Q-SYS KNX-IP Interface Plugin

Use this plugin to connect, control, and view the status of a KNX system (Group Addresses) using a standard IP Gateway that supports the KNXnet/IP protocol for communication (Tunneling mode).

Please refer to the "Test KNX-IP Interface v.n.n.n.n.qsys" design and the "Liste Adr KNX.xlsx" Excel file for guidance on utilizing the Plugin and filling out the address list. You can download these files through the Asset Manager platform.

Note that only one instance of this Plugin is supported by Core.

Version:

Date (d.m.y)	Programmer	Version	Comments
12.10.2023	David Conus	1.0	Initial BETA
13.02.2024	David Conus	1.0	Initial RELEASE

Compatibility:

The plugin was developed and tested with the following configurations:

- Core110f. (Also tested in Redundancy Mode).
- QSD v9.7.0 and v9.9.1
- KNX Gateways:
  - Siemens N 148/22
  - ABB IPS/S3.1.1
  - Weinzierl KNX IP Interface 730
  - Schneider SpaceLogic KNX IP Interface MTN6502-0105

Prerequisites:

Be familiar with the KNX protocol (standardized communication protocol used in smart building and home automation systems) and ETS software (application used for configuring and programming devices in a KNX installation), or at least know the object types (DPT), object addresses and work with a KNX programmer for commissioning.

Connecting to the Gateway:

To begin using the plugin, drag it into the schematic.
For a description of all configurable properties, see “Properties”.
Press F5 (or F6 to emulate) to save your design to the Core and run it.
Double-click the plugin to open the setup panel.

If you know the IP Address of the Gateway: In the plugin's Setup tab > Connect to Device section, type the IP Address of the device and press Enter to launch the **Communication process*.**
If not, you can use the Discovery feature by selecting the Refresh Interface List button. This will display a list of gateways (Discovered Interfaces) with their names, KNX address, IP address and IP Port that are solely compatible with KNX Tunneling. **It is important to note that discovery relies on multicast IP protocol (address 224.0.23.12), so the success of this function may be dependent on your network infrastructure** (such as routers, Wi-Fi…) and/or your network card settings (such as security protocols, firewall configurations…).
Selecting the gateway from the list will automatically launch the **Communication process***.

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***Communication process:**

To initiate the Communication process with KNX objects, complete the following steps:

- the gateway IP address is entered (either manually or by discovery).
- the IP port is entered (default 3671).
- a valid local network interface has been selected (this means that the "Local IP Address" tab automatically displays the IP address of the Core or of your laptop, depending on the connection mode).

At this time, the plugin will automatically attempt an IP connection with the Gateway.
If IP communication has been established the Plugin will:

- Send a Read command (request status) to the KNX Group Addresses (GA) that require feedback ("Feedback (Ri)" button activated).
  - KNX Status information: Initializing-GA READ VALUE: 1st Attempt
  - LED (Ri): red and ON
- Wait for these Objects to respond for the maximum time agreed by the KNX protocol.
  - LED (Ri): if response found green and ON
- If there are addresses that have not responded, a 2nd attempt will be made.
  - KNX Status information: Initializing-GA READ VALUE: 2nd Attempt
  - LED (Ri): still red and ON
- Once this process is complete, you'll get a message (KNX Status) indicating either that everything is OK:
  - KNX Status information: OK
- Or a momentary message indicating how many GA haven't responded:
  - KNX Status information: Compromised-No response from [n] KNX Group Address [GA] after 2 attempts. It will be ignored and the plugin will operate normally

  If this is the case, the plugin will work normally, but check why these Objects didn't respond (incorrect settings, ETS programming…). After a max. of 60 sec this message will be discard.

If you see "OK" on the Connection Status indicator, you are successfully connected to the device. If you see a "Compromised" or "Missing" error, check to make sure you entered the correct parameters.
To help you to understand the fault you can select the debug mode for more information (see "Properties").

If you see "OK-CONNECTION STATE RESPONSE: NO ERROR [00h]" on the KNX Status indicator, you are communicating correctly in Tunneling mode with the KNX Gateway and the heartbeat process is started.
If not, an error message will indicate the KNX problem (these are exactly the KNX protocol error messages).
For Address group entries: See the Groups page information

Properties:

Show Debug

Select 'Yes' to show the Debug Output window. For details, see the Debug Output topic in the Q-SYS Help.

Debug Print

Select an Option depending on which kind of debug information you would like to show on the "Debug Output". For details, see the Debug Output topic in the Q-SYS Help.

Number of Groups (GA)

Enter the maximum number of KNX Group Addresses you require (between 1 and 260).

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Setup Page:

Connect to Device

IP Address (To fill in)

The IP address of the KNX IP Gateway.

IP Port (To fill in)

The IP Port of the KNX IP Gateway. **Default: 3671 (KNX standard).**

Local Network Interface (Combo Box)

The list of Network Interface Cards (NIC) available. Non-compatible NICs including "Loopback", "vEthernet" and "Virtual" are automatically discarded.

Local IP Address

The IP address of the device with which KNX Tunneling will be performed. This can be your Laptop (Emulation Mode) or a Core. This value is automatically filled in depending on the NIC selected. See above.

Discovered Interfaces (List Box)

The list KNX IP Gateway available. Non-compatible Gateways are automatically discarded, only Tunneling capabilities devices are displayed.
The format is: “Friendly Name (IP Address:IP Port – KNX Individual Address)
It is important to note that discovery relies on multicast IP protocol (address 224.0.23.12), so the success of this function may be dependent on your network infrastructure (such as routers, Wi-Fi…) and/or your network card settings (such as security protocols, firewall configurations…).

Refresh Interface List

Button to start the discovery process, see above.

Interface Information

Serial Number
Serial number of the Gateway. In the format [Manufacturer ID:Serial Number]
Multicast Address
The Multicast Address of the Gateway (useful for network routing).
MAC Address
The MAC Address of the Gateway.
Friendly Name
Gateway name as specified in the ETS software.

Individual Address
Gateway Individual Address as specified in the ETS software. (Not to be confused with a Group Address).

Project Install ID
Installation ID of the project as specified in the ETS software.

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KNX Status

Displays the current KNX Tunneling communication status:

- OK-CONNECTION STATE RESPONSE: NO ERROR [00h]:
  o The Plugin is connected to the unit
- Initializing-GA READ VALUE: [1st] or [2nd] Attempt:
  - Plugin connected to Gateway and startup process in progress (interrogation of necessary Group Addresses for the 1st or 2nd time). See Communication process.
  - Compromised-No response from [n] KNX Group Address [GA] after 2 attempts, it will be ignored
  - Plugin connected to Gateway and startup process done. A number [n] of addresses did not respond. This will be ignored and if communication with the Gateway is ok the message will disappear within 60 sec. **See Communication process.**
- FAULT-No IP Communication
  - The gateway's IP address and/or IP port are missing and/or Local Network Interface error.
- FAULT-No answer from Gateway
  - The plugin could not communicate with the Gateway. **Note that once disconnected, this message may take up to 120 sec. to appear.**
- FAULT-CONNECT RESPONSE: NO MORE CONNECTIONS [24h]
  - The Gateway cannot communicate with the plugin at the moment because all channels are in use. **Wait for up to 60 seconds, as the gateway should release a channel automatically, as per the KNX standard. The plugin will then repeat its communication process.**
- FAULT-*information and code error[xxh]*
  - Information message with KNX protocol error code. This may help you, possibly share the information with the KNX system programmer.

Connection Status

Displays the current connection status:

- OK: Plugin is connected to the unit
- Compromised-KNX Group Address [GA] status in progress, wait…:
  - Plugin connected to Gateway and startup process in progress (interrogation of necessary Group Addresses). **See Communication process.**
- MISSING-2130: bind: The requested address is not valid in its context.
  - Local Network Interface error. Change the interface.
- FAULT-IP Address and/or IP Port missing
  - The gateway's IP address and/or IP port are missing.
- FAULT-Disconnected:
  - The plugin could not communicate with the Gateway. **Note that once disconnected, this message may take up to 120 sec. to appear.**
- FAULT-[KNX-Layer] *information with help*
  - KNX error code interpretation. This may help you, possibly share the information with the KNX system programmer.

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Groups (nn-nn) Page:

Name

Friendly Name of the Group Address

Address (GA)

KNX Group Address. **Only 3-Level Style [main/middle/group] is supported (e.g. 2/4/22).**
The range is from 0/0/1 to 31/7/255 (extended range).
If the message Invalid appears, you have entered an incorrect format.

Data Type (DPT)

KNX Data Type. These types and values are supported:

- **1-bit [1.*]** -> Values can be :
  - ON : 1 or true
  - OFF : 0 or false
- **4-bit [3.*]** -> Values can be :
  - Dim Dn: From 1 to 7. 1 is default (0%)
  - Dim Up: From 9 to 15. 9 is default (100%)
  - Dim Stop: 0
- **1-Byte (0-100) [5.001]** -> Values can be :
  - From 0 to 100
- **1-Byte (0-255) [5.004]** -> Values can be :
  - From 0 to 255
- **2-Byte (Unsign) [7.*]** -> Values can be :
  - From 0 to 65535
- **2-Byte (Float) [9.*]** -> Values can be :
  - -670760.00 to 670760.00 **(Pay attention to 2-byte precision. Optimized range between -41.0 to 128.0 (in steps of 0.5) to match the rounded process of ETS.**
- **4-Byte (Float) [14.*]** -> Values can be :
  - $-3.40282^{E}38$ to $3.40282^{E}38$ **(Pay attention to 4-byte precision).**
    (Value with exponent is wrote in this format e.g. : 3.112011e+16)

Feedback (Ri)

Read on initialization and update value on status change

Toggle the button to activate or deactivate the automatic reading of the address value during initialization and when it's modified. To change this value, you can also use true or false (see the .xlsx file for example).

- **LED if present:** Means that you want automatic reading of the value.
- **LED red off:** No value request has yet been sent to the object.
- **LED red on:** A value request has been sent to the object, but no response has been received.
- **LED green on:** A value request has been sent to the object, and a response has been received.
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Link FB in Pairs

Synchronize a pair of Group Addresses (Feedback GA synced with Command GA)

Toggle the button to enable or disable pair-wise address synchronization (group of two).
When enabled, your 2nd group address will be automatically designated as feedback, and its Data Type will match that of the first one. As soon as its value changes, the 1st group address will adopt the same value.

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Value (W)

Write a value

Used to write and/or read the value of an object.

If the message Wait appears, KNX Tunneling communication is not ready.

If the message Invalid appears, you have entered an incorrect format.

Read (R)

Read a value

Use this button to force the system to read the value of an object. If no response is received, the object may not be set to respond (see ETS programming).

To make it easier for you to fill in these values, you can use the Excel file "Liste Adr KNX.xlsx".

It's very easy to select and copy all the values of the 4 columns in green: Name, Address (GA), Data Type (DPT) and Feedback (Ri) for each page, and copy them all at once by selecting all these values on the corresponding Plugin page. **Be careful not to copy the Data Type (DPT) and Feedback (Ri) columns if you are using the 'Link FB in Pairs' option, as this could result in gaps in the Excel table, causing cell information to shift.**

Controls Pins:

Pin Name	Value	String	Position	Pins Available
Group Data > Group Nbr (number of group):				
Address (GA)	(text)			Input / Output
Feedback (Ri)	0 / 1	false / true	0 / 1	Input / Output
Link FB in Pairs	0 / 1	false / true	0 / 1	Input / Output
Name	(text)			Input / Output
Read Value (R)	0 / 1	false / true	0 / 1	Input / Output
Type (DPT)	(text)			Input / Output
Value (W)	integer, float, boolean (depending of the Data Type)			Input / Output
Setup > Connect to Device:				
IP Address	(text)			Input / Output
IP Port	(text)			Input / Output
Local IP Address	(text)			Output
Local Network Interface	(text)			Input / Output
Setup > Interface Information:				
Friendly Name	(text)			Output
Individuel Address	(text)			Output
MAC Address	(text)			Output
Multicast Address	(text)			Output
Project Install ID	(text)			Output
Serial Number	(text)			Output
Connection Status	(text)			Output
Disable*	0 / 1	disable / enable	0 / 1	Input / Output
KNX Status	(text)			Output

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Disable*: Use this control pin to enable or disable the plugin in your design. When Disabled is set to enabled (value of 1), the Connection Status changes to "Not Present - Disabled".