

Apricum



UIMtp

KNX USB Interface

Technical & Application Description

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1 Product Description

The KNX USB Interface UIMtp provides a bi-directional data connection between USB and KNX TP. PCs can be connected via USB and the bus system is galvanically isolated. UIMtp establishes access to all bus devices for commissioning, addressing, setting parameters, visualization, protocolling, and diagnostic operation. Operational states are shown by LEDs. UIMtp is supplied by both KNX TP and USB. No external power supply is necessary.

With the ETS (or compatible commissioning tool), UIMtp works as the KNX programming interface having no KNX communication objects for itself. Due to HID profile support, no specific USB driver is required. USB suspend mode is supported. The protocol used for communication between interface and host is the flexible "cEMI" protocol.

The connection between KNX and a PC with standard software (like ETS, EITT, also in Raw Frame operating mode) or other software is handled by the Falcon driver. UIMtp supports extended frames and long messages with up to 220 bytes APDU length. Easy software handling is ensured. For specific diagnostic applications like EITT, UIMtp supports the "Raw Frame" operating mode.

1.1 Front Panel

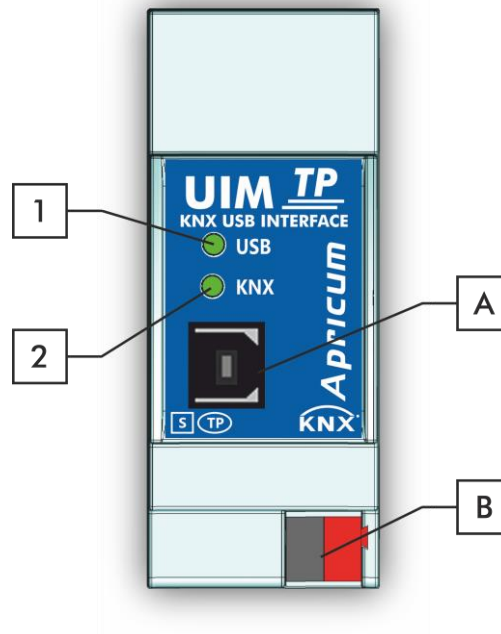


Figure 1: Front View

Table 1: Front Panel Elements

LEDs		Buttons / Connectors	
1	State USB	A	USB Connector
	(+Telegram Traffic USB)	B	KNX TP Connector
2	Bus State KNX TP		
	(+Telegram Traffic KNX TP)		

1.2 LED Indication

Table 2: LEDs Colours

Number	LED	Colour	Explanation / Range
1	State USB	green	USB connection OK / No telegram traffic
		blinking green	Telegram traffic extent indicated by blinking
		red	USB Suspend Mode
		< off >	No USB connection
2	Bus State KNX TP	green	KNX TP connection OK / No telegram traffic
		blinking green	Telegram traffic extent indicated by blinking
		< off >	KNX TP line not connected (or no USB connection)



Without being connected to USB, UIMtp is off.

1.3 Commissioning

Please note for commissioning with default settings:

- Individual Address is 0.2.255

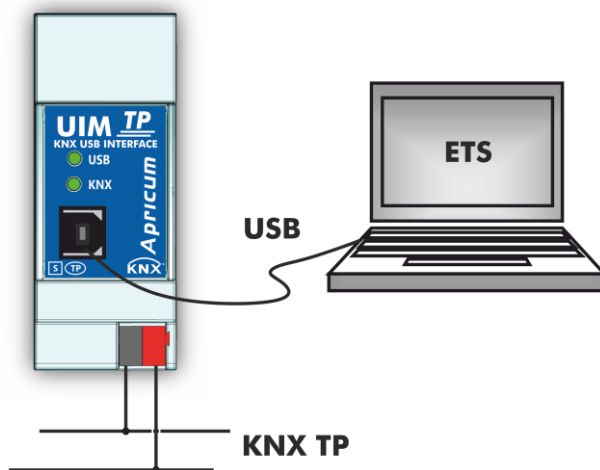


Figure 2: Connection Scheme



Please also read chapter 1.4 Important Notes before putting the device into operation.

1.4 Important Notes

It is recommended to participate the standardized courses of a KNX-certified training center before installing, programming, and commissioning a KNX system. Here, the participant gains the necessary knowledge and skills, also required for troubleshooting, by practical exercises.

Please read this chapter carefully before first use and installation:

1.4.1 Installation and Commissioning

- In the case of damage (at storage, transport) no repairs may be carried out by unauthorized persons
- After connection to USB, the device works with its default settings
- **Warning: Do not connect to 230 V. The device is supplied by USB and does not require any additional external power supply**
- The device may only be installed and put into operation by a qualified electrician or authorized person
- For planning and construction of electric installations the appropriate specifications, guidelines and regulations in force of the respective country have to be complied
- For configuring, use the ETS (or ETS Inside)

1.4.2 Mounting and Safety

- For mounting use an appropriate equipment according to IEC60715
- Installation on a 35 mm DIN rail (TH35)
- Connect the KNX bus line as for common KNX bus connections with a KNX bus cable, to be stripped and plugged into a KNX TP connector
- Do not damage electrical insulations during connecting
- Installation only in dry locations

1.4.3 Maintenance

- Accessibility of the device for operation and visual inspection must be provided
- The housing must not be opened
- Protect the device from moisture, dirt and damage
- The device needs no maintenance
- If necessary, the device can be cleaned with a dry cloth

1.5 Feature Summary

- Data connection between PC and KNX bus line.
- Suitable for usage with ETS. No extra application program necessary.
- UIMtp supports extended frames and long telegrams up to 220 bytes APDU length. (With all MEC couplers and UIM interfaces long messages e.g. for energy metering applications and visualization purposes can be processed.)
- Access to every bus device in the KNX bus system for commissioning, addressing, setting parameters, visualization, protocolling and diagnostics.
- Use of cEMI ("Common EMI") protocol.
- No specific USB driver needed due to USB HID Profile.
- Galvanic isolated bi-directional access to KNX TP.
- Usage also without Falcon driver software.
- Support of Raw Mode, a special diagnostic mode.
- Can be used with EITT.
- Low current consumption.
- Installation module for 35mm top-hat rails (DIN, TH35).
- UIMtp works without external power supply.

2 Operational Description

In KNX network installations the UIMtp can be used as KNX USB interface. After establishing the USB connection, UIMtp operates with its default settings. Setting the correct Individual Address is necessary to include UIMtp in the KNX bus system.

Both LEDs lighting green show proper working of KNX bus connection and USB connection. Lightning green means the connection is established. Blinking green indicates the telegram traffic extent. In Microsoft Windows the UIMtp is recognized as HID (Human Interface Device). So, no extra drivers have to be installed or downloaded.

The UIMtp's ETS (dummy) database entry, e.g. for connecting a visualization device, is available for ETS5 and upward. The database without parameters and without communication objects can be added to an ETS project as usual.



It is recommended to use USB cables that do not exceed 5 m.

2.1 KNX Programming Interface

To use UIMtp for ETS programming it has to be chosen as the Current Interface in the ETS Bus Connections window or alternatively during editing a project, at the bottom line (“Name and state of current connection”) of the ETS window.

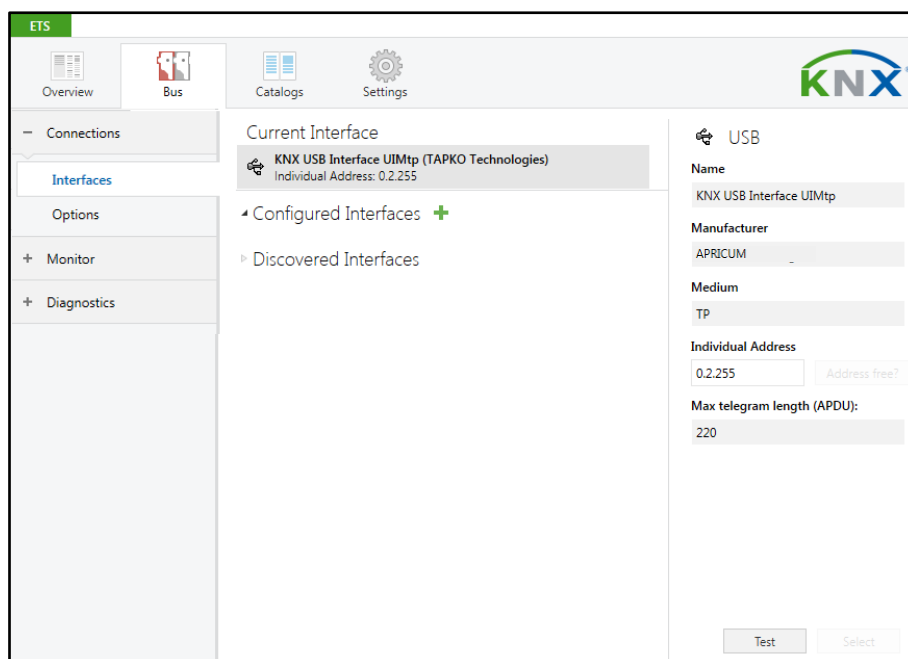


Figure 3: ETS Bus Connection Interface Window

2.2 Individual Address Assignment

The device is supplied with the Individual Address 0.2.255. With the ETS the Individual Address can be assigned to the device by setting the desired address in the Individual Address field of the Bus Connections window of the ETS. To download the desired Individual Address, the UIMtp has to be chosen as the Current Interface. Then type in the Individual Address and press the Test button.

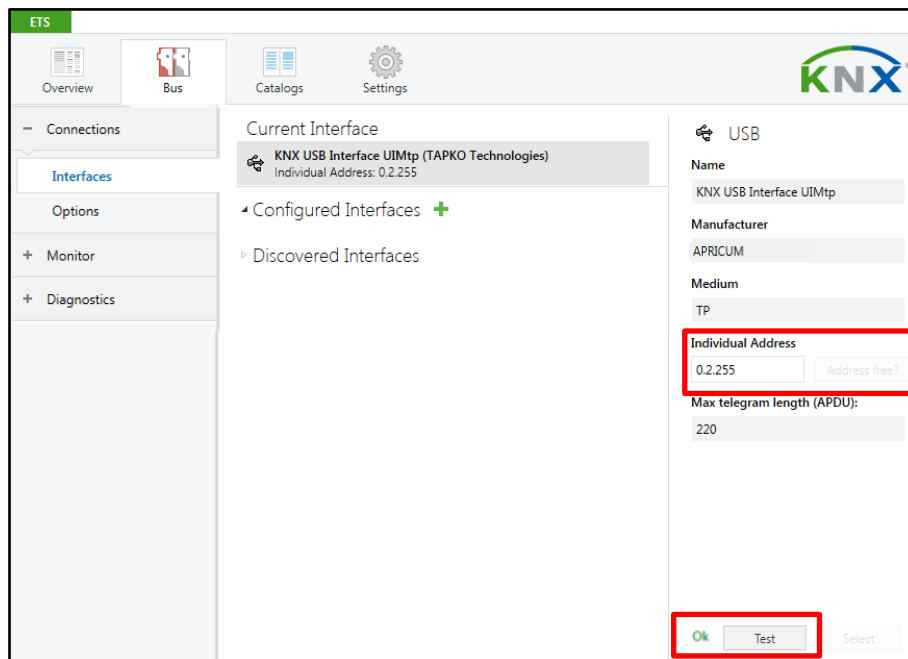


Figure 4: Individual Address Assignment

2.3 Project Individual Address

For i.e. connecting a visualization device to KNX, the UIMtp must be contained in the ETS project. The necessary product database entry can be downloaded from the TAPKO website and from the KNX Online Catalog.

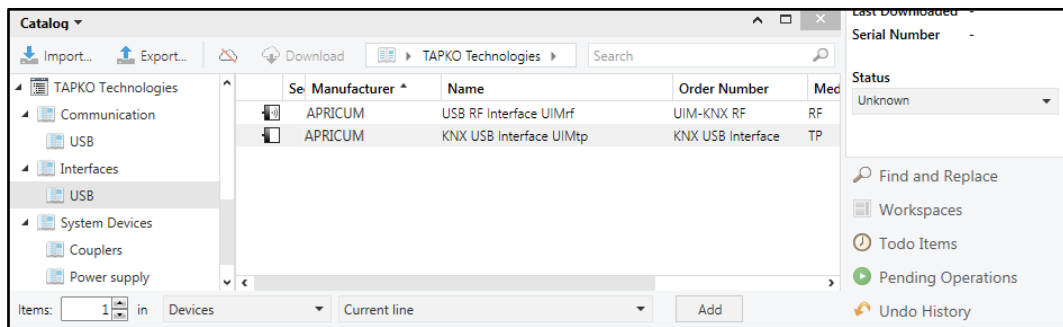


Figure 5: TAPKO USB Interfaces in the ETS Catalog

With the ETS, the project Individual Address can be assigned by setting the desired address in the properties window of the ETS.



Figure 6: ETS Properties Window

2.4 Group Associations

To establish a connection between a device of interest and its visualization application the UIMtp can be used as the connecting interface. To enable group communication, the group objects have to be entered to the Group Associations of UIMtp per drag & drop (see following figure).

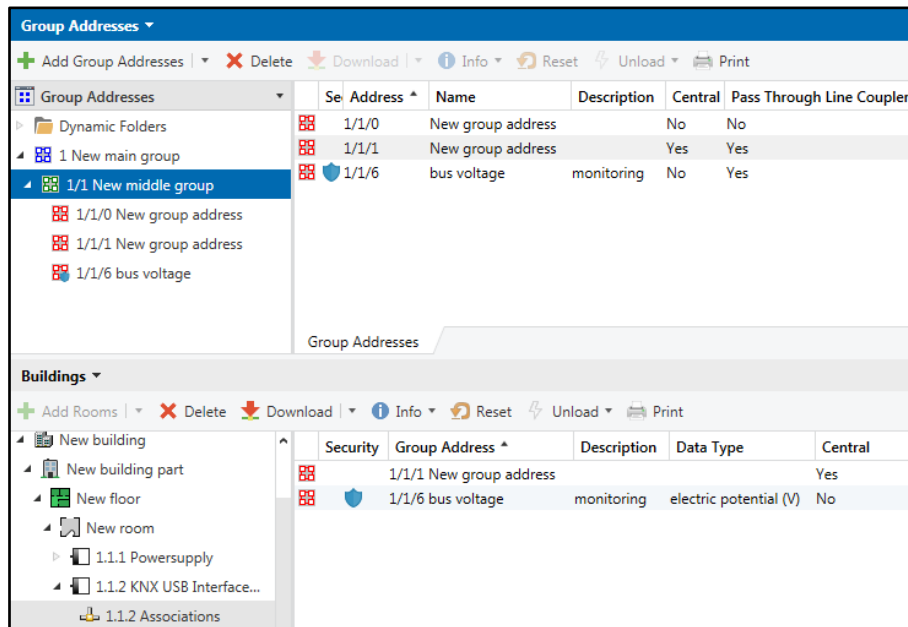


Figure 7: USB Interface Group Address Associations



Interfaces used in KNX Secure installations must know the type of access to the corresponding Group Associations. To allow communication for the regarded interface, the combination of PA/IA + GA is stored as position information in relevant devices. Automatically, GAs become added to couplers' filter tables by ETS.



Visualization of KNX Secure devices can only be done with using secured Group Associations.

3 Glossary

ACK	An ACK is a positive IACK frame. If the sender detects an ACK, then the sender's data has been received correctly, meaning the data has been successfully transmitted to the receiver.
Acknowledgement frames	Acknowledgment on the KNX Link Layer is also called Immediate ACK (IACK) in KNX jargon, presumably to differentiate it from other ack methods on the upper layers. Regarding sender and receiver, IACK frames are used to confirm to the sender the transmitted data was received correctly by the receiver (ACK) or not (BUSY/NACK). Also, a receiver cannot respond by sending back an IACK when a frame is damaged or incorrectly addressed (missing IACK). The IACK confirmation is a mechanism within a KNX TP line or segment. For communication across different lines or segments, the couplers connecting the lines generate the relevant IACKs.
BUSY	A BUSY is a negative IACK frame. If the sender detects a BUSY, then the receiver was not able to process the received frame. Thereafter, the sender waits for a short time period and retries to send the frame.
Communication Object	same as Group Object
Data Point Type (DPT)	Standardized data format for transmitting values via KNX. The complete list of DPTs is available at KNX Association.
Extended Frames format	An extended frame has a maximum APDU length of 254 octets and a maximum length of 263 octets (incl. checksum).
Filtering	Filtering of telegrams by couplers can be accomplished according to the topology via Individual Addresses (Physical Telegrams) and according to filter tables for group communication via Group Addresses (Group Telegrams).
Group Address	Group addresses are used to link group communication objects.

Group Communication Object	Group communication objects contain the datapoints which are transmitted via runtime communication. One or more group addresses are assigned to one group communication object. One of these assigned group addresses is the sending group address (to send the group communication object value to the bus). The remaining assigned group addresses, if available, then receive the value.
Group Object	same as Group Communication Object. A data point in KNX can be called shortly a 'Group Object' or just 'Object'.
Group Telegram	Group-oriented telegrams are named Group Telegrams. Filtering of Group Telegrams by couplers is accomplished according to their built-in filter tables for group communication.
IACK	see Acknowledgement frames
Individual Address	The Individual Address of a device defines the location of the device within the topology.
Long Telegrams	Long telegrams or long frames are telegrams having an APDU length that exceeds 15 octets. Long telegrams use the extended frame format.
NACK	A NACK is a negative IACK frame. When the sender detects a NACK, then the sender's data has not been received correctly by at least one device meaning it has not been successfully transmitted to one or more receivers. Thereafter, the sender waits for a short time period and retries to send the frame.
Physical Address	same as Individual Address
Physical Telegram	Individually addressed telegrams are named Physical Telegrams.
Repetition of telegrams	When there is no positive IACK on the regarded TP line (e.g. NACK, BUSY, missing IACK), couplers usually repeat messages up to three times. For all MEC couplers, the number of repetitions on TP is configurable.

Security functions	For using ETS Security functions, a minimum ETS version is necessary. Security functions have been available since ETS version 5.7.2 (ETS Inside 1.4.0).
Short Telegrams	Short telegrams or short frames are telegrams having an APDU length that is not exceeding 15 octets. Short telegrams use the standard frame format.
Standard Frame format	A standard frame has a maximum APDU length of 15 octets and a maximum length of 23 octets (incl. checksum).

4 Technical

4.1 State of Delivery

Table 3: Factory Default Setting

General	
Individual Address	0.2.255

4.2 Datasheet

Marking/Design	UIMtp
Current consumption	KNX TP: < 5mA and USB: < 20 mA
Connections	USB: USB2.0 connector (Type B, female) KNX TP line: KNX TP connector (red/black), screwless, for single-core cable Ø 0.6...0.8 mm
LED Display elements	State (USB and KNX)
Mounting	35 mm top-hat rail (TH35) according to IEC60715
Protection type	IP20 according to IEC60529
Pollution degree	2 according to IEC60664-1
Protection class	III according to IEC61140
Overvoltage category	III according to IEC60664-1
Approbation	KNX-certified according to ISO/IEC14543-3
CE Marking	In compliance with directives 2014/35/EU (LVD), 2014/30/EU (EMC), 2011/65/EU (RoHS)
Standards	EN IEC 61000-6-2, EN IEC 61000-6-3, EN IEC 63000, EN IEC 63044-3, EN IEC 63044-5-1, EN IEC 63044-5-2, EN IEC 63044-5-3
Voltage supply	KNX: 21...30V DC (SELV) USB: 5 V DC (SELV)
Housing color	Plastic PA66 housing, grey
Housing dimensions	H = 90 mm, W = 36 mm (2 modules), D = 71 mm
Mounting depth	64 mm
Weight	62 g
Operating temperature	-5...45 °C
Storage temperature	-20...60 °C
Ambient humidity	5...93 %, non-condensing
USB cable length	Max. 5 m
USB driver	HID Device, standard driver included in Windows/Linux

4.3 Technical Drawings



All dimensions shown here are specified in mm.



The total device width is 2 modules at 18 mm.

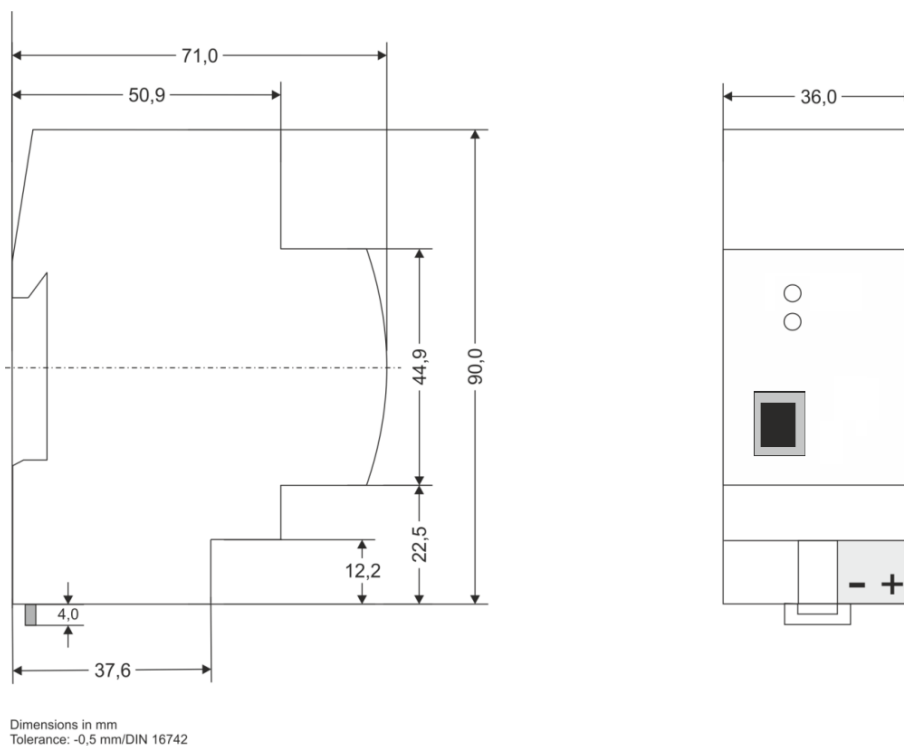


Figure 8: Dimension drawings

UIMtp

Application:

KNX USB Interface

Doctype:

Technical & Application Description

Release Number / Release Date:

R2.0 / November 2022

TAD is intended for:

(x = 0,1,2, ... and y = a,b,c, ...)

Firmware	2.x
Databases	R2-0y
ETS version	ETS5 and higher

Weblink to actual ETS Database:

<https://www.apricum.com/uimtp>

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