# Crestron **SDK for Microsoft® .NET Component**

Software

Introduction and Tutorial

CRESTRON®

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# Contents

# Software: SDK for Microsoft® .NET Component

## Introduction

**NOTE:** This document assumes that the user has a proficient working knowledge of Microsoft Visual Studio, the .NET framework and associated languages, and is familiar with Crestron® control systems and their functions.

The Crestron Software Development Kit (SDK) for Microsoft® .NET Component is designed to allow developers to create .NET projects capable of bi-directional communication between a computer running the .NET component and Crestron 2-Series and X-Gen control systems.

This communication, employing Crestron's implementation of joins and signal types, allows for the creation of powerful dynamic interfaces that will run on systems running the .NET framework.

The .NET component is an Ethernet Intersystem/Device Communication symbol in SIMPL Windows that can be thought of as a touchpanel in that it can send and receive the three basic data types: *digital*, *analog*, and *serial*. These data types may take a variety of forms corresponding to the various controls available in the SDK, but the control events sent to the control system would take some form of:

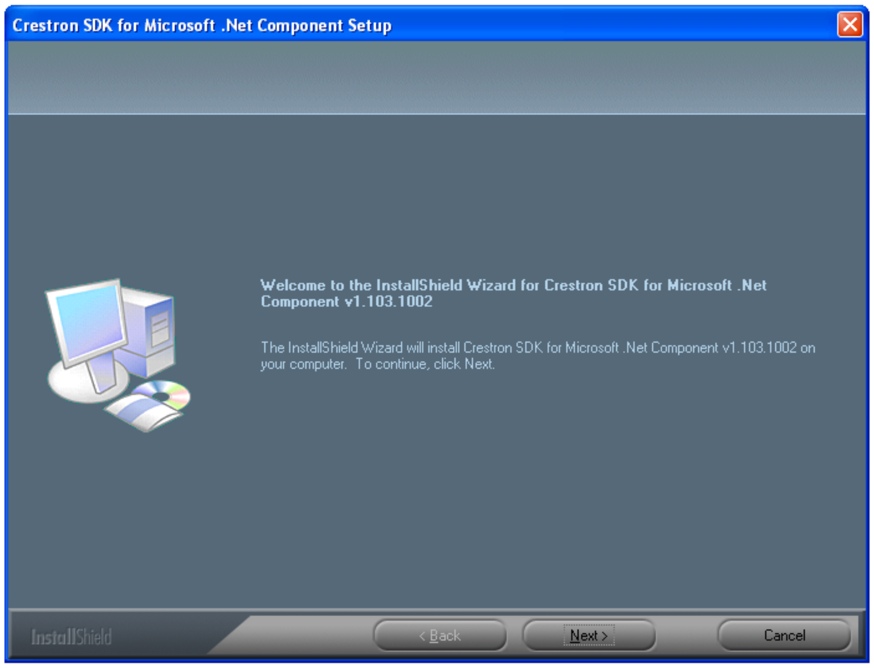
- onDigital
- onAnalog
- onSerial

## Installing the SDK for Microsoft .NET Component

### Automatic Installation

Download the SDK for Microsoft .NET Component installer from the Crestron website to your desktop. Double click the file to automatically start the installation wizard. The Crestron SDK for Microsoft .NET Component "Setup Welcome" window appears.

*Crestron SDK for Microsoft .NET Component "Setup Welcome" Window*

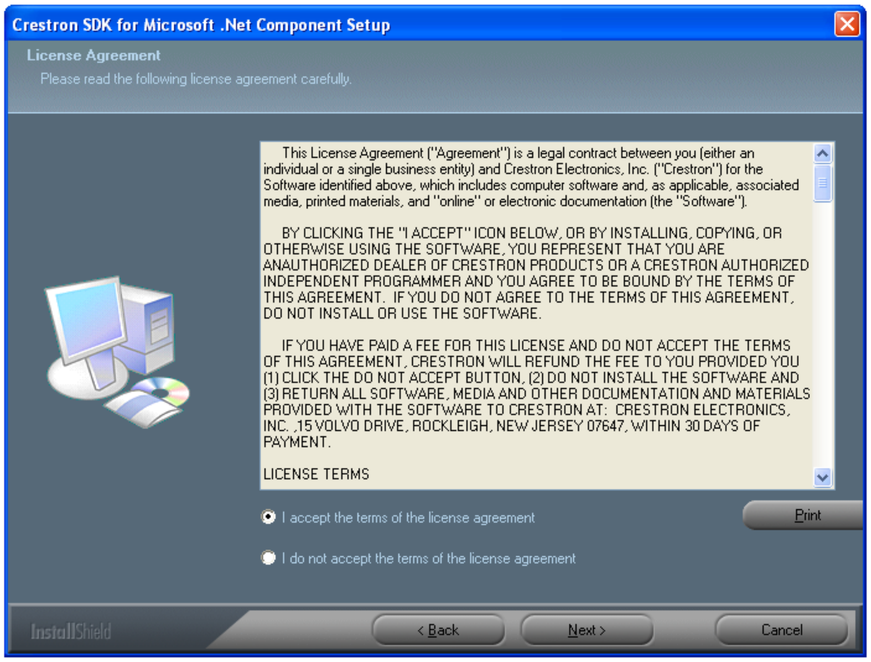


**Welcome to the InstallShield Wizard for Crestron SDK for Microsoft .Net Component v1.103.1002**

The InstallShield Wizard will install Crestron SDK for Microsoft .Net Component v1.103.1002 on your computer. To continue, click Next.

1. Click **Next** to display the "License Agreement" window where you will be prompted to accept (or not) the license agreement governing the .NET component. Accept the agreement (if you want to continue) by clicking the appropriate radio button. You can also use the **Print** button to retain a copy for your records. Click **Next** to continue.

*"License Agreement" Window*



Crestron SDK for Microsoft .Net Component Setup
License Agreement
Please read the following license agreement carefully.
Print
InstallShield
< Back
Next >
Cancel

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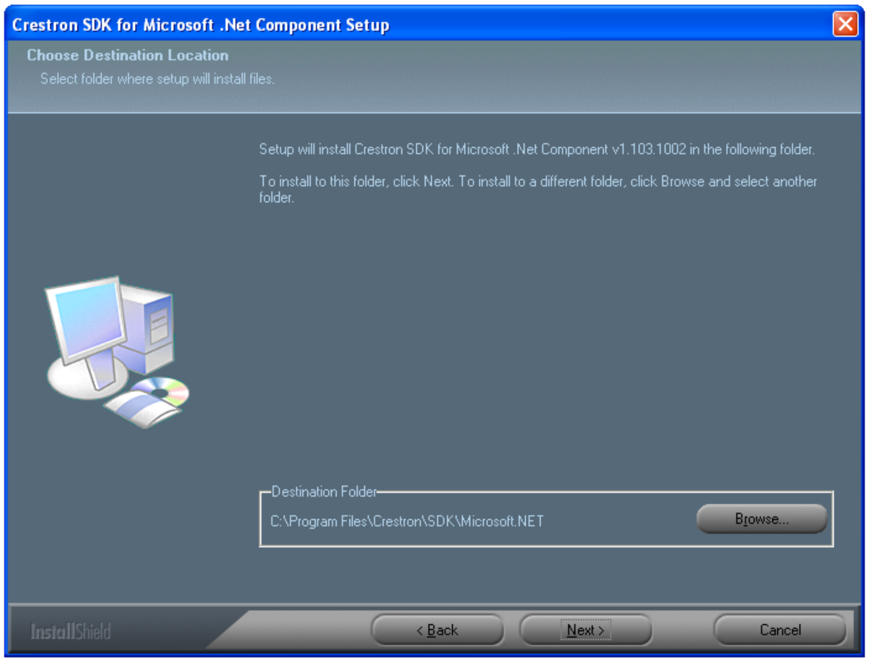
2. The “Choose Destination” window allows you to select the destination of the install. It is recommended that you accept the default unless your installation has other requirements.

***“Choose Destination” Window***


Crestron SDK for Microsoft .Net Component Setup

Choose Destination Location

Select folder where setup will install files.

Setup will install Crestron SDK for Microsoft .Net Component v1.103.1002 in the following folder.

To install to this folder, click Next. To install to a different folder, click Browse and select another folder.

Destination Folder
C:\Program Files\Crestron\SDK\Microsoft.NET

3. Click **Next** to complete the installation.

## Getting Started

1. Start Microsoft Visual Studio, select **Open Project** from the **File** menu and browse to the file: **SDK for Microsoft .NET Component Test Program.sln** or **SDK for Microsoft .NET Component Test Program.csproj** and open it. The ActiveCNX SDK for .NET example project opens.

# ActiveCNX.NET SDK Component Reference

The methods and events are all part of the class known as ActiveCNX.

**NOTE:** There may be additional parameters, events and return types for any given method. Refer to the Microsoft Visual Studio help file for more information.

### *Class ActiveCNX*

**Package:** Crestron
**Class:** ActiveCNX
**Member of:** Crestron.ActiveCNX
**Language:** C# for .NET

The ActiveCNX class handles the communication between a computer running the ActiveCNX control and Crestron 2-Series and X-Gen control systems.

*Constructor Detail*

#### ActiveCNX()

```
public ActiveCNX()
```

This is the default constructor.

**Member of:** Crestron.ActiveCNX.ActiveCNX
**Language Version:** C# for .NET

#### ActiveCNX(string, long, string, string, int, bool)

```
public ActiveCNX(string strIPAddress, long lIPID, string
strUserName, string strPassword, int intPort, bool
boolSSL)
```

This constructor initializes the object, and connects it to the control system corresponding to the listed constructor arguments.

**Member of:** Crestron.ActiveCNX.ActiveCNX
**Language Version:** C# for .NET

#### ActiveCNX(string, long, string, string, int, bool, int, int)

```
public ActiveCNX(string strIPAddress, long lIPID, string
strUserName, string strPassword, int intPort, bool
boolSSL, int iHeartBeatInterval, int iHeartBeatTimeOut)
```

This constructor initializes the object, and connects it to the control system corresponding to the listed constructor arguments.

**Member of:** Crestron.ActiveCNX.ActiveCNX
**Language Version:** C# for .NET

*Method Details*

### Connect()

`public void Connect()`

**Member of:** Crestron.ActiveCNX.ActiveCNX
**Language Version:** C# for .NET

This is the default connect method. If you have set the connection related properties of this object (either via the constructor, or direct assignment,) this version can be used. If the properties are not defined, one of the other connect methods must be used.

**Return Type:**

`void`

**Events:**

`onConnect` — Triggered when a connection is established with the control system.

`onError` — Triggered when an error is generated by the connection.

### Connect(string, long)

`public void Connect(string` *`strIPAddress`*`, long` *`lIPID`*`)`

**Member of:** Crestron.ActiveCNX.ActiveCNX
**Language Version:** C# for .NET

This connect method is used when the string and long properties are not defined in the ActiveCNX class, such as when ActiveCNX() is used.

**Arguments:**

`string strIPAddress` — The IP Address of the control system expressed as a string.

`long lIPID` — The Crestron Internet Protocol ID (IP ID) expressed as a string. The default is 03.

**Return Type:**

`void`

**Events:**

`onConnect` — Triggered when a connection is established with the control system.

`onError` — Triggered when an error is generated by the connection.

### Connect(string, long, bool)

`public void Connect(string` *`strConnectTo`*`, long` *`lIPID`*`,`
`bool` *`boolSSL`*`)`

**Member of:** Crestron.ActiveCNX.ActiveCNX
**Language Version:** C# for .NET

This connect method is used when the string, long and Boolean properties are not defined in the ActiveCNX class, such as when ActiveCNX() is used.

**Arguments:**

`string strIPAddress` — The IP Address of the control system expressed as a string.

`long lIPID` — The Crestron Internet Protocol ID (IPID) expressed as a string. The default is 03.

`bool boolSSL` — Status of SSL expressed as a Boolean.

**Return Type:**

`void`

**Events:**

`onConnect` — Triggered when a connection is established with the control system.

`onError` — Triggered when an error is generated by the connection.

`onCertVerification` — Triggered when the SSL is invoked. Returns SSL certification information as a string.

### Connect(string, long, string, string, int, bool, int, int)

```
public void Connect(string strConnectTo, long lIPID,
string strUserName, string strPassword int iPort, bool
boolSSL, int iHeartBeatInterval, int iHeartBeatTimeOut)
```

**Member of:** Crestron.ActiveCNX.ActiveCNX
**Language Version:** C# for .NET

This connect method is used when the string, long, Boolean and int arguments are not defined in the ActiveCNX class, such as when ActiveCNX() is used.

**Arguments:**

`string strIPAddress` — The IP Address of the control system expressed as a string.

`long lIPID` — The Crestron Internet Protocol ID (IPID) expressed as a string. The default is 03.

`string strUserName` — The network username expressed as a string.

`string strPassword` — The network password expressed as a string.

`int iPort` — The IP port expressed as an integer.

`bool boolSSL` — Status of SSL expressed as a Boolean.

`int iHeartBeatInterval` — Sets the number of milliseconds between heartbeats sent to the control system.

`int iHeartBeatTimeOut` — The number of milliseconds where no heartbeat response is received before causing an "onError" event. The displayed message will read: "Heartbeat timeout occurred".

**NOTE:** The iHeartBeatTimeOut number must be larger than the iHeartBeatInterval.

**Return Type:**

`void`

**Events:**

`onConnect` — Triggered when a connection is established with the control system.

`onError` — Triggered when an error is generated by the connection.

`onCertVerification` — Triggered when the SSL is invoked. Returns SSL certification information as a string.

### Disconnect()

```
public void Disconnect()
```

**Member of:** Crestron.ActiveCNX.ActiveCNX
**Language Version:** C# for .NET

The Disconnect method is used to monitor the connection to the control system.

**Return Type:**

`void`

**Events:**

`onDisconnect` — Triggered when the connection to the control system has been lost.

`onError` — Triggered when an error is generated by the connection.

### SendAnalog(int, int)

```
public bool SendAnalog(int iJoin, int iValue)
```

**Member of:** Crestron.ActiveCNX.ActiveCNX
**Language Version:** C# for .NET

The method used to pass join and value variables to the control system when the **Send** button is clicked and **Analog** is selected as the signal type.

**Arguments:**

`int iJoin` — The join number sent to the control system expressed as an integer.

`int iValue` — The contents of the Value field sent to the control system and expressed as an integer.

**Return Type:**

`boolean` — True equals Success. False equals Fail.

**Events:**

`onAnalog` — Triggered when SendAnalog() is initiated.

`onError` — Triggered when the analog value fails to send.

### SendAnalog(int, int, int)

`public bool SendAnalog(int iSlot, int iJoin, int iValue)`

**Member of:** Crestron.ActiveCNX.ActiveCNX
**Language Version:** C# for .NET

The method used to pass slot, join and value variables to the control system when the **Send** button is clicked and **Analog** is selected as the signal type.

**Arguments:**

`int iSlot` — The slot number selected from the Slot combo box specifies the slot for a sub-slotted symbol.

`int iJoin` — The join number sent to the control system expressed as an integer.

`int iValue` — The contents of the *Value* field sent to the control system and expressed as an integer.

**Return Type:**

`boolean` — True equals Success. False equals Fail.

**Events:**

`onAnalog` — Triggered when SendAnalog() is initiated.

`onError` — Triggered when the analog value fails to send.

### SendDigital(int, bool)

`public bool SendDigital(int iJoin, bool boolValue)`

**Member of:** Crestron.ActiveCNX.ActiveCNX
**Language Version:** C# for .NET

The method used to pass join and boolean variables to the control system when the **Send** button is clicked and **Digital** is selected as the signal type.

**Arguments:**

`int iJoin` — The join number sent to the control system, expressed as an integer.

`bool boolvalue` — True or false sent to the control system, expressed as 1 or 2.

**Return Type:**

`boolean` — True equals Success. False equals Fail.

**Events:**

`onDigital` — Triggered when SendDigital() is initiated.

`onError` — Triggered when sending a digital fails.

### SendDigital(int, int, bool)

public bool SendDigital(int *iSlot*, int *iJoin*, bool *boolValue*)

**Member of:** Crestron.ActiveCNX.ActiveCNX
**Language Version:** C# for .NET

The method used to pass slot, join and boolean variables to the control system when the **Send** button is clicked and **Digital** is selected as the signal type.

**Argument:**

`int iSlot` — The slot number selected from the Slot combo box specifies the slot for a sub-slotted symbol.

`int iJoin` — The join number sent to the control system, expressed as an integer.

`bool boolvalue` — True or false sent to the control system, expressed as 1 or 2.

**Return Type:**

`boolean` — True equals Success. False equals Fail.

**Events:**

`onDigital` — Triggered when SendDigital() is initiated.

`onError` — Triggered when sending a digital fails.

### StartRepeatingDigital(int)

public bool StartRepeatingDigital(int *iJoin*)

**Member of:** Crestron.ActiveCNX.ActiveCNX
**Language Version:** C# for .NET

The method used to send a continuous “high” signal to compensate for poorer networks (e.g., wireless networks) to ensure that the digital is dropped before a TCP Disconnect occurs.

**Argument:**

`int iJoin` — The join number sent to the control system, expressed as an integer.

**Return Type:**

`boolean` — True equals Success. False equals Fail.

**Events:**

`onDigital` — Triggered when StartRepeatingDigital() is initiated.

`onError` — Triggered if the repeating digital fails to start.

### StartRepeatingDigital(int, int)

```
public bool StartRepeatingDigital(int iSlot, int iJoin)
```

**Member of:** Crestron.ActiveCNX.ActiveCNX
**Language Version:** C# for .NET

The method used to send a continuous "high" signal to compensate for poorer networks (e.g., wireless networks) to ensure that the digital is dropped before a TCP Disconnect occurs.

**Argument:**

`int iSlot` — The slot number selected from the Slot combo box specifies the slot for a sub-slotted symbol.

`int iJoin` — The join number sent to the control system, expressed as an integer.

**Return Type:**

`boolean` — True equals Success. False equals Fail.

**Events:**

`onDigital` — Triggered when StartRepeatingDigital() is initiated.

`onError` — Triggered if the repeating digital fails to start.

### StopRepeatingDigital(int)

```
public bool StopRepeatingDigital(int iJoin)
```

**Member of:** Crestron.ActiveCNX.ActiveCNX
**Language Version:** C# for .NET

The method used to stop the repeating digital initiated by StartRepeatingDigital().

**Argument:**

`int iJoin` — The join number sent to the control system, expressed as an integer.

**Return Type:**

`boolean` — True equals Success. False equals Fail.

**Events:**

`onDigital` — Triggered when StopRepeatingDigital() is initiated.

`onError` — Triggered if it fails to stop the repeating digital.

### StopRepeatingDigital(int, int)

`public bool StopRepeatingDigital(int iSlot, int iJoin)`

**Member of:** Crestron.ActiveCNX.ActiveCNX
**Language Version:** C# for .NET

The method used to stop the repeating digital initiated by StartRepeatingDigital().

**Argument:**

`int iSlot` — The slot number selected from the Slot combo box specifies the slot for a sub-slotted symbol.

`int iJoin` — The join number sent to the control system, expressed as an integer.

**Return Type:**

`boolean` — True equals Success. False equals Fail.

**Events:**

`onDigital` — Triggered when StopRepeatingDigital() is initiated.

`onError` — Triggered if it fails to stop the repeating digital.

### SendSerial(int, string)

`public bool SendSerial(int iJoin, string strValue)`

**Member of:** Crestron.ActiveCNX.ActiveCNX
**Language Version:** C# for .NET

The method used to pass join and string variables to the control system when the **Send** button is clicked and **Serial** is selected as the signal type.

**Arguments:**

`int iJoin` — The join number sent to the control system, expressed as an integer.

`string strValue` — A string passed to the control system.

**Return Type:**

`boolean` — True equals Success. False equals Fail.

**Events:**

`onSerial` — Triggered when SendSerial() is initiated.

`onError` — Triggered if SendSerial fails.

### SendSerial(int, int, string)

```
public bool SendSerial(int iSlot, int iJoin, string
strValue)
```

**Member of:** Crestron.ActiveCNX.ActiveCNX
**Language Version:** C# for .NET

The method used to pass slot, join and string variables to the control system when the **Send** button is clicked and **Serial** is selected as the signal type.

**Arguments:**

`int iSlot` — The slot number selected from the Slot combo box specifies the slot for a sub-slotted symbol.

`int iJoin` — The join number sent to the control system, expressed as an integer.

`string strValue` — A string passed to the control system.

**Return Type:**

`boolean` — True equals Success. False equals Fail.

**Events:**

`onSerial` — Triggered when SendSerial() is initiated.

`onError` — Triggered if SendSerial fails.

### UpdateRequest()

```
public void UpdateRequest()
```

**Member of:** Crestron.ActiveCNX.ActiveCNX
**Language Version:** C# for .NET

The UpdateRequest method requests the status of all attributes assigned to the symbol, except for attributes with a value of zero or false.

**NOTE:** Defined member variables tied to attribute values should be zeroed out to avoid invalid values.

**Return Type**

`void`

**Events:**

`onConnect` — Triggered when a connection is established with the control system.

`onError` — Triggered when an error is generated by the connection.

*Event Details*

### onAnalog

```
public event Crestron.ActiveCNX.ActiveCNXEventHandler
onAnalog
```

**Member of**: Crestron.ActiveCNX.ActiveCNX
**Language Version:** C# for .NET

Triggered when an analog join is received from the control system.

| PROPERTY | VALUE |
|---|---|
| Slot | Integer—The slot for a sub-slotted symbol. |
| Join | Integer—The join number. |
| AnalogValue | Integer—The analog value (0 to 65535) sent from the control system. |

### onCertVerification

```
public event
Crestron.ActiveCNX.ActiveCNXCertificateEventHandler
onCertVerification
```

**Member of**: Crestron.ActiveCNX.ActiveCNX
**Language Version:** C# for .NET

Triggered when SSL certificate/verification information is received from the control system.

| PROPERTY | VALUE |
|---|---|
| Certificate | String—The SSL certificate. |
| VerificationResults | String—The results of verifying the SSL certificate. |

### onConnect

```
public event
Crestron.ActiveCNX.ActiveCNXConnectionEventHandler
onConnect
```

**Member of**: Crestron.ActiveCNX.ActiveCNX
**Language Version:** C# for .NET

Triggered when a connection is made with a control system.

### onDigital

```
public event Crestron.ActiveCNX.ActiveCNXEventHandler
onDigital
```

**Member of**: Crestron.ActiveCNX.ActiveCNX
**Language Version:** C# for .NET

Triggered when a digital join is received from the control system.

| PROPERTY | VALUE |
|---|---|
| Slot | Integer—The slot for a sub-slotted symbol. |
| Join | Integer—The join number. |
| DigitalValue | Boolean—The digital value (True/False) sent from the control system. |

### onDisconnect

```
public event
Crestron.ActiveCNX.ActiveCNXConnectionEventHandler
onDisconnect
```

**Member of**: Crestron.ActiveCNX.ActiveCNX
**Language Version:** C# for .NET

Triggered when the connection to a control system is broken.

| PROPERTY | VALUE |
|---|---|
| DisconnectReasonMessage | String—Message sent by control system indicating the reason for the disconnect. |

### onError

```
public event
Crestron.ActiveCNX.ActiveCNXErrorEventHandler onError
```

**Member of**: Crestron.ActiveCNX.ActiveCNX
**Language Version:** C# for .NET

Triggered when an error is generated by ActiveCNX.

| PROPERTY | VALUE |
|---|---|
| ErrorMessage | String—The error message received from the control system. |

### onSerial

```
public event Crestron.ActiveCNX.ActiveCNXEventHandler
onSerial
```

**Member of**: Crestron.ActiveCNX.ActiveCNX
**Language Version:** C# for .NET

Triggered when a serial join is received from the control system.

| PROPERTY | VALUE |
|---|---|
| Slot | Integer—The slot for a sub-slotted symbol. |
| Join | Integer—The join number. |
| SerialValue | String—The serial value sent from the control system. |

## *Properties Details*

### IPAddress

```
public string IPAddress { get; }
```

**Member of**: Crestron.ActiveCNX.ActiveCNX
**Language Version:** C# for .NET

Used to read and return the IP address of the ActiveCNX object.

### IPID

```
public long IPID { get; }
```

**Member of**: Crestron.ActiveCNX.ActiveCNX
**Language Version:** C# for .NET

Used to read and return the IP ID of the control system.

### IPPort

```
public long IPPort { get; }
```

**Member of**: Crestron.ActiveCNX.ActiveCNX
**Language Version:** C# for .NET

Used to read and return the IP port of the control system.

### isConnected

```
public bool isConnected { get; }
```

**Member of**: Crestron.ActiveCNX.ActiveCNX
**Language Version:** C# for .NET

Reads and returns the connection status of the control system.

*EventArg Classes*

### ActiveCNXEventArgs()

```
public class ActiveCNXEventArgs : System.EventArgs
```

**Member of:** Crestron.ActiveCNX
**Language Version:** C# for .NET

This is the base ActiveCNXEventArg class.

### ActiveCNXEventArgs(int, int, bool)

```
public ActiveCNXEventArgs(int iSlot, int iJoin, bool
boolDigitalValue)
```

**Member of:** Crestron.ActiveCNX.ActiveCNXEventArgs
**Language Version:** C# for .NET

This initializes the properties corresponding to the listed arguments.

### ActiveCNXEventArgs(int, int, int)

```
public ActiveCNXEventArgs(int iSlot, int iJoin, int
iAnalogValue)
```

**Member of:** Crestron.ActiveCNX.ActiveCNXEventArgs
**Language Version:** C# for .NET

Initializes the properties corresponding to the listed arguments.

### ActiveCNXEventArgs(int, int, string)

```
public ActiveCNXEventArgs(int iSlot, int iJoin, string
strSerialValue)
```

**Member of:** Crestron.ActiveCNX.ActiveCNXEventArgs
**Language Version:** C# for .NET

Initializes the properties corresponding to the listed arguments.

### ActiveCNXErrorEventArgs()

```
public class ActiveCNXErrorEventArgs : System.EventArgs
```

**Member of:** Crestron.ActiveCNX
**Language Version:** C# for .NET

This is the base ActiveCNXErrorEventArg class.

### ActiveCNXErrorEventArgs(int, string)

```
public ActiveCNXErrorEventArgs(int iNumber, string
strMessage)
```

**Member of:** Crestron.ActiveCNX.ActiveCNXErrorEventArgs
**Language Version:** C# for .NET

Initializes the properties corresponding to the listed arguments.

### ActiveCNXConnectionEventArgs()

```
public class ActiveCNXConnectionEventArgs :
System.EventArgs
```

**Member of:** Crestron.ActiveCNX
**Language Version:** C# for .NET

This is the base ActiveCNXConnectionEventArgs class.

### ActiveCNXConnectionEventArgs(bool, int, string)

```
public ActiveCNXConnectionEventArgs(bool boolConnected,
int iParam, string strParam)
```

**Member of:** Crestron.ActiveCNX.ActiveCNXConnectionEventArgs
**Language Version:** C# for .NET

Initializes the properties corresponding to the listed arguments.

### ActiveCNXCertificateEventArgs()

```
public class ActiveCNXCertificateEventArgs :
System.EventArgs
```

**Member of:** Crestron.ActiveCNX
**Language Version:** C# for .NET

This is the base ActiveCNXCertificateEventArgs class.

### ActiveCNXCertificateEventArgs(string, string)

```
public ActiveCNXCertificateEventArgs(string
strCertificate, string strCertVerification)
```

**Member of:** Crestron.ActiveCNX.ActiveCNXCertificateEventArgs
**Language Version:** C# for .NET

Initializes the properties corresponding to the listed arguments.

# How to Use the Code

The following examples show how the code can be used to initialize the ActiveCNX component to connect to a device, handle join events and show connection issues. These examples are taken from the example project opened in "Getting Started" on page 3 of this manual. They are representative only and may not apply to your situation.

## Initialization

1. Establish your base classes (or libraries or namespaces) with the using directive.

**NOTE:** It is only necessary to establish namespaces needed for your project.

```
using System;
using System.Diagnostics;
using System.Drawing;
using System.Collections;
using System.ComponentModel;
using System.Threading;
using System.Windows.Forms;
using Data;
```

2. Establish the Crestron namespace.

```
using Crestron.ActiveCNX;
```

3. Establish the namespace of the example program.

```
namespace ActiveCNX_Test_Program
```

4. Initialize Form1 as required for Windows Form Designer support. This block of code populates the IP ID combo box with all possible IP IDs, creates the ActiveCNX() class object in memory, allows event handlers to update the *Received from Control System* text box, as well as defines event handlers.

***Example Program Code***

```
public Form1()
{
       InitializeComponent();

      this.ddlLogging.SelectedIndex = 0;
       for (int x = 3; x < 255; x++)
       {
       this.cbIPID.Items.Add(string.Format("{0:X2}",x));
       }
       this.cbIPID.SelectedIndex = 0;
       this.cbValue.SelectedIndex = 0;
       this.cbSlot.SelectedIndex = 0;
       this.acnxConnection = new ActiveCNX();
       this.cbValue.Hide();
       this.tbValue.Hide();
       this.lblValue.Hide();

       this.acnxConnection.onConnect += new
Crestron.ActiveCNX.ActiveCNXConnectionEventHandler(acnxConnection_onConnect);
       this.acnxConnection.onDisconnect +=new
Crestron.ActiveCNX.ActiveCNXConnectionEventHandler(acnxConnection_onDisconnect);
       this.acnxConnection.onError += new
Crestron.ActiveCNX.ActiveCNXErrorEventHandler(acnxConnection_onError);
       this.acnxConnection.onAnalog +=new
Crestron.ActiveCNX.ActiveCNXEventHandler(acnxConnection_onAnalog);
       this.acnxConnection.onDigital += new
Crestron.ActiveCNX.ActiveCNXEventHandler(acnxConnection_onDigital);
       this.acnxConnection.onSerial += new
Crestron.ActiveCNX.ActiveCNXEventHandler(acnxConnection_onSerial);
       this.acnxConnection.onCertVerification += new
Crestron.ActiveCNX.ActiveCNXCertificateEventHandler(acnxConnection_onCertVerificati
on);

        Control.CheckForIllegalCrossThreadCalls = false;
}
```

## Connecting to a Control System

All connection and interaction with a control system is accomplished via the buttons, selections and text entries on a compiled interface such as the example program. The actions they generate are controlled by event handlers.

In order to make a connection to a control system the IP address, IP ID and IP port must be declared by selections on the interface. Once this is done, the **Connect** button can be clicked which will attempt the connection.

**NOTE:** Adding an event handler for a acnxConnection_onDisconnect at the same time helps monitor the connection.

1. The btnConnect_Click handler will establish the IP address and IP ID as well as validate the user name, password, IP port and whether SSL is being used.
2. When the connection is established, the acnxConnection_onConnect handler is triggered. This prints update request information to the *Received from Control System* field and flips the states of the **Connect** and **Disconnect** buttons appropriately.

3. Implement the acnxConnection_onDisconnect handler as one way of monitoring the connection.

**NOTE:** The acnxConnection_onError handler can also be implemented to monitor error events generated by ActiveCNX.

## Handling Join Events

The acnxConnection_onAnalog, acnxConnection_onDigital, acnxConnection_onSerial and btnSend_Click event handlers enable the ActiveCNX SDK for .NET to both send and receive join information.

The acnxConnection_onAnalog, acnxConnection_onDigital and acnxConnection_onSerial event handlers are triggered when an analog, digital or serial join is received from the control system. The btnSend_Click event handler is triggered when the **Send** button on the interface is clicked and transmits the entered join, slot and value information.

1. Add the event handlers to handle join information sent from the control system.
2. Add the event handler to send join, slot and value information to the control system.

## Showing Connection Problems

To monitor the connection, enable the acnxConnection_onDisconnect and acnxConnection_onError event handlers.

1. Add the acnxConnection_onDisconnect event handler to listen for a disconnect from the control system.
2. Add the acnxConnection_onError event handler to monitor error events generated by ActiveCNX that indicate a connection problem.

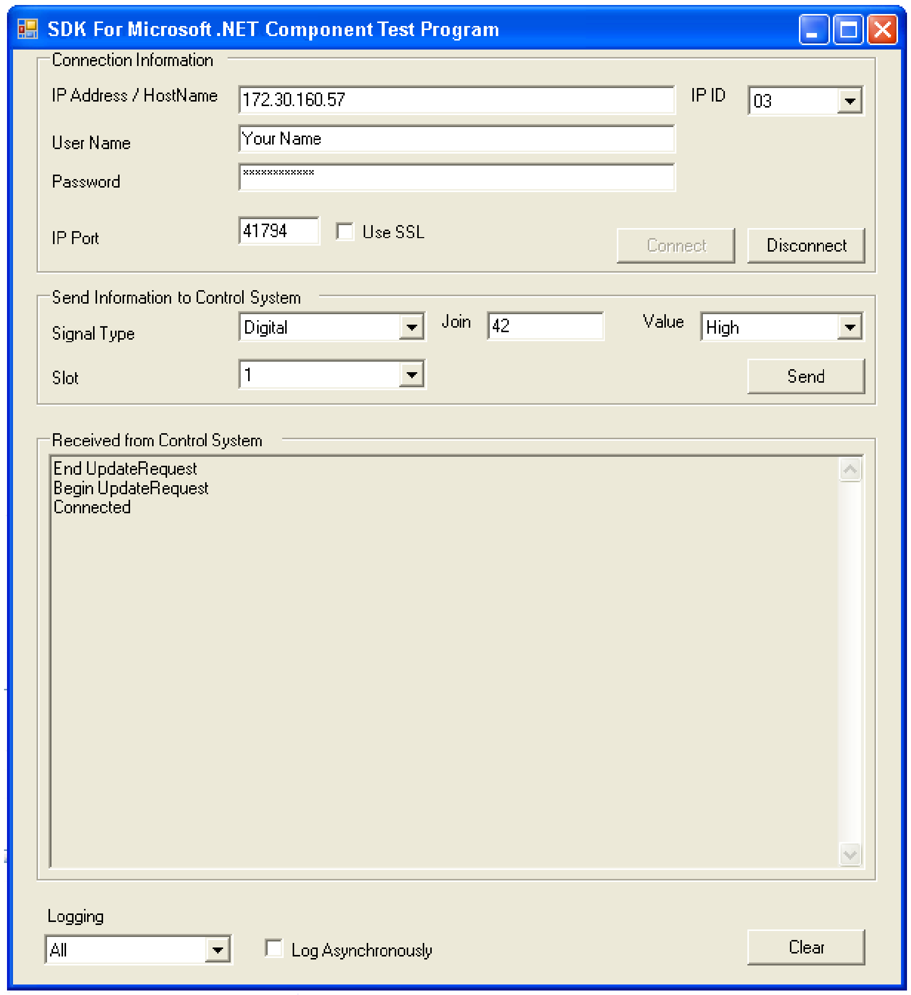
## The Example Program

The ActiveCNX for .NET Example Program is available from the Crestron website and shows one possible way to use the ActiveCNX for .NET SDK to create an interface to a 2-Series or X-Gen control system.

Opening the example program in Microsoft Visual Studio will provide you with insight regarding the creation and implementation of a C# .NET project suitable for your needs. Running the program illustrates the various features you will find in the code.

1. Open the project file: **SDK for Microsoft .NET Component Test Program.sln** or **SDK for Microsoft .NET Component Test Program.csproj** in Visual Studio and press **F5** to compile and run in Debug mode. The example program, Form 1, shown below, opens.

***Crestron ActiveCNX for .NET Example Program***



IP Address / HostName: 172.30.160.57
IP ID: 03
User Name: Your Name
Password: ************
IP Port: 41794

Signal Type: Digital
Join: 42
Value: High
Slot: 1

```
End UpdateRequest
Begin UpdateRequest
Connected
```

Logging: All

2. Enter an IP address or host name in the *IP Address/HostName* text box, select the appropriate IP ID from the IP ID combo box, enter the appropriate IP port in the *IP Port* text box. If required by your control

system, enter a username and password in the text boxes by the same names and click **Connect**.

3. When the connection is made, the **Connect** button is grayed out and the **Disconnect** button takes focus. Any messages that result are displayed in the *Received from Control System* field.
4. To send a signal to the control system, choose the type of signal from the Signal Type combo box, enter the appropriate join number in the *Join* field, select or enter the appropriate signal in the *Value* field and click **Send**.

**NOTE:** If you are monitoring the control system and its installed symbol(s) via the Toolbox Text Consol or the SIMPL debugger, you will see the results of the values you send.

5. Errors and control system responses to events are displayed in the *Received from Control System* field.

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