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Dr Robot[®] C# Advance X80 Demo Program

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1 Prepare

To use X80 Demo programs, you need download some support programs from Dr Robot and install or register them. Here is the list:

1. DRROBOTSentinelCONTROL.OCX

This ActiveX control component needs be copied to windows/system32 folder and use regsvr32 to register it.

2. WiRobotGatewayforWiFi.exe

You can copy it to your working folder.

3. DrRobotSensorMapBuilder.dll

This dll file provides some functions to build around sensor map for collision avoidance. It needs to be copied to "windows/system32" folder and use regsvr32 to register it.

4. DrRobotP2PSpeedDrive.dll

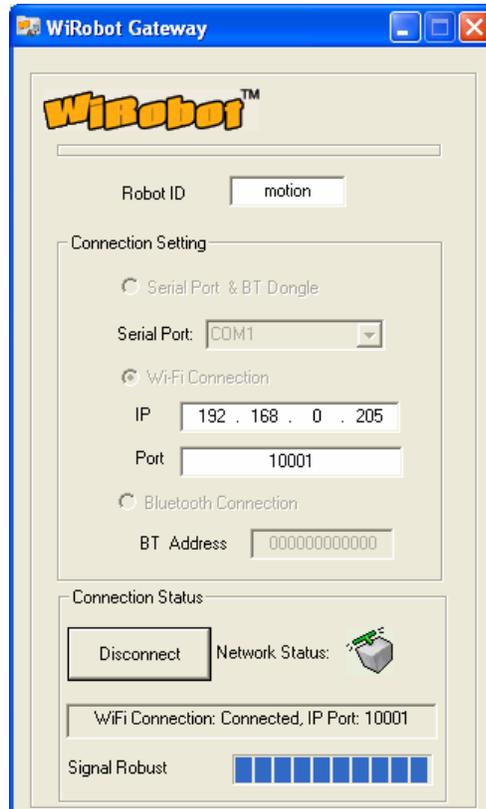
This dll file provide some functions to make robot move form one point to another point. It needs to be copied to "windows/system32" folder and use regsvr32 to register it.

5. Install DirectX9.0C for Joystick control in program.

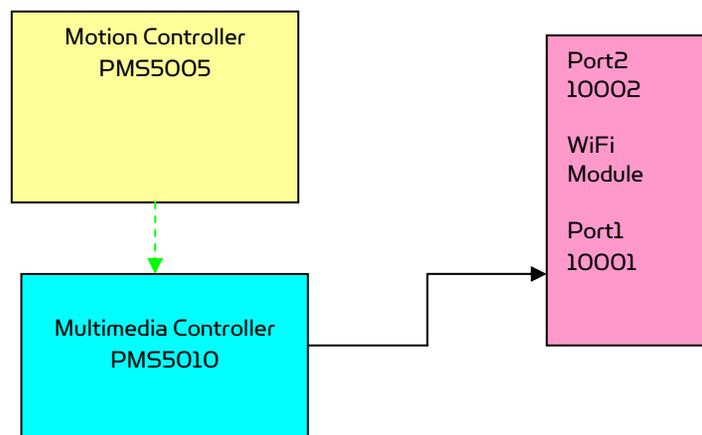
Note: For DRROBOTSentinelCONTROL.OCX, you can refer to Dr Robot SDK API User Manual.

2 User Interface

There is no power management on X80 robot. So there is only one DrRobotSentinelControl ActiveX in this program, and you only need to run one WiRobotGatewayforWiFi.exe  program and set Robot ID as "motion", type in your robot IP and set Port as "10001" (default), and click "Connect" button.



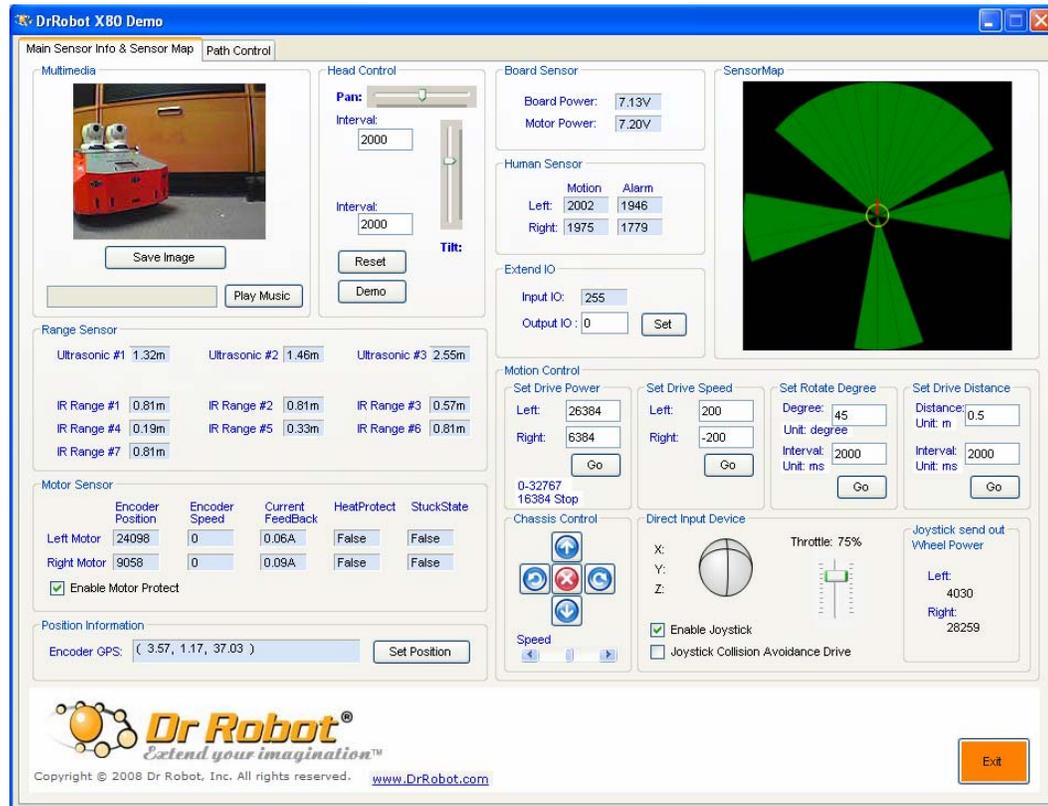
WiRobotGatewayforWiFi.exe



Controller Boards Connection Diagram

Open the  DrRobotX80Demo.sln Microsoft Visual Studio Solution Version: Visual C# Express 2008 project and click F5 button to run the program.

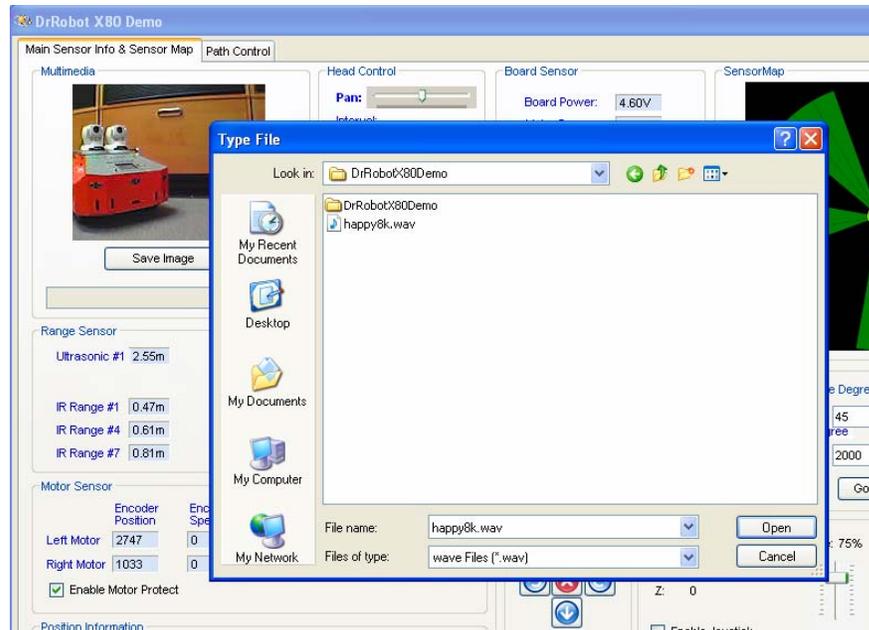
Tag: Main Sensor Info & Sensor Map



1. Multimedia

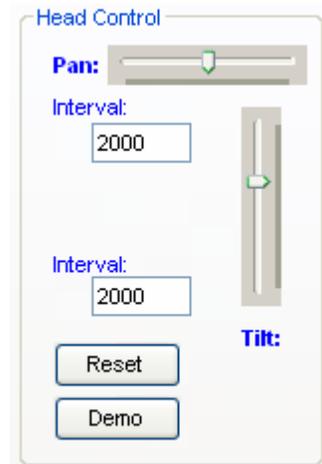


- Click , the image should save at DrRobotX80Demo\bin\Debugphoto.bmp, you can modify store path
- Click , the "Open File" dialog form should present, select "happy8k.wav" to play this music.



Note: If you can not hear the music, copy this happy8k.wav to your C:\, and try again. You can select any 8K 16-bit Mono .wav file to play.

2. Head Control



- Adjust Pan or Tilt scroll bar to controll head camera movement
- Modify "Interval" value to change movement finish time, the unit is milsecond (ms)
- Click , to set the head to original central position.

Note: If you find the camera is not in the central position, you can modify the ServoConfig.xml to get correct position.

Open "DrRobotX80DemoDLL\DrRobotX80Demo\DrRobotX80Demo\bin\Debug\ServoConfig.xml" with Notepad.exe, modify the <Ini> tag value.

```

<DataSetServoConfig xmlns="http://tempuri.org/DataSetServoConfig.xsd">
  <ServoConfigDataTable>
    <Min>2400</Min>
    <Ini>3650</Ini>      <- Increase this value, head up
    <Max>4300</Max>
    <ID>0</ID>
  </ServoConfigDataTable>
  <ServoConfigDataTable>
    <Min>300</Min>
    <Ini>3300</Ini>      <- Increase this value, head turn left
    <Max>6300</Max>
    <ID>1</ID>
  </ServoConfigDataTable>
</DataSetServoConfig>

```

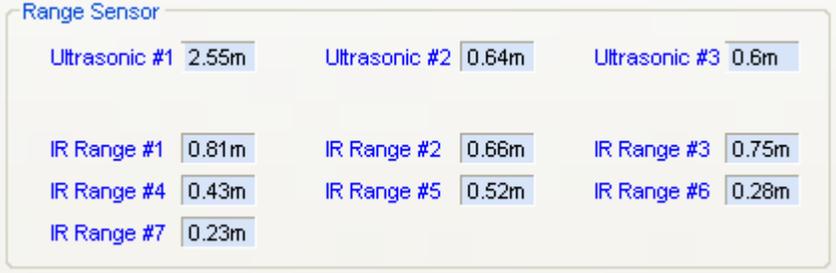
Save the setting, and also copy it to

"DrRobotX80DemoDLL\DrRobotX80Demo\" folder and

"DrRobotX80DemoDLL\DrRobotX80Demo\DrRobotX80Demo\" folder to replace the old "ServoConfig.xml"

- Click , the head should demonstrate "Up-Down" twice, "Left-Right" twice and "Stop" movement.

3. Range Sensor

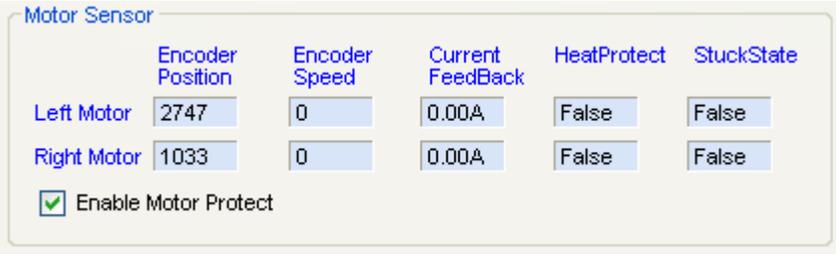


The screenshot shows a 'Range Sensor' window with the following data:

Sensor Type	Reading
Ultrasonic #1	2.55m
Ultrasonic #2	0.64m
Ultrasonic #3	0.6m
IR Range #1	0.81m
IR Range #2	0.66m
IR Range #3	0.75m
IR Range #4	0.43m
IR Range #5	0.52m
IR Range #6	0.28m
IR Range #7	0.23m

- List the sensor reading

4. Motor Sensor



The screenshot shows a 'Motor Sensor' window with the following data:

Motor	Encoder Position	Encoder Speed	Current FeedBack	HeatProtect	StuckState
Left Motor	2747	0	0.00A	False	False
Right Motor	1033	0	0.00A	False	False

Enable Motor Protect

- List Encoder reading
- Checked Enable Motor Protect option, the motor should automatic stop once the motor overheat or got stuck.

5. Position Information

Position Information

Encoder GPS: (0.00, 0.00, 0.00)

- List currently position value
- Click to reset this value to (0.00, 0.00, 0.00)

6. Board Sensor

Board Sensor

Board Power: 4.10V

Motor Power: 4.18V

- List the board and motor 's power voltage.

7. Human Sensor

Human Sensor

	Motion	Alarm
Left:	2029	2024
Right:	2021	2013

- List left and right human motion sensor reading

8. Extend IO

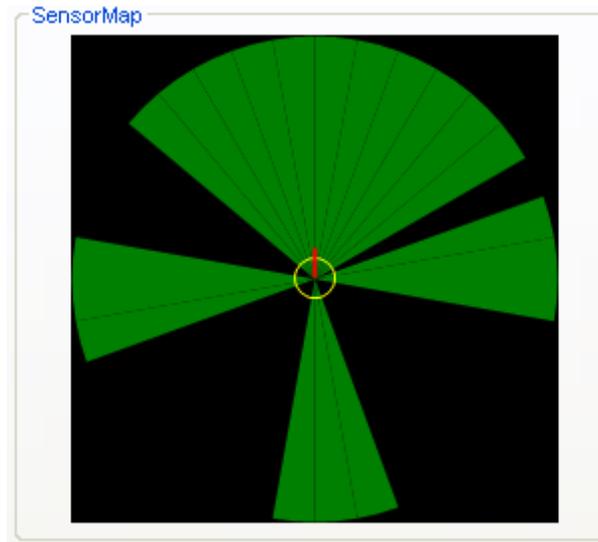
Extend IO

Input IO: 255

Output IO: 0

- List Input IO value
- Click to set the Output IO parameter, "0" for "00000000" and "255" for "11111111". For detail , refer to X80 User manual

9. SensorMap



- Display currently obstacle status which detected by range sensors (Ultrasonic & IR Sensor)

10. Motion control -> Set Drive Power

The figure shows a control panel titled "Set Drive Power". It has two input fields: "Left:" with the value "26384" and "Right:" with the value "6384". Below these is a "Go" button. At the bottom, there is a legend: "0-32767" and "16384 Stop".

- Drive robot via PWM value, value must between 0 ~ 32767, set 16384 to stop motor

11. Motion control -> Set Drive Speed

The figure shows a control panel titled "Set Drive Speed". It has two input fields: "Left:" with the value "200" and "Right:" with the value "-200". Below these is a "Go" button.

- Drive robot via encoder speed

12. Motion Control -> Set Rotate Degree

Set Rotate Degree

Degree:

Unit: degree

Interval:

Unit: ms

- Set "Degree" to "45", robot should turn left 45°, set "-45", robot should turn right 45°, set "720", robot should turn 2 circle.

13. Motion Control -> Set Drive Distance

Set Drive Distance

Distance:

Unit: m

Interval:

Unit: ms

- Drive robot to designed distance, unit is meter.

14. Motion Control -> Chassis Control

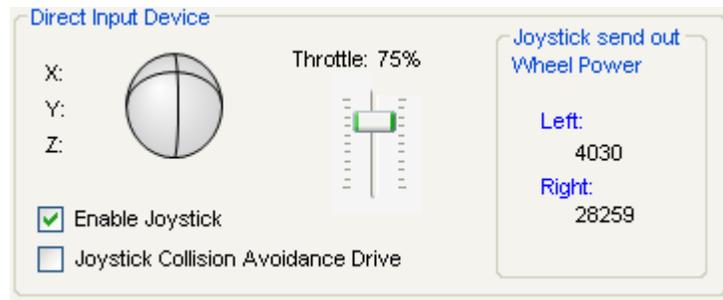
Chassis Control

Speed

- Click the arrow button to drive robot "Forward", "Backward", "Turn Left", "Turn Right" and "Stop"
- Adjust Speed Scroll bar to change the motion speed.

Note: If you can not find the perfect speed for your robot, you can modify this scroll bar's **maximum** value.

15. Motion -> Direct Input Device



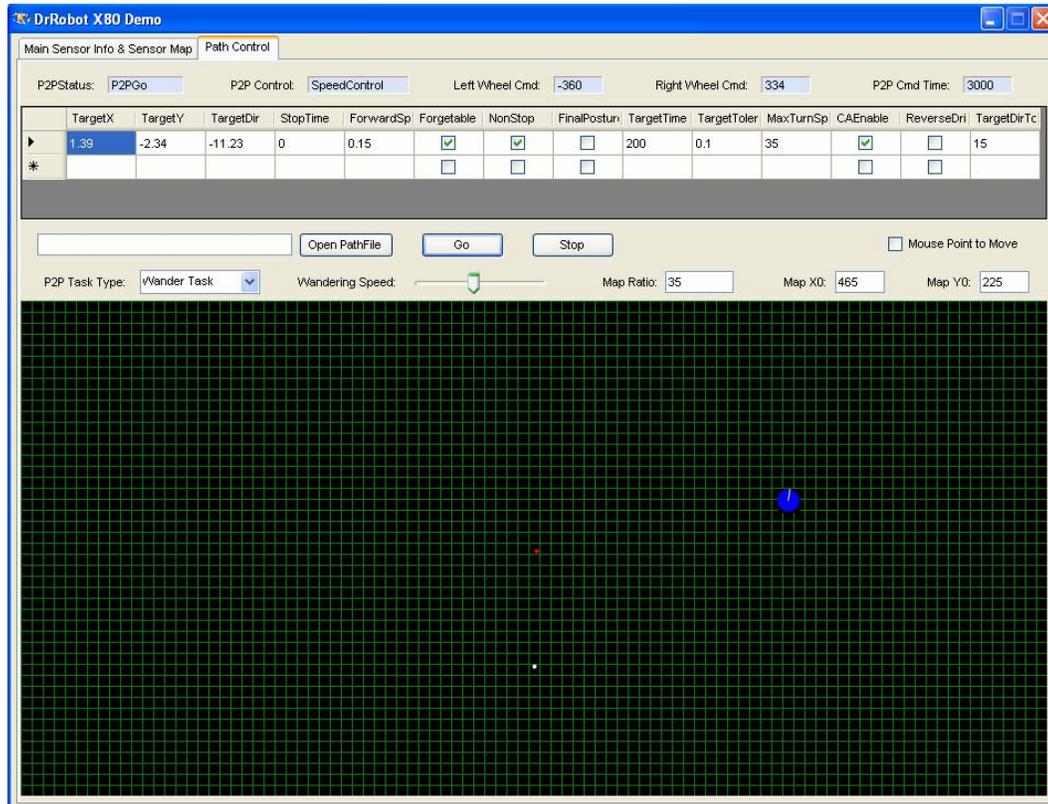
- Check Enable Joystick , drive the robot via Joystick, push the handheld stick forward, the robot drives forward, for faster speed, just push bigger range.
- Click Joystick Collision Avoidance Drive to active “Collision Avoidance” function when you drive robot via Joystick.

16. Motion -> Direct Input Device -> Joystick send out Wheel Power



- Display currently PWM value for driving robot

Tag: Path Control



1. Robot Path Control Information

TargetX	TargetY	TargetDir	StopTime	ForwardSp	Forgetable	NonStop	FinalPostun	TargetTime	TargetToler	MaxTurnSp	CAEnable	ReverseDri	TargetDirTc
1.39	-2.34	-11.23	0	0.15	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	200	0.1	35	<input checked="" type="checkbox"/>	<input type="checkbox"/>	15
*					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				<input type="checkbox"/>	<input type="checkbox"/>	

2. Path Control Panel

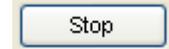


- Open PathFile to select Path file
- Click Go to execute the task
- Click Stop to stop robot movement
- P2P Task Type: Wander Task for select the task,

 when you select "Wander Task", and then click Go, the robot should auto wandering around the environment.

When you select "P2P task", you need to provide the path file, if there are 3 points in your file, robot should start from point 1 and access point 2 and arrive point 3.

When you select "Patrol Task", you also need to provide the path file, if there are 3 points in your file, robot should start from point 1 and access point 2 and point 3 and return to point 1 and run again and again until you click



- Wandering Speed:  for adjust the speed
- Map Ratio: for zoom in or zoom out map, increase value should zoom out the map.
- Map X0: Map Y0: for set the location of control point (Red dot) in the picture
- checked Mouse Point to Move option, use mouse to click on map, a "Target Point" (White dot) should present on the map, the robot should run to this target point.

Note: The robot position is based on encoder information. You can reset it to any position. Then robot will estimate position based on it.