Unified Computers & Programming
Installation Instructions for Windows

IMPORTANT INSTALLATION NOTE:

The USB IR Tower has been known to cause Windows computers to crash if plugged in for prolonged periods. It can also prevent Windows XP form starting up correctly after a student's logon.

This problem is results when a high powered USB device (the IR Tower) causes an over current in the USB hub. If temporarily unplugging the IR Tower does not remedy the problem, try another USB port, try unplugging all other USB devices, or try a completely different computer.

IMPORTANT GENERAL KNOWLEDGE ABOUT THE RCX AND IR TOWER:

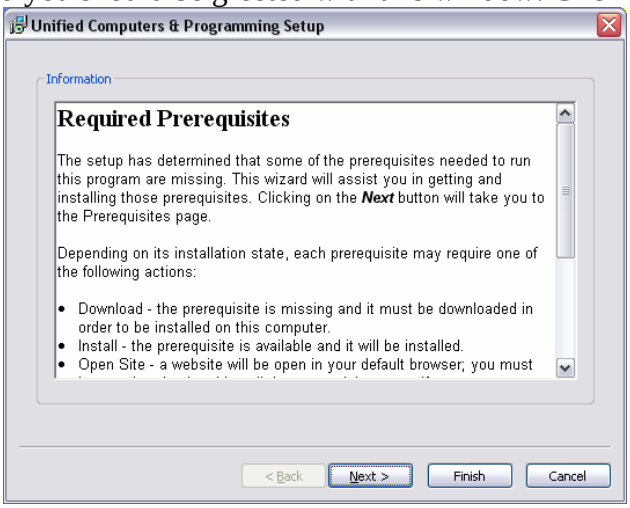
1. The RCX requires batteries to preserve its memory (volatile memory). Removal of the batteries for more than ~1 minute will result in the erasing of not only the programming but the RCX firmware. You MUST reinstall the firmware before AdaGide will talk to the RCX.
2. The IR Tower and the RCX should be no farther than a meter for reliable data transfer. The two dark plastic faces should be pointed at each other.
3. The IR Tower has a small green LED that lights up when it is working.
4. The RCX has 5 program slots, which can be selected by the **Prgm** button. The number on the LCD to the right of the little man indicates which program slot you are in. When you download an Ada program to the RCX, make sure you know which slot your program has been stored in or use the **Prgm** button to select the correct program to run.
5. When a sensor detects something or a motor is turned on a little black triangle will appear on the LCD next to that sensor/motor port.
6. When the **View** button is pressed a larger caret will appear over one of the little black triangles. The number displayed on the RCX is the value corresponding to that port. It could be the sensor's raw value or the motor's power. These values are what your program sees.
7. Use the **Run** button to run your programs.
8. The RCX will power itself off if left on.
9. The motor behavior is dependent on the battery level. As the battery voltage drops, the motor's behavior will become less predictable. It typically takes 1 complete hour of leaving the motors on before the batteries are useless. Please see a TA if you think your batteries are low.

TABLE OF CONTENTS:

I. SOFTWARE INSTALLATION

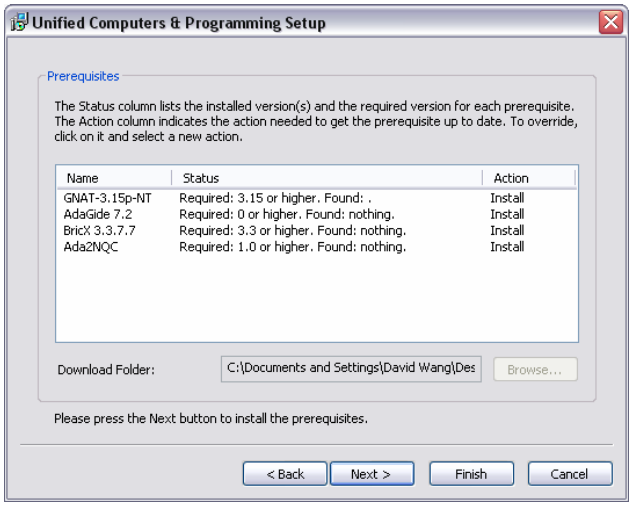
1. Go to the Unified website and download the file "UnifiedC&PInstallation.exe." This installer serves as a front end to several other installers.

2. Run the file and you should be greeted with this window. Click NEXT.



Note: You will *not* see this window if you already have acceptable versions of GNAT, AdaGide, and BricX installed. Continue to step 28.

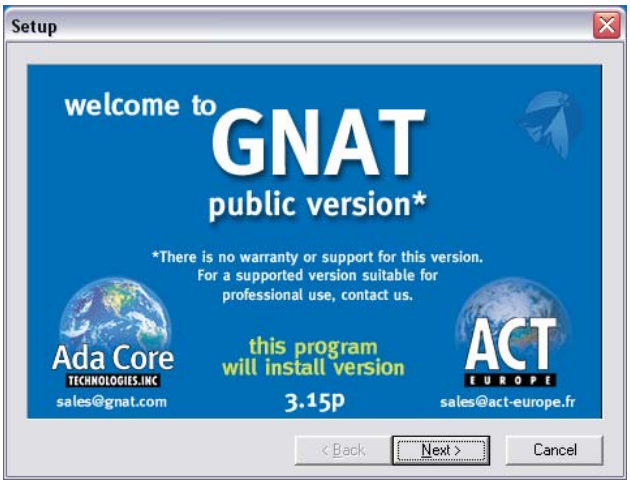
3. This screen tells you the prerequisite software that needs to be installed. Click NEXT.



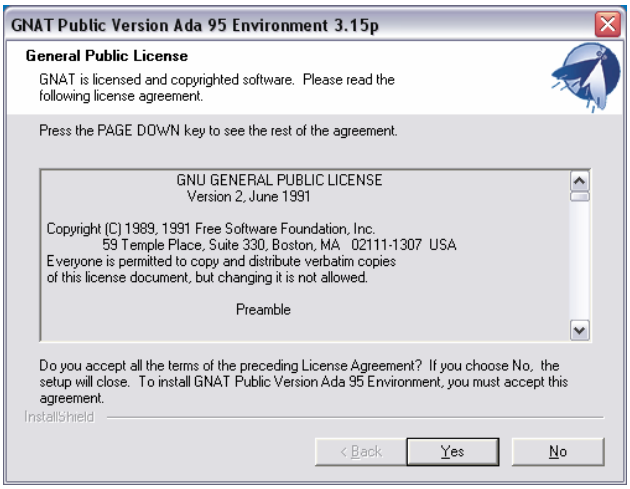
Note: If you think you already have an acceptable version of any of these three programs you may choose not to install them by clicking in the Action column.

GNAT

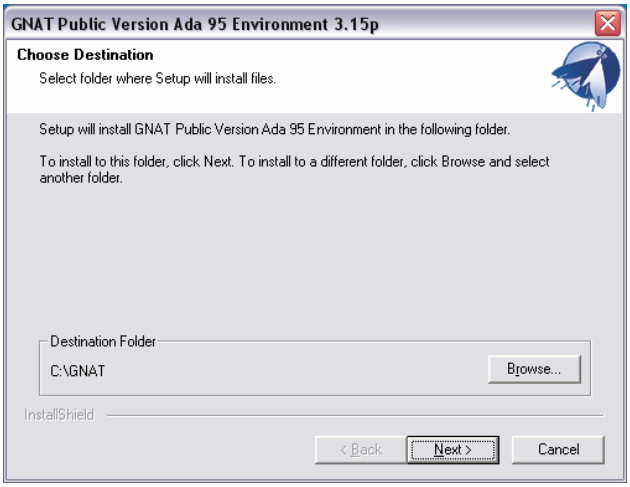
4. This is the GNAT installation. GNAT includes the Ada standard libraries, compiler, and linker. While you will not use GNAT directly, AdaGide, the graphical front end will use GNAT. Click NEXT.



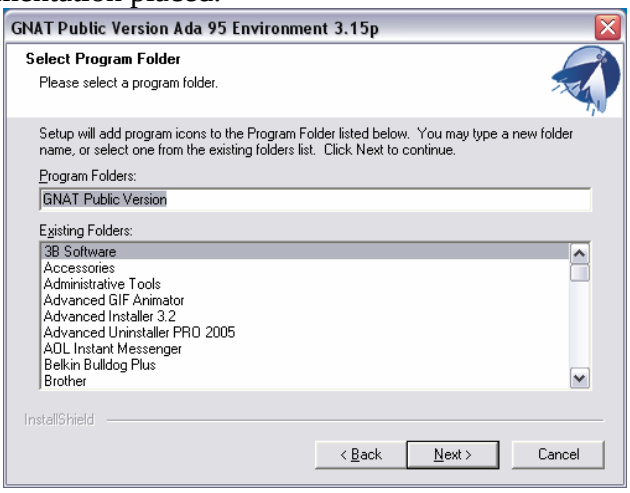
5. If you accept the software license click YES.



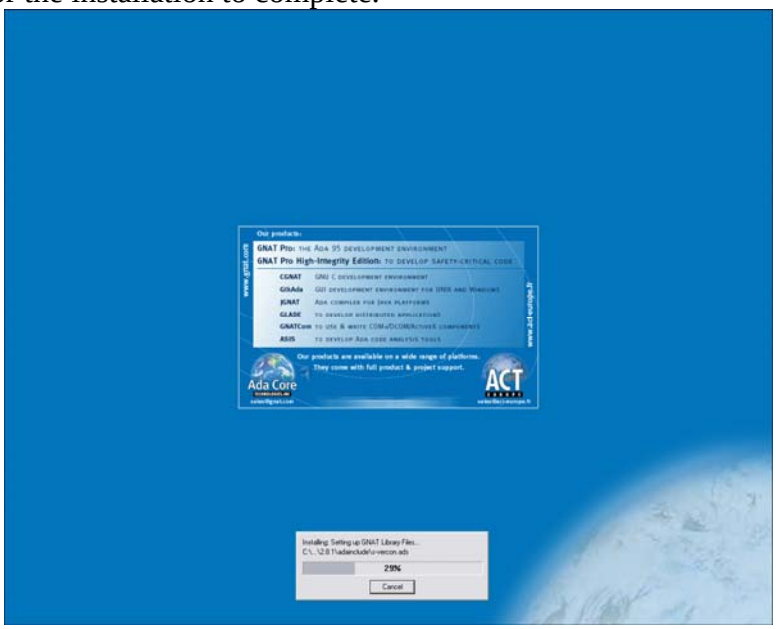
6. Choose the directory into which you wish to install GNAT. Choosing a directory other than default will *not* affect the installation.



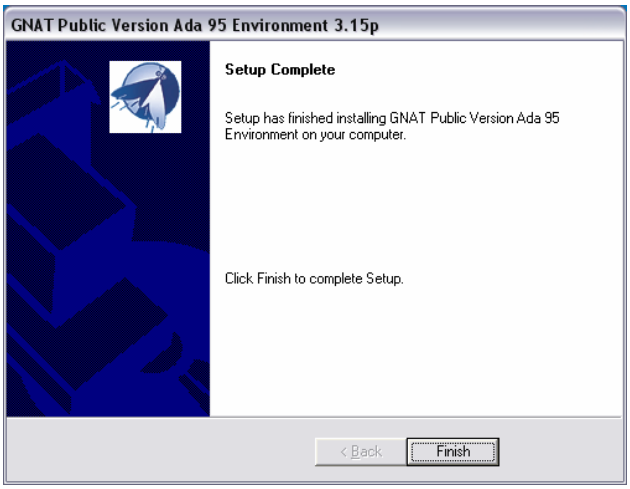
7. Choose the name of the Start->Programs->Folder in which you would like the GNAT documentation placed.



8. Wait for the installation to complete.

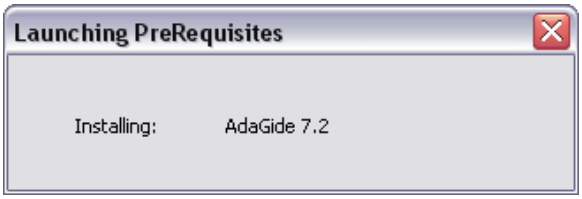


9. You should get this confirmation screen if everything installs correctly. Click FINISH.



ADAGIDE

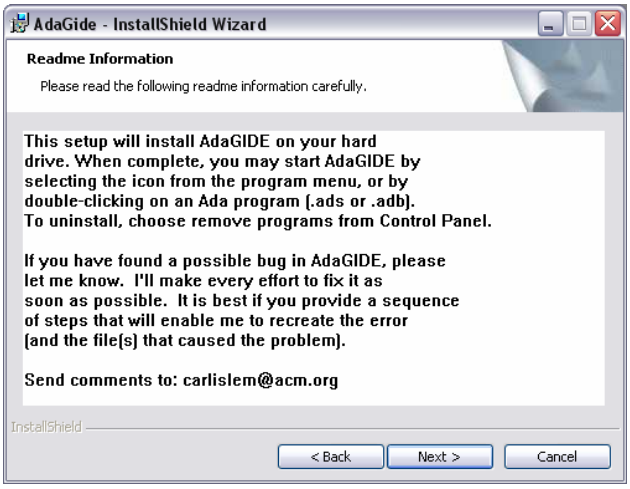
10. This will return you to the Unified C&P Installation window. After a few seconds the next installation will begin automatically.



11. AdaGide is the IDE (Integrated Development Environment) for Ada for Windows. It uses the programs installed with GNAT. Click NEXT.

12. If you accept the software license, choose "I accept . . ." and click YES.

13. Click NEXT.



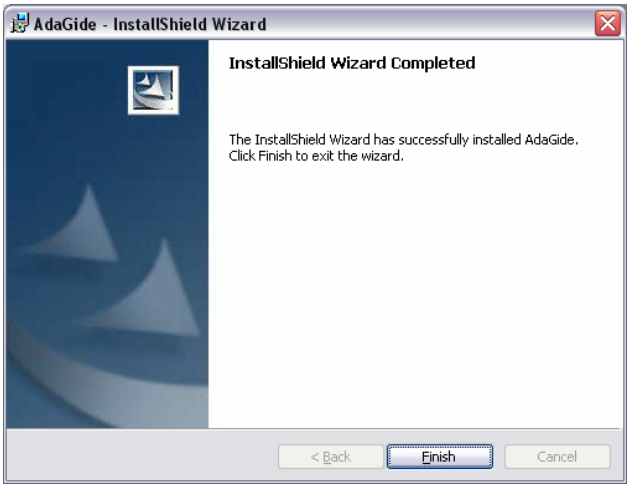
14. Choose the directory into which you wish to install AdaGide. Choosing a directory other than default will *not* affect the installation. REMEMBER where you installed AdaGide, it will be important in step 29.

15. Choose the type of installation you would like. Typical is recommended. Click NEXT.

16. If all the installation details are correct click NEXT.

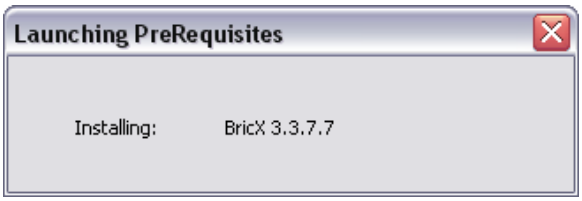
17. Wait for the installation to complete.

18. Upon completion you should be greeted with this screen. Click FINISH.

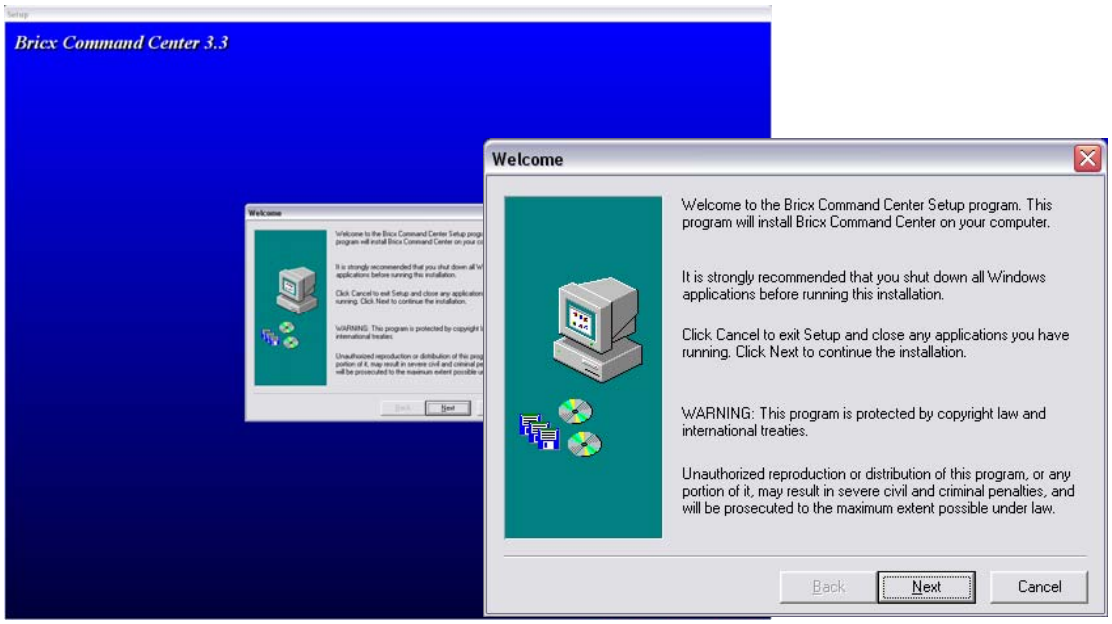


BRICX

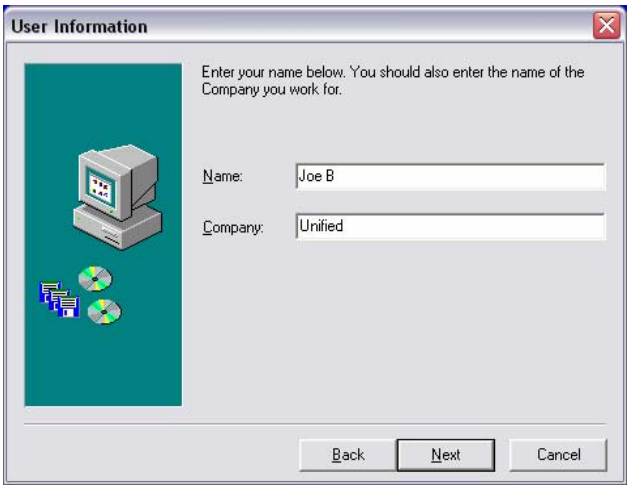
19. This will return you to the Unified C&P Installation Window. After a few seconds the next installation will begin automatically.



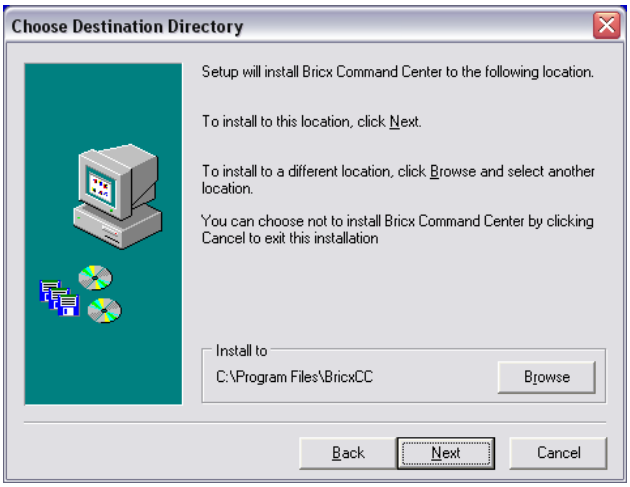
20. BricX or BricxCC is like AdaGide, but is the IDE for the Lego RCX in the C programming language. While you will not program in this IDE, it supports some fancy/important features of the RCX that AdaGide does not. Click NEXT.



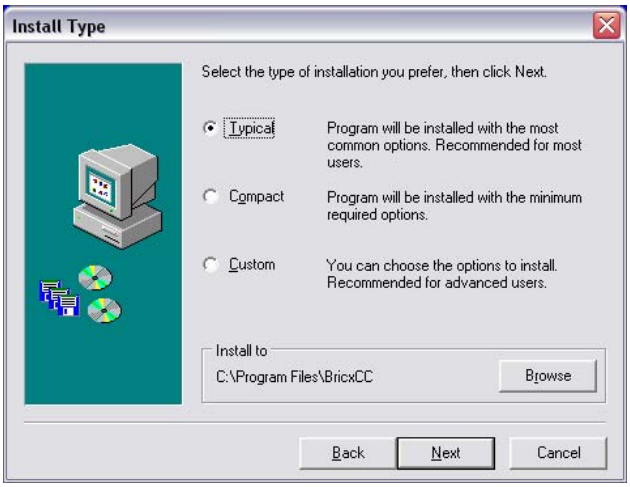
21. Enter your name and company then click NEXT.



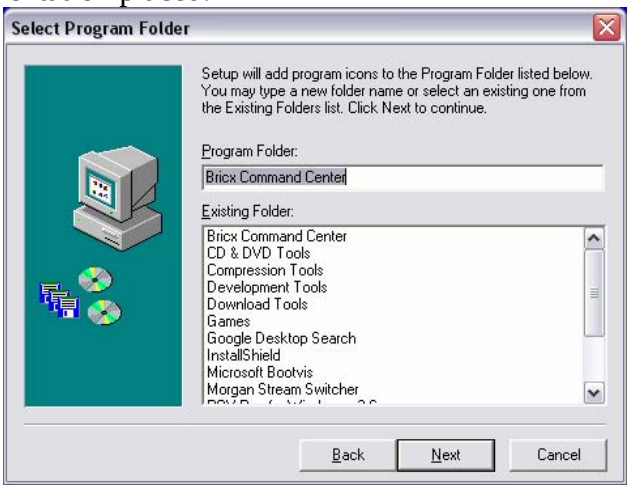
22. Choose the directory into which you wish to install BricxCC. Choosing a directory other than default will *not* affect the installation.



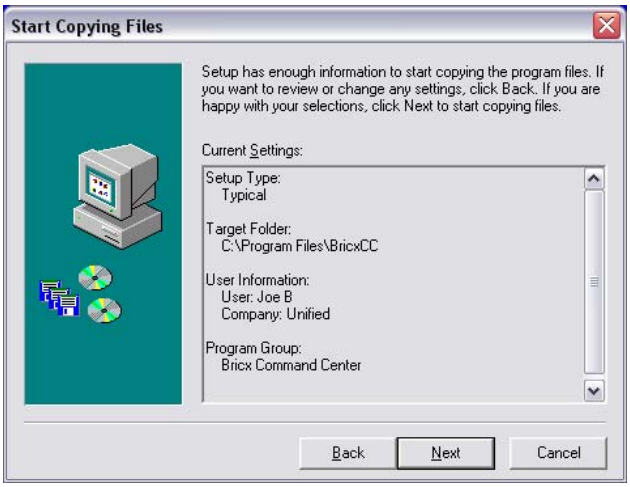
23. Choose the type of installation you would like. Typical is recommended. Click NEXT.



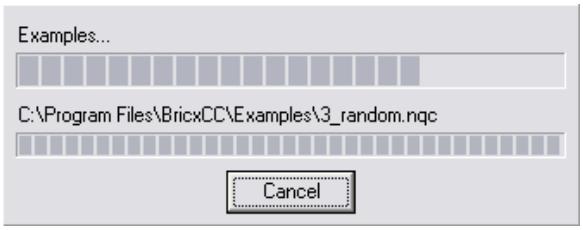
24. Choose the name of the Start->Programs->Folder in which you would like the BricX documentation placed.



25. If all the installation details are correct click NEXT.

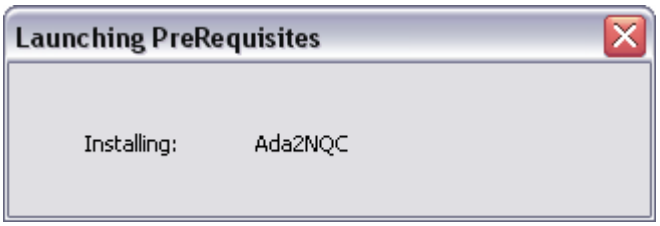


26. Wait for the installation to complete.

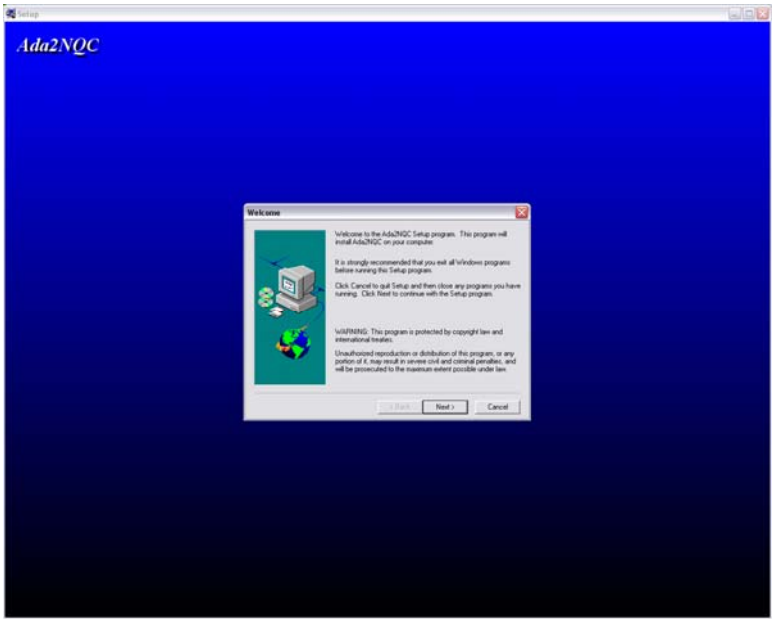


ADA2NQC

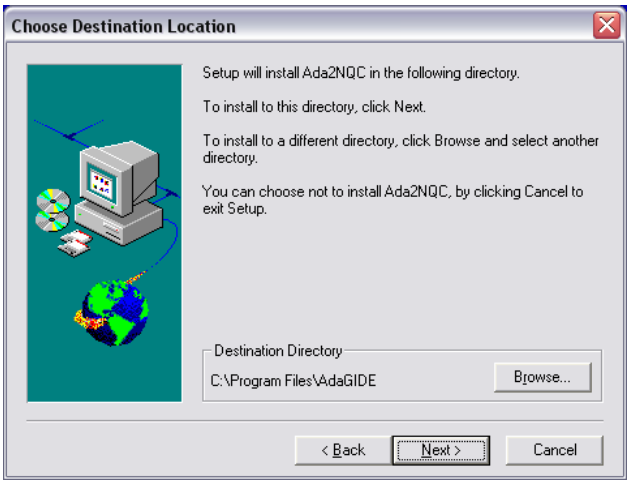
27. This will return you to the Unified C&P Installation Window. After a few seconds the next installation will begin automatically.



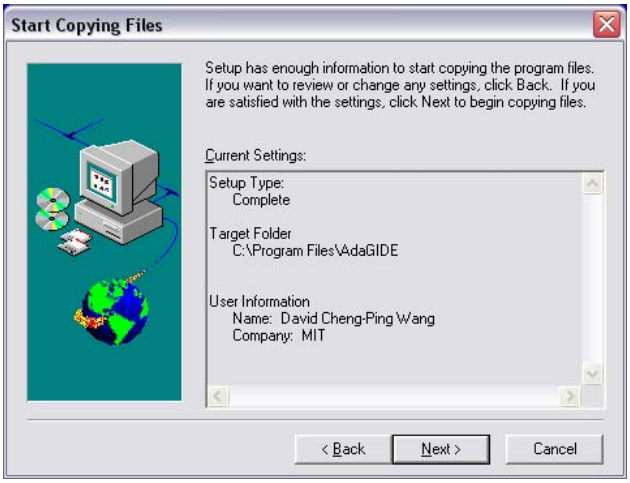
28. Ada2NQC is an interpretive translator. Compiling for your computer creates very different binary files than compiling for the RCX. Since NQC is a very robust compiler that already targets the RCX, Ada2NQC translates your .adb files into a language known as Not Quite C for this compiler. Click NEXT.



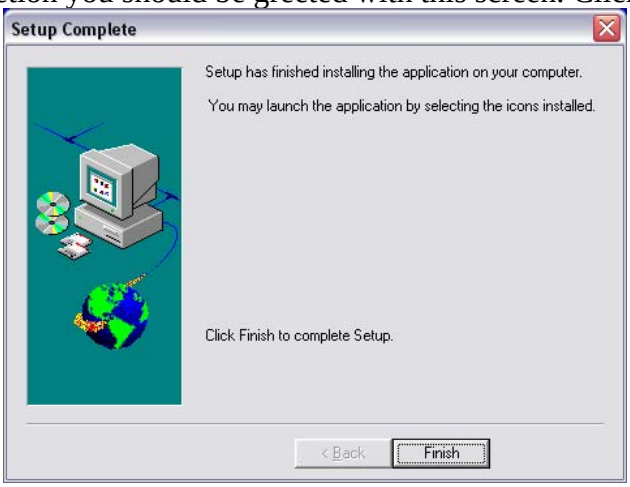
29. The directory you choose Ada2NQC to be installed in MUST be identical to the one in which AdaGide was installed. (Note that the capitalization of the AdaGide folder is not significant). Click NEXT.



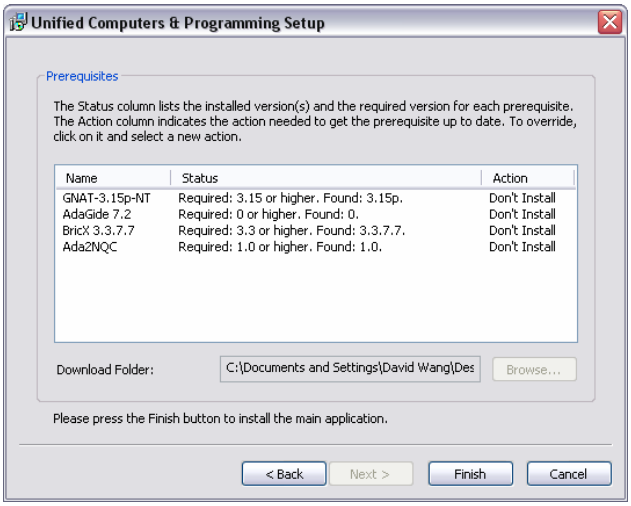
30. If all the installation details are correct click NEXT.



31. Upon completion you should be greeted with this screen. Click FINISH.



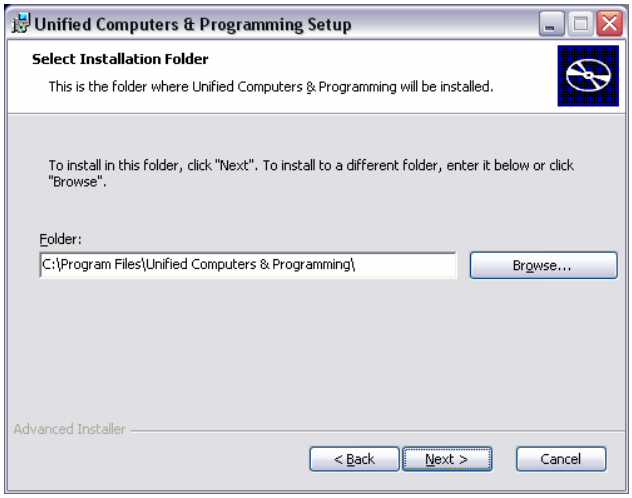
32. Upon completion, the installation will return you to the Unified C&P Installation window. The Action column should now say “Don’t Install.” If the action column still says “Install” and you are sure every prerequisite installed, change it to “Don’t Install.” Click FINISH.



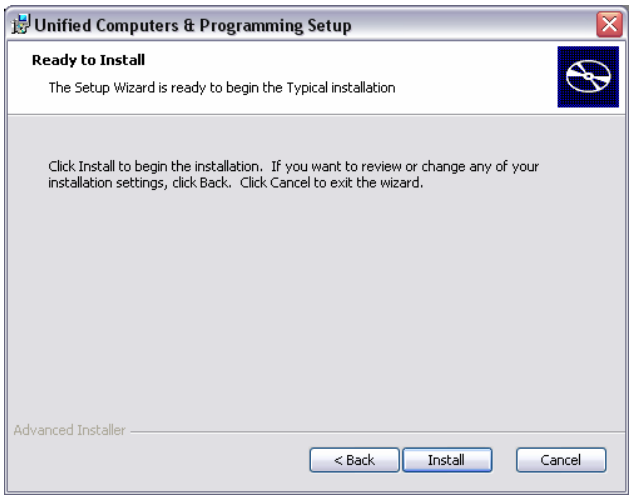
UNIFIED COMPUTERS & PROGRAMMING

33. After unpacking the Unified C&P Installation files, the main installation will begin.

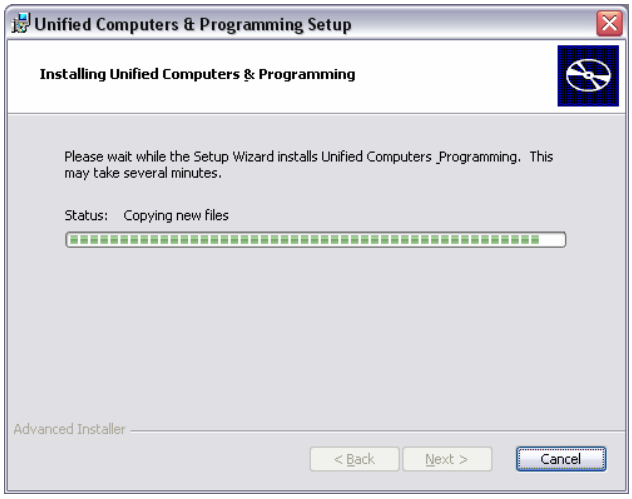
34. Choose the directory into which you wish to install Unified C&P. Choosing a directory other than default will *not* affect the installation.



35. Click INSTALL.

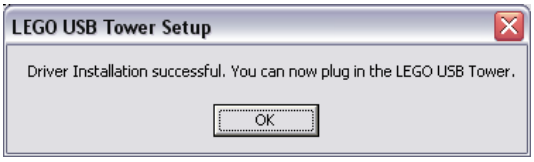


36. Wait for the installation. . .

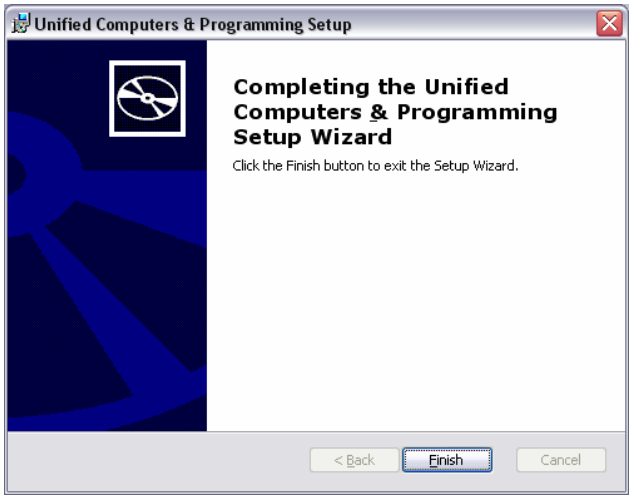


37. Midway through installation this driver installation windows will appear. Click YES if you ever intend to program the RCX using your computer otherwise click CANCEL. You may rerun the C&P Installation program at a later date.

38. When the installation completes click OK.



39. Congratulations you are now done with the installation. Click FINISH.



40. If you now navigate to Start->Programs you will see a new folder called Unified C&P. This folder includes some important documentation, the RCX firmware, and some code that you might need quick access to in the future. It also holds the uninstall instructions.

II. INSTALLING THE LEGO TOWER

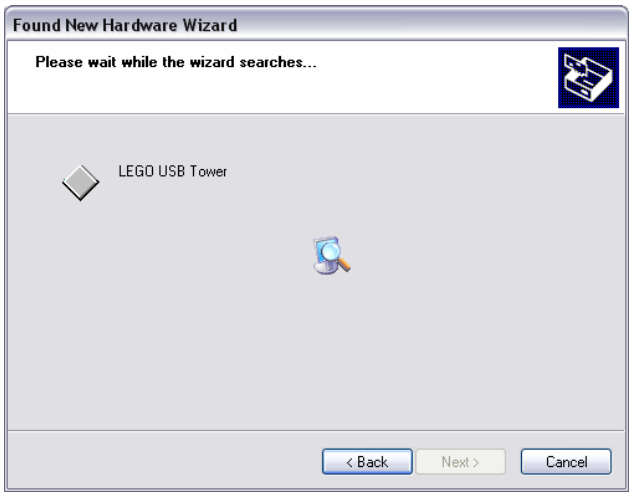
41. If you completed the Unified C&P Installation above, the LEGO Tower drivers have already been copied to your computer.

42. Plug in the LEGO IR Tower to an available USB port. If you attempt to plug it in to a USB hub external to your computer make sure it is a 'powered' hub (has an AC/DC adapter) otherwise you may have problems with your Tower in the future. The Tower uses IR to program the RCX.

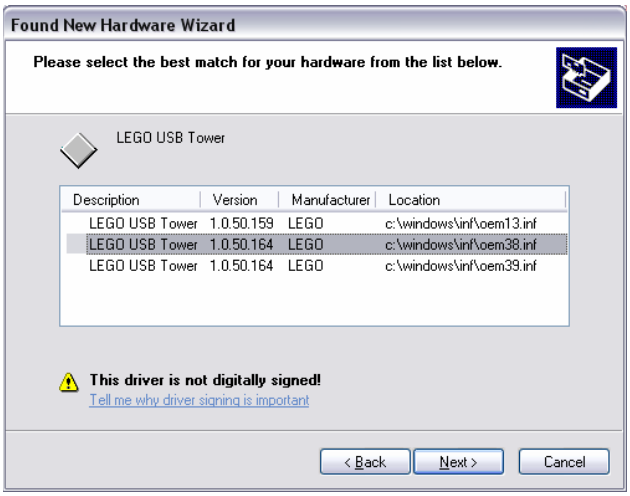
43. If your computer identifies the IR Tower this window will pop up. If not go to Start->Control Panel->Add Hardware to attempt to locate the IR Tower. Select "No, not this time" and click NEXT.

44. Select "Install the software automatically" and click NEXT.

45. The computer will search for the IR Tower Drivers.



46. Eventually, a driver will be found. If you have used the IR Tower previously on your computer, make sure Version 1.0.50.164 is chosen. The previous driver had problems with the hyper threading on Pentium 4 chips. Click NEXT.



47. Wait for the installation to compete.

48. When the installation completes click FINISH.

III. FIRMWARE FOR THE RCX

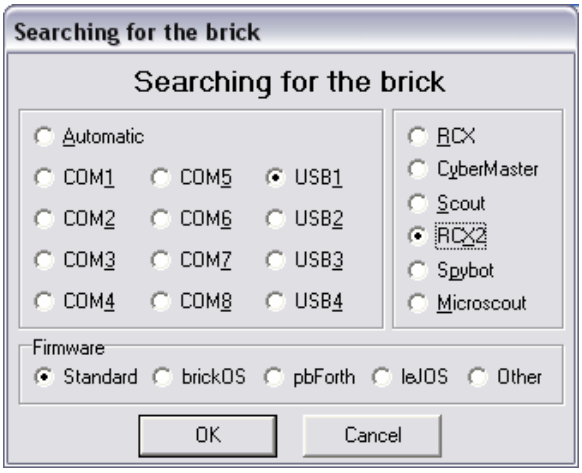
49. Like your computer runs on an OS (Operating System), the RCX runs on firmware, the basic OS for the RCX. These steps will take you through installing the firmware on the RCX.

Note: If you see 4 digits the LCD of your RCX when it is turned on, the firmware has already been installed. If not, you will need to reinstall the firmware. Reinstalling the firmware often may indicate the batteries are low, that the batteries have been removed for periods greater than ~ 1minute, or the RCX is defective.

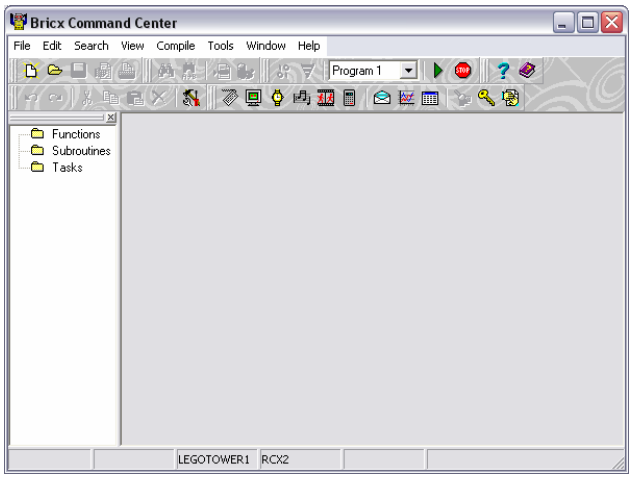
50. Run BricX. Start->Programs->Bricx Command Center->Bricx Command Center (or whatever you called this folder during installation).

51. Turn ON the RCX. Make sure the IR Tower and RCX are facing each other.

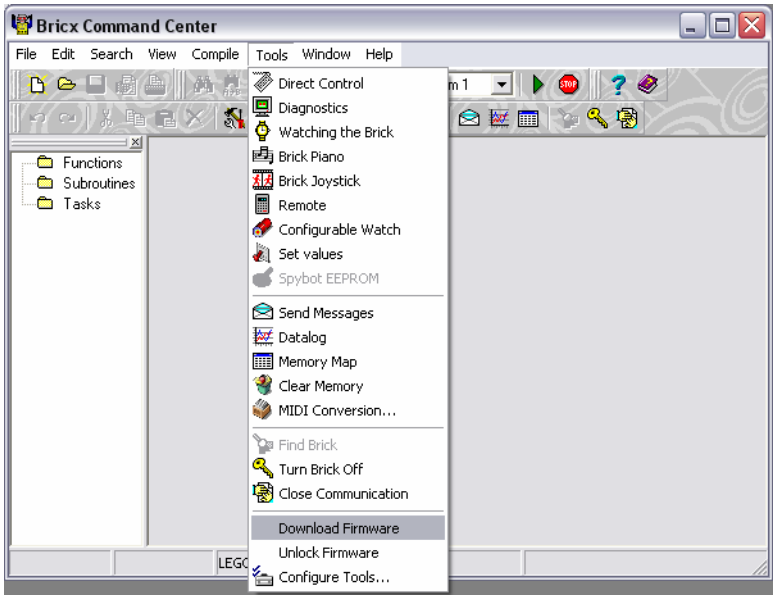
52. Select “USB1”, “RCX2” and “Standard” firmware. (You may have to repeat this step multiple times selecting different USB ports). Click OK.



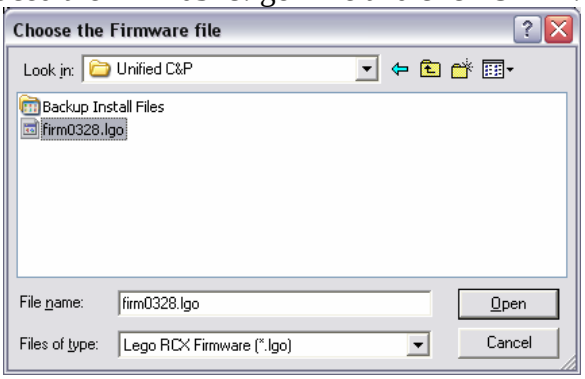
53. If the RCX is detected, this window will appear:



54. Go to the Windows Start Menu: Start->Programs->Unified C&P. Click and Drag the file "firm0328.lgo" to a location you can find. (i.e. Desktop).
55. Back to BricX. Go to Tools->Download Firmware



56. A file selection window will appear. Make sure the RCX is ON. Navigate to wherever you placed the "firm0328.lgo" file and click OPEN.

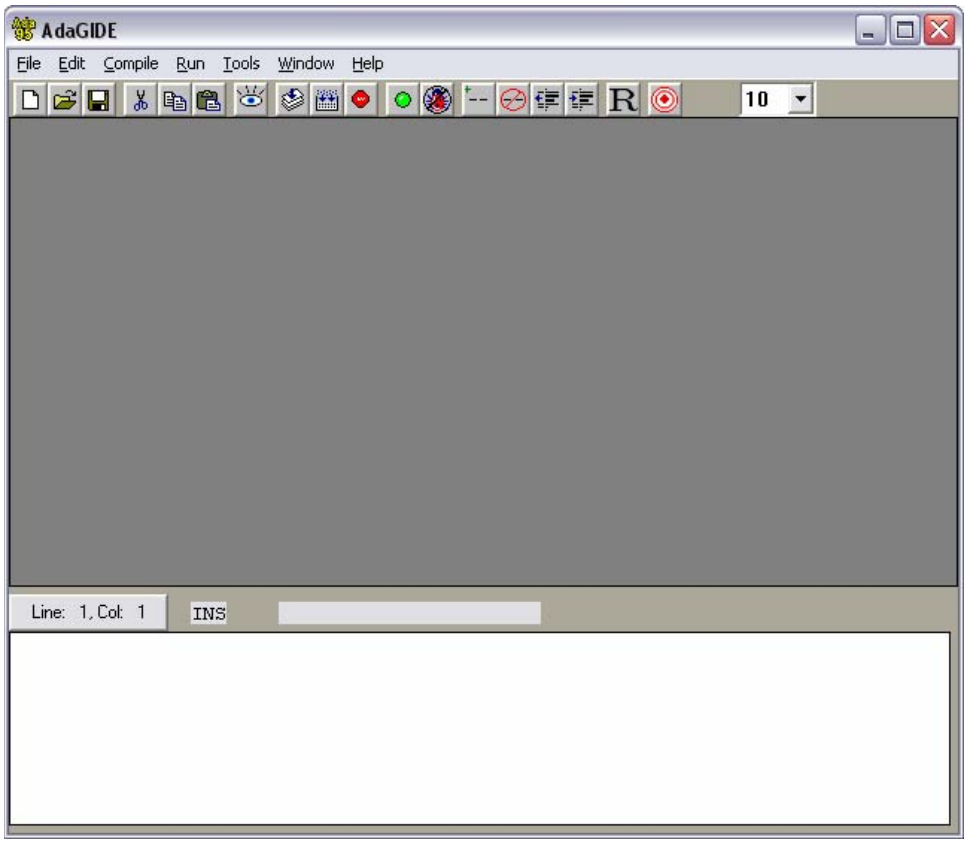


57. The firmware download will begin. A green light will appear on the IR Tower to indicate it is working. The RCX will have an upside down triangle on the LCD indicating there is something being downloaded to it and a number counting upwards. Do NOT disturb the IR Tower and RCX at this time.

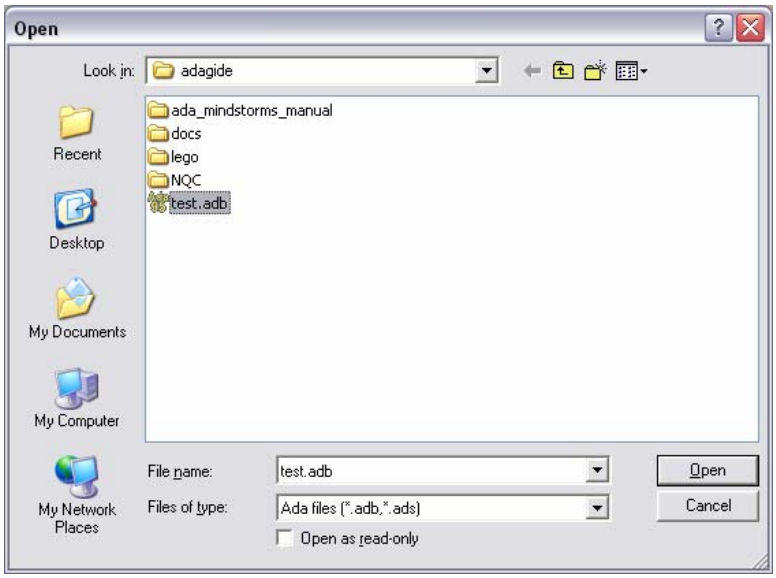
58. The RCX will beep when the firmware download is complete. You may now close BricX.

IV. PROGRAMMING THE RCX

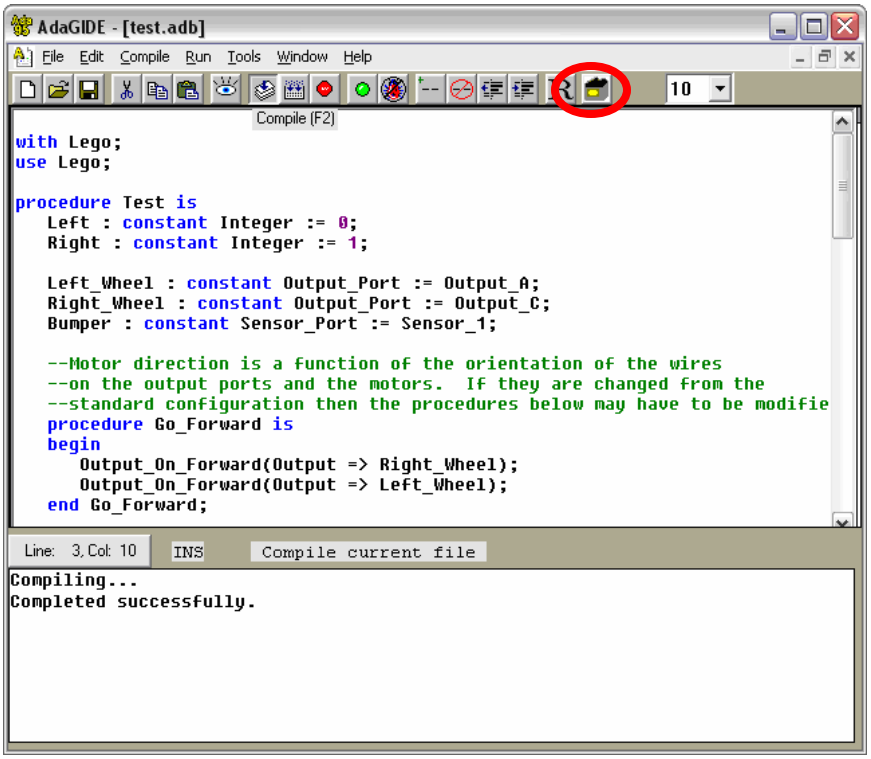
59. Run AdaGide. Start->Programs->AdaGide



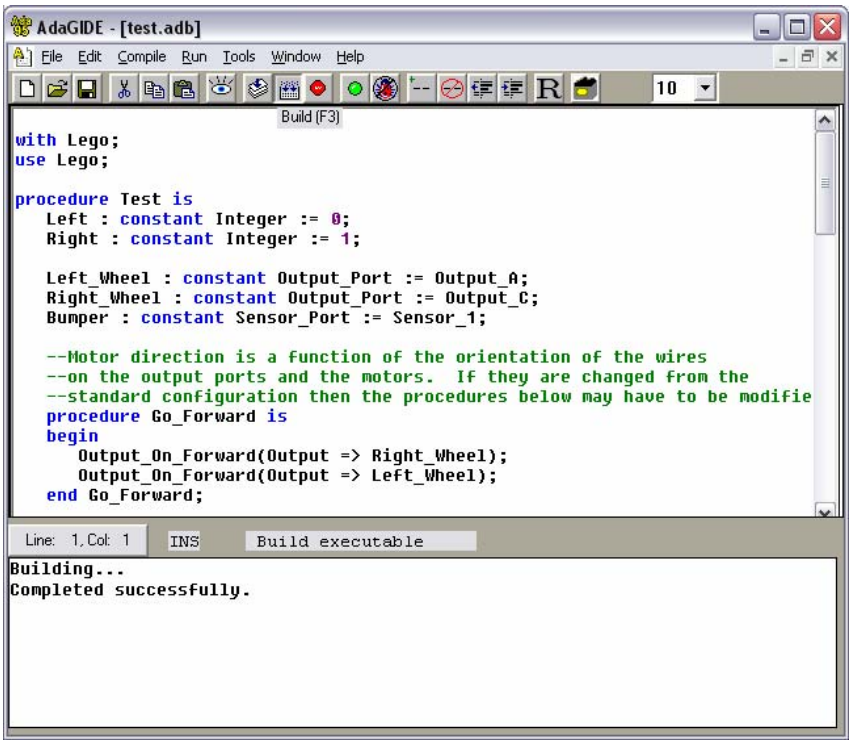
60. File->Open. If test.adb is not in the current directory navigate to C:\Program Files\adagide. Select **test.adb** and click OPEN.



61. Check that **Lego Mindstorms** is the target. Click on the **Compile Button** or **F2.**

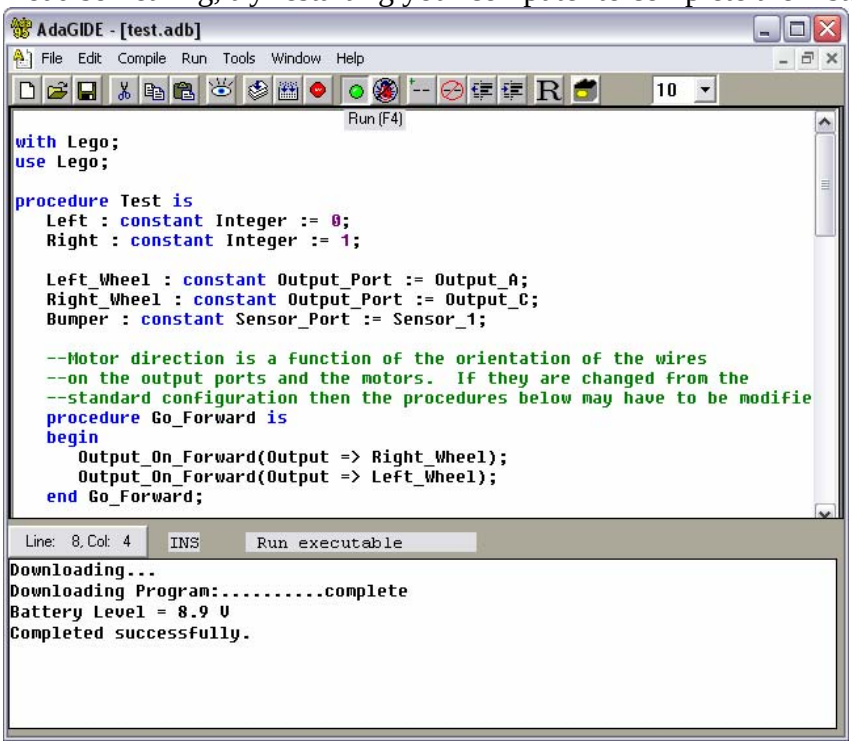


62. Click on the **Build Button** or **F3**.



63. Make sure the IR Tower is facing the RCX and that the RCX is on. Check which program slot is currently selected.

64. Click on the **Run Button** or **F4.** Your RCX should beep when the download is done. If you do not see the exact output below, the RCX did not beep, but it did download something, try restarting your computer to complete the installation.



65. Press the **Run Button** on the RCX.