NATIONAL CONTROL DEVICES

NCD Component Library Quick Start Guide

Communications Tool for NCD Product Line

NCD Component Library

Communications Tool for NCD Product Line

Table of Contents

Introduction

With the NCD Component Library, you will receive over 40 samples from A/D Conversion to Duration and Pulse Timing and best of all, it's FREE!! We want the user to be able to experiment with all the different samples available, so as of right now the samples cannot be downloaded individually.

Quick Summary of NCD Component Library

➢ Simplifies the communications to the NCD product line

➢ Samples available for specific applications

➢ A/D Conversion

➢ Motion Detection

➢ Keypad Data

➢ Potentiometer Values

➢ Storage Features

➢ Duration and Pulse Timing

➢ ProXR Timer Calibration and Testing

➢ Setting/Reading the Status of up to 256 Relays

➢ Samples available for specific relays

➢ Up to 8 Channel Relays

➢ 16 Channel Relays

➢ ProXR Relays

➢ SCAN Series Controllers

➢ 802.15.4 Wireless Relays

➢ ZigBee Relays

➢ Source code included so you can customize the sample to fit your needs

➢ All samples are FREE

➢ <u>SignalSwitch</u> Compatible

Download NCD Component Library

With the NCD Component Library we've "started" the programming for you. We say '*started*' because these are fully functioning samples, but we've also included the source code so you can customize them to your exact needs.

➢ Start by downloading and installing the NCDComponentSetup.zip file: NCDComponentSetup.zip

Plugin for Visual Basic

The NCD Component library is a plugin for the Microsoft Visual Basic that greatly simplifies the communications to the NCD product line. The sample can be run in Visual Basic and fully customizable to your needs. It is compatible with version 2005, 2008, and 2010. The instructions are shown using Visual Basic Express 2010.

➢ Download and install Visual Basic 2010 Express. The program may be downloaded from the Microsoft website: http://www.microsoft.com/visualstudio/en-us/products/2010-editions/visual-basic-express

C# Language

The NCD Component Library also supports the C# programming language for those who are more comfortable with this program.

Building Visual Basic Applications

V isual Basic is our preferred language for communicating to the NCD product line. Visual Basic is engineered for productively building type-safe and object-oriented applications.

The following set of instructions will guide you in learning how to operate your device using the NCD Component Library in Visual Basic. The example provided here is developed for Visual Basic 2010 Express Edition. Follow these simple steps and you will be on your way to controlling the NCD device from your desktop computer in 30 minutes or less.

Step 1: Start Visual Basic Program

➢ From the Windows Start Menu, open the Visual Basic Express 2010 program.

➢ Click the 'New Project' link on the left.

➢ From the 'New Project' dialog box, select 'Windows Forms Application' and click 'OK'.

➢ Name your application file.
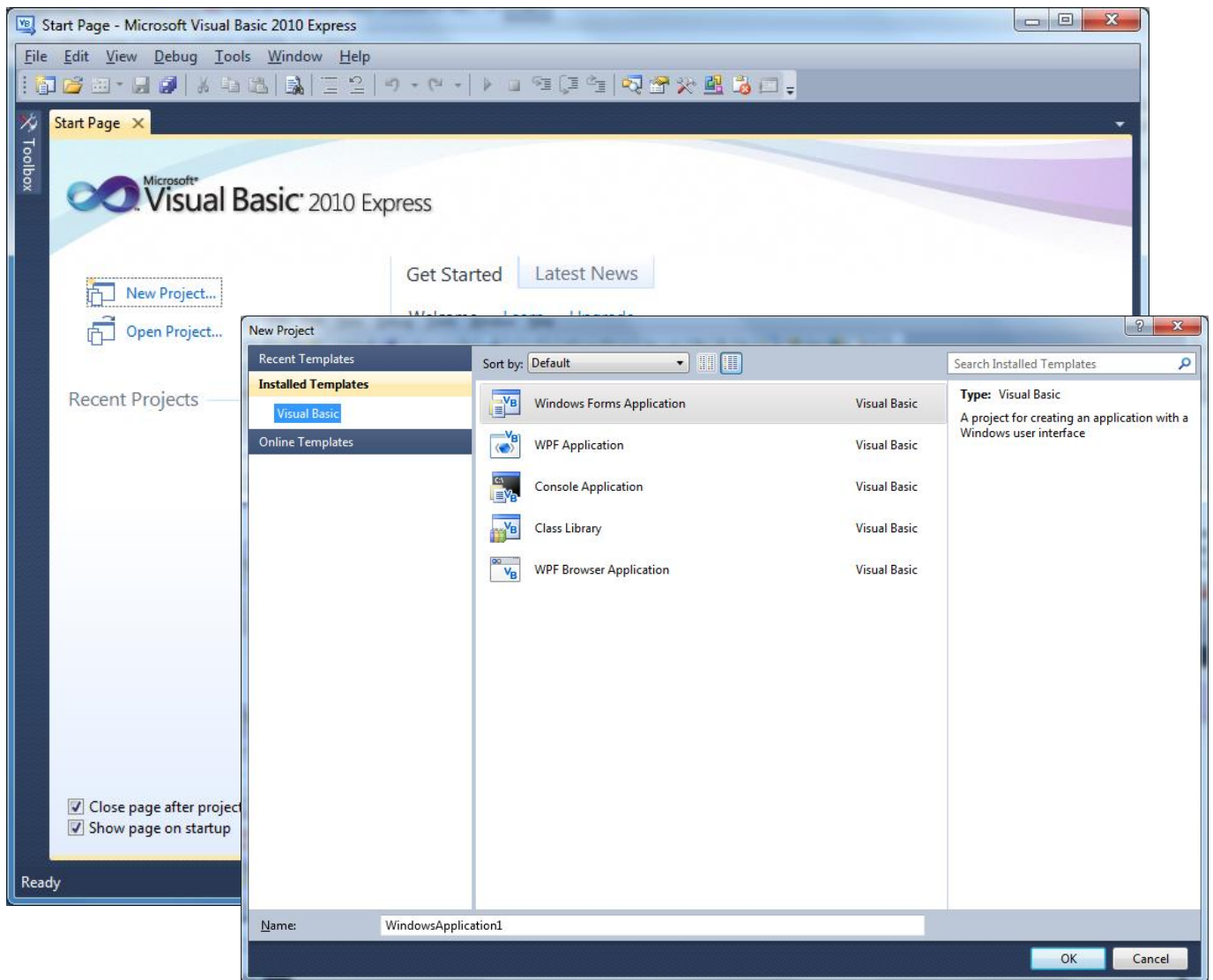
Step 2: Add the NCD Component to your toolbox.

The project will open displaying Form1.

> ➢ Expand the Toolbox menu at the left.
> ➢ Right-click in the Toolbox menu and select 'Choose Items'.
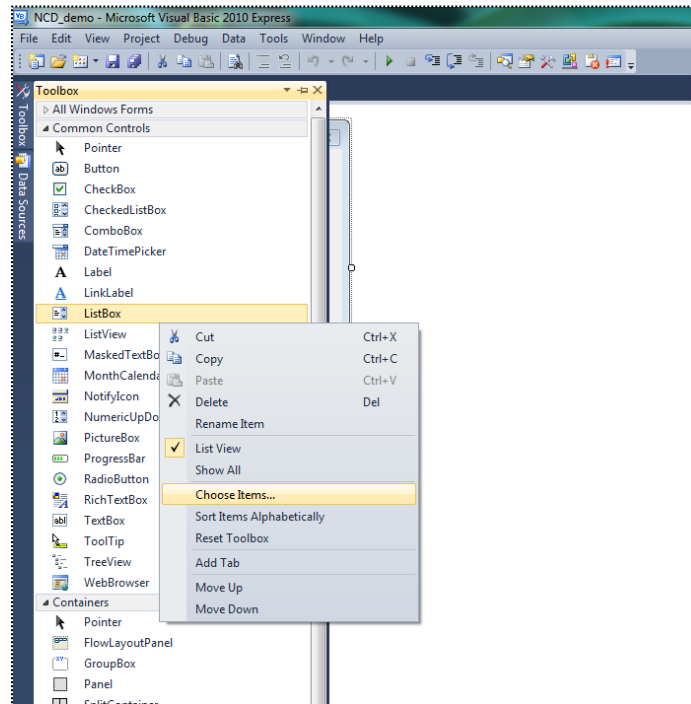
> ➢ Browse to select 'ncdcomponent.dll' from your computer.
> *Note: NCDComponent has to be installed; it can be downloaded from here.*

NcdComponent default install position is:

▸C:\Program Files (x86)\NCD Component v2.0\bin *for 64 bits OS*

▸C:\Program Files\NCD Component v2.0\bin   *for 32 bits OS*

> ➢ Add NCD Component to the Form by dragging and dropping the component onto the form.
> *Note: It will not display on the form; however, it will display under the form.*

Step 3: Set Properties of NCD Component

The next step is to set up the properties of your device.

➢ Click on the NcdComponent1 at the bottom of the Visual Basic window as shown below.

➢ Make sure that the Properties Window is displayed; it is shown at the right below.

➢ **If you are connecting your device through the serial port:**

▸ Set the 'Using ComPort' to 'True'

▸ Set the PortName

▸ Set the Baud Rate

➢ **If you are connecting your device through TCP/IP**:

▸ Set the 'Using ComPort' to 'False'

▸ Set the IP Address

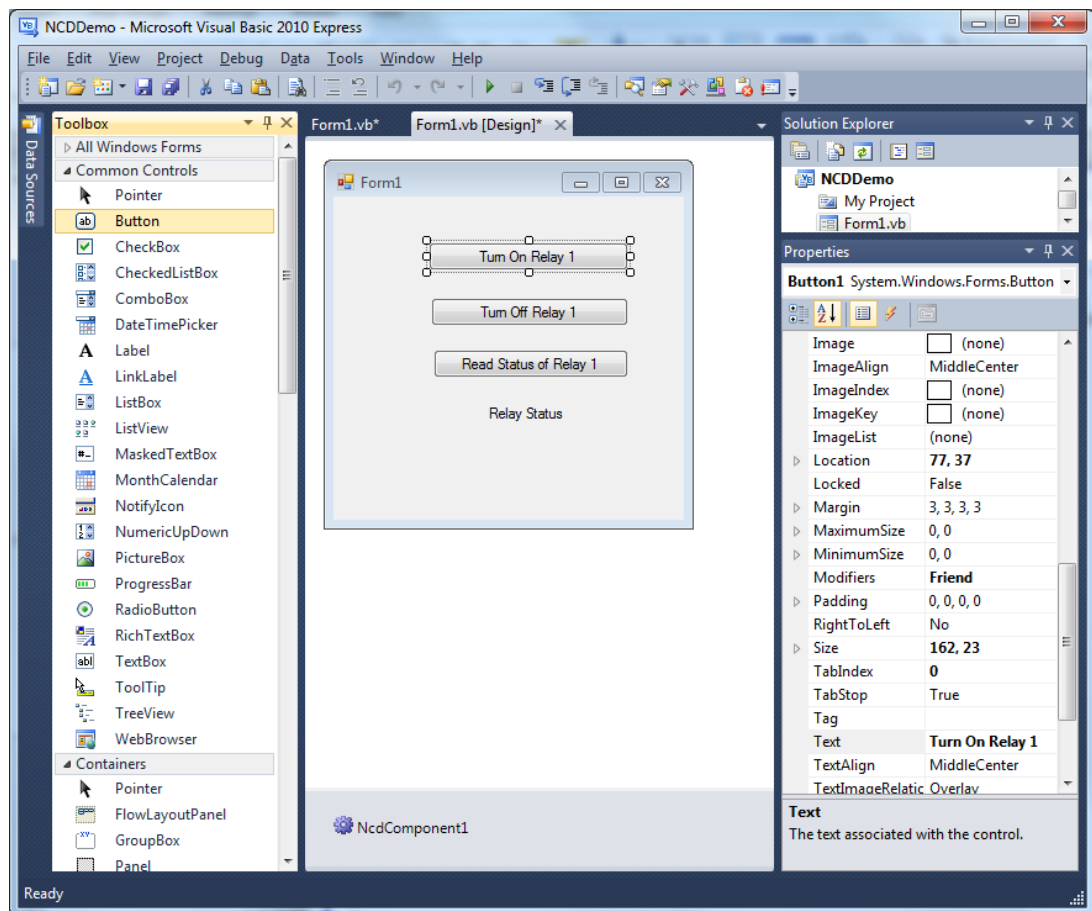▸ Set the Port
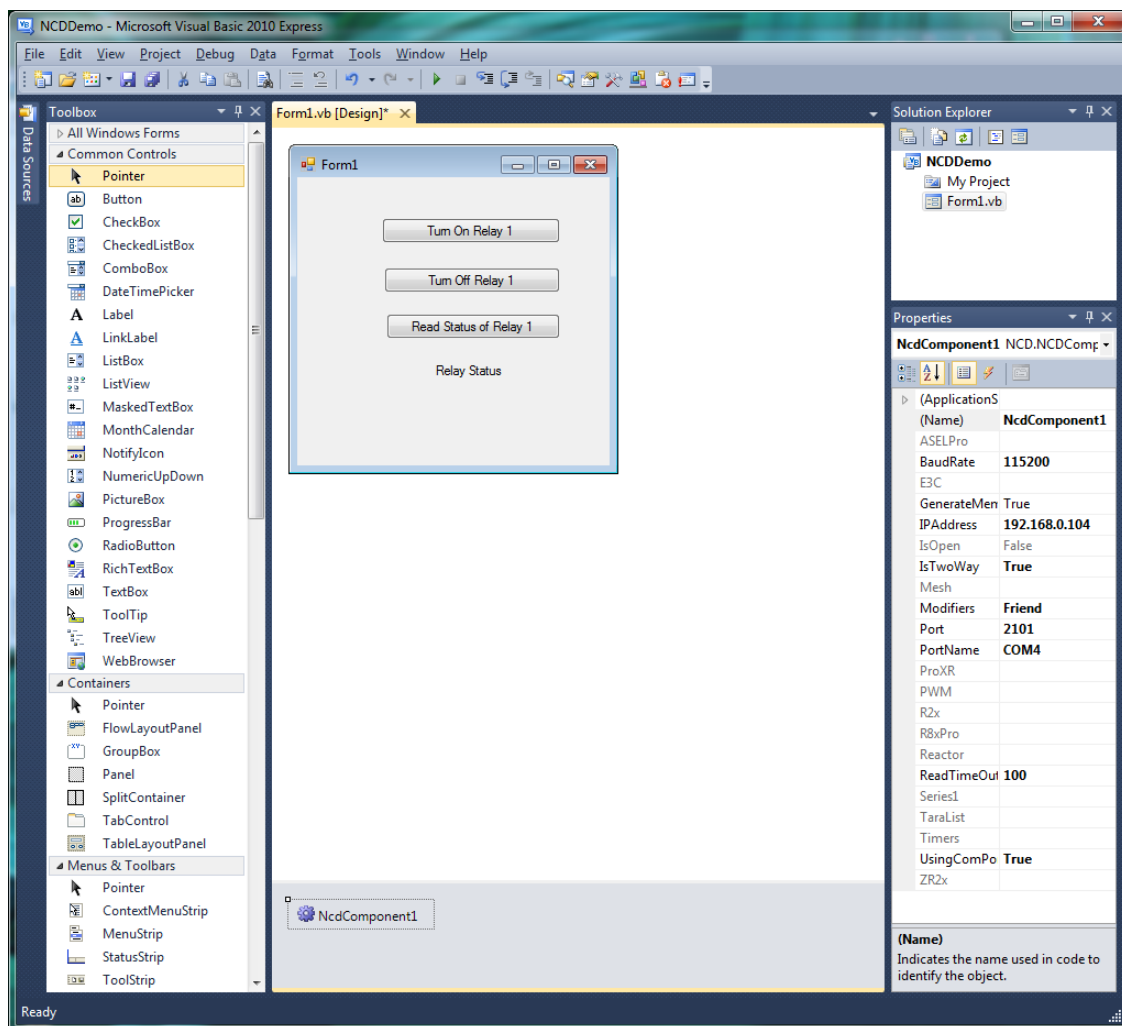
Step 4: Add Buttons to the Form

The next step is to add three buttons to the Form to allow you to make selections with your device.

> ➢ Click on the 'Button' menu control in the Toolbox and drag it to your form. Repeat this step two times.
> ➢ Properties Window is displayed; it is shown at the right below.
> ➢ Use the Text property to change the words displayed on each button.
>> ▸ Click on 'Button1' and set the Text to "Turn On Relay 1"
>> ▸ Click on 'Button2' and set the Text to "Turn Off Relay 1:
>> ▸ Click on 'Button2' and set the Text to "Read Status of Relay 1

Step 5: Add a Label to the Form

The next step is to add a label to the form that will allow you to display the status of the relay.

> ➢ Click on the 'Label' menu control in the Toolbox and drag it to your form.
> ➢ Use the Text property to change the words displayed on the label.
>> ▸ Click on 'Label1' and set the Text to "Relay Status"

Step 6: Add Code to Open the Port

The next step is to add the visual basic code that will open the port when the form is loaded.

➢ Double-click on the background of the Form1 in the 'Design' view as shown below. This will take you to the coding window for the Load event.
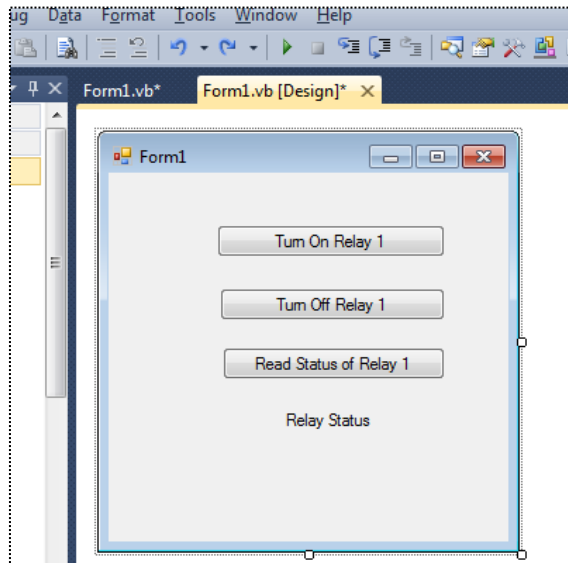
➢ Type the following code on the line between the Private Sub and End Sub lines

‣ **NcdComponent1.OpenPort()**

Note: As you type, you may select the appropriate commands from the shortcut menu that appears.
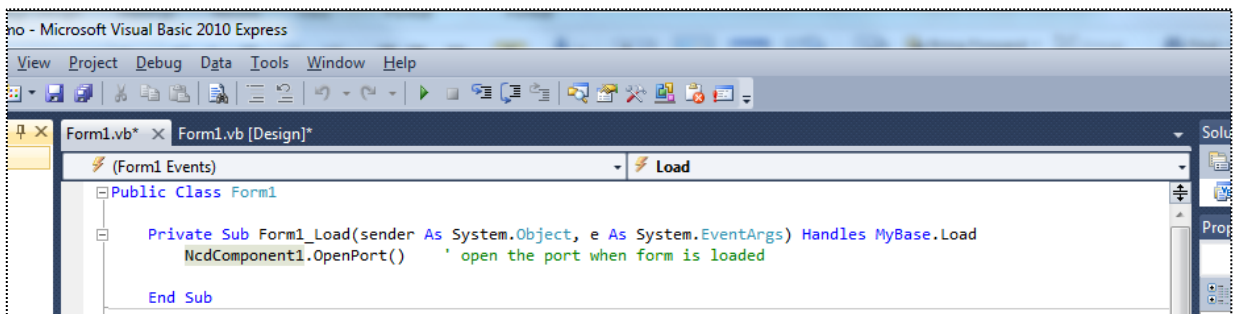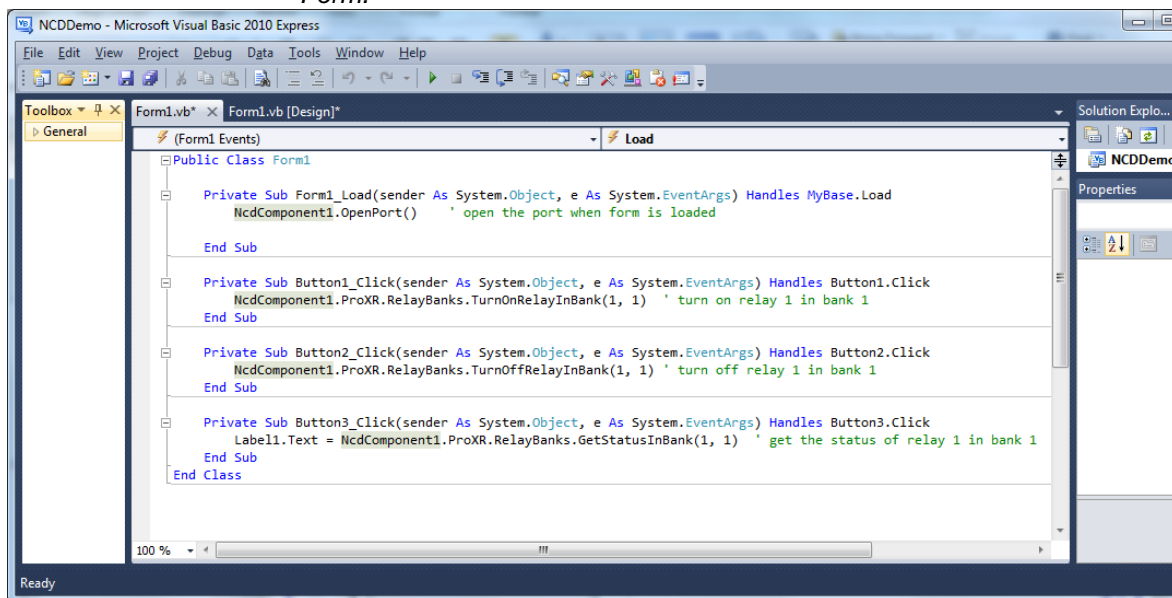
Step 6: Add Code to the Buttons

The next step is to add the visual basic code that will turn the relay on or off and read status of the relay in the button's click event.

➢ Return to "Design' view of the form and double-click on the **first** button. This will take you to the coding window for the button's Click event.

➢ Type the following code on the line between the Private Sub and End Sub lines

▸ **NcdComponent1.ProXR.RelayBanks.TurnOnRelayInBank(1, 1)**

Note: As you type, you may select the appropriate commands from the shortcut menu that appears. Choose the appropriate NCD device (such as ProXR).

➢ Return to "Design' view of the form and double-click on the second button. This will take you to the coding window for the button's Click event.

➢ Type the following code on the line between the Private Sub and End Sub lines

▸ **NcdComponent1.ProXR.RelayBanks.TurnOffRelayInBank(1, 1)**

➢ Return to "Design' view of the form and double-click on the **third** button. This will take you to the coding window for the button's Click event.

➢ Type the following code on the line between the Private Sub and End Sub lines

▸ **Label1.Text = NcdComponent1.ProXR.RelayBanks.GetStatusInBank(1, 1)**

Note: This will read the status of the relay and display it on the label on the Form.

```
NCDDemo - Microsoft Visual Basic 2010 Express

File  Edit  View  Project  Debug  Data  Tools  Window  Help

Toolbox        Form1.vb*  ×  Form1.vb [Design]*                    Solution Explo...
 ▷ General       (Form1 Events)                    Load              NCDDemo
             Public Class Form1                                  Properties

                 Private Sub Form1_Load(sender As System.Object, e As System.EventArgs) Handles MyBase.Load
                     NcdComponent1.OpenPort()     ' open the port when form is loaded

                 End Sub

                 Private Sub Button1_Click(sender As System.Object, e As System.EventArgs) Handles Button1.Click
                     NcdComponent1.ProXR.RelayBanks.TurnOnRelayInBank(1, 1)  ' turn on relay 1 in bank 1
                 End Sub

                 Private Sub Button2_Click(sender As System.Object, e As System.EventArgs) Handles Button2.Click
                     NcdComponent1.ProXR.RelayBanks.TurnOffRelayInBank(1, 1) ' turn off relay 1 in bank 1
                 End Sub

                 Private Sub Button3_Click(sender As System.Object, e As System.EventArgs) Handles Button3.Click
                     Label1.Text = NcdComponent1.ProXR.RelayBanks.GetStatusInBank(1, 1)  ' get the status of relay 1 in bank 1
                 End Sub
             End Class

100 %
Ready
```

Step 7: Run Program

Click the "Play" button on the Toolbar to test and debug your application.

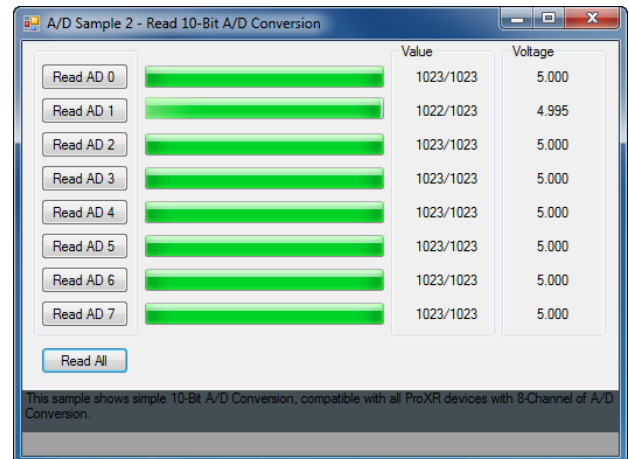# NCD Component Library Samples
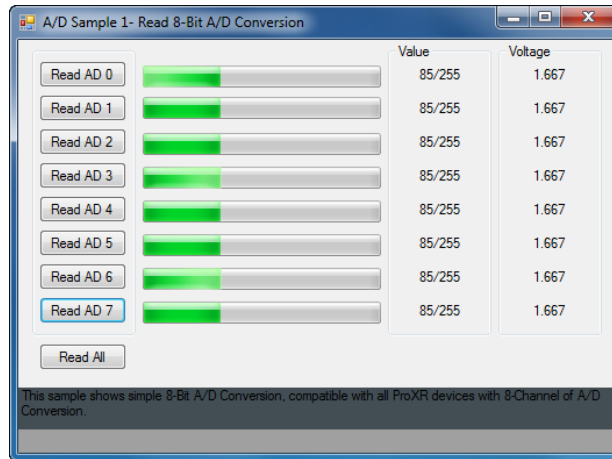
ADSample1.exe

Analog to Digital Converter Sample 1

This sample (left) shows simple 8-Bit A/D Conversion, compatible with all ProXR devices with 8-Channels of A/D Conversion.

ADSample2.exe

Analog to Digital Converter Sample 2

This sample (right) shows simple 10-Bit A/D Conversion, compatible with all ProXR devices with 8-Channels of A/D Conversion.
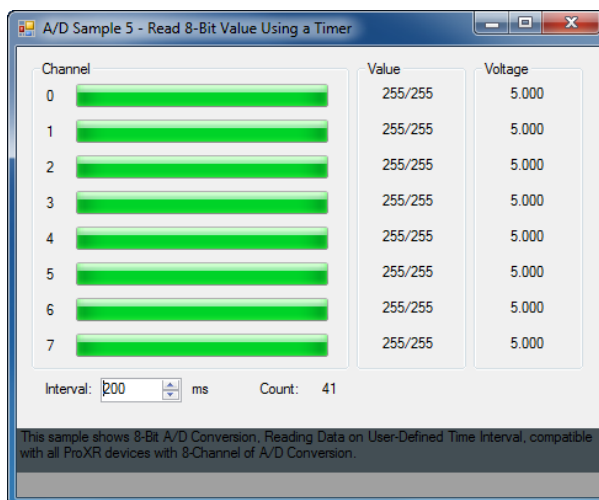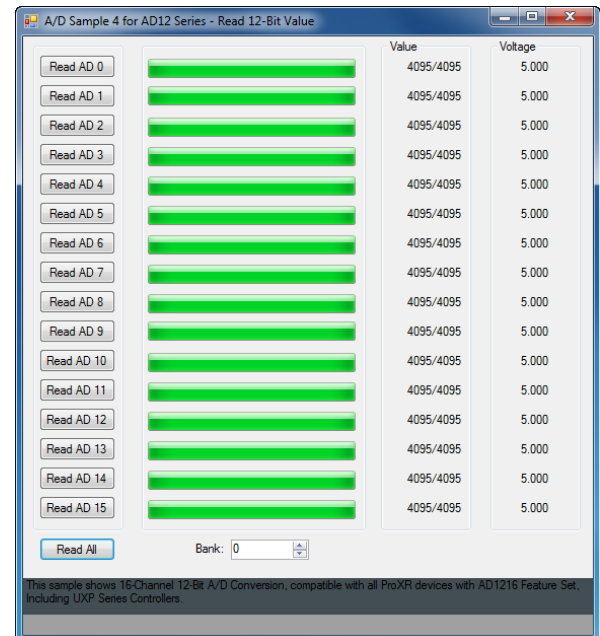
ADSample3.exe

Analog to Digital Converter Sample 3

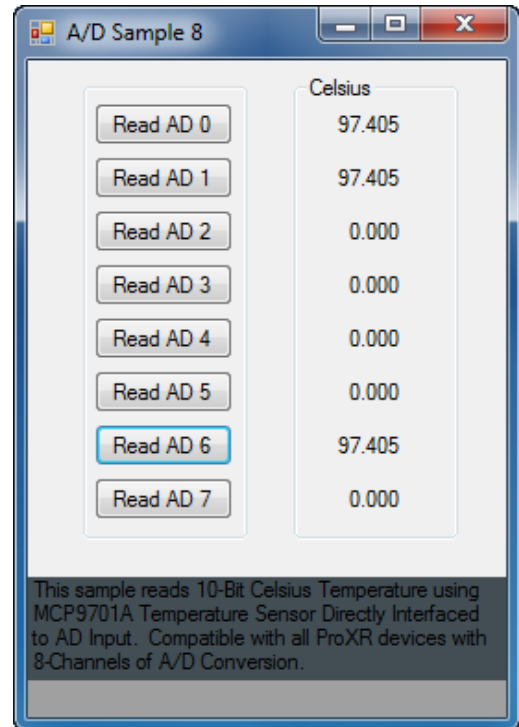*This sample (left) shows 16-Channel 8-Bit A/D Conversion, compatible with all ProXR devices with AD1216 Feature Set, including UXP Series Controllers.*

ADSample4.exe

Analog to Digital Converter Sample 4

This sample (right) shows 16-Channel 12-Bit A/D Conversion, compatible with all ProXR devices with AD1216 Feature Set, including UXP Series Controllers.


ADSample5.exe

Analog to Digital Converter Sample 5

This sample (left) shows 8-Bit A/D Conversion, Reading data on User-defined Time Interval, compatible with all ProXR devices with 8-Channels of A/D Conversion.

ADSample6.exe

Analog to Digital Converter Sample 6

This sample (left) shows 12-Bit A/D Conversion, reading data on User-defined Time Interval, compatible with all ProXR devices with 8-Channels of A/D Conversion.

ADSample7.exe

Analog to Digital Converter Sample 7

This sample (right) shows 16-Channel 12-Bit A/D Conversion, reading data on User-defined Time Interval, compatible with all ProXR devices with AD1216 Feature Set, including UXP Series Controllers.

ADSample8.exe

Analog to Digital Converter Sample 8

This sample (right) reads 10-Bit Celsius Temperature using MC9701A Temperature Sensor directly interfaced to AD Input. Compatible with all ProXR devices with 8-Channels of A/D Conversion.

A/D Sample 8

Celsius

Read AD 0	97.405
Read AD 1	97.405
Read AD 2	0.000
Read AD 3	0.000
Read AD 4	0.000
Read AD 5	0.000
Read AD 6	97.405
Read AD 7	0.000

This sample reads 10-Bit Celsius Temperature using MCP9701A Temperature Sensor Directly Interfaced to AD Input. Compatible with all ProXR devices with 8-Channels of A/D Conversion.

Com Event Sample 1

Turn On Relay 1	Turn Off Relay 1	Read Status of Relay 1	OFF
Turn On Relay 2	Turn Off Relay 2	Read Status of Relay 2	OFF

```
Rec : 85
Send : 254
Send : 8
Rec : 85
Send : 254
Send : 9
Rec : 85
Send : 254
Send : 0
Rec : 85
Send : 254
Send : 1
Rec : 85
Send : 254
Send : 16
Rec : 0
Send : 254
Send : 17
Rec : 0
```

This sample demonstrates how to Raise OnReadData and OnWriteData Event when Data is Sent/Received, Samples allows you to see Data Sent/Received with NCD Component Library.

ComEventSample1.exe

Com Event Sample 1

This sample (left) demonstrates how to Raise OnReadData and OnWriteData Event when data is Sent/Received, sample allows you to see data Sent/Received with NCD Component Library.
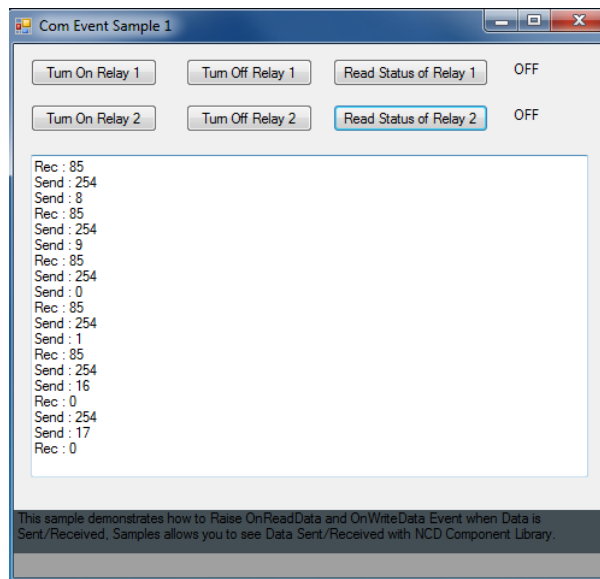
PotSample1.exe

Potentiometer Sample 1

This sample (right) demonstrates simple control of 8 digital potentiometers. Compatible with all ProXR POT Series Controllers.

Pot Sample 1 - Set Potentiometers ...

Potentiometer	Value	
Potentiometer 0	155	Set
Potentiometer 1	100	Set
Potentiometer 2	60	Set
Potentiometer 3	128	Set
Potentiometer 4	95	Set
Potentiometer 5	128	Set
Potentiometer 6	210	Set
Potentiometer 7	180	Set
All Potentiometers	255	Set

This sample demonstrates simple control of 8 digital potentiometers. Compatible with all ProXR POT Series Controllers.
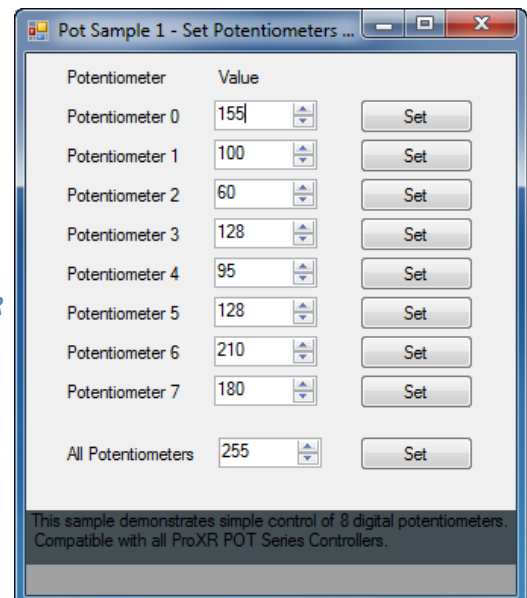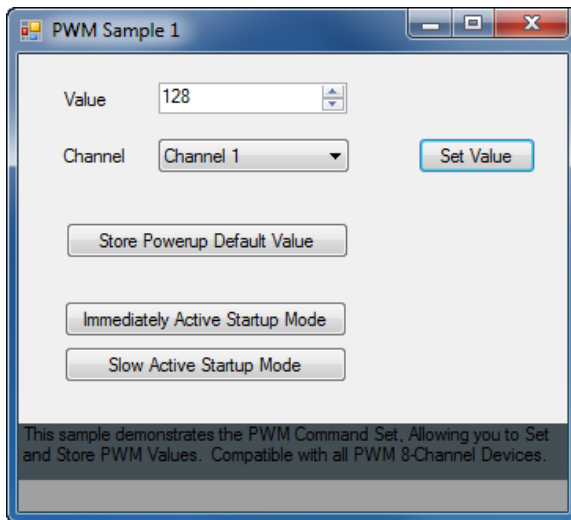
PotSample2.exe

Potentiometer Sample

This sample (right) demonstrates storing and reading stored potentiometer values. Compatible with all ProXR POT Series Controllers.
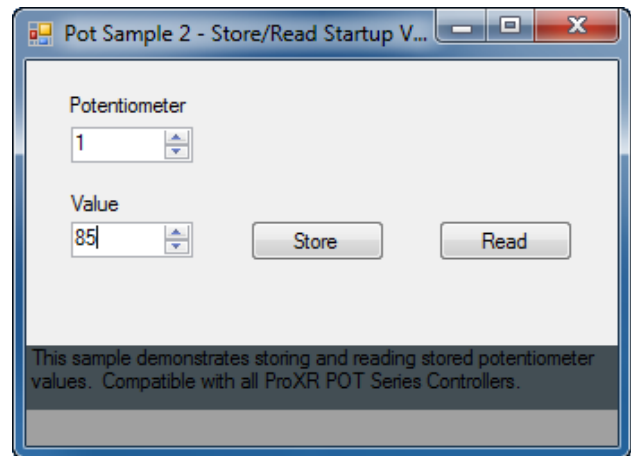
PWMSample1.exe

PWM Sample 1

This sample (left) demonstrates the PWM Command Set, allowing you to Set and Store PWM values. Compatible with all PWM 8-Channel Devices.

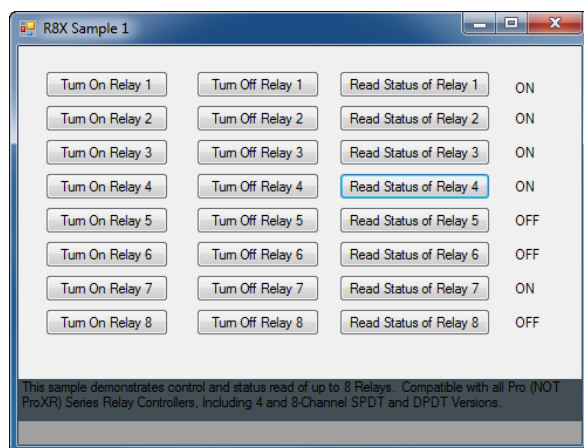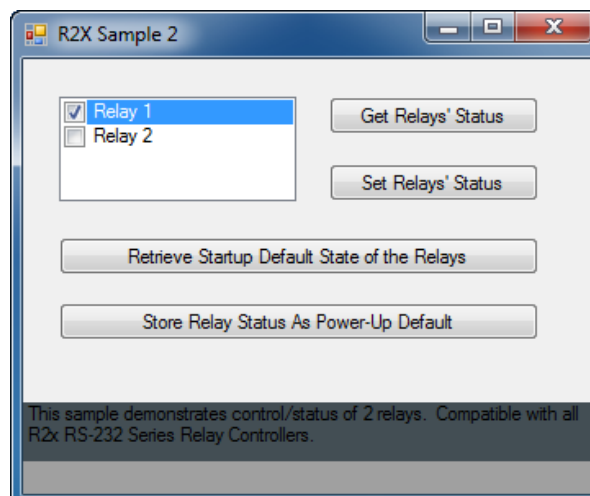### R2xSample1.exe

2 Relay Control Sample 1

This sample (right) demonstrates control/status of 2 relays. Compatible with all R2x RS-232 Series Relay Controllers.

R2xSample2.exe

2 Relay Control Sample 2

This sample (right) demonstrates control/status of 2 relays and demonstrates data storage features. Compatible with all R2x RS-232 Series Relay Controllers.

R8XSample1.exe

8 Relay Control Sample 1

This sample (left) demonstrates control and status read of up to 8 Relays. Compatible with all Pro (Not ProXR) Series Relay Controllers, including 4 and 8-Channel SPDT and DPDT Versions

R8XSample2.exe

8 Relay Control Sample 2

This sample (right) demonstrates control, status read, and data storage of up to 8 relays. Advanced features also supported. Compatible with all Pro (Not ProXR) Series Relay Controllers, including 4 and 8-Channel SPDT and DPDT Versions.
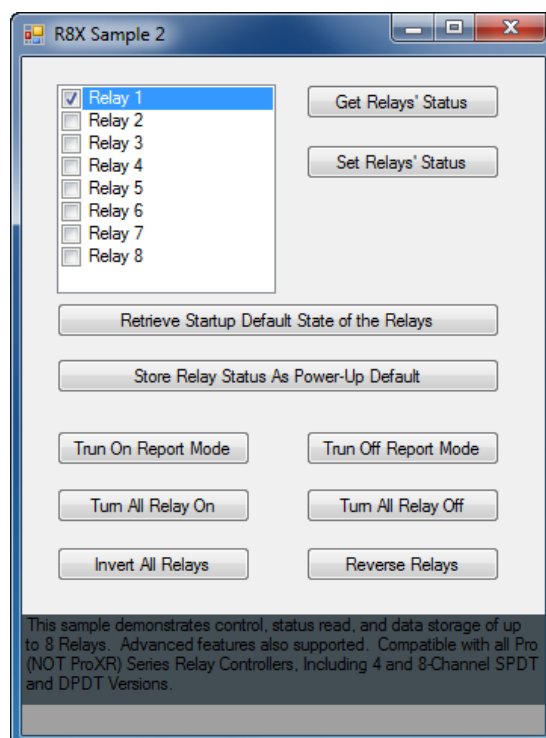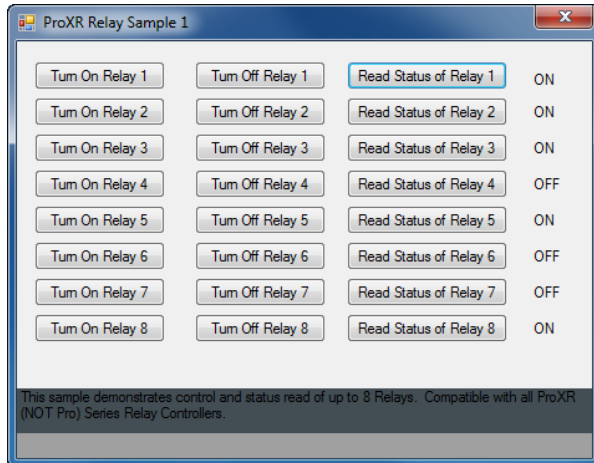
ProXRRelaySample1.exe

Up to 8 Channel ProXR Sample

This sample (left) demonstrates control and status read of up to 8 relays. Compatible with all ProXR (Not Pro) Series Relay Controllers.

ProXRRelaySample2.exe

ProXR bank Selection Features

This sample (right) demonstrates bank selection features of ProXR Series Relay Controllers.
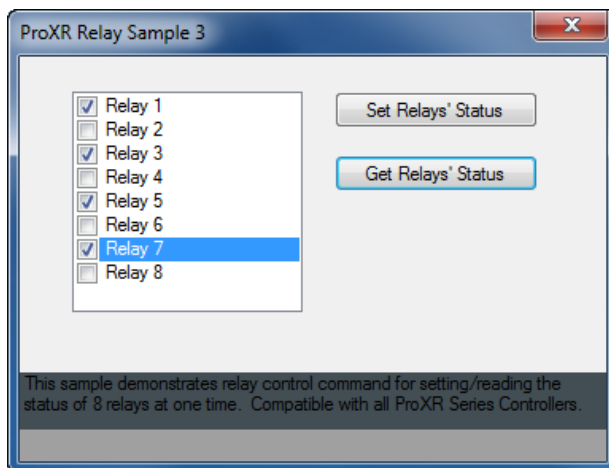
ProXRRelaySample3.exe

Setting/Reading the status of 8 Relays at one time

This sample (left) demonstrates relay control command for setting/reading the status of 8 relays at one time. Compatible with all ProXR Series Controllers.
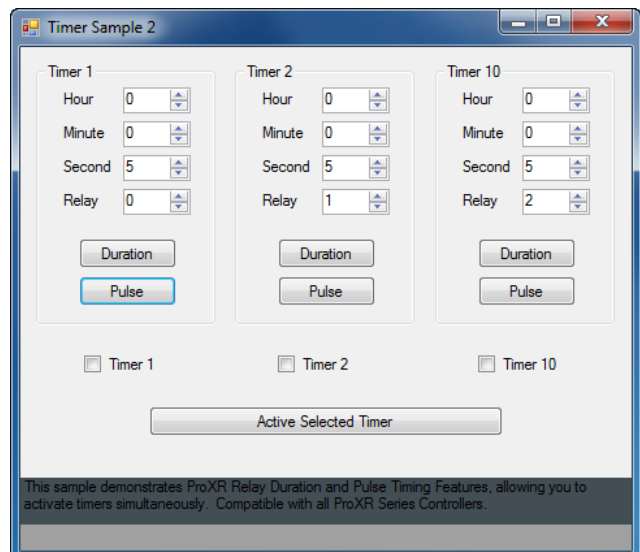
ProXRRelaySample4.exe

Setting/Reading the Status of up to 256 Relays

This sample (right) graphically demonstrates setting and reading the status of up to 256 Relays. Compatible with all ProXR Series Controllers.
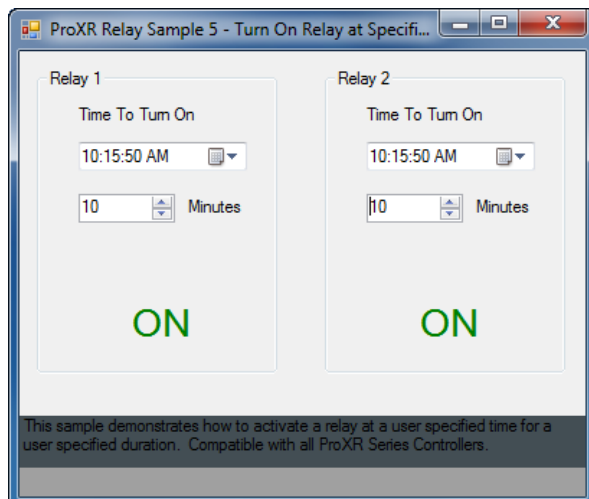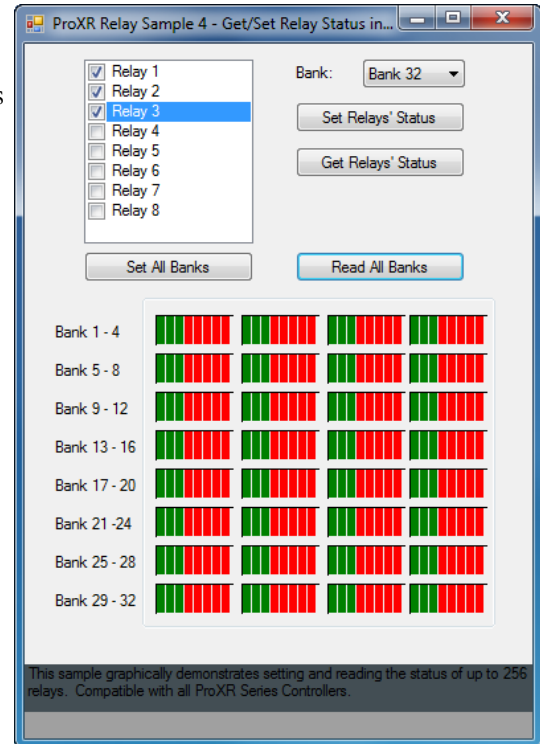
ProXRRelaySample5.exe

Activate a Relay with Specified Time/Duration

This sample (left) demonstrates how to activate a relay at a user specified time for a user specified duration. Compatible with all ProXR Series Controllers.

ScanSample1.exe

Reads inputs from all ProXR SCAN Series Controllers

This sample (right) demonstrates how to read inputs from all ProXR SCAN Series Controllers. Compatible with all ProXR SCAN and UXP Series Controllers (when using ScanSwitch Expansion Modules).
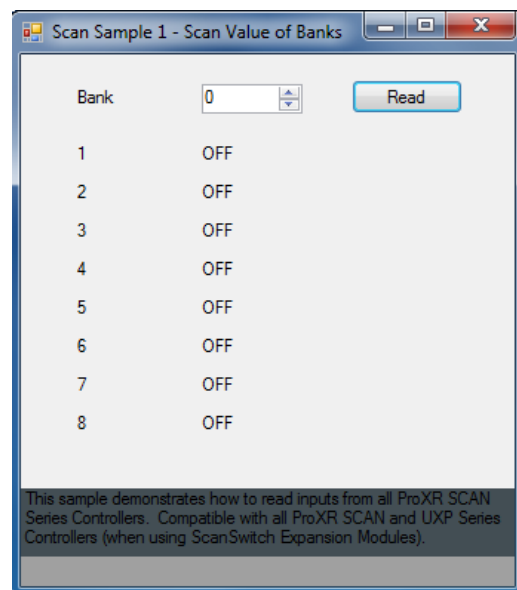
Scan Sample2.exe

Read up to 256 Inputs from All ProXR SCAN Series.

This sample (right) demonstrates relay control command for setting/reading the status of 8 relays at one time. Compatible with all ProXR Series Controllers.
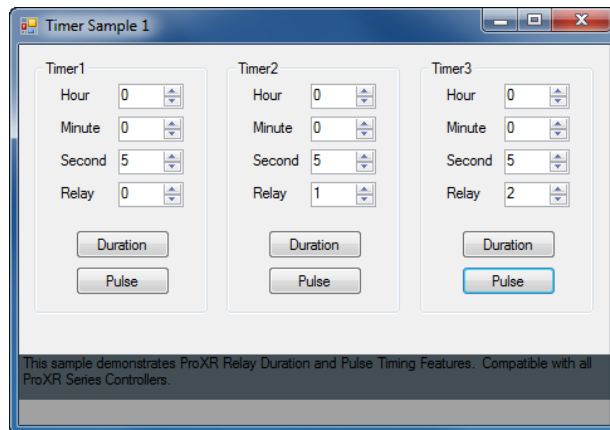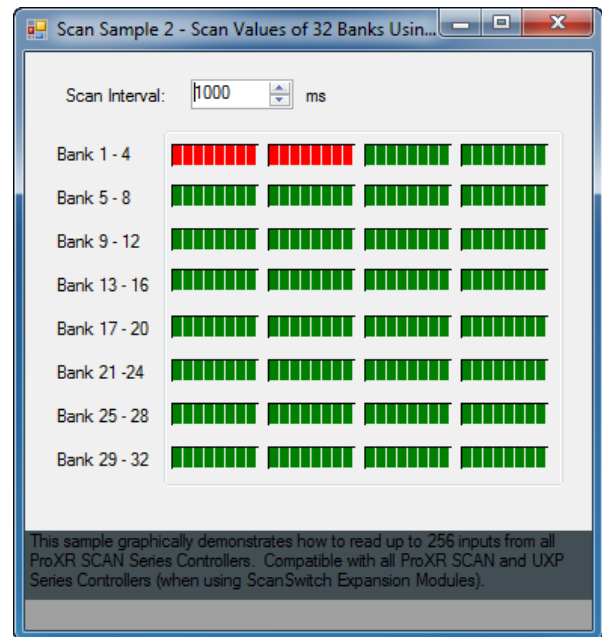
TimerSample1.exe

ProXR Relay Duration and Pulse Timing Features

This sample (left) demonstrates ProXR Relay Duration and Pulse Timing Features. Compatible with all ProXR Series Controllers.

TimerSample2.exe

Timing Features to Activate Timer Simultaneously
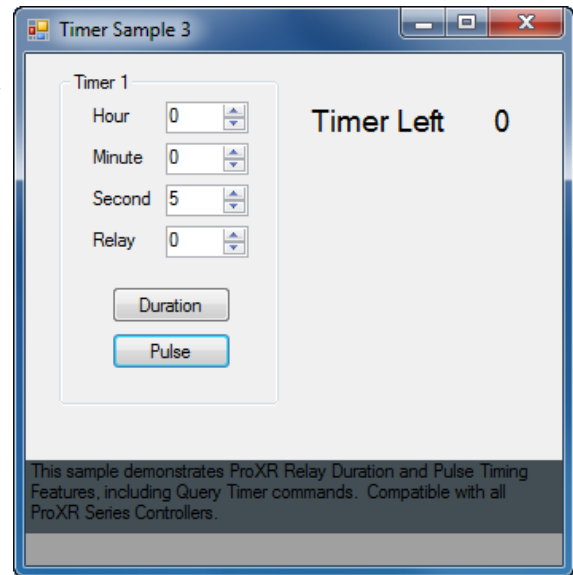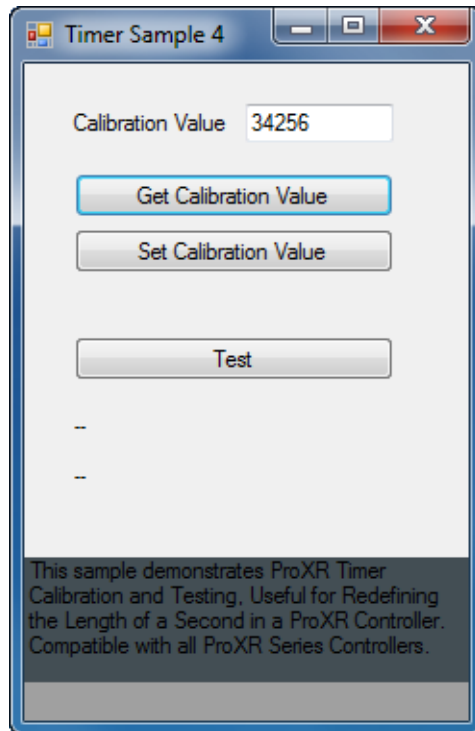
This sample (right) demonstrates ProXR Relay Duration and Pulse Timing Features, allowing you to activate timers simultaneously. Compatible with all ProXR Series Controllers.

TimerSample3.exe

Timing Features, Including Query Timer Command

This sample (right) demonstrates ProXR Relay Duration and Pulse Timing Features, including Query Timer Command. Compatible with all ProXR Series Controllers.
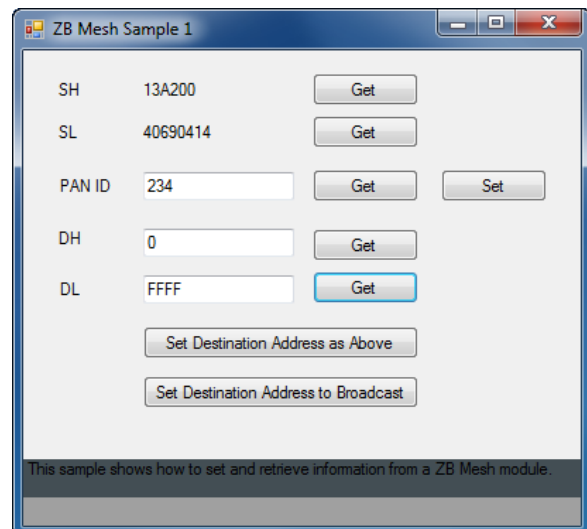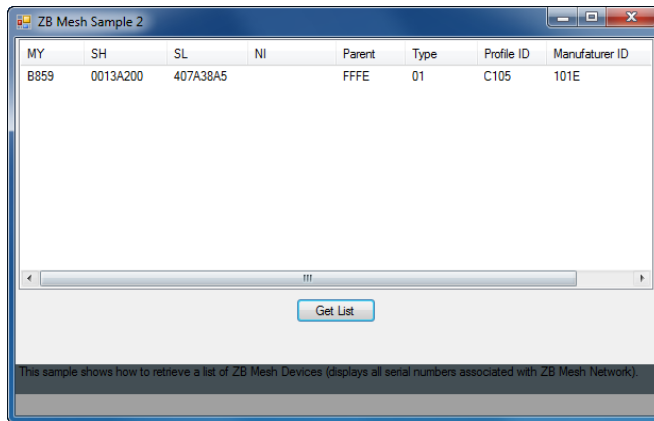
Timer Sample 3

Timer 1
Hour   0
Minute 0
Second 5
Relay   0

Duration
Pulse

Timer Left   0

This sample demonstrates ProXR Relay Duration and Pulse Timing Features, including Query Timer commands. Compatible with all ProXR Series Controllers.

Timer Sample 4

Calibration Value   34256

Get Calibration Value

Set Calibration Value

Test

--

--

This sample demonstrates ProXR Timer Calibration and Testing, Useful for Redefining the Length of a Second in a ProXR Controller. Compatible with all ProXR Series Controllers.

TimerSample4.exe

ProXR Timer Calibration and Testing

This sample (left) demonstrates ProXR Timer Calibration and Testing, Useful for Redefining the Length of a Second in a ProXR Controller. Compatible with all ProXR Series Controllers.

ZBMeshSample1.exe

Set & Retrieve Information from a ZigBee module

This sample (right) shows how to set and retrieve information from a ZigBee module.

ZB Mesh Sample 1

SH   13A200   Get

SL   40690414   Get

PAN ID 234   Get   Set

DH   0   Get

DL   FFFF   Get

Set Destination Address as Above

Set Destination Address to Broadcast

This sample shows how to set and retrieve information from a ZB Mesh module.
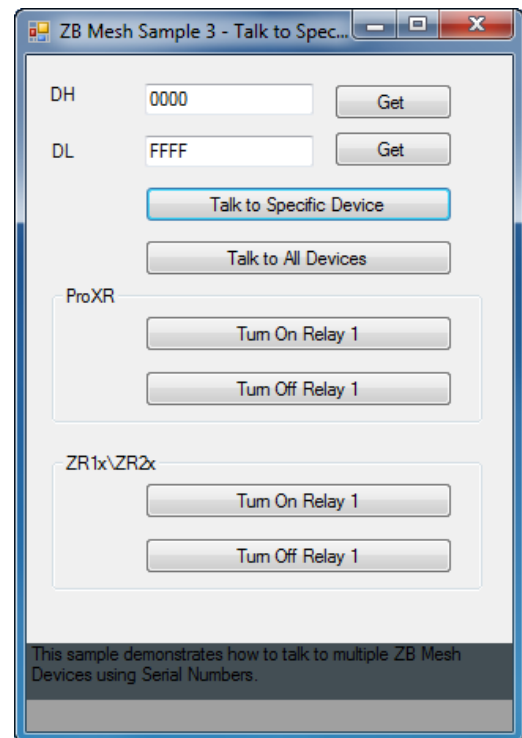
ZBMeshSample2.exe

How to retrieve a List of ZigBee Devices

This sample (left) shows how to retrieve a list of ZigBee Devices (displays all serial numbers associated with ZigBee Mesh Network).

ZBMeshSample3.exe

Talk to Multiple ZigBee Devices Using Serial Numbers

This sample (right) demonstrates how to talk to multiple ZigBee Devices using Serial Numbers.
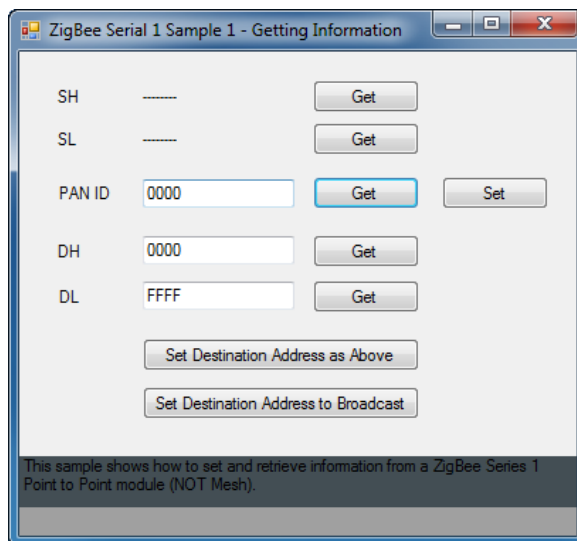
### ZBSeries1Sample1.exe(802.15.4 Wireless Serial)

Set and Retrieve Information from a 802.15.4 Wireless Series

This sample (left) shows how to send and retrieve information from a 802.15.4 Wireless Series 1 Point to Point module (NOT Mesh).

ZBSeries1Sample2.exe (802.15.4 Wireless Serial)

Talk to Multiple 802.15.4 Wireless Series 1 Point to Point Devices

This sample (right) demonstrates how to talk to multiple 802.15.4 Wireless Point to Point Devices using Serial Numbers (NOT Mesh).
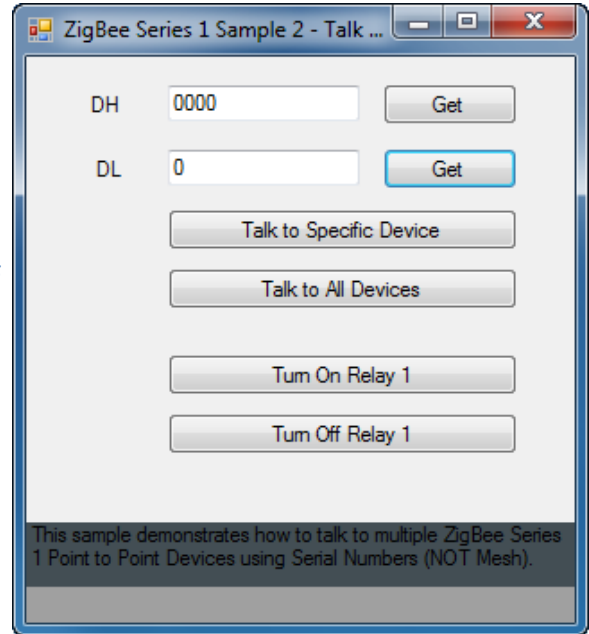
ReactorSample1.exe

Test Hardware and Basic Functions of all Reactor Series Controllers

This sample (below) shows how to Set and Receive Relay Status and Read AD Input values for all Reactor Series Controllers.
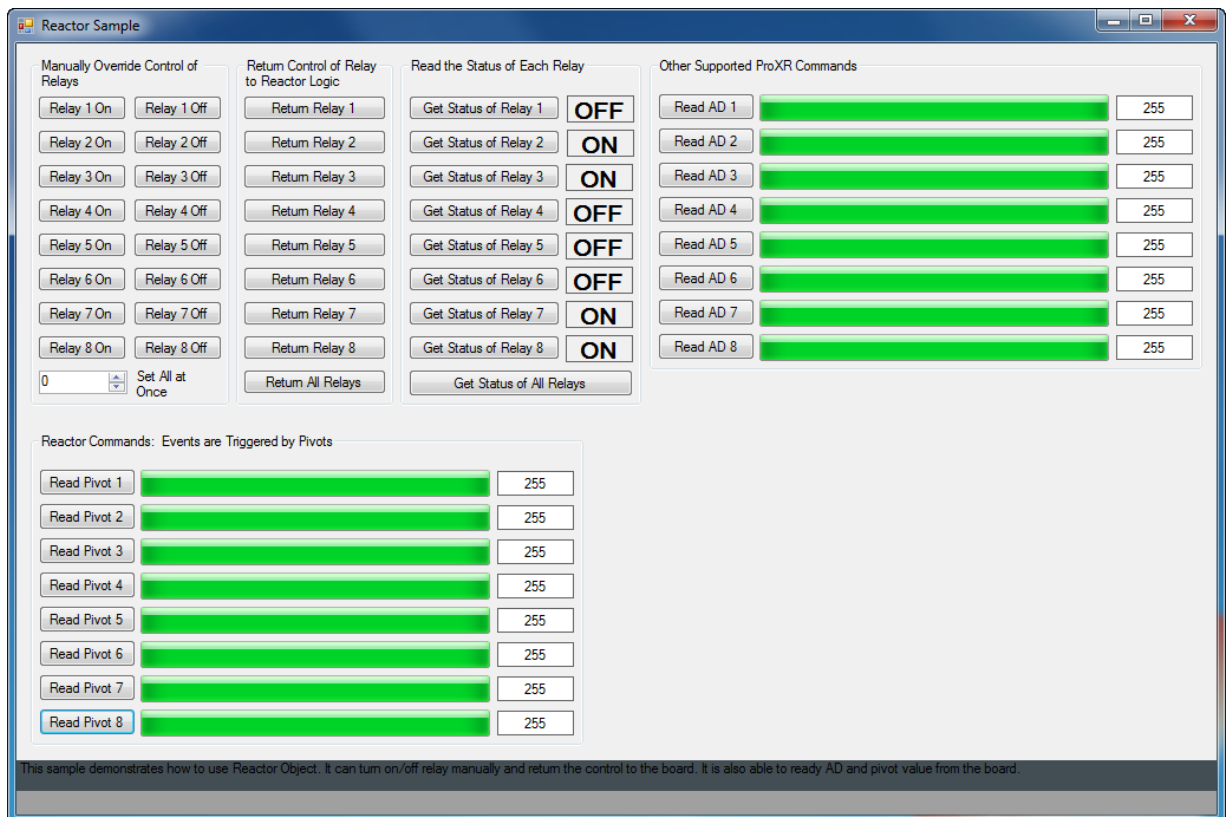
TaralistSample1.exe

Test Hardware and Basic Functions for all Tara list Series Controllers

This sample (below) shows how to Set and Receive Relay Status and Read AD Input Values for all Tara list Series Controllers.

Technical Support

Technical support is available through our website, <u>controlanything.com</u>. **Support** is the way we connect NCD engineers to our customers.
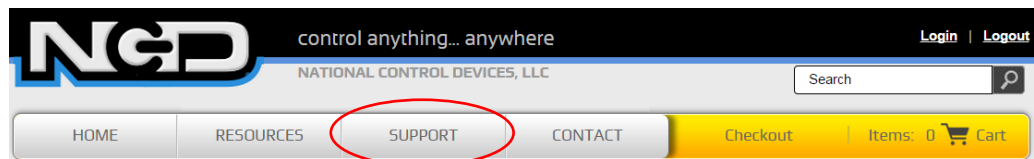
*Click on the **Support** tab at the top of any page on our website to be taken to the **Forum** page. Here you can publicly post or review problems that customers have had, and learn about our recommended solutions.*

Our engineers monitor questions and respond continually throughout the day. Before requesting telephone technical support, we ask that customers please try to resolve their problems through **Support** first. However, for persistent problems, NCD technical support engineers will schedule a phone consultation.

Contact Information

National Control Devices, LLC
PO Box 455
Osceola, MO 64776
417-646-5644 phone
866-562-0406 fax
Open 9 a.m. - 4 p.m. CST

Like "National Control Devices" on Facebook, and follow us on Twitter @ControlAnything.

All orders *must* be placed online at our website, www.controlanything.com

Notice:

The only authorized resellers of NCD products are

- www.controlanything.com
- www.relaycontrollers.com
- www.relaypros.com

All other websites are not authorized dealers; we have noticed some retailers offering our products fraudulently.