

Crestron **SDK for Microsoft®**
ActiveX® Controls
Software

Introduction and Tutorial



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SDK for Microsoft® ActiveX® Controls

Introduction

NOTE: This Software Development Kit (SDK) can be used with any development software packages that support Microsoft ActiveX controls. However, the sample applications require Microsoft Visual Basic® 6 to compile. For later versions of Visual Basic, please obtain our SDK for Microsoft.NET Component.

NOTE: This guide assumes a proficient knowledge of Microsoft Visual Basic 6, Crestron SIMPL™ Windows® and Crestron products and terminology.

The *ActiveCNX* control created by this SDK can be thought of as a touchpanel symbol in SIMPL Windows. It can send and receive the three data types: *digital*, *analog*, and *serial* data. These inputs go into the control system and appear to the control system as an “e-control PC Interface” symbol. From that point, the user programs the SIMPL logic as if the system was a real touchpanel.

When a signal changes on the inputs of the “e-control PC Interface”, a message is sent to the *ActiveCNX* control. The control responds by firing an event. There are three main control events that the user can capture and utilize in a PC program.

- OnDigital
- OnAnalog
- OnSerial

All three events return a join number and their corresponding value. The user’s program can then interpret this data however it needs to. For example, an incoming digital signal can be used to enable a button on a screen or could be used to trigger a non-graphical event such as sending an email.

An important aspect of the control is the fact that it is hidden at runtime. This allows any readily available visual OCX components to easily attach to the *ActiveCNX* control component to provide a custom GUI. For example, the digital control signals can be “attached” to a simple windows button or some type of elaborate image button OCX that the user downloads from the Web.

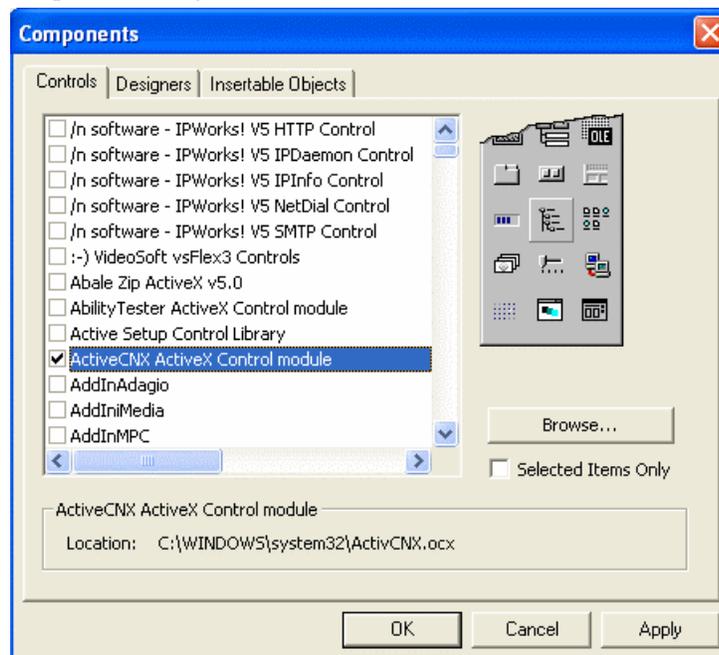
The *ActiveCNX* control can also be used to communicate directly to any CEN device. In this configuration, the signals map directly to the device instead of signal number inputs to the SIMPL program. For example, with the CENIO to close relay 7 simply send a “enabled” signal to join 7.

Step by Step Tutorial

The *ActiveCNX* control can be used in Visual Basic 6 or any other visual development environment that supports OCX controls. The following example shows how this control is used in Visual Basic 6. To add *ActiveCNX* to the development environment right click in the components window and select **Components** or go to **Project | Components**. A dialog similar to the one after this paragraph appears.

NOTE: This SDK is for Visual Basic 6 and not VB.NET.

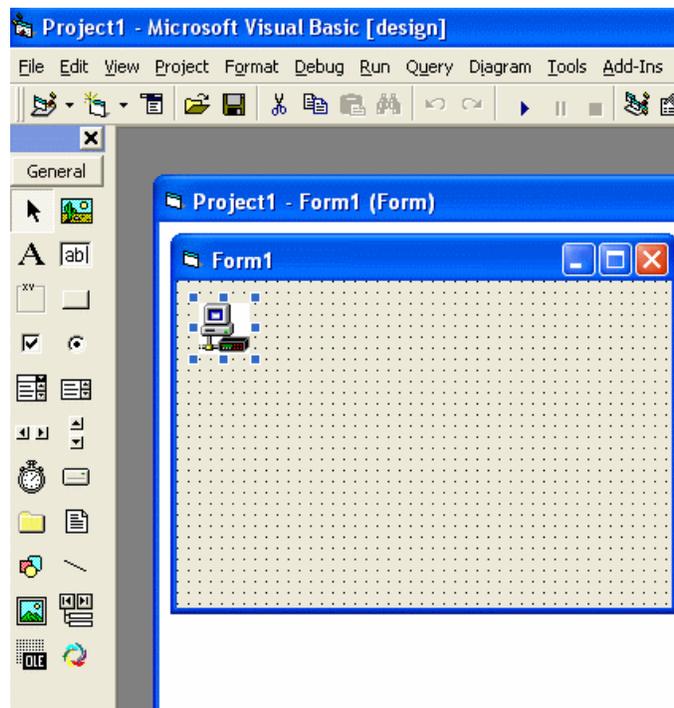
Components Dialog Box



Look in the list for *ActiveCNX ActiveX Control module*, if the component has not been registered yet, click the **Browse** button. From the “Browse” dialog, select the ActiveCNX.OCX file. Once the control is in the list ensure the control is checked and press **OK** or **Apply**.

The component now has an icon in the component window. The icon is the Crestron Swirl. Since the component is available on the toolbar, it can be used just like any other Visual Basic Control. Simply highlight the control and draw it on the form. Like the timer component and the Microsoft® Winsock control, the components are invisible at runtime. This means they are on the form to allow the user to connect other components but there is no need for a visual representation at runtime. The image on the following page shows what the *ActiveCNX* control looks like on the form.

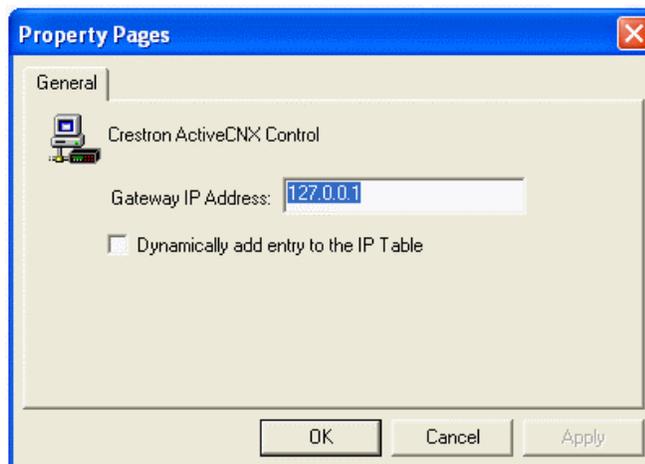


ActiveCNX Control

Properties

To get and set the components properties right click the *ActiveCNX* icon and select **Properties**. The “Property Pages” dialog appears. It permits the programmer to set initial values

NOTE: These property values can always be set programmatically as well.

Property Pages Dialog Box

GatewayIPAddress - This property is the IP address of the PC that is running the CNX Gateway software. If the configuration is a local server then this property need not be set, since it defaults to the local host (127.0.0.1). For distributed applications there maybe one server and many PC clients (ActiveCNX controls) connecting to the CNX Gateway from different places on the network (or Internet). In this case, the CNX Gateway IP address needs to be set by typing the new value in the property sheet or dynamically by setting the **GatewayIPAddress** Property.

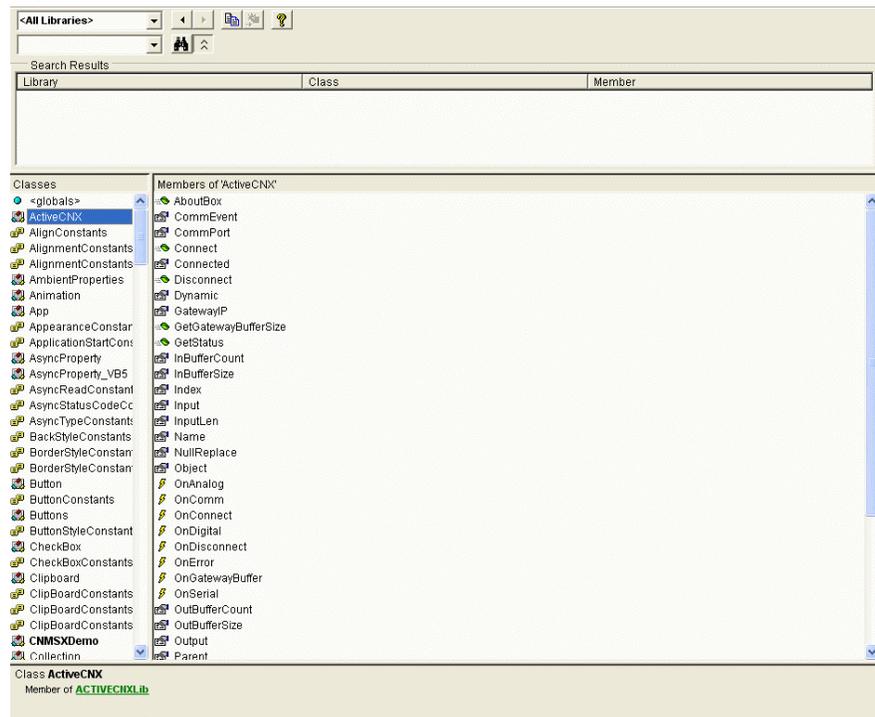
Dynamic - This property is only used with CEN devices, therefore this property is ignored if used with the CNMSX and 2-Series control systems. If this value is set to TRUE, a dynamic entry is added into the device's IP ID table. Otherwise, to get feedback to the application, a static entry must be manually added to the IP table in the CEN device (refer to the latest revision of the specific CEN device documentation). The default value of this property is FALSE.

There is only one connection per *ActiveCNX* Control so if connect is called the second time Disconnect() is automatically called and Connect() is issued again with the new properties. For multiple connections per application, simply drop multiple *ActiveCNX* controls on the form.

Methods

The general procedure for using the components methods are to first call Connect() to start the control session and when complete call Disconnect(). Between Connect() and Disconnect() any combination of the sending and receiving the three data types can be used. At anytime during development if the programmer needs to see methods, properties, or events available for the *ActiveCNX* they can bring up the “Object Browser” in Visual Basic. The Object browser list for the *ActiveCNX* control is shown below.

Object Browser List



Events

OnDigital
 OnAnalog
 OnSerial

 OnError
 OnConnect
 OnDisconnect

The *ActiveCNX* control also triggers events used for feedback and for handling errors. In “design mode” the user can select the ActiveX component from the combo box on the left then select which event to capture. Once the event is selected, it is entered into the program as a “sub procedure”. From this point, the programmer can handle the signal however they choose. For example, a digital “on” could signal another component to send a specific email. The event returns the join number and the corresponding value. For example if a temperature sensor value on the Cresnet network changes and the signal is fed into the Touch Panel symbol the OnAnalog event is fired with its join number and the analog value (Long) as parameters.

The OnConnect() event is only fired if the connection is successful after calling the Connect() method. If Connect() fails for some reason the type and description is sent to the OnError() event.

The OnDisconnect() event is only fired if there is a successful disconnection.

Errors

When an error occurs the OnError() event is triggered with one of the following parameters and a description string.

ERROR CODES:

CNX_BASEERROR	7000	Can not create socket.
CNX_CANNOT_CREATE	7001	Already connected
CNX_ALREADY_CONN	7002	Not connected to server
CNX_NOT_CONN	7003	The Windows Sockets implementation detected that the network subsystem failed.
CNX_NETDOWN	7004	The virtual circuit was reset by the remote side.
CNX_CONNRESET	7005	The virtual circuit was aborted due to timeout or other failure.
CNX_CONNABORTED	7006	The virtual circuit was aborted due to timeout or other failure.
CNX_CONNREFUSED	7007	The attempt to connect was rejected. Make sure the server is running.
CNX_CONNCLOSED	7008	Connection closed by the remote side.
CNX_INVALID_IP	7009	Invalid IP address.
CNX_NOT_AVAIL	7010	IP address not available.
CNX_TIMEDOUT	7011	Timed out waiting for connection to remote socket.
CNX_NOT SOCK	7012	Not a socket. Call Connect() first.
CNX_NOTCONNECTED	7013	Not connected yet.
CNX_REJECT	7014	Crestron CIP device not found at specified Cresnet ID or IP address.
CNX_GENERAL	7015	General Windows Sockets Error.
CNX_NOTCIPNODE	7016	Destination IP is not a valid CIP node

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