

EIBA Handbook Series

Release 3.0

Volume 1: Primer

Part 3: Glossary

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1. Glossary

Words in *italic* are items of this glossary. For abbreviations, please refer to “2. List of abbreviations”. For some abbreviations, further explanation is given in this glossary. The wording is then written in full.

ACCESS

 *Bus Access*

ACCESS CONTROL

 *Bus Access*

ACKNOWLEDGMENT / ACKNOWLEDGE (ACK)

Short telegram sent back after reception of a preceding telegram (by all addressed devices) of the preceding telegram indicating correctness or not of the preceding telegram.

ACTUATOR

EIB Bus Device in the system that receives and processes *Data packets*. These data packets are then converted into application-related (mechanical) actions.

Examples: - Load switches
- Monitor activators

ADDRESS

Number or name used for identifying members in a communication or an installation.

+ *Destination Address - Group Address - Physical Address - Source Address*

ADDRESS FIELD

Part of a telegram or message, containing address information like source or destination address.

ADDRESSING

Facility for giving *Addresses* to *EIB Bus Devices* for specific exchange of information.

ANALOG

Indication that the range of possible values for a given is continuous and not limited to a discrete number. It is the opposite of *Digital*

APPLICATION CONTROLLER

Control device connected to the bus for application of logic operations and sequences.

Not required for simple applications.

APPLICATION MODULE

Possible hardware part of an *EIB Bus Device*, specific for some application, which forms a user interface or other physical input/output.

AREA

The Area is a part of the Logical *Topology* of an EIB Network. It is composed of a Main Line and the connected Lines, with all connected devices.

The Area number is encoded in the uppermost part of the physical address of the device.

ASYNCHRONOUS TRANSMISSION

Type of data transmission without synchronization between the clocks for bit transmission and reception in the *Transmitter* and the *Receiver*. The clocks run independently at a predefined frequency.

Typically, an octet to be transmitted is preceded by a start bit and followed by one or more stop bits.

☞ *Synchronous Transmission*

BACKBONE BUS

Higher order *Bus* used e.g. for connecting several sub-busses. Can be designed in the same way as a sub-bus or be capable of considerably more performance.

BACKBONE COUPLER (BBC)

Special coupler for connecting an EIB network with a backbone line.

BACKBONE LINE

The hierarchically highest *Logical Segment* in the Logical *Topology* of an EIB network.

BASEBAND TRANSMISSION

Signal transmission without carrier frequency. Takes up the entire bandwidth of the transmission medium.

BASIC COMPONENT

A device in an installation which is application independent and provides systems relevant basic means.

Examples: Power Supply Unit, Choke, Filter, etc.

BAUD RATE

A measure of signaling speed in digital communication circuits (DIN 44302). The speed in baud is equal to the number of discrete conditions or meaningful signal events per second (Baud = 1/sec). Also referred to as modulation rate. If one binary character is transmitted per second, the baud rate is equal to the bit rate.

BI-DIRECTIONAL

Indication for a communication mechanism that allows simultaneous communication in two directions between a sender and a receiver. It is the opposite of unidirectional.

BINARY VALUE

☞ *BCD*

BIT

Coined from "binary digit". Smallest information unit; can have the value 0 or 1.

BIT ERROR

Corruption of a binary signal element in transmission.

Example: in EIB TP corruption of "0" into "1" or vice-versa

BIT RATE

Number of bits transmitted in a given unit of time. Measured in bps (bits per second) or kbps.

For the EIB *Building management* system:

◇ on Twisted Pair: 9.6 kbps

◇ on Powerline: 2.4 kbps

☞ *Baud Rate - Transmission Rate*

BRIDGE

A functional unit that interconnects two local area networks that use the same logical link control protocol but may use different medium access control protocols.

(Conform ISO/IEC 2382-25: 1992)

A bridge connects a physical segment with another physical segment. A bridge does not have a physical address. A bridge acknowledges layer-2 services and transmits layer-2 request frames to the other side.

☞ *Gateway, Router*

BUILDING MANAGEMENT SYSTEM

Networking of components via an installation bus to form a system matched to the electrical installations, which assures functions and process-sequences in a building. The intelligence is distributed among the components; information is normally exchanged directly between the network components.

BUS

A local area network in which there is only one path between any two data stations and in which data transmitted by any station are available to all other stations connected to the same transmission medium.

BUS ACCESS

Process whereby each individual *EIB Bus Device* gains entry to the *Bus* for the exchange of information (not physical, purely organizational).

BUS ACCESS CONTROL

☞ *Carrier Sense Multiple Access, Collision Avoidance*

BUS ACCESS UNIT (BAU)

Generic term indicating every device that forms an interface to the bus, at least implementing the Physical Layer and Data Link Layer, to which an application (software and/or hardware) may connect for realizing *Building management system* functions.

BUS CABLE

EIB standardized cable for wiring *Twisted Pair* media EIB networks.

BUS COUPLING UNIT (BCU)

Standardized Bus Access Unit for each individual *EIB Bus Device*. The bus coupling units form the physical and electrical coupling between the *EIB Bus Device* and the *Bus*. They convert the bus signals so that they can be processed by the series-connected electronic circuits in the *EIB Bus Devices*.

BUS DEVICE

☞ *EIB Bus Device*

BUS DEVICE UNDER TEST

General term used to indicate a device submitted to EIB software or hardware conformity tests.

BUS LINE

 *Line*

BUS ORGANIZATION

 *Centralized System - Decentralized System*

BUS SYSTEM

System with one or more transmission media, on which information is exchanged between the *EIB Bus Devices* connected to it.

 *Bus*

BUS TRAFFIC LOAD

A measure of the time-related loading of the *Line* with telegrams.

BYTE

Unit consisting of 8 *Bits*. Also referred to as *Octet*.

CARRIER SENSE MULTIPLE ACCESS, COLLISION AVOIDANCE (CSMA/CA)

Bus Access mechanism, as implemented for on the EIB Twisted Pair medium. Each EIB bus device scans the Bus and gains access only when it has detected that no more data traffic is running on the Bus. In the transmission of a message there is a simultaneous listening process to establish whether possibly a further EIB bus device has started transmitting at the same time. That EIB Bus Device who is the first to detect that its message has been corrupted immediately withdraws. The other message can thus be transmitted uncorrupted to its Destination Address. After a wait time, the interrupted EIB Bus Device transmits its Telegram again.

CENTRALIZED SYSTEM

A system in which the entire flow of information is handled by a *Controller*

CHARACTER

A character consists of an octet, preceded by a start bit and followed by a stop bit, transmitted on the physical medium via some modulation mechanism. Octets inside a character are transmitted LSB first.

 *Octet*

CHECKSUM

Additional data within a telegram, in order to be able to detect any transmission error.

CODING

Representation of information in form comprehensible to the system, e.g. in the *Building management* system.

COLLISION

The event where two or more devices have simultaneously transmitted data on the communication medium, leading to distortion of the signals of at least one device and corruption of the message. EIB TP avoids collisions.

☞ *Carrier Sense Multiple Access, Collision Avoidance*

COMMAND

Information contained in the telegram, required, e.g. to trigger an actuator.

Examples: ON/OFF, UP/DOWN, COLD/WARM, DIM.

However, runtime EIB communication is value-oriented rather than command-oriented. The precise meaning (semantics) of a value is determined only when designing a project by the combination of Group Address assignments and parameter settings for individual devices. This allows tremendous flexibility when combining devices in an installation.

COMMUNICATION OBJECT

Also Group Communication Object or Group Object.

Memory space used as “mail box” for sending and receiving *Messages*.

A Communication Object is actually a local instance of an EIB *Shared Variable*, which is addressed via a multicast Group Address. Each Communication Object can be bi-directional (read/write) and allows an EIB device to send an unsolicited group telegram (to update the corresponding *Shared Variable*).

At Application Layer, the abstract representation of a Communication Object is a Service Access Point. Via the Association Table, the EIB Transport Layer maps Group Addresses (actually *cr_id*'s) to SAP's 1-to-1 for sending, and 1-to-n for receiving. This allows overlapping Group Addresses.

☞ *Group Address, , Communication Relationship Identifier*

COMMUNICATION RELATIONSHIP IDENTIFIER (CR_ID)

Abstract internal representation of a communication relationship in an EIB network, used by the EIB communication stack from transport layer upwards.

For example, the EIB Group Transport Layer maps a Group Address to a *cr_id*.

COMPATIBILITY

In the *Building management* system, the working together of various devices and systems from various manufacturers via one bus.

☞ Interworking, Interoperability

CONNECTOR

Coupling device employed to connect the medium of one circuit or communication element with that of another circuit or communication.

CONTROL FIELD

Single character field transmitted as first field in an EIB telegram containing the telegram priority and the repetition indication.

CONTROLLER

Central unit in a system that receives, monitors, sorts and handles the flow of information. Not essential in the *Building management* system, as generally the EIB bus devices can perform these tasks.

☞ *Application Controller*

COUPLER

☞ *Backbone coupler - Bus Access Unit - Bus Coupling Unit - Line coupler - Repeater*

DATA

In general, all information exchanged via a transmission route. A term used in the building management system for the net information as component of a *Telegram*.

Examples: YES/NO, ON/OFF, values corresponding to brightness, temperature, degree of dimming, etc.

DATA FIELD

Part of the EIB Telegram containing the transmitted data, as set by the Application Layer, formatted according to the EIB Interworking Standards.

DATA INTERFACE

☞ *EIB Data Interface*

DATA PACKET

A bit sequence which contains all details for transmission of information from one *EIB Bus Device* to one or more other devices. It can be structured for example as follows:

1. priorities
2. destination address
3. source address
4. commands
5. data
6. acknowledgment
7. checksum

DATA RAIL

In the EIB TP implementation a printed circuit board for the *Bus* with 2 conductors for the *Data* including power supply and 2 conductors for additional power supply. With a data rail mounted in a *DIN Rail*, one can snap DIN Rail mounted *EIB Bus Devices* on the DIN rail.

DECENTRALIZED SYSTEM

A system which does not require a higher-order controller. In such a system the bus devices control e.g. the information exchange process or the *Bus Access* themselves.

DESTINATION ADDRESS

The address field containing the information indicating to which device(s) the message or telegram is sent.

The destination address can be a group address, a physical address or a polling address. Broadcast transmission uses destination address 0.

DEVICE

Physical entity which is either a *Router* or an *EIB end device*. A device has a unique physical address. A device is composed of at least one communication and

- either at least one internal application together with an interface to the physical world around the device
- or only an interface to at least one external application, which itself contains the interface to the physical world around the device

or both: one or more internal applications and an interface to one or more external applications.

DIGITAL

Indication that the range of possible values for some given is limited to a number of discrete possibilities mostly equally spread. It is opposite of *Analog*.

DIN RAIL

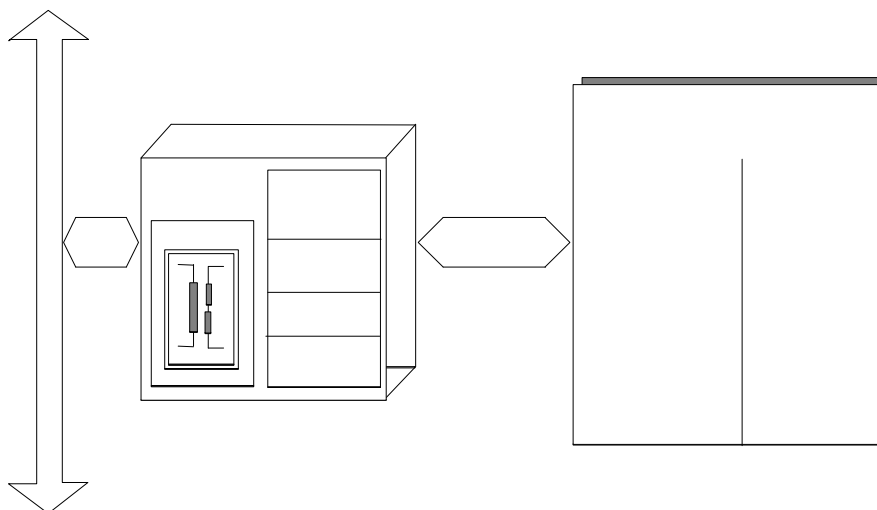
Rail to DIN EN 50 022, onto which appropriately designed DIN rail-mounted devices can be snapped if a *Data rail* is mounted in it.

EIB APPLICATION

Software or hardware that uses the *EIB communication*.

EIB BUS DEVICE

Product built up from two parts: the *Bus Access Unit* and the *Application Module*.



The application module may also contain/consist of a second processor.

EIB COMMUNICATION

That part of an *EIB Bus Device* that communicates with other EIB devices via the EIB bus. EIB communication is part of the device.

EIB DATA INTERFACE (EDI)

EDI 1 is based on V.28 with some modifications.

EDI 2 is based on EIA-562 with some modifications.

EIB END DEVICE (EED)

This is a device with a unique physical address, which performs an application in a lighting, heating, ventilating and air conditioning or related *Building management system* environment.

EIB INTERWORKING TEST TOOL (EITT)

The EIB Interworking Test Tool is a tool especially intended for development and EIB test lab engineers to verify the compliance of the implemented communication objects to the EIS standards and or proprietary non-EIS as well as verification of the management services supported by a bus device (if applicable). The tool will be extended to cater for the testing of the entire EIB communication stack in the near future.

EIB INTERWORKING STANDARD (EIS)

A number of data formats, which have been standardised for a number of functions inside EIBA. Some of these format descriptions also include semantics and others additionally also include state machines. The latter are currently denominated as Object Interworking Standards (ObIS). EIS formats are obligatory for Communication objects realising a function as described in the EIS. For functions for which an appropriate EIS has not yet been defined, a non-EIS may be used by the manufacturer (subject to approval of the Certification Department/EG 3.12 Interworking).

EIB NETWORK

All of the EIB media, connectors, and associated communication elements by which a given set of communicating EIB devices is interconnected. An EIB system consists of at least one physical segment.

ELECTRICAL SEGMENT

Electrical Segments are defined for wire media. An Electrical Segment is a part of a logical segment that is electrically uninterrupted. If in an Electrical Segment the medium is short-circuited, no communication is possible in that Electrical Segment.

For EIB TP, the electrical segment is composed of a twisted pair cable (max. 1000m) with, depending on the used BAUs a maximum of 64 or 256 *EIB Bus Devices* connected to it. Every electrical segment has at least one own *Power Supply Unit* and choke.

ELECTRICALLY ERASABLE PROM (EEPROM)

Memory component, mostly used in digital electronic equipment, that can not be written at run-time (Read Only Memory). Dedicated equipment may in an electrical way erase the component's contents and reprogram it.

ELECTROMAGNETIC COMPATIBILITY (EMC)

Systems must be designed so that they do not disturb or interfere with each other. In the definition of the electromagnetic compatibility, the noise radiation and noise immunity must be taken into account.

ERROR DETECTION

Process for detecting transmission faults, e.g. using a *Parity Bit* or a *Checksum-byte*.

EIB TOOL SOFTWARE (ETS)

The unique commercial software tool suite allowing the design, commissioning and test of EIB devices in a manufacturer independent way, manufactured under control of the EIBA System Department.

EIB TOOL ENVIRONMENT (ETE)

An architecture providing libraries, drivers and components for local- and remote access to the EIB media, the product- and project database and Graphical User Interfaces (GUI). The ETE implementation is commercially available for 3rd party use, in various information technologies. The ETE is designed under control of the EIBA System Department.

FAN IN

Standardized value of input current, initially defined at will.

FAN OUT

Indicates how many inputs can be forced by one output.

Example : Fan out = 8 can force 8 outputs with fan in = 1
or 4 outputs with fan in = 2

FAST POLLING

A communication mode, unique for Twisted Pair, that allows a Polling Master to retrieve in one single *Telegram* a single byte from up to 14 Polling Slaves.

FRAME

A set of consecutive frame characters with an inter-character gap of less than 2,5 bit times.

FRAME CHARACTER

A set of consecutive digit time slots in which the position of each digit time slot can be identified by reference to the edge of the character start bit.

FREQUENCY MULTIPLEX

Facility for simultaneous transmission of various information via one transmission medium with the aid of different carrier frequencies.

FUNCTIONAL EXTRA LOW VOLTAGE (FELV)

Grounded network without safe separation.

GATEWAY

Connection between *Bus Systems* with different *Transmission Rates* and/or different telegram format.

GROUP ADDRESS (GA)

A Group Address is a “run-time” logical link between individual *Communication Objects* of EIB devices in an installation. It is a multicast address, which means that any number of *Communication Objects* in the whole installation may be updated by a single group frame. The resulting flexibility is much greater than what can be achieved by merely grouping devices.

Group Addresses are assigned when a project (installation) is designed and commissioned. The *EIB Tool Software* (ETS) helps the project designer to assign and manage Group Addresses, which have a 16-bit numerical value. They are shown alternatively (but equivalently!) in a 2- or 3-level representation: <main group>/<subgroup> or <main group>/<middle group>/<sub group>.

More formally, a Group Address is the identifier of an EIB Shared Variable.

HANDSHAKE

Acknowledgment procedure in which the *Receiver* gives the *Transmitter* confirmation of readiness for dialog.

HOME AND BUILDING ELECTRONIC SYSTEMS (HBES)

Generic term in internal, European Standardization for different interconnected electronic systems in a home. An HBES consists of at least a medium with connected devices including the rules for exchange of information between the individual devices and the components connected externally (e.g. switches, luminaries etc.).

INSULATION

Physical and electrical arrangement of the parts of a signal transmission system to prevent electrical interference currents within or between the parts.

INTEGRATED SERVICES DIGITAL NETWORK (ISDN)

Fully digital public networks for voice and data communication. For ISDN a set of digital transmission protocols and services is defined. Full duplex simultaneous transmission is possible with high transmission quality for use over different media such as telephone wires.

INTERFACE

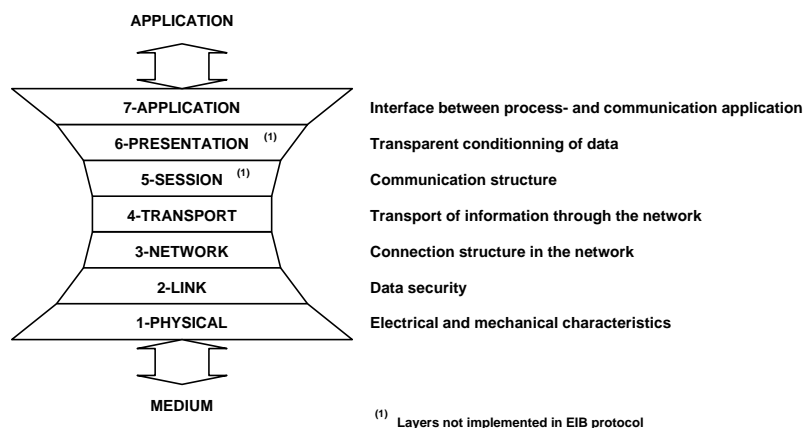
Mechanical (e.g. plug-type), electrical (e.g. pin assignment) and data-technical (e.g. protocol). Defined transition point between and within system components.

INTERFERENCE

☞ *Electromagnetic Compatibility*

ISO / OSI - REFERENCE MODEL

Model for structuring communications systems into various layers. It stipulates no conditions, but merely describes those conditions to be stipulated in the various layers, e.g.:



JABBER

A faulty devices continuously transmission on the medium.

LOCAL

Communication: denotes communication between devices on the same line.

LOGICAL SEGMENT

☞ *Line*

LINE

A line is the smallest segment in the logical *Topology* of a network. It may consist of 255 EIB end devices at maximum.

For EIB Twisted Pair:

At maximum 3 *Physical Segments* connected together by means of *Repeaters* may form a Line.

+ *Medium.*

LINE COUPLER (LC)

Device for connecting a *Line* with a *Main line*

MAIN LINE

The main line is a hierarchically higher logical segment allowing the interconnection of *Lines* by means of *Line couplers*.

☞ *Backbone line - Line - Logical Segment - Physical Segment*

MAINS SIGNALING

Transmission of information via the AC 230V network.

MASTER / SLAVE

In a master/slave system, a device (master) directs the function sequence in the exchange of information. All others (slaves) are dependent on it. In the bus system used in the *Building management system*, all *EIB Bus Device* are of equal status.

MEDIUM

Term for means of transmission along which communication signals flow.

Example: copper lines (twisted pair), infrared, radio (air), 230V mains, coaxial cable, optical fiber, etc.

MESSAGE

A message is an amount of data exchanged between two or more entities of a layer in the communication stack. Message-format and contents comply with the peer-to-peer protocol defined for the given layer.

MESSAGE CYCLE

An L_Data.req frame immediately followed by the short acknowledgment frame or a L_Poll_Data.req frame immediately followed by the L_Poll_Data.res frame build up a message cycle.

MODEM

Abbreviation for “MOdulator-DEModulator”.

A device that modulates the transmitted signal and demodulates the received signal at a data station.

MODULE

Functional unit.

MULTICAST (ADDRESSING)

Efficient one-to-many addressing, as used by EIB Group Addressing. A single multicast frame (or group telegram) can update the value of any number of *Communication Objects* of any number of devices in an EIB network. The central role of multicast addressing in EIB eliminates redundant communication and strongly reduces the need for bandwidth.

+ Group Address, Communication Object, Shared Variable

NEGATIVE ACKNOWLEDGMENT (NACK)

☞ *Acknowledgment / Acknowledge*

NETWORK

Generic term. A group of interconnected bus lines with *EIB end devices*, optionally with *Bridges* and *Routers*, that form the basis of a system control.

Examples: - 230 V mains
- Overland line network
- Data network
- Telephone network
- Radio network

NETWORK VARIABLE

☞ *Shared Variable*

NOISE IMMUNITY

☞ *Electromagnetic Compatibility*

NOISE RADIATION

☞ *Electromagnetic Compatibility*

NON-EIS

Data format used in a *Communication Object* that does not comply to an *EIB Interworking Standard*. Use allowed only after explicit approval of the EIBA Certification Department.

☞ *EIB Interworking Standard*

OBJECT

+ *Application Object - Communication Object - Constructed Object - Primitive Object*

OCTET

Unit consisting of 8 *Bits*

PARITY

☞ *Parity Bit*

PARITY BIT

Means for detecting faults in a data format.

Test bit appended to the end of a row of bits in order to make the cross-check sum of the bits odd or even.

PEER-TO-PEER

“Peer-to-peer” is a communications model in which each party has the same capabilities and either party can initiate a communication session. Other models with which it might be contrasted include the client/server model and the master/slave model.

PHYSICAL ADDRESS (PA)

The Physical Address is a unique identifier given to an *EIB Bus Device*, corresponding to its location in the logical *Topology*.

PHYSICAL EXTERNAL INTERFACE (PEI)

EIB standardized connection between the *Bus Access Unit* and the *Application Module* .

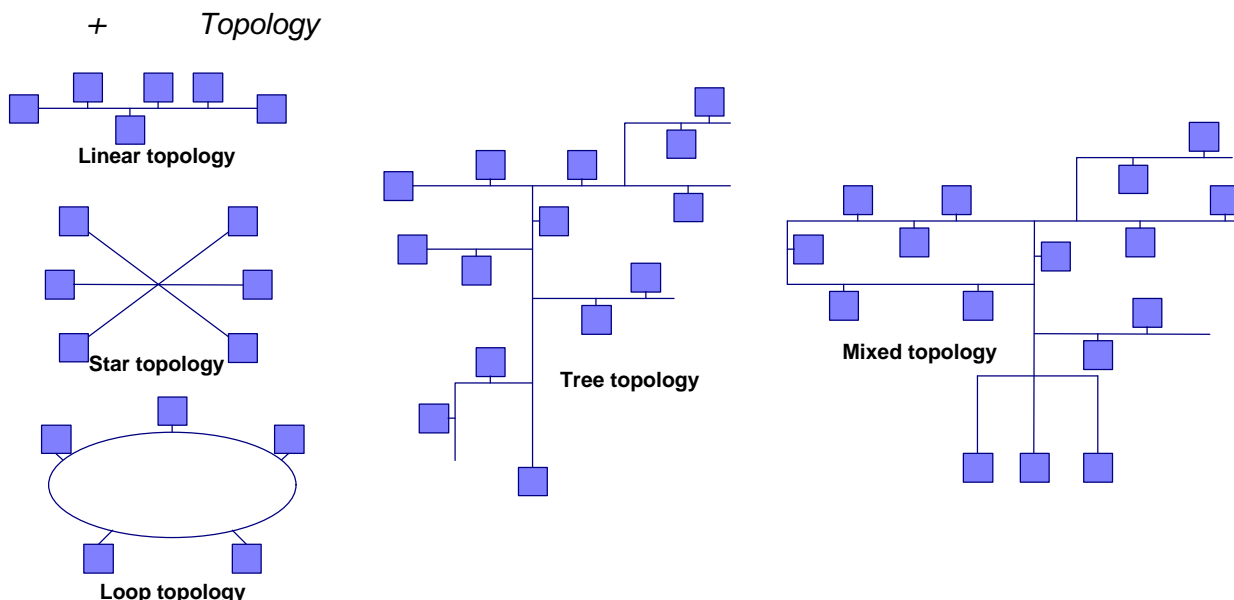
PHYSICAL SEGMENT

A physical segment is a number of *EIB end devices* connected to a bus cable.

☞ *Electrical Segment*

PHYSICAL TOPOLOGY

The physical topology describes the physical layout of a network. This is especially meaningful in networks with wire media, such as Twisted Pair or Power Line.



PROTOCOL IMPLEMENTATION CONFORMANCE STATEMENT (PICS)

A standardised written confirmation that a given protocol is supported in a given product (be it entirely, as a subset or in exceptional cases as a superset of the protocol).

PROTOCOL IMPLEMENTATION EXTRA INFORMATION FOR TESTING (PIXIT)

PIXIT is a standardised in-depth description of the way a given protocol (e.g. EIB) is implemented in a given product. The PIXIT shall be regarded as a further elaboration of the PICS to allow testing of a product submitted for certification.

PL-SIGNALING

Power Line Signaling

☞ *Mains Signaling*

POLLING

☞ *Fast Polling*

POWER SUPPLY UNIT (PSU)

A power supply is connected to a Twisted Pair *Physical Segment* to provide the DC-voltage required for the TP transmission and the necessary energy for devices that get their power from the network.

PRIORITY

The items of information occurring in a system are of different importance, e.g. the alarm "Fire" is undoubtedly more urgent than the signal "TV ON". This must be taken into account in the system. "Fire" has for example priority 1, and "TV ON" for example priority 10.

PROGRAMMING

This term is used in the *Building management system* for e.g.:

- ◇ Assignment of addresses
- ◇ Input of switching times
- ◇ Input of logic operations
- ◇ Definition of threshold values

PROTECTIVE EXTRA LOW VOLTAGE (PELV)

Grounded network with safety separation.

PROTOCOL

The *EIB Bus Devices* connected to the *Bus* must mutually exchange information in accordance with a prescribed order. A protocol must therefore be agreed on.

RANDOM ACCESS MEMORY (RAM)

Memory type for temporary data storage. Its contents can be read or written. Loss of data without voltage.

READ ONLY MEMORY (ROM)

Memory type whose contents can only be read. No loss of data without voltage.

REPEATER

Device that replenishes the signal level, thus extending the range over which signals can be correctly transmitted and received for a given medium. An EIB repeater connects two EIB segments to enlarge the physical signal range.

ROUTER

A router connects a line with another line. It has a unique physical address. A router acknowledges layer-2 services and transmits the layer-2 request frames to the other side, if the EIB end device associated with the destination address of the frame is located on the other side.

RS 232 - C

Designation of a standardized serial voltage interface. Alternative designation V.24.

SAFETY EXTRA LOW VOLTAGE (SELV)

Ungrounded network separated safe from other networks.

SENSOR

In the *Building management* system, term for an *EIB Bus Device* that takes up a physical value, converts it into electrical values, incorporates it in the form of data in a *Telegram* and transmits it to the *Bus*.

Examples : Temperature, brightness, humidity.

SHARED VARIABLE

A shared variable is a 1-14 byte value which is available on an EIB network and addressed (or actually identified) by a Group Address. A local copy (or instance) of such a variable in a device is called a Group (Communication) Object.

EIB provides a 16 bit group address space for shared variable identifiers. This means that even with the limitation of some implementations to 15 bits, there may still be 32k shared variables, each with any number of local instances.+ Group Address, CommObj

SHIELDING

Conductive protective coating enclosing for example the transmission medium. Shielding reduces *Electromagnetic Compatibility* problems.

SOURCE ADDRESS

The source address is the *Address* of that *EIB Bus Device* sending the telegram. It is always a physical address.

STATE MACHINE

Description of possible states of a process and resulting new states after defined actions. (This technical term was created by information specialists during the development of the mathematical theory of automation.)

SYNCHRONOUS TRANSMISSION

Type of data transmission for which the clocks for bit transmission and reception in the *Transmitter* and the *Receiver* are synchronized.

This can typically be realized by using an extra clock signal line, or by extraction of the clock signal from the received data signal, using synchronization character(s) or dedicated encoding.

 *Asynchronous Transmission*

SYSTEM DEVICE

EIB Devices that provide system relevant functions. They are absolutely necessary

Example: *Bus Access Unit, Line coupler, etc.*

TELEGRAM

A telegram is a sequence of characters, separated in time, which runs in the communication medium.

TOPOLOGY

Layout of the *Network*

The tree structure can be implemented with the least restrictions and involving the least planning regulations.

TRANSCEIVER

Combination of receiving and transmitting equipment in a common housing, employing common circuit components for both transmitting and receiving.

TRANSMISSION RATE

☞ *Bit Rate*

TRANSMISSION SECURITY

Total of the parameters defined in a transmission system, ensuring problem-free information transmission and thus the effective working of the system.

Examples: The organizations contained in the *telegram*, which contribute to secure transmission.

TWISTED PAIR (TP)

Twisted cores.

UNIVERSAL ASYNCHRONOUS RECEIVER TRANSMITTER (UART)

A circuit that converts parallel data, which are to be transmitted, into serial data and serially received data into parallel data.

2. List of abbreviations

AC	Alternating Current
ACK	Acknowledge
ADC	Analog to Digital Converter
ADREF	acknowledge data register empty flag
AM	Application Module
AP	Application Program
APC	Application Controller
ARBDIS	ARBitration DISable
ASCII	American Standard Code for Information Interchange
B	Bridge
BAU	Bus Access Unit
BbC	Backbone Coupler
BCD	Binary Coded Decimal
	Bus Connected Device
BCU	Bus Coupling Unit
BETDR	bit engine data register empty flag
bt	bit time
BW	BandWidth
CA	Collision Avoidance
CCITT	Comité Consultatif International Télégraphique et Téléphonique
CENELEC	Comité Européen de Coordination de Normalisation Electrotechnique
CO	Communication Object
CP	Current Probe
CPU	Central Processing Unit
Cr_id	Communication relationship identifier
CSMA/CA	Carrier Sense Multiple Access with Collision Avoidance
CSMA/CD	Carrier Sense Multiple Access with Collision Detection
D	Data
DC	Direct Current
DIN	Deutsches Institut für Normung
DL	Data Link
DLL	Data Link Layer
DSO	Digital Storage Oscilloscope
DUT	Device Under Test
EDI	EIB Data Interface
EED	EIB End Device
EEPROM	Electrically Erasable Programmable Read Only Memory
EIB	European Installation Bus
EIBA	European Installation Bus Association
EIBRst	Bit Engine Hardware Reset
EIS	EIB Interworking Standard
EMC	Electromagnetic Compatibility
EMI	Electromagnetic Impulse
	External Message Interface

EOP	End Of Packet
ESPRIT	European Strategic Program for Research in Information Technology
ETE	EIB Tool Environment
ETS	EIB Tool Software
FCS	Frame Check Sequence
FELV	Functional Extra Low Voltage
HBES	Home and Building Electronic Systems
HVAC	Heating, Ventilation ad Air-conditioning
IACK	Immediate ACKnowledgment
IE	Interrupt Enable
IEC	International Electrotechnical Commission
IS	International Standard
ISDN	Integrated Services Digital Network
ISO	International Standards Organization
LC	Line Coupler
LLC	Logical Link Control
LSB	Least Significant Bit
MAC	Medium Access Control
MAU	Medium Attachment Unit
maxRstCnt	maximum Restart Count
MSB	Most Significant Bit
NAK	Negative AcKnowledge
NRZ	Non Return to Zero
OSI	Open System Interconnection
PA	Physical Address
PB	Parity Bit
PCB	Printed Circuit Board
PDU	Protocol Data Unit
PE	Protection Earth
PEI	Physical External Interface
PELV	Protective Extra Low Voltage
PhL	Physical Layer
PSU	Power Supply Unit
PTT	Public Telephone network
RAM	Random Access Memory
RDR	Receive Data Register
ROM	Read Only Memory
RVP	Reverse Voltage Protection
SAP	Service Access Point
SELV	Safety Extra Low Voltage
SPD	Surge Protection Devices
TDR	Transmit Data Register
TP	Twisted Pair
TSR	Transmit Shift Register
UART	Universal Asynchronous Receiver Transmitter
VAC	Voltage Alternating Current
VDC	Voltage Direct Current
VDE	Verband Deutscher Elektroingenieure