

# **EIBA Handbook Series**

**Release 3.0**

## **Volume 1: Primer**

### **Part 1: Document Overview**

30.03.1999

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## 1. Foreword

The EIBA Handbook is intended to help any EIBA member to develop, manufacture and technically support EIB compatible products. As such, it will be a useful manual for all people involved in this task within every EIBA Member company or company having concluded an EIB Trademark Licence Agreement.

The Handbook Series Release 3.0 introduce a new layout that is intended for a better readability and ease of use by the different skills involved in product development.

Another main goal is to clearly separate contents dedicated to support the product development and those setting both the detailed specifications and the requirements which apply for EIB conformity.

To reach this aim, the **EIBA Handbook Series** is divided into **Volumes** that can be distributed to different organisations or departments within a company.

These are then structured into **Parts**, and **Chapters**.

Please refer also to the graphical overview below.

A cross reference table is given in the next pages to this foreword.

### 1.1 How to Use this Handbook

This handbook is structured in **Volumes**, **Parts** and **Chapters**. These are indicated as « Chapter V/P/C ». « Chapter 3/5/2 » for example means Volume 3, Part 5, Chapter 2. This information is found on the bottom of every page and below numbered figures.

Below a global overview of the **Parts** of the Handbook is given, together with a more detailed table of contents that lists up to heading level 1 paragraph of every **Chapter**. A Chapter is always closed with an table of contents that lists up to 3 heading levels.

### 1.2 Commercial in Confidence

These EIBA Handbook Series are communicated to all EIBA Members and Licencees for their exclusive use. These parties are committed to treat its contents confidentially, and may not communicate its contents in full or in part to third parties other than to subcontractors under condition of a non-disclosure agreement.

### **1.3 Copyright**

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### **1.4 Disclaimer**

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## 2. Overview of Volumes and Parts

**Volume 1: Primer** gives a general overview of the whole EIB system and philosophy, and will be useful to all people like product managers, developers, quality people, ... wanting to have a basic knowledge of the system. It is also a first step to a better understanding of the EIBA Handbook Series.

**Volume 2: Guide for Development** is the basis for the knowledge needed for development of products based on the EIB technology. It will lead technical people to a sufficiently detailed know-how of this technology in order to develop products in this environment.

**Part 2/1: Cookbook** is intended to be a tutorial for the hardware and software development. Its structure makes it easy to read, giving the basics of the EIB unique features, illustrated by practical examples. The EIB System Introduction introduces the main concepts and tools supported by this technology. It is followed by the description and tutorial for the different hardware and software implementations on different communication media.

**Part 2/2: Software Tools** will introduce to the various software environments available on different computer platforms to support the management of complete EIB installations. It will enable making a proper use of the standard software packages and customizing them to your own company use.

This part is not available yet. Please refer to the EIB Tool Software (ETS2) documentation.

**Part 2/3: Data Sheets** gives an overview of the main features of the now available components enabling product development. The Data Sheets included is a collection of those supplied by the manufacturers. They include only EIB certified components or products, and the information is given under the responsibility of each manufacturer.

**Volume 3: System Specifications** is the whole specification for EIB complying products and components. It will be used as a reference for hardware and software development of products. As such you need only to refer to the corresponding parts relevant for your development, taking advantage of the features provided by the components of your system supplier. It enables also the complete development of products implementing the EIB technology.

**Part 3/1: Architecture** outlines and interconnects the communication stack, the application environment and management features which are described in the next parts.

**Part 3/2: Communication Media** specifies referring to the OSI-model the Physical Layer and Link Layer for each communication medium for which the EIB-system has been implemented.

**Part 3/3: Communication** bases on the OSI model for communication to give the requirements for the implementation of an EIB compliant communication stack from Network Layer upwards.

**Part 3/4: Application Environment** defines the EIB specific environment on top of the communication stack for application development.

**Part 3/5: Management** draws the specifications for management server features in the devices and management client features in controllers and tools.

**Part 3/6: Standardized Interfaces** gives the standardized environment in which the application programs reside: the routines provided by Application Programmer's Interface and the hard- and software features of the Physical External Interface.

**Part 3/7: Interworking** defines the rules to be followed to build devices and applications able to interwork with other manufacturer's products within the world of EIB certified products.

### **Part 3/8: Control and Management System**

This part describes the standardized architecture and components which are implemented for the use of the EIB-system in systems for home- and building control and management other than the run-time interworking.

**Part 3/9: EIB.net** contains the specifications for porting EIB-messages on Ethernet.

**Volume 4: Hardware Specifications and Tests** provides you with the constructional requirements for EIB devices, dealing mainly with Electrical, Functional, Environmental Conditions and Quality features needed to comply with the EIB design quality level.

**Part 4/1 Safety and Environmental Requirements for Application Products** lays down hardware requirements to be met for EIB certification by application products. The requirements are based on European standardisation and fix the obligatory use for hardware certification of the European family standard for Home and Building Electronic Systems EN 50090-2-2 in conjunction with an appropriate product standard.

**Part 4/2 Safety and Environmental Requirements for Basic and System Components** lays down hardware requirements to be met for EIB certification by basic and system components/devices. As for such devices an appropriate product standard is not available, explicit requirements as regards EMC and environmental conditions are given in this handbook part, which have to be complied with for EIB certification. These requirements are in some cases higher than the European family standard for Home and Building Electronic Systems EN 50090-2-2.

**Part 4/3 Safety and Environmental Requirements EMC Test Setup** is intended as a further elucidation of the EN 50090-2-2 and a support for manufacturers while testing compliance of bus products to the EMC requirements of part 2 and 3'

**Part 4/4 EIB Specific Requirements for Application Products and Basic and System Components and Devices**

lists additional requirements and/or recommendations for application products as well as basic and system components, other than those specified in Part 1 or 2. The requirements relate to such aspects as quality management system, useful life, power consumption, reliability/failure rates and material recycling.

**Part 4/5 Installation Safety Requirements** lays down requirements which have to be taken into account when installing a (Twisted Pair) bus system and covers such aspects as the use of protective impedances, the use of the second pair of the TP cable, overvoltage protection, installation in special locations,...

**Part 4/6 Assessment and Test of Electrical Safety** is intended to support the manufacturer while assessing the compliance of developed bus products to electrical safety requirements. This handbook part amongst others provides a test report form for electrical safety and guidelines for execution of the high voltage tests.

**Volume 5 Certification** will define the necessary requirements, steps, and procedures to obtain from EIBA the granting of the EIB marking for products or services. It will be particularly useful for people in charge for obtaining the EIB mark.

**Volume 6 Standardized Profiles and Tests**

Each profile defines a set of minimum requirements for each of the system specifications categories (Medium Dependent Layers, Medium Independent Layers, Application Environment, Network Management, Application Interfaces, ...).

**Volume 7 Application Descriptions**

This Volume describes extra information to the Application Domains in which the EIB-products are used.

**Volume 8: System Conformance Tests****8/1 Introduction**

In this section the software requirements for the various types of EIB devices are explained via a classification of EIB products in EIB test classes. On the basis of this chapter, a manufacturer as well as an EIB accredited test lab will be able to assess in which case his respectively the submitted product must undergo which kind of tests. In other words this section explains the extend of testing required for each EIB product class.

**8/2 Medium Dependent Layers Tests** contains test specifications for the media on which the EIB protocol has been implemented. These test specifications are especially related to the various physical layer implementations and their respective Link Layer Medium Access Units.

**8/3 Medium Independent Layer Tests** contains test specifications for the EIB protocol stack layers, i.e. for those independent of a physical layer implementation. These test specifications especially relate to the EIB Link Layer, Transport Layer, Network Layer and Application Layer.

**8/4 Application Environment Tests** contains test specifications for the User Layer.

**8/5 Network Management Tests** contains test specifications for the defined Management Services of BCU and Line coupler.

**8/6 Application Interfaces Tests** contains test specifications for the defined EIB Application Programmer's Interface and External Message Interfaces.

**8/7 Interworking Tests** contains test specifications for the defined EIB Interworking Standards and also for non-EIS objects.

## **Volume 9 Standardized Components and Devices and Tests**

**9/1 Cables and Connectors** describes the requirements and tests for certification of standardised and non-standardised EIB connectors (a.o. the RS232 connector, the PEI connector, the BCU connector, the contact block and data rail, ...), the EIB Twisted Pair cable and the overvoltage protector.

**9/2 Basic Components** contains the requirements and tests for certification of standardised and non-standardised EIB TP power supply unit, TP choke, PL Phase coupler and PL filter.

**9/3 Couplers** includes requirements and tests for certification of standardised EIB RS232 interfaces and EIB TP Line coupler/repeater. Scheduled for inclusion is also a description of the EIB TP Appliance Interface, the PL Repeater and the Media Coupler.

**9/4 BCU's and BIM's** is under preparation and will contain the requirements and tests for all currently available and standardised Bus Coupling units and Bus Interface Modules (in their various mechanical constructions).

**9/5 Transceivers** is under preparation and will contain requirements and tests for standardised EIB transceivers (such as the TP-UART).

**9/6 Standardized Libraries** is under preparation. It is planned that it will contain a description of the standardised software libraries as offered by EIBA (e.g. Falcon for bus access and Eagle for database access).



### 3. Cross Reference Table Release 3.0 to Version 2.21

| Convergence Structure<br>= Structure HB 3.0 V1.0    |  | HB 3.0<br>Pre-Release 1 | HB 2.21                 |
|---|--|-------------------------|-------------------------|
| Vol 1 Primer  |  |                         |                         |
| 1/x   | Primer   | 1                       | 1                       |
| Vol 2 Guide for Development                         |  |                         |                         |
| 2/1   | Cookbook   | 2/1                     | ---                     |
| 2/2   | Software Tools   | 2/2                     | 11                      |
| 2/3   | Data Sheets  | 2/3                     | ---                     |
| Vol 3 System Specifications                         |  |                         |                         |
| 3/1   | Architecture   | ----                    | Annex B(Glossary        |
| 3/2   | Communication Media  | 3/1                     | 8.1, 8.2                |
| 3/3   | Communication  | 3/1                     | 8.3-8.5                 |
| 3/4   | Application Environment  | 3/2/1                   | ----                    |
| 3/5   | Management   | 3/2/2                   | 8.6                     |
| 3/6   | Standardized Interfaces  | 3/2/3 ; 3/3             | 3.4 (PEI)               |
| 3/7   | Interworking   | 3/4                     | 4                       |
| 3/8   | Control and Management System  | ----                    | ---                     |
| 3/9   | EIB.net  | ----                    | ---                     |
| Vol 4 Hardware Specifications and Tests             |  |                         |                         |
| 4/1   | Safety and Environmental Requirements for Application Products                                 | 4/1                     | 5.1, 5.2, 6, 7          |
| 4/2   | Safety and Environmental Requirements for Basic and System Components                          | 4/2                     | 5.1, 5.2, 5.4, 5.5 6, 7 |
| 4/3   | Safety and Environmental Requirements EMC Test Setup   | 4/3                     | 7.3                     |
| 4/4   | EIB Specific Requirements for Application Products and Basic and System Components and Devices | 4/4                     | 9, 3.8                  |
| 4/5   | Installation Safety Requirements   | 4/5                     | 5.3                     |
| Vol 5 Certification                                 |  |                         |                         |
| 5   | Certification  | 5                       | 10                      |
| Vol 6 Standardized Profiles and Tests               |  |                         |                         |
| 6   | Standardized Profiles and Tests  | ----                    | 8.8, 10.6               |
| Vol 7 Application Descriptions                      |  |                         |                         |
| 7   | Application Descriptions   | ----                    | ---                     |
| Vol 8 System Conformance Tests                      |  |                         |                         |
| 8/2   | Medium Dependent Layers Tests  | 3/6                     | 8.8                     |
| 8/7   | Interworking Tests   |                         | 10.6                    |
| Vol 9 Standardized Components and Devices and Tests |  |                         |                         |
| 9/1   | Cables and Connectors  | 3/5                     | 2, 3.5-3.7              |
| 9/2   | Basic Components   |                         |                         |
| 9/3   | Couplers   |                         |                         |
| 9/4   | BCU's and BIM's  |                         | 3.1-3.3                 |
| 9/5   | Transceivers   | ----                    | ---                     |
| 9/6   | Standardized Libraries   | ----                    | ---                     |

## 4. Cross reference Table Version 2.21 to Release 3.0

| Handbook Version 2.21  | Handbook Series Release 3.0  | Comments                    |
|--|--|-----------------------------|
| Chapter  | V/P/C: Title   |                             |
| Chapter 1: Installation Bus Primer                                       | 1: Primer  | Same contents               |
| Chapter 2: Basic & System Components                                     | 9: Standardized Components and Devices and Tests                               |                             |
| Chapter 3: Bus Coupling Unit and Bus Interface Modules                   | 9/4: BCU's and BIM's   | For requirements            |
|  | 2/1: Cookbook  | For tutorial aspects        |
| Chapter 4: Interworking  | 3/7: Interworking  | HB 2.21+ including Appnotes |
| Chapter 5: Electrical Safety Requirements for Installation and Equipment | 4: Hardware Specifications and Tests   |                             |
| Chapter 6: Functional Safety   | 4: Hardware Specifications and Tests   |                             |
| Chapter 7: Environmental Conditions                                      | 4: Hardware Specifications and Tests   |                             |
| Chapter 8: System Communication Specification                            | 3/2: Communication Media<br>3/3: Communication<br>3/4: Application Environment | Improved specification      |
| Chapter 9: Quality   | 4: Hardware Specifications and Tests   |                             |
| Chapter 10: Conformity Assessment: the EIB Certification System          | 5: Certification   |                             |

## 5. EIBA Handbook Series – Release 3.0, Overview

### 5.1 Graphical Representation

|  |                                       |  |                                 |  |   |   |
|--|---------------------------------------|--|---------------------------------|--|---|---|
| <b>Volume 1</b><br>Primer                            | <b>Part 1</b><br>Document Overview    | <b>Part 2</b><br>Introduction to the System    | <b>Part 1</b><br>Glossary       | <b>Appendices</b>                        |   |   |
| <b>Volume 2</b><br>Guide for Development             | <b>Part 1</b><br>Cookbook             | <b>Part 2</b><br>Software Tools                | <b>Part 3</b><br>Data Sheets    |  |   |   |
| <b>Volume 3</b><br>System Specifications             | <b>Part 1</b><br>Architecture         | <b>Part 2</b><br>Communication Media           | <b>Part 3</b><br>Communication  | <b>Part 4</b><br>Application Environment | <b>Part 5</b><br>Management                       | <b>Part 6</b><br>Standardized Interfaces                  |
|  | <b>Part 7</b><br>Interworking         | <b>Part 8</b><br>Control and Management System | <b>Part 9</b><br>EIB.net        |  |   |   |
| <b>Volume 4</b><br>Hardware Specifications and Tests | <b>Part 1</b><br>Application Products | <b>Part 2</b><br>Basic And System Components   | <b>Part 3</b><br>EMC Test Setup | <b>Part 4</b><br>Specific Requirements   | <b>Part 5</b><br>Installation Safety Requirements | <b>Part 6</b><br>Assessment and Test of Electrical Safety |
| <b>Volume 5</b><br>Certification                     |                                       |  |                                 |  |   |   |
| <b>Volume 6</b><br>Standardized Profiles and Tests   |                                       |  |                                 |  |   |   |
| <b>Volume 7</b><br>Application Descriptions          |                                       |  |                                 |  |   |   |

|   |   |  |   |  |   |  |
|---|---|--|---|--|---|--|
| <b>Volume 8</b><br>System<br>Conformance<br>Tests                         | <b>Part 1</b><br>Introduction             | <b>Part 2</b><br>Medium<br>Dependent<br>Layers Tests | <b>Part 3</b><br>Medium<br>Independent<br>Layer Tests | <b>Part 4</b><br>Application<br>Environment<br>Tests | <b>Part 5</b><br>Network<br>Management<br>Tests | <b>Part 6</b><br>Application<br>Interfaces Tests |
|   | <b>Part 7</b><br>Interworking<br>Tests    |  |   |  |   |  |
| <b>Volume 9</b><br>Standardized<br>Components<br>and Devices<br>and Tests | <b>Part 1</b><br>Cables and<br>Connectors | <b>Part 2</b><br>Basic<br>Components                 | <b>Part 3</b><br>Couplers                             | <b>Part 4</b><br>BCU's and<br>BIM's                  | <b>Part 5</b><br>Transceivers                   | <b>Part 6</b><br>Standardized<br>Libraries       |

## 5.2 General Table of Contents

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2. Overview of Volume 1: Primer

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  - 1.2 The Media
  - 1.3 Data Exchange & Interworking
  - 1.4 The EIB Protocol
  - 1.5 The EIB Components
  - 1.6 The EIB Installation Software
  - 1.7 An EIB-Based Lighting Control System
2. EIB: Developer's View
  - 2.1 Preface
  - 2.2 Network Topology
  - 2.3 Media
  - 2.4 The EIB OSI Communication Protocol
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3. Mini-Licensees
4. Royalty-Per-Unit-Licensees
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  - 2.3 System

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## **Part 2/2: Software Tools**

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  - 2.5 State Machine of Layer-3 for Bridges
  - 2.6 State Machine of Layer-3 for Routers

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  - 1.2 One-to-All Connection-less (Broadcast) Communication Relationship
  - 1.3 One-to-One Connection-less Communication Relationship
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- 3. Transport Layer Services
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  - 5.5 Information Server about the Manufacturer of the External User Application
  - 5.6 Mask Version and Mask Type Server
  - 5.7 BAU Restart Server
  - 5.8 Property Server
  - 5.9 Service Information Server
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