

# User Manual

## K-BUS®KNX IP Router\_V1.3

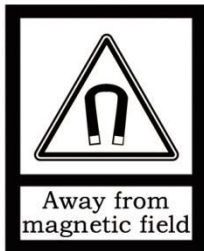
BNIPR-00/00.1



**KNX/EIB Home and Building Control System**

# Attentions

1. Please keep devices away from strong magnetic field, high temperature, wet environment;



2. Do not fall the device to the ground or make them get hard impact;



3. Do not use wet cloth or volatile reagent to wipe the device;



4. Do not disassemble the devices.

# Contents

<b>Chapter 1 Summary</b>	<b>1</b>
1.1 Function overview	2
1.2 Tunneling	3
1.3 Routing	3
1.4 KNX IP Routers	3
<b>Chapter 2 Technical Data &amp; Dimension and Connection Diagram</b>	<b>4</b>
2.1 Technical data	4
2.2 Dimension diagram	5
2.3 Connection diagram	6
<b>Chapter 3 Planning and Application</b>	<b>8</b>
3.1 Operation Modes	8
3.1.1 LED indication	8
3.1.2 The Function Button	8
3.1.3 The Programming Button and LED	9
3.2 IP router application	9
3.2.1 KNX Telegrams in the IP Network	9
3.2.2 The IP Router in a Network Installation	10
3.2.3 The IP Router as an Area Coupler	10
3.2.4 The IP Router in a Mixed System	11
3.2.5 The IP Router as A Line Coupler	12
<b>Chapter 4 Parameter setting description in the ETS</b>	<b>13</b>
4.1 Physical Address Assignment	13
4.2 General	14
4.3 IP Configuration	15
4.4 KNX Multicasting Address	16
4.5 Main Line	17
4.6 Sub Line	18
<b>Chapter 5 Web Front-end</b>	<b>20</b>
5.1 Accessing the Web Front-end	20
5.1.1 Via windows Network UPnP	20
5.1.2 Via IP Address	21
5.1.3 Via MAC Address	22
5.2 Device Info	22
5.3 KNX	23
5.4 Firmware Update / Boot Mode	24
5.5 IP Tunneling Address Assignment	26
<b>Chapter 6 State of Delivery</b>	<b>28</b>

## **Chapter 1 Summary**

The IP Router can be used as line or backbone coupler. It provides a data connection between the upper KNXnet/IP line (main line or backbone) and the lower TP KNX bus line (sub line). The basic functionality of the IP Router is to couple the Ethernet with one or more KNX-TP lines. The IP Router features a galvanic isolation between the Ethernet and the KNX-TP line(s). Due to its flexibility the IP Router can be used as a line coupler e.g. to connect several KNX TP lines via Ethernet. And it can be used as a backbone coupler to connect several TP areas or different TP installation systems via Ethernet.

The main task of the IP Router is filtering the traffic according to the installation hierarchy. For group oriented communication the traffic is filtered according to the built-in filter tables.

With the ETS or any other KNX compatible commissioning tool the IP Router can be used as the programming interface. For this purpose the device provides up to 4 additional physical addresses that can be used for tunneling. The IP Router has no KNX communication objects for itself.

The IP Router is a Tunneling and Routing device. These features are described in the following sections in detail. The device front panel consists of seven LEDs and two buttons as illustrated below. The device offers a detailed internal diagnosis by displaying all operational states in different Operation Modes with three pairs of LEDs. The LEDs show the variety of device states like Bus OK, traffic, errors/faulty communication NACK, BUSY on the bus, state of the filter table, and etc.

The IP Router is a modular installation device. It can be installed in the distribution board on 35mm mounting rails according to EN 60715.

This manual provides the technical information about the IP Router as well as assembly and programming in detail for users, and explains how to use the interface device by the application examples.

## **1.1 Function overview**

The IP Router has the follow functions:

- ♦ **The IP Router supports extended frames and long telegrams up to 240 bytes APDU length. In combination with the line coupler and the long messages are made possible (e.g. for energy metering applications and visualization purposes).**
- ♦ **The IP Router favorably replaces a line coupler or an area coupler. Using LAN as a fast medium to exchange telegrams between lines and/or areas is the great advantage.**
- ♦ **The IP Router works without external power supply.**
- ♦ **Providing tunneling protocols and a connection point for the ETS (or any other tool to enable commissioning and monitoring) the ETS address for tunneling is not necessarily the one that is already configured. Four parallel connections are possible, one separate address for each and every connection.**
- ♦ **IACK sending on sent out messages is ETS configurable**
- ♦ **After no IACK response on a sent message the IP Router can repeat it up to three times. For physically addressed or for group addressed telegrams this can be configured via ETS independently. In case of an IACK response there will be no repetition. The failure mechanism of a negative IACK or BUSY is still maintained hereby.**
- ♦ **Programmable automatic switch on of the filter table after timeout.**
- ♦ **For a predefined amount of time (ETS configurable) it is possible to switch off the filter table with pressing a button on the device. So, without re-configuring the device with the ETS the filter table can be switched off by a button press which is necessary for running fast diagnostics on site. Filtering of messages can temporarily be disabled by pressing the “Function” button. This eases commissioning and debugging of the system. Without an ETS download a temporary access to other lines is possible. After the timeout an automatic switching the filter table on is implemented (the timeout is configurable in the ETS). This avoids forgetting to reactivate the filter.**

- ♦ **UPnP is available to discover the device in the IP network. That is only possible with a proper network installation in terms of topology. With the KNXnet/IP Search Request the ETS can recognize the device as a communication interface.**
- ♦ **For networks with a high bus load a high internal amount of communication buffers is suitable.**
- ♦ **The IP Router is featuring a high internal amount of communication buffers being capable of smoothing peaks in the communication load course.**
- ♦ **The IP Router's ETS database entries are available for the ETS3.0f and upward.**
- ♦ **The IP Router supports KNXnet/IP, ARP, ICMP, IGMP, HTTP, UPnP discovery, UDP/IP, TCP/IP, DHCP and Auto IP.**

## **1.2 Tunneling**

The presence of the Internet Protocol (IP) has led to the definition of KNXnet/IP. KNXnet/IP provides the means for point-to-point connections like "KNXnet/IP Tunneling" for ETS and/or between a supervisory system and a KNX installation.

The KNXnet/IP Device Management provides configuring KNXnet/IP devices via the KNX network effectively. Additionally, with this the time required for network configurations is reduced.

## **1.3 Routing**

Routing is the way of interconnecting KNX lines or areas via IP network(s) using KNXnet/IP. In IP networks the KNXnet/IP Routing defines how KNXnet/IP routers communicate with each other.

## **1.4 KNX IP Routers**

The IP Router is a KNX IP router. KNX IP routers are highly similar to TP line couplers. The only exception is that they use the communication medium Ethernet as their main line. However, it is also possible to integrate KNX end devices via IP directly. This makes the Ethernet a KNX medium.

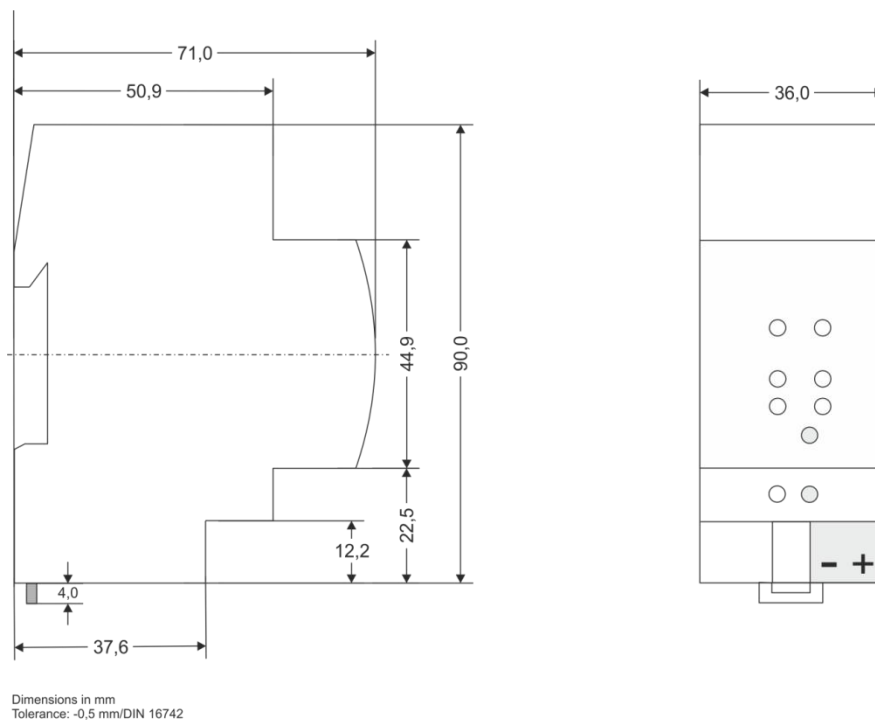
## Chapter 2 Technical Data & Dimension and Connection Diagram

### 2.1 Technical data

<b>Power supply</b>	Operation voltage	21-30V DC, via the KNX bus
	Current consumption	<20 mA
<b>Connections</b>	KNX	Via bus connection terminal (red/black)
	LAN	RJ45 socket for 100 Mbit and 10 Mbit BaseT, IEEE 802.3 networks
<b>Operating and display</b>	Bus State IP LED (main line)	Green on: IP line OK; Off: IP line error or not connected; Orange on: Manual function active.
	Bus State TP LED (sub line)	Green on: Sub line OK; Off: Sub line not connected.
	Traffic on IP LED (main line)	Green blinking: Telegram traffic on IP line ; Off: No telegram traffic; Red blinking: Transmission error on IP line.
	Traffic on TP LED (sub line)	Green blinking: Telegram traffic on sub line; Off: No telegram traffic; Red blinking: Transmission error on sub line.
	GA LED	Off: Routing of Group Telegrams is different on main line and sub line; Green on: Filter table active; Orange on: Route all; Red on: Block.
	PA LED	Off: Routing of Physical telegrams is different on main line and sub line; Green on: Filter table active; Orange on: Route all; Red on: Block
	Programming button and LED	For assignment of the physical address
	Function button	Switch to manual function or execute to the factory reset
<b>Temperature</b>	Operation	-5 °C ... + 45 °C
	Storage	-25 °C ... + 55 °C
	Transport	- 25 °C ... + 70 °C
<b>Relative humidity</b>	5%~93% (non-condensing)	

<b>Design</b>	Modular installation device, on 35mm mounting rail
<b>Dimensions</b>	90 mm×36 mm×71mm
<b>Weight</b>	0.1KG
<b>Housing, colour</b>	Plastic PA66 housing, grey
<b>Protection</b>	IP 20, to EN 60529
<b>CE mark</b>	In accordance with EMC and low voltage guidelines
<b>Markings</b>	KNX/EIB

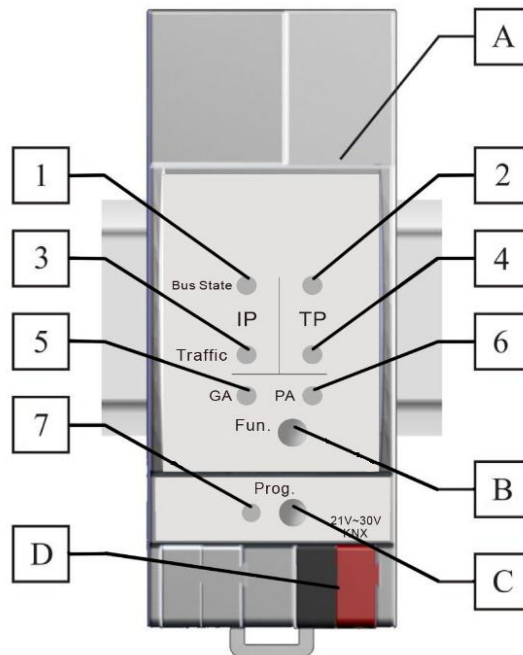
## 2.2 Dimension diagram



1 SU = 18mm



## 2.3 Connection diagram



Number	Element	Indication Description
1	Bus State IP LED (Main line)	Green on: IP line OK Orange on: Manual overwrite active Off: IP line error or not connected
2	Bus State TP LED (Sub line)	Green on: Sub line line OK Off: Sub line not connected
3	Traffic on IP LED (Main line)	Green blinking: Telegram traffic extent indicated Off: No telegram traffic
4	Traffic on TP LED (Sub line)	Green blinking: Telegram traffic extent indicated Red blinking: Transmission error Off: No telegram traffic
5	GA LED (Group Address Routing)	Green on: Filter table active Orange on: Route all Red on: Block all Off: Routing of Group Telegrams is different on main line and sub line
6	PA LED (Physical Address Routing)	Green on: Filter table active Orange on: Route all Red on: Block all Off: Routing of Physical telegrams is different on main line and sub line

7	Programming LED	Red on: device in boot mode or addressing mode ; Red blinking: No IP connection Upon receiving the physical address the device automatically returns from addressing mode to normal operating mode.
A	Ethernet connector	
B	Function button	During normal operation a rather short press (≈3 sec) activates and deactivates the Manual Function. A long press (≈15 sec) soon followed by a short press (≈3 sec) executes the Factory Reset. After the second press, all parameters will be set to factory default (incl. Individual Address)
C	Programming button	Learning button for switching between normal operating mode and addressing mode for assigning the physical address
D	KNX-Bus connection	

## **Chapter 3 Planning and Application**

According either to the factory default settings or the latest parameter settings downloaded from ETS (also other tools) in normal operating mode the IP Router operates as it is supposed to. The IP Router features two different modes, the “Normal Mode” and the “Boot Mode”.

### **3.1 Operation Modes**

#### **3.1.1 LED indication**

Refer to the description in section 2.3 above.

#### **3.1.2 The Function Button**

The function button is used for two purposes; either to switch to manual function or to do a factory reset. It depends on the current operation mode of the IP Router and the duration of time this button is being pressed.

##### **3.1.2.1 Switch to Manual function**

**Long press ( $\approx 3$  sec) in “Normal Mode”**

The default function is set by the LAN line and the (KNX) line parameters. Manual function is configured in “General parameters”.

**Note: The latest downloaded settings (parameters) and filter table are still available after switching back from “Manual operation” to “Normal operation”.**

##### **3.1.2.2 Factory Reset**

**Very long press ( $\approx 15$ s) in “Normal Mode”**

A factory reset is carried out by pressing the button for about 15 seconds (Bus State IP/TP LED light orange). After release, pressing it again for 3 seconds resets all the parameters to factory default (incl. physical address). Subsequently, LED indicate normal operation again.

### **3.1.3 The Programming Button and LED**

#### **In “Normal Mode”:**

To download the desired physical address and/or a full ETS settings download the programming button needs to be pressed. Successive pressing on the programming button will lead to turn on and off the programming LED, i.e. LED 7 which is lighting red. The blinking red programming LED indicates that the Ethernet cable is not properly connected.

The boot mode, which is entered by a web front-end, is used to upgrade the firmware program. See Chapter 5 for details.

## **3.2 IP router application**

In network installations IP Router is used as KNX IP line/area coupler to couple KNX IP and KNX TP. After connecting to KNX TP, IP Router operates with its default settings. Setting the correct physical address is necessary to include IP Router in the present KNX bus system. Only physical addresses x.y.0 are allowed to be set.

### **3.2.1 KNX Telegrams in the IP Network**

The IP Router sends telegrams from/to the KNX to/from the IP network in accordance with the KNXnet/IP protocol specification. According to the default setting these telegrams are sent as multicast telegrams to the multicast IP address 224.0.23.12 port 3671. The multicast IP address 224.0.23.12 is the defined address for the KNXnet/IP from the KNX Association in conjunction with the IANA. This address should be preserved and used as defined. Only if it becomes necessary due to the existing network, it could be changed in the “General Parameters” as described in KNX Multicasting Address. During commissioning, it is important to note:

- ♦ **All KNX IP devices that are intended to communicate with each other via IP network must have the same IP multicast address**
- ♦ **Multicast IP address 224.0.23.12 may need to be changed corresponding to the type**

of network and the setting of the network components

- ♦ **IGMP (Internet Group Management Protocol) is used for the IP configuration to establish multicast group memberships**
- ♦ **If the IP address is changed from the IP side, it may sometimes happen that the ETS does not recognize the device anymore and the connection can no longer be established (tunneling uses IP address)**
- ♦ **As a precaution, always run a restart or change the address from the TP side**
- ♦ **Please ask your administrator if problems occur for the IP Address assignment**
- ♦ **According to the topology, the additional physical addresses (for tunneling) always have to be assigned in the range of sub line addresses. For more information about the additional tunneling addresses please refer to Tunneling addresses (Additional Phys. Addresses).**
- ♦ **If a KNX/USB or KNX/IP interface is used to program a device of another line connected to a KNX IP Router, you should pay close attention to have the correct topology!**

### **3.2.2 The IP Router in a Network Installation**

In a network installation the IP Router can either be used as a KNX area coupler or as a KNX line coupler.

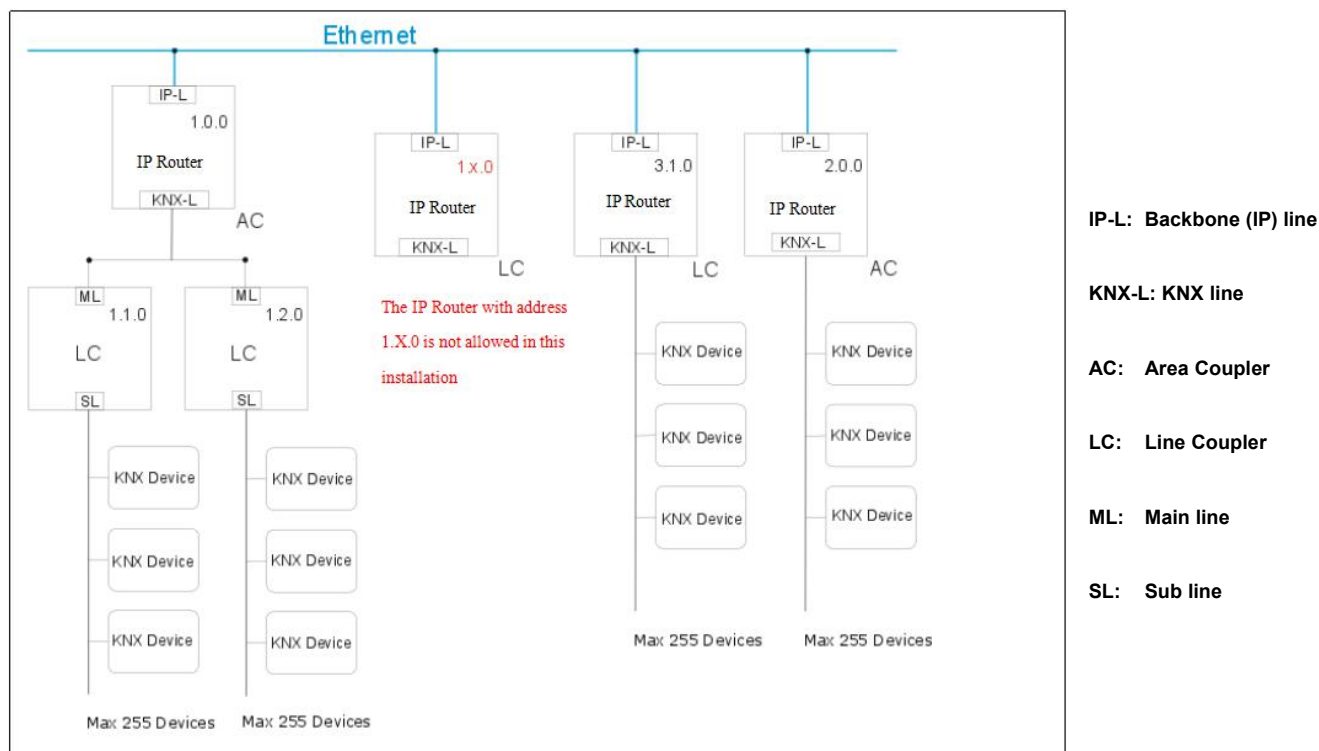
### **3.2.3 The IP Router as an Area Coupler**

The IP Router can replace an area coupler in a KNX network. For this purpose it must receive the physical address of an area coupler (X.0.0,  $1 \leq X \leq 15$ ). In the ETS up to 15 areas can be defined with area couplers.

### 3.2.4 The IP Router in a Mixed System

If it is necessary in a KNX system to use the IP Router at one point as an area coupler, e.g. office or home complex, and at another point as a line coupler, e.g. a remote underground garage or a pool; this is possible. It is only necessary to ensure that the IP Router used as a line coupler uses a line coupler address from a free addressing area. The following picture best illustrates the topology with IP Router routers as area and/or line couplers. Special attention needs to be paid that if a IP Router area coupler with address “1.0.0” already exists in the installation, no other IP Router line coupler (or any other KNX IP router) with address “1.X.0,  $1 \leq X \leq 15$ ” is allowed to be used in that network, and of course vice versa, if a IP Router line coupler with address “1.1.0” already exists in the installation, no other IP Router area coupler (or any other KNX IP router) with address “1.0.0” is allowed to be used in that network.

A direct connection between two IP Routers is possible as well. In this case, the auto IP will assign each IP Router an IP address and the two IP Routers will communicate over either a normal or a crossed network cable.



Mixed system

### **3.2.5 The IP Router as A Line Coupler**

The IP Router of a KNX network can assume the functionality of a line coupler. For this purpose it must have the physical address of a line coupler (X.Y.0,  $1 \leq X \text{ \& } Y \leq 15$ ). In the ETS up to 225 lines can be defined (from 1.1.0 to 15.15.0).

When the coupler receives telegrams (for example during commissioning) that use physical addresses as destination addresses, it compares the physical addresses of the receiver with its own physical address and then decides whether it has to route the telegrams or not.

Due to telegrams with group addresses the coupler reacts in accordance with its parameter settings. During normal operation (default setting), the coupler only routes those telegrams whose group addresses have been entered in its filter table.

If the coupler routes a telegram and does not receive an acknowledgement, or if a bus device discovers a transmission error, the coupler repeats the telegram up to three times (depending on the corresponding parameter that is set to the device through the last ETS download). With the parameters „Repetitions if errors...“, this behaviour can be set separately for both lines. These parameters should stay with the default setting.

**The ETS does not provide an unload procedure for the application of the IP-Router !**

**In the following description we describe parameters using screenshots created in the ETS.**

## Chapter 4 Parameter setting description in the ETS

All screen shots in this chapter represent the IP Router's database entry in ETS.

### 4.1 Physical Address Assignment

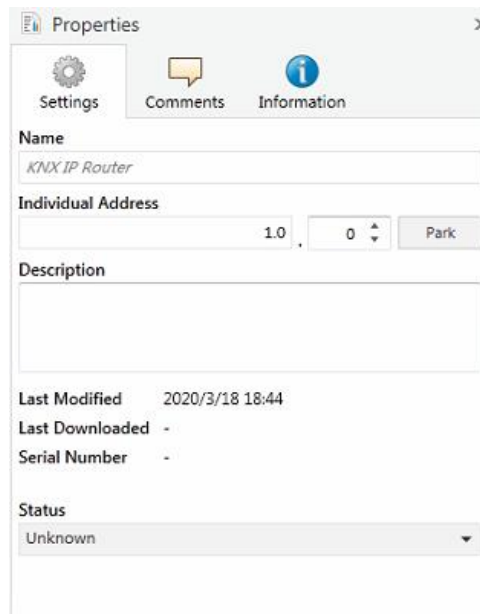


Fig.4.1: Properties window

To download the desired physical address and/or a full ETS setting into the device, during the procedure the programming button needs to be pressed.

(The programming button is used to put the device into "Program Mode"). With the ETS the physical address can be assigned to the device by setting the desired address in the properties window of the ETS, starting the download and pressing the programming button. After assignment the device restarts itself. (A blinking red LED 5 indicates that the Ethernet cable is not properly connected.)

To commission the device a PC with ETS and an interface connection (IP, USB) to the data bus is required.



## 4.2 General

1.1.0 KNX IP Router > General

General

IP configuration

KNX multicast address

Main line (KNX IP)

Subline (KNX TP)

Host name

Slow tunneling connections support

Switch-off time for Manual Function

Manual Function

KNX IP Router

☐ yes ☒ no

1 hour

pass all telegrams

Fig. 4.2: General

ETS-Text	Selection	Comment
Host name	<b>KNX IP Router</b>	Field to enter the device name (30 signs max.) providing an easy search of the device with the ETS or with a KNXnet/IP visualization system.
Slow tunneling connections support	Yes <b>No</b>	Enable to support slow tunneling connections.
Switch-off time for Manual Function	10min, <b>1hour</b> , 4hours, 8hours	After expiry of this time period the Manual Function is switched off automatically.
Manual Function	Disabled <b>Pass all telegrams</b> Pass all physical telegrams Pass all Group telegrams	Configuration setting for telegram routing when the Manual Function is active.

Please note that commissioning straight at delivery status (default settings) means:

- ① The IP coupler does block all telegrams because the filter table is not defined
- ② The fall-back time after manual operation is 120 min
- ③ The physical address is 15.15.0.

## 4.3 IP Configuration

1.1.0 KNX IP Router > IP configuration

General	HTTP port	<input type="radio"/> 80 <input checked="" type="radio"/> 8080
IP configuration	DHCP	<input type="radio"/> do not use <input checked="" type="radio"/> use
KNX multicast address		
Main line (KNX IP)		
Subline (KNX TP)		

1.1.0 KNX IP Router > IP configuration

General	HTTP port	<input type="radio"/> 80 <input checked="" type="radio"/> 8080
IP configuration	DHCP	<input checked="" type="radio"/> do not use <input type="radio"/> use
KNX multicast address	IP address	<input type="text" value="192.168.192.241"/>
Main line (KNX IP)	Subnet mask	<input type="text" value="255.255.248.0"/>
Subline (KNX TP)	Default gateway	<input type="text" value="192.168.192.2"/>
	DNS server	<input type="text" value="114.114.114.114"/>

Fig 4.3: IP configuration

ETS-Text	Selection	Comment
HTTP port	80 <b>8080</b>	Select one of the two official system ports.
DHCP	Do not use <b>Use</b>	If DHCP is not used, following parameters are to be set (see table below). If DHCP is used, no further IP parameters have to be set.
IP address	0-255.0-255.0-255.0-255	IP Byte 1 to 4: manual input.
Subnet mask	0-255.0-255.0-255.0-255	SM Byte 1 to 4: manual input.
Default gateway	0-255.0-255.0-255.0-255	DG Byte 1 to 4: manual input.
DNS server	0-255.0-255.0-255.0-255	DNS Byte 1 to 4: manual input.

## 4.4 KNX Multicasting Address

The multicast address 224.0.23.12 is the defined address for the KNXnet/IP from the KNX Association in conjunction with the IANA. This address shall only be changed if it becomes necessary due to the existing network.

1.1.0 KNX IP Router > KNX multicast address

General	System multicast	<input checked="" type="radio"/> do not use <input type="radio"/> use
IP configuration	Byte 1	239
KNX multicast address	Byte 2 [0 - 255]	0
Main line (KNX IP)	Byte 3 [0 - 255]	0
Subline (KNX TP)	Byte 4 [0 - 255]	0

Fig. 4.4: KNX multicast address

ETS-Text	Range	Comment
System multicast	Do not use <b>Use</b>	If "do not use" is selected, the address is to be defined physically. If "use", the system multicast is 224.0.23.12
Byte 1 (of the IP routing multicast address) This range is reserved for the IP multicast address.	System: [224] Physical: <b>[239]</b>	If System multicast address is used, "224" is permanently set. If Physical multicast address is used, "239" is permanently set.
Byte 2 [0 - 255] (of the IP routing multicast address)	0-255	Can only be set manually if a physical multicast address is used.
Byte 3 [0 - 255] (of the IP routing multicast address)	0-255	Can only be set manually if a physical multicast address is used.
Byte 4 [0 - 255] (of the IP routing multicast address)	0-255	Can only be set manually if a physical multicast address is used.

**Note:** During commissioning it should be regarded that all KNX IP devices intended to communicate with each other via IP must use the same IP routing multicast address. To ensure proper functioning, execute a manual restart after changing the multicast address.

## 4.5 Main Line

1.1.0 KNX IP Router > Main line (KNX IP)

General	Telegram routing	configure ▼
IP configuration	Group telegrams: Main group 0...13	filter ▼
KNX multicast address	Group telegrams: Main group 14...31	filter ▼
	Physical telegrams	filter ▼

[Main line \(KNX IP\)](#)

[Subline \(KNX TP\)](#)

Fig. 4.5: Main line

ETS-Text	Selection	Comment
Telegram routing	Groups: filter, Physical: block <b>Groups and Physical: filter</b> Groups: route, Physical: filter Groups and Physical: route configure	<ul style="list-style-type: none"> <li>- <u>Block</u>: no telegram is routed.</li> <li>- <u>Filter</u>: only telegrams are routed which are entered in the filter table.</li> <li>- <u>Route</u>: the telegrams are routed.</li> <li>- <u>Configure</u>: the following parameters can be set physically.</li> </ul> This parameter is to be set depending on the planed configuration.
Group telegrams: Main group 0..13	1. transmit all(not recommended) 2. block <b>3. filter</b>	1. Group telegrams (main group 0...13) are all routed. 2. Group telegrams (main group 0...13) are all blocked. 3. Group telegrams (main group 0...13) are routed if entered in the filter table.
Group telegrams: Main group 14..31	1. transmit all(not recommended) 2. block <b>3. filter</b>	1. Group telegrams (main group 14...31) are all routed. 2. Group telegrams (main group 14...31) are all blocked. 3. Group telegrams (main group 14...31) are routed if entered in the filter table.
Physical telegrams	1. transmit all(not recommended) 2. block <b>3. filter</b>	1. All physical telegrams are transmitted. 2. No physical telegram is transmitted. 3. Only physical telegrams are routed based on the physical address.

**Note:** The parameter “transmit all” for Group telegrams and Physical telegrams is intended only for testing purposes and should not be set for normal operation.

## 4.6 Sub Line

1.1.0 KNX IP Router > Subline (KNX TP)

General	Telegram routing	configure ▼
IP configuration	Group telegrams: Main group 0...13	filter ▼
KNX multicast address	Group telegrams: Main group 14...31	filter ▼
Main line (KNX IP)	Physical telegrams	filter ▼
	Physical telegrams: Repetition if errors on subline	up to 3 repetitions ▼
Subline (KNX TP)	Group telegrams: Repetition if errors on subline	up to 3 repetitions ▼
	Telegram confirmation on subline	<input checked="" type="radio"/> if routed <input type="radio"/> always
	Send confirmation on own telegrams	<input type="radio"/> yes <input checked="" type="radio"/> no
	Configuration from subline (KNX TP)	<input checked="" type="radio"/> allow <input type="radio"/> block

Fig. 4.6: Sub line

**Note:** If the parameter “Send confirmation on own telegrams” is set to “yes”, with sending any own routed telegram the IP Router will systematically send an ACK.

ETS-Text	Selection	Comment
Telegram routing	Groups: filter, Physical: block <b>Groups and Physical: filter</b> Groups: route, Physical: filter Groups and Physical: route Configure	- <u>Block</u> : no telegram is routed. - <u>Filter</u> : only telegrams are routed which are entered in the filter table. - <u>Route</u> : the telegrams are routed. - <u>Configure</u> : the following parameters can be set physically. This parameter is to be set depending on the planed configuration.
Group telegrams: Main group 0..13	1. transmit all(not recommended) 2. block <b>3. filter</b>	1. Group telegrams (main group 0...13) are all routed. 2. Group telegrams (main group 0...13) are all blocked. 3. Group telegrams (main group 0...13) are routed if entered in the filter table.

Group telegrams: Main group 14..31	1. transmit all(not recommended) 2. block <b>3. filter</b>	1. Group telegrams (main group 14...31) are all routed. 2. Group telegrams (main group 14...31) are all blocked. 3. Group telegrams (main group 14...31) are routed if entered in the filter table.
Physical telegrams	1. transmit all(not recommended) 2. block <b>3. filter</b>	1. All physical telegrams are transmitted. 2. No physical telegram is transmitted. 3. Only physical telegrams are routed based on the physical address.
Physical telegrams: Repetition if errors on subline	1. no <b>2. up to 3 repetitions</b> 3. one repetition	After subline transmission error (e.g. due to missing receiver) Physical telegrams: 1. The physical telegram is not repeated. 2. The physical telegram is repeated up to 3 times. 3. The physical telegram will be repeated only one time.
Group telegrams: Repetition if errors on subline	1. no <b>2. up to 3 repetitions</b> 3. one repetition	After subline transmission error (e.g. due to missing receiver) Group telegrams: 1. The group telegram is not repeated. 2. The group telegram is repeated up to 3 times. 3. The group telegram will be repeated only once.
Telegram confirmations on subline	<b>1. if routed</b> 2. always	1. Routed telegrams to IP main line are confirmed by an ACK on the subline. 2. Each telegram on the subline is confirmed by an ACK
Send confirmation on own telegrams	Yes <b>No</b>	1. Telegrams sent out to the subline are confirmed by added ACK. 2. No ACK confirmation
Configuration from subline (KNX TP)	<b>Allow</b> Block	If blocked an ETS download to the IP Router can occur only via IP main line.

## Chapter 5 Web Front-end

The web front-end can be used to read out the actual device parameters (HTTP port, IP address, MAC address, ...), to update its firmware and to adjust the (additional) tunneling addresses. To identify a particular IP router of a KNX network the Programming LED/Programming Mode can be remotely switched on and off without pressing the on-device Programming Button.

**To switch back from Boot Mode to normal operation it is necessary to run the firmware update procedure and then abort, or wait for the 10 min timeout.**

### 5.1 Accessing the Web Front-end

There are three ways to access the IP Router. It can be accessed like a Microsoft Windows UPnP network device (Windows7 or later) and by a web browser. For access by a web browser either the IP address or the MAC address, together with the HTTP port, have to be known. How to use IP address and MAC address with the browser's URL bar is described in the following.

**For access via web browser the HTTP port that is set by ETS (or the factory default parameter value) has to be used. The IP Router is able to use both official HTTP system ports (80 and 8080). Factory default HTTP port is 8080.**

#### 5.1.1 Via windows Network UPnP

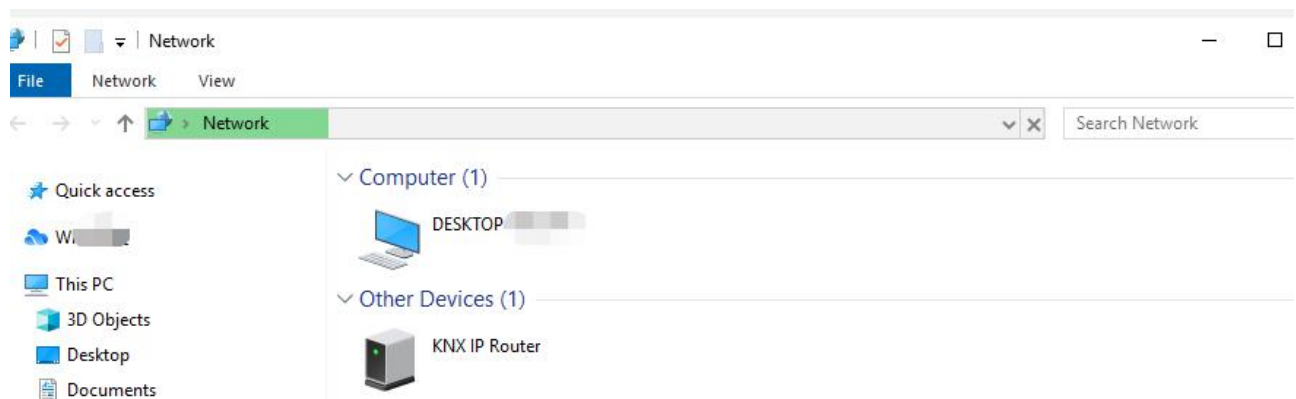


Fig. 5.1: as UPnP network device (KNX IP Router)

When the UPnP network function is enabled, KNX IP Router appears in the Windows Network. Double-click on the IP router network device opens the web front-end with the standard web browser. If KNX IP Router is not visible as an UPnP network device a manual restart is recommended. After that, the device becomes visible in the list of network devices.

### 5.1.2 Via IP Address

When IP address and HTTP port (80 or 8080) are known, this information is sufficient to access the web front-end by a web browser. The actual IP address is shown in the ETS list of Discovered Interfaces.

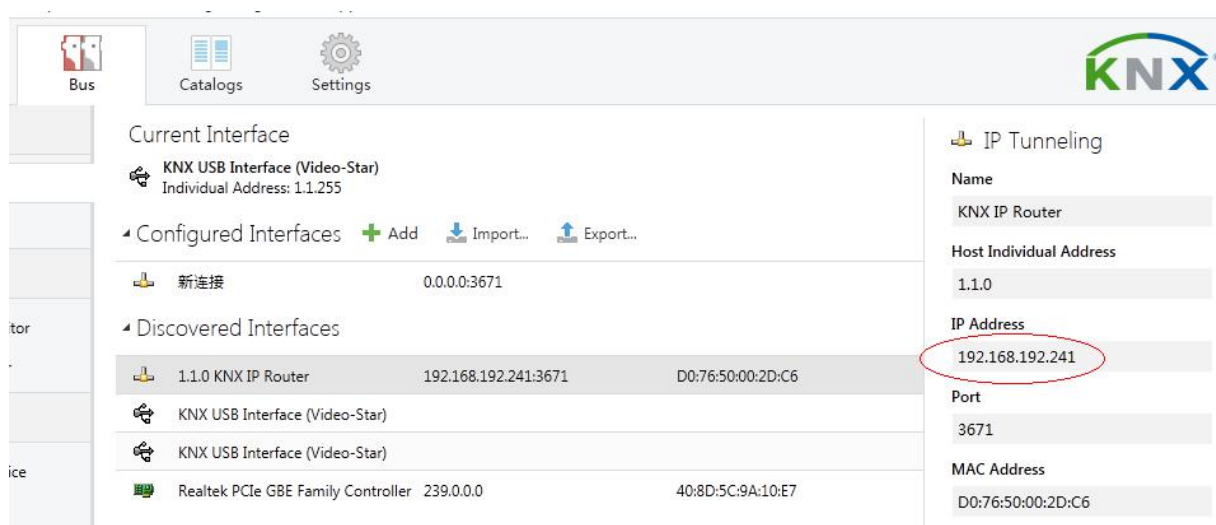


Fig. 5.2: Identifying IP address with ETS

According to the preset IP configuration (HTTP port, IP address and DHCP, respectively) in the URL bar has to be entered (without brackets):

**`http://[IP address]:[HTTP port]/`**

Example: <http://192.168.192.241:8080/>





### 5.1.3 Via MAC Address

When NetBIOS is installed (by default on Windows systems and Linux systems containing SAMBA) the MAC address that is printed on a label on the side of the IP Router's housing can be used. Due to name resolution is mandatory to establish communication by Host name, activation of NetBIOS is necessary.

Use the MAC address in the form of AA-BB-CC-XX-YY-ZZ and the preset HTTP port to be entered in the browser's URL bar as described here (without brackets):

**`http://[IP address]:[HTTP port]/`**

Example: <http://knx-iprt-002dc6:8080/>



## 5.2 Device Info

After accessing the web front-end the Device Info tab is shown. All general information about the current device settings is visible.



KNX IP Router

Device Info

KNX

Update

### Device Information

Status:	normal operation
DHCP:	Off
IP Address:	192.168.192.241
Subnet Mask:	255.255.248.0
Gateway:	192.168.192.2
DNS:	114.114.114.114
Http Port:	8080
MAC Address:	D0-76-50-00-2D-C6
Hostname:	KNX-IPRT-002DC6
Description:	KNX IP Router
UDN:	uuid:1f6b0c73-2a3d-5f37-4a51-d07650002dc6
Application SW version:	2.0.10
Bootloader SW version:	2.3

Fig. 5.3: Device info tab

## 5.3 KNX

Here, all KNX specific addresses are shown. Setting changes can easily be checked. With a simple click on “On” or “Off” Programming Mode can be switched on/off. This function is equivalent to a Programming Button press. Together with the Device Info tab it is easy to distinguish the regarded device (with a certain IP address or MAC address or serial number) from other similar devices in the same IP network.

Four tunneling addresses can be set. ETS sets the first tunneling address. With a click on “Set” the remaining ones are set. Moreover, routing multicast address, serial number of the device and a last-60-minutes KNX busload diagram are visible. The red curve shows the maximum busload history and the green one shows the average busload history both of the TP side.

**The web browser used has to support SVG graphics.**

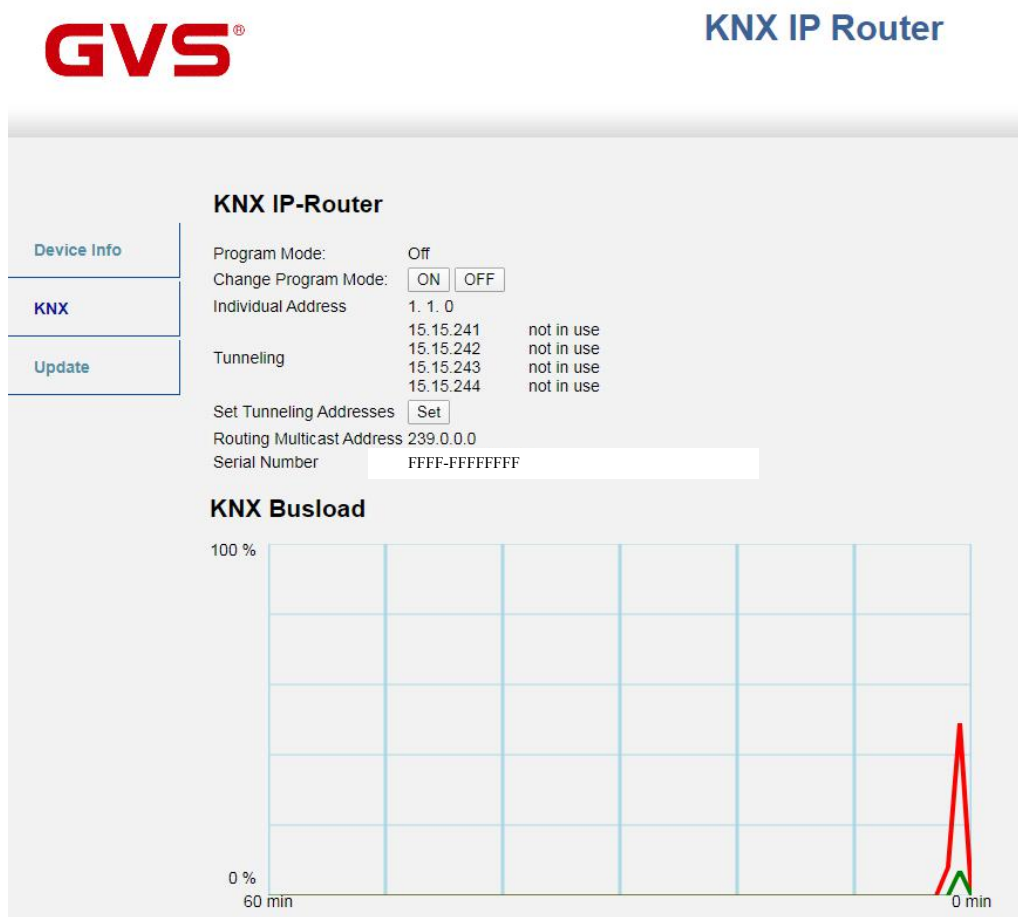


Fig. 5.4: KNX tab

## 5.4 Firmware Update / Boot Mode

Under the Update tab the firmware of the IP Router can be updated via IP i.e. the Ethernet network like described in following steps. During the remote update process, the IP Router enters Boot Mode. Then LEDs 1, 2, 3, and 7 light as described in section 2.3.

**If Boot Mode is already active only the web front-end instructions from step 3 to step 5 must be followed (refresh, request update). Boot Mode is still active after device reset and after factory reset.**

To exit Boot Mode it is necessary to enter the Update tab of the web front-end. Then either the firmware update has to be completed (if a new firmware is available) or the firmware update process has to be stopped by a click on the “Abort” button. After that the IP Router restarts and continues with normal operation.

Step 1: Open the Update tab of the web front-end.

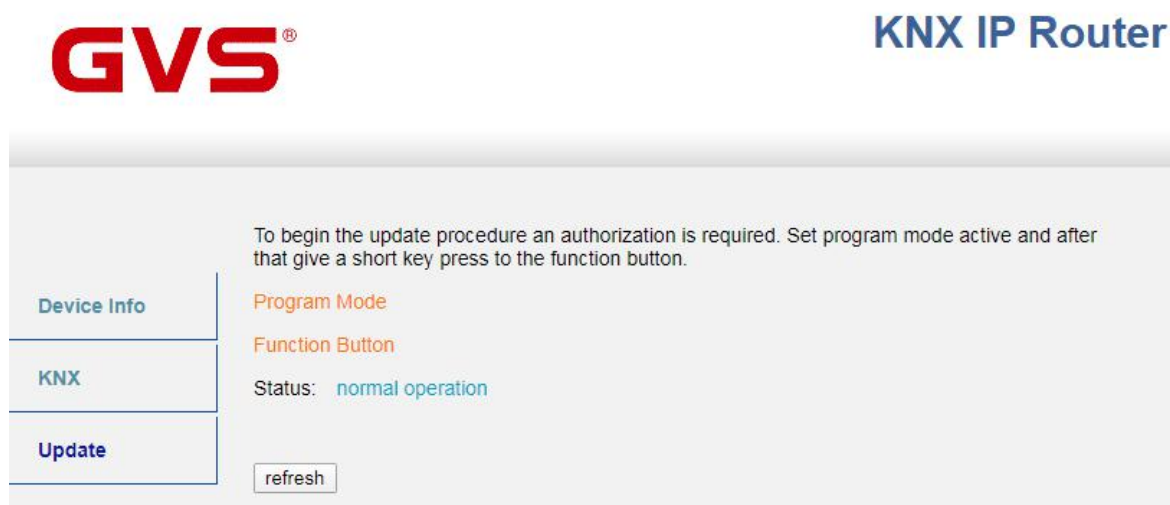


Fig. 5.5: Update tab

Step 2: Activate Programming Mode (KNX tab or Programming Button).

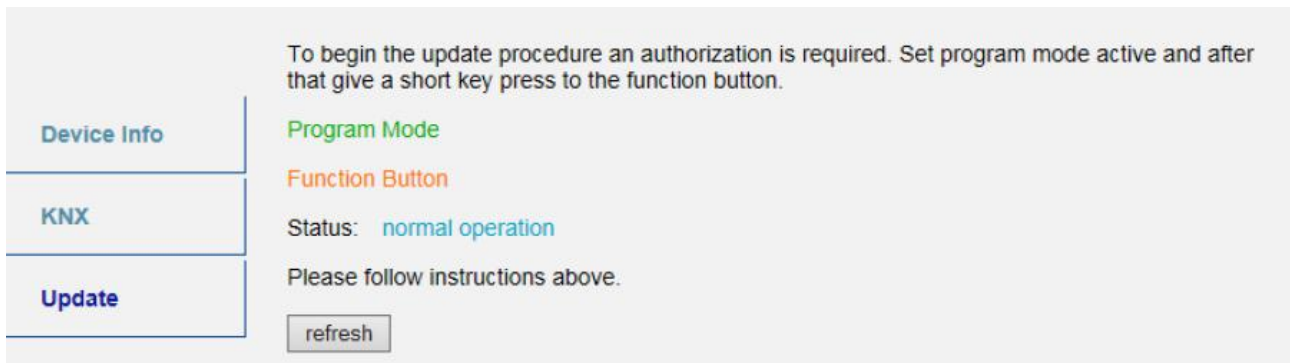


Fig. 5.6: Update Tab and activated Programming Mode

Step 3: After Programming Mode activation give a short press to the Function Button. Then click on the “refresh” button (alternatively, refresh the browser).

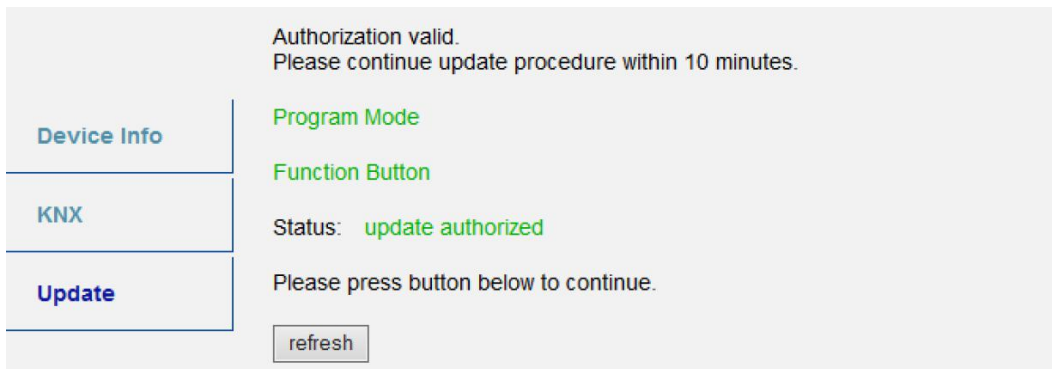


Fig. 5.7: Update Authorized

Step 4: When the “request update” button appears it has to be pressed to select the update file and enter “Boot Mode”.

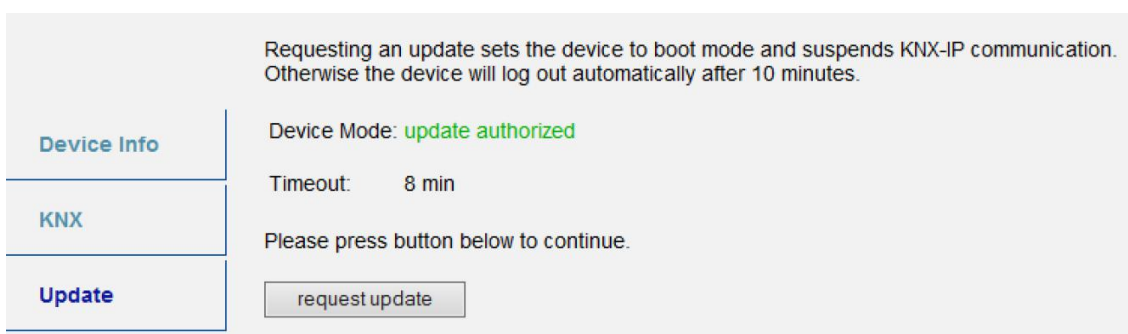


Fig. 5.8: Request Update

Step 5: The update file can be selected and uploaded. After that, the device restarts. Clicking on the “Abort” button cancels the firmware update procedure and the device exits Boot Mode.

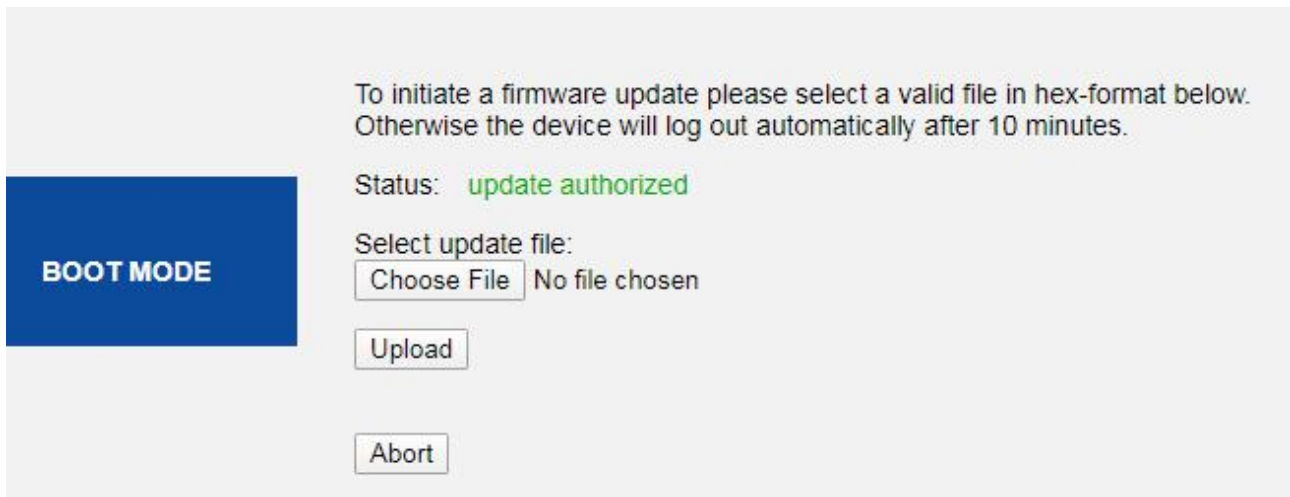


Fig. 5.9: Select Update File

## 5.5 IP Tunneling Address Assignment

According to the host's physical address assignment the first tunneling address (additional physical address) of the IP Router can only be set by ETS.

**Please make sure: The additional physical addresses for tunneling and the host's physical address have to be different.**

Step 1: Open the ETS Bus tab and select KNX IP Router as the "Current Interface". In the "IP Tunneling" window the already assigned host physical address can be read.

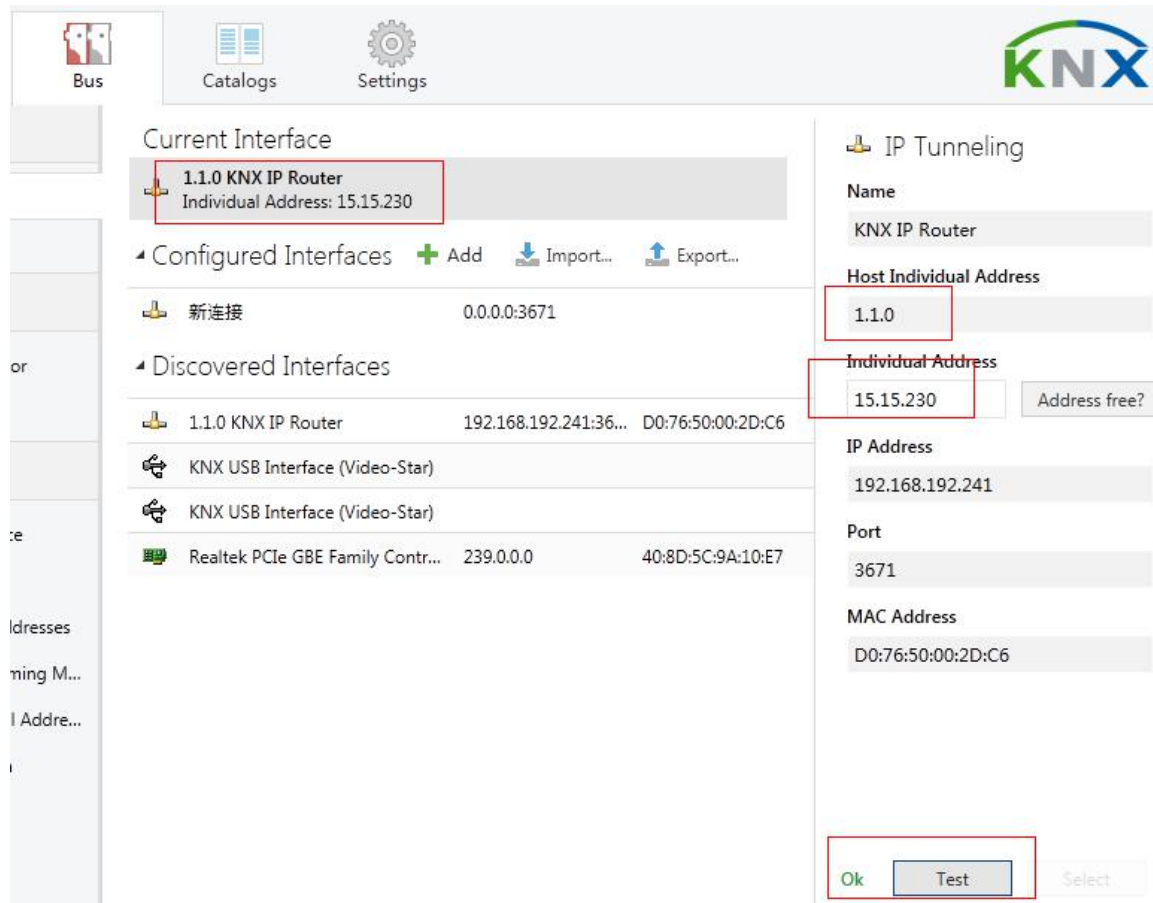


Fig. 5.10: First Additional Physical Address (First Tunneling Address)

Step 2: Set the first additional physical address by the “Individual Address” field. Click on the “Test” button. If the green Ok appears, the first tunneling address is set. In this example it is “15.15.230”.

Step 3: Now open the KNX tab of the web front-end. Click on the “Set” button to set the remaining three tunneling addresses basing on the first tunneling address as follows.

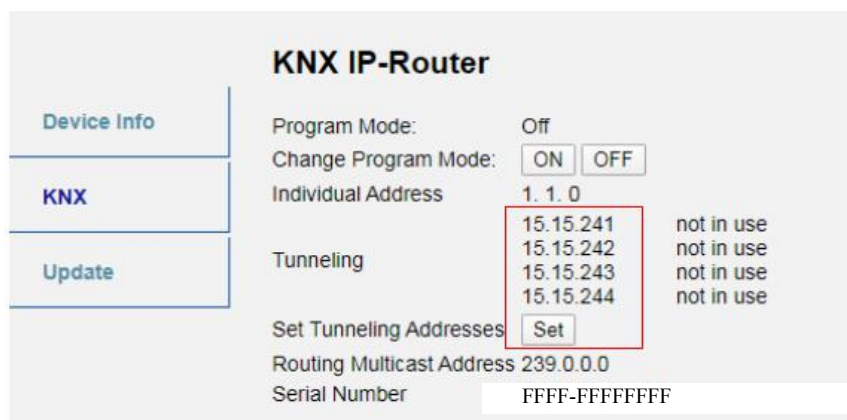


Fig. 5.11: Additional Tunneling Address Assignment in the Web Front-end

## Chapter 6 State of Delivery

The IP Router is delivered with the following default factory settings:

<b>Physical address</b>	15.15.0
<b>Tunneling Addresses</b>	15.15.241
	15.15.242
	15.15.243
	15.15.244
<b>IP configuration</b>	
<b>IP address assignment</b>	DHCP/Auto IP
<b>IP routing multicast address</b>	224.0.23.12
<b>Main Line (IP Main line to TP Subline)</b>	
<b>Group telegrams (main group 0...13)</b>	Filter (Filter table is empty)
<b>Group telegrams (main group 14...31)</b>	Filter
<b>Physical telegrams</b>	Filter
<b>Sub Line (TP Subline to IP Main line)</b>	
<b>Group telegrams (main group 0...13)</b>	Filter (Filter table is empty)
<b>Group telegrams (main group 14...31)</b>	Filter
<b>Physical telegrams</b>	Filter
<b>Physical telegram: Repetition if errors on sub line (KNX TP)</b>	Up to 3 repetitions
<b>Group telegram: Repetition if errors on sub line (KNX TP)</b>	Up to 3 repetitions
<b>Telegram confirmations on line (KNX TP)</b>	If routed
<b>Send confirmation on own telegrams</b>	No
<b>Configuration from sub line (KNX TP)</b>	Allow