

How To Start Up The KNX System?

ETS3 - Buildings in Gotowy projekt Inteligentnego Domu 200m

File Edit View Commissioning Diagnostics Extras Window Help

Group Addresses in Gotowy projekt Inteligentnego Domu 200m

Address	Name
1	WY01-parter
2	WY02-parter
3	WY03-parter
4	WY28 - WC parter
5	WY05-parter
6	WY06-parter
7	WY07-parter
8	WY08-parter
9	WY09-parter
10	WY14-parter rezerwa
11	WY20-parter
12	WY21-parter
13	WY27-parter
14	WY23-parter
15	WY24-parter
16	WY10s-parter
17	WY10s dim-parter
18	WY04s-parter
19	WY04s dim-parter
20	WY12s-parter
21	WY12s dim-parter
22	WY13s-parter
23	WY13s dim-parter
24	WY11-parter
25	rez
26	Blokada czujni w kotłowni

Buildings in Gotowy projekt Inteligentnego Domu 200m

Address	Room	Function	Description
1.1.59	RG		Integracja z al...
1.1.37	RG		Złazce 3P
1.1.11	RG		WR2
1.1.12	RG		WR3
1.1.10	RG		WR1
1.1.2	RG		WY82
1.1.1	RG		WY81
1.1.3	RG		WY83
1.1.4	RG		WY84
1.1.5	RG		WY85
1.1.36	RG		WY86 - do rde...
1.1.6	RG		DM1
1.1.7	RG		DM2
1.1.9	RG		DM4

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Chapter 1 – Programming preparations

Information required to programme a KNX system

Assigning functions to buttons

1. The decision on which circuits shall be switched from which touch sensor panel buttons is best made with the assistance of a table, where on the left a given touch sensor button is indicated, and on the right, the relevant circuit number (lamps, blinds, gates, sockets, etc.) as designated in the design. Switched circuits require one button, dimmer circuits and blinds - two buttons (to ensure the ability to steplessly determine the light level or the window blind opening level).
2. Description of scenes and circuit groups. Certain control consoles allow the programming of initiation of scenes (multiple lamp groups) switched at the same time. To such a group, one can assign i. e. a lowered screen or window blinds. The number of scenes is not limited, but usually a few scenes are sufficient for a single room.
3. In rooms „rich” with lamps, blinds, etc., the function „Everything on” is useful, allowing one i. e. to quickly exit the living room without having to switch off every lamp separately. This button may be assigned to any button.
4. The same rules govern wishes concerning buttons of radio remote control units (i. e. entry gate, garage door, lamp over garage, garden lamps).

Integration with other systems

One should determine, which events or signals from other systems must be used in or introduced into the KNX system - i. e. security zone intrusion signal (to switch the lights on and scare the intruder away), window open signal (to shut down the heating in that room), bathroom flood signal from alarm (to cut off the water line to the washing machine), etc. Determined should be also, which signals are to be routed out from the KNX system to external systems, i. e. the furnace/air conditioner on signal, a GSM communications unit signal, etc.

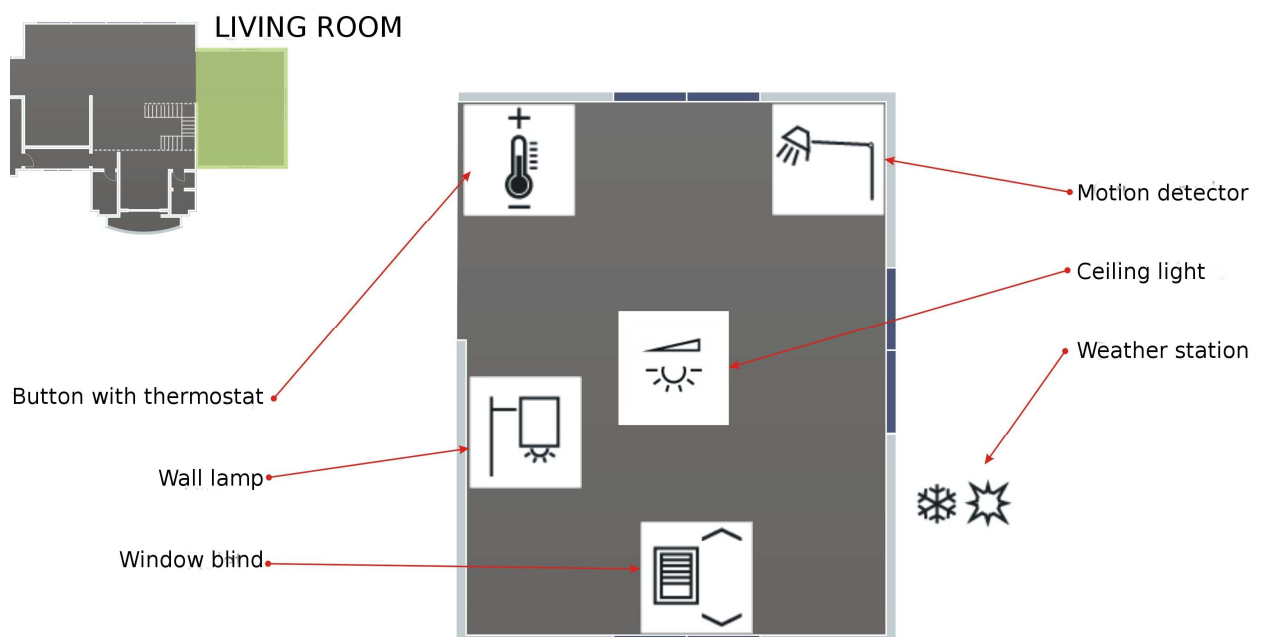
Visual displays

Should one want to have a preview of the system state on their computer or display, it must be indicated, which signals from the KNX system (and signals introduced from other systems) are to be shown on the computer/display screen.

Sample system

In this guide, we will be based on a sample small system, controlling appliances in one room and one anteroom:

- living room ceiling lamp (with intensity adjustment)
- living room wall lamp (switched only)
- marquee (window blind) on the terrace by the living room
- living room radiator
- anteroom ceiling lamp



The set of devices required for the above is:

- bus power supply 320mA Hager TXA 111
- binary output 8x ABB SA/S 8.6.1
- dimmer 4x150W Merten 6493 15
- shutter actuator GIRA (any)
- touch sensor FD 6x with thermostat JUNG RCD AL 3096

ETS application

Application description

The ETS (or *KNX Tool Software*) is a set of tools used to design and start-up KNX systems using a PC running MS Windows.

ETS is an open, manufacturer-independent platform, foreseen for installation specialists and professionals from all branches of the house and building electronics industry. From a formal point of view, starting up a bus system entails sending appropriate programming packets to the EEPROM in bus components. It is not important, where in the building the appliances are. What is important, however, is to define such a component by providing its physical address (which describes its location on the network, zone number, line number and number of component in the line), group addresses (describes the function of a given network component) and provision of necessary parameters required for correct operation of the device and co-operation with the bus. Processing a project entails connecting numerous individual devices into one functional whole, connected by group addresses.

Software download

The demo version may be downloaded from <https://my.knx.org/en/downloads>. It has the limitation up to 5 devices. To unlock the ETS to the full version, a licence key must be ordered.

ETS prices and licensing

The ETS demo version (limited to 5 devices) is for free.

The ETS Lite version (limited to 20 devices) is for 200 EUR net.

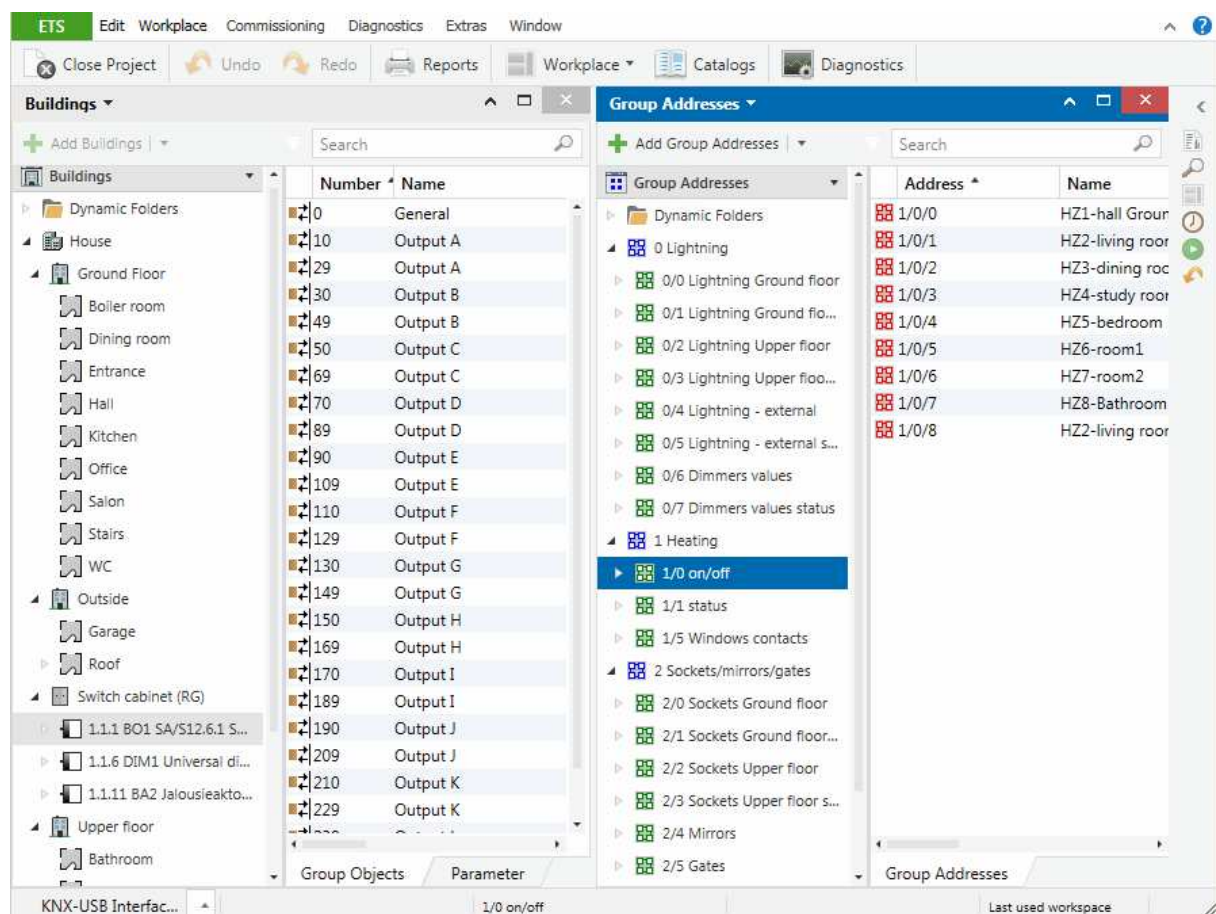
The full version costs 1000 EUR net.

Chapter 2 – Creating a design in ETS

I. General rules of working with the ETS

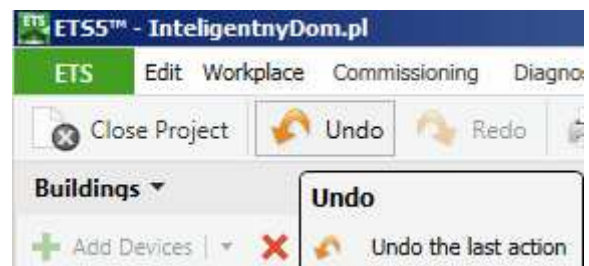
User friendliness

ETS is a very user-friendly application. Most options are set by default to settings optimum for a beginner, so that work can be quite easy and effective from beginning on. The software requires no programming skills, all options are described using natural language or typical symbols. A typical application view is provided below.



Undoing an action

Each action we have made and deem wrong can be undone by the option **Undo**, or using the typical key combination: **Ctrl+Z**.

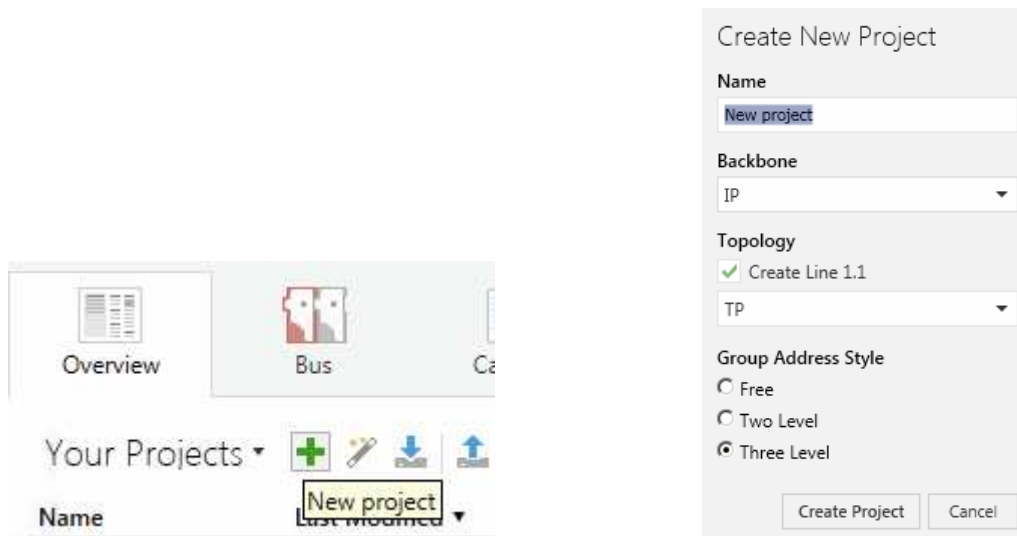


II. Step by step - from opening the ETS to system diagnostics

In order to create a design in the ETS and upload it to a system, the following actions are required:

1. Collection of device libraries and their import to the ETS
2. Creation of a new design
3. Creation of the room structure
4. Inserting appliances into rooms
5. Setting device parameters
6. Creating functional groups
7. Assigning appliance objects to groups
8. Describing scenes and device configuration
9. Setting central functions
10. Creation of status groups and assigning devices to these
11. Description of object priorities and flags
12. Connecting the computer to the bus
13. Setting of ETS - KNX communication
14. Assigning physical addresses to devices
15. Upload of device applications
16. System trials
17. If required, diagnostics and repairs

Creating a new device



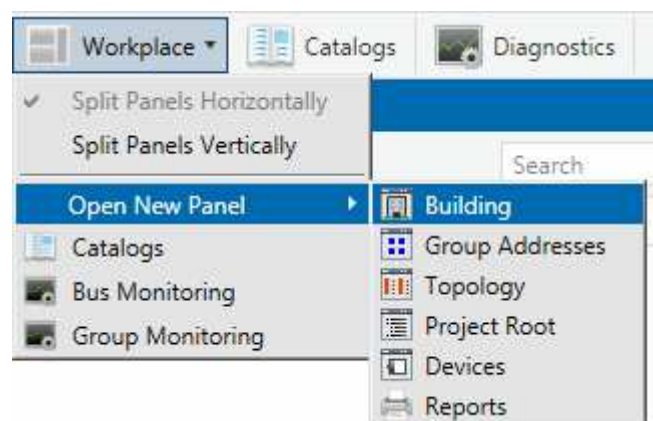
Having selected **New Project** from the **Overview** menu, we will see a small window pop up, where we may enter the project name (i. e. the customer's last name), the signal transmission medium (TP bus, 230V grid –PL, Radio-RF, Ethernet-IP).

Creating the room structure

- 0 – basement
- 1 – ground floor
- 2 – first floor
- 3 – attic

The room structure for any investment is a case of individual taste, and the naming may of course also differ. For each storey (structure), I recommend entering a room with the following scheme: NUMBER – NAME, i. e. **P05-salon** (living room). Heating and electric junction cabinets are also included in the room structure.

In order to add a building, click on the **Workplace** icon/title, and select **Open New Panel > Building**.



IV. Setting device parameters

Despite the fact that each device in a KNX system has its basic functions defined (i. e. a binary output has just an on/off connector, and a dimmer additionally has lamp power adjustment), then at the same time each device has a multitude of configuration options adapting it so that it can best fulfil a given function (i. e. dimming speed, delay time before lamp shut-down, etc.). **Each function and its parameter are thus described in detail in the device documentation.** Below are presented, in turn, all functions and parameters required to execute a sample system.

Bus power supply 320mA Hager TXA 111

The power supply has no adjustable parameters. In practice may not even be inserted into a design (of course then, the application will return an error, thinking that it's also not connected physically).



Binary output ABB SA/S 8.6.1

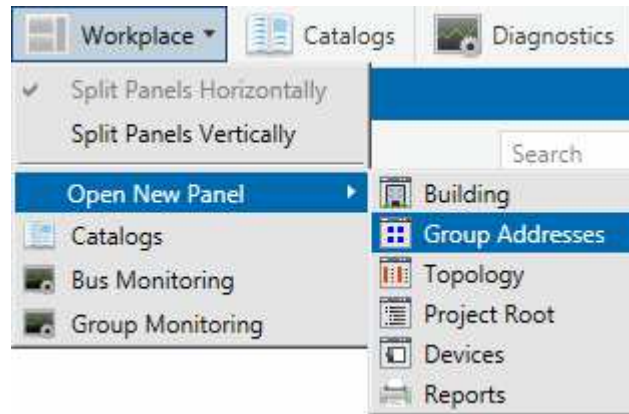
Channel A of this binary output has the wall lamp connected, channel B is for the radiator actuating drive to open/close the water flow to the radiator, and channel C hosts the anteroom lamp. We will set the parameters of this device.



V. *Functional groups and object assignment*

Creating functional groups

Similarly to the room list, in the ETS we can create a list of groups (functions) to be provided by our system:



Numbers at function names are so-called group addresses - a very important matter for the system, because thanks to these the devices know which orders to follow, and which ones to ignore (if we i. e. want to turn on the living room ceiling lamp, so only appliances from group 1/1/1 will react, and the others will ignore the command). These names and the group logic structure are not important for the system - this is for the designer, who thus can get a quick overview of the structure of a given system.

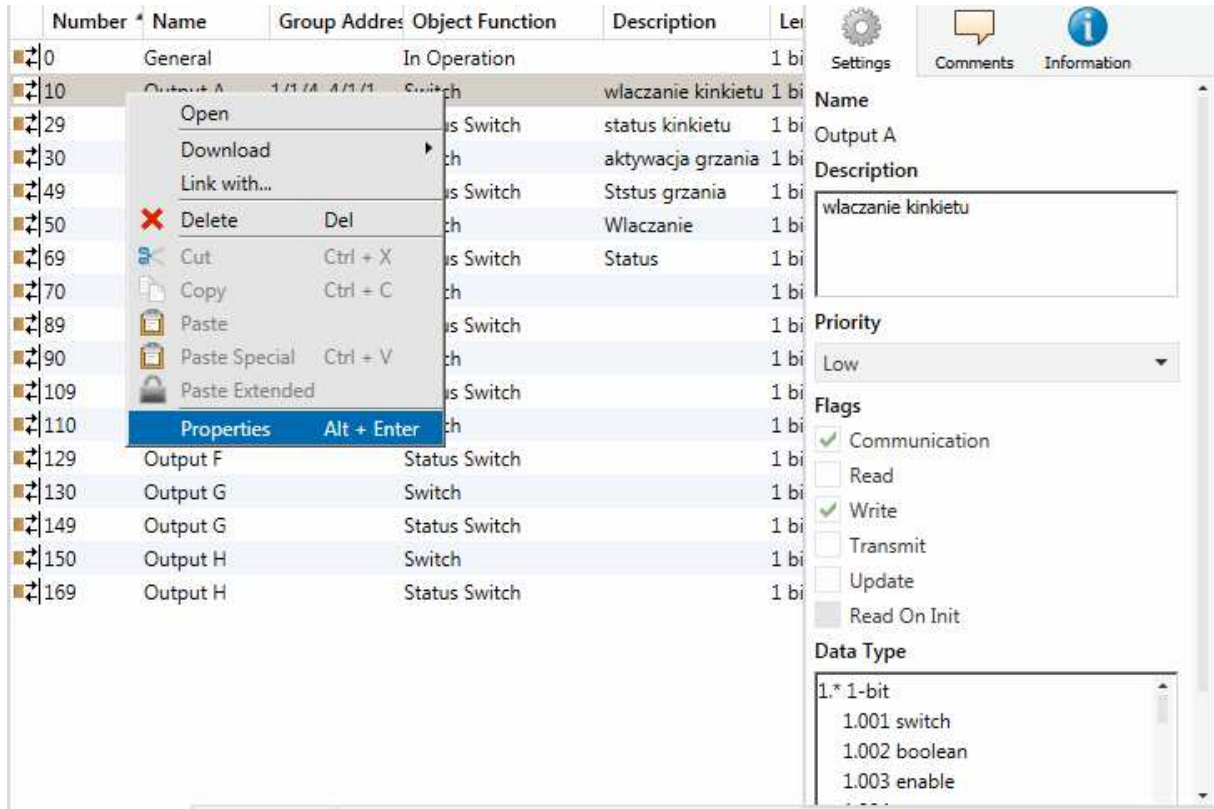
Main groups

The main group count depends on the individual system, there can be up to 16 (numbered 0-15). Example main groups : 1 – lighting; 2 – heating; 3 - air conditioning; 4 – blinds; 5 – sockets; 6 – central functions; 7 – scenes; 8 – audio (multiroom); 9 – logic.

NOTE. Groups 14 and 15 are not filtered by connectors (used to transfer signals between KNX bus lines) and messages from them will always be transferred to all lines, possibly causing unnecessary bus load (i. e. delaying other signals).

VI. Object properties

If we right-click an object and select the **Properties** option, we will see and possibly be able to change its properties.



These are: **Priority**, **Data Type** in bits, and flags (**Communication**, **Read**, **Write**, **Transmit**, **Update**). These values are also visible in the object view for a device beside their name and function. They are described below.

Number	Name	Group Address	Object Function	Description	Length	C	R	W	T	U	Data Type	Priorit
10	Output A	1/1/4, 4/1/1	Switch	włączanie kinkietu	1 bit	C	-	W	-	-	1.* 1-bit	Low
29	Output A	1/1/5	Status Switch	status kinkietu	1 bit	C	R	-	T	-	1.001 switch	Low
30	Output B	2/1/1	Switch	aktywacja grzania	1 bit	C	-	W	-	-	1.002 boolean	Low
49	Output B	2/1/3	Status Switch	Ststus grzania	1 bit	C	R	-	T	-	1.003 enable	Low
50	Output C	1/0/0	Switch	Wlaczanie	1 bit	C	-	W	-	-		Low
69	Output C	1/0/1	Status Switch	Status	1 bit	C	R	-	T	-		Low

Chapter 4 – Operation with on-line bus connection

I. Uploading software to devices

Physical preparation

Still at the office, before transferring the junction cabinet to the customer, applications need to be uploaded to the KNX devices installed in it. Applications need to also be uploaded to sensor ports and marked with a permanent marker according to names in the design. If there are no agreed functions, then upload at least physical addresses so as not to have to run around the building later to assign physical addresses to devices.

Connecting the computer to the bus

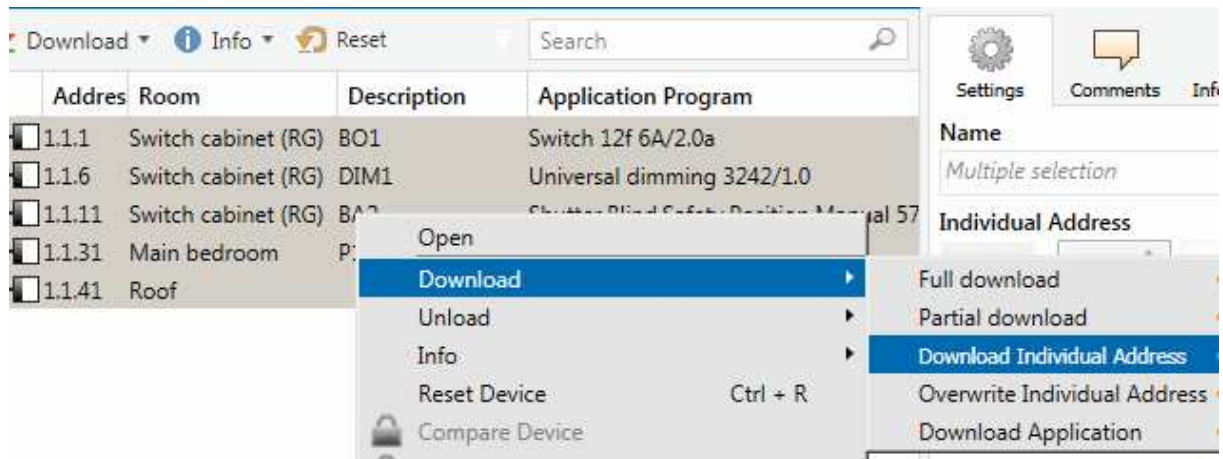
A computer on which the ETS is installed, should be connected to the KNX system via a USB port or a LAN/Internet.



USB connectors for junction cabinets and boxes(Siemens, Busch-Jaeger, b+b Automation)

Uploading physical addresses to devices

In order for the ETS system to know which device in the project is which actual physical device, one needs to assign physical addresses from the software to the individual devices. In order to do this, select the devices as appropriate and the option to assign (program) individual addresses.



Upon selection of this function, the software shall ask us one by one to press address assignment buttons on devices. Usually (in case of junction cabinet equipment) these are clearly visible (but not labelled) buttons on the module housing. In case of touch sensors, an appropriate component is usually found on the box port (recessed, a thin stick/match is required). Usually, after pressing this button, we see a confirmation in the form of a red diode lighting up. At times, for aesthetic reasons, these buttons are hidden (i. e. in case of certain Merten motion detectors), and its activation requires the use i. e. of a magnet placed at an appropriate location on the device. This is usually precisely described in the manual provided with every appliance.

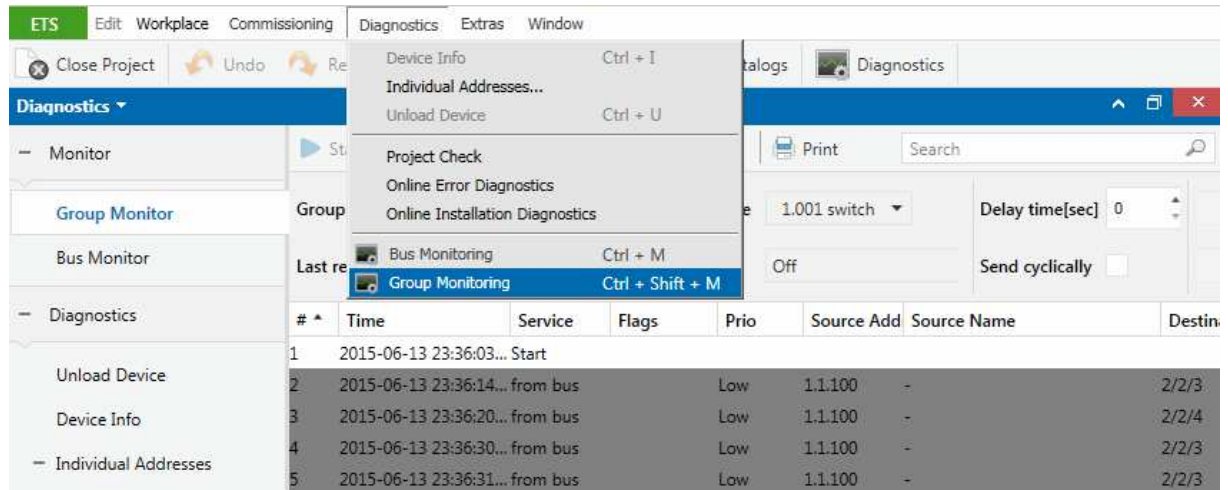
Loading applications to devices

If we have already identified devices having assigned unique physical addresses to them, we can load applications to them. Even if this process is time-consuming (newer devices require applications which upload longer - even up to half an hour!), however luckily once we've initiated it, we can leave the computer for between a few minutes (while one application is uploading) to a few hours (when uploading applications to all house devices).

To load applications, select the appropriate devices and select the application upload option.

Group Monitoring

Here we can monitor telegrams sent on the bus and send such telegrams i. e. to test a particular function.



The screenshot shows the ETS software interface. The 'Diagnostics' menu is open, displaying options such as 'Device Info', 'Individual Addresses...', 'Unload Device', 'Project Check', 'Online Error Diagnostics', 'Online Installation Diagnostics', 'Bus Monitoring', and 'Group Monitoring'. The 'Group Monitoring' option is selected, and its keyboard shortcut 'Ctrl + Shift + M' is visible. Below the menu, a table displays a list of telegrams received on the bus.

#	Time	Service	Flags	Prio	Source Add	Source Name	Destin
1	2015-06-13 23:36:03...	Start					
2	2015-06-13 23:36:14...	from bus		Low	1.1.100	-	2/2/3
3	2015-06-13 23:36:20...	from bus		Low	1.1.100	-	2/2/4
4	2015-06-13 23:36:30...	from bus		Low	1.1.100	-	2/2/3
5	2015-06-13 23:36:31...	from bus		Low	1.1.100	-	2/2/3

Chapter 5 – Optional tasks

Reports

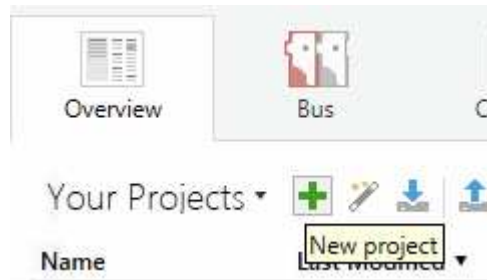
The ETS contains extended report generation functions. For this purpose, select **Reports**. The window below will show a list of available reports.



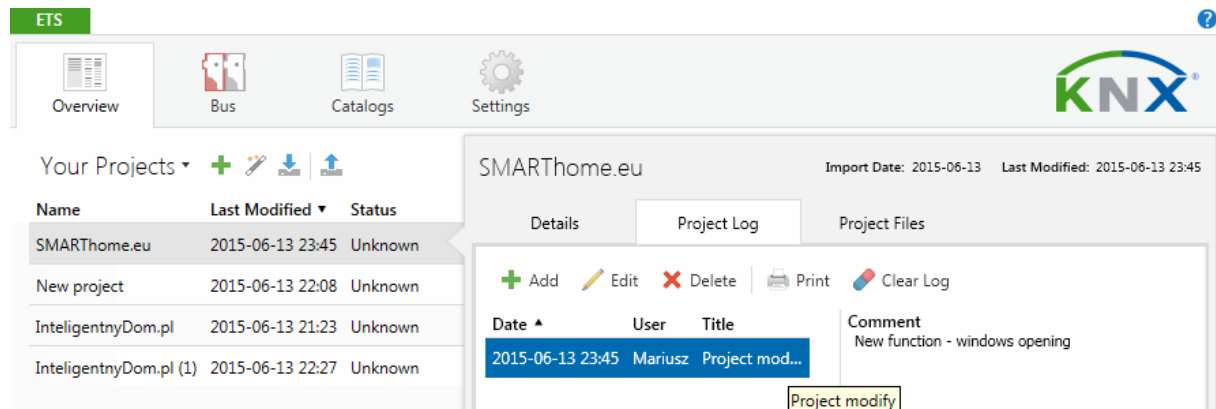
Upon completion of a project, it is worth it to at least preview every report, to be aware whether it can be useful to us or the customer, and if necessary, **Print** it out.

Managing projects

The ETS allows keeping in its database of data concerning numerous designs (programmes) for many systems (customers). They can be created from scratch (**Overview** -> **New Project**), imported (**Overview** -> **Import**) from a different ETS instance (i. e. backup), and exported (**Overview** -> **Export** for copying i. e. to a second designer's workstation or to make a backup). Designs saved outside of the ETS (**Exported**) are archived and take up little space.



By clicking a project we can view and/or edit its properties - the name, customer contact details, project beginning and end date, security options, project history entries (useful in case the designer changes), etc.



Other guides by this author

How to make your house intelligent? (an e-mail training course in 20 parts)

This is the only free publication on the market to gather all basic information about intelligent home systems in a reader-friendly guide form. The guide is targeted primarily at persons building or designing a house or flat, but also at specialists and designers who would like to get to know the basics or have them all together in one publication. The guide has over 160 pages and is distributed via e-mail in 20 parts (with the option of downloading it in whole). You can read more and sign in at www.smarthome.eu/a/general-guide.html

How not to forget that one little cable?

Do you know that forgetting one little cable can cause you to break down your walls again and cause the family to complain that you weren't diligent enough to read the list of over 200 cables that you need to account for when designing the installation for your house? Learn more about this guide and order it at www.smarthome.eu/a/order-cables-guide.html

How to create a KNX/EIB design and installation?

Installation specialists and smart home system designers often seek answers to these and many related questions regarding the design and implementation of KNX/EIB systems. Browsing hundreds of pages of general material is time-consuming and ineffective. This, however, can be avoided. Learn more about this guide and order it at www.smarthome.eu/a/order-design-guide.html

How to Pick and Choose KNX Equipment?

There are now over 5000 devices and appliances for the KNX system offered by 165 manufacturers. How to handle all of this? How to pick the device to best suit user expectations? From among over 5000 units, this guide, on over 100 pages, contains descriptions and/or images of over 200 or the most interesting devices and their uses, including a handful of practical tips. Find out more about this guide and order it at: www.smarthome.eu/a/order-units-guide.html

How to build an electric switch cabinet for the KNX/EIB system?

Step by step we will guide you through the process of assembly and construction of large electric switch cabinets. We will also tell you what you definitely cannot forget, and where you should take particular care. Learn more about this guide and order it at www.smarthome.eu/a/order-cabinet-guide.html

How to Start Up a KNX System?

A guide on programming KNX devices in the ETS application, or starting up a system. This guide will provide You with the knowledge You expect. It will replace a programming training seminar, and having read it, you will be able to single-handedly programme and start-up a KNX system i. e. for a small house. Learn more about this guide and order it at: www.smarthome.eu/a/order-startup-guide.html

How to win customers for premium products?

Solid information for everyone offering Premium-class products to their customers - expensive, luxury components for the home that are not required by most people, who still dream of them, and yet are available for the few who consider them absolutely necessary :) Learn more about this guide and order it at: www.smarthome.eu/a/order-clients-guide.html

Installations - document templates

I am providing templates of documents, designed by experts from SMARTech in consultation with lawyers. Apart from a contract draft for the execution of an installation, available are, among others, commissioning protocols, system verification documents, even calls for payment. Learn more about this guide and order it at www.smarthome.eu/a/order-documents-guide.html

The set of guidebooks about KNX systems and installations

All guidebooks above in one set you can buy with 30% discount.
www.smarthome.eu/a/knx-system-the-set-of-guidebooks.html

Ready Design Plans

A KNX/EIB system design for a house of 200 sq m

Based on this design you will learn how to execute other smart home designs and installations. The smart electric installation on its own (the design includes others as well) for a house of 200 sq m contains 171 modules in the switch cabinet, 130 cables running from the cabinet to the building, and several thousand connections. An experienced designer needs about 112 hours of work to create such a design. The time and money saved through the use of ready elements - this would be enough to calmly recommend the smart system design specifically to you.

Learn more about this guide and order it at www.smarthome.eu/a/order-plans-pdf.html

KNX/EIB system design - ETS files

Thanks to this, you can implement changes and load ready programs to devices according to your system within a few hours. You can be certain that everything will work correctly. This set consist ETS database and project files and list of functions implemented in typical 200m2 house.

Learn more about this guide and order it at www.smarthome.eu/a/order-plans-ets.html