

Crestron **CI-KNX**
KNX Control Interface

Operations & Installation Guide



This document was prepared and written by the Technical Documentation department at:



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Industry Compliance

As of the date of manufacturer, the Crestron CI-KNX has been tested and found to comply with specifications for CE marking and standards per EMC and Radiocommunications Compliance Labelling.



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Important Safety Instructions

- Read these instructions.
- Keep these instructions.
- Heed all warnings.
- Follow all instructions.
- Do not use this apparatus near water.
- Clean only with dry cloth.
- Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.
- Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
- Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding-type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
- Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
- Only use attachments/accessories specified by the manufacturer.
- Unplug this apparatus during lightning storms or when unused for long periods of time.
- Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.
- Disconnect power prior to connecting or disconnecting equipment.
- Do not install in direct sunlight.
- The apparatus must be installed in a way that the power cord can be removed either from the wall outlet or from the device itself in order to disconnect the mains power.
- Prevent foreign objects from entering the device.

WARNING:

TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS APPARATUS TO RAIN OR MOISTURE. THE APPARATUS SHALL NOT BE EXPOSED TO DRIPPING OR SPLASHING. OBJECTS FILLED WITH LIQUIDS, SUCH AS VASES, SHOULD NOT BE PLACED ON THE APPARATUS.

WARNING:

TO PREVENT ELECTRIC SHOCK, DO NOT REMOVE COVER. THERE ARE NO USER SERVICEABLE PARTS INSIDE. ONLY QUALIFIED SERVICE PERSONNEL SHOULD PERFORM SERVICE.



The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.



The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

WARNING:

THIS IS AN APPARATUS WITH CLASS I CONSTRUCTION. IT SHALL BE CONNECTED TO AN ELECTRICAL OUTLET WITH AN EARTHING GROUND TERMINAL.

IMPORTANT:

The Crestron CI-KNX can be used with Class 2 output wiring.

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KNX Control Interface: CI-KNX

Introduction

The Crestron CI-KNX is a control interface by which a Crestron control system can be coupled to a KNX (previously known as KNX) installation using Ethernet (TCP/IP). Also, the Crestron CI-KNX filters the desired information out of received KNX messages and sends them to the Crestron control system via the TCP/IP interface, which provides the Crestron installation with live updates of the KNX installation.

The Crestron CI-KNX offers functionality to program separate KNX objects. This results in a new and flexible method for programming your KNX system.

Features and Functions

- DIN-rail mountable
- Control up to 250 Objects on a KNX network
- Equipped with a TCP/IP port
- Capable of using Power Over Ethernet
- Capable of sending live updates. No polling necessary
- Capable of addressing and controlling separate KNX objects

Specifications

Specifications for the Crestron CI-KNX are listed in the following table.

Crestron CI-KNX Specifications

SPECIFICATION	DETAILS
Power Power Usage	External power supply 12-24V AC or 12-30V DC Alternative: 'Power-over-Ethernet' Power consumption: < 800 mW
Minimum 2-Series Control	Version 2 or later

System Update File ^{1,2}	
Environmental	
Ambient Temperature	
Operating	23° to 113° F (-5° to 45° C)
Non-Operating	-13° to 158° F (-25° to 70° C)
Humidity	5% to 93% RH (non-condensing)
Enclosure	
Chassis	plastic
Mounting	2M wide DIN rail mounting(35mm)
Dimensions	
Height	3.54 in (9 cm)
Width	1.38 in (3.5 cm)
Depth	2.36 in (6 cm)
Weight	0.179 lbs (0.081 kg)

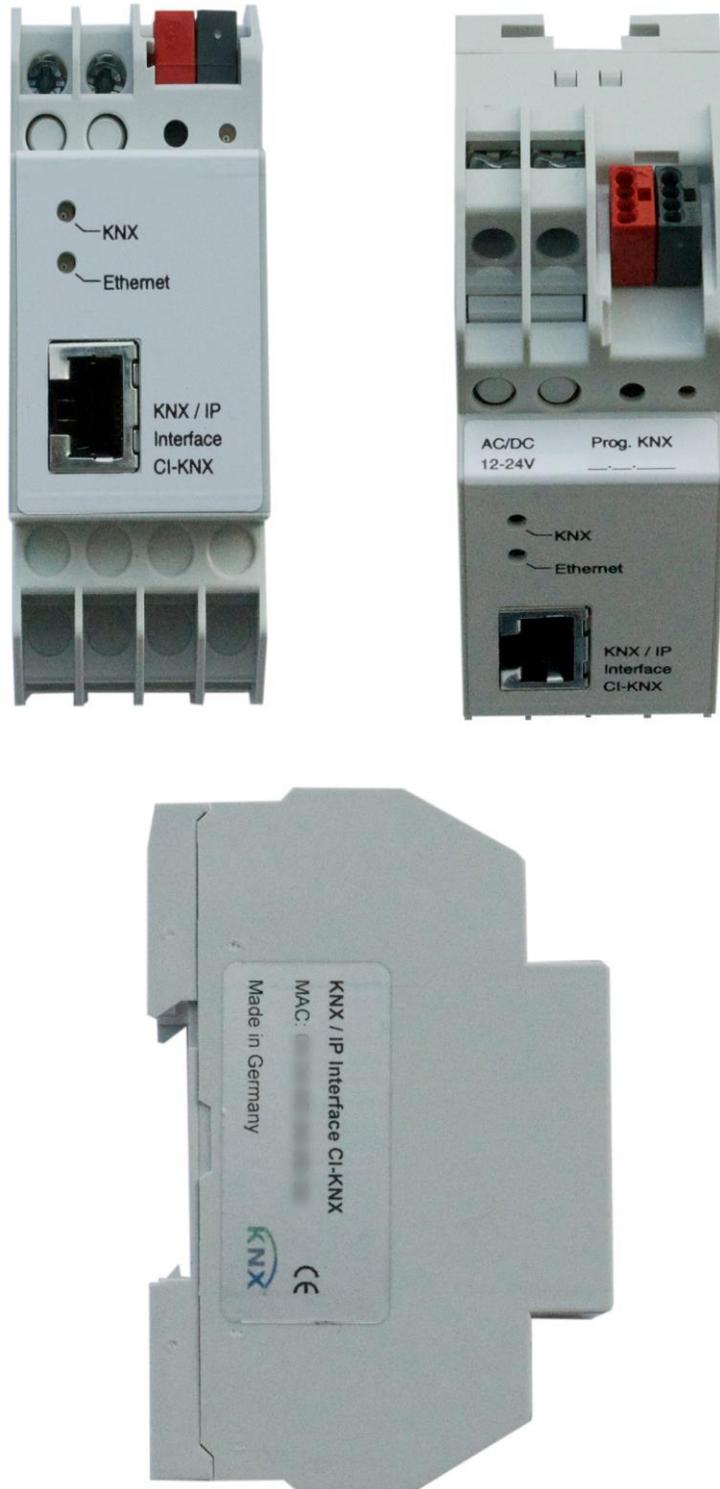
1. The latest software versions can be obtained from the Crestron website. Refer to the NOTE following these footnotes.
2. Crestron 2-Series control systems include the AV2 and PRO2. Consult the latest Crestron Product Catalog for a complete list of 2-Series control systems.

NOTE: Crestron software and any files on the website are for authorized Crestron dealers and Crestron Authorized Independent Programmers (CAIP) only. New users may be required to register to obtain access to certain areas of the site (including the FTP site).

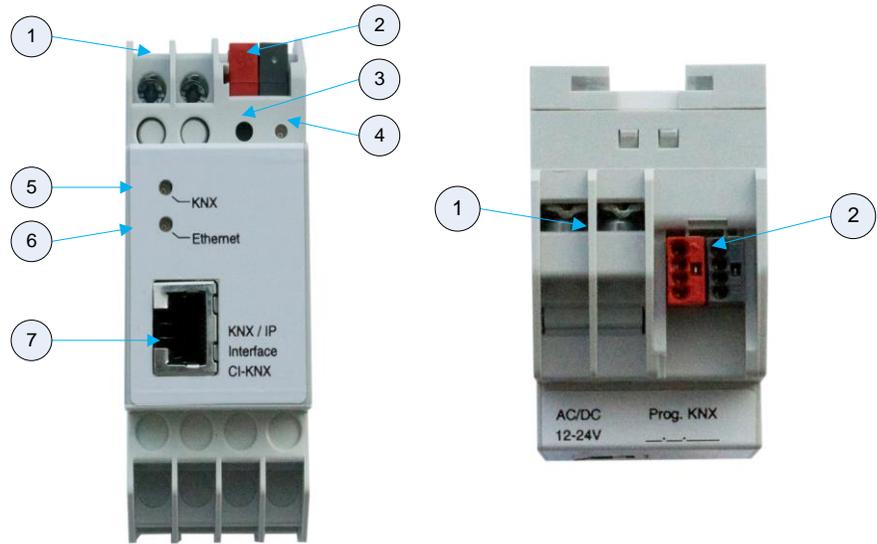
Physical Description

This section provides information on the connections, controls and indicators available on your Crestron CI-KNX.

Crestron CI-KNX Physical View



Crestron CI-KNX Overall Dimensions



Connectors, Controls & Indicators

#	CONNECTORS, CONTROLS & INDICATORS	DESCRIPTION
1	Power Connector	Connector for external power supply. (12V to 24V AC or 12V to 30V DC)
2	KNX BUS Connector	Wago connector that connects the Crestron CI-KNX with the KNX bus.
3	Programming Button	Press to set the unit in ETS programming mode.
4	Learn LED	Color: red Red when the CI-KNX is in programming mode.
5	KNX LED	Color: Green Lights up to indicate bus voltage on KNX. Flashes to indicate telegram traffic.
6	Ethernet LED	Color: Green Lights up to indicate bus voltage on KNX. Flashes to indicate telegram traffic.
7	RJ45 Socket	RJ45 socket for connecting an Ethernet patch cable.

Setup

Network Wiring

The Crestron CI-KNX is used as interface for connecting to KNX on data point level (KNX Application Layer).

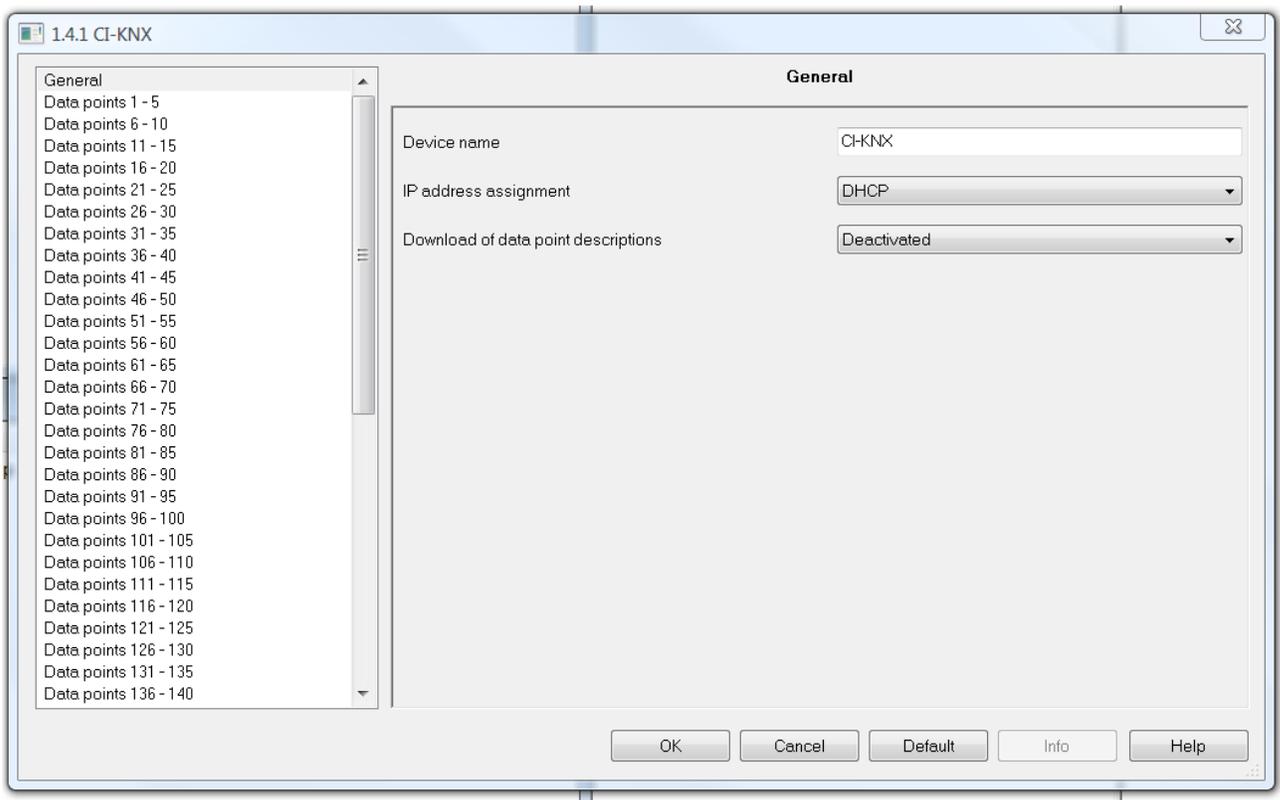
It is possible to connect to KNX-Bus everywhere over LAN. A bus connection over the internet with Crestron CI-KNX is also possible

- **Changing the IP-address configuration.**

There are two ways to assign an IP-address to the Crestron CI-KNX: get the IP-address from DHCP-server or configure it with ETS (as ETS parameter).

1. DHCP-server: Connect the Crestron CI-KNX on a network with a DHCP server. The DHCP server will assign a free IP-address to the Crestron CI-KNX.
2. ETS parameter:

With ETS, the following parameters can be set:



Device name:

It's possible to assign any name for the Crestron CI-KNX. The device name should be significant (e.g. Data points 1st floor), because this is used when searching for devices.

IP-Address assignment:

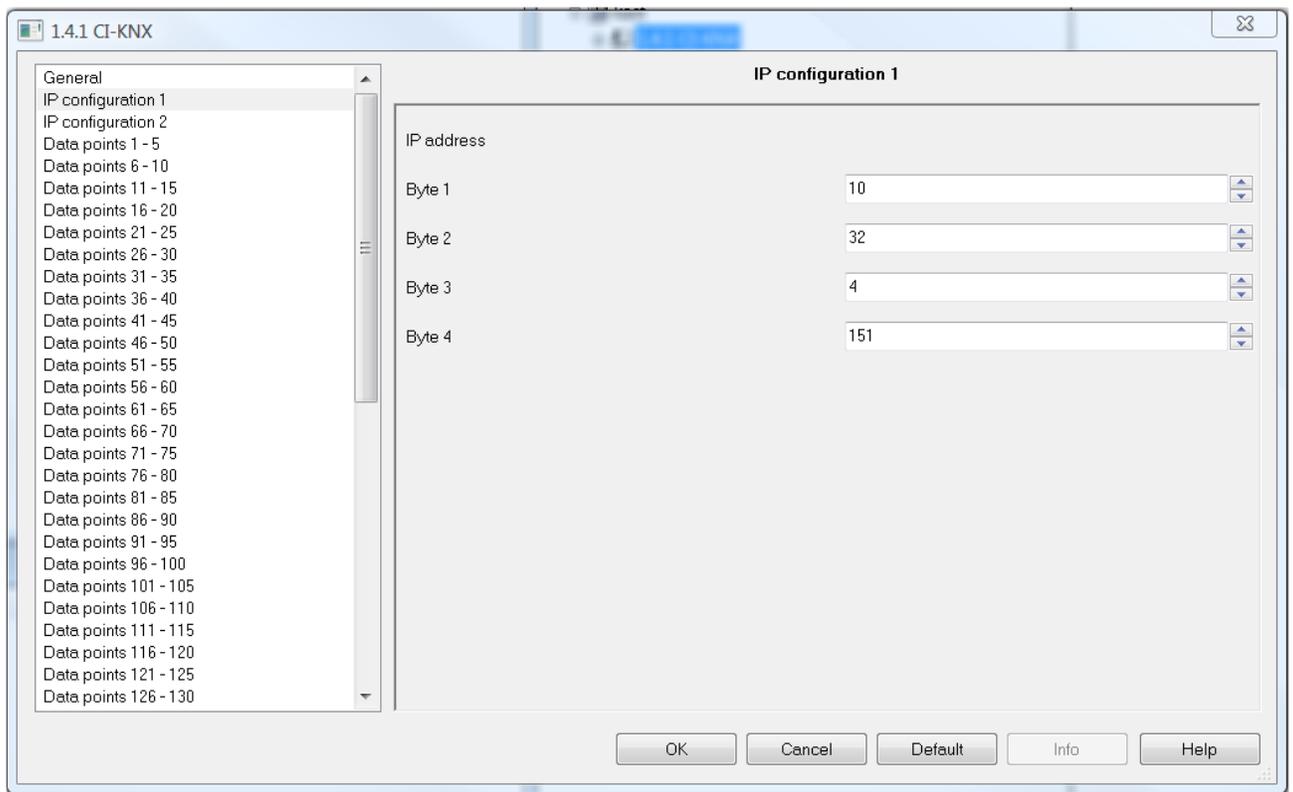
DHCP: The device can get its IP-address from a DHCP-server automatically. There must be a DHCP-server in the LAN in order to use this functionality (e.g. this can be a DSL-router with a DHCP-server integrated).

Manually: In this case, the IP-address, the sub network and the IP-address of the gateway have to be entered.

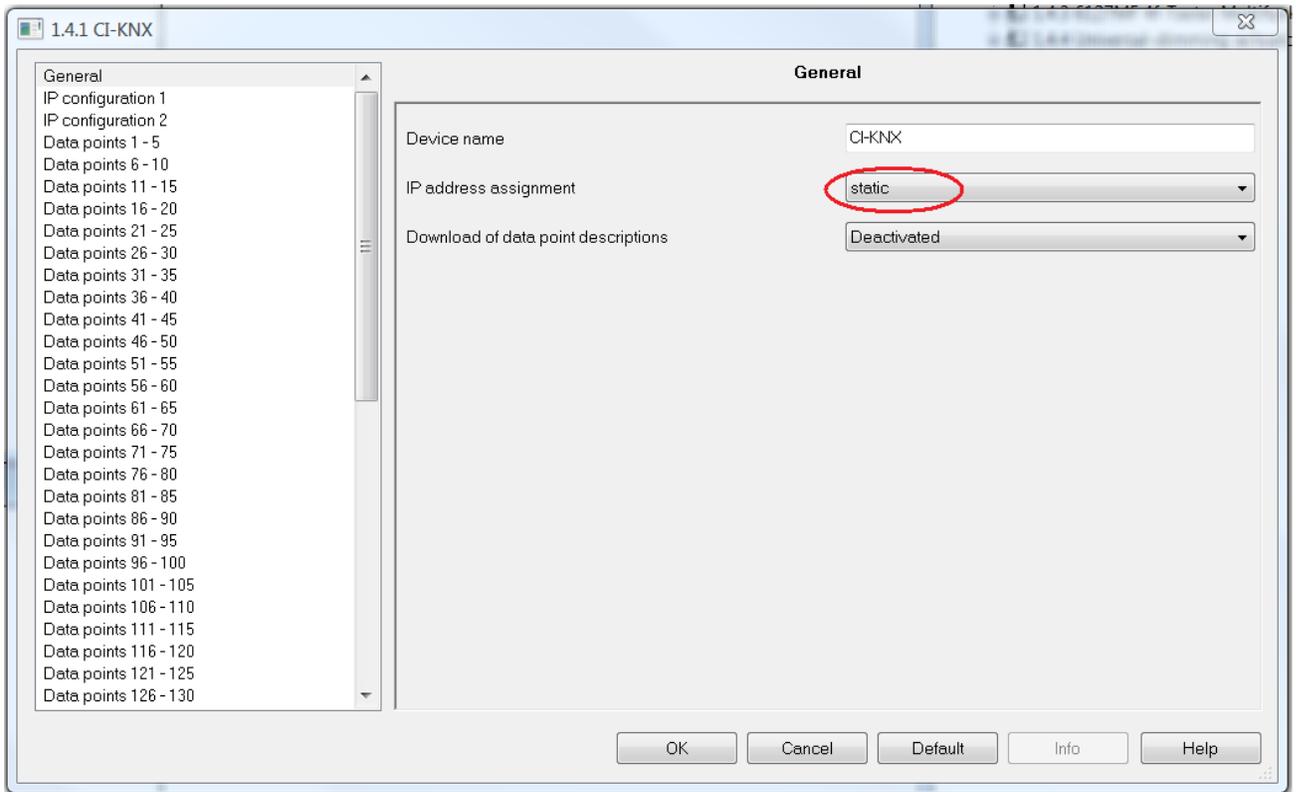
Download of the data point-descriptions: If this parameter is activated, then descriptions will be written into the device in ETS.

Attention!:

When changing this parameter, all the data point descriptions will be exchanged in ETS.

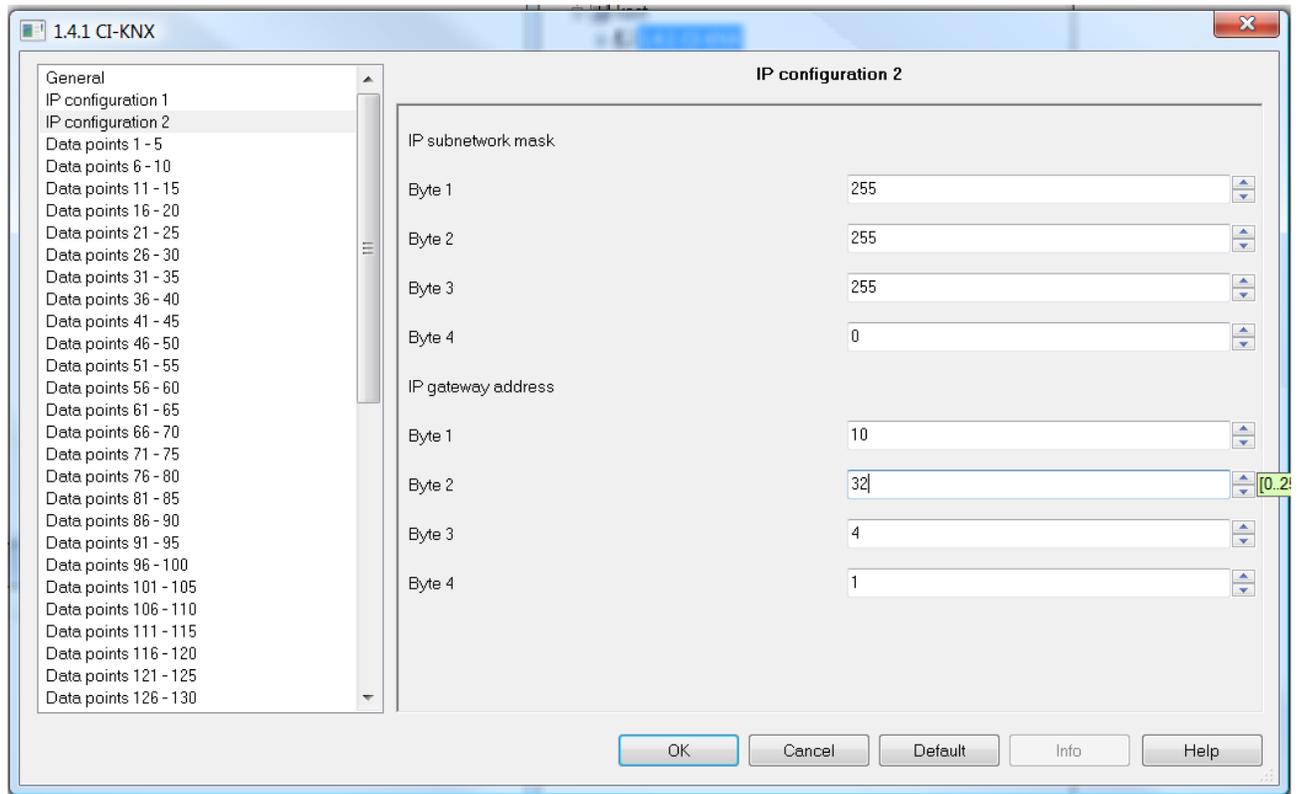
IP-Configuration

Set the IP address assignment parameter to 'static'



IP-Address:

Enter the IP-Address of the Crestron CI-KNX here.



IP-Subnetwork mask:

Enter the subnet mask here. The mask helps the device to discover,

whether the communication partner is the local network. If the partner is not in the local network, then the device sends the IP telegrams not directly to the partner but to the gateway, which forwards the telegrams to the device.

IP-Gateway-Address:

Enter the IP-Address of the gateway here.

Hint: Fill out 0.0.0.0 if the Crestron CI-KNX is only used in the local LAN.

Example for IP-Address assignment

The Crestron CI-KNX shall be accessed using a PC

IP-Address of the PC: 192.168.1.30

Subnet of the PC: 255.255.255.0

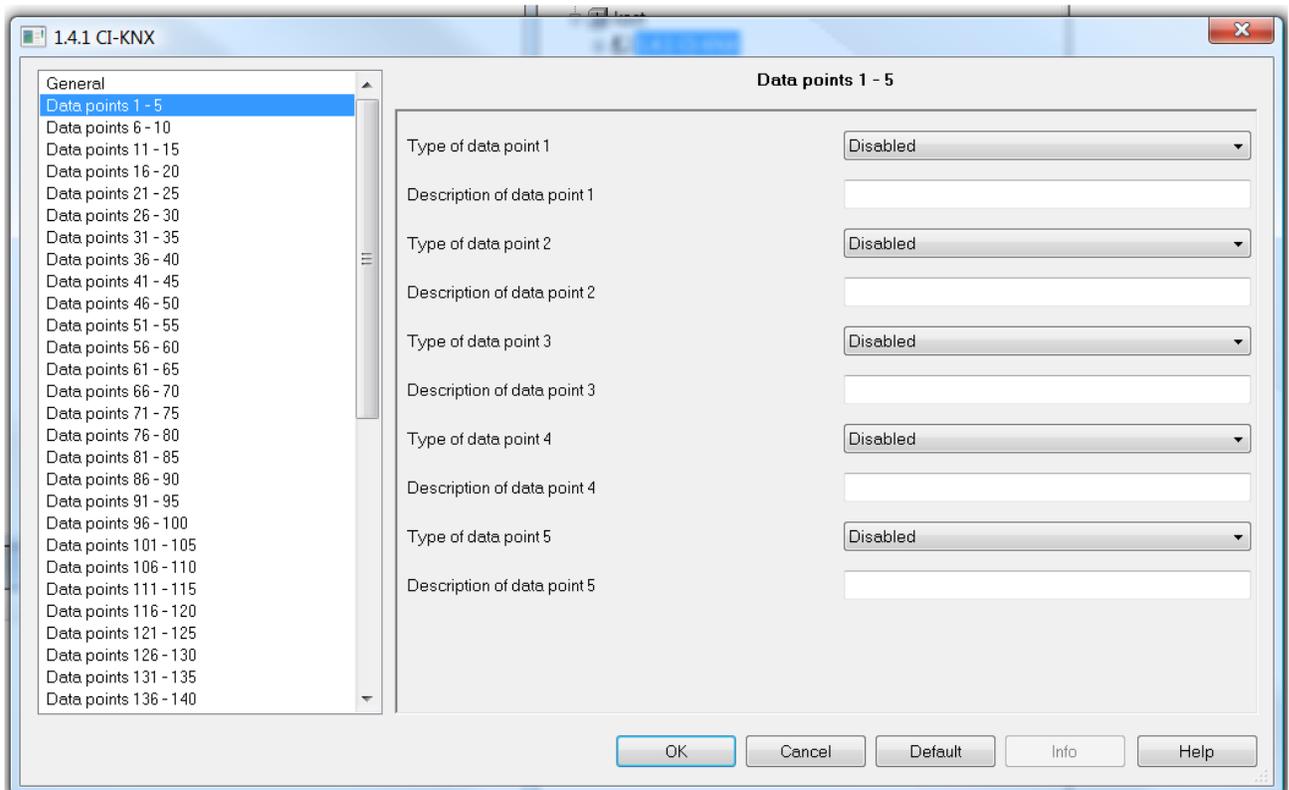
The Crestron CI-KNX is located in the same local LAN therefore it uses the same subnet mask. Because of the used subnet mask the IP-address assignment is limited, only addresses with format 192.168.xx can be assigned to the device, xx stands for the range 1-255 (without 30, because this host number is already assigned to the PC). Be careful not to use one IP-address more than once.

IP-address of the Crestron CI-KNX: 192.168.1.31

Sub network of the Crestron CI-KNX: 255.255.255.0

- **Data points:**

Up to 250 data points can be parameterized. Each data point gets a group address, in order to send to the bus. More than one group address can be set for one object.



Data point types:

For each data point the type can be set. Following data points are available:

1 Bit, 2 Bit, 3 Bit, 4 Bit, 5 Bit, 6 Bit, 7 Bit, 1 Byte, 2 Byte, 3 Byte, 4 Byte, 6 Byte, 8 Byte, 10 Byte, 14 Byte

NOTE: The Crestron demo program currently offers modules to control data points of the following types only: 1 Bit, 2 Bit, 4 Bit, 1 Byte, 2 Byte, 3 Byte, 4 Byte, 6 Byte, 14 Byte

Data point description:

For each data point a short description (max. 30 characters) can be entered, in order to check the usage of the data point later, when the device is running.

Attention:

Only if the parameter “Download of data point description” is activated, the description will be written into the device.

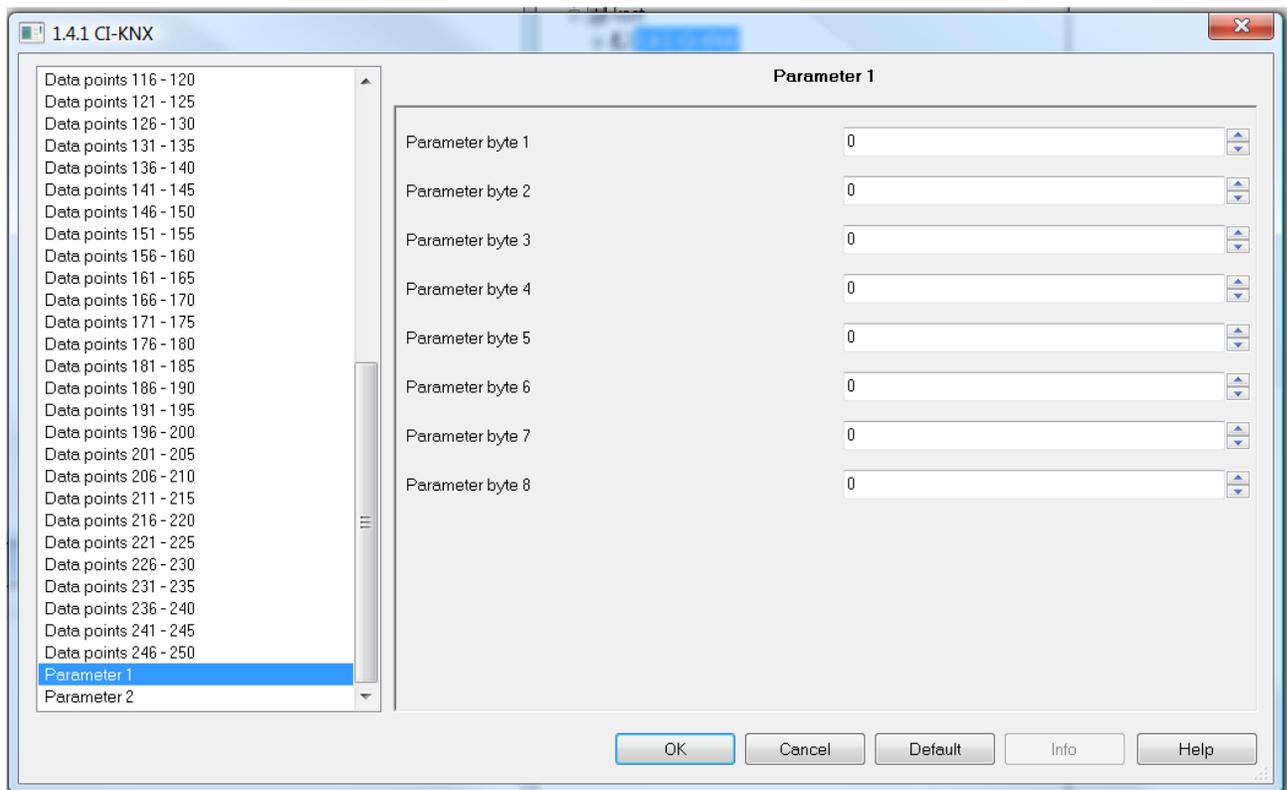
If you change the parameter “Download of data point description”, all data point descriptions will be exchanged in ETS.

Parameter:

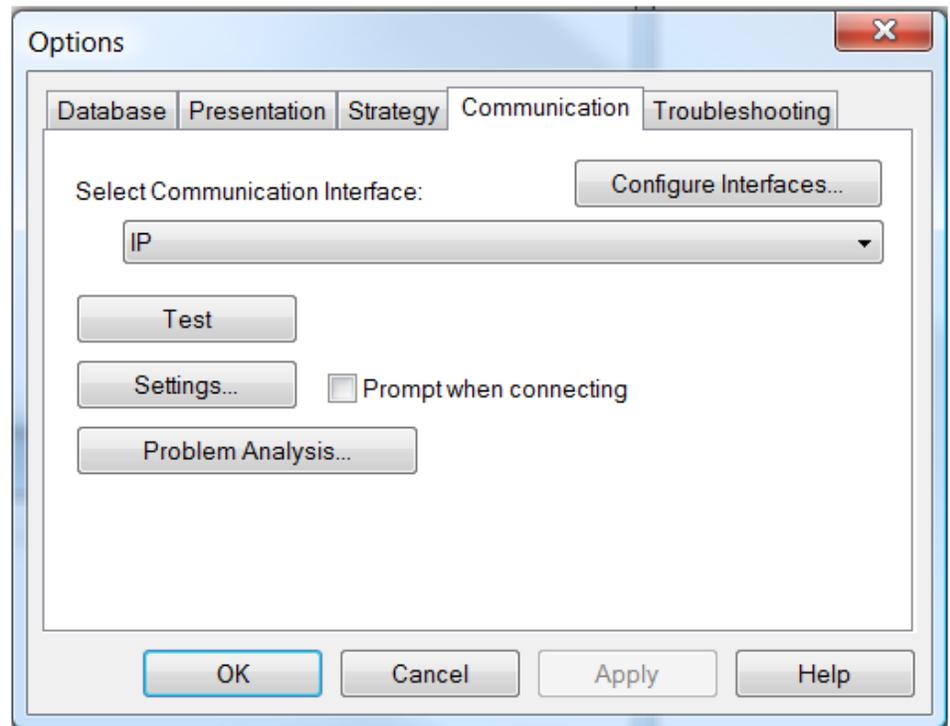
The Crestron CI-KNX has 16 free parameters, which can be read out over Ethernet. These can be used for client specific purposes.

Parameter Byte:

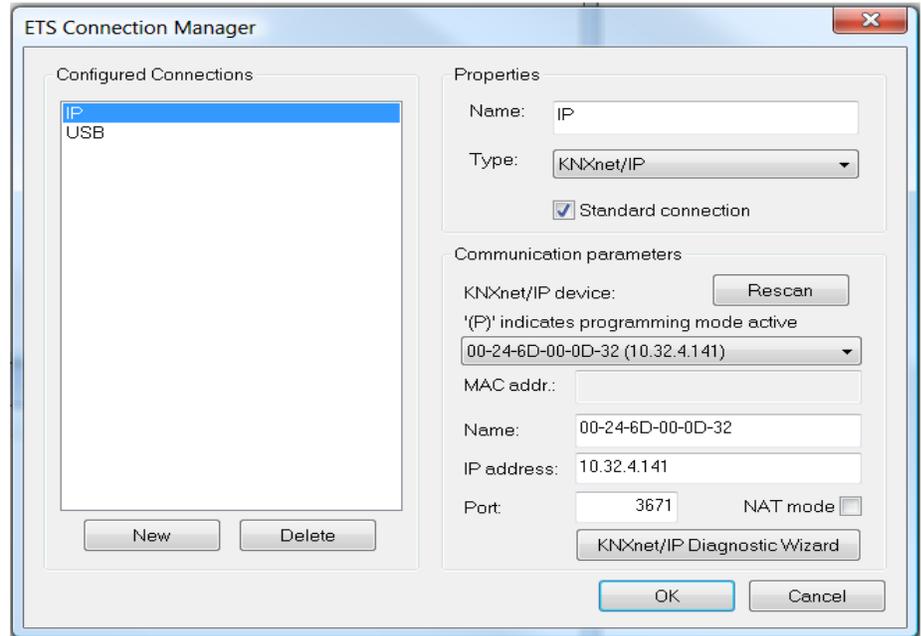
For each of the 16 parameters, a value between 0 and 255 can be entered.



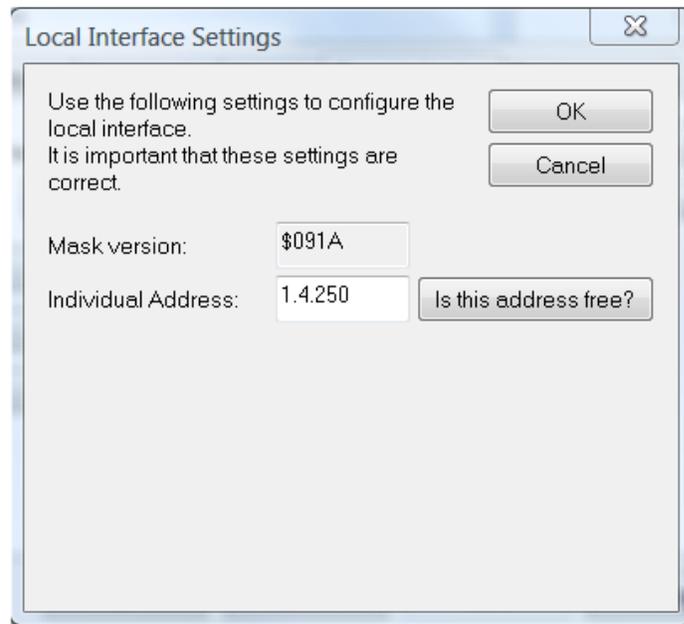
- Crestron CI-KNX as interface to KNX
If the IP-configuration of the Crestron CI-KNX is valid, then this device can act as an interface to KNX. In order to use this function, go to the ETS (version 3.1c or higher), take Extras/Options and then the tab communication:



Click on Configure Interfaces... to open the ETS connection manager. Create a new connection of the type KNXnet/IP. ETS automatically starts searching for KNXnet/IP devices. All detected devices should be shown. The preferred device has to be selected.



In order to access the KNX, the Crestron CI-KNX needs a second physical address. This address is only used for bus access and can be adjusted separately: Go to Extras/Options in the ETS menu and choose Communication. Then choose the already created connection. Click on Settings and the following dialog box will open:

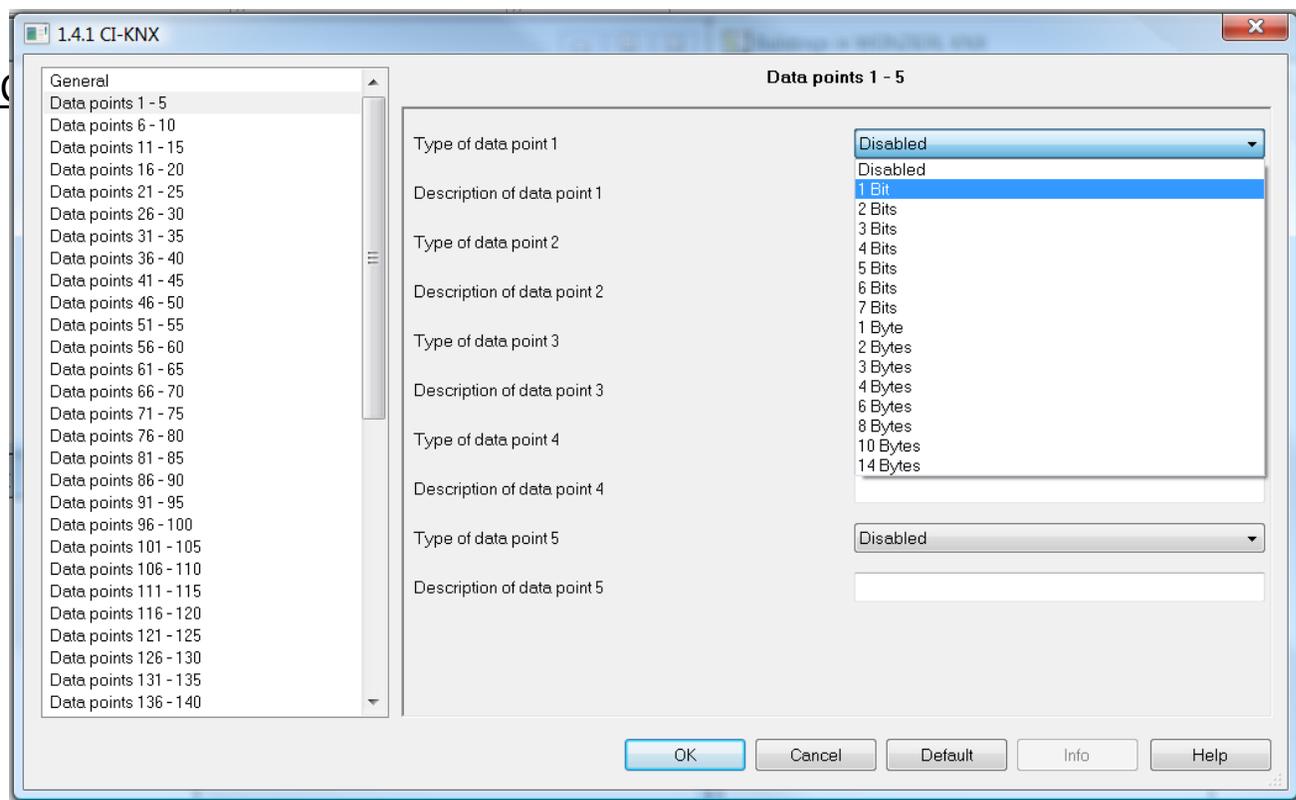


Enter an unused physical address. The address shall be valid in the line where the interface is installed. A dummy device may be created in the ETS-project to reserve this address.

CI-KNX Setup

The CI-KNX uses an object-oriented way of programming. Therefore the CI-KNX has to be added as a new device in ETS. To do so, one needs the ETS library file included in Crestron CI-KNX archive (CI-KNX.vd2). Once you've added the CI-KNX you can right click on it and choose "Edit Parameters..." to open the CI-KNX configuration screen.

This will open the CI-KNX configuration screen. At this screen you can add new KNX objects or you can change the general settings as described in the previous paragraph.



Every object has the following parameters:

- **Number:** The object id number
- **Type:** The type of the object (see drop down box)
Select disable if the object id is not used.
- **Description:** Short description, maximum 30 characters.

As described above, a Crestron CI-KNX can be setup to communicate with other KNX units based on Object ids.

When using Object Addresses the Crestron programmer needs to know which objects are present in the ETS program. Using this information the programmer can control the status of these objects and the group addresses the objects belong to.

For example every controllable light zone will have at least one object. This object will be linked to a Group Address in ETS. If a device function needs to be controlled by this object, then the device object representing this device function should be added to the same Group Address in ETS. By sending a value to the CI-KNX object all the device functions that were added to this Group Address will be triggered accordingly. E.g. when a lighting zone switch object is added to this Group Address, then sending a 1 to the CI-KNX object will turn the lighting zone to 1 and sending a 0 will turn it off.

Extra to every object you have information about the data - type, meaning the format of the expected data. The type is specified by the number of bits used; the general types are 1 Bit, 2 Bit, 4 Bit, 1 Byte, 2 Byte, 3 Byte, 4 Byte, 6 Byte and 14 Byte.

Installation

- Attach the Crestron CI-KNX to the DIN rail.
- Connect the CAT5 cable
- Connect the KNX bus

- Connect the power source to power up the CI-KNX (if Power over Ethernet is not used)

Programming Software

Have a question or comment about Crestron software?

Answers to frequently asked questions (FAQs) can be viewed in the Online Help section of the Crestron website. To post a question or view questions you have submitted to Crestron's True Blue Support, log in at <http://www.crestron.com> First-time users will need to establish a user account.

Earliest Version Software Requirements for the PC

NOTE: Crestron recommends that you use the latest software to take advantage of the most recently released features. The latest software is available from the Crestron website.

Crestron has developed an assortment of Windows®-based software tools to develop a controlled system. You can create a program to control the Crestron CI-KNX using the Crestron programming tool SIMPL Windows.

Programming with SIMPL Windows

SIMPL Windows is Crestron's premier software for programming Crestron control systems. It is organized into two separate but equally important "Managers".

Configuration Manager

Configuration Manager is the view where programmers "build" a Crestron control system by selecting hardware from the *Device Library*.

- To incorporate the Crestron CI-KNX into the system, drag the Crestron CI-KNX from the User module | Product module folder after copying the modules to the User macro folder or the same folder where the project is stored.

Program Manager

Program Manager is the view where programmers "program" a Crestron control system by assigning signals to symbols.

The symbol can be viewed by double clicking on the icon or dragging it into *Detail View*. Each signal in the symbol is described in the SIMPL Windows help file (**F1**). The Crestron CI-KNX modules should be placed in the user database specified in the SIMPL Windows software.

Example Program

An example program for the Crestron CI-KNX is available from the Crestron website (<http://applicationmarket.crestron.com>).

Uploading and Upgrading

Crestron recommends using the latest programming software and that each device contains the latest firmware to take advantage of the most recently released features. However, before attempting to upload or upgrade it is necessary to establish communication. Once communication has been established, files (for example, programs or firmware) can be transferred to the device.

Programs and Firmware

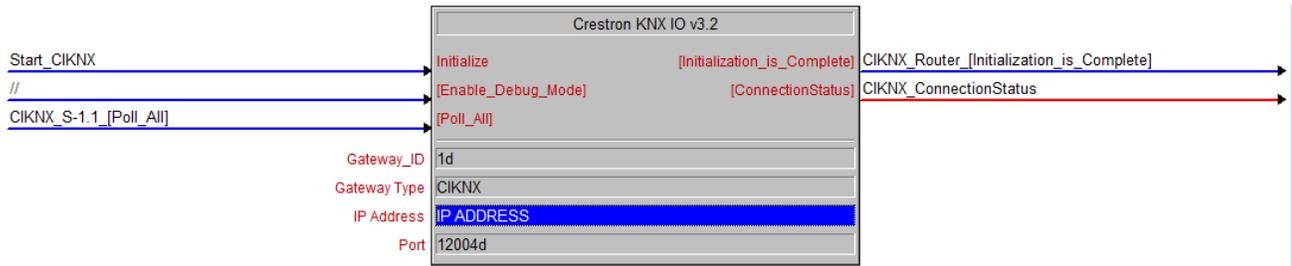
Program or firmware files may be distributed from programmers to installers or from Crestron to dealers. Firmware upgrades are available from the Crestron website as new features are developed after product releases. One has the option to upload programs via the programming software or to upload and upgrade via the Crestron Toolbox. For details on uploading and upgrading, refer to the SIMPL Windows help file or the Crestron Toolbox help file.

SIMPL Windows

If a SIMPL Windows program is provided, it can be uploaded to the control system using SIMPL Windows or Crestron Toolbox.

Operation

Main Module: Crestron KNX IO v3.2



The “Crestron KNX IO v3.2” module deals with the CI-KNX communication. The module communicates via TCP/IP with the CI-KNX. To configure the module the user should fill in the correct IP address and Gateway ID. The Gateway ID is used to associate the IO module with other KNX data type modules in the program. Up to 250 KNX data type modules can be linked to one IO module. This module is ALWAYS required.

The Initialize input needs to be pulsed once to start the module. This is required to associate the IO module with all the KNX data type modules with the same Gateway ID.

Once the Initialization_is_Complete output latches high, the modules are ready to be used.

The ConnectionStatus output provides feedback on the current status of the TCP/IP connection with the CI-KNX.

Other functionality includes polling the values for all associated KNX data type modules and enabling/disabling debug mode.

Debug mode should be turned off during normal operation.

Object Modules

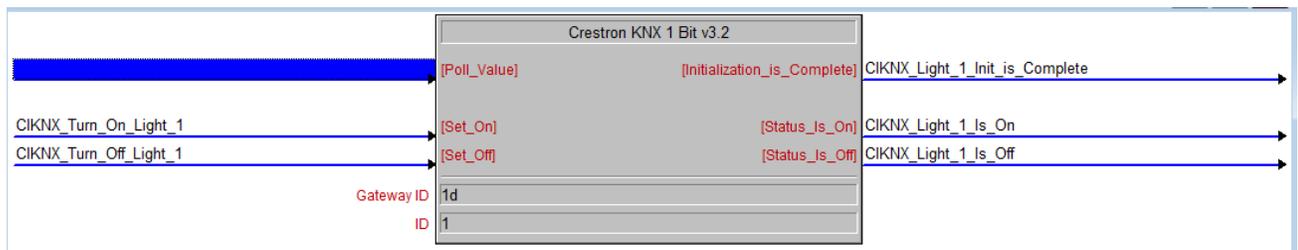
For every Object that needs to be controlled exactly one object module needs to be inserted, no matter if it deals with control, feedback or both. Meaning that if you need control or feedback from the same object in different parts of your program, only one object module should be inserted. Then distribute its inputs and/or outputs via standard Symbol Windows logic.

The different types of object modules

For every common data type in the KNX system there is a specific Crestron module, this will allow you to send or read out any specific KNX command or signal.

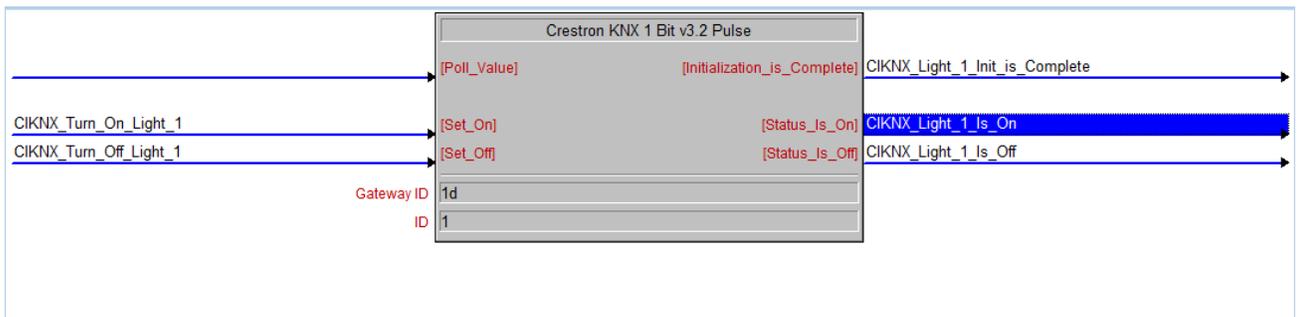
Data type 1 bit

The most used data types are binary switch functions (on/off). They are used for a lot of different purposes like switching lamps, triggering presets, activate alarm functions...



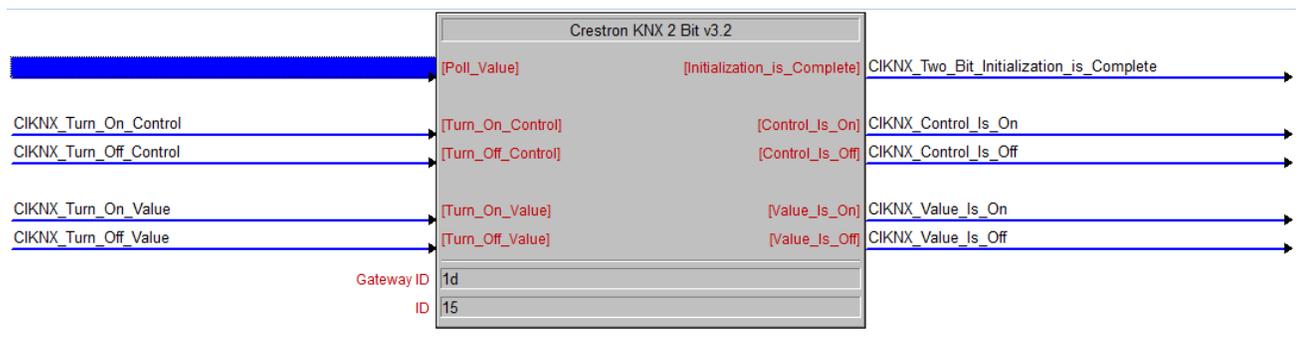
When the “Set_On” or “Set_Off” inputs are pulsed, the matching commands is sent to the KNX bus. The “Status_Is_On” or “Status_Is_Off” output will latch high to indicate the current state of the data type object.

We also provide the 1 bit pulse module which has the same functionality as the normal 1 bit module except that the outputs will pulse instead of latching high.



Data type 2 bit

The 2 bit data type is used to represent a switch with up to 4 states.

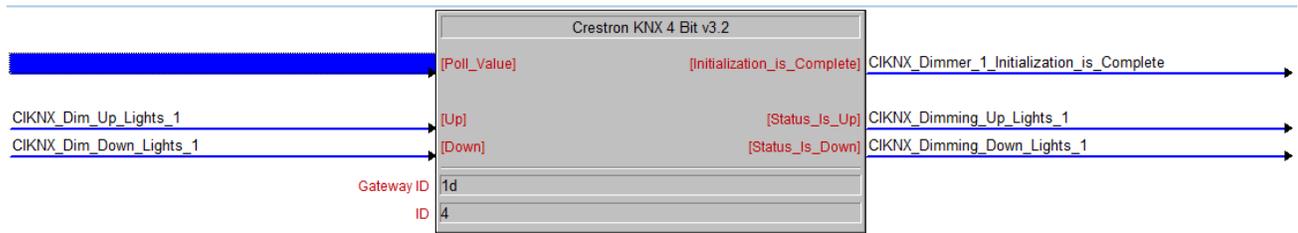


The feedback outputs will latch high to indicate the state of the 2 bit object.

Data type 4 bit

The 4 bit data type and is commonly used to control dimmers. The 4 bit module requires the usual address parameters. Dimming speed is set standard to 1 although

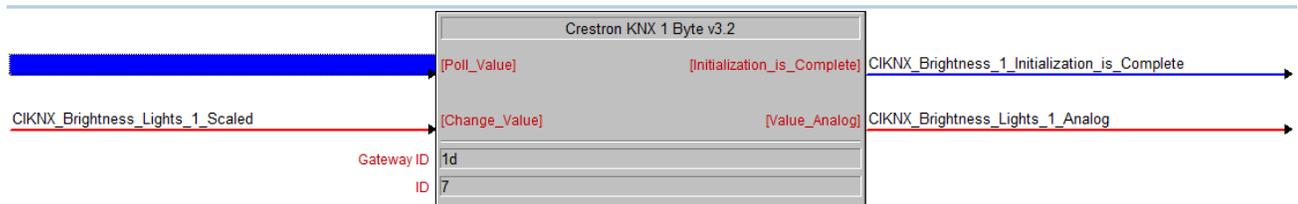
the KNX has 7 different dimming speeds. Speed 1 (slow) is standard and this proved to be sufficient for most common use cases. The feedback shows the dimming up and dimming down activity only, not the light level.



The feedback is independent from the dimming speed. Even when a KNX button panel controls the same dimmer with a different speed the feedback will still be produced.

Data type 1 Byte

The 1 Byte values are being used for all sorts of things with KNX, however in most of the cases it is used for controlling a dimmer with absolute values (e.g. level 70%). Therefore the KNX 1 Byte module requires an analog value on its input, it also gives out an analog value as feedback:

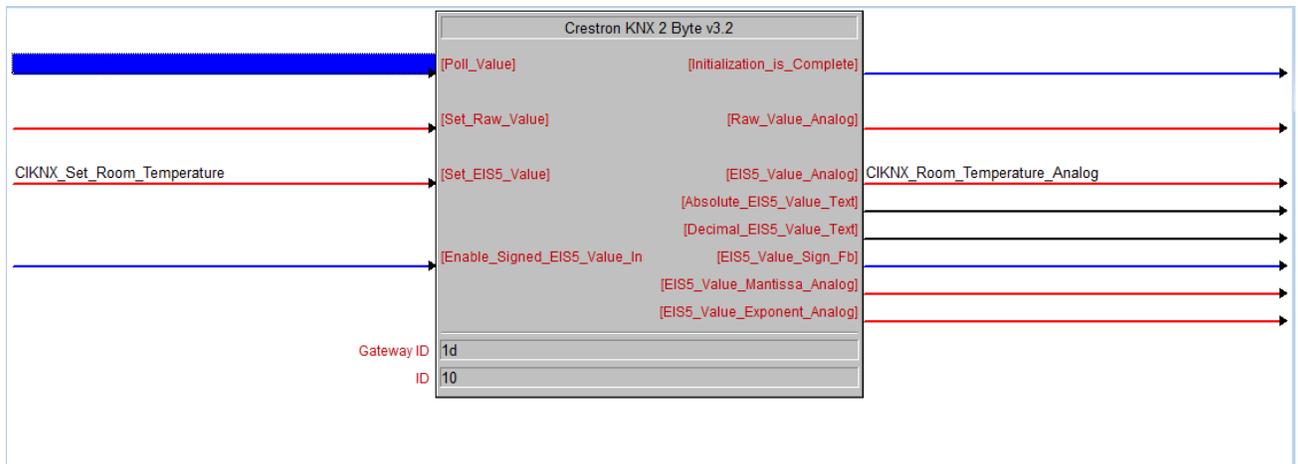


Every change of the input signal will result in a string being sent out. It uses the lower 8 bits of the analog signal. The value of the input signal should therefore range between 0 and 255. The analog input signal can be generated by an Analog Initialize symbol (see above). Also the output signal ranges from 0 to 255 (low byte).

Data type 2 Byte

The 2 byte data type is almost identical to the 1 Byte data type. In this case however the value to be controlled and read out is 16 bit (0d to 65535d). 2 byte modules are mostly used to read out analog values like temperature.

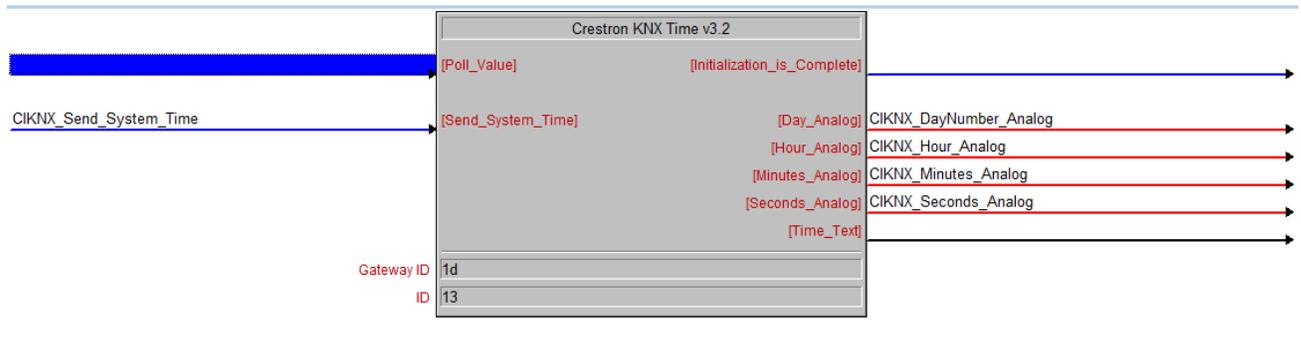
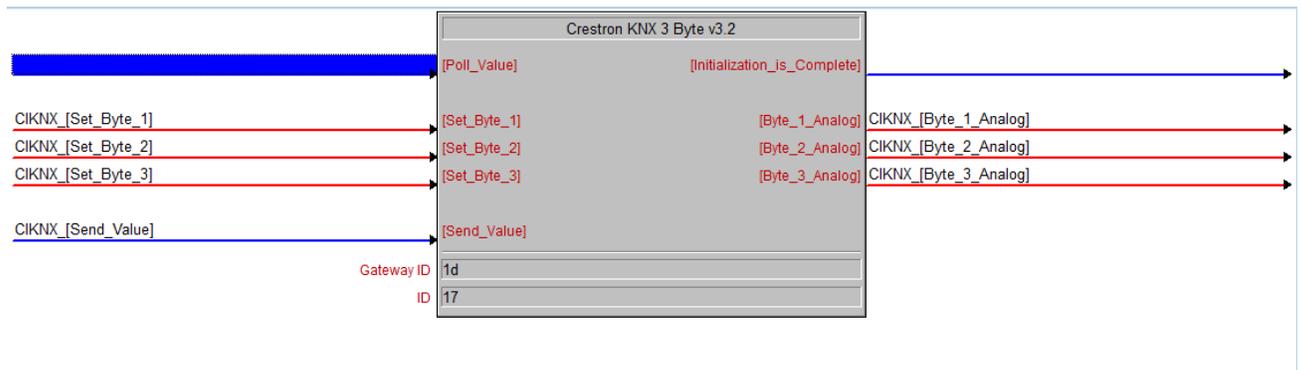
The module also offers inputs and outputs to use the EIS5 type. EIS5 is a KNX data type that is commonly used to send a 2 Byte decimal value to the KNX system. E.g. Set the “Set_EIS5_Value” input to 2550 to send 25,5 to the KNX system.

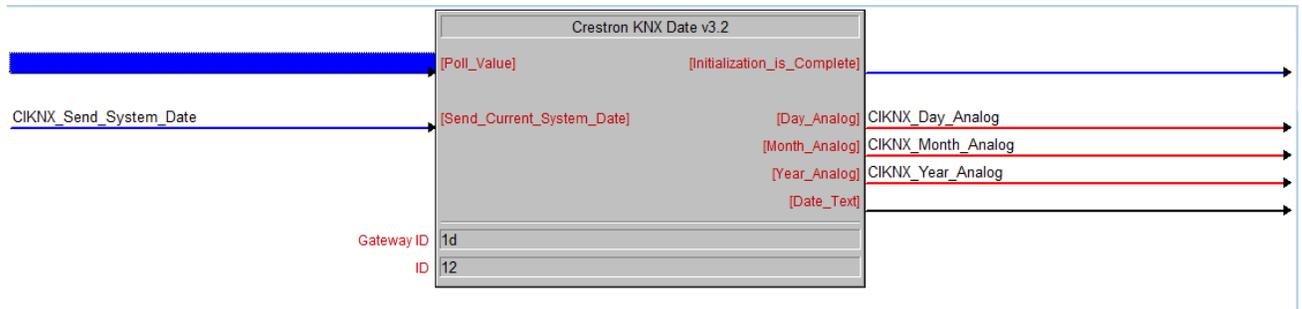


Values to set the correct temperature (1800d, 2200d) depend on the KNX device.

Data type 3 Byte – Time - Date

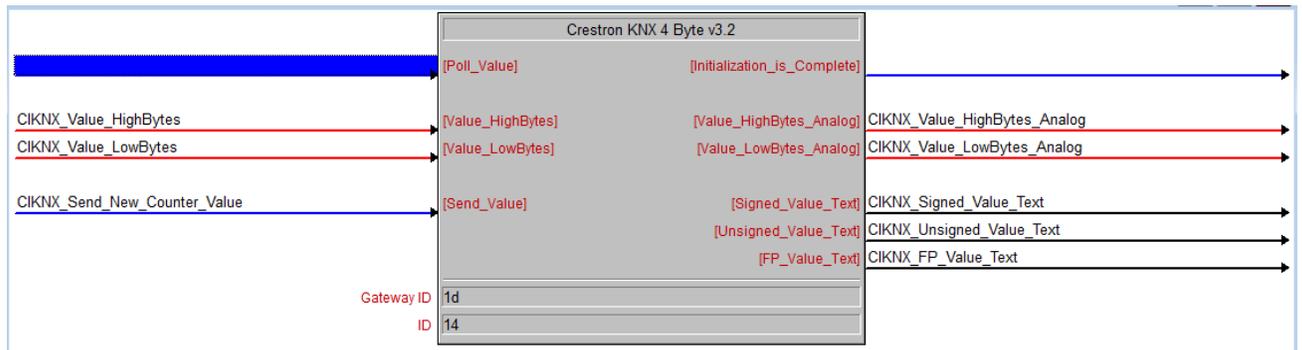
The 3 Byte data type is commonly used to represent time and date. We provide a generic 3 byte module that allows to send/receive the raw bytes. Aside from that separate modules are provided for time and date.





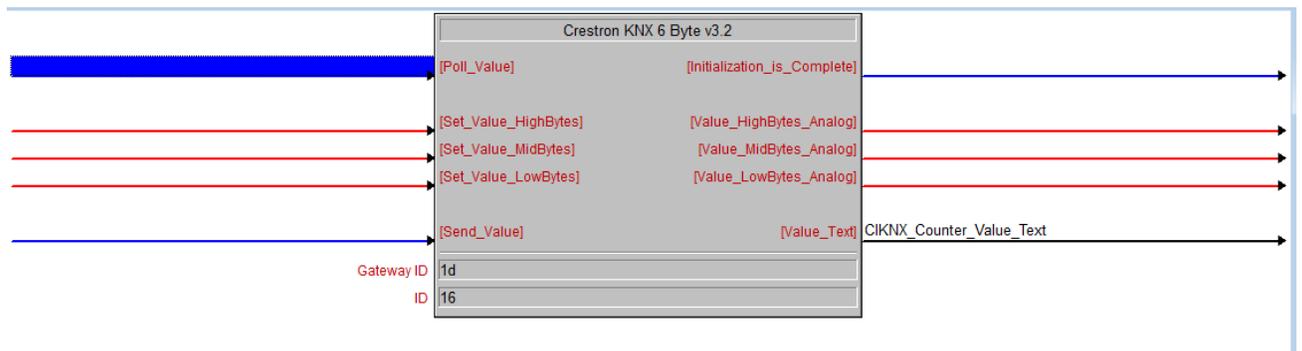
Data type 4 Byte

The 4 byte module is used to control and read out a 32 bit value (0d to 4294967295d). SMPL windows only supports 16 bit analog signals so the 32 bit value is split into two 16 bit signals. These signals represent the 16 high and low bits. The module also offers serial outputs to display the 4 Byte value as a signed, unsigned and Floating Point value.



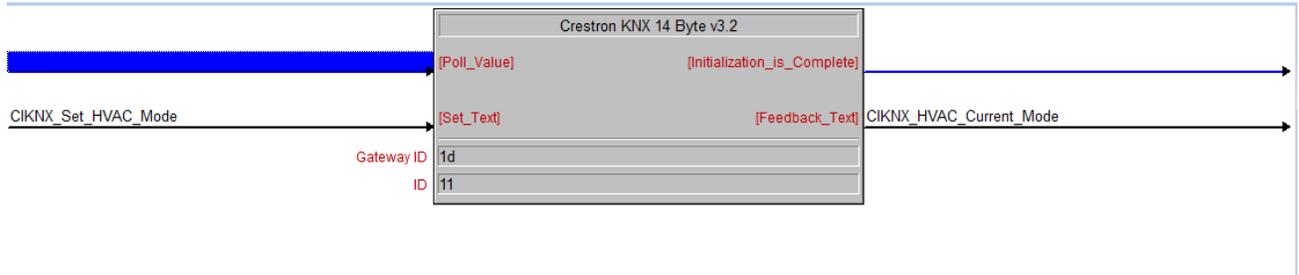
Data type 6 Byte

The 6 byte module is used to control and read out a 48 bit value. SMPL windows only supports 16 bit analog signals so the 32 bit value is split into three 16 bit signals. These signals represent the 16 high, mid and low bits. The module also offers serial outputs to display the 6 Byte value as an unsigned value.



Data-type 14 Byte

The 14 byte module sends and receives ASCII text messages from the KNX network. With this module you can request a status (e.g. “Door open”) or send text to a display (ex. Radio RDS text). If the strings being sent are less than 14 bytes then the module will automatically add “zero” bytes.

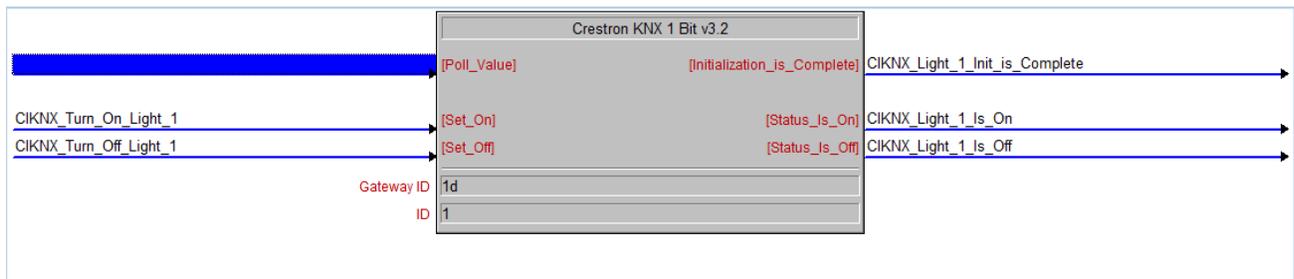


Polling

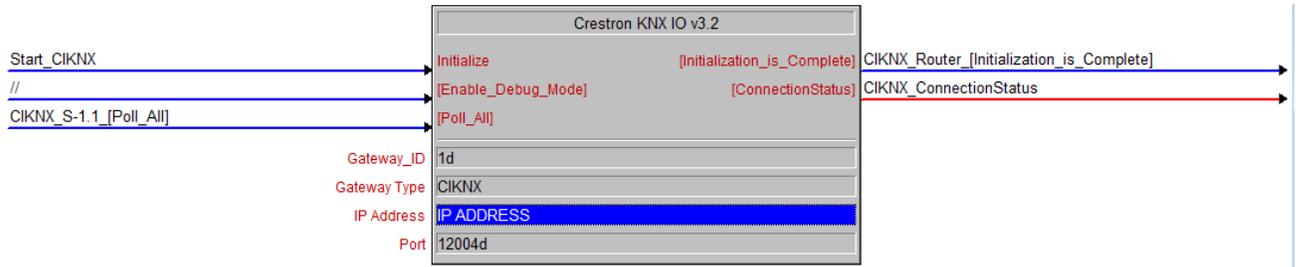
The problem when working with a KNX system is that feedback signals are not always generated automatically for every change on the network.

E.g. a dimmer can have multiple group addresses via which it is controlled. It can, for example, use 3 addresses: One to switch on/off (1 bit), one to dim up/down (4 bit) and one to create a level-feedback value (absolute value – 1byte).

With every action the light level can change, so the momentary level feedback should also change when dimming takes place. One can choose to not get live feedback as such, by deselecting the “Transmit for received data” checkbox (page 9-10). Therefore, KNX Data Type module contains a digital input called “Poll_Value” for polling the value for the KNX data type.



When the “Poll_All” input of the “KNX IO v3.2” module is pulsed, the module polls for feedback of every used object module. The answer is processed by the normal object modules and appears at the particular feedback output.



The “Poll_All” input should only be used at the start of the program to sync all KNX modules.

Use the “Poll_Value” inputs on the KNX Data Type modules to poll for individual values once the program is started.

Polling is only possible if you enable the “Read” flag in the ETS software.

Problem Solving

Troubleshooting

The following table provides corrective action for possible trouble situations. If further assistance is required, please contact a Crestron customer service representative.

Crestron CI-KNX Troubleshooting

TROUBLE	POSSIBLE CAUSE(S)	CORRECTIVE ACTION
Device does not function.	Device is not communicating with the network.	Use Crestron Toolbox to poll the network. Verify network connection to the device.
	Device is not receiving power from a Crestron power source.	Use the provided Crestron power source. Verify connections.
	Device is not receiving sufficient power.	Use the Crestron Power Calculator to help calculate how much power is needed for the system.
Loss of functionality due to electrostatic discharge.	Improper grounding.	Check that all ground connections have been made properly.

Reference Documents

The latest version of all documents mentioned within the guide can be obtained from the Crestron website (<http://applicationmarket.crestron.com>).

Further Inquiries

If you cannot locate specific information or have questions after reviewing this guide, please take advantage of Crestron's award winning customer service team by calling Crestron at +32-15-509920.

You can also log onto the online help section of the Crestron website (<http://www.crestron.com>) to ask questions about Crestron products. First-time users will need to establish a user account to fully benefit from all available features.

Future Updates

As Crestron improves functions, adds new features and extends the capabilities of the Crestron CI-KNX, additional information may be made available as manual updates. These updates are solely electronic and serve as intermediary supplements prior to the release of a complete technical documentation revision.

Check the Crestron website periodically for manual update availability and its relevance. Updates are identified as an “Addendum” in the Download column.

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