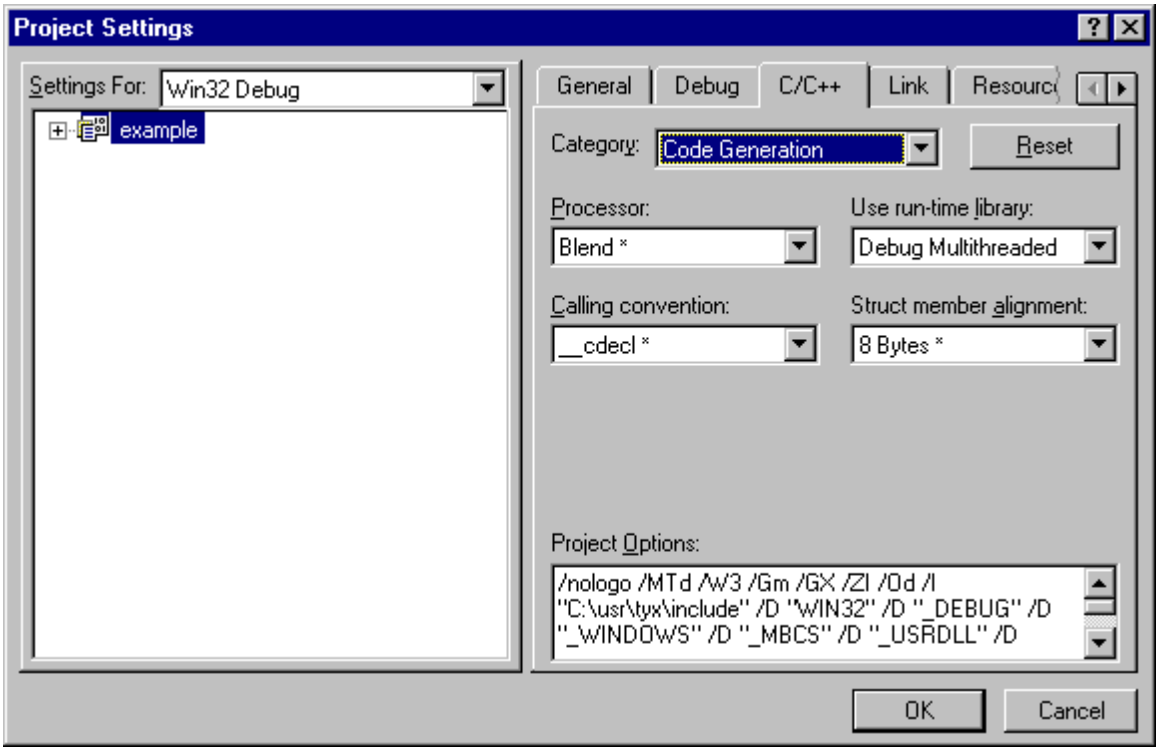


- Press **OK**.
- We now need to add basically all the settings that you would have in the TYX Wcem settings. The first thing will be to include the additional path of all the header files that you wish to include in your project. In this case, one that is unavoidable is the **cem.h** file from TYX. The path is usually

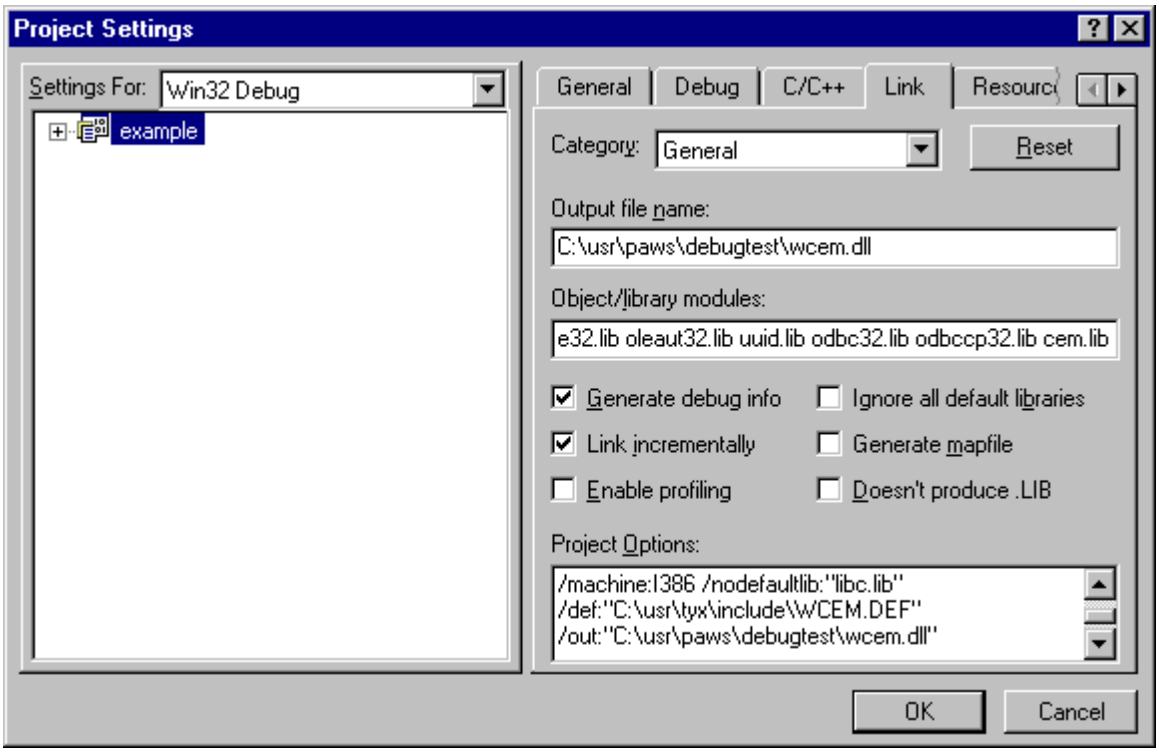
C:\usr\tyx\include. This can be done going into **Project->Settings->C/C++** in the **Preprocessor Category** as shown below:



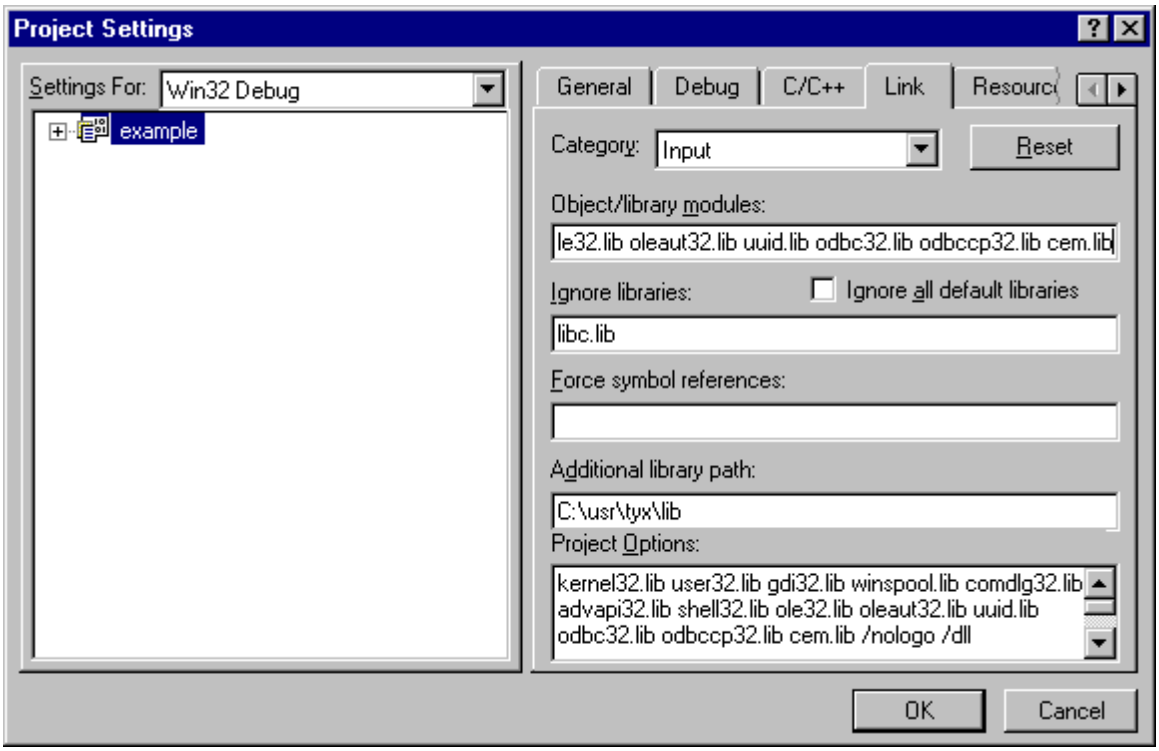
- **Note:** For greater safety, make sure that the **Use run-time library** option under **Code Generation** is set to **Debug Multithreaded** as shown below.



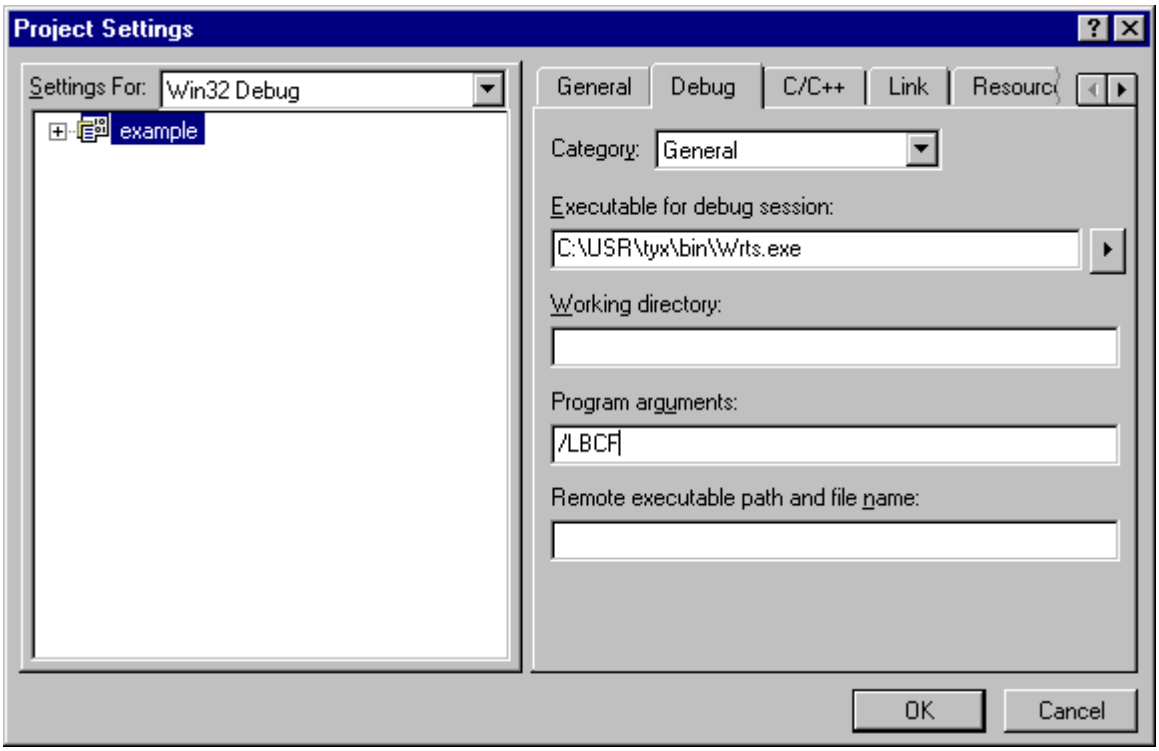
- Under the **General** Category in **Link**, we need to include all the libraries that will be addressed by our project. In this case, we need to add **cem.lib** at the end of the libraries already included as shown below. You may wish to delete any additional libraries that aren't used, but it will not affect your project if you leave them there.
- You also need to specify the location of the **Wcem.dll** output file. This is where you need to be careful about making sure that it will not conflict with the one generated with the TYX studio. In this case, we will just locate the **Wcem.dll** generated here in the same directory as the one used by the TYX studio, hence **C:\usr\paws\debugtest**.
- Under the **Project Options**, we need to add **/def:"C:\usr\tyx\include\WCEM.DEF"** as shown below. If we fail to do this, the **dll** will build, but the Wrts will fail to make proper use of the **Wcem.dll**.



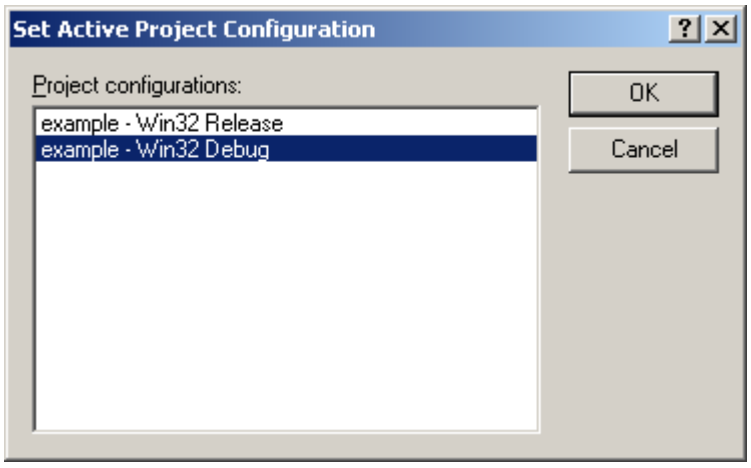
- Under the **Input** Category in **Link**, we need add the additional paths for the additional libraries as show below.
- We also need to ignore the **libc.lib** library to avoid redefinition warnings.



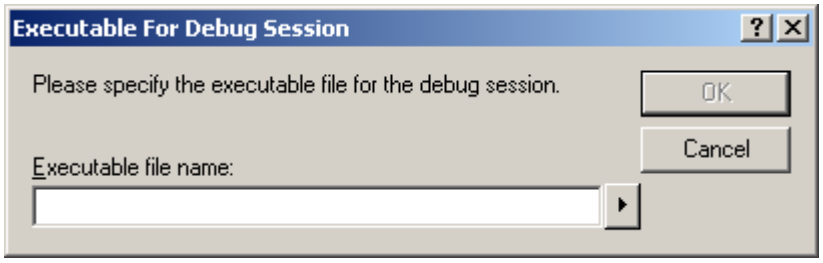
- The next step is to set up the environment so that the Wrts can be started from the MS studio. Under the **General** Category in **Debug**, you should look for the Wrts on your system for **Executable for debug session**. Typically, it's located under **C:\usr\tyx\bin**.
- For versions **1.6.1** (included) of the Wrts or earlier, if the **Busconfi** file is local to the project, you need to add **/LBCF** under program arguments. If it is not local, or if the version of the Wrts is later than **1.6.1**, then skip this Program argument. For versions of the Wrts later than **1.6.1**, the Wrts will look for the **busconfi** file in the local directory, and use it if it's there, and if not, it will use the one in the Station subdirectory.



- You are now ready to build the project and start it in debug mode. Make sure that the active configuration is the debug version, which is the default one (under **Build/Set Active configuration…**)

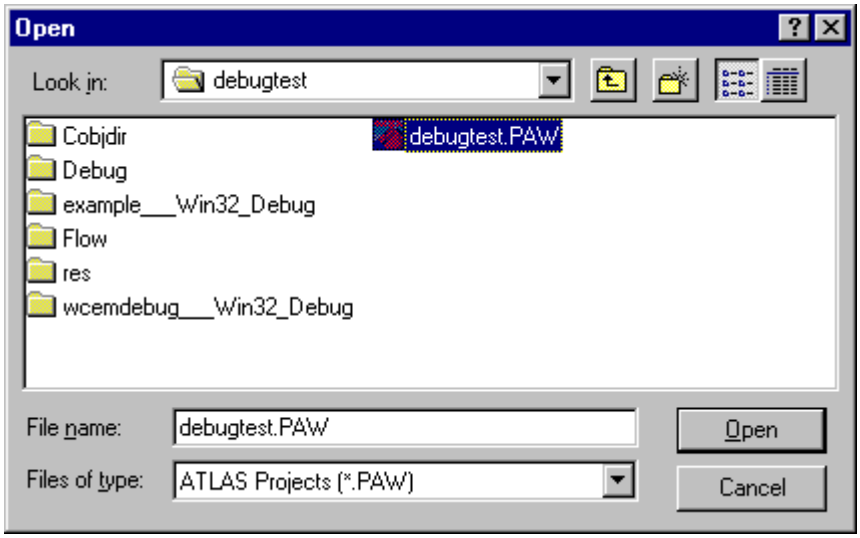


- Build the project by pressing **F7**.
- You can place breakpoints in the **C** files that you have under the MS Studio, such as at the Display function in the **FNG.c** file.
- Now you can run the project in debug mode via **F5** or via **Build->Start Debug-> Go**. You may see the following window if you missed the step regarding setting the **Executable for Debug Session**. The first time, you will see the following window

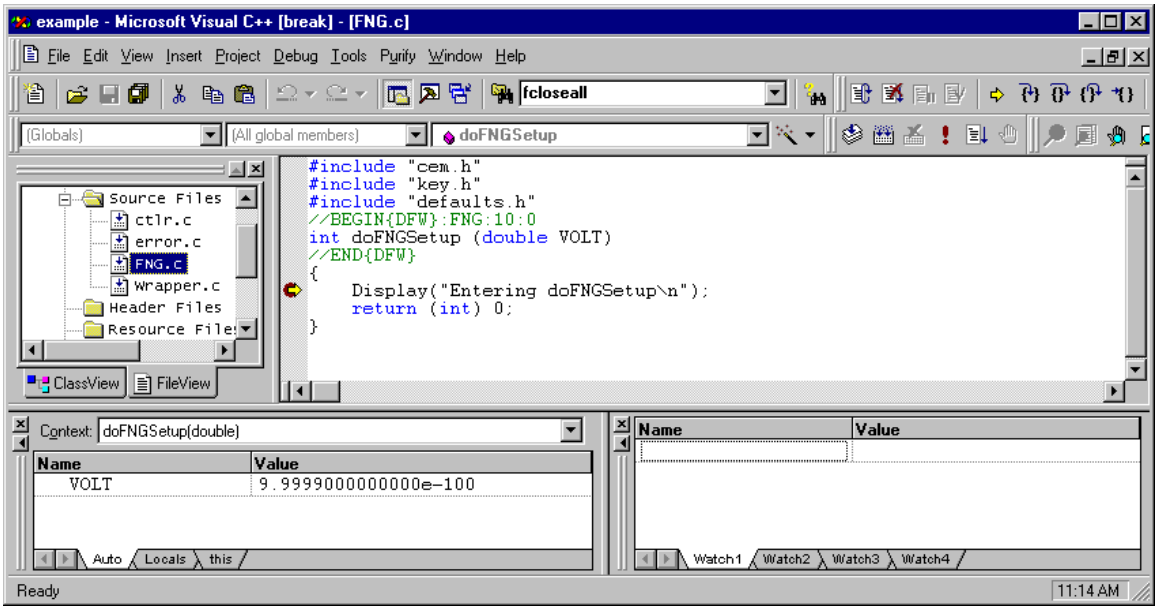


- That is the window that will determine which executable to launch that will load the **Wcem.dll**, which is the output of the MSVC project. Click on the arrow next to the edit box and select **Browse**. Select **Wrts.exe**. This exe is usually located under **c:\usr\tyx\bin**
- Click on **Open,** and then **OK**.
- Click **OK** on the message box that tells you that the Wrts does not contain debug information after checking the checkbox in order to not see this window the following time. This is the window that you will see if you didn't miss the step regarding setting the **Executable for Debug Session**.

- Once the Wrts started, you should select the **testdebug.PAW** project as shown below



- Run the project from the Wrts and MSVC will stop at the breakpoint set in the **Setup** function as shown below. In this case, we placed a breakpoint in the **FNG.c** file.



- As we can see in the window above, the MSVC++6.0 stopped the execution as the breakpoint.

Note: If you are having problem with the breakpoint, it will be because you will have built the Wcem.dll with the studio which has a release configuration and cannot be debugged. In order to overcome this problem, you need to do a rebuild all from the MSVC compiler in order to overwritte the one generated by the Paws Studio.