Integration Note

Manufacturer:	KNX Input / Output
Model Number(s):	**(Various)**
Core Module Version:	5.4 or newer 8.3.761 for IP gateway support
Document Revision Date:	1/16/2020

OVERVIEW AND SUPPORTED FEATURES

KNX systems are designed and built to the KNX specifications. Units that are available on the market have been certified and should have received the KNX logo. KNX systems can include a variety of input and output devices. This Integration Note explains how to use the Input/ Output tab on the Configurator to connect to simple sensors and actuators.

For more information on using KNX climate, lighting or shades, refer to other KNX Integration Notes.

In KNX terminology, a "sensor" is the button on the wall that a user presses, or similar input device. An "actor" or "actuator" is the output device that closes the circuit, such as a relay. The sensor or actuator must have a 1 bit Group Address available to connect on the Input/ Output tab.

IP GATEWAY INFORMATION

Supported IP Gateway : Tapco SIMip ; https://www.tapko.de/products/detail/simip/

A suggested source is direct from Tapco, using provided email of: **sales@tapco.de**

Note: Only add one KNX gateway in the Configurator. You also cannot have one IP gateway and one RS-232 gateway connected simultaneously as they both would have the same address in KNX by default

RS-232 Gateway Information

IMPORTANT! The KNX integration requires the use of the Tapko SIM-KNX gateway. This part is available with several options: the suggested part numbers are shown below:

For DIN rail mounting	SIM-KNX128-RS232-DIN-Rail
For other mounting	SIM-KNX-128-RS232
A suggested source is Opternus: http://www.opternus.com/en/tapko/sim-knx-devices.html	

Only add one KNX gateway in the Configurator, the KNX communication device will then automatically appear on all the tabs that support KNX.

KNX INPUT / OUTPUT SUPPORTS THE FOLLOWING FEATURES:

Inputs: Any sensor in the KNX system that properly programmed and available Group Address can be configured as an input.

ELAN Home Systems ● 1690 Corporate Circle ● Petaluma, CA 94954 USA
tech support: 800.622.3526 • main: 760.710.0990 • sales: 877.289.3526 • email: elan@elanhomesystems.com

Relay Outputs: Any actuator in the KNX system that has a properly programmed and available Group Address can be configured as an output.

Devices Supported: Any approved KNX sensor or actuator that exposes the Group Addresses listed in this document is supported.

KNX INPUT/OUTPUT DOES NOT SUPPORT THE FOLLOWING FEATURES:

Auto-Detection: Auto detection of devices is not supported at this time.

Trigger without state change: Inputs must change state (for example, go from Off to On) in order to trigger an Event Map in the g! system. An input turning "off" when it is already "off" will not be recognized by g! as an event.

Other modes/functions: Any functions not specifically listed in this document are not supported. See the Programming KNX section for a list of the specific device types and control functions supported.

INSTALLATION OVERVIEW

1. Install the KNX system and verify that it runs properly as a stand-alone system.

   IMPORTANT! By default, the Tapko gateway is set to a physical address of 15.15.255. During ETS programming, do not use this address for any other device.

2. Run a KNX bus wire from the KNX system to the KNX Gateway. Run a Cat5 cable from the KNX gateway back to the **g!** system controller.
3. Connect the **g!** system to the KNX system electrically. See the wiring diagrams for more information.
4. Configure the **g!** system for the desired devices and confirm communication.
5. Test the system by turning devices on and off.

PROGRAMMING KNX

The configuration of a KNX system in g! requires that the dealer first fully commission the system so that it functions as a stand-alone KNX system. The software configuration tool that dealers use to program KNX systems is called ETS.

KNX systems are configured in g! by specifying in the Configurator the Group Addresses that are setup in the KNX installation. Once the g! system knows the Group Addresses for the desired devices in the KNX system, the g! controller is able to communicate with those devices.

The term Group Addresses should be thought of as a variable that can be shared by several devices in the KNX system. Each Group Address contains exactly one piece of data (one variable), but KNX supports different data types. One Group Address might contain a TRUE or FALSE variable (on or off), while another Group Address might contain an 8 bit number (a dim level).

For example, a dealer setting up a light in an entryway could create a Group Address named "Entry Light". This Group Address would be a data type "bit" meaning that it stores a TRUE or FALSE value. When the user presses the button to turn on the light, the sensor "sets" the Group Address to TRUE. The relay that controls the load receives the message that the Group Address is now TRUE, and closes the relay to turn on the light.

There are two formats for displaying Group Addresses, and it is straight forward to map between them. The first format uses three numbers separated by "/", such as 1/1/5. The second format uses just two numbers, such as 15/55. In g!, only the first format is used.

With the three digit Group Address format, the first digit can be between 0 and 31 (only 0 and 15 using ETS 3), the second digit can be between 0 and 7, and the third digit can be between 0 and 255. Typically, the first digit is used to specify a location (building, wing, floor), the second a type of activity (lighting, climate, etc), and the third is an index. However, there are no requirements covering how the Group Addresses are selected, so dealers can really choose any numbers they want.

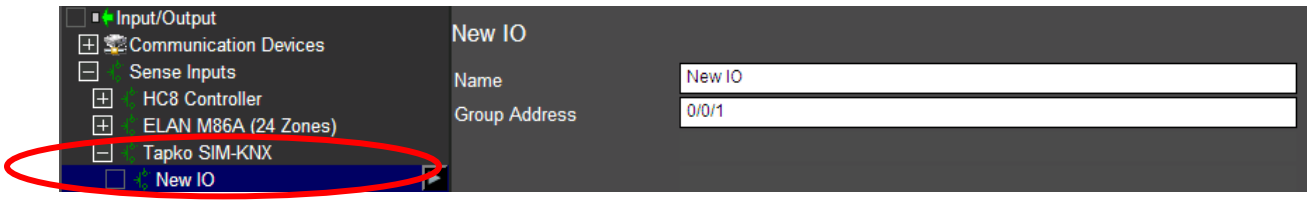
KNX Gateway Programming: The g! System communicates with the KNX bus using the Tapko Gateway product. All Tapko Gateway configuration is performed by the g! System over RS-232, and no special programming of this device is required. The only requirements for the Tapko Gateway are that is wired correctly to the KNX bus, and no other device uses the same physical address (15.15.255).

> **IMPORTANT!** In ETS, be sure to check that the “read” flag is set for any Group Address that g! needs to read. Not all devices enable this setting by default.

In the Configurator, you can add the following devices to interface to a KNX system for basic input and output: **KNX Input** and **KNX Output.** For both, just one Group Address is needed, and it must be a basic 1 bit on / off Group Address.

g! CONFIGURATOR SETUP

1. Add a Communication Device on the Input/Output tab.
2. If using sense inputs, add a Tapko SIM-KNX Input Controller under the Sense Inputs section and connect it to the correct Communication Device.
3. Add an input to the KNX Input Controller for each desired Input.
4. Enter the KNX Group Address and Type Information for the input by typing in the Group Address field.



5. If using Relay Outputs add a Tapko SIM-KNX Output Controller under the Relay Outputs selection and ensure it is connected to the correct Communication Device.
6. Add Outputs for each desired Output to the KNX Output Controller
7. Enter the KNX Group Address and Type Information for the input by typing in the Group Address field.

8. Setup control or indicators from Custom Interfaces or Event Maps as desired.

USING KNX SENSORS FOR MEDIA ZONE CONTROL

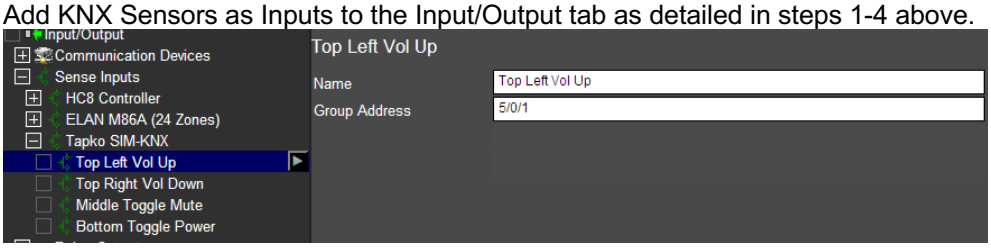
KNX sensor buttons can be used to trip Event Maps and provide control for a number of simple functions in the **g!** System, including Media zone control, from a KNX Sensor (keypad). The following is an example of how to implement these features based on an ABB 6114 3f-Triton Sensor. While some elements may vary from item to item, this should be useful as a general guideline to this type of function. The following example will use the 3 rocker switches to control Power, Mute and Volume on an integrated media zone controller from a KNX sensor keypad.

KNX Programming Brief:

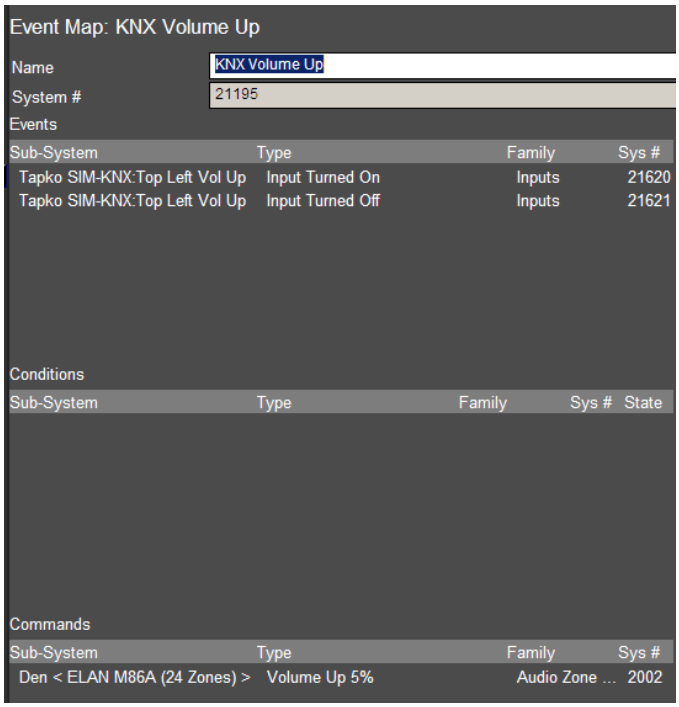
- Parameters for Rocker 1: Switching sensor with 2 Functions, both sides of rocker set to TOGGLE, and LED Operation mode set to Orientation Light (to prevent any LED tracking confusion). This will be used to control the Volume.
- Parameters for Rocker 2 & 3: Switching sensor with 1 Function, set to TOGGLE and LED Operation mode set to Orientation Light (to prevent any LED tracking confusion). These will be used to control Zone Mute and Zone Power.
- Enter Group Addresses for each button object. In this example, the result is 4 Group Addresses. One Rocker 1 Left, One Rocker 1 Right, and One each for Rocker 2 and 3.

g! Configuration Brief:

1. Add KNX Sensors as Inputs to the Input/Output tab as detailed in steps 1-4 above.

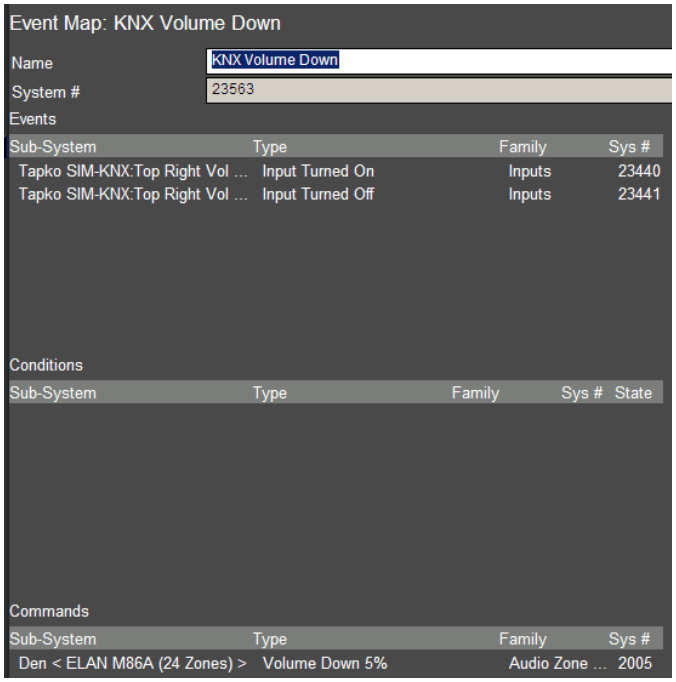


2. Create Event Maps on the Event Mapper tab as follows.
3. **Volume Up:**
    a. Create a New Event Map and name it appropriately, such as KNX Volume Up.
    b. Add an Event from System Family: Inputs>Event Groups: *Tapko SIM KNX*, Available Events: *Top Left Volume Up,* Input Turned ON. (Note that *names* may vary in your installation.)
    c. Add a second Event from System Family: Inputs, Event Groups: *Tapko SIM KNX*, Available Events: *Top Left Volume Up,* Input Turned OFF. (Note that *names* may vary in your installation.)
    d. The result is an Event Map with TWO Events: one for the Input turning ON, and one for the Input turning OFF. Note that <u>either</u> EVENT may occur to trip this Event Map.
    e. Add a Command from System Family: Audio Zone Controller, Command Groups: <*Media Zone*>, Available Commands: Volume Up 5%. Note that *names* may vary in your installation.)
    f. Example Event Map finished:



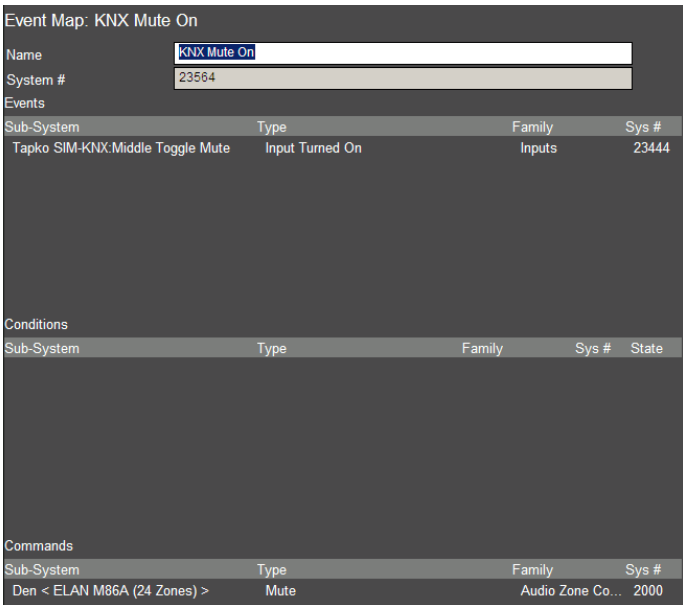
    g. The resulting Event Map will allow any press of the LEFT rocker 1 to send volume up.

4. **Volume Down:**
    a. Simply repeat the steps for Volume UP with three variations:
    b. Name the new Event Map “Volume Down”
    c. Replace the Input with the Right rocker (as opposed to the Left used for Volume Up)
    d. Use Volume Down 5% (instead of Volume Up 5%).

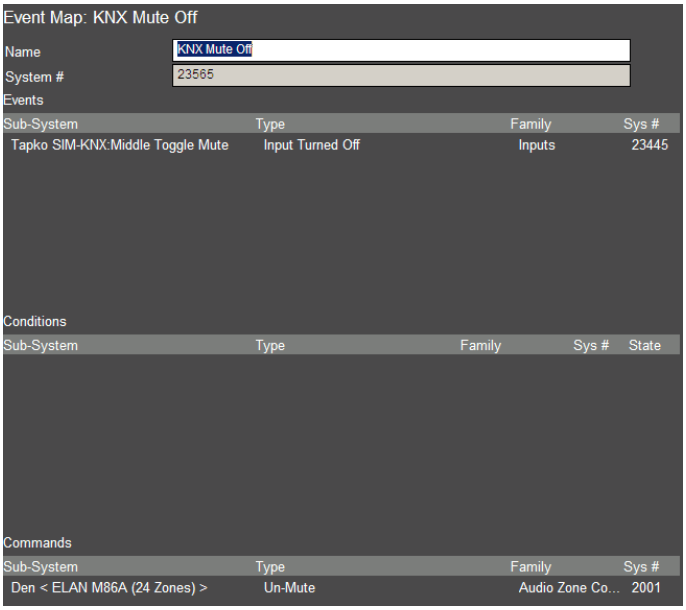


    e. The resulting Event Map will allow any press of the RIGHT rocker 1 to send volume down.

5. **Media Zone Mute:**
    a. Create a New Event Map and name it appropriately, such as KNX Mute On.
    b. Add an Event from System Family: Inputs>Event Groups: *Tapko SIM KNX*, Available Events: *Middle Toggle Mute,* Input Turned ON. (Note that *names* may vary in your installation.)
    c. Add a Command from System Family: Audio Zone Controller, Command Groups: <*Media Zone*>, Available Commands: Mute. (Note that *names* may vary in your installation.)

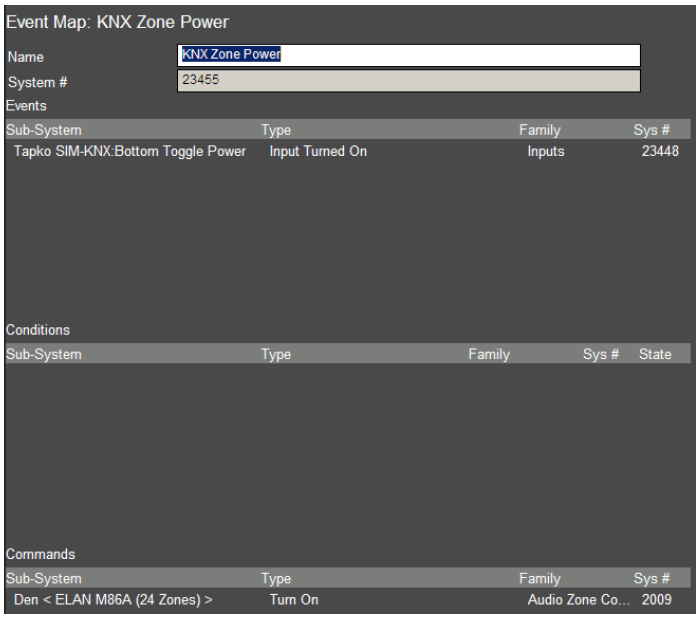


6. **Media Zone Mute OFF**:
    a. Simply repeat the steps for Mute ON with three variations:
    b. Name the new Event Map “Mute OFF”
    c. Change the Event for the Input turned OFF (instead of turned on)
    d. Use Command to “Un-Mute” (instead of mute).

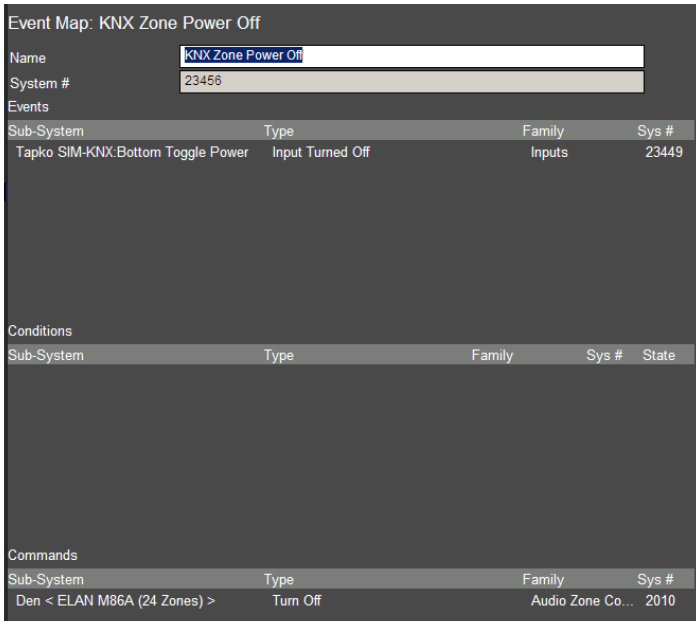


7. The result of the steps 5 & 6 is the Mute will toggle as the KNX button is toggled.
8. **Media Zone Power On:**
    a. Create a New Event Map and name it appropriately, such as KNX Power On.
    b. Add an Event from System Family: Inputs>Event Groups: *Tapko SIM KNX*, Available Events: *Bottom Toggle Power,* Input Turned ON. (Note that *names* may vary in your installation.)

c. Add a Command from System Family: Audio Zone Controller, Command Groups: <*Media Zone*>, Available Commands: Input Turned On. Note that *names* may vary in your installation.)

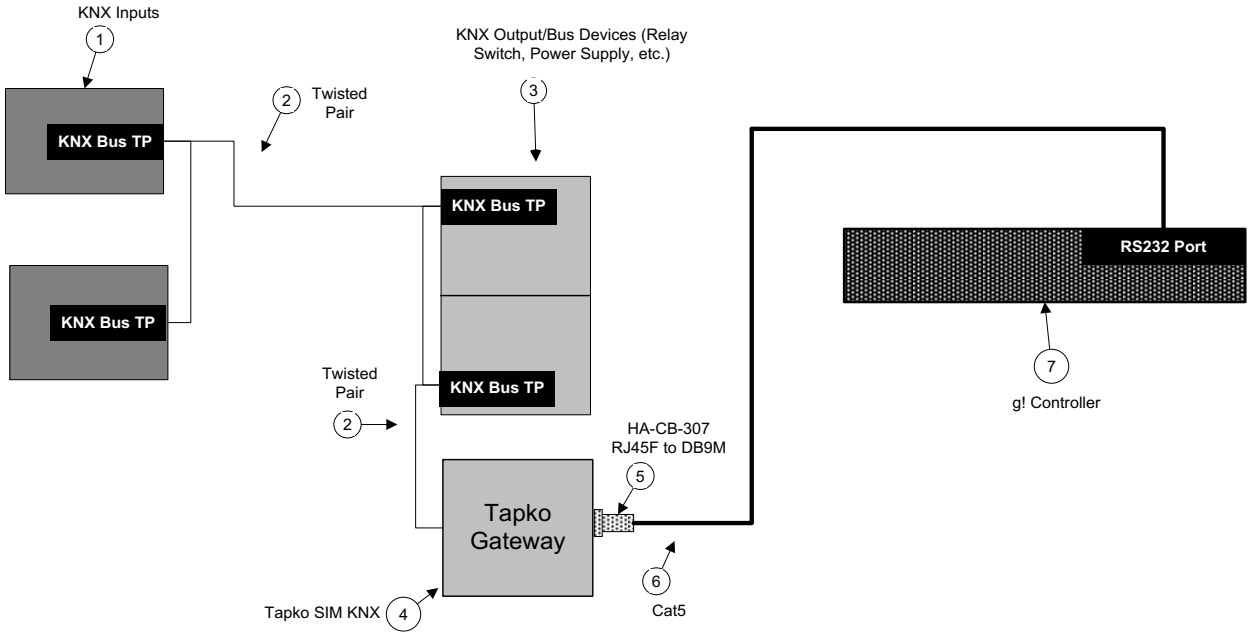


9. **Media Zone Power Off:**
   a. Simply repeat the steps for Power ON with three variations:
   b. Name the new Event Map “Power OFF”
   c. Change the Event for the Input turned OFF (instead of turned on)
   d. Use Command to “Turn OFF” (instead of turn on).



10. The result of the steps 8 & 9 is the Zone Power will toggle as the KNX button is toggled. Note this will always turn on the zone to the last active source.

CONNECTION DIAGRAM



Note: Diagram shows TP connection as KNX bus medium for example. Other bus types exist and may be used.

BILL OF MATERIALS FOR RS-232 CONNECTIONS

#	Device	Manufacturer	Part Number	Protocol	Connector Type	Notes
1	KNX Sensors (Room Controller, etc)	Various	Various	KNX	Screw Terminals	
2	TP Cable	Installer	N/A	KNX	Bare lead	
3	KNX Devices (Ex. Relay Module)	Various	Various	KNX	Screw Terminals	
4	Tapko Gateway	Tapko	SIM-KNX128-RS232	KNX x RS-232	Screw Terminals X DB9	
	Tapko Gateway - DIN Mount	Tapko	SIM-KNX128-RS232-D	KNX x RS-232	Screw Terminals X DB9	
5	DB9 to RJ45 adapter	Elan	HA-CB-307	RS-232	DB-9 Male X RJ-45 Female	
6	Category 5 cable	Installer	N/A	RS-232	RJ45 Male	
7	g! Controller	Elan	Various (e.g. HC-12)	RS-232	RJ45 Female	

g! CONFIGURATION DETAILS

The following table provides settings used in the g! Configurator. Please refer to the *g! Configurator Reference Guide* for more details.
In the table below:

- "<Select>", "<Select Scene>" Select the appropriate item from the list (or drop-down) in the Configurator.
- "<User Defined>", etc. Type in the desired name for the item.
- "<Auto Detect>", etc. The system will auto detect this variable.
- "<Type in Group Address>" Enter appropriate Group address in format *00/00/00*

Devices	Variable Name	Setting	Comments
Communication Devices	**Name**	<User Defined> (Default: New Device)	Elan recommends renaming for clarity
	Type	**Serial Port**	
	Communication Type	**Tapko SIM-KNX**	
	Location	<User Defined> (Not Required)	
	Com Port	<Select>	COM1, 2, 3 etc.
			See Note 1
Input Controller	**Name**	<User Defined>	Elan recommends renaming for clarity
	Device Type	**Tapko SIM-KNX**	
	COM Device	<Select from list>	Select Tapko Comm Device
Input	**Name**	<User Defined>	Elan recommends renaming for clarity
	Device ID	(Not Required)	This setting is not used at this time.
	Group Address	<Type in Group Address>	1 bit: On / off
			Add one Input for each Input used
Output Controller	**Name**	<User Defined>	Elan recommends renaming for clarity
	Device Type	**Tapko SIM-KNX**	
	COM Device	<Select from list>	Select Tapko Comm Device
Output	**Name**	<User Defined>	Elan recommends renaming for clarity
	Device ID	(Not Required)	This setting is not used at this time.
	Group Address	<Type in Group Address>	1 bit: On / off
			Add one Output for each Output used

NOTE 1: Only **one** Comm Device is required for all subsystems if using only **one** KNX bus/Tapko SIM-KNX. The Comm Device will automatically populate on all tabs.

COMMON MISTAKES

1. Incorrect KNX programming. KNX must be fully programmed and functional as a standalone system prior to integration with the g! system. In addition, the following particular items must be set correctly:
    a. The correct KNX Objects must be associated with KNX Group Addresses, and the correct Group Address must be specified for each specific function in the g! Configurator.
    b. Certain objects may need to have the “Read” flag set on them in ETS software, as this may not be the default setting.
    c. All Group Addresses must be the three digit type (00/00/00), and the two digit (00/00) type is not supported.
    d. All KNX programming must be downloaded to physical devices. Ensure you have not performed programming/changes offline that are not downloaded to the physical devices.
2. Programming any device in your KNX bus with the same address as the Tapko SIM KNX. The SIM KNX utilizes 15.15.255 by default.
3. Adding multiple communication devices. If you have **ONE** Tapko SIM-KNX (one KNX bus) that you are using for multiple subsystems (example: Input/Output & Climate), then you only need **one** Communication Device. Adding the Tapko SIM-KNX to one Subsystem in Configurator will automatically populate it on all supported subsystem tabs.