

Programming BIObot Robot Using C# Class Library

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Outline

- Take a look at the **A.B.E. (Autonomous roBot controllEr)** C# robot class library
- Learn how to include the library in a project and access the contained methods
- Examine several pieces of code for common tasks such as opening a serial port
- Discuss this week's lab and any relevant challenges

A.B.E. C# Class Library

- Requires .NET 2.0 so that we can leverage System.IO.Ports.SerialPort.
- Can use Visual Studio® 2005 or the free Visual C# Express.
- Provides methods for discovery of available ports, open port and close port.
- Access to motion control, sensors, RFID, and various other firmware parameters.
- Does not matter if using Bluetooth or ZigBee since each provide a wireless asynchronous serial pipeline.

Compiled Help File

- Close_Serial_Port Method
- Get_Port_List Method
- Halt_Agent Method (timeOut, numRetries)
- Move_To_Position Method (leftWheel, rightWheel, timeOut, numRetries)
- Open_Serial_Port Method (strPort, baudRate)
- Refresh_AD_Light_Reflex_Level Method (timeOut, numRetries)
- Refresh_AD_Readings Method (timeOut, numRetries)
- Refresh_Digital_Pin_Reading Method (pinNum, timeOut, numRetries)
- Refresh_Encoder_Readings Method (timeOut, numRetries)
- Refresh_Move_Complete Method (timeOut, numRetries)
- Refresh_Position_PID_Gains Method (timeOut, numRetries)
- Refresh_Reflex_Tripped Method (timeOut, numRetries)
- Refresh_RFID_Reading Method (timeOut, numRetries)
- Refresh_Velocity_PID_Gains Method (timeOut, numRetries)
- Refresh_Velocity_Readings Method (timeOut, numRetries)
- Reset_RFID_Module Method (timeOut, numRetries)
- Reset_Sensor_Reflex_Tripped Method (timeOut, numRetries)
- Save_Parameters_To_EEPROM Method (timeOut, numRetries)
- Set_ABE_Base_Rate Method (pinBaudRate, timeOut, numRetries)
- Set_AD_Reflex_Level Method (reflexLevel, timeOut, numRetries)
- Set_Closed_Loop_Velocity Method (leftWheelVelocity, rightWheelVelocity, timeOut, numRetries)
- Set_Digital_Pin_High Method (pinNum, timeOut, numRetries)
- Set_Digital_Pin_Low Method (pinNum, timeOut, numRetries)
- Set_Light_Reflex_Level Method (reflexLevel, timeOut, numRetries)
- Set_Open_Loop_Velocity Method (leftWheelVelocity, rightWheelVelocity, timeOut, numRetries)
- Set_Position_PID_Gains Method (Kp, Ki, Kd, timeOut, numRetries)
- Set_Sensor_Reflex Method (strIDString, timeOut, numRetries)
- Set_Velocity_PID_Gains Method (Kp, Ki, Kd, timeOut, numRetries)
- Write_RFID_Data_ASCII Method (strdataRFID, timeOut, numRetries)
- Write_RFID_Data_Hex Method (strdataRFID, timeOut, numRetries)
- Write_RFID_Data_Integer Method (intdataRFID, timeOut, numRetries)

Additional Information

- Run the A.B.E. Manual Control Center software and take a look at the Local User Manual.
- You will find that each of the functions are described in some detail.



Add Library to Project

- Need to add the ABE_Class_Library.dll to your project as a reference.
- Declare a new instance of this class.
- Finally start using it in your project.

```
//Declare instance of ABE_Class_Library.  
ABE_Class_Library.ABE_Functions myRobot = new ABE_Class_Library.ABE_Functions();
```

Configure & Open COM Port

```
string strResponse = myRobot.Open_Serial_Port("COM1", 19200);  
if (strResponse != "OK")  
{  
    MessageBox.Show(strResponse);  
    return;  
}  
MessageBox.Show("Serial Port Open");
```

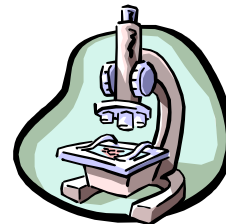
Close Serial Port

```
string strResponse = myRobot.Close_Serial_Port();  
if (strResponse != "OK")  
{  
    MessageBox.Show(strResponse);  
    return;  
}  
MessageBox.Show("Serial Port Closed");
```

Get A/D Readings

```
string strResponse = myRobot.Refresh_AD_Readings(500,1);  
if (strResponse != "OK")  
{  
    MessageBox.Show(strResponse);  
    return;  
}  
MessageBox.Show("Error Getting A/D Readings");  
MessageBox.Show("Battery Level = " + myRobot.abeParameters.BatteryLevel.ToString());
```

Demo Creating a New Visual Studio Project Also Discuss this Week's Lab



Questions?

