

Setup for Control Lego MindStorms Robots in Ch

This document describes how to download relevant software and setup the computer to control Lego MindStorms robots in Ch.



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1. How to check if my computer supports Bluetooth communication

Click “Start”, right click on ‘My Computer’ , select 'Manage', then select 'Device Manager' in the popped up window, look for 'Bluetooth Radios'. If you cannot find it, it means your device doesn't support Bluetooth and you need to buy a Bluetooth dongle to work with your computer.

1. How to download and install Ch NXT Control Package on your PC

1

Before you begin, make sure your computer is connected to the internet.

In addition, make sure you have Ch installed in your computer.



2

Open a web browser and go to <http://iel.ucdavis.edu/projects/chmindstorms/>.

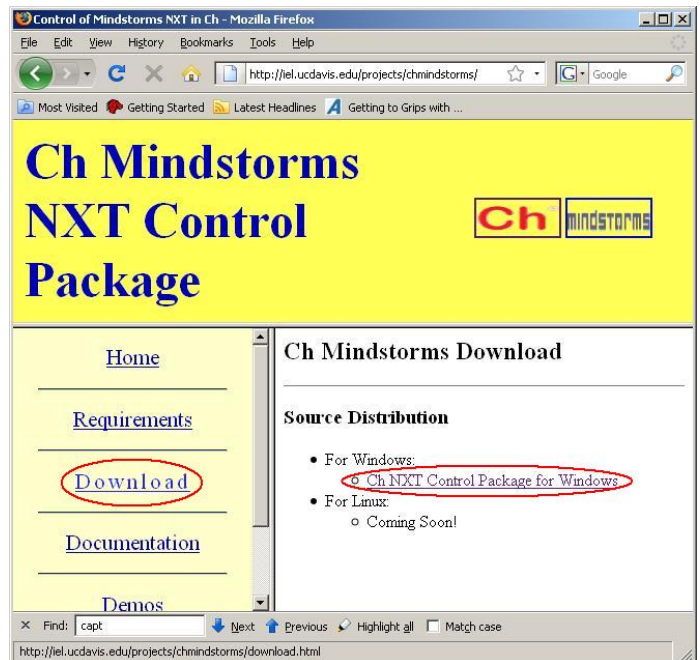


3

Click on the "Download" button to go to the download section.

After you have reached the Ch Mindstorms Download section, Download the Ch NXT Control Package for Windows.

Make sure you know where the file is downloaded.



4

Open Ch command shell by double clicking on the Ch command shell icon on your desktop. Ch command shell should pop up and the default directory should be your user directory.



5

In the command shell, go to the directory where the Ch NXT Control Package is located. For this case, the package's zip file is called "chnxtwin-1.0.3.zip".

If the package is downloaded onto your desktop, just type "cd Desktop".

If the package is downloaded onto your C drive, just type "cd /".

If the package is downloaded somewhere else, navigate to that directory using "cd folder" command and "ls" command.

"cd ..." command, it goes to the folder you would like to go into, and substitute "..." with the name of the folder you would like to go into.

"ls" command list the files and folders in the current directory.

 A screenshot of the Ch Professional command shell window. The title bar says 'Ch Professional'. The window content shows the following text:


```

Ch
Professional edition, version 6.1.0.13661
(C) Copyright 2001-2008 SoftIntegration, Inc.
http://www.softintegration.com
C:/Documents and Settings/vhgtasang> cd desktop
C:/Documents and Settings/vhgtasang/desktop> ls
9797_LME_UserGuide_US_low.pdf  MAE220lab1.m
basic-miktex-2.7.3248.exe      ModularBot
bluetooth_large.jpg           oderk.ch
CControl.chf                  putty.lnk
ch.tar                        Shortcut to WinSCP.lnk
chcontrol-2.5.0.exe            spring.qnn
chmechanism-2.1.0.exe          Texmaker.lnk
chnxtwin-1.0.2                texmakerwin32_install.exe
chnxtwin-1.0.3.zip             Thumbnails
Control.h                     u-boot-connex-400-r1604.bin
eng004102_Tue_3-10-09.xls     ulimage-2.6.21-r1-gunstix-custom-connex.bin
ENK2Inst.zip                  vib.pdf
htpe5.exe                     VIB_OLD
hyper                          vibtool1.c
Joshi-Kalman_Lectures.pdf     vthud.m
LEdBeta(0.52)Build(6300)Std.exe vtoolbox
MAE220lab1.asv                wrar380.exe
C:/Documents and Settings/vhgtasang/desktop> _
  
```

Note: If your file is downloaded on your desktop

 A screenshot of the Ch Professional command shell window. The title bar says 'Ch Professional'. The window content shows the following text:


```

Ch
Professional edition, version 6.1.0.13661
(C) Copyright 2001-2008 SoftIntegration, Inc.
http://www.softintegration.com
C:/Documents and Settings/vhgtasang> cd /
C:/> ls
C:\Ch\bin\ls.exe: reading directory .: Permission denied
Lchrc          DRIVERS          mobile C security test
AUTOEXEC.BAT   FOUND.000          MSDOS.SYS
BOOT.INI        FOUND.001          MSOCache
BOOTSECT.DOS    FOUND.002          NTDETECT.COM
Ch              FOUND.003          NTLDR
chnxtwin-1.0.3  FOUND.004          Program Files
chnxtwin-1.0.3.zip FOUND.005          System Volume Information
Config.Msi      hpr5550.xml        Thumbnails
CONFIG.SYS      1386               UNIXPNP
cvgwin          Inetpub            WINDOWS
DELL            IO.SYS             WRSHDNT
DELL.SDR        Kensington
Documents and Settings MAILLABp5p2
C:/>
  
```

Note: If your file is downloaded on your C drive.

6

In the directory where you downloaded the package, type in the command “unzip” then followed by the name of package to unzip the package. For my case, the package name is chnxtwin-1.0.3.zip, so I typed in the command “unzip chnxtwin-1.0.3.zip”.

< This will create a directory chnxtwin-1.0.3 in the current directory and unzip all the files in the chnxtwin-1.0.3.zip into that directory. >

If a directory with the same file name is there, type “A” to replace all the files.

```

Ch Professional
Ch
Professional edition, version 6.1.0.13661
(C) Copyright 2001-2008 SoftIntegration, Inc.
http://www.softintegration.com
C:/Documents and Settings/whgtsang> cd /
C:/> ls
C:\Ch\bin\ls.exe: reading directory .: Permission denied
_chcre          DRIVERS      mobile C security test
AUTOEXEC.BAT   FOUND.000     MSDOS.SYS
BOOT.INI       FOUND.001     MSOCache
BOOTSECT.DOS   FOUND.002     NTDETECT.COM
Ch             FOUND.003     NTLDR
chnxtwin-1.0.3  FOUND.004     Program Files
chnxtwin-1.0.3.zip FOUND.005     System Volume Information
Config.Msi     hpfr5550.xml  Thumbs.db
CONFIG.SYS     1386         UXIPNP
cygwin         inetpub       WINDOWS
DELL           IO.SYS        VRSHDNT
DELL.SDR       Kensington
Documents and Settings MALL08p5p2
C:/> unzip chnxtwin-1.0.3.zip
  
```

7

After all the files are extracted, navigate into the directory by typing “cd chnxtwin-1.0.3”.

Type in the command “make install” to install the Ch NXT Control Package.

<This command copies chnxtwin/ into C:/Ch/package/chnxtwin. It will also install important files for the package to run in Ch.>

If another version of the Ch NXT control package is installed, type “y” to uninstall and reinstall the package.

```

Ch Professional
cygwin          1386         Thumbs.db
DELL            inetpub       UXIPNP
DELL.SDR        IO.SYS        WINDOWS
Documents and Settings Kensington  VRSHDNT
C:/> unzip chnxtwin-1.0.3.zip
Archive: chnxtwin-1.0.3.zip
  creating: chnxtwin-1.0.3/
  inflating: chnxtwin-1.0.3/Readme.txt
  creating: chnxtwin-1.0.3/chnxtwin/
  creating: chnxtwin-1.0.3/chnxtwin/include/
  inflating: chnxtwin-1.0.3/chnxtwin/include/ch_nxt.h
  creating: chnxtwin-1.0.3/chnxtwin/demos/
  inflating: chnxtwin-1.0.3/chnxtwin/demos/machine_auto.ch
  inflating: chnxtwin-1.0.3/chnxtwin/demos/vehicle_auto.ch
  inflating: chnxtwin-1.0.3/chnxtwin/demos/humanoid_rtc.ch
  inflating: chnxtwin-1.0.3/chnxtwin/demos/vehicle_rtc.ch
  inflating: chnxtwin-1.0.3/chnxtwin/demos/machine_rtc.ch
  creating: chnxtwin-1.0.3/chnxtwin/lib/
  inflating: chnxtwin-1.0.3/chnxtwin/lib/ch_nxt.c
  inflating: chnxtwin-1.0.3/Makefile
C:/> cd chnxtwin-1.0.3
C:/chnxtwin-1.0.3> make install
  
```

2. How to connect your NXT to your PC (Method 1)

1

Before you begin, make sure your PC have Bluetooth capabilities.

Next, make sure that you have Bluetooth installed and enabled on your PC. See your Bluetooth instruction manual for more details.

Turn on your NXT. If your NXT not on, press the orange button on your NXT to turn it on.

2

Double click on “My Bluetooth Places” in your desktop.

Or

Double click on the Bluetooth icon in the notification area (notification area is usually in the bottom right corner of your desktop).



Option 1



Option 2



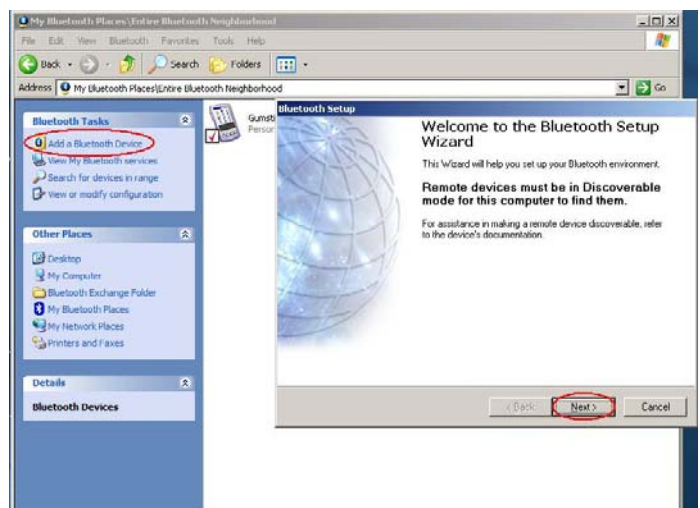
3

A window called “My Bluetooth Places” should pop up.

In the window, click on “Add a Bluetooth Device” under the Bluetooth Tasks category.

A window called “Bluetooth Setup” should pop up.

Click “Next” on the setup window to continue to the select a device section.



4

The computer should start searching for Bluetooth devices to connect to, make sure the NXT device is in the selection window.

If NXT device is not on the selection window, make sure NXT is on and click "Search Again" button.

If the NXT device is present, highlight NXT device and click "Next".

NXT should make a sound and ask you for a passkey.



5

On your NXT, enter the passkey then select the "check" and press the orange button.

If you have chosen the default passkey "1234", just press the orange button.



6

Back to the setup window, type in the passkey “1234” in the Bluetooth security code and click “Pair Now” button.

If the pair between your PC and the NXT is successful, the next selection section should pop up.

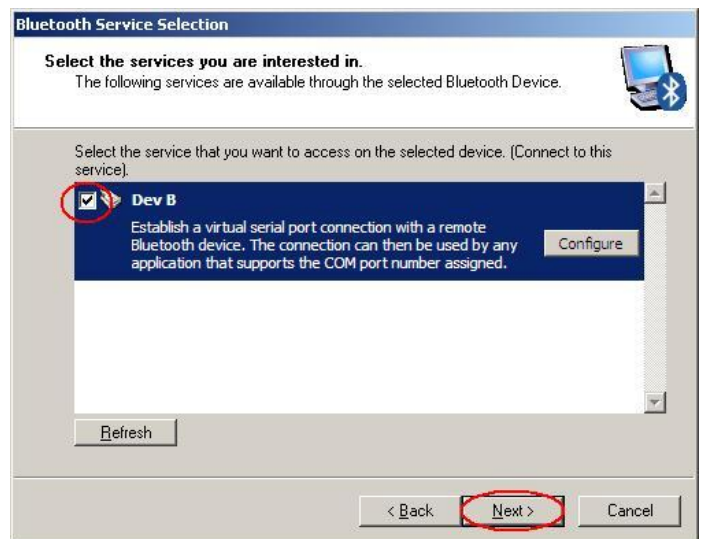
If the next selection section doesn’t pop up, take a look at your NXT’s screen. If it asks for a pass key, repeat step 5.



7

Check the box on “Dev B” and click “Next”.

If another window pop up that state “shortcut for the selected device has been created...”, just click “OK”.



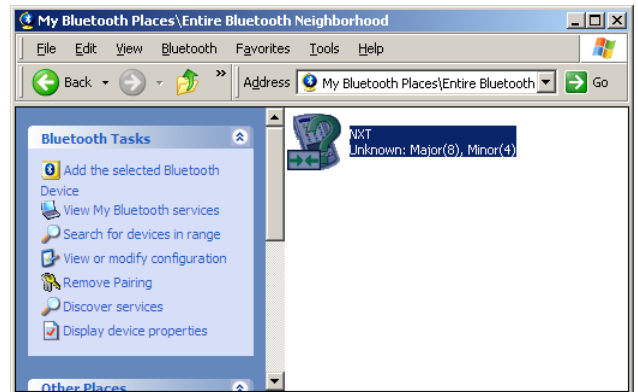
8

Click "Finish" to complete the Bluetooth connection between your PC and the NXT.



9

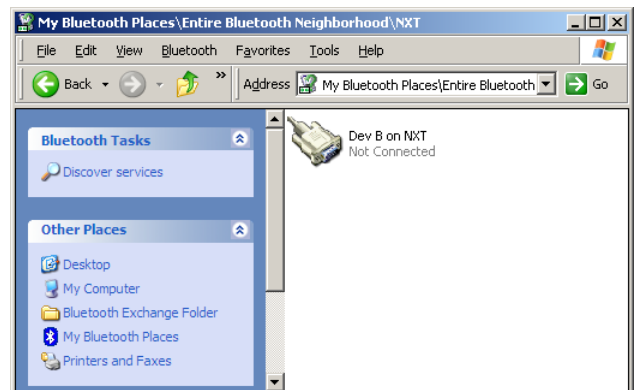
Goto the My Bluetooth Places folder and NXT should be there with a green connected icon. Double click on the icon.



10

In the NXT folder, it shows the status of the connection between the computer and the NXT. If the device is not connected, double click on the icon to connect it.

If the device is connected, it should look like the icon indicated below.



3. How to connect your NXT to your PC (Method 2)

In method 1, you have used your computer to establish a connection to your NXT. In a situation where there are multiple computers and multiple NXTs, there will be confusion in which NXT is connected to which computer. In method 2, you will use your NXT to establish a connection to your computer. This method will ensure that your NXT will be connected to your own computer.

1

Make sure that you have Bluetooth installed and enabled on your PC. In addition, make sure that you turn on discovery for your Bluetooth to allow the NXT to detect your computer. See the manual for your Bluetooth device for further details.

Turn on your NXT.



2

On your NXT brick, select the Bluetooth option indicated on the screen.



3

Next, on your NXT brick, select the Search option indicated on the screen.
The NXT will now search for nearby Bluetooth devices to be connected to.
Wait for the NXT to finish searching.



4

After the NXT receive the list of nearby Bluetooth devices, you can select the computer that you would like to connect to (Computer devices have a computer icon attached to it).



5

After you have selected a computer, the NXT will ask you which port you would like to connect. Select an open port (indicated by an icon with a number encased in a dotted square box.)



6

Next, the NXT will ask for the pass key. If you want to use the default pass key "1234", just press the orange button.



7

Afterward the computer will receive the signal from the NXT and a message will pop up near the notification area on top of the Bluetooth icon. Double click on the Bluetooth icon in the notification area.



8

A Bluetooth Security Code window will pop up. Type in the pass key ("1234" if it is default) and click OK.



9

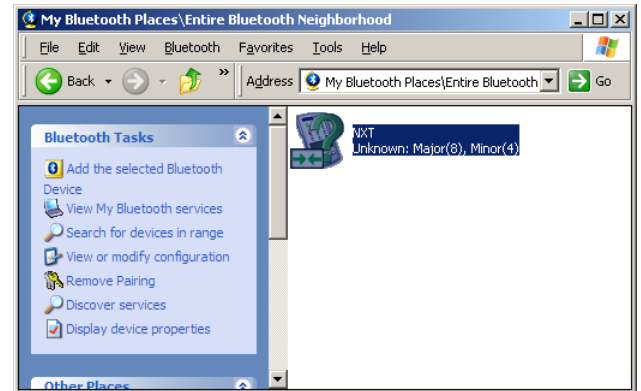
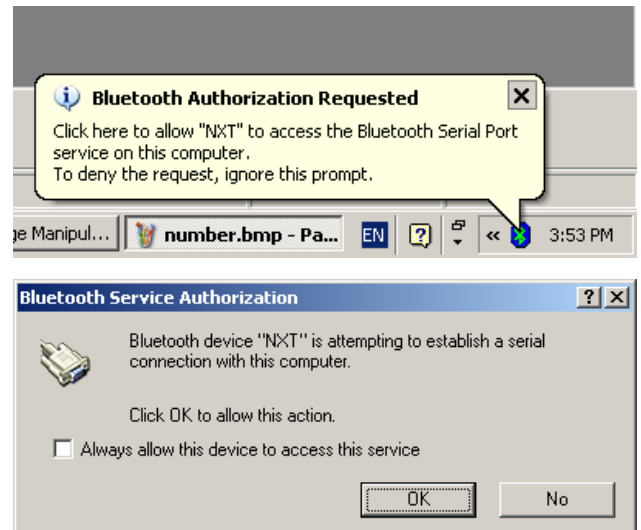
Next, the computer will prompt you to authorize the Bluetooth connection with a notification message near the notification area.

Double click on the Bluetooth icon again. A Bluetooth Service Authorization window will pop up and click OK to allow the NXT to connect to your computer.

If the notification didn't show up, go back to the Bluetooth setting in your NXT brick and repeat from step 3.

10

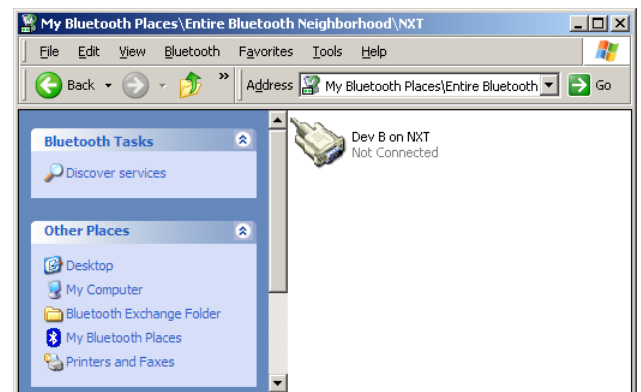
Goto My Bluetooth Places folder and NXT should be there with a green connected icon. Double click on the icon.



11

In the NXT folder, it shows the status of the connection between the computer and the NXT. If the device is not connected, double click on the icon to connect it.

If the device is connected, it should look like the icon indicated below.



4. How to run your Ch NXT demos in ChIDE

1

Make sure you have Ch installed and Ch Mindstorms NXT Control Package installed in your PC.

Also, make sure the NXT is connected to your PC via Bluetooth.



2

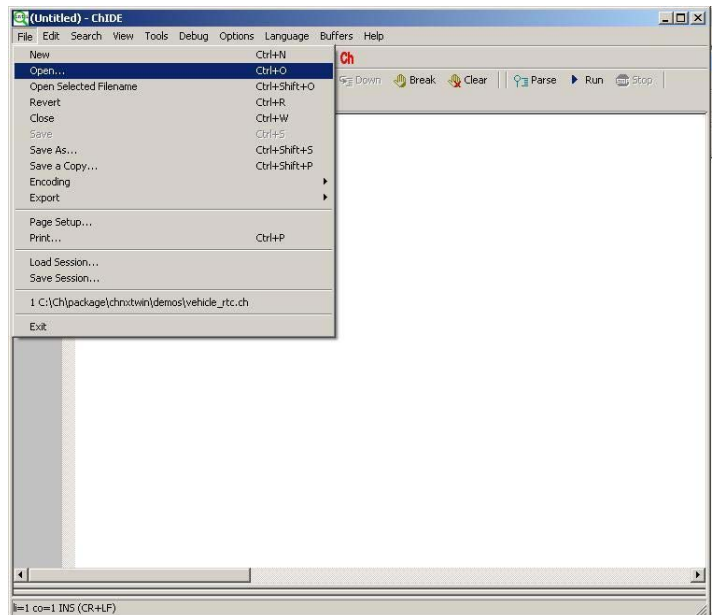
Open ChIDE by double clicking on the ChIDE icon on your desktop. ChIDE window should pop up.



3

In Ch IDE window, open a file by clicking on “File” in the menu bar and then click on “Open”.

Or simply hold “Alt” and press “F”, then press “o” on your keyboard.

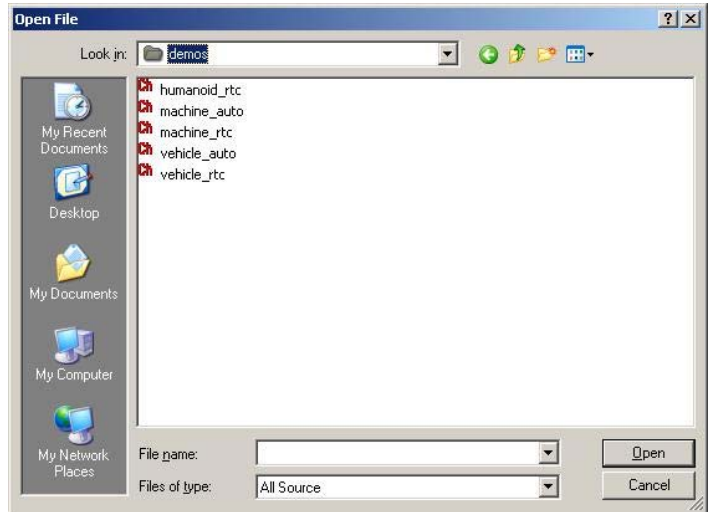


4

Navigate to your NXT demos directory.

If your Ch directory is located at C:\Ch, which is the default location of Ch, then navigate to "C:/ch/package/chnxtwin/demos/".

After you are in the directory, select one of the demos and click "Open"

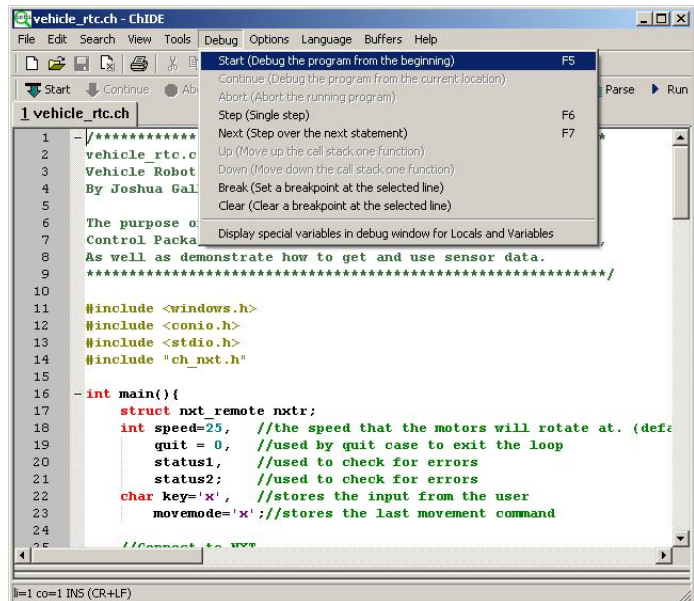


5

After opening a demos file, you can check out the code or change the code using ChIDE. (The file that is opened is "vehicle_rtc.ch")

To run the demo, click "Start" on debug bar.

Or simply press "F5" on your keyboard.

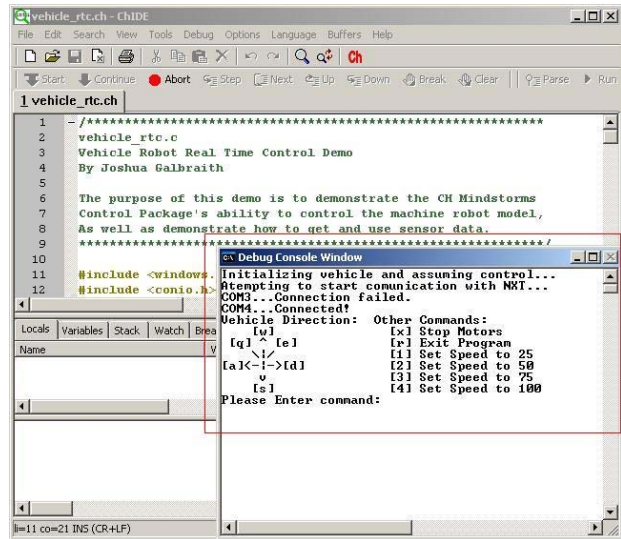


After starting the program, a debug console window should pop up and the demos program should be sent to the NXT.

For this demos, "vehicle_rtc.ch", you can control the NXT by entering commands in the **Debug Console Window**.

The manual control for NXT vehicle is:

Press "w" to go forward,
 press "s" to go backward,
 press "a" to go left,
 press "d" to go right,
 press "x" to stop motors
 ... etc



5. How to run your Ch NXT demos in a Ch command shell

1

Make sure you have Ch installed and Ch Mindstorms NXT Control Package installed in your PC.

Also, make sure the NXT is connected to your PC via Bluetooth.



2

Open Ch command shell by double clicking on the Ch command shell icon on your desktop. Ch command shell should pop up.



3

In the command shell, type in "cd /\\" to back to your C drive.

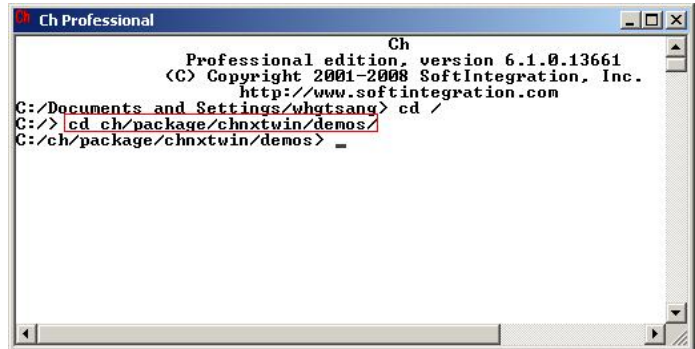


4

Navigate to your NXT demos directory.

If your Ch directory is located at C:\Ch, which is the default location of Ch, then type in the command "cd ch/package/chnxtwin/demos/" to goto your NXT demos folder for ch.

If you have installed your Ch Mindstorms NXT Control Package some other directories, navigate to the demos folder in Ch command shell.



```

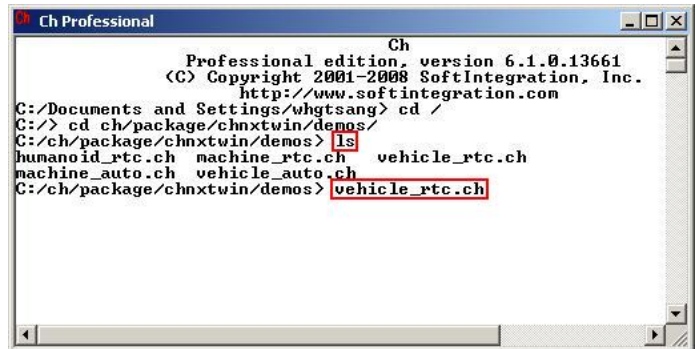
Ch Professional
Ch
Professional edition, version 6.1.0.13661
(C) Copyright 2001-2008 SoftIntegration, Inc.
http://www.softintegration.com
C:/Documents and Settings/whgtsang> cd /
C:/> cd ch/package/chnxtwin/demos/
C:/ch/package/chnxtwin/demos>
  
```

5

Type in "ls" to list the demos are available in the folder.

Type in file name to run the demos.

For example, type in command "vehicle_rtc.ch" to run the manual control for NXT vehicle.



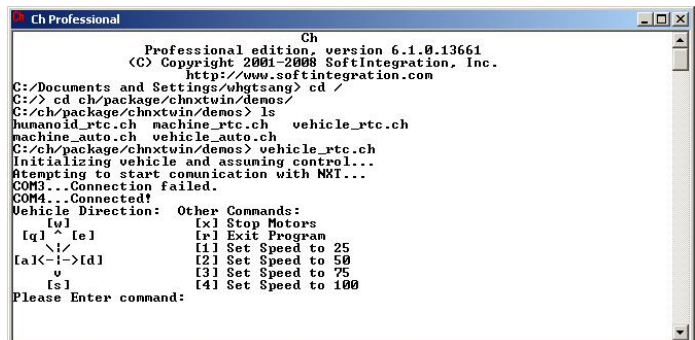
```

Ch Professional
Ch
Professional edition, version 6.1.0.13661
(C) Copyright 2001-2008 SoftIntegration, Inc.
http://www.softintegration.com
C:/Documents and Settings/whgtsang> cd /
C:/> cd ch/package/chnxtwin/demos/
C:/ch/package/chnxtwin/demos> ls
humanoid_rtc.ch  machine_rtc.ch  vehicle_rtc.ch
machine_auto.ch  vehicle_auto.ch
C:/ch/package/chnxtwin/demos> vehicle_rtc.ch
  
```

6

For example, type in command "vehicle_rtc.ch" to run the manual control for NXT vehicle.

The manual control for NXT vehicle is:
 press "w" to go forward,
 press "s" to go backward,
 press "a" to go left,
 press "d" to go right,
 press "x" to stop motors
 ... etc



```

Ch Professional
Ch
Professional edition, version 6.1.0.13661
(C) Copyright 2001-2008 SoftIntegration, Inc.
http://www.softintegration.com
C:/Documents and Settings/whgtsang> cd /
C:/> cd ch/package/chnxtwin/demos/
C:/ch/package/chnxtwin/demos> ls
humanoid_rtc.ch  machine_rtc.ch  vehicle_rtc.ch
machine_auto.ch  vehicle_auto.ch
C:/ch/package/chnxtwin/demos> vehicle_rtc.ch
Initializing vehicle and assuming control...
Attempting to start communication with NXT...
COM3...Connection failed.
COM4...Connected!
Vehicle Direction:  Other Commands:
[w] ^ [e]          [x] Stop Motors
[q] ^ [e]          [r] Exit Program
[a]<-|->[d]         [1] Set Speed to 25
v           [2] Set Speed to 50
[s]         [3] Set Speed to 75
           [4] Set Speed to 100
Please Enter command:
  
```