

Integrating AV-Applications into KNX

KNX AV Conference

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Weinzierl Engineering GmbH

Agenda

Weinzierl Engineering GmbH – The Company

KNX Control for Audio-Video

What is BAOS?

KNX BAOS Modules and Devices

ETS database entries



About Weinzierl

Founded in 2001

Location

- Burgkirchen an der Alz
- Southeast in Bavaria
- About 110 km Southeast from Munich

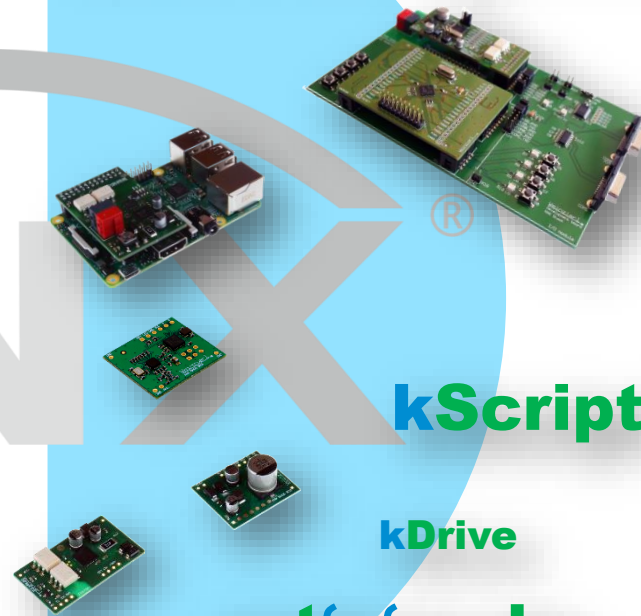
Development of hardware and software for building automation



Products

Devices

Development



kScript

kDrive

net'n'node

KNX Stack NGS

System Solutions for KNX

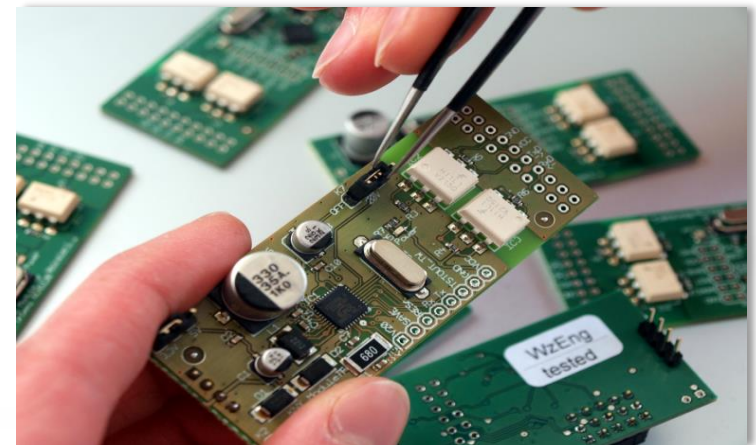
KNX Modules

KNX Stacks

KNX Tools for developers

Services

- Hardware / Software Development
- KNX accredited test lab



KNX Control for Audio-Video

Integration into building control

Usage of KNX design switches

Integration into visualization tools

KNX Infrastructure

- Integration into scenes with lighting, shutters, etc.
- Usage of KNX timers
- Usage of KNX topology via Bus, RF, IP, remote access



Audio-Video in KNX Standard

Volume 7: Application Specifications

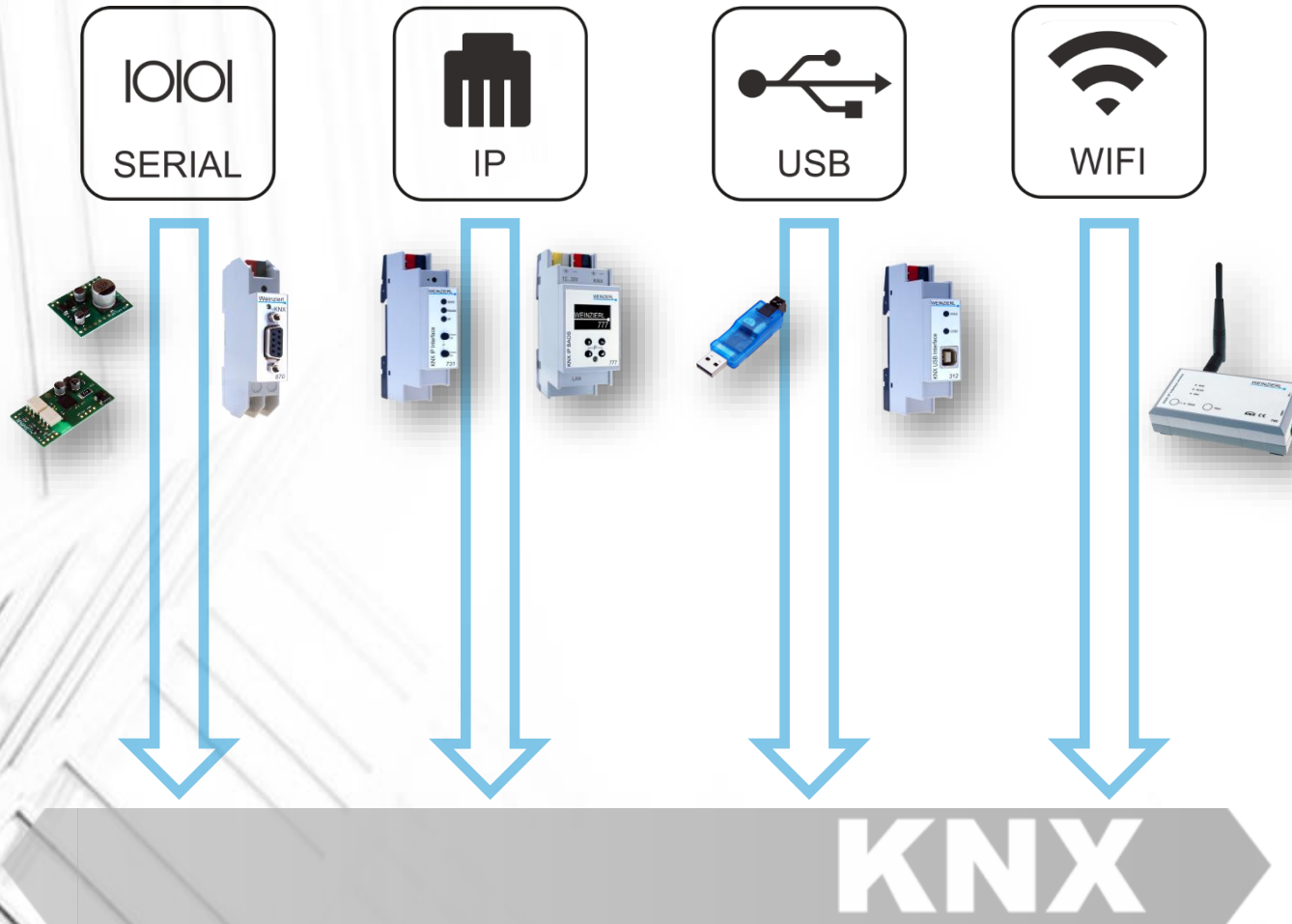
Part 70: Control of Audio and Video Equipment

Chapter 1: General Principles

- Interworking
- KNX data point types for AV
- In-line with other applications like dimming

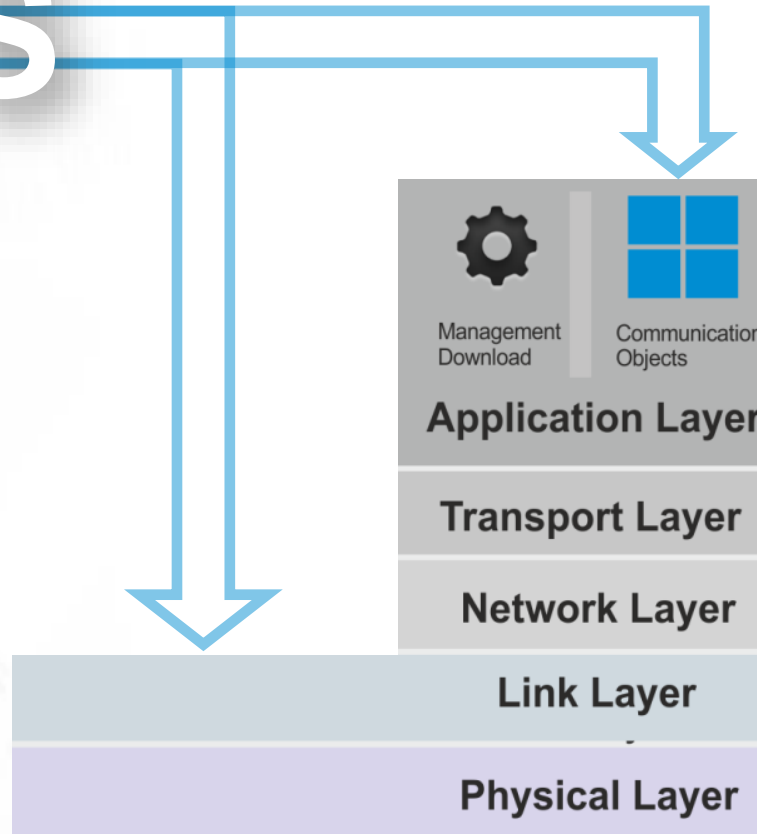


Access to the KNX Bus



Access on different layers

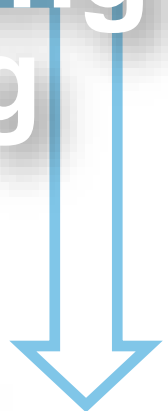
BAOS



KNX

ETS: Telegrams

USB
IP Tunneling
IP Routing



What is BAOS?



BAOS

Bus Access and Object Server

Bus Access

- Telegram level
- Programming interface for the ETS

Object Server

- Object Level
- Universal IP Gateway for building automation
- Residential Gateway
- Allows a fast integration of non-KNX devices into a KNX network

Application areas for BAOS

Connecting devices to KNX

- Sensors, actuators
- Heating, ventilation
- Audio,...

Typical use case

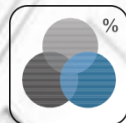
- Small and medium quantity
- Expansion of existing devices

Advantages

- Low investment
- Rapid development
- Certified system software

ETS product database

- Available as generic
- Individualization possible



KNX

BAOS: System integration

KNX Telegrams



ETS 5 PROFESSIONAL

Configuration structure & links



Structure & values



BAOS protocol: Object Server

BAOS

- Bus Access and Object Server

Abstraction

- Separates KNX handling from client
- Client communicates to BAOS module
- No KNX telegrams to be handled by client

BAOS data

- Data points (group objects)
- Parameters (ETS)
- Server items (Module related)

Advantages of the object server

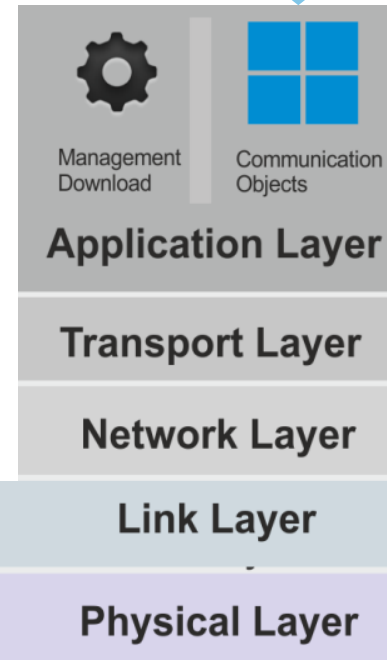
The object server always keeps the current values

- Even if the application is not connected
- No group-value-read required
- Short latencies



Application: Data points

BAOS Protocol



KNX

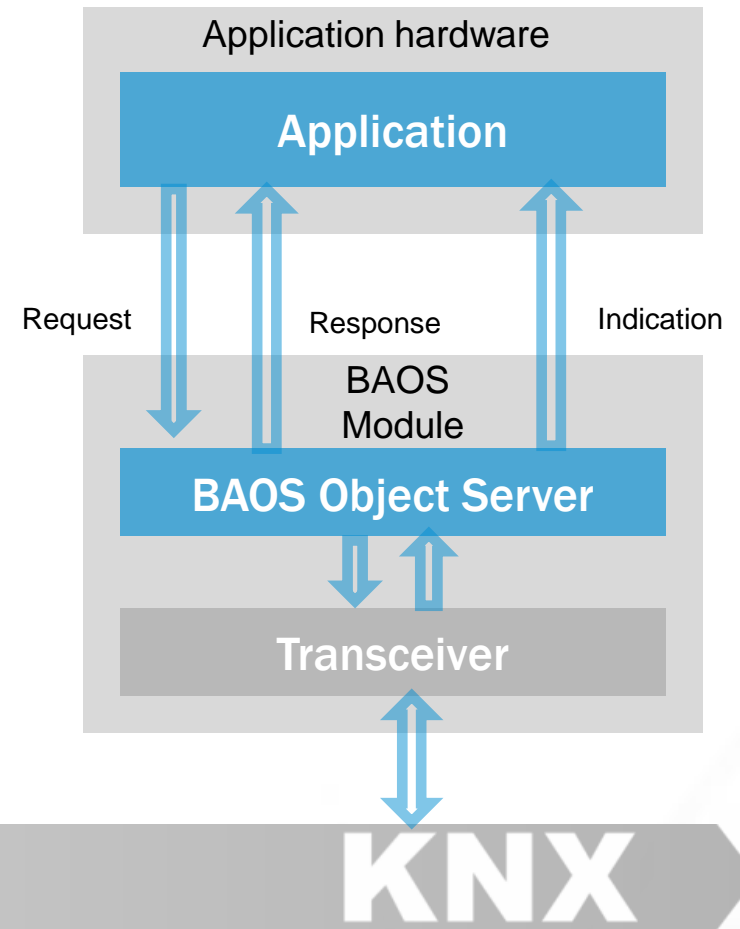
BAOS Protocol: Communication

Access to communication objects

- GETDATAPOINTVALUE.REQ
- GETDATAPOINTVALUE.RES
- DATAPOINTVALUE.IND
- SETDATAPOINTVALUE.REQ
- SETDATAPOINTVALUE.RES

Access to ETS parameters

- GETPARAMETERBYTE.REQ
- GETPARAMETERBYTE.RES



KNX BAOS Modules

Board

- Microcontroller
- KNX Transceiver

Certified KNX Stack

Interface to communication objects

- Up to 1000 data points

Interface on Telegram level

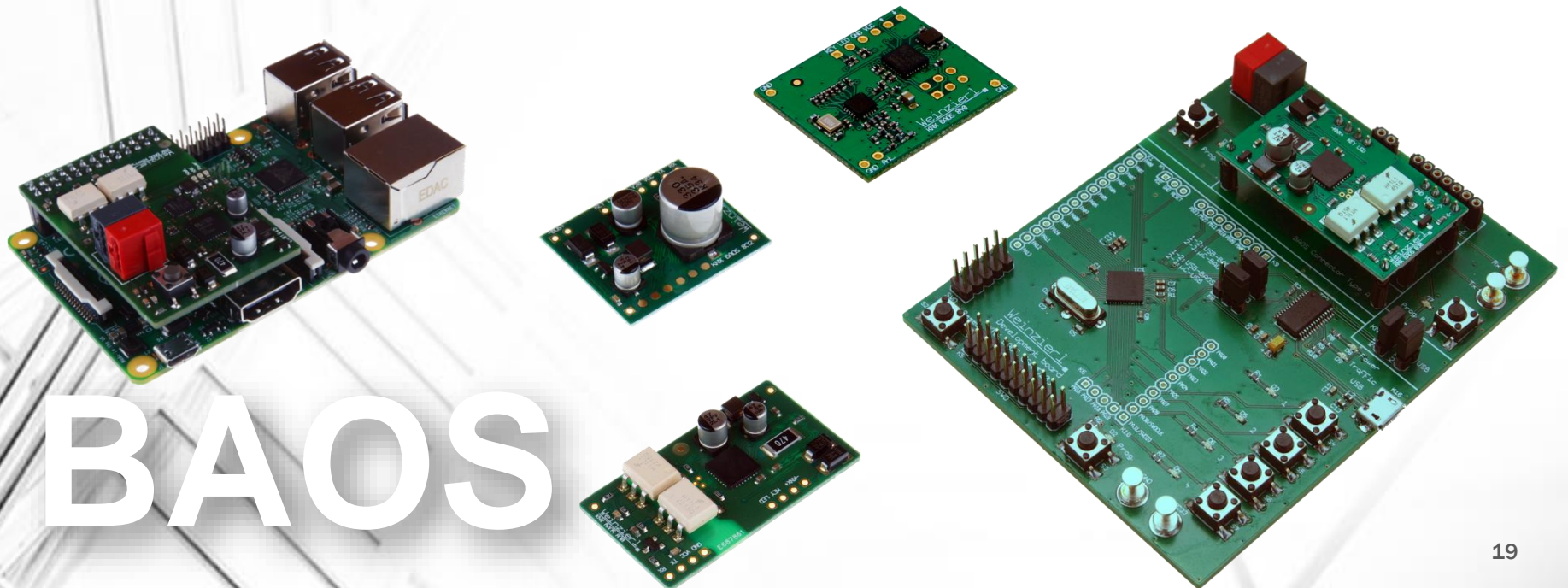
Serial protocol based on FT1.2



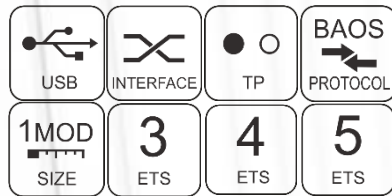
KNX BAOS Modules

KNX BAOS Modules with certified Stack

- KNX BAOS 830 with galvanic isolation
- KNX BAOS 832 bus powered
- KNX BAOS 838 kBerry for Raspberry PI®
- KNX BAOS 840 wireless with KNX RF



KNX USB Interface 312



BAOS

Installation width 1 HP (18mm)

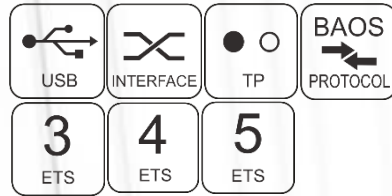
Support of KNX Long Frames

Improved user interface

- Visualization of communication errors

Support of BAOS for connecting non-KNX devices to KNX via USB

KNX USB Interface Stick 332



Compact shape

Support of KNX Long Frames

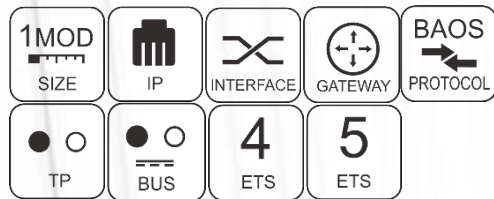
Improved user interface

- Visualization of communication errors

Support of BAOS for connecting non-KNX devices to KNX via USB



KNX IP BAOS 773 / 774



KNX IP BAOS with 18 mm width

- Up to 5 simultaneous KNXnet/IP Tunneling connections

Powered by the KNX bus

Improved user interface

- Visualization of communication errors

BAOS Binary Protocol V2

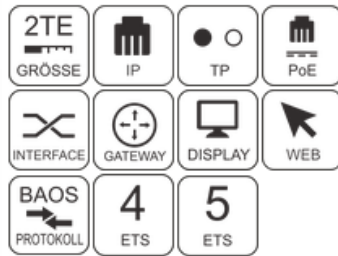
- UDP/IP or TCP/IP

Support of 250/1000 data points



BAOS

KNX IP BAOS 777



Universal KNX IP Gateway

KNX IP Interface

Object Server (BAOS)

Integrated Web Server with visualization

Feature richness

- Flexible configuration on the device, via web browser or ETS
- Timers, NTP
- History, E-Mail
- Structured and generic database
-

IP BAOS

BAOS – Web Services

For web applications

For mobile devices

- iOS (iPhone, iPad)
- Android devices

Based on JSON (Java Script Object Notation)

Public API (Application Programming Interface)

Demo available

KNX IP BAOS 777

- RESTful services
- Web visualization



KNX IP BAOS 777: ETS entry



Generic

- Flat list of data points
- For getting started

Structured

- Building structure with rooms
- Functions with data points
- Generation of semantic information
- e. g. for visualizations

Individual

- Tailored for your application

ETS database entry

Generic ETS database entry

- For a quick start
- DCA for import/export

The screenshot displays the ETS database interface. On the left, a tree view shows the project structure under 'Buildings'. The selected path is: Buildings > 1 First floor > 1.1 Living room > 1.1.70 App_Knx... > 1.1.71 Revox... > Group Addresses > 3 Entertainment > 3/3 Living room > 3/3/33 Music. The main area shows the configuration for '1.1.70 App_KnxBaos > Datapoint 1-10'. The configuration is organized into a table with columns for 'Datapoint type', 'Datapoint description', and 'Datapoint value'. The values are as follows:

| Datapoint type | Datapoint description | Datapoint value |
|-------------------|--------------------------|---------------------------------|
| Datapoint type 1 | Datapoint description 1 | DPT 1 - Binary-1 Bit |
| Datapoint type 2 | Datapoint description 2 | Play/Stop |
| Datapoint type 3 | Datapoint description 3 | DPT 3 - Dimming up/down-4 B |
| Datapoint type 4 | Datapoint description 4 | Fast Forw/Back |
| Datapoint type 5 | Datapoint description 5 | DPT 5 - Percent Value-1 Byte |
| Datapoint type 6 | Datapoint description 6 | Volume |
| Datapoint type 7 | Datapoint description 7 | DPT 7 - Unsigned Value-2 Bytes |
| Datapoint type 8 | Datapoint description 8 | Remaining Time |
| Datapoint type 9 | Datapoint description 9 | DPT 18 - Scene with Ctrl-1 Byte |
| Datapoint type 10 | Datapoint description 10 | Setting |
| Datapoint type 11 | Datapoint description 11 | DPT 16 - String-14 Bytes |
| Datapoint type 12 | Datapoint description 12 | Title |
| Datapoint type 13 | Datapoint description 13 | Disabled |
| Datapoint type 14 | Datapoint description 14 | Disabled |
| Datapoint type 15 | Datapoint description 15 | Disabled |
| Datapoint type 16 | Datapoint description 16 | Disabled |

ETS database entry

Individual ETS database entries

- By the manufacturer using KNX MT
- As service from Weinzierl Engineering

The screenshot shows the ETS software interface. On the left is a project tree with the following structure:

- Buildings
 - Dynamic Folders
 - Trades
 - Topology Back...
 - Dynamic Folders
 - 1 First floor
 - 1.1 Living room
 - 1.1.70 App_Kn...
 - 1.1.71 Revox...
 - Group Addresses
 - Dynamic Folders
 - 3 Entertainment
 - 3/3 Living room
 - 3/3/1 Next/Prev
 - 3/3/2 Seek
 - 3/3/3 Volume
 - 3/3/4 Time

On the right, the '1.1.71 Revox Gateway designed by Weinzierl > Rooms' configuration table is displayed:

| Common | Room 1 | Standard |
|--------|---------|-------------|
| | Name | Living room |
| Rooms | Room 2 | Advanced |
| | Name | Party room |
| | Room 3 | Disabled |
| | Room 4 | Disabled |
| | Room 5 | Disabled |
| | Room 6 | Disabled |
| | Room 7 | Disabled |
| | Room 8 | Disabled |
| | Room 9 | Disabled |
| | Room 10 | Disabled |

ETS database entry

Individual ETS database entries

| Buildings | Num | Name | Object Fur | Description | Group A | Length | C | R | W | T | U | Data Type |
|------------------|-----|-------------------------------------|------------|-------------|---------|--------|---|---|---|---|---|--------------|
| Dynamic Folders | 17 | KNX Action 7 | Switch | | | 1 bit | C | - | - | T | - | 1-bit, switc |
| Trades | 18 | KNX Action 8 | Switch | | | 1 bit | C | - | - | T | - | 1-bit, switc |
| Topology Back... | 41 | Living room: Room On/Off | Switch | Power | 3/3/32 | 1 bit | C | - | W | - | - | 1-bit, switc |
| Dynamic Folders | 42 | Living room: Room State | State | | | 1 bit | C | - | - | T | - | 1-bit, switc |
| 1 First floor | 43 | Living room: Select User 1/Room Off | Switch | | | 1 bit | C | - | W | - | - | 1-bit, enab |
| 1.1 Living room | 44 | Living room: Select User 1 State | State | | | 1 bit | C | - | - | T | - | 1-bit, enab |
| 1.1.70 App_Kn... | 45 | Living room: Select User 2/Room Off | Switch | | | 1 bit | C | - | W | - | - | 1-bit, enab |
| 1.1.71 Revox... | 46 | Living room: Select User 2 State | State | | | 1 bit | C | - | - | T | - | 1-bit, enab |
| Group Addresses | 47 | Living room: Select User 3/Room Off | Switch | | | 1 bit | C | - | W | - | - | 1-bit, enab |
| Dynamic Folders | 48 | Living room: Select User 3 State | State | | | 1 bit | C | - | - | T | - | 1-bit, enab |
| 3 Entertainment | 49 | Living room: Select User 4/Room Off | Switch | | | 1 bit | C | - | W | - | - | 1-bit, enab |
| 3/3 Living room | 50 | Living room: Select User 4 State | State | | | 1 bit | C | - | - | T | - | 1-bit, enab |
| 3/3/1 Next/Prev | 59 | Living room: Userstream Radio | Trigger | | | 1 bit | C | - | W | - | - | 1-bit, trigg |
| 3/3/2 Seek | 60 | Living room: Userstream Music | Trigger | Music | 3/3/33 | 1 bit | C | - | W | - | - | 1-bit, trigg |
| 3/3/3 Volume | 71 | Living room: Next/Previous | Step | Next/Prev | 3/3/1 | 1 bit | C | - | W | - | - | 1-bit, step |
| 3/3/4 Time | 74 | Living room: Volume relative | Relative | | | 4 bit | C | - | W | - | - | 3-bit cont |
| 3/3/5 Settings | 75 | Living room: Volume value | Absolute | Volume | 3/3/3 | 1 byte | C | - | W | - | - | 8-bit unsi |
| 3/3/6 Title | 76 | Living room: Volume value State | State | | | 1 byte | C | - | - | T | - | 8-bit unsi |
| 3/3/7 Test | 83 | Living room: Timer Event 1 On/Off | Switch | | | 1 bit | C | - | W | - | - | 1-bit, enab |
| 3/3/32 Power | 84 | Living room: Timer Event 1 State | State | | | 1 bit | C | - | - | T | - | 1-bit, enab |
| 3/3/33 Music | 85 | Living room: Timer Event 2 On/Off | Switch | | | 1 bit | C | - | W | - | - | 1-bit, enab |
| | 86 | Living room: Timer Event 2 State | State | | | 1 bit | C | - | - | T | - | 1-bit, enab |
| | 101 | Party room: Room On/Off | Switch | | | 1 bit | C | - | W | - | - | 1-bit, switc |
| | 102 | Party room: Room State | State | | | 1 bit | C | - | - | T | - | 1-bit, switc |
| | 103 | Party room: Select User 1/Room Off | Switch | | | 1 bit | C | - | W | - | - | 1-bit, enab |

Settings Comm... Inform...

Name
Living room: Volume value

Description
Volume

Priority
Low

Flags

- Communication
- Read
- Write
- Transmit
- Update
- Read On Init

Data Type

5.001 percentage (0..100%)

5.003 angle (degrees)

5.004 percentage (0..255%)

Find and Replace

Workspaces

Todo Items

Reading Operations

Net'n Node

Bus monitor program

- Free edition

Multiple port architecture

- USB, IP, Serial

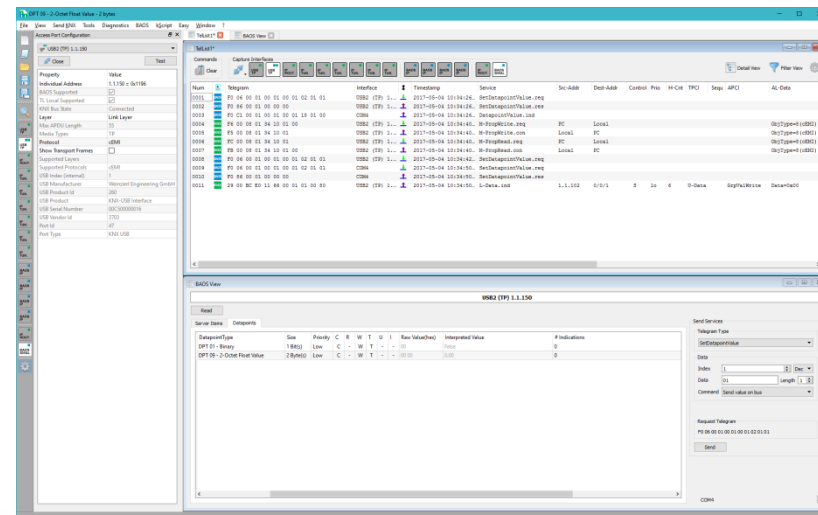
For all KNX media

- TP, PL, RF, IP

For BAOS Protocol

- BAOS view

net'n node



**Thank
You**
For your
Attention!