



## **Building Automation Training Center**

*Training Course: KNX Advanced Course*

## ***General Information***

### ***Course Description***

The KNX Advanced Course is an extension 100% practical course, to the KNX Basic Course.

The Advanced Course provides the knowledge and the use of:

- Flags
- Visualization Systems
- Security
- Coupler in Complex Buildings
- Heating Control
- Failsafe Planning
- Logic functions
- Light Control
- Additional ETS Tools

After completing the Advanced Course, the trainee has enough knowledge to work with KNX in a professional and profitable way in advanced projects.

The course is taught in English.

As a prerequisite, the trainee should have been certified as a KNX Partner, through the KNX Basic Course.

### ***Venue***

BATC Courses take place at BATC Offices located in 171, Street 11, Mkalles 2701 2327 / Lebanon

### ***Target Audience***

Any technically qualified person, dealing in home automation, and mainly electrical engineers, could attend the course.

### ***Training Cost***

Each training session has a course fee of USD 1850.00 per participant for the complete duration of the 5 days (40 hours), including the KNX Certification exam.

The participants are responsible for paying their travel and hotel accommodation themselves however a support in accommodation may be provided by the management of BATC. Lunch and coffee during the training is offered by BATC.

## ***Registration***

Please find the registration form on [www.batc.com.lb](http://www.batc.com.lb). Please send signed form to [batc@batc.com.lb](mailto:batc@batc.com.lb) 3 weeks in advance of the training dates. The registration is considered as “first come first served”.

## ***Cancellation / No show of participant***

In case the participant cancels the training course in less than 10 days from the beginning of the course or does not show for the course, the complete course fee will be charged. Replacement of a participant within the company’s staff is accepted at any time without cost.

In the event of cancellation / no show of the participant, if we are charged for hotel services which have not been used, we shall reserve the right to pass on these charges to the participant.

## ***Certification***

As the Trainee passes the examination, an Upgrade KNX Certificate would be issued, which gives a good base to build a continued professional carrier in the field of Home & Office Automation.

Additionally the successful Trainee will have an extra mark in the partner database at [www.knx.org](http://www.knx.org) where it will be marked he has passed the exam for the Upgrade course.

## ***On Hand Tools***

Each user is provided with a laptop where the KNX software to be trained on is provided throughout the training period. These laptops contain all the examples to be used.

Each user is provided with a set of devices that are interconnected using the KNX bus showing the various devices. Those panels are for training purposes and could be purchased for further in-house tests.

## ***Manuals***

Each user is provided one set of hard copy of the documentation used during the training. This documentation is used at a later stage during design and implementation of KNS systems.

Hard copies of the presentation and exercises are joined to the manuals to allow taking notes.

## **Contact**

For More details about trainings and training information, please contact Mrs. Marina Beledian, [batc@batc.com.lb](mailto:batc@batc.com.lb) , Tel: +961 1 683770 x 103

## Synopsis Advanced Course

### ***Chapter I: Couplers***

1. Couplers
2. The TP1 Coupler
  - 2.1 Structure of the TP1 Coupler
  - 2.2 Connection of TP1 Couplers
  - 2.3 Parameters of Line and Backbone Couplers
  - 2.4 Parameters of Line Repeaters
  - 2.5 Routing
  - 2.6 Telegram Structure for Download of couplers
  - 2.7 Filter Table
3. Couplers for Powerline Installations
  - 3.1 Structure of the System Coupler
  - 3.2 Filter Table
  - 3.3 Parameters
  - 3.4 Commissioning of Devices
4. The IP Router
  - 4.1 IP Router as Backbone Coupler
  - 4.2 IP Router as Line Coupler
  - 4.3 Use of the IP Router as Line and Backbone Coupler
  - 4.4 IP Router as Backbone/Network Coupler
  - 4.5 Network Settings
  - 4.6 Parameters of the IP Router

### ***Chapter II: Fail-safe planning***

1. General
2. Software Measures
  - 2.1 Cyclical Telegrams for Monitoring
  - 2.2 Priority of a Telegram
  - 2.3 Behaviour after Bus Voltage Recovery
3. Hardware Measures for a Safe KNX Installation
  - 3.1 Distributed System with Controllers
  - 3.2 Logic Modules and Visualisation in Connection with Couplers
  - 3.3 Multi-channel Switch Actuators
  - 3.4 Benefits of Line Couplers
  - 3.5 Power Supply
  - 3.6 Power Supply in event of a Power Failure
4. Practical Example
  - 4.1 Cyclical Monitoring of 2 Lines using a Controller

## ***Chapter III: Flags***

1. Flags
  - 1.1 Setting the Flags
  - 1.2 The Communication Flag 'C'
  - 1.3 The Read Flag 'R'
  - 1.4 The Write Flag 'W'
  - 1.5 The Transmit Flag 'T'
  - 1.6 The Update Flag 'U'
  - 1.7 The Read on Init Flag

## ***Chapter IV: Heating***

1. General
  - 1.1 Foreword
  - 1.2 Planning the Heating System
  - 1.3 Function and Type of Heating Components
  - 1.4 Commissioning the Heating System
2. Integration of the Heating into the Building Management System
  - 2.1 Individual Room Control
  - 2.2 KNX Connection to Heating or Cooling Systems
3. Fan Coil
  - 3.1 Introduction
  - 3.2 KNX Integration

## ***Chapter V: Integrated Applications***

1. Integrated KNX Applications
  - 1.1 Introduction
  - 1.2 Scene control
  - 1.3 Logic Controller
  - 1.4 Open-loop or Closed-loop Brightness Control
  - 1.5 Heating – Ventilation – Air Conditioning
  - 1.6 Time and Event Control

## ***Chapter VI: Interworking***

1. Introduction
2. Advantages of Interworking
3. Principles of KNX Interworking
  - 3.1 Introduction
  - 3.2 Coding of Datapoint types
4. KNX common datapoint Types

- 4.1 Introduction
- 4.2 Boolean Data
- 4.3 1 Bit with priority control
- 4.4 3 Bit with Control
- 4.5 Character Set
- 4.6 8 Bit without Sign
- 4.7 8 Bit with Sign
- 4.8 2 Octet without Sign
- 4.9 2 Octet with Sign
- 4.10 2 Octet Floating Point Number
- 4.11 Time
- 4.12 Date
- 4.13 Date + Time
- 4.14 4 Octet without Sign
- 4.15 4 Octet with Sign
- 4.16 4 Octet Floating Point Number
- 4.17 Access Control
- 4.18 Character String
- 4.19 Scene Control
- 4.20 Common HVAC Datapoint types
- 4.21 Datapoint Types N8
- 5. Combination of DPTs into devices
  - 5.1 General
  - 5.2 Functional Block – Dimming Actuator Basic
  - 5.3 Functional Block – Sunblind Actuator Basic

## ***Chapter VII: Lighting Control***

- 1. General
- 2. Conventional Brightness Control: Sun shines – Light switches off
- 3. Principle
- 4. Constant Lighting Control
  - 4.1 Constant Lighting Control: Areas of Application, Objective
  - 4.2 Types of Closed-loop Control
  - 4.3 Usable Bus Devices
  - 4.4 Characteristics of Sensors and Actuators
  - 4.5 Parameterisation Notes, Flags, Possible Errors, Bus Load etc.
  - 4.6 Parameterisation Example
  - 4.7 Installation Notes
- 5. Brightness Control
  - 5.1 Areas of Application, Objective
  - 5.2 Types of Open-loop Lighting Control
  - 5.3 Usable Bus Devices
  - 5.4 Parameterisation Notes, Flags, Bus Load etc.

- 5.5 Parameterisation Example
- 5.6 Installation Notes
- 6. Brightness Control, combined with Master/Slave Control
  - 6.1 Objective
  - 6.2 Principle
  - 6.3 Available Devices
  - 6.4 Parameterisation Example
  - 6.5 Installation and Solution Notes
- 7. Appendix Tasks
  - 7.1 Task 1: Lighting – Control dependent on External Light
  - 7.2 Task 2: Lighting – Closed Loop Control Master-Slave with separate Actuator
  - 7.3 General hints for the calibration of lighting closed loop control

### ***Chapter VIII: Logic Operations***

- 1. Introduction
- 2. Logical Connection of Communication Objects
  - 2.1 Switch Actuator (Binary Output) with Logic Function
- 3. Logical Connection of Group Addresses
  - 3.1 Logic Module
- 4. Extensive Logical Connections of Group Addresses
  - 4.1 Application Unit (Example)
  - 4.2 Graphical Project Design in a Logic Diagram
- 5. Tasks
  - 5.1 Linking Actuator Objects
- 6. Logic Operations (Appendix)
  - 6.1 Basic Functions and Elements
  - 6.2 Compound Elements

### ***Chapter IX: Security Technology***

- 1. Basic Principles
  - 1.1 General
- 2. KNX and Intruder Alarm Technology
  - 2.1 General
  - 2.2 Installation and Topology
  - 2.3 Project Design
  - 2.4 KNX Devices
- 3. Terms
  - 3.1 Sensors
  - 3.2 Intruder Alarm Control Unit
  - 3.3 Alarm Signals
  - 3.4 Set Mode / Arming Device



- 3.5 Panic Alarms
- 3.6 Monitoring
- 3.7 Groups
- 4. Regulations / Sources
  - 4.1 VDE
  - 4.2 VdS Guidelines
  - 4.3 EN Norms
  - 4.4 Sources / Supplement

## ***Chapter X: Supplementary Tools***

- 1. Supplementary Tools for ETS 3
  - 1.1 Introduction
  - 1.2 Overview of ETS 3 Supplementary Tools
  - 1.3 Software Protection for Supplementary Tools
- 2. Reconstruction
  - 2.1 Performance characteristics
  - 2.2 Limitations
  - 2.3 Reading the Installation
  - 2.4 Reconstruct
- 3. Macros
  - 3.1 Assign Group Address Globally
  - 3.2 Export Group List
  - 3.3 Import Group List
  - 3.4 Delete Unused Group Addresses
  - 3.5 Change Object Flags
  - 3.6 Change Parameters
  - 3.7 Replace Product
  - 3.8 Import Device List
  - 3.9 Export Device List
  - 3.10 Fill Visualisation Dummy
  - 3.11 Macro Editor
- 4. Design
  - 4.1 Documentation
  - 4.2 Graphical project design

## ***Chapter XI: Visualisation Systems***

- 1. Visualisation systems
  - 1.1 General
  - 1.2 Requirements for a Central Display
  - 1.3 Terms
  - 1.4 Transfer of the KNX Project Design Data

- 1.5 Notes for Recording the Status with the Visualisation
- 1.6 Notes for Starting the Visualisation
- 1.7 Connection of the Visualisation to the Bus System
- 1.8 Exporting project data: Support by ETS
- 1.9 Physical access point in the Bus System
- 1.10 Telegrams sent across Lines/Areas
- 1.11 Types of Bus Communication