



**DYACON**®  
RUGGED DATA SYSTEMS



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# Quick Start Guide

**CT6xx Series**

57-5104 Rev C  
April 2009

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# CT6xx Series Introduction

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## Scope

There are three manuals for the CT6xx Series;

- (1) CT6xx Series Reference Manual
- (2) CT6xx Series Software Development Manual
- (3) CT6xx Series Quick Start Guide

The content of this document is intended as a quick start for developers as they begin to work with the CT6XX. The system integrator is responsible to provide specific operating instructions and manuals for end users.

## CT6xx Series General Description

The CT6 Series (referred to as the CT6xx) is a rugged, sealed, tracking and communication device intended for the vehicle market. It is an open architecture device, programmable with industry standard tools. It incorporates a powerful ARM-based processor, multiple communication ports, and digital inputs/outputs. In addition, it can include GPS, GSM/GPRS and CDMA 1xRTT. It also can include a built-in UPS to sustain operation during short interruptions in power. With its power supply sensing input, enough time is available for the application to store critical data and put the unit in a low power mode to prevent the loss of data and prevent the corruption of the application.

Note: Reference to the CT6 Series or CT6xx may also include OBC605, which is a limited-feature version of the product family.

## Development Disk

A CD containing the files discussed in this document is available from Dyacon. Refer to the CT6xx Series Software Development Manual and the CT6xx Series Reference Manual for additional information.

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## CT6xx Series Development Kit

For first time developers, the CT6XX typically ships out as a kit that includes the following:

Item	Description
CT6xx	CT6xx Series Device
CT6 BOB	Break-Out Board for ease of development
Power Brick	110 AC in / 12 V DC out that connects to the CT6 BOB
Null Modem Cable	Used to connect the CT6 BOB to a host computer via serial port
Development Tools CD	Developers Tools disk also referred to as Utility Disk
Connection Cables	Set of Power/IO cables (optional)

### Development Tools Disk (Utilities Disk)

The development tools disk includes the following:

Tool	Description
OBCLink	OBCLink is a windows-based utility program used to communicate between the CT6 and the host computer.
GNU X-Tools	30-day evaluation of the GNU X-Tools by Microcross.
VX-Tools	Visual X-Tools
CT6 Tools	Various example programs with source code. Also manuals and support documentation.

## Development Tools Disk Folders

Following is a partial listing of where to find some useful information after the installation has been completed. (Assuming that the default settings are used when installation takes place.)

Path	Description
C:\cygwin	Main folder includes the GNU General Public License document.
C:\cygwin\docs	Contains documentation for the Microcross tools including libraries, utilities, compiler tools, debugging tools, etc.
C:\cygwin\home\obc605	Folder containing documentation, examples, and utilities for the CT6XX.
C:\cygwin\home\obc605\docs\	CT6XX Manuals.
C:\cygwin\home\obc605\TestPrograms\	Includes source listings of various examples including examples for the CDMA cell phone, GPS, J1708, RS485, a terminal example and a timer example.
C:\cygwin\home\obc605\utilities\	OBCLink.exe utility program, initab file, and Jload

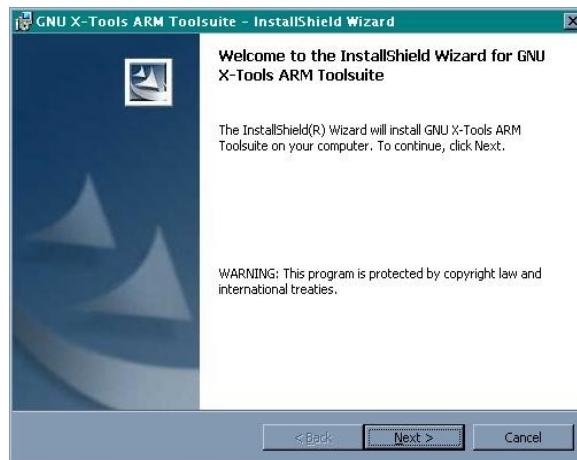
# CT6xx Tools Installation

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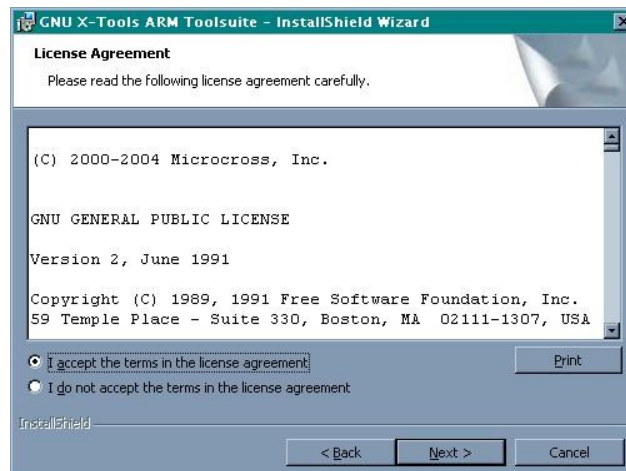
## Development Tools Installation

The CT6XX development tools disk is designed to auto run when it is placed in a CD drive. Following are the basic instructions:

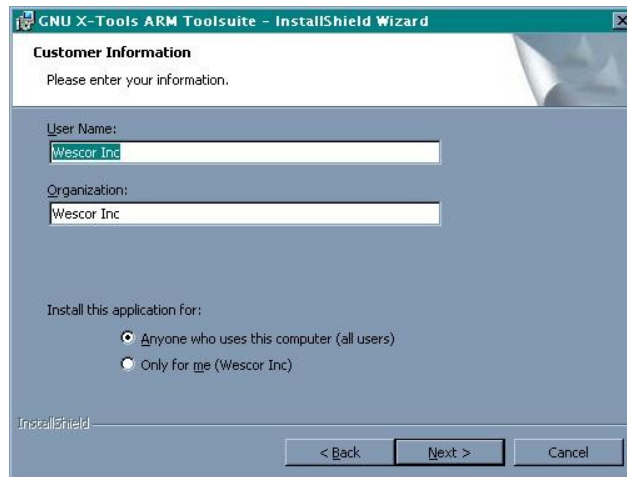
1. Insert the CT6xx Development Tools (Utilities) CD into your PC (host computer).
2. The disk should auto run. If not, open files on the disk and execute setup from the root directory. Follow the installation instructions on the host computer.



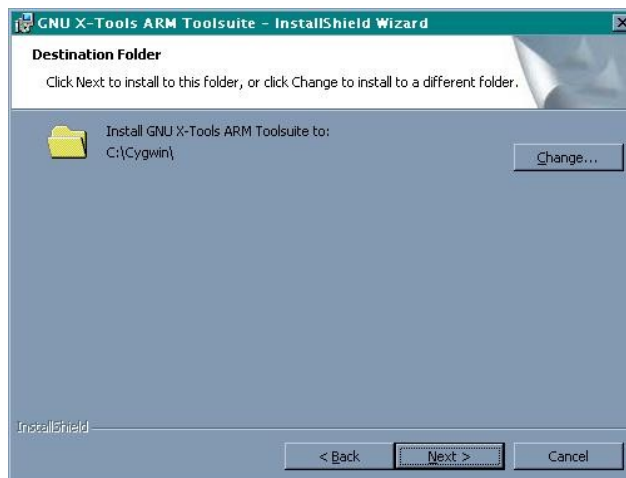
3. Click Next to continue with the installation.
4. Click the "I accept the terms in the license agreement." Click Next to continue.



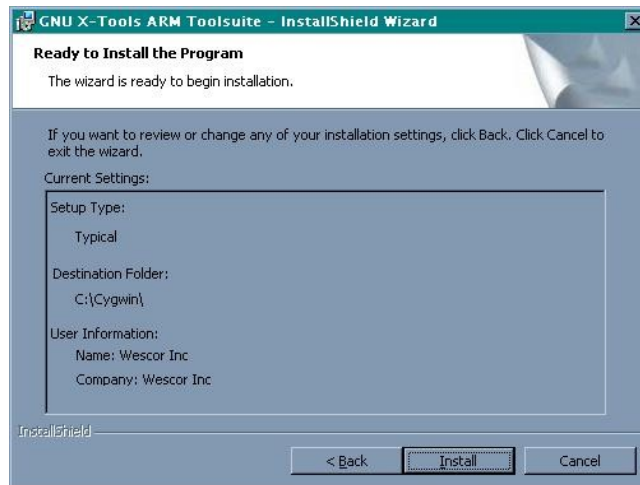
5. Key in the desired User Name and Organization and select the desired installation. Click Next to continue.



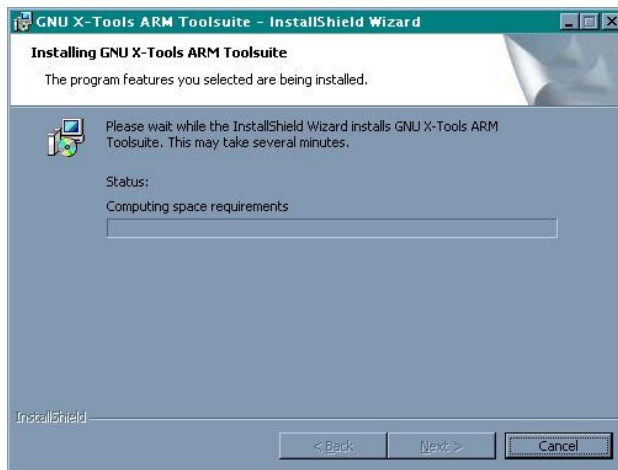
6. Use the default destination folder or click Change to install to a different folder. Click Next to install to the selected folder.



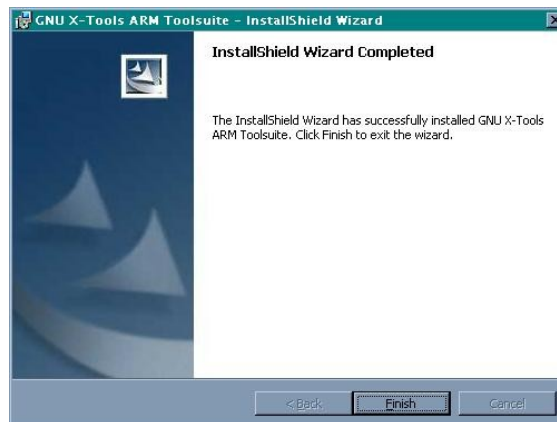
7. The wizard is ready to begin installation. If you want to review or change any of your settings, click Back. Click Install to continue.



8. Depending upon the type of computer being used, the installation may take several minutes.

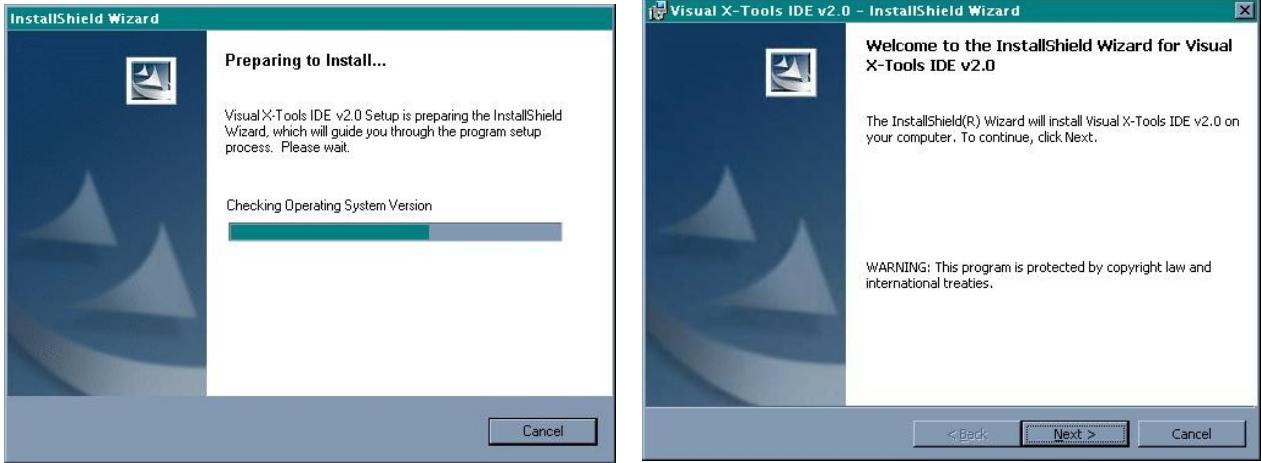


9. When complete, click Finish to exit the wizard.

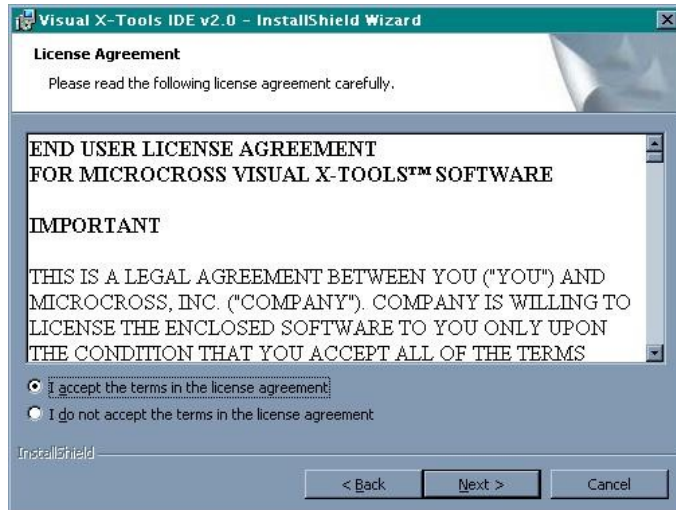




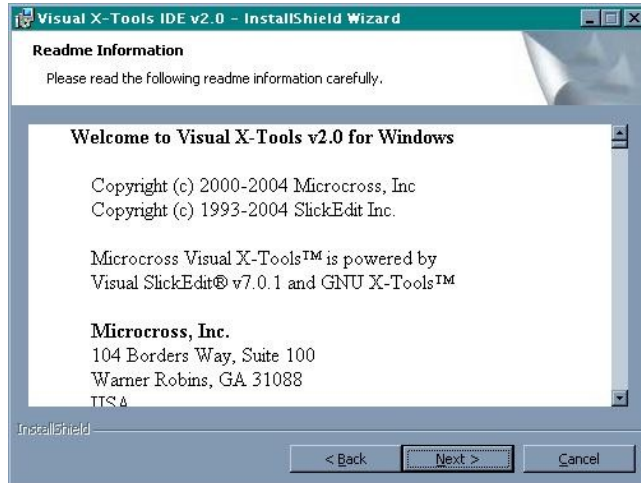
10. To install Visual X-Tools execute setup from the following folder:  
VXTools\
  11. Click Next to begin the installation wizard.



12. Please read the license agreement carefully, select “I accept the terms in the license agreement,” and click Next to continue.



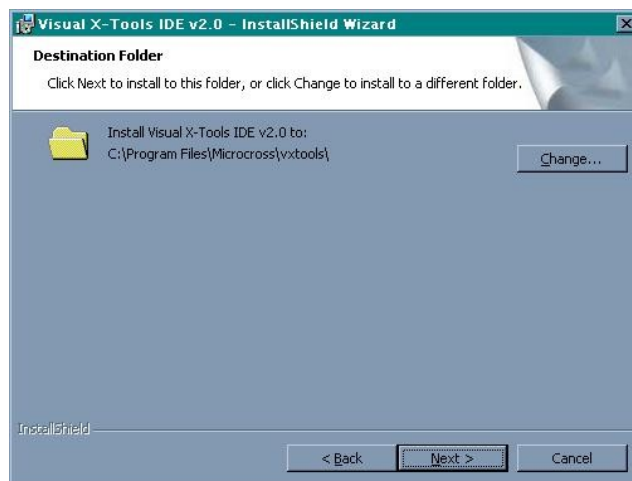
13. Read the Readme information and then click Next to continue.



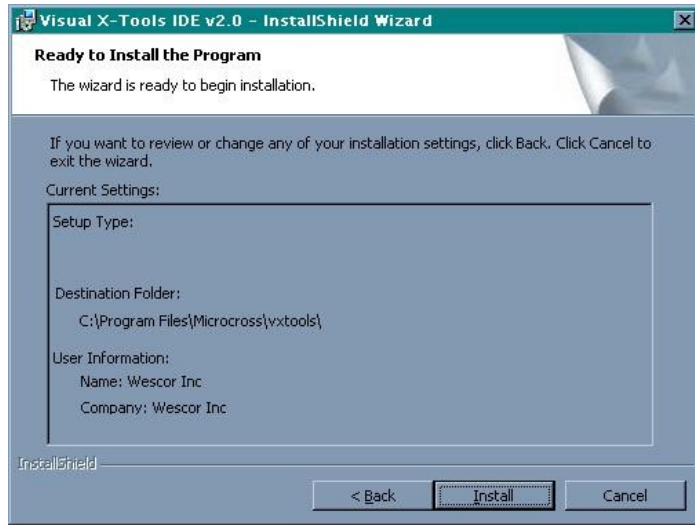
14. Key in your User Name and Organization and select the desired method of installation. Click Next to continue.



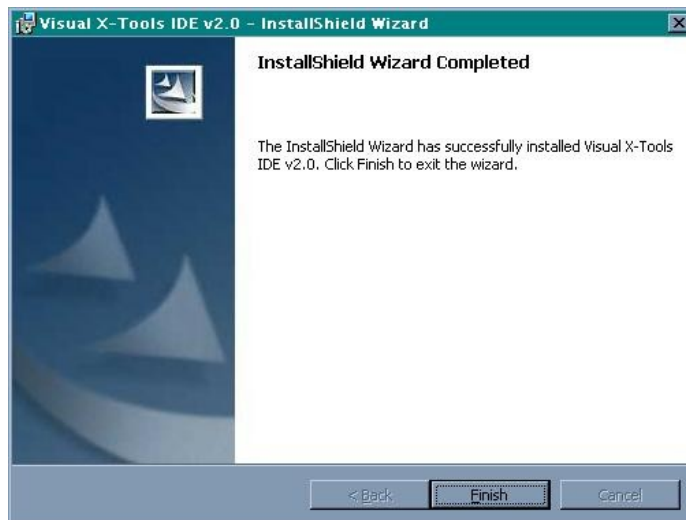
15. Use the default destination folder or click Change to install to a different folder. Click Next to continue.



16. To review or change any of the installation settings, click Back. Click Install to begin the installation.



17. When the installation has completed, click Finish.



# OBC Tools Installation

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## OBC Tools Installation

The purpose of the Tools installation is to provide test programs and utility files needed for interfacing with the CT 6xx. The location of manuals are also included in this section. The only relevant folder is the TestPrograms folder. The location of this folder is of importance when running the compiler tools. Other folders can be either left on the disk or copied onto the local drive at a location of your convenience. The following procedures outline where to place the TestPrograms folder:

1. On the local drive, find C:\cygwin\home\.
2. Copy the TestPrograms folder from the Developers (Utility) disk located under the obc605 directory to the location designated in step 1.
3. Copy the Utility and Docs folders under the obc605 directory on the Developers CD to a desired location on your hardrive.

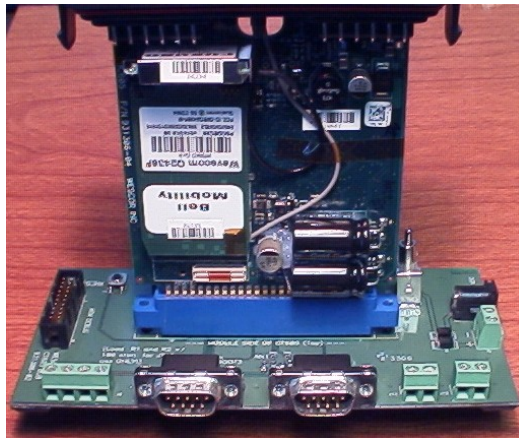
Installation of all the tools has now been completed. It is also possible to run the installation programs again to modify or uninstall the programs. Note that if uninstall is used, it may take a few minutes for the installation to complete because of the size of the X-Tools environment and number of files to be uninstalled. You will also need to manually remove the directories copied in this section.

# Hardware Setup

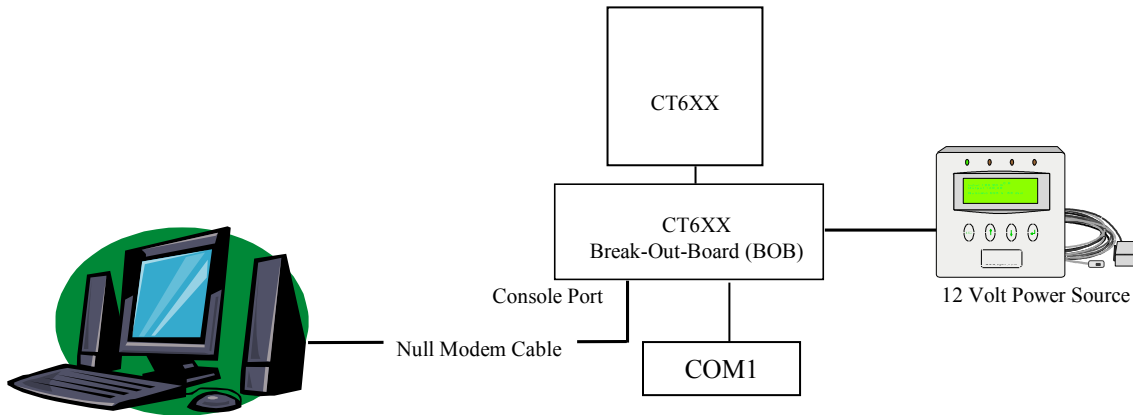
1. In a static free work area, remove the CT6XX PCBA from its case (use a flat head screwdriver to release the latches on each side of the case).
2. Place the CT6XX PCBA into the CT6XX BOB as shown below

**CAUTION:**

Make sure that the CT6XX PCBA is inserted into the CT6XX BOB correctly, as shown below. Inserting the PCBA backwards can cause damage to the CT6XX PCBA and to the CT6XX BOB.



3. Connect the Console port on the CT6XX BOB to the PC's serial port with a null modem cable.



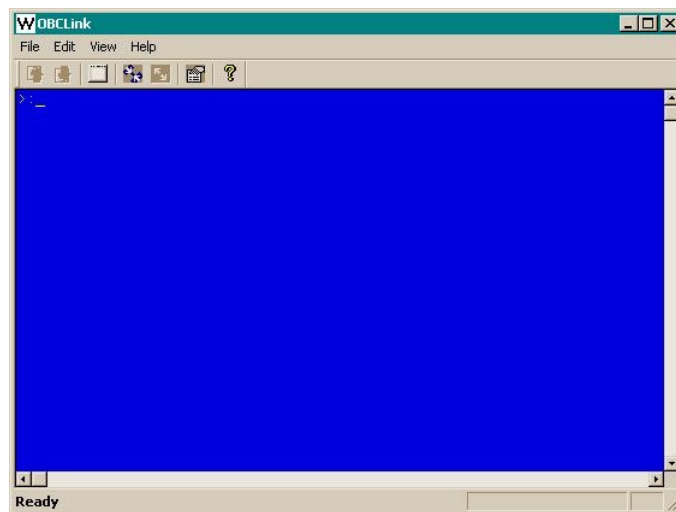
4. Having the CT6XX BOB's On/Off switch in the OFF position, connect power to the CT6XX BOB using the power brick or an alternative 12V source.

# OBCLink

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## Using OBCLink

OBCLink allows the host computer to communicate with the CT6XX. Files can be transferred back and forth between the CT6XX and host computer. CT6XX shell commands can also be issued from the host computer.



1. Run OBCLink.exe, which can be found in the Utilities folder of the obc605 folder on the Developers (Utilities) CD. Refer to the OBCLink section of the CT6XX Series Reference Manual for additional details on how to use the program.
2. Configure the COM port by clicking on the Properties button (sixth button from the left). Select the desired COM port and baud rate. The default baud rate for the CT6XX is 38400. Units are shipped with a standard configuration “initab” file that changes the baud rate to 115200.
3. Click the connect button (fourth button from the left).
4. Assuming that the CT6XX has been placed in the CT6XX BOB and everything has been connected properly as outlined in the previous section, apply power to the CT6XX by switching the switch on the CT6XX BOB to the On position. The red and green LEDs on the CT6XX PCBA briefly flash. Boot information is displayed in the OBCLink work area and the cursor should be on the prompt “#.”

5. Shell Commands can be issued at the command prompt. Following are a few examples:

At the command prompt:

Key in “help” to display a listing of all the commands available.

```
#help
Command Set:
call      cat          cp          date        dchk        defrag
df        echo          edit        exit        finfo       flash
fsize    gosub         goto        gpio        help        history
if        item          ld          ls          mem         read
reset     return        rm          rs232       run         set
delay     time          tfs         sleep       suspend     sysinfo
plvl      version       watchdog    xrcv        xsnd
```

Individual command help can be displayed by keying in help followed by the specific command, for example, key in “help ls” to view the help for the list command. Refer to the CT6XX Series Software Development Manual for information regarding the shell commands.

```
#help ls
List the current set of files in the file system
Usage: ls [-almx] [[filter] [filter...]]

Options:
-a      display 'hidden' files
-l      long format
-m      enable more
-x      set exit flag if error

Required privilege level: 0
```

```
#sysinfo
TOS 1.3
Platform: Wescor OBC605
CPU: MC9328MXL ARM920T
Built: Feb 6 2007 @ 14:00:15
Stack: bottom=0x80d57bc, size=16384 (10% used)
API Entry Addr: 0x20
TOS RAM: 0x807d000-0x80d9d64
App RAM Base: 0x8100000
#
```

# Visual X-Tools Example Program

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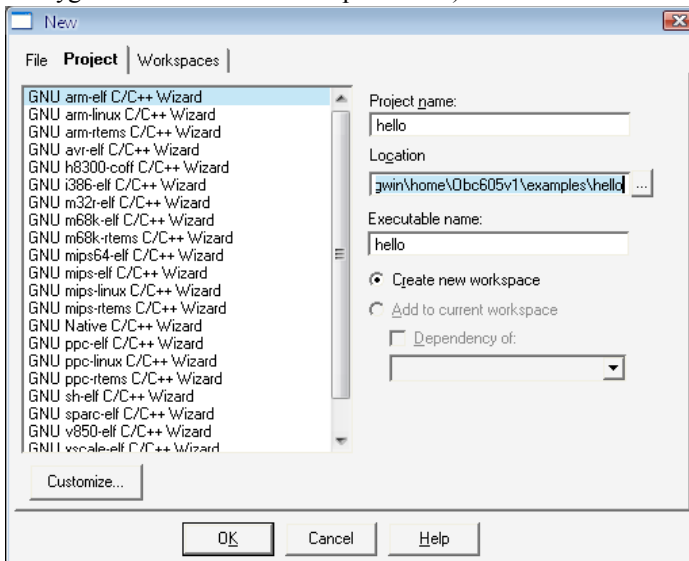
## Assumptions

- GNU-X-Tools is already installed
- VX-Tools is already installed
- OBCTools is already installed
- User has a basic understanding of the development process for the CT6XX

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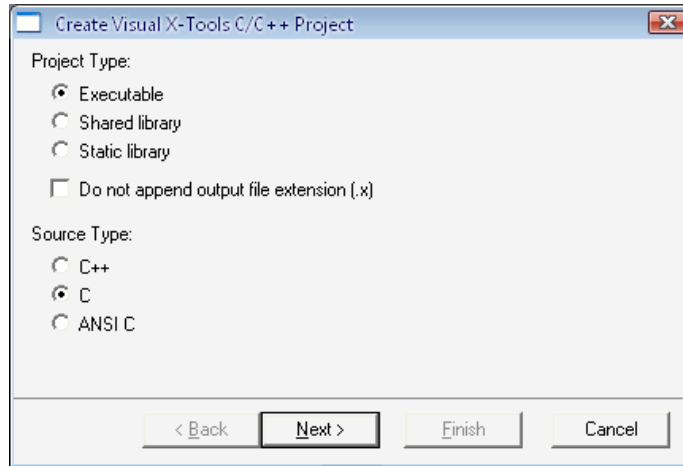
## Visual X-Tools Example Program

1. Execute Visual X-Tools.
2. Select Demo mode & continue when prompted to install demo version  
NOTE: When asked to exit the program, click OK. The demo version will continue to operate.
3. From the main menu, select Project->New...
4. In the Project tab select “GNU arm-elf C/C++ Wizard”, enter the project’s name (i.e. hello) and enter the location (path) where the project should be created (i.e. C:\cygwin\home\Obc605\examples\hello\). Click the OK button.

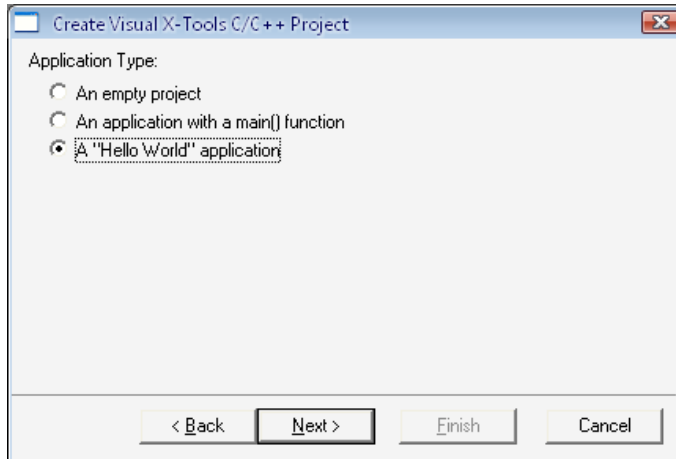




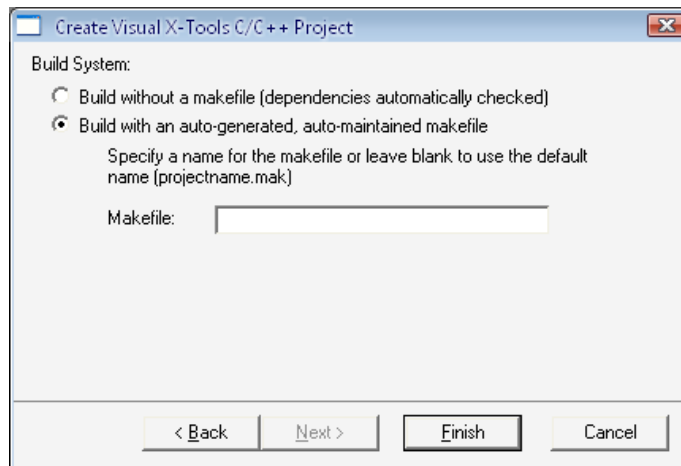
5. In the Create dialog box, select Executable for Project Type and C for source Type. Click Next to continue.



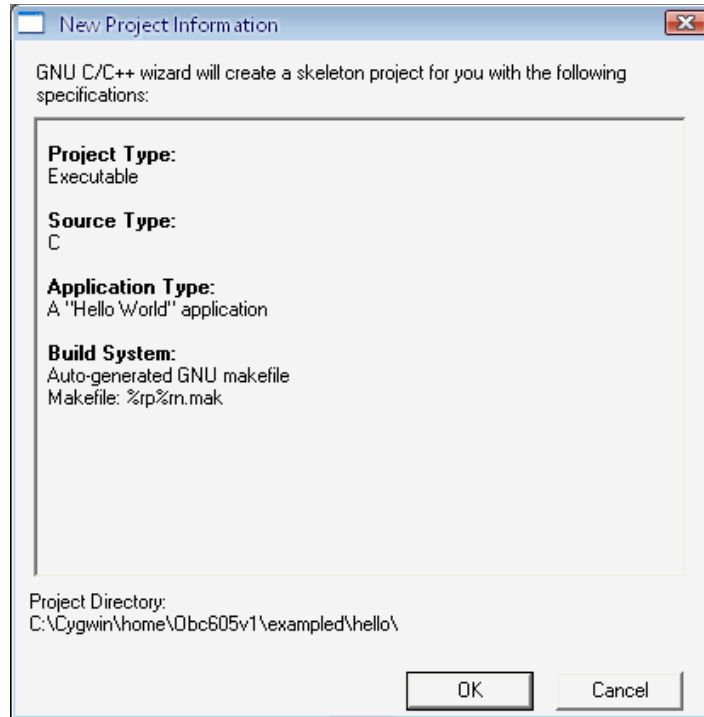
6. In the next dialog box select A "Hello World" application and click Next.



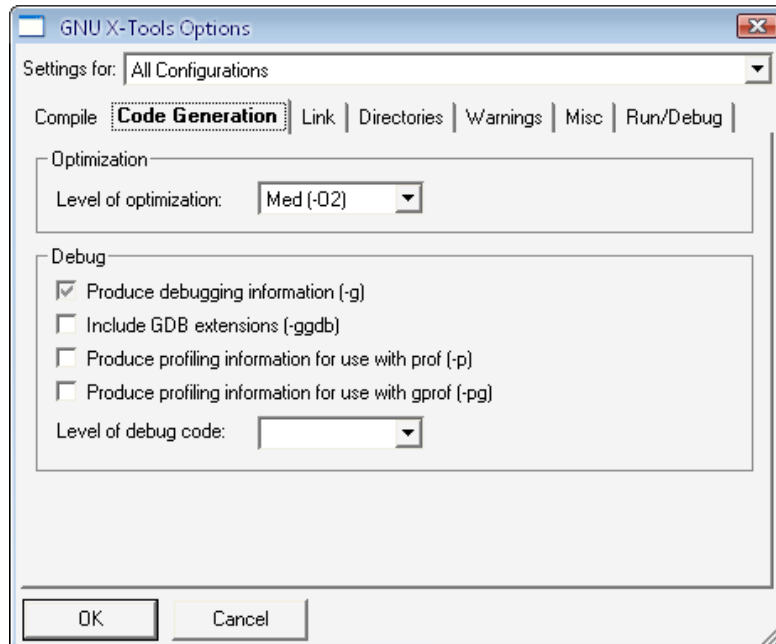
7. From Build System, select the "Build with an auto-generated, auto-maintained makefile," leave the makefile name blank (default) and click Finish.



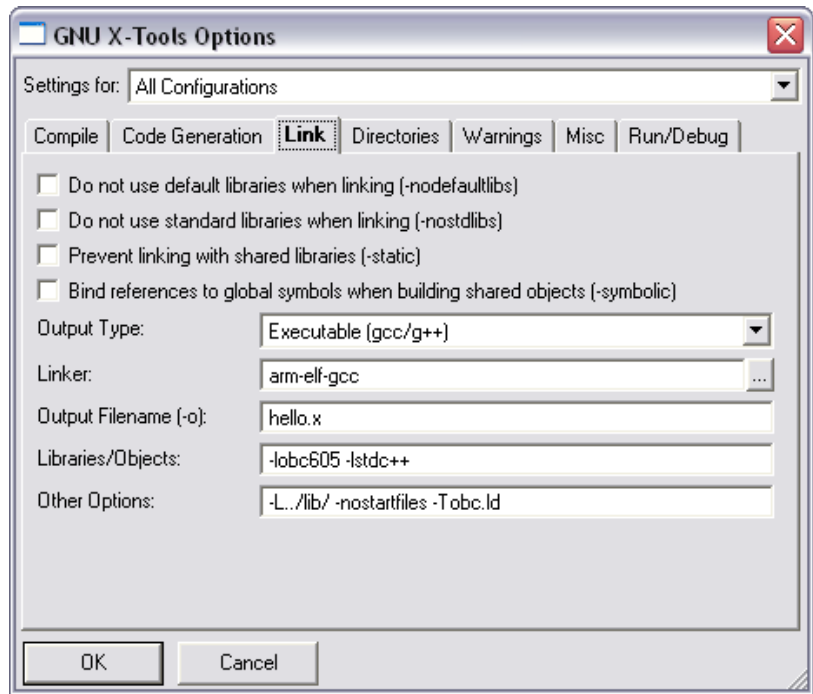
- At this point the “New Project Information” dialog should be presented. Click the OK button to accept the choices.



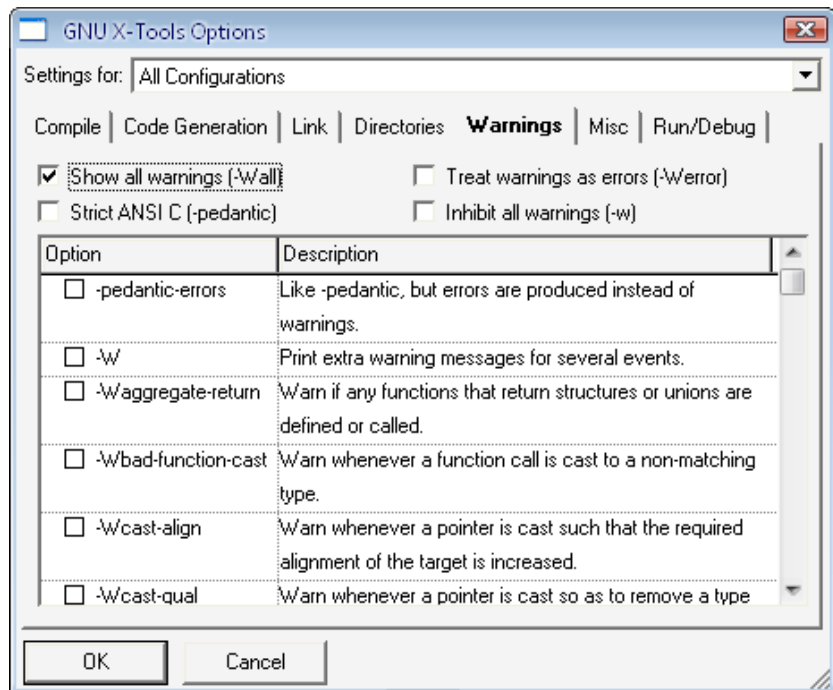
- The project’s environment needs to be set up so the correct tools are invoked to generate the executable. Follow the steps to incorporate the Strip command found in the “Adding the Strip command to the Build menu” section later in this manual.
- From the main menu, select the “Build->GNU C X-Tools Options..” In the “Code Generation” tab, select “Med(-O2)” for the Level of optimization.



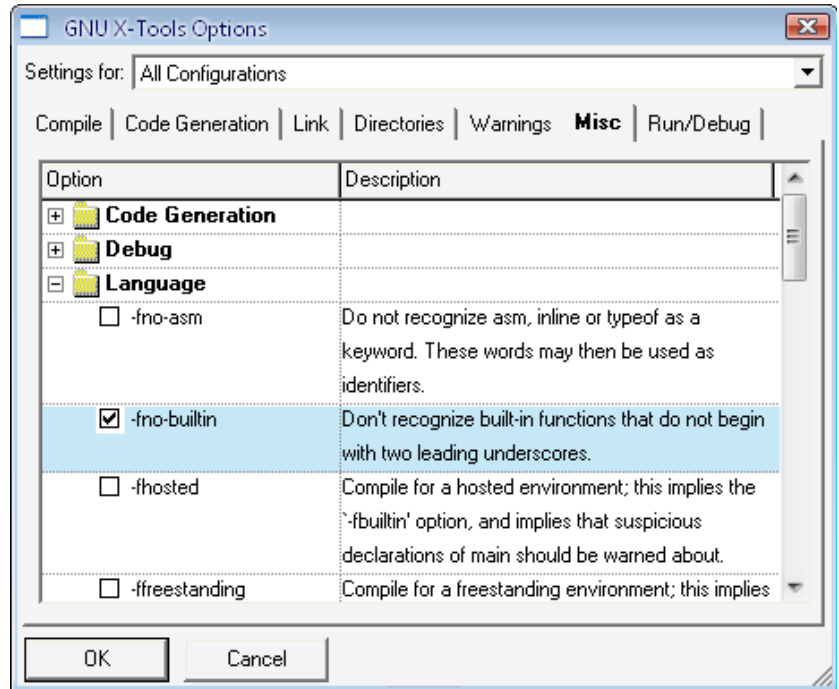
11. In the Link tab, set it as follows:



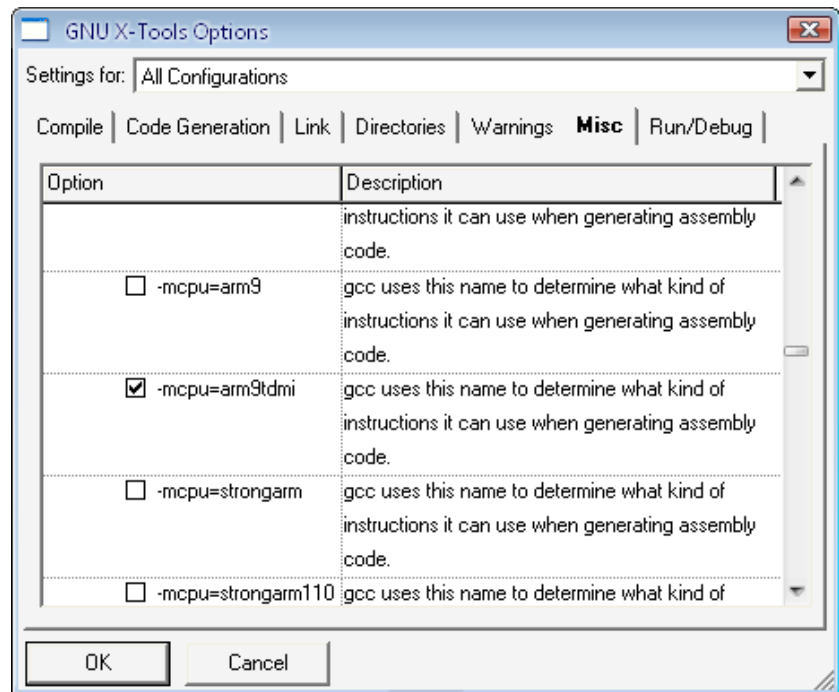
12. In the Warnings tab, select “Show all warnings.”



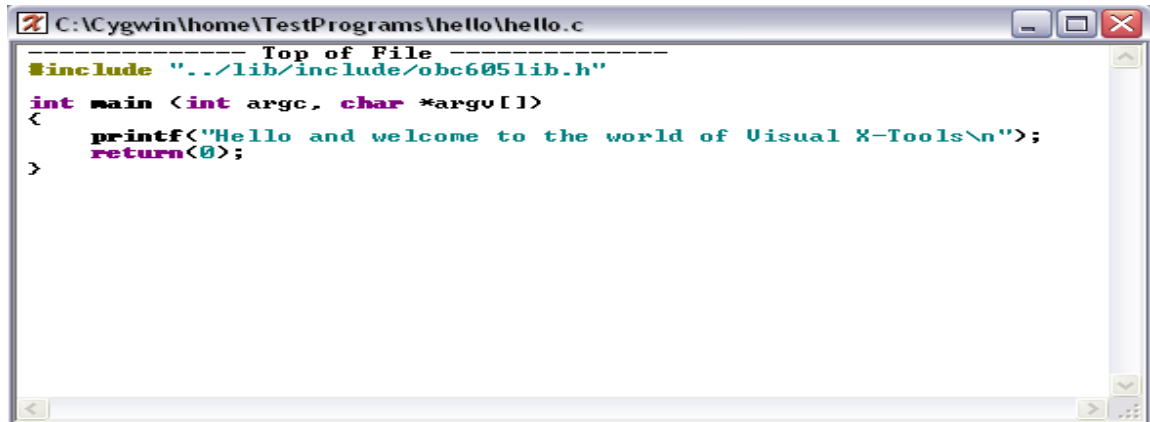
- In the Misc tab expand the “Language” option and select “-fno-builtin.”



- Expand the “Machine” option and under “arm-elf” find and select “-mcpu=arm9tdmi”. Click the OK button to close the dialog box.



15. The OBC605 header file needs to be included. Change the program's "include" statement as follows:



```

C:\Cygwin\home\TestPrograms\hello\hello.c
----- Top of File -----
#include "../lib/include/obc605lib.h"
int main (int argc, char *argv[])
<
    printf("Hello and welcome to the world of Visual X-Tools\n");
    return<0>;
>
  
```



16. Click the Build button to generate the hello executable.

17. Once the binary is generated, strip the program of unnecessary information so that the binary is smaller (this step is not required, but it makes the binary about 25% smaller). To do this, select Build->Strip from the main menu. See "Adding the Strip Command" on the following page. (If the default folder settings were used, the binary file is located in the debug folder, C:\cygwin\home\obc605\examples\hello\debug\.)



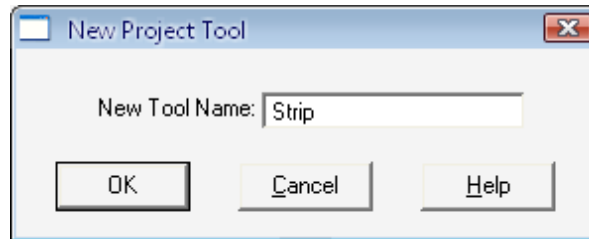
18. Follow the steps later in this manual in the "Adding a button to the Build toolbar to invoke OBCLink" section.

19. Invoke OBCLink (click the OBCLink button in the Build Toolbar).
20. Connect the host computer to the CT6XX as was described in the "Hardware Setup" section of this manual.
21. If the CT6XX is not already powered on, apply power to the CT6XX and click the "connect" icon.
22. Drag and drop the program "hello" to the work area of OBCLink C:\cygwin\home\obc605\examples\hello\debug\hello (upload it as an executable file).
23. From within OBCLink, run the "hello" program by keying in the file name hello from the command prompt. Hello and welcome to the world of Visual X-Tools\n should be displayed in the work area of OBCLink.

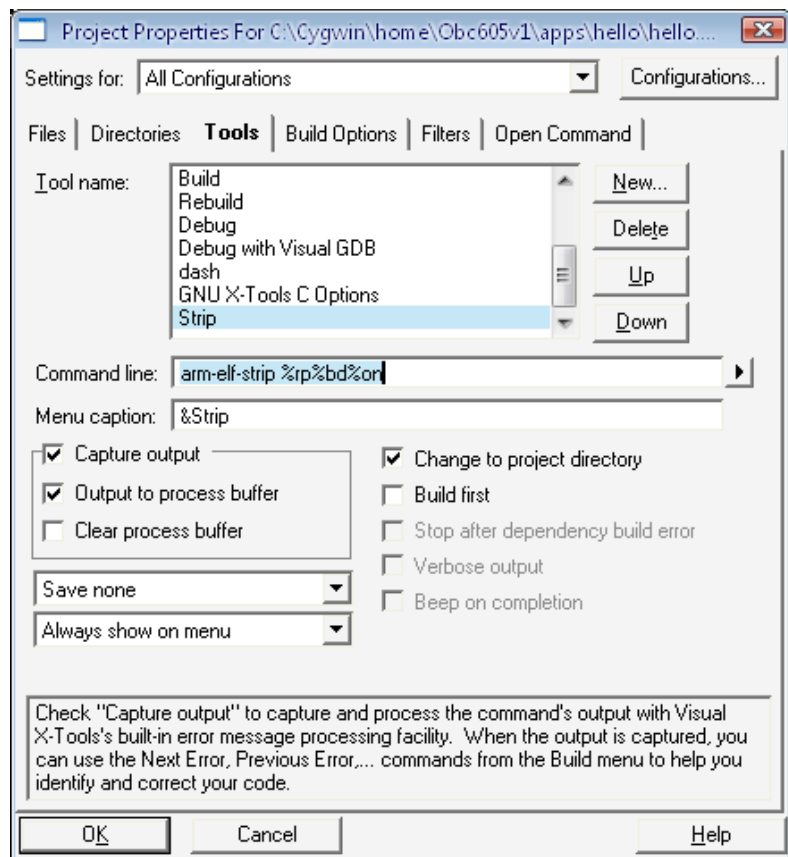
## Adding tools to the vx-tools environment

### Adding the Strip command to the Build menu

1. From the main menu select Project->Project Properties...
2. In the Tools tab, click the New.. button to create a new tool entry.
3. In the New Project Name dialog box enter the word "Strip" (omit quotes) and click the OK button.



4. At the Command Line enter "arm-elf-strip %rp%bd%on" (omit the quotes). Select Capture output and Output to process buffer, and click the OK button.

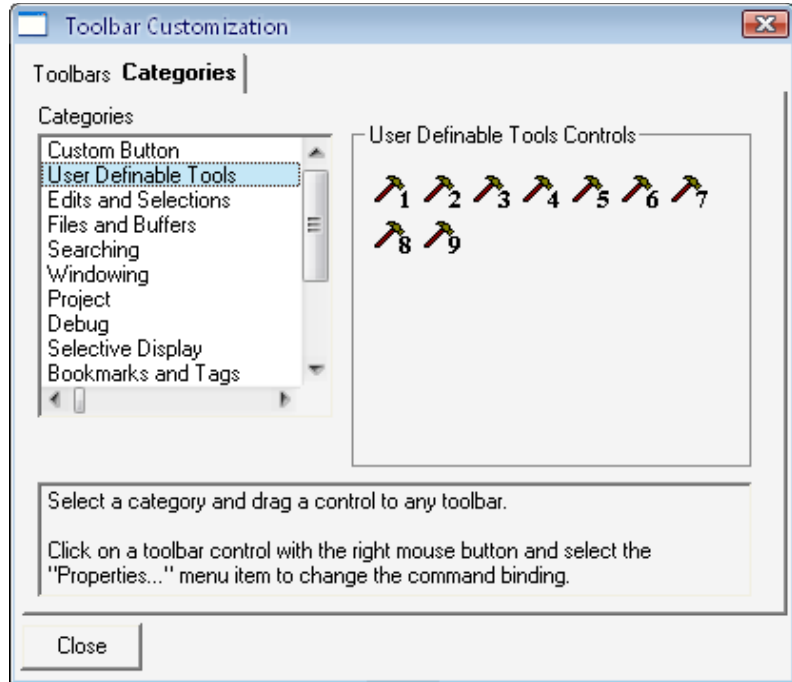


## Adding a button to the Build toolbar to invoke OBCLink

1. Right click the Build toolbar and select Toolbars...



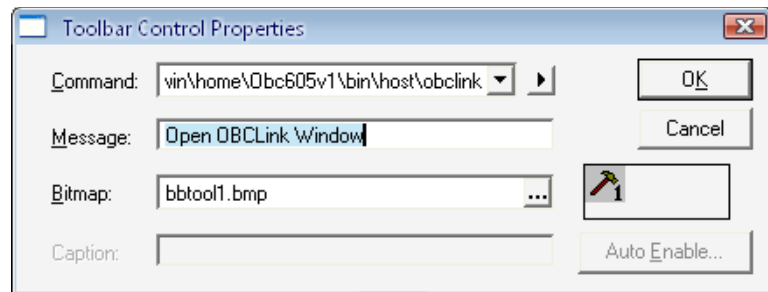
2. In the Categories tab, select "User Definable Tools" under categories.



3. Drag the first icon to the Build toolbar and then click the Close button to dismiss the dialog box.



4. Right click the new tool button and select Properties... from the popup menu.
5. In the Toolbar Control Properties enter the path and name of the OBCLink program and in the Message space enter "Open OBCLink Window" (omit the quotes). Click the OK button.



DYACON, Inc

# Manual History

## **February 2007**

Initial release of the CT605 Series Quick Start Guide.

## **November 2007**

Made minor corrections to the manual.

Updated with Dyacon Inc.

## **July 2008**

Converted to Dyacon name.

## **April 2009**

Adapted Manual to cover entire CT6 series