

BAB TECHNOLOGIE GmbH

# **LINK**MODULE Documentation

Version 1.2.0. Type: KNX/TP, EnOcean Item no.: 10551, 13551

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## 1 LINKMODULE

We are happy that you have purchased the **LINK**MODULE and thank you for your trust. The **LINK**MODULE provides a cost-effective and simple way to securely connect remote parts of the facility. Please read this description carefully in order to perform the best possible configuration.

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Figure 1: LINKMODULE KNX/TP

Product name: Intended use: Type: Item number: LINKMODULE Modules for facility coupling via network Modular device (Reiheneinbaugerät, REG) 10551 (KNX) / 13551 (EnOcean)



### 1.1 FUNCTIONAL OVERVIEW

The **LINK**MODULE connects remote KNX or EnOcean systems via the network. If this is happening between the BAB devices **LINK**MODULE, EIB**PORT, FACILITY**MASTER, this kind of connection can be performed rapidly and securely across network domains. For this purpose, the BAB facility coupling report and BAB **SECURE**LINK have been implemented in addition to a KNXnet/IP Server.



Figure 2: LINKMODULE – Facility coupling with FACILITY MASTER



Figure 3: LINKMODULE – SECURELINK with EIBPORT



## 1.2 TECHNICAL DATA

#### **Technical Data**

- Operating voltage:
- Typical power consumption
- Power consumption:
- Connection:
- Resistant to climate:
- Ambient temperature:
- Storage temperature:
- Rel. humidity (non-condensing):

#### Mechanical Data

- Assembly:
- Dimensions (W x H x D) in mm:
- Housing:
- Degree of protection:
- Interfaces (depending on version):
  - Ethernet (all types)
  - KNX/TP (type 10551)
  - EnOcean (type 13551)

#### **Specific Features**

BAB facility coupling and BAB **SECURE**LINK

#### Software Requirements

- Communication:
- Browser:

12-32V 300mA at 12V <= 5 W Power supply via screw-type terminal EN 50090-2-2 -5 to +35°C -10 to +60 °C 5% - 80%

Modular device (REG) housing 4 TE 70 x 90 x 63 Plastic IP20 (according to EN 60529)

via RJ45 female connector via pluggable screw terminal SMA male connector

Network interface Current standard browsers

## 1.3 SCOPE OF DELIVERY AND INTERFACES

The scope of delivery of **LINK**MODULE includes the following content:

- 1 x LINKMODULE KNX/TP or LINKMODULE EnOcean
- 1 x enclosed CD

A power supply unit for the device is NOT included in the scope of delivery!

In addition to the terminal for the power supply (<u>12-32V DC</u>), the **LINKMODULE** provides the following interfaces:

- 1 x RJ 45; Ethernet 100Mbit/s Full Duplex
- KNX®/TP connection or SMA female connector for EnOcean

#### FACTORY SETTINGS ON DELIVERY:

IP address: 192.168.1.220 User name: "admin" Password: "admin"

### 1.4 UPDATES

We reserve the right to offer firmware updates free of charge for the **LINK**MODULE. We will inform you about our new firmware via our newsletter or homepage. The update files are made available in the download section on our homepage.

#### www.bab-tec.de

### 1.5 IMPORTANT INFORMATION ON THE OPERATING INSTRUCTIONS

When using these instructions, it must be noted that the software described herein is constantly improved for the benefit of our customers so that the details might possibly not be up to date any more. Information on current **LINK**MODULE firmware and also on this description ("**LINK**MODULE documentation") can be found on <u>www.bab-tec.de</u>.

### 1.6 FUNCTIONAL SECURITY

If there are specific requirements to avoid risks for persons or property (functional security), additional measures must be taken which are to be considered during planning and executing. When utilising the LINKMODULE, there are interactions with other devices/connections which can lead to risks for the system. Failure of individual devices or functions or connections especially can result in the non-function of the system. There are several ways to reduce the risks, depending on the system and the customer requirements.

However, these measures must provide the necessary independence from the system operation (LINKMODULE with facility coupling) and be constantly available.

## **@**

## 2 ASSEMBLY

#### The operating voltage of the LINKMODULE is 12-32V DC

The device presented here is the LINKMODULE KNX/TP, modular device (REG) housing 4 TE. Dimensions (width x height x depth):  $70 \times 90 \times 63$  mm

- In order to be able to connect the power supply comfortably, the pluggable screw terminals (see figure below) are removed.
- Now, the power supply cables are connected to the pluggable screw terminals (see figure below). In doing so, the <u>polarity</u> must be considered:

#### (Left: plus (+), right: minus (-)).

- Now, the pluggable screw terminals can be reconnected to the **LINK**MODULE.
- The device can then be snapped onto the mounting rail according to DIN EN 60715.





	LINKMODULE terminals
(1)	KNX/TP connection (type 10551) via pluggable screw terminal
(2)	Power supply via screw pluggable screw terminal 12-32V DC
(3)	USB terminal
(4)	RJ45 female connector for Ethernet LAN

"heartbeat". The flashing interval increases

depending on the device workload.



## 2.1 LED STATUS

The **LINK**MODULE has two DUO LEDs ("Power/Boot" and "Status"). Each DUO LED provides a green and a red LED. The top LED is the Power/Boot LED, the bottom LED is the Status LED.

#### POWER / BOOT LED

LED display	Status
OFF	The device is not ready for operation. No operating voltage is supplied.
GREEN	The device is ready for operation.
FLASHING ORANGE	The device is booting.
STATUS LED	
LED display	Status
OFF	The device is booting.
FLASHING GREEN	The device has started; the LED simulates a

FLASHING RED Communication takes place via KNX.

#### Explanation:

The green "Power/Boot" LED lights up as soon as the **LINK**MODULE is supplied with power. Two to three seconds after the power supply has been switched on, this LED also starts to flash red (flashing orange) until the booting process has been completed. Then, the LED is continuously illuminated green while the "Status" LED flashes green (simulating a "heartbeat"). The flashing frequency increases depending on the workload of the device.

It takes approx. <u>2 minutes</u> for the LINKMODULE to start.



## 2.2 INITIAL OPERATION

When the **LINK**MODULE has been assembled and started as described in chapter "Assembly", initial operation can now be performed as specified below.

#### Factory setting on delivery:

IP address	192,168,1,220
	152.100.1.220

Subnet mask 255.255.255.0

User name admin

Password admin

Device Name LinkModule

Note: The password must be changed immediately when logging in for the first time. If the password is lost, the device cannot be reset!

### 2.2.1 LANGUAGE

The language of the **LINK**MODULE interface depends on the language set in the browser. For the **LINK**MODULE, German and English are available.

### 2.2.2 SYSTEM REQUIREMENTS

In order to configure the device as requested, the following system requirements are necessary:

- A current browser (e.g. Firefox, Chrome, Safari etc.)
- Network and network cable
- Power supply via pluggable screw terminal
- A remote device with KNXnet/IP routing or BAB facility coupling enabled which is accessible via network
- Local connection to KNX or EnOcean system



### 2.2.3 ESTABLISHING CONNECTION

If the device is in delivery condition (see above), it can be accessed via the IP address mentioned above and the network settings must be adjusted to the address range if necessary. For this purpose, please refer to chapter "Adjusting the network settings of your computer". If you do not know the network settings of the device, the "DiscoveryTool" can help you to find out at which IP address the device is available (see below).

#### 2.2.3.1 DISCOVERYTOOL

The "DiscoveryTool" software is platform-independent and can be run on any operating system. It can be found on the supplied CD or in the download section at <u>www.bab-tec.de</u>.



Figure 5: DiscoveryTool icon

Double-click the program icon to start the software. All devices available in the network are shown in the program window including device name and serial number. A **LINK**MODULE can be recognised by means of a serial number starting with "BT126\*"(KNX/TP) and "BT136\*"(EnOcean).

M DiscoveryTool							
Aktualisieren							
knxeasy (BT2010012110)           CUBEVISION MODULE (BT1010000830)           ept8 (BT010000830)           ep-test3 (BT0100188211)           ept4 (BT0300000430)           CubeVisionName (BT1032294010)							
IP-Adresse	IP-Adresse 172.31.49.241						
Firmware	1.0.1						
HTTP-Port	80						
SSH-Port	36						
BMX/TCP-Port	0						
BMX/UDP-Port	0						
Im Browser öffnen	Netzwerk Einstellungen						

Figure 6: DiscoveryTool

The colour marking of the devices in the DiscoveryTool has the following meaning:

- Grey = Information is being retrieved
- Green = Device is within the same network area as the PC
- Yellow = Device is NOT in the same network area as the PC

Mark the required device in the list. The available device information is displayed in the fields below. If the device is marked green, you can immediately call up the start page of the device by pressing the "Open in browser" button. If the device is marked yellow, change the network settings of your PC correspondingly (see following chapter).

## **(**

#### 2.2.3.2 ADJUSTING THE NETWORK SETTINGS OF YOUR COMPUTER

In order to adjust the network settings of your computer and establish a connection to the device, please proceed as follows:

- Open the IP address settings (in Windows 7):
- Click "Start Button" --> "Control Panel" --> "Network"
- Select "Network Connection", then "LAN Connection" ("Intel PRO1000 GT" in the figure below).

🔵 🗢 💱 « All Control Pan	el Items   Network and Sharing Center	- 4	• Search	Control Panel	Q
ontrol Panel Home	View your basic network information	on and s	et up con	nections	0
hange adapter settings	🧶 —— 🧔	- 1			See full map
ettings	KONOHA Netv (This computer)	vork		Internet	
	View your active networks			Conn	ect or disconnect
	A New A		Access type:	Internet	
	Home network	1	HomeGroup	: Joined	
			Connections	a 📱 Local Area C	onnection 2
	Change your networking settings				
	Set up a new connection or network				
	Set up a wireless, broadband, dial-u point.	p, ad hoc, i	or VPN conn	ection; or set up a	router or access
	Connect to a network				
	Connect or reconnect to a wireless,	wired, dial	up, or VPN	network connectio	n.
	Choose homegroup and sharing op	tions			
ee also	Access files and printers located on	other netw	ork comput	ers, or change shar	ing settings.
dobe Version Cue CS4	Troubleshoot problems				
omeGroup	Diagnose and repair network problems, or get troubleshooting information.				
ternet Options					

Figure 7: Windows - Network and Sharing Center

• Then click "Properties":

12		
Connection		
IPv4 Connect	ivity:	Internet
IPv6 Connect	ivity:	No network access
Media State:		Enabled
Duration:		11:20:13
Speed:		1.0 Gbps
Details		
Activity —	Sent —	🖉 — Received
Details Activity	Sent —	— Received 31,471,070
Details Activity Bytes:	Sent —	Received 31,471,070

Figure 8: "LAN Connection" status

• Select "Internet protocol Version 4 (TCP/IPv4)" and click on "Properties" again:



Figure 9: LAN Connection Properties

- Now note down the current IP address settings or take a screenshot in order to ensure that you can reset the IP address setting after configuring the **LINK**MODULE.
- Now change the IP address settings (IP address and subnet mask) as required:

Ð	Control Panel\Network and Internet\Network Connection	s – 🗆 🗙
🛞 🎯 🕆 🛉 😰 🕨 Control Panel 🕨 Netv	ork and Internet   Network Connections	✓ ♂ Search Network Connections ,
File Edit View Tools Advanced Help	Ethornot Status     X	
Organise 👻 Disable this network device	Di Ethernet Properties	his connection » 📰 🔹 🔟 🔞
Ethernet Nicht identifiziertes Netzwerk	Internet Protocol Version 4 (TCP/IPv4) Prope	rties 🔀
Controller der Familie Realtek PCI	General	
	You can get IP settings assigned automatically if your network si this capability. Otherwise, you need to ask your network adminis for the appropriate IP settings. Obtain an IP address automatically.	ipports itrator
	Use the following IP address:	
	IP address: 192 . 168 . 1 . 200	1
	Subnet mask: 255 . 255 . 255 . 0	
	Default gateway:	
	<ul> <li>Obtain DNS server address automatically</li> <li>Use the following DNS server addresses:</li> </ul>	
	Preferred DNS server:	1
	Alternative DNS server:	j l
	Validate settings upon exit	nced
	ОК	Cancel
	1	
3 items 1 item selected		III 🖬
Controller der Familie Realtek PCIe GBE		📲 Computer 💷

Figure 10: TCP/IPv4 Properties

Example of a valid configuration with factory settings of the LINKMODULE:

- Free IP address: 192.168.1.230
- Subnet mask: 255.255.255.0
- Now confirm your input with "OK".
- Close all windows until the "Windows Network and Sharing Centre Settings" window is shown.



Thus, you have adjusted the network settings of your PC to those of the **LINK**MODULE. The **LINK**MODULE web interface can be accessed via the browser. Restore the original network settings of your PC by following the steps described above as soon as you have configured the **LINK**MODULE correspondingly.

When the IP address of your PC and your **LINK**MODULE are placed in the same network mask, you can continue the configuration.

#### 2.2.3.3 LOGIN

Now open your internet browser and enter the IP address into the address field (<u>on delivery</u> <u>192.168.1.220</u>).

The web interface starts. In order to get full access, initially click "Login".

The login window opens, enter "admin" as the user name and "admin" as the password to log in.

Note: The password must be changed immediately when logging in for the first time. If the password is lost, the device cannot be reset!

	Log	j In		
Username Password			_	
Cancel			ок	



The **LINK**MODULE menu with 6 configuration menus appears:

- VPN Server
- BAB SECURELINK
- Facility coupling
- Configuration
- Information
- Logout

#### 2.2.3.4 ADJUSTING THE NETWORK SETTINGS OF THE LINKMODULE

In order to modify the IP address of the LINKMODULE, click "Configuration"



Figure 12: LINKMODULE start menu

The configuration menu opens, the network settings are performed in the menu item "Network".

	-	
1	G	))

BAB TECHNOLOGIE	LINKMODU Version 1.1.1	LE
General	Network	
Network >	DHCP	
User Administration	IP Address	192.168.1.220
Backup / Restore	Netmask	255.255.255.0
Save Configuration	Gateway	192.168.1.1
	DNS Server	
	DNS Server #1	1
	DNS Server #2	
	DNS Server #3	
	NTP Server	
	NTP Server #1	0.de.pool.ntp.org
	NTP Server #2	2.2.2.2
	NTP Server #3	

Figure 13: LINKMODULE Network menu

Now adjust the IP address to your network environment. When you have modified your IP address and you want it to be saved, click the "Save Configuration" field. In order to reconnect with the **LINK**MODULE web interface, your computer will again need the former IP address or the IP address corresponding to your current address space of the **LINK**MODULE (chapter "Adjusting the network settings of your computer").

#### Note: In order to browse the LINKMODULE now, you must enter your new IP address

DHCP: (Dynamic Host Configuration Protocol)	If DHCP is active, the device automatically obtains the network settings. For this purpose, the availability of a DHCP server in the local network is mandatory.
IP address / network mask / gateway:	If DHCP is not active, the network settings must be carried out statically. In case of doubt, contact your network administrator as to which settings are to be carried out. Please note that an IP address may never be assigned twice!
DNS server:	DNS is the abbreviation for Domain Name System. The DNS server converts Internet addresses, for example "www.bab-tec.de", into the IP address "85.214.89.170" and vice versa. Without a valid DNS entry, NTP, weather services from the Internet and UPnP do not work.
NTP server:	NTP is a free service for synchronising the system time of Internet-compatible devices. If time synchronisation is not possible, please check the system time from time to time in the "General" menu item. NTP server list: e.g. <u>http://www.pool.ntp.org/zone/europe</u>



## 2.3 INITIALIZING VPN SERVER

In order to create a **SECURE**LINK connection between LINKMODULE; EIBPORT or **FACILITY**MASTER or to be able to access the device from a computer via VPN connection, a prior initialisation of the VPN server is required. In this regard, please note chapter "<u>VPN Server / BAB SECURELINK</u>".

## 2.4 LINKMODULE KNX/TP

For a **LINK**MODULE KNX/TP (item no. 10551) you open the menu "Configuration" – "KNX" in order to call up the KNX/TP configuration. In addition to the KNX configuration, the KNX interface of the device can also be tested here.

Note: Please check if KNX/TP is correctly connected to the device.

KNX INTERFACE (TYPE 10551)

Physical address:	Indicate the physical address of your <b>LINK</b> MODULE here.
KNXnet/IP tunnelling address:	Enter the address used for your KNXnet/IP tunnelling connection here. This address(es) are virtual addresses and may not be assigned a second time nor coincide with the physical (real) address of the LINKMODULE
KNXnet/IP routing:	Activates KNXnet/IP Routing in the <b>LINK</b> MODULE. Note: This function can only be activated if the physical (real) address is a line or area linking address.
KNXnet/IP tunnelling:	Activates KNXnet/IP tunnelling in the <b>LINK</b> MODULE

• Click on "Save Configuration" in order to accept the settings.



#### TEST INTERFACES

KNX address

Switching KNX address

Enter the group address you want to perform the test with here

By clicking "On/off", the address given above will be switched

Reading out address status

When clicking on "Status Query", a pop up window with the current status information about the group address given above will appear

General	KNX	
Network		
KNX >	Physical Address	4.7.13
User Administration	KNXnet/IP Tunneling Address	4.7.14;4.7.15
Backup / Restore	KNXnet/IP Routing	
Save Configuration	KNXnet/IP Tunneling	
	Test KNX Interface	
	KNX Address	1/0/1
	Switch a KNX Address	Toggle
	Read Address State	Request Status

Figure 14: LINK MODULE KNX Configuration

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## 2.5 LINK MODULE ENOCEAN

EnOcean is a radio system for buildings which, due to so-called "energy harvesting", doesn't require batteries and utilizes ambient energy, and is therefore low in maintenance and reliable. With this features, an EnOcean solution is very flexible and simultaneously cost-effective, which makes it the perfect solution for retrofitting.

## Note: Please check if the magnet base antenna is correctly connected to the SMA female connector.

### 2.5.1 TECHNICAL DETAILS ENOCEAN INTERFACE

#### EnOcean (868 MHz):

Operational frequency: Range: (depending on construction material) Input objects: Output objects: External antenna: 868.3 MHz 300 m in open areas / 30 m in buildings

Any number 128 2.50 m cable, magnet base and SMA male connector.

### 2.5.2 OPERATING PRINCIPLE ENOCEAN

An EnOcean radio network consists of sensors and actuators. The sensors utilize your ambient energy to transmit the corresponding radio signal. So that an actuator can interpret and respond to the signals of a sensor, the actuator must be adapted to the sensor. The so-called EnOcean Profiles (EEP) determine how the data provided by the sensor are to be interpreted. Thus, it is important that sensor and actuator utilize the same EnOcean Profile (EEP).

#### Device categories / sensors

EnOcean distinguishes between three device categories in its sensor technology. The device category gives information about the kind of EnOcean signal involved and simultaneously about what the receiver can expect.

- Switch module: A module which sends out a corresponding radio signal via user interaction. That is switches, rockers, position and key card switches as well as window handles.
- 1 byte sensor: A sensor which sends out information of 1 byte size.
- 4 byte sensor: A sensor which sends out information of 4 byte size.

#### Actuators

Actuators will perform their controlling on the basis of sensor signals. Therefore, sensor and actuator have to be adapted to each other. Thus, it is important to know which EnOcean profile is to be emulated to address a LINKMOUDULE actuator correctly. The actuator manufacturer will inform you about which profile the actuator utilizes.

#### **EnOcean Profiles (EEP)**

The EnOcean profiles (EnOcean Equipment Profile - EEP) define the device category, the function and the device specification. During the **LINK**MODULE configuration, the KNX parameters automatically adapt to the selected profile. The profile consists of 3 number pairs separated by a hyphen: XX-XX-XX

The different positions represent the following: ORG-FUNC-TYPE

• ORG determines which messages form the communication base (see also 'Device categories/sensors').



- FUNC determines which device is involved, that is e.g. a switch or a temperature sensor.
- TYPE determines the exact specifications of the device functionality.

#### Transmitter ID (Trans. ID)

Is a definite device address which only exists once. This address allows the sending device to be identified.

#### Teaching Telegram / LRN Telegram

Is a special telegram used to "teach" the sensor to recognize the actuator, that is, to adapt the actuator to the sensor. It is important for the actuator to know from which hardware address it gets its sensor data. There are several kinds of adapting mechanisms. Please consider the respective descriptions.

### 2.5.3 ENOCEAN CONFIGURATION

The **LINK**MODULE internally works with the KNX group address system. In order to continue to use received EnOcean signals within the device or to trigger EnOcean telegrams, KNX group addresses must be used. You will find information about this in chapter "KNX Addressing".

#### 2.5.3.1 ENOCEAN CONFIGURATION

In order to access the corresponding **LINK**MODULE configuration mask, open the menu "configuration" – "EnOcean Editor". Java Applets must be able to be started (please note also the indications in chapter "EnOcean Editor"). The window generally consists of 3 areas:

EnOcean Configurat	tion					<u> </u>
📭 📬						
Trans. ID Type N	Vame	Profile	Tel	le. (TI) La	ast Value	Last Status
ff85d166 📿 🔿		1 Byte Sensor: Unknown	0			
0010d9c4 🛹 F	enstergriff	05-10-00: Window Handle	16	CI	osed	Type2 - U-msg
00012707 🖍		4 Byte Sensor: Unknown	0			
						J
Time	Trans. ID	Name	Value			Status
18:21:04 0222	0010d9c4	Fensterariff	Closed			Type2 - U-msg
18:21:03.0762	0010d9c4	Fensterariff	Opened			Type2 - U-msg
18:21:01.0853	0010d9c4	Fenstergriff	Tilt			Type2 - U-msg
18:21:00.0943	0010d9c4	Fensterariff	Opened			Type2 - U-msg
18:20:59.0694	0010d9c4	Fensterariff	Tilt			Type2 - U-msg
18:20:58.0836	0010d9c4	Fenstergriff	Opened			Type2 - U-msg
18:20:56 0786	0010d9c4	Fenstergriff	Closed			Type2 - U-msg
18:20:55.0822	0010d9c4	Fensterariff	Opened			Type2 - U-msg
18:20:48.0653	0010d9c4	Fenstergriff	Tilt			Type2 - U-msg
18:20:46 0698	0010d9c4	Fensterariff	Opened			Type2 - U-msg
18:20:34.0183	0010d9c4	Fensterariff	Closed			Type2 - U-msg
18:20:31.0035	0010d9c4	Fensterariff	Opened			Type2 - U-msg
18:20:26 0165	0010d9c4	Fenstergriff	Tilt			Type2 - U-msg
10.00.00 0005	0010d9c4	Fensterariff	Opened			Type2 - U-msg
18/20/23 0985		, energini	opened			1)poz 0
18:20:23.0985	0010d9c4	Fensterariff	Closed			Type2 - U-msg
18:20:23.0985 18:20:19.0407 19:20:10.0006	0010d9c4	Fenstergriff	Closed			Type2 - U-msg
18:20:23.0985 18:20:19.0407 19:20:10.0006	0010d9c4	Fenstergriff	Closed			Type2 - U-msg

Figure 15: EnOcean Configuration

- (Red) *Configuration Menu*: Basic settings of the EnOcean module are adjusted here and the EnOcean devices are emulated.
- (Blue) Device List: All EnOcean devices are ordered and listed here in the order of their device ID (Trans. ID).
- (Green) *Telegram List:* All received EnOcean telegrams are listed here in the order of their arrival time.

Additionally, at the bottom of the window there are the action buttons available for securing or discarding the settings.



#### 2.5.3.2 ENOCEAN SETTINGS



The EnOcean settings show the hardware parameters of the incorporated EnOcean module (TCM 300 Transceiver). The following settings can be performed:

#### **EnOcean active**

Here, you can switch the module on or off.

#### Repeater

The repeater function is used to repeat a receiving signal in order to increase its range. The following settings are available:

- *Off:* Repeater function is turned off.
- *Level 1:* The telegram is repeated by one repeater only.
- *Level 2:* The telegram is repeated by two repeaters.

#### **RX** sensitivity

Determine the receiving sensitivity in which you want the EnOcean module to work. You can choose between "Low" and "High".

#### 2.5.3.3 ADAPTING THE ENOCEAN DEVICE

All EnOcean devices within range are displayed both in the device list and in the telegram list as they are sending something. As already mentioned, the EnOcean telegram must be connected with a group address in order to make it usable for the LINKMODULE. This is done as follows:

1. Mark the device of interest in the device list.

Advice: If you are not sure which device has which Trans. ID, activate the device of interest and look up in the device list for which device the telegram counter increases (column

#### <u>"telegrams").</u>

📭 🖸	2					
Trans. ID	Туре	Name	Profile	Tele. (TI)	Last Value	Last Status
fl85d164	1		4 Byte Sen	2		
ff85d166	Ś		1 Byte Sen Remove	2		
000162c2	Ŷ		1 Byte Sen Properties	1		
0010d9c4	\$	Fenstergriff	05-10-00: Vymoow Handle	16	Closed	Type2 - U-msg
00012707	Ŷ		4 Byte Sensor: Unknown	0		

#### Figure 17: Calling up properties

- 2. When you have detected the device of interest, mark it with the mouse, press the right mouse button and click '*Properties*'. Alternatively, double-click on the device.
- 3. The window "*EnOcean Device Configuration*" will open. Via this dialogue, the EnOcean devices will be "adapted.
- 4. Initially, assign a definite "*Device Name*", referring to the device function. In the input screen, you will further find the following parameters:

EnOcean Device Configu	uration		<b>—</b> ×
Device			
Device Name	Button	Received Telegrams	2
Device ID	ff85d164	Teach-In Telegrams	0
Device Enabled	V		
EnOcean Profile (EEP)	Eltako Switching (z.B. FS	R14/FSR61)	<b>•</b>
Latest Value			

- Figure 18: EnOcean Device Configuration
- *Device ID:* This is the unique device address through which the device is identified.
- *Received Telegrams:* Here, the number of telegrams already received by the **LINK**MODULE from this device is counted.
- *Teach-in Telegrams:* If the device should send teach-in telegrams, their number is shown here.
- *Device Active:* If you would like to keep the device in the EnOcean configuration without using it, you can deactivate it for the **LINK**MODULE usage via this option.

Base ID	ffd02900
Version	2.0.0.0
API Version	2.0.0.0
EnOcean Aktiv	V
Repeater	Off
RX Empfindlichkeit	Hoch

Figure 16: EnOcean Settings

- EnOcean Profile (EEP): The different EnOcean devices are defined via so-called profiles. Hereby, the device category involved is detected as early as at the signal input and a pre-selection is made. Then it is also possible to select from the profiles known from the LINKMODULE. As soon as a profile is selected, the corresponding KNX parameters are shown underneath.
- *Last Value:* This field interprets the payload of the last radio signal from this device ID according to the selected profile. If there is no profile selected, the crude data are shown.
- 5. Select the corresponding profile of your EnOcean device. If you are not sure about which profile your device 'speaks', please contact the manufacturer of the device. After the right profile has been selected, one or more input fields appear in the "*Parameters*" area:

EnOcean Device Configuration Device Geräte Name Taster Wohnzimmer ein Empfangene Teleg. Geräte ID 0024b376 Lern-Telegramme 0 Gerät aktiv EnOcean Profil (EEP) 05-02-01: 2 Wippen: Licht & Jalou Letzter Wert Parameter . Invertieren 1/0 **Wippe 1** Funktion Schalten / Dimmen -Schalten EIS 1 (1 Bit) • . Dimmen EIS 2 (4 Bit) -Wippe 2 Funktion Schalten / Dimmen -Schalten EIS 1 (1 Bit) • Dimmen EIS 2 (4 Bit) • Schließen

Different parameters appear depending on which profile has been selected. If one switch (rocker) has been selected,

Figure 19: EnOcean Device Configuration

various additional functions can be carried out (see chapter "<u>Configuration example for EnOcean</u> <u>button</u>").

- 6. Now, enter the corresponding KNX group addresses in the address fields to obtain a connection to the selected EnOcean device. You will find detailed information about the KNX group addresses and their assignment in chapter "KNX Addressing".
- 7. When you have entered the addresses in the parameters as requested, close the *EnOcean Device Configuration* window.
- 8. Save the changes in the window "*EnOcean Configuration*" via the button "*Save & Close*" or "*Assume*" (the window stays open).

As soon as this step is taken, the entered KNX telegrams are triggered via EnOcean signals. In order to be able to use the addresses more easily later, you should enter them into the ESF data with a definite designation (see Chapter "KNX Addressing")



#### 2.5.3.4 EMULATING ENOCEAN DEVICES

The LINKMODULE provides a Transceiver Module which not only permits receiving but also sending EnOcean telegrams. In order to do this, the LINKMODULE emulates an EnOcean device. Via a configuration mask, you can determine which device is emulated with which KNX telegram by the LINKMODULE (the device internally works with KNX group addresses also during the EnOcean execution).

New Emulated Device

#### Assigning a new emulated device

In order to assign a new device, please click the KNX logo in the configuration menu ("Editor" > "Extras" > "EnOcean Configuration"). Thus, a window designated "New Emulated Device" will open.

In the upper half of the window, you will be asked to choose a hardware address. The address is unique and 128 different addresses can be assigned in total. If a device has already been assigned, the device name is highlighted in red on the ID list.

#### Selecting the device category

Depending on which actuator is to be controlled by EnOcean, the appropriate device category has to be selected. Additionally, the appropriate profile can be preselected directly beneath the corresponding category. By confirming with "OK", the settings will be confirmed and the "EnOcean Device Configuration" window will open.

#### Defining emulated device ("EnOcean Device Configuration")

The device assigned in this way is initially provided with a definite device name. Additionally, the following parameters are presented (see also chapter "Example: Emulate temperature sensor")

- Device ID: Is the definite hardware address you have . selected before. Can not be modified at this point.
- *Received Telegrams:* Shows the number of telegrams already received from this hardware address. In an emulated device, this number should generally be "0".
- . Teaching Telegrams: Shows the number of "teaching telegrams" already sent from this hardware address.
- . Device Active: If you would like to keep the device in the EnOcean configuration without using it, you can deactivate it for the **LINK**MODULE usage via this option.
- EnOcean Profile (EEP): Here, the profile the emulated device should use is selected. The profile settings depend on the actuator to be communicated with. If the profile is unknown, the manufacturer of the actuator can provide information.
- Last Value: This field interprets the user data from the last telegram according to the selected profile or simply displays it.

After all settings have been performed as requested, continue with the corresponding KNX parameters in the lower window section. These comply with the profile and are sent as KNX telegrams when there has been an EnOcean signal detected at receipt.

2:	34:	66:	98:	
3:	35:	67:	99:	
4:	36:	68:	100:	
5:	37:	69:	101:	
6:	38:	70:	102:	
7:	39:	71:	103:	
8:	40:	72:	104:	
9:	41:	73:	105:	
10:	42:	74:	106:	
11:	43:	75:	107:	
12:	44:	76:	108:	
13:	45:	77:	109:	
14:	46:	78:	110:	
15:	47:	79:	111:	
16:	48:	80:	112:	
17:	49:	81:	113:	
18:	50:	82:	114:	
19:	51:	83:	115:	
20:	52:	84:	116:	
21:	53:	85:	117:	_
22:	54:	86:	118:	
23:	55:	87:	119:	
24:	56:	88:	120:	Ŧ
Switch Mo	dul			
RPS Unknov	vn			•
🔵 1 Byte Se	nsor			
1 Byte Senso	or: Unknown			V
🔾 4 Byte Se	nsor			
4 Byte Senso	or: Unknown			T

Figure 20: Emulating EnOcean device

0 - 31	32 - 63	64 - 95	96 - 127	
0:	32:	64:	96:	
1:	33:	65:	97:	
2:	34:	66:	98:	
3:	35:	67:	99:	
4:	36:	68:	100:	
5:	37:	69:	101:	
6:	38:	70:	102:	
7:	39:	71:	103:	
8:	40:	72:	104:	
9:	41:	73:	105:	
10:	42:	74:	106:	
11:	43:	75:	107:	
12:	44:	76:	108:	
13:	45:	77:	109:	
14:	46:	78:	110:	
15:	47:	79:	111:	
16:	48:	80:	112:	
17:	49:	81:	113:	
18:	50:	82:	114:	
19:	51:	83:	115:	
20:	52:	84:	116:	
21:	53:	85:	117:	
22:	54:	86:	118:	
23:	55:	87:	119:	
24:	56:	88:	120:	
Switch Mo	dul			
RPS Unknown	ı			
) 1 Byte Sen	sor			
Byte Sensor	Unknown			1



EnOcean Konfig

OK Cancel

O



#### EXAMPLE: EMULATE TEMPERATURE SENSOR

#### Profile

"07-10-03 temperature, target value" is selected as the profile.

#### Parameters

According to this profile, the following parameters are available:

- *Basic Target Value:* Enter the basic target value for the actuator here. 20°C are preselected.
- Maximum Target Value Modification: Enter the maximum value in °C to modify the target value here. 3°C are preselected here.
- Temperature: Enter the group address transmitting the current temperature value (data type EIS 5) here.
- *Target Value:* Enter the group address to modify the absolute target value (data type EIS 5) here
- Sending Teaching Telegram: When the corresponding actuator is in the "learning" mode, the emulated sensor can be adapted via this trigger.

01100						
Device Name			Received Tel	egrams	3	
Device ID	ff85d1	64	Teach-In Tele	agrams	0	
Device Enabled	✓					
EnOcean Profile (EEP)	07-10-	03: Temperature;	Setpoint			
Latest Value	Temp	eratur: 22.0°C Set	ooint: 0%			
aramotors						
arameters	_					
Setpoint-Typ	l	Relative				
Setpoint Offset						20 🗘
Setpoint Range						3
Function		Data	Type		KNX Address	
Temperature		EIS 5 (2 Byte FF	y) 🔹	-		<b>_</b> ,
Setpoint		EIS 5 (2 Byte FF	) <b>•</b>	. —		-,
Night setback active		EIS 1 (1 Bit)	•			-,
		(				
						Apply

When all parameters are set as required, close the window "EnOcean Device Configuration" and save your settings via the "Save & Close" or "Accept" button.

### 2.5.4 KNX ADDRESSING

The **LINK**MODULE addressing concept is based on the group addressing of the KNX system. Sending EnOcean Telegrams as well as transmitting received telegrams is performed based on KNX group addresses only. The KNX group address is a 16 bit address which is split in a so-called 'real' and a 'virtual' section. Additionally, there is a 2-digit as well as a 3-digit representation:

#### 3-digit:

MG= Main Group / CG= Central Group / SG= Subgroup MG / CG / SG

#### 2-digit:

MG= Main Group / SG= Subgroup MG / SG

Note: The LINKMODULE interface only supports the 3-digit representation.

#### Real / Virtual Address Space

The KNX address space ranges in total from 0/0/0 to 31/7/255 (in the 3-digit representation). Therein, the range from 15/7/255 is designated as <u>real</u> address space and the address space from 16/0/0 to 31/7/255 as <u>virtual</u> address space.

Note: For the communication between EnOcean and KNXnet/IP routing, only the real address space is used.

### 2.5.5 CONFIGURATION EXAMPLE FOR ENOCEAN BUTTON

In the following, an exemplary configuration for sending and receiving of an EnOcean button profile (profile "05-02-01: 2Rockers, Light & Blind") is shown.

#### 2.5.5.1 LINKMODULE AS THE RECEIVER (ACTUATOR)

This switch provides either one or two rockers and transmits their status within a radio signal. In order to link these radio signals with KNX, various functions are available:

- Switch / Dim: The EnOcean push button can be used as a switch and as a dimmer. Thereby, a long keystroke is interpreted as a dim command.
- Push Button: When pushing the button, an EIS 1 telegram of the value 1 is triggered. When 'letting go', a telegram of the value O is triggered. One address can be assigned per position respectively (I and O).
- *Switch:* When pushing the button, the status is only changed once; either a 1 or a 0 is sent.

Invertieren 1/0			
▼ Wippe 1			
Funktion	Schalten / Dimmen		
Schalten	EIS 1 (1 Bit)	1/0/1	•
Dimmen	EIS 2 (4 Bit)	1/0/2	•
▼ Wippe 2	1.44		
Funktion	Taster		•
Taster I	EIS 1 (1 Bit)	1/1/1	•
Taster O	EIS 1 (1 Bit)	▼ 1/1/2	•

Figure 22: Receiving KNX parameters

Blind: For the "Move" and the "Step" commands, there is one address entered respectively (EIS 1).

Additionally, the output to the KNX addresses can be inverted. In this case, the actual output "1" becomes "0" and vice versa.

#### 2.5.5.2 LINKMODULE EMULATES ENOCEAN PUSH BUTTON

When the profile mentioned above is emulated by the LINKMODULE, the parameter screen looks slightly different. The "switch" is missing as this function can not be carried out with EnOcean.

#### Functions

- Switch / Dim: There is one switch and one dim address for each rocker. The information on if it was switched or dimmed is sent in the KNX via different group addresses.
- Push Button: For the button, there is one address for the value "0" and one for the value "1". At reception on the respective input object, the corresponding EnOcean signal is transmitted.
- Blinds: The blind control also consists of two EIS 1 objects. One is for the 'Move' command ("1"), the other one for the 'Step' command ("0").

#### Sending a Telegram

These buttons may be used to adapt the emulated device to the actuator of interest. These two buttons simulate the respective rocker directly from the EnOcean configuration.

Invertieren 1/0			
▼ Wippe 1			
Funktion	Schalten / Din	nmen	•
Schalten	EIS 1 (1 Bit)	2/0/1	•
Dimmen	EIS 2 (4 Bit)	2/0/2	Þ
Telegramm senden	1	O	
▼ Wippe 2			
Funktion	Taster		•
Taster I	EIS 1 (1 Bit)	2/1/1	Þ
Taster O	EIS 1 (1 Bit)	2/1/2	Þ
Telegramm senden		0	

Figure 23: Sending KNX Parameters

#### Inverting

The respective EnOcean output values are inverted. The "1" becomes a "0" and vice versa.







## **3 VPN SERVER / BAB SECURELINK**

The LINKMODULE provides an integrated VPN server, which may be used for two functions:

- Establishing a BAB SECURELINK connection (device acts as VPN Client) to other BAB devices (LINKMODULE, EIBPORT, FACILITYMASTER)
- VPN server for a secured connection between PC and LINKMODULE via an OpenVPN client

In order to be able to use the functionalities, it is important for the integrated VPN server to be initialized after initial operation, see below:

### 3.1 INITIALIZING VPN SERVER

In order to use the VPN relevant services (BAB **SECURE**LINK, VPN server) in the **LINK**MODULE, the VPN server must be initialized once. In order to do this, click "Start Basic Configuration" in the "VPN Server" menu.

#### Figure 24: Initializing VPN Server

Note: The initialization takes approx. 10 minutes. During this time, the required certificates are produced. Please leave the browser window open until the configuration has been established successfully.



### 3.2 VPN SERVER

When the VPN server has been initialized successfully (see above), the VPN server settings will be displayed.

Enable Server					V
				Show S	Server Log
External IP or	Host Name			172.31.130.220	
LINKMODULE	VPN IP				
VPN Port					4
VPN Subnet R	ange			10.8.0.0	
VPN Subnet N	lask			255.255.255.0	
Maximum Nur	nber of Clients			50	
				Save	Settings
reate OpenV	PN (VPN Client) Co	nfiguration File			
Client Name					
				of the OpenVPN ins	stallation (C:\Program
opy OpenVPN ( iles\OpenVPN\( ) Linux, rename (nown Clients	configuration file '[Nan config for standard ins it to .conf, to have it au and Issued Certifica	ne].ovpn' into the 'con tallations on Window tomatically loaded b ites	ifig' directory vs) and restart vy OpenVPN o	the OpenVPN GUI. n system start.	
opy OpenVPN ( iles\OpenVPN) Linux, rename <b>nown Clients</b> Client Name	configuration file '[Nan config for standard ins it to .conf, to have it au and Issued Certifica Client VPN IP	ne].ovpn' into the 'con tallations on Window tomatically loaded b tes Client IP	ifig' directory vs) and restart vy OpenVPN o Connected	the OpenVPN GUI. n system start.	

#### Figure 25: VPN Server Settings

#### VPN SERVER SETTING (FOR INCOMING CONNECTIONS)

In order to configure the VPN server for incoming connections, the following parameters are available:

- Activating VPN Server: VPN server is only activated by ticking the box.
- *Display Server Log:* "CLIENT LIST", "ROUTING TABLE" and "GLOBAL STATS" are displayed.
- External IP Address / Host name: Please enter the address under which the LINKMODULE is externally reachable here. If the incoming connection (a VPN client trying to connect to the server) is coming from the same network, the local IP address of the LINKMODULE has to be entered here. If the connection comes from outside the network, the external address of the respective network must be used (e.g. the external IP address of the DSL router).
- LINKMODULE VPN IP: Indicates the IP address the LINKMODULE has within the VPN network.
- *VPN Port:* Determines the port number on which the VPN service communicates.
- *VPN Subnet IP Section:* Determines the IP section in which the VPN network is established (10.8.0.0 is preset).
- *VPN Subnet Mask:* Determines the subnet section of the VPN IP section (255.255.255.0 preset).
- *Maximum Number of Clients:* This amount determines how many VPN clients can connect to the server.
- Save Settings: Saves the settings.

Note: The VPN server is only active when "Activate VPN server" is marked and the settings have been saved.



#### ESTABLISH OPENVPN (VPN CLIENT) CONFIGURATION FILE

Helps to create a VPN connection between computer and **LINK**MODULE. The VPN required connection settings are summed in an OpenVPN configuration file and saved on the local computer. OpenVPN is a free software for establishing VPN connections for almost all operating systems.

				Create an	nd Download
Copy OpenVPN c Files\OpenVPN\c	onfiguration file '[Nam onfig for standard insta to .conf, to have it aut	e].ovpn' into the 'confi illations on Windows) comatically loaded by	ig' directory of and restart the Open∨PN on s	Create and Downloa Only enabled if the o spaces or special cha	ad client name contains no racters
Known Clients	and Issued Certific	ates			
Client Name	and Issued Certific	Client IP	Connected	since	

Figure 26: Establishing an OpenVPN Client Configuration

Please download the appropriate OpenVPN client software for your operating system.

- Windows: "OpenVPN GUI" (from <u>www.openvpn.net</u>)
- MAC OS: "Tunnelblick" (from <u>www.tunnelblick.net</u>)
- Android: "OpenVPN for Android" (from the Google PlayStore)
- iOS: currently no support ("inline mode" is not supported)

You will also find the current download links on our homepage: <u>www.bab-tec.de</u>.

- Enter the defined name for the configuration file under "Client Name". Via this name the respective computer will later be identified from the "Known Clients" list.
- Click "Establish and Download". A browser dialogue for downloading the "\*.ovpn" configuration file will open. Save the configuration file on your computer. Simultaneously, the configuration file is displayed in the "Known Clients and Issued Certificates" list as a known client.
- Copy the OpenVPN configuration file '[Name].ovpn' in the 'config' register of the Open VPN installation (for Windows "OpenVPN GUI". Standard path: "C:\Program Files\OpenVPN\config", in MAC OS simply open the file via "Tunnelblick") and restart OpenVPN GUI.
- Then, all loaded connection configuration files are displayed in the context menu of the OpenVPN clients. Click on the connection name of interest to connect.



Figure 27: Establish OpenVPN GUI Connection



• A window with log messages will open and a connection attempt will be started. If the connection has been established successfully, the icon in the Windows system tray changes colour (green) and a corresponding message is shown.



Figure 28: OpenVPN GUI Connection Established

#### KNOWN CLIENTS AND ISSUED CERTIFICATES

All established configuration data will be displayed in this list.

Client Name			
			Create and Download
Files\OpenVPN\c In Linux, rename i Known Clients	onfig for standard insta t to .conf, to have it au and Issued Certific	allations on Window tomatically loaded l cates	rs) and restart the OpenVPN GUI. by OpenVPN on system start.
Files\Open\/PN\c In Linux, rename i Known Clients Client Name	onfig for standard insta t to .conf, to have it au and Issued Certific Client VPN IP	allations on Window tomatically loaded l cates Client IP	rs) and restart the OpenVPN GUI. by OpenVPN on system start. <b>Connected since</b>

Figure 29: OpenVPN – Known Clients List

In an active connection, "Client IP" and "Connected since" are filled in with the corresponding values.

#### Certificate

Each connected client has received their own certificate via the configuration file. The certificate can be displayed, downloaded ("Download") or blocked ("Block") via the "Certificate" button.



Figure 30: OpenVPN Client – Display certificate



#### **Block client**

In order to block a connected client, use the "Revoke" function in the "Certificate" menu. The client connection is cut off immediately. In order to reuse the client, the revoke has to be removed and a new configuration file has to be created.

• Open "Certificate" again. Click "Delete". Afterwards, you can again download a configuration file for the same client name.

## 3.3 BAB SECURELINK

A **SECURE**LINK connection is a VPN connection specialized in BAB devices which allows a simple establishment of a secured linking of several system parts beyond network domains. Currently, **SECURE**LINK is available for the following devices:

- LINKMODULE
- EIBPORT
- FACILITYMASTER

### 3.3.1 CONNECTION PRINCIPLE

As an example, the **SECURE**LINK connection principle between **LINK**MODULE and **FACILITY**MASTER is displayed. The device (here: **LINK**MODULE) from which the **SECURE**LINK connection is established acts as VPN client, whereas the addressed device is the VPN server (here: **FACILITY**MASTER)



### 3.3.2 REQUIREMENTS

For a successful **SECURE**LINK connection, the following requirements occur:

- Complete network settings in both devices (Standard Gateway, DNS)
- The VPN server in the opposite device has to be initialized and activated (consider external IP address / host name)
- Communication on TCP port 1724 between both devices possible



### 3.3.3 ESTABLISH SECURELINK CONNECTION

In order to establish a SECURELINK connection, please proceed as follows:

- Switch to the configuration window "BAB **SECURE**LINK ".
- Fill in the fields beneath BAB **SECURE**LINK.
  - *BAB VPN Server Address:* Enter the IP address or host name of the opposite BAB device which activated the VPN server.
  - BAB VPN Server HTTP Port: Enter the http port of the opposite BAB device here
  - *BAB Device Account / Password:* Enter the "admin" user data of the opposite BAB device.

Enable Client	
	Show Client Log
	Check VPN Connection
BAB SecureLink	
BAB VPN Server Address	tymaster.de
BAB VPN Server HTTP Port	80
BAB Device Account	admin
Password	••••
	Retrieve from Server

Figure 31: BAB SECURELINK Menu

- Click "Retrieve From Server". The required **SECURE**LINK user data will be loaded from the distant BAB device.
- Activate the control box "Enable client" beneath "Connection Status". Then, the connection is established.

#### **Display Client Log**

Log messages for monitoring the connection will be shown.

#### **Testing VPN Connection**

Here, the VPN connection can be tested in advance



### 3.4 FACILITY COUPLING

Via the "Facility coupling" service, group address telegrams are transmitted via a UDP Unicast connection from one BAB device to another. Due to the Unicast connection, the communication via network domains can be established with a lower effort than would be the case with a KNXnet/IP routing connection. The facility coupling are currently supported by the following BAB devices:

- EIBPORT
- FACILITYMASTER
- LINKMODULE
- APPMODULE Extension
- DUODMX GATEWAY Extension (only receiving)

Note: The facility coupling communication is a group address-based communication. Physically addressed telegrams will not be transmitted. Programming KNX devices by means of ETS is not possible via the facility coupling.

When using the facility coupling via BAB **SECURE**LINK, the connection is provided with additional protection. See chapter "<u>Facility coupling via BAB</u> SECURELINK".

### 3.4.1 REQUIREMENTS

For establishing a connection between BAB devices, the following conditions must be fulfilled.

- Complete network settings on both devices (Standard Gateway, DNS)
- Free communication to UDP Port 1735
- Fixed external target device address (fixed IP address / dynamic DNS address / VNP IP)
- Possibly established and activated SECURELINK connection, if requested

Note: For receiving facility coupling telegrams, there is no need to perform any settings on the opposite device.

### 3.4.2 ESTABLISHING FACILITY COUPLING

Switch to the menu "Facility coupling" and click "Add Job". A new facility coupling job (service) will be added.



Figure 32: Setting up a facility coupling job



The facility coupling job configuration mask will appear. Fill in the requested fields. Per job (service) 10 filter rules may be assigned. Several services may be assigned simultaneously. The number of services is only limited by the system workload.

Add Job Job Name Hostname / IP Address	
Add Job Job Name Hostname / IP Address	
Hostname / IP Address	
Save Job	
Get Host by Name Instantly	
Always Get Host by Name	
Allow Loop Backs	
Target System ID	0
Rules / Transformations	
Source > Target (EIB World)	

Figure 33: Facility coupling job configuration mask

The parameters are:

#### Job name

Assign a definite name for the job (service).

#### Host name or IP address

Host name or IP address of the distant BAB device with facility coupling support. For a connection via BAB **SECURE**LINK, indicate the VPN IP of the distant device here. (For **SECURE**LINK establishing, please consider chapter "<u>BAB **SECURELINK**</u>")

#### Resolving host name immediately

- *active*: the name resolution is performed immediately at initial operation
- deactivated: the name resolution is performed only when the facility coupling service is activated



**Resolv**e host name every time

- *active*: the host name is resolved at every start of the facility coupling service. (only appropriate with dynamic name resolution)
- *deactivated*: the host name is only resolved at the first start of the facility coupling service

#### Feedback permitted

- actively: feedbacks via LAN are permitted
- deactivated: feedbacks via LAN are suppressed

#### Target system ID

Currently only usable for EIBPORT and **FACILITY**MASTER. Definite KNX system ID (0 - 255) (no entry: Target system ID = 0)

#### Rules / transformations

The transmitting rules allow the communication to the opposite device to be filtered and transformed. Therefore, e.g. real group addresses from the source world can be transcribed within virtual addresses (see below) in the target world in order to avoid unnecessary workload or group address overlapping. For rule input, wild cards can be used. The symbol "\*" is used as a wild card. Depending on the position (before and after the "/"), the "\*" represents the KNX main group or subgroup.

Rule	Meaning
*/*/* -> */*/*	All KNX facility 1 main and subgroups are linked 1:1 into the KNX facility 2. <b>Caution:</b> In the target world, all incoming telegrams (from the real address space) are resent to the KNX!
6/*/* -> 6/*/*	All group addresses of the main group 6 of the KNX facility 1 are linked into the main group 6 of the KNX facility 2
7/*/* -> 17/*/*	All group addresses of main group 7 of the KNX facility 1 are linked into the virtual main group 17 of the KNX facility 2 • Therefore, address overlapping can be avoided1
*/*/1 -> */*/1	The addresses 0/0/1; 1/1/1; 2/2/132/7/1 are linked into the KNX facility 2

#### Virtual group addresses

The main groups 16-32 are the virtual group addresses. They are only available within the **LINK**MODULE and are not transmitted to the KNX interface. In facility coupling, virtual group addresses may apply to avoid address overlapping and unnecessary workload.

#### Example

E.g., if a lighting scene is to be started from facility 1 (LINKMODULE) to facility 2 (FACILITYMASTER), the lighting scene is provided with a virtual group address (e.g. 17/1) in facility 2. In the LINKMODULE of facility 1, the following rule might be parametered:

e.g.  $2/3 \rightarrow 17/1$ . The real group address in facility 1 (e.g. assigned to a push button) is translated into the virtual group address in facility 2 (the lighting scene).

Note: For receiving facility coupling telegrams, there is no need to perform any settings in the opposite device.

#### BIDIRECTIONAL COMMUNICATION VIA FACILITY COUPLING

In order to establish a bidirectional communication between two BAB devices, it is required to set up one facility coupling job respectively in the correspondent opposite device. The facility coupling job always transmits to the devices indicated in the job mask in a unidirectional way only.



### 3.5 FACILITY COUPLING VIA BAB SECURELINK

If the facility coupling are established via the BAB **SECURE**LINK, the communication between the unit parts is tap-proof. To do this, please proceed as follows.

- Determine VPN server and VPN client.
- Initialize VPN server in both devices (see chapter "Initializing VPN Server")
- Establish SECURELINK from client to server (see chapter "Establish SECURELINK connection")
- Establish facility coupling, indication VPN IP addresses (!) (see chapter "Establishing facility coupling")

By indicating the VPN IP address, the facility coupling communicate via the secured **SECURE**LINK tunnel.

## **@**

## **4** CONFIGURATION

The configuration is for setting the following parameters:

- Device name, installation site, setting system time
- Performing network settings incl. NTP time server
- Physical addressing the KNX interface, KNXnet/IP settings
- Testing the KNX interface
- Linking EnOcean profile with KNX group addresses
- User Administration
- Save and Restore

## 4.1 SAVE CONFIGURATION

As soon as you have modified the configuration, please click on the "Save configuration" field.

### 4.2 GENERAL

In the "General" window, the following basic settings can be performed.

General >	General	
Network		
KNX		LinkModule
User Administration	Location	Europe/Berlin
Backup / Restore	System Time	05 02 2016 17:09
		03.02.2010 17.08
Save Configuration		

Figure 34: General configurations

Device name: Assign an individual name for the **LINK**MODULE, which name will be displayed in the "Discovery Tool" and the BAB STARTER.

Installation site: Adapt the installation site to the local time zone settings.

System time: Indicates the system time of the device. When clicking on the time indication, the system time is synchronized with the PC time.

Note: Please make sure that the system time of the device is up to date. A deviating system time can result into problems with the telegram handling! If possible, use an NTP time server for synchronization.

### 4.3 NETWORK

DHCP:	If DHCP is active, the device automatically obtains the network settings. A DHCP
	server must be available in the local network.
IP address /	If DHCP is not active, the network settings must be carried out statically. In case

IP address /If DHCP is not active, the network settings must be carried out statically. In casenetwork mask /of doubt, contact your network administrator as to which settings are to begateway:carried out. Please note that an IP address may never be assigned twice!

DNS Server: DNS is the abbreviation for Domain Name System. The DNS server converts Internet addresses, for example "www.bab-tec.de" into the IP address "85.214.89.170" and vice versa. Without a valid DNS entry, NTP, weather services from the Internet and UPnP do not work.

NTP Server:NTP is a free service for synchronising the system time of Internet-compatible<br/>devices. If time synchronisation is not possible, please check the system time<br/>from time to time in the "General" menu item.<br/>NTP server list: e.g. <a href="http://www.pool.ntp.org/zone/europe">http://www.pool.ntp.org/zone/europe</a>

BAB TECHNOLOGIE	LINKMODU Version 1.1.1	E
General	Network	
Network >	DHCP	
User Administration	IP Address	192.168.1.220
Backup / Restore	Netmask	255.255.255.0
Save Configuration	Gateway	192.168.1.1
	DNS Server	
	DNS Server #1	
	DNS Server #2	
	DNS Server #3	
	NTP Server	
	NTP Server #1	0.de.pool.ntp.org
	NTP Server #2	2.2.2.2
	NTP Server #3	

Figure 35: Network settings



### 4.4 KNX

The KNX-specific settings of the **LINK**MODULE are made in the "KNX" menu. Additionally, it is possible to test the KNX interface.

#### KNX

#### Physical address:

Here, you can determine the physical address to be used by the **LINK**MODULE in the KNX network. Please make sure that the physical address corresponds to the installation site and does not occur twice.

#### KNXnet/IP tunnelling address:

This addresses are used by the internal KNXnet/IP server for a KNXnet/IP tunnelling connection established to the device (using the **LINK**MODULE as a programming interface for the ETS). At least 2 free addresses must be entered. The addresses are separated via semicolon (Example: 4.7.14;4.7.15).

## Note: Please note that this addresses must not be the same as the physical addresses (see above) and that they must not be used by any other participant in the line either.

#### KNXnet/IP routing:

Activates KNXnet/IP routing for the linking of lines and areas via KNXnet/IP. Can only be activated if the physical address (see above) corresponds to that of a line or area coupler.

# Note: KNXnet/IP routing uses Multicast! Since multicast packages are usually not transferred by routers, "Routing" only works within a subnet. Use the facility coupling combined with SECURELINK if you want to link across network domains.

Communication: Mulitcast 224.0.23.12, port 3671

#### KNXnet/IP tunnelling:

Activates the KNXnet/IP tunnelling access to the device. This connection can be used for programming KNX devices or for exchanging data. The **LINK**MODULE is the server.

Note: The number of the addresses indicated above determines the number of the connections simultaneously possible. The ETS requires 2 free addresses for a connection.

General	KNX	
Network	Dhurical Address	
KNX >		4.7.13
User Administration	KNXnet/IP Tunneling Address	4.7.14;4.7.15
Backup / Restore	KNXnet/IP Routing	
Save Configuration	KNXnet/IP Tunneling	
	Figure 36: KNX Configuratior	1

Communication: Unicast, UDP Port 3671



#### TESTING INTERFACE

#### KNX address

Enter the group address you want to test with here

#### Switching KNX Address

By clicking on "On/Off", a EIS 1 (1bit) switching command is triggered on the group address mentioned above.

#### Reading Out Address Status

When clicking on "Status Query", the status of the group address mentioned above is queried and displayed in a pop up window.

est KNX Interface			
KNX Address	1/0/1		
Switch a KNX Address	Toggle		
Read Address State	Request Status		

Figure 37: Testing KNX Interface

## **@**

## 4.5 ENOCEAN EDITOR

When you use a **LINK**MODULE EnOcean, the link to the "EnOcean Editor" appears here instead of the KNX configuration. The EnOcean Editor is entirely described in the chapter "LINK MODULE EnOcean".

## Note: The EnOcean Editor is a Java Applet application. Please use a browser allowing to start Java Applets or the program "BAB STARTER" to start the editor.

- <u>Usage in BAB STARTER</u>: You will find the software and the corresponding documentation on the CD enclosed or in the download section of our homepage, <u>www.bab-tec.de</u>.
- <u>Starting in the browser:</u> Please consider the following chapter.

## 4.5.1 JAVA SETTINGS / PREPARATIONS ON THE CLIENT PC

## Note: When working with the EnOcean Editor, the following JAVA settings are mandatory to be considered priorly.

#### **PC Requirements**

In order to be able to use the EnOcean Editor, you need Java and a browser. Thus, the editor is independent of the operating system.

#### Java and browser version

We recommend using a current version of Apple Safari or Mozilla Firefox as a browser. Please note that a current Java version has been installed and that the Java browser plug-in is up-to-date. If Java has not been installed yet, you will find a current version at <u>www.java.com</u>. Please check the following settings on your computer before you start working in the EnOcean Editor.

🛃 Java Control Panel				
General Update Java Security A	dvanced			
The Java Update mechanism ensures you have the most updated version of the Java platform. The options below let you control how updates are obtained and applied.				
Notify Me:	Before downloading 🗸 🗸			
Check for Updates Au	Advanced			
Java Update will check for Wednesday at 8:00 AM. I appear in the system task the icon to see the status update is downloaded. Typically, you will be notifi	Java Update will check for updates at least once a week on Wednesday at 8:00 AM. If an update is recommended, an icon will appear in the system taskbar notification area. Move the cursor over the icon to see the status of the update.You will be notified before the update is downloaded. Typically, you will be notified of the update within a month of its			
release. However, if an up notified within a week of it	date is considered critical, you will be s release.			
	Update Now			
	OK Cancel Apply			

Figure 38: Updating Java



#### Deleting and deactivating temporary files

Please close all browser windows (also download windows etc.) and switch to the Java Control Panel via "*Start*" > "*System Control*" > "*Java*". On the first tab, "*General*", there are the "*Settings*" of the "*Temporary Internet Files*". Please remove the tick at "*Leave Temporary Files on Computer*" and delete all files using the "*Delete Files*" button.

Temporary Files Settin	ngs
Eeep temporary files on my computer,	
Location Select the location where temporary files are to er(AppDatar).scalLaw(Suri Java/Deployment)c	ept. ache] Oprope
Disk Spece Select the compression level for JAR files: Set the errount of disk spece for storing tempo	[1006 ]] cary files: 32768 [\$] .00
Delete Files	Bestore Defaults
	OK Cancel

Figure 39: Deactivate Temporary Files

#### Expand main memory for Java / deactivate old Java versions

Switch from the "General" tab to the "*Java*" tab. Please open the settings for the Java Runtime Environment via "*Displays*". The window shows you all Java versions installed on this computers. If several versions are installed, please de-install all versions except the current version. Then, double-click into the "*Java Runtime Parameters*" field and enter "*-Xmx256M*" (pay attention to the minus sign). Then press "*Enter*" and leave the window using "*OK*".

In the "*Java Control Panel*" window below, it is important that you click "*Apply*" before closing the window with "*OK*".

Platform	Product	Location	Path	Runtim	e Parameters	Enabled
.7	1.7.0_65	http://java.s.,	C: Program Files	x86		V
						- 32

Figure 40: Expanding Java Main Memory

Afterwards, please also empty the cache data of your browser. Instructions on how to do this can be found on the Internet or in the help file of the browser. After all steps have been carried out and completed, the browser must be restarted.



### 4.5.2 BAB STARTER

In more recent browsers problems may occur when Java applets as they are used in the EnOcean Editor are to be started. To avoid the problem, you can use the new software "BAB STARTER". You will find the software and the corresponding documentation on the CD enclosed or in the download section of our homepage, <u>www.bab-tec.de</u>.

## 4.6 USER ADMINISTRATION

The menu item "User Administration" is to be able to modify or add user data.

General       User Administration         Network       Disable Password Recovery         KNX       Disable Password Recovery         User Administration       List of Users         Backup / Restore       admin         Save Configuration       Add							
Network       Disable Password Recovery         KNX       Disable Password Recovery         User Administration       List of Users         Backup / Restore       admin         Save Configuration       Add       Edit       Delete	General	User Administration					
KNX     User Administration     List of Users     admin       Backup / Restore     Save Configuration     Add     Edit	Network						
User Administration > List of Users Backup / Restore Save Configuration Add Edit Delete	KNX						
Backup / Restore Save Configuration Add Edit Delete	User Administration >	List of Users	admin		<b>^</b>		
Save Configuration	Backup / Restore						
Save Configuration							
Add Edit Delete	Save Configuration						
Add Edit Delete							
Add Edit Delete							
Add Edit Delete				-	Ŧ		
			Add	Edit			

Figure 41: User Administration



## 4.7 BACKUP / RESTORE

In the menu item "Backup / Restore", you can create security backups and restore these backups, if necessary. By clicking on "Create a Backup", you can download and save a backup from the LINKMODULE. Then, you can upload these by activating the "Select Backup File" button beneath "Restore Settings".

General	Backup Settings		
Network	Modules	Configuration	7
KNX	Modules	Configuration	
User Administration		VPN Configuration and Certificates	$\checkmark$
Backup / Restore	Comment		
Save Configuration			
			.::
		Create a Backup	
	Restore Settings		
	Select Backup File	💩 Select Backup File	
	Modules		
			-
	Backup creation date		
	Firmware Version		
	Comment		
			:
		Destore	
		Restore	

Figure 42: Save

## 6

## 4.8 SYSTEM

In the menu item System, you will find the functions "Reboot Device" and "Firmware Update". In order to perform the function "Reboot Device", please click the "Perform Reboot" button.

#### FIRMWARE UPDATE

In the menu item Firmware update you can manually select and upload the update files.

General	Service	
Network	Reboot Device	
KNX		
User Administration	Firmware Update	
Backup / Restore		
System >	Current Firmware	1.2.0
	Select Update File	💩 Select Update File
Save Configuration	Update Type	
	Version	
	Keep Network Settings	
		Perform Update

#### Figure 43: System

## 4.9 LEAVE CONFIGURATION

In order to leave the menu or to go back to the start page, please use the "Back" function of the browser or click the BAB TECHNOLOGIE "Home button" (complete header diagram of the LINK MODULE web interface).



#### Figure 44: Home Button

## 6

## **5** INFORMATION

Beneath the menu item Information you will find all the relevant information about your **LINK**MODULE such as system information, processor workload, Java storage workload and software licenses.

If support is required, please have this information ready.

In order to leave the menu or to go back to the start page, please use the Back function of the browser or click the BAB TECHNOLOGIE Home button.

Produkt			LINK_N	10DULE			
Hersteller			BAB TE	ECHNOLOGIE GI	mbH		
Version			1.1.1				
Seriennummer			BT106	4903720			
Temperatur (Sy	stem)		34.5 °C				
ystemmonitor							
		Prozes	sorauslastu	ng			
30 -							
25-							
20- F							
Last (		•					
10-							
5 -	In A					111	1
05							
		Java-Spe	icherauslast	tung			
2.5							
2 -							
<b>e</b> <sup>1.5</sup>							
Last (							
0.5 -							

Figure 45: Information

## 6 LOGOUT

When you have performed all modifications, you can log out by clicking on the "Logout" field.