EXOR INTERNATIONAL

Tech-note

KNX TP/IP Communication Driver for JMobile

This Technical Note contains the information needed to connect the system to KNX networks

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Contents

KNX TP/IP Driver

KNX is the association that promotes the KNX communication standard, designed for applications in home and building automation systems.
The KNX standard, approved as European Standard EN 50090, EN 13321-1, is based on the communication stack of EIB with some extensions. EIB is the acronym for European Installation Bus.
Additional information and further details can be found in the KNX web site www.knx.org.

The network communication media supported by the HMI panels are:

- TP-1: twisted pair, type 1, which corresponds to a bus line operating at 9600 bit/s.
- IP: network connection via TCP/IP over Ethernet network.

Note: *Connection to KNX systems in TP Mode requires the optional KNX communication module PLCM02. Verify the suitable version of communication module for your HMI model.*

The EIB is an event-driven decentralized automation system.
The information to be transmitted over the bus is organized in “telegrams” sent by a source to one or more destination devices.
The bus line of EIB systems carries both data and power for the devices. The data is modulated over the DC voltage of the power supply.
HMI panels are not powered from the network and they still need the usual power supply.

The planning, design and commissioning of KNX installations are normally done using the ETS configuration software. This software tool is supplied by the KNX organization. ETS is a registered trademark of KNX.
This document contains the information required to use ETS in combination with the HMI panels.

All KNX compliant devices come with a device descriptor delivered as a file to be imported in the configuration tool.
The model adopted by HMIs corresponds to a KNX device with no objects. For what concerns the ETS, the only function supported by the HMI panels is the device physical address assignment.

Protocol Editor Settings

Add (+) a driver in the Protocol Editor and select the protocol called “KNX TP/IP” from the list of available protocols.

The protocol parameters can be selected from the dedicated dialog boxe:

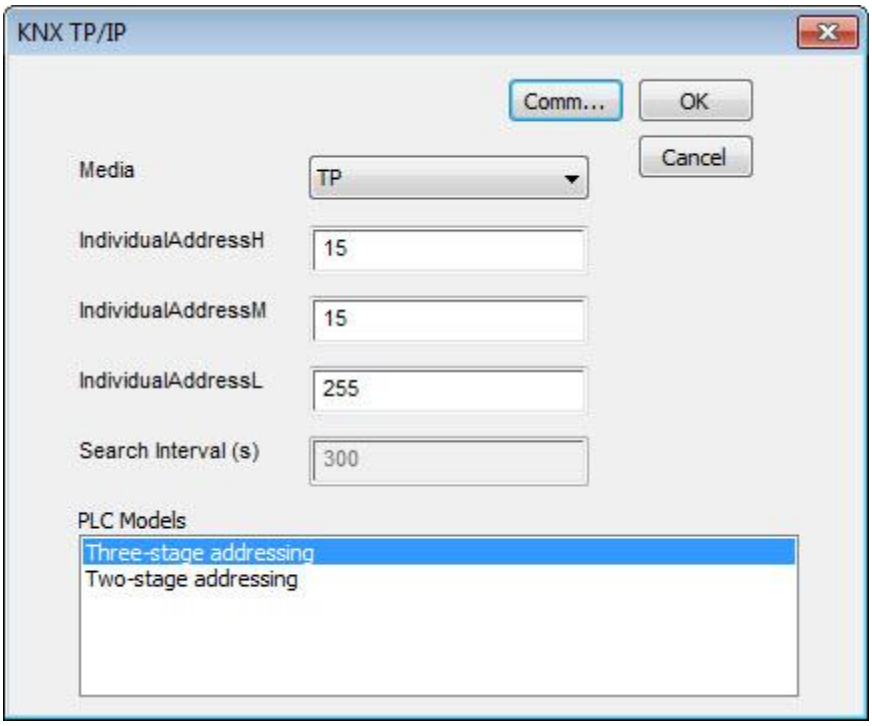


Figure 1

The Individual Phisical Address can be assigned on the HMI screen at the first download of the project configured for the KNX protocol. This is the Phisical Address that identifies the panel in the KNX network. The default address value is: 15.15.255.

Please note that, as any other KNX device, also the HMI device must have unique Individual Address in the KNX network and it must correspond to the real point in the network where the HMI device is connected.

Media	Allows the selction of the Media, select TP to connect to the KNX network using the optional KNX communication module PLCM02. Select IP to connect to the KNX network via TCP/IP.
IndividualAddressH	Phisical Address High Part (Area)
IndividualAddressM	Phisical Address Medium Part (Line)
IndividualAddressL	Phisical Address Low Part (Device)
PLC Models	KNX telegram can have three or two stage addressing, select model corresponding to your needs
Search Interval (s)	When media is set to IP, the KNX driver will re-evaluate the network with period “Search Interval” (default: 300 seconds). On searching the network, the KNX driver will discover the tunneling endpoints that are available at that time. Endpoints will therefore be registered as possible

sources / destinations for group address operations. Depending on endpoints settings or endpoints temporary unavailability the available sources / destinations for group address operations may vary. Thus the capability for the KNX driver to re-evaluate periodically its knowledge about the network.

Communication parameters

The communicaton parameters can be selected from the dedicated dialog boxe:

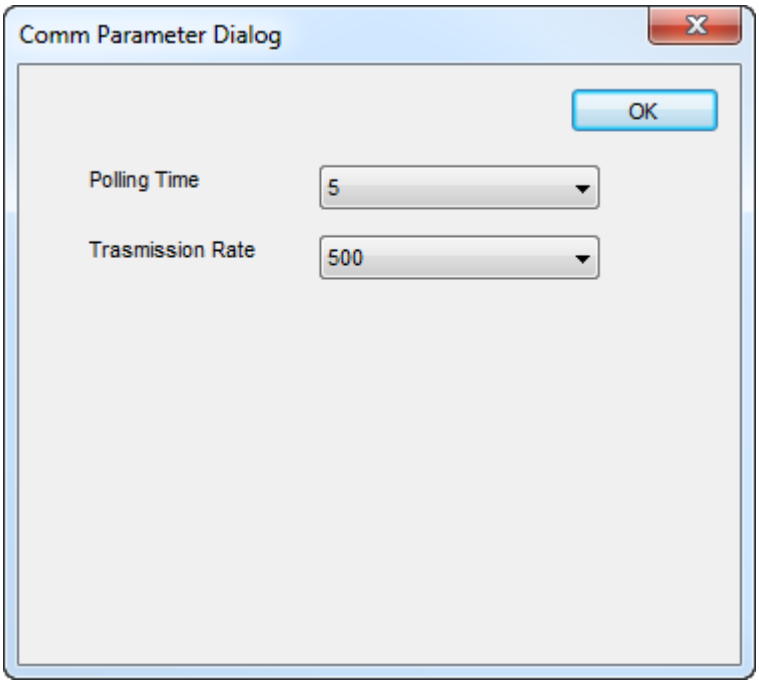


Figure 2

Polling Time Defines how often the tags with Polling attribute enabled are requested to the network (seconds).

Trasmission Rate Defines the interval of time between two consecutive write operations performed by the operator panel (milliseconds).

Tag Import

The KNX TP/IP driver supports the Tag import facility.The import filter accepts symbol files with extension ".esf" created by the ETS programming tools.
The ETS configuration software can export the database information related to group addresses.
To export database information select "Extract data" from the File menu of ETS software.

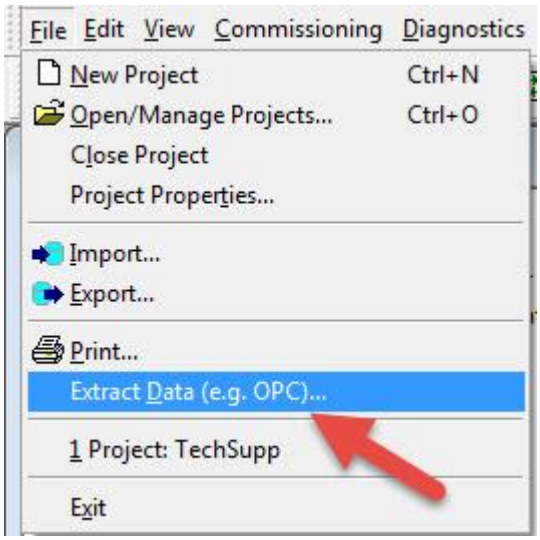


Figure 3

Select the option "Export to OPC Server" to export data in ".esf" format.
Clicking on "Export..." creates the ".esf" file to be imported in the Tag Editor.

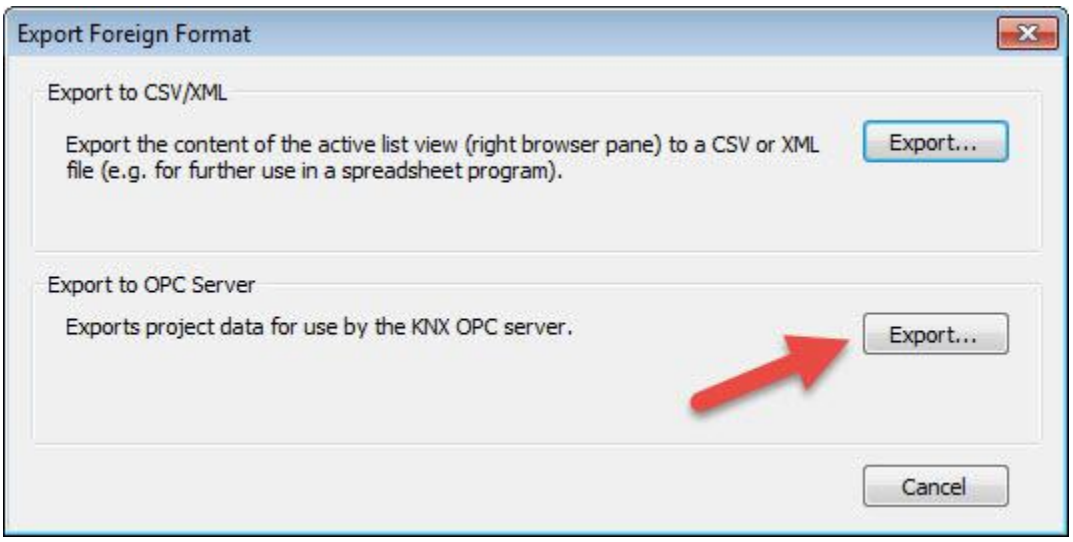


Figure 4

To import tags from the ".esf" file created, select the communication driver in the Tag Editor and click on the "Import tag" button to start the import process.

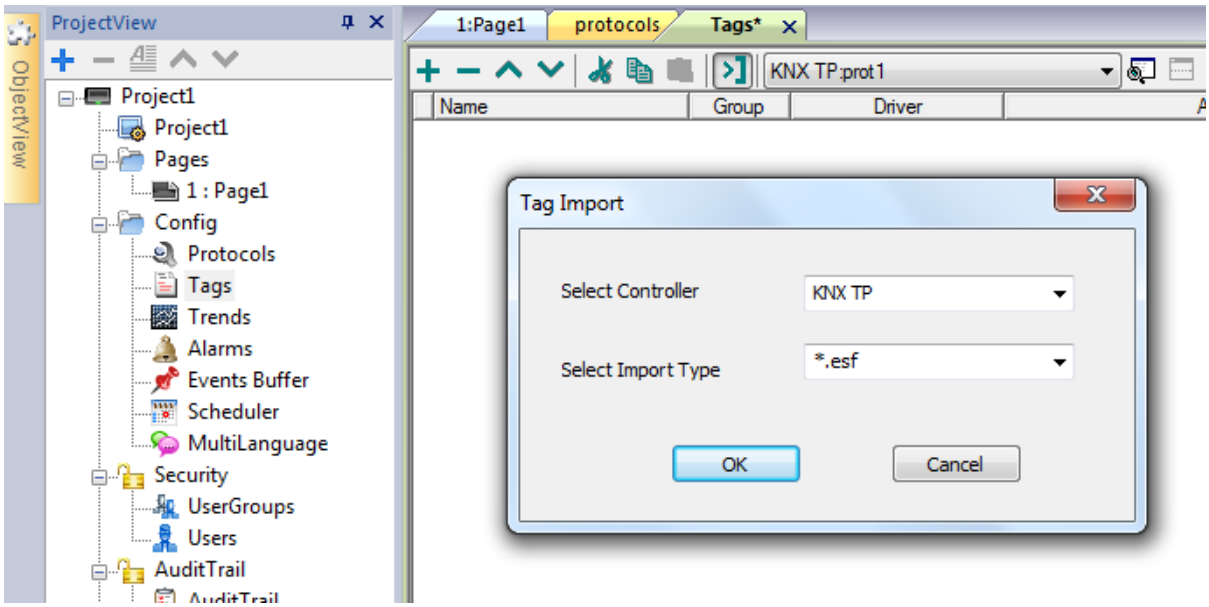
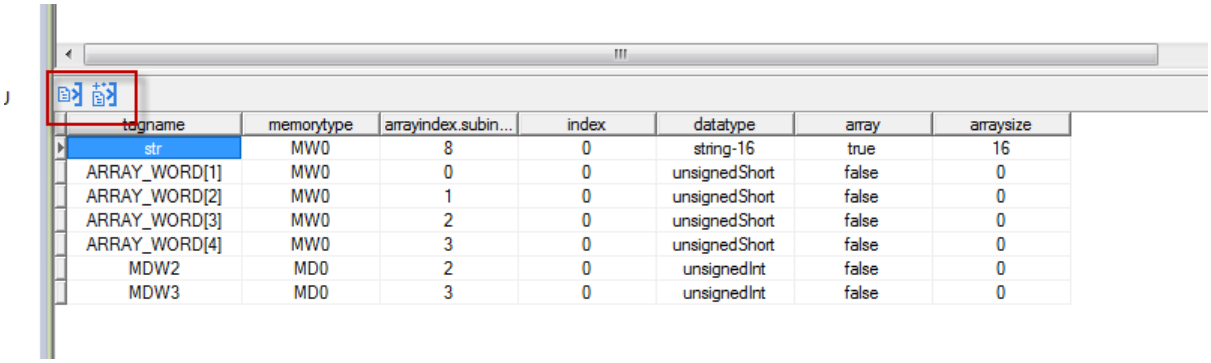


Figure 5

Locate the ".esf " file and confirm with OK. The tags present in the imported document are listed in the tag dictionary.The tags can now be added to the project using the "Add tags" button as shown in Figure 6.



tagname	memorytype	arrayindex.subin...	index	datatype	array	arraysize
str	MW0	8	0	string-16	true	16
ARRAY_WORD[1]	MW0	0	0	unsignedShort	false	0
ARRAY_WORD[2]	MW0	1	0	unsignedShort	false	0
ARRAY_WORD[3]	MW0	2	0	unsignedShort	false	0
ARRAY_WORD[4]	MW0	3	0	unsignedShort	false	0
MDW2	MD0	2	0	unsignedInt	false	0
MDW3	MD0	3	0	unsignedInt	false	0

Figure 6

Polling Attribute

The Polling attribute is associated to each individual tag (corresponding to a KNX group address). This attribute can be found it in the “Edit tags” window, as shown in Figure 7.

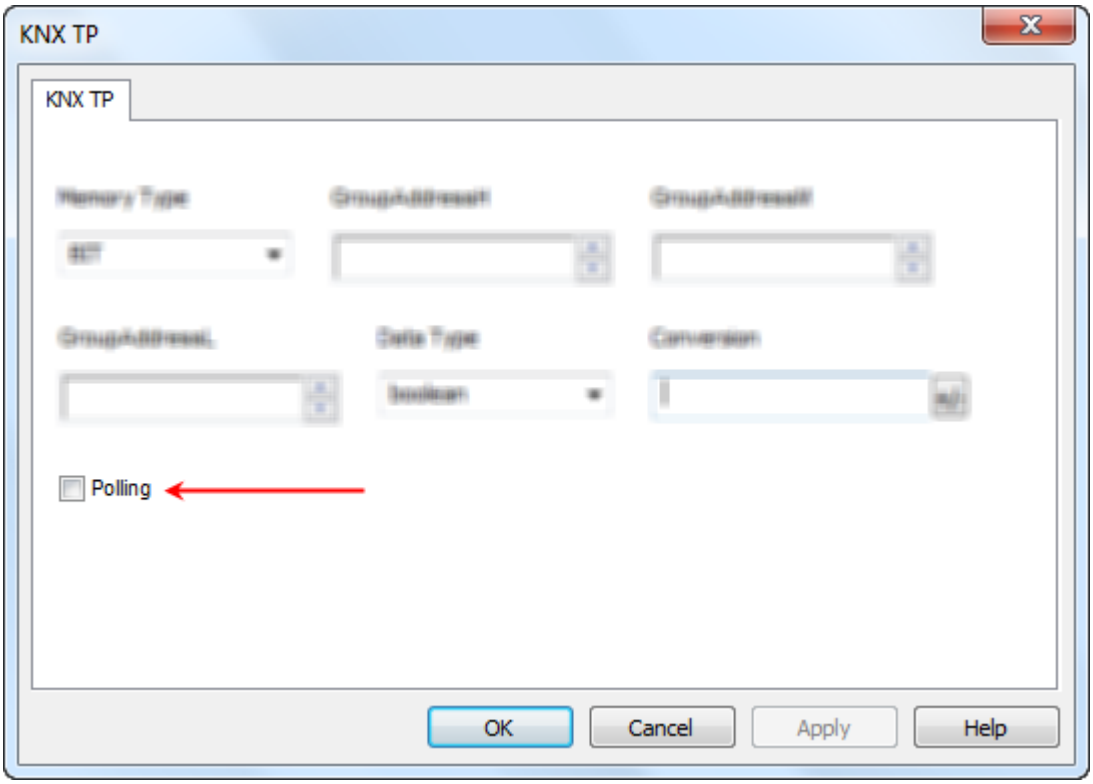


Figure 7

Special Data Types

The list of special data formats supported by this implementation of the KNX protocol is the following:

Data Types	Memory Type	KNX Datapoint Type
Bit	BIT	1.0xx
1 Bit Controlled	1BIT	N/A
3 Bits Controlled	3BIT	3.007
Octet, Unsigned	OU	4.00x 5.00x 17.001 18.001
Octet, Signed	OS	6.001 6.010
2 Octets, Unsigned	2OU	7.0xx
2 Octets, Signed	2OS	8.0xx
2 Octets, Float	2OF	9.0xx
Time	TIM	10.001
Date	DAT	11.001
String	STR	16.000 16.001
4 Octets, Unsigned	4OU	12.001
4 Octets, Signed	4OS	13.0xx
4 Octets, Float	4OF	14.0xx
Access	ACC	15.000
Uncertain (1 byte)	U1	Uncertain
Uncertain (2 Bytes)	U2	Uncertain
Uncertain (3 Bytes)	U3	Uncertain
Uncertain (4 Bytes)	U4	Uncertain

Some KNX Datapoint Types can be converted using the “Scaling” functionality, available for all the tags.
In Figure 8 you can see an example of scaling conversion for Percent values of dimmer actuators (Datapoint Type 5.001 DPT_Scaling). Applying this Scaling conversion, the “0/0/1 % Value” tag manage values in range 0÷100 instead of standard range 0÷255 of Unsigned Octet.

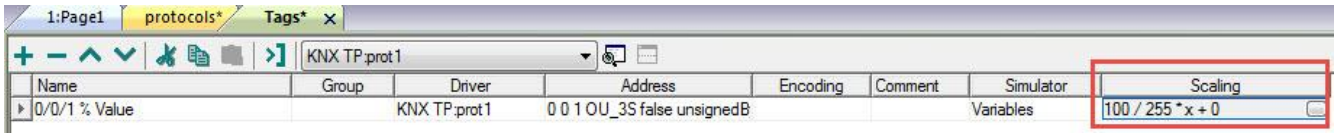


Figure 8

Dimming function

To operate a dimming function in JMobile, you need to work using the 3 Bits Controlled data type. Actually this is a 4 bit data where the 1st bit is used to determine if increment or decrement the value and the remaining 3 bits determines the percentage of dimming applied.

The Tag will represent a fixed percentage value (from 0% to 100%) of increasing or decreasing of a particular device value.

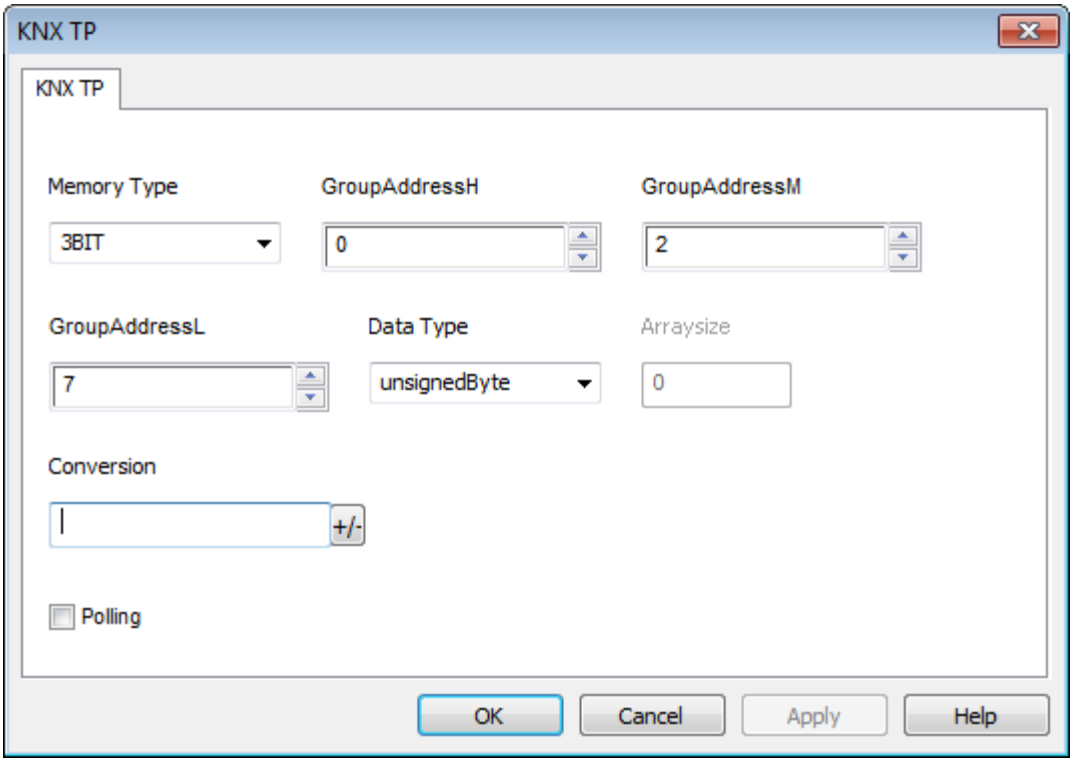


Figure 9

The table below reports the action performed for each value assumed by the Tag.
For example, to increase the dimmed value of 25% it is necessary to write into the Tag that manages the dimming the binary value “1011”, wich in decimal code, corresponds to “11”.

Direction	Data	Action
0	001	Down 100%
0	010	Down 50%
0	011	Down 25%
0	100	Down 12%
0	101	Down 6%
0	110	Down 3%
0	111	Down 1%
1	001	Up 100%
1	010	Up 50%
1	011	Up 25%
1	100	Up 12%
1	101	Up 6%
1	110	Up 3%
1	111	Up 1%

As mentioned before to increase the dimmed value by 25% it is necessary to write 11 in the corrisponding Tag, To do this a Write Tag action programmed as shown in the Figure 10 must be created.

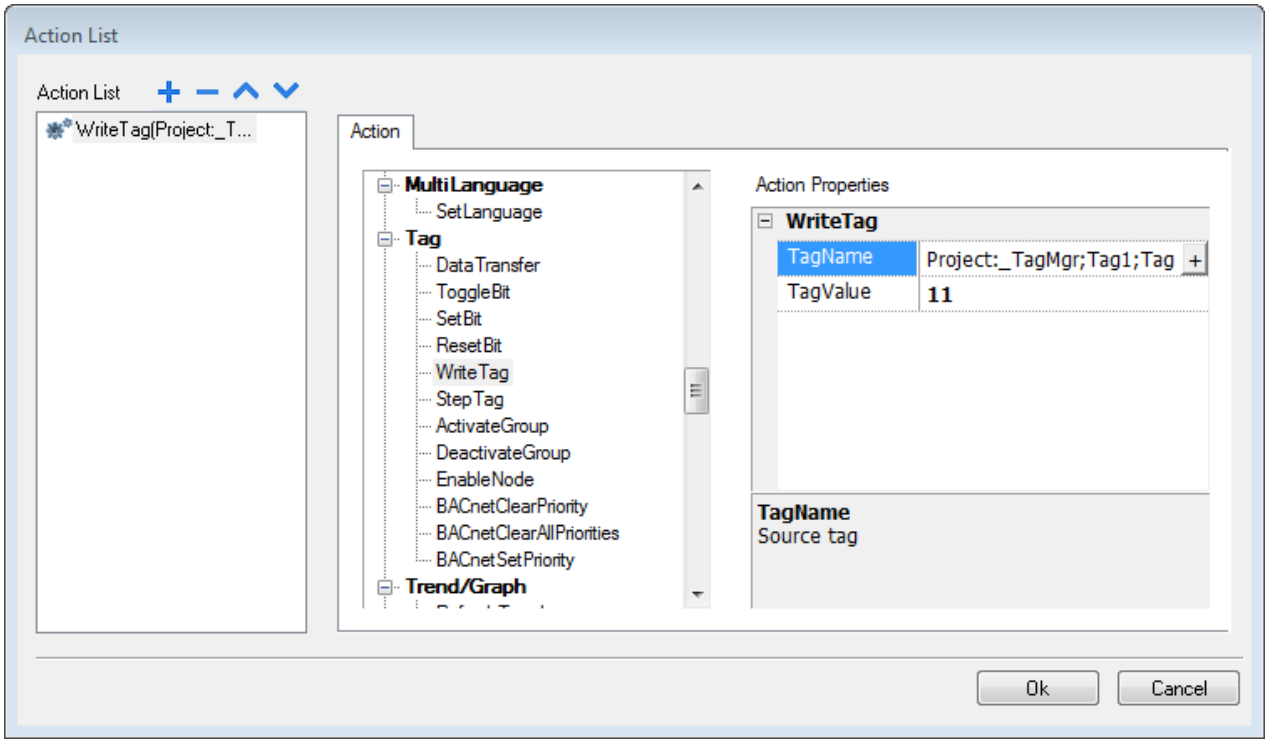


Figure 10

Time

The Time data type requires a special data conversion.

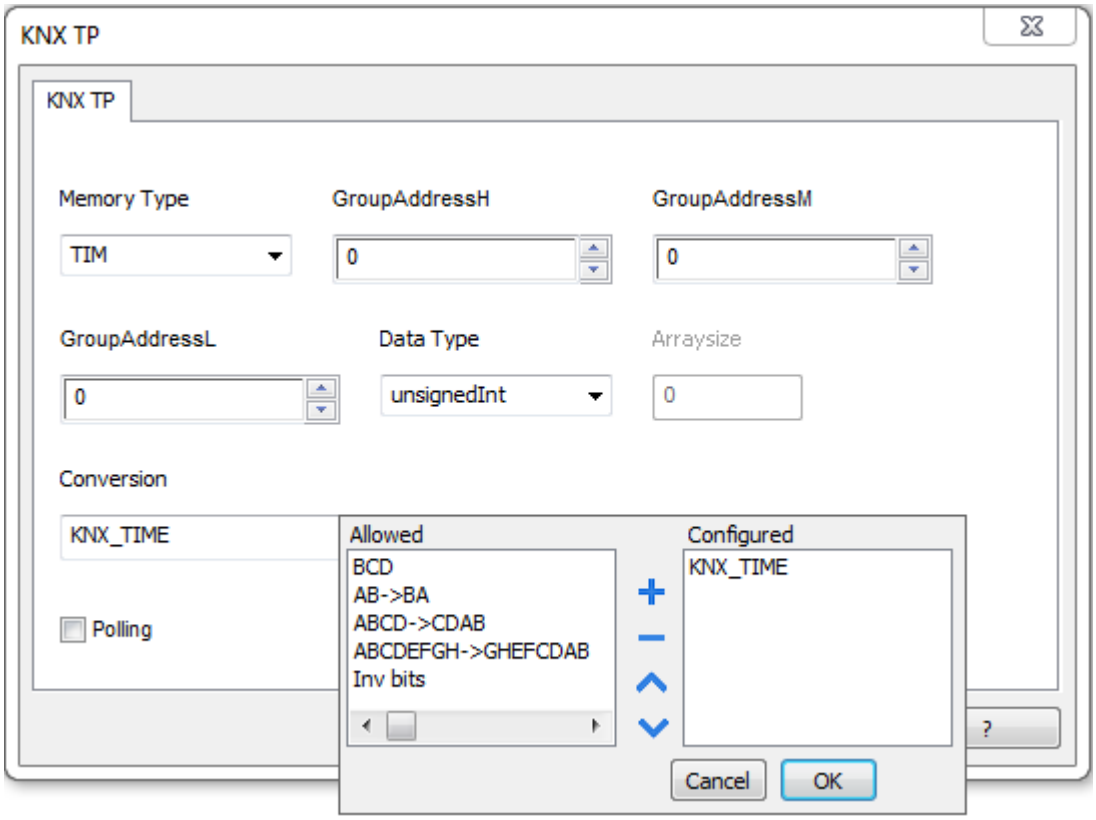


Figure 11

The correct visualization of the time information from this tag can be achieved using the widget dedicated to handle “Time” data source.

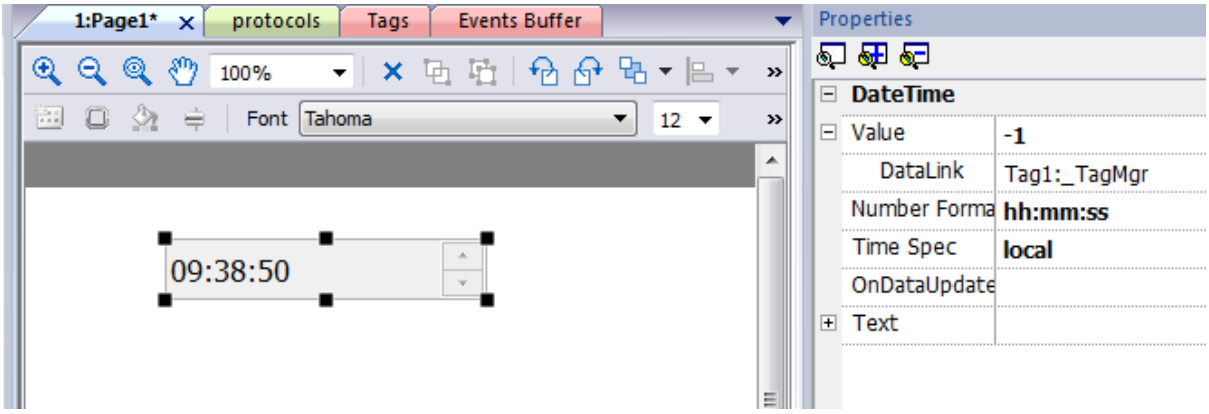


Figure 12

***Note**: In the “DateTime” widget it is important to set properly the “Time Spec” property in order to avoid the influence on the visualization of the HMI clock timezone and DST settings; Select Number format properly.*

***Note**: Write operation from HMI to KNX network will be executed only with “No Day” information.*

Date

The Date data type requires a special data conversion.

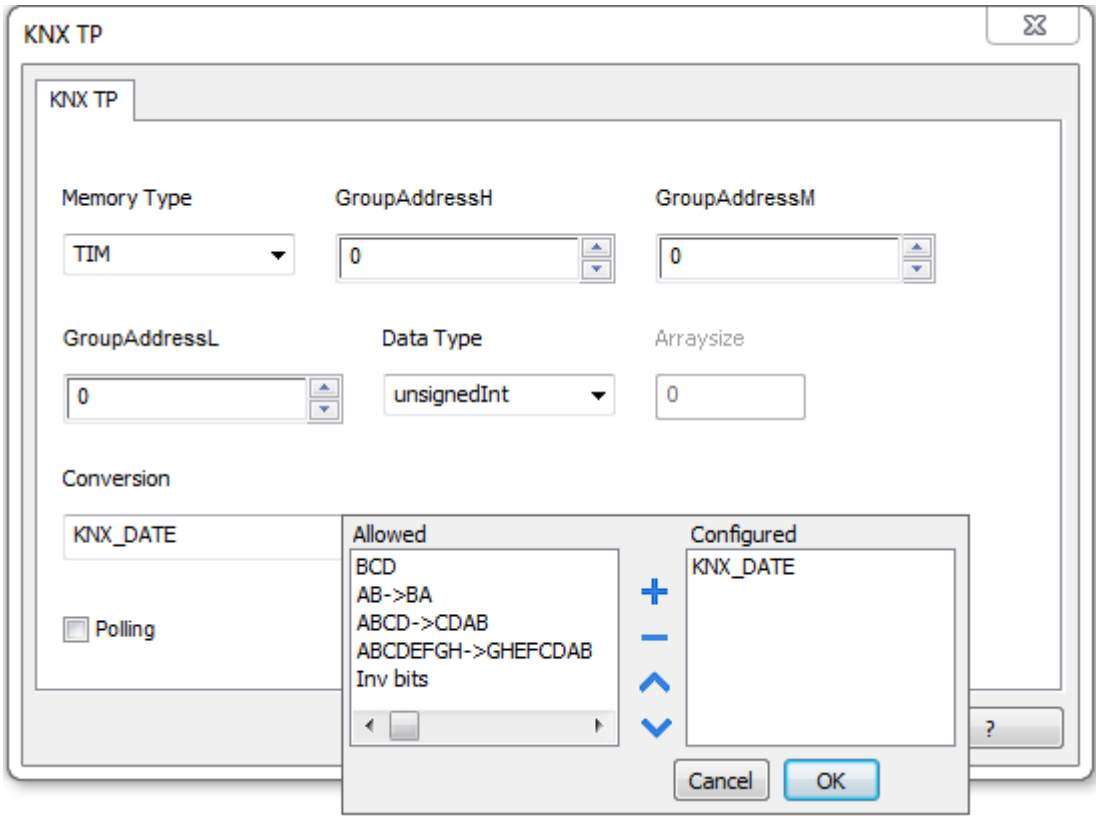


Figure 13

The correct visualization of the date information from this tag can be achieved using the widget dedicated to handle “DateTime” data source.

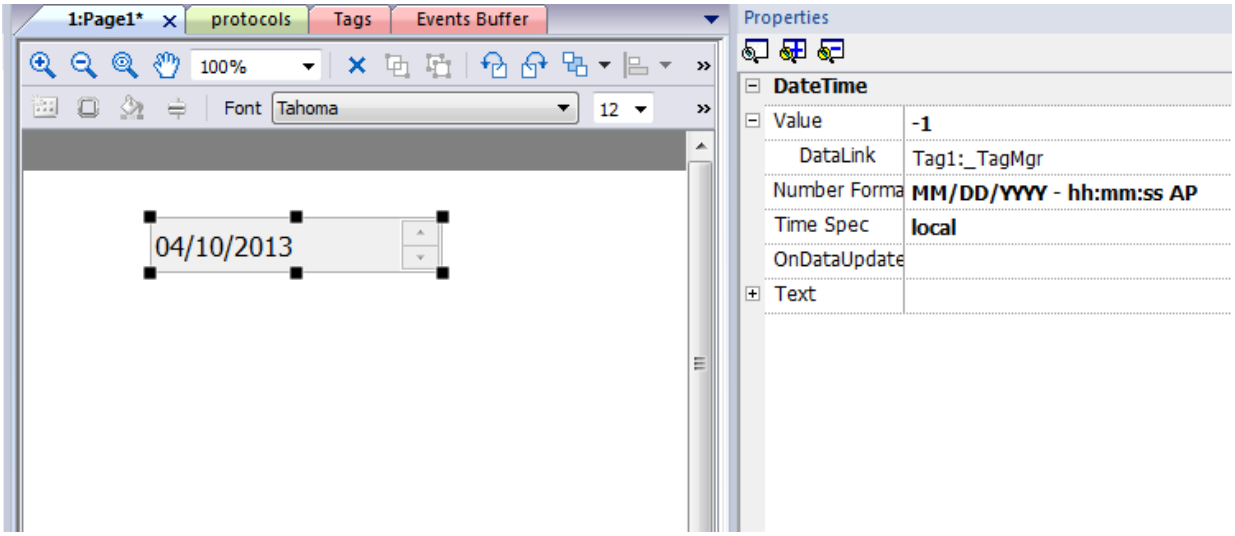


Figure 14

Time – Day of the Week

The Day of the Week data type is part of Time telegram and requires a special data conversion.

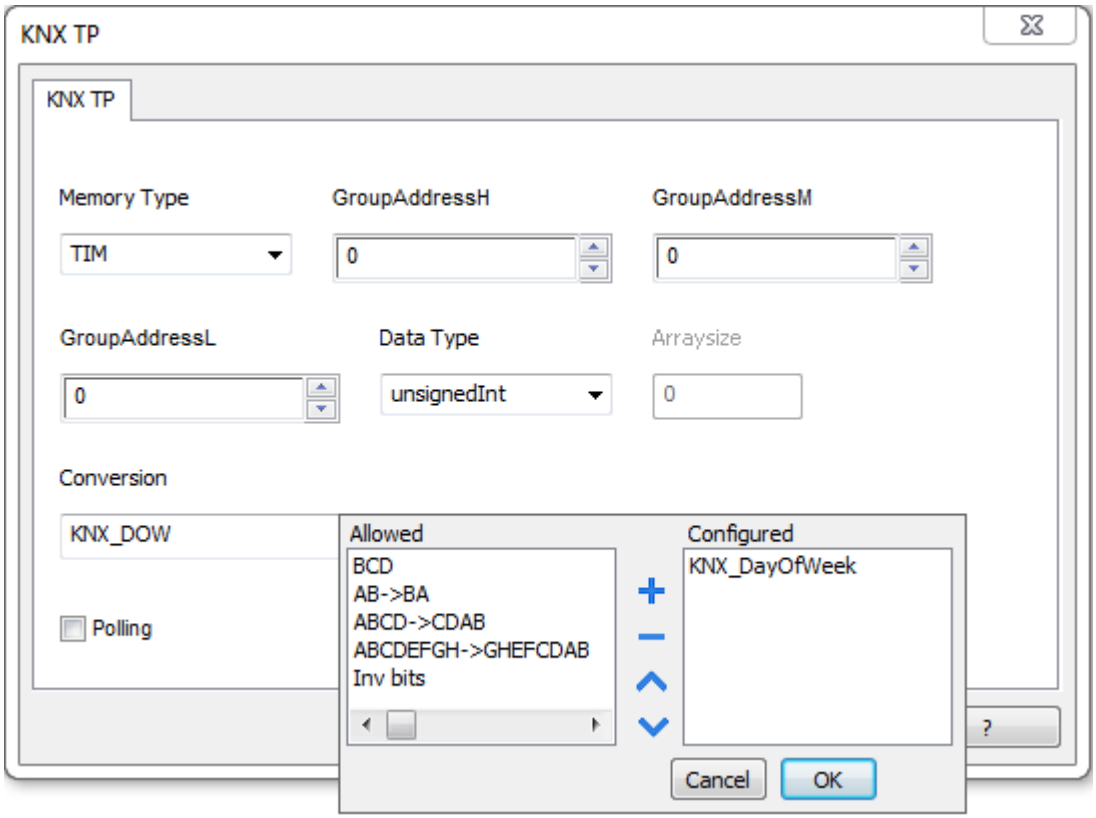


Figure 15

Note: This object is in read-only mode

Programming Mode

Programming Mode is a special device operating mode that allows changing some system parameters. It is common to most KNX TP devices.

Programming Mode for Individual Address programming via ETS can be set directly in the HMI device.

The first time a HMI project made for the KNX TP communication driver is downloaded to an HMI panel, the unit is assigned the specified Phisical Address (see Figure 1).

Programming Mode for the HMI panel can be enabled by placing on the screen a widget assigned to the Programming Mode internal variable.

At present there are no database files that can be imported in ETS, so the HMI device can't be programmed using ETS software. The Programming Mode is available only for future functionalities.

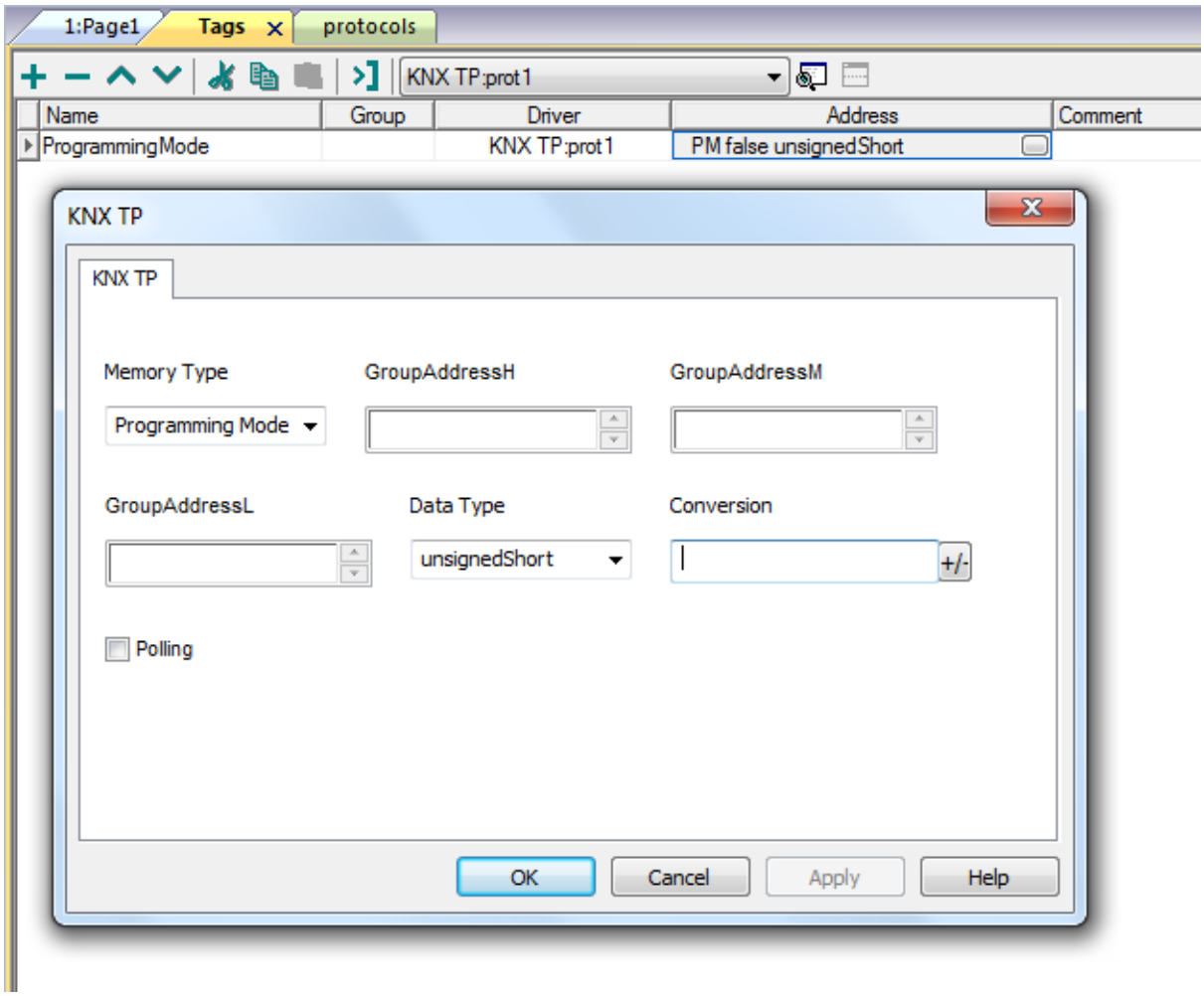


Figure 16

The “Programming Mode” value can be 0 or 1

Individual Address

The Individual Address can be displayed placing on the HMI screen an object for “Individual Address” data type.

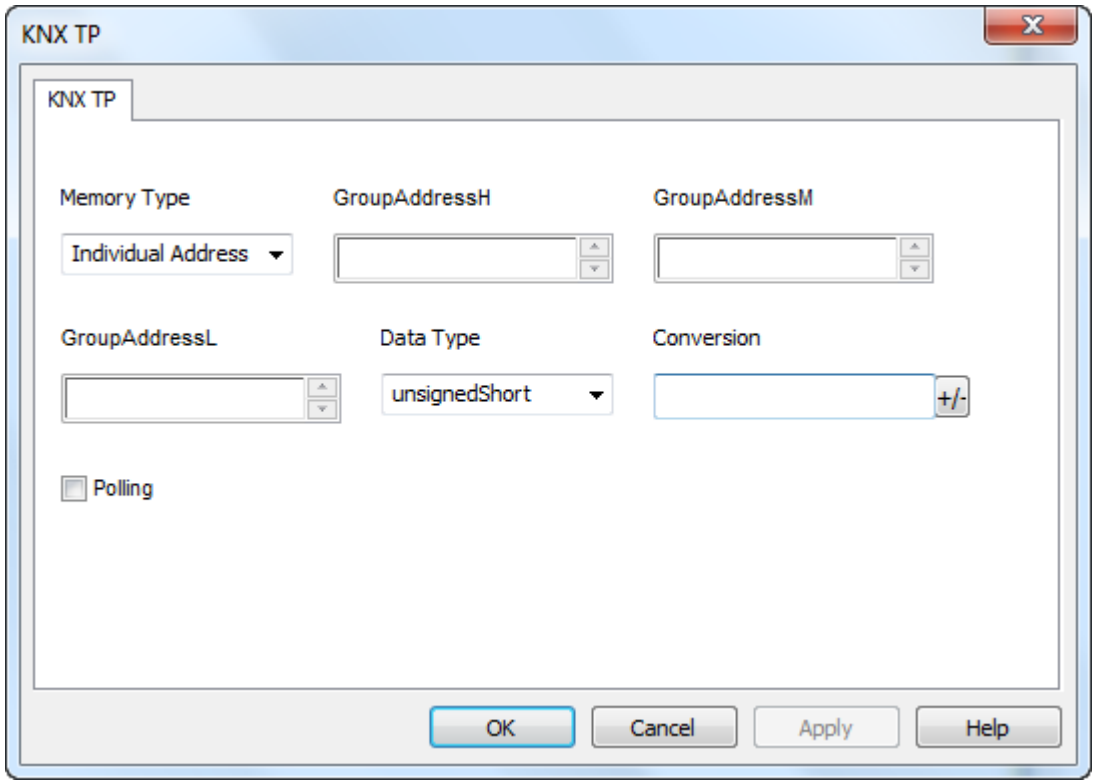


Figure 17

The Individual Address can be alternatively assigned directly on HMI screen with a write operation to the internal variable.

Please note that, as any other KNX device, also the HMI device must have unique Individual Address in a KNX network.

Figure 18 shows an example of how the individual address in hex format has to be interpreted.

Figure 18

Note: *The max value for Individual address is 15.15.255*

Communication Status

The communication status can be displayed using the dedicated system variables. Please refer to the User Manual for further information about available system variables and their use.

The status codes supported for this communication driver are:

Error	Notes
Timeout	Request is not replied within the specified timeout period; ensure the controller is connected and properly configured for network access
Response error	The tag requested by the panel may be not available in the system or communication session completed with errors
General Error	Error cannot be identified; should never be reported; contact technical support
Internal software error	Unrecognized error