The EIB System for Home & Building Electronics

Welcome to an open system.

1 *Dozens of companies are already developing products for EIB, and experiencing double-digit growth rates of their annual turnover in this business segment. Check below to find out what EIB has in store for you.*

EIB's invitation!

Answering all automation challenges for residential and commercial buildings, EIB is the first solution for Home & Building Electronic (HBE) networks. EIB's decentralised, open network technology is the choice of more than 100 leading companies from industry and engineering. Under various brand names, they market certified, EIB compatible equipment for:

- electrical installation,
- measurement and control,
- heating, ventilation and air conditioning (HVAC),
- security and alarms,
- energy and load management
- household appliances, etc.

Originally launched on Twisted Pair communication, EIB now supports all relevant fieldbus media including Powerline and Radio Frequency. EIB.net introduces automation-level capability based on Ethernet.

The EIB bandwagon

Full scale commercial deployment of EIB products has started more than 5 years ago. Nearly 2'000 products are available in over 5'000 variations from dozens of manufacturers.

Today, several million nodes have been installed in tens of thousands of installations, ranging from homes and apartments with 20 devices, up to large commercial buildings and campuses with 60'000 devices installed.

Capacity and performance of EIB

Data oriented (rather than command-oriented) and designed for extremely efficient multicast "group" addressing, EIB TP effortlessly reaches fieldbus performance. Today, dozens of installations with 10'000 and more nodes are up and running. (Note that the data-rate-to-net-performance ratio is very different from what we typically find in more traditional master-slave bus systems.)

Media

EIB is a system for Home & Building Automation based on a decentralised, peer-to-peer, OSI-compliant network operating system. It uses a serial transmission protocol and is available on the following media:

- twisted pair (9600 bps)
- powerline (1200/2400 bps; initially for 230V, 50Hz only)
- EIB.net (e.g. 10 Mbit/s on Ethernet)
- radio frequency (1998).
- infrared (1999).

EIB.net defines a 10 megabit extension, based on the ISO/IEC 8802-2 Logical Link Layer (includes Ethernet) as transport medium.

Local infrared extensions and ISDN gateways are available today.

Frames and Addressing Mechanisms

EIB supports the following (mutually independent) address spaces:

- 16-bit multicast "group address" space;
- 16-bit physical address space to identify individual devices;

supported by:

- 16-bit fast polling address space (for fast and reliable master-slave polling)
- 16-bit (sub)system identification for open media (PL, RF, ...), to distinguish nearby systems.

EIB allows variable length packets. One packet or "telegram" may carry up to 14 bytes of useful data. A new specification extends this to 256 bytes.

Importantly, EIB supports *full* multicast "group" addressing. Full means that:

1. EIB is not limited to grouping devices: each device may publish several variables (known as "(Group) Communication Objects") *individually*, which can be grouped independently from one another into network-wide shared variables.

   As a bonus, properties of Interface Objects may be published as shared variables as well.
2. A shared variable can be fully read/write bidirectional. In this way, all devices can also send unsolicited multicast frames.
3. EIB makes a 16 bit address space available for these shared variables. Even with the limitation of some implementations to 15 bits, this signifies that one installation may have up to 32k shared variables (or "group addresses"), each with any number of local instances.

Object-based network management

EIB's Interface Objects permit abstract management of device and network resources, via the <device>.<object>.<property> addressing scheme. The multicast extension <group>.<object>.<property> is under consideration.

Open System / Standard Implementations

EIB is open: the full "EIB Handbook" specification is available to everyone interested at about US$ 350. This even allows the EIB network OS to be implemented on any industry-standard chip.

On the other extreme, fully integrated "Bus Coupling Units" (BCU's) are available, combining a transceiver and a microprocessor with RAM and EEPROM. The BCU has a standardised interface to an application-specific module. As the BCU's are compatible for the different media, the same module may be combined with the TP-BCU as well as the PL-BCU.

In between, a chip set and Bus Interface Modules (BIM) offer various levels of integration. Contact EIBA for details on licensing EIB system source code.

Interworking

The EIB Interworking Standards (EIS) allow components from various vendors to be combined in a single installation. Many niche vendors and a multitude of OEM arrangements prove that EIS are a solid claim indeed.

Tool Suites and API Component Framework

In addition, this allows the use of a single, common tool (ETS, the EIB Tool Software) to be used for configuring and commissioning EIB installations. Today, about 6'000 copies of ETS are used by electrical contractors, system integrators etc. world-wide. EIB's Component-based Installation Design (built on ETS) radically reduces project engineering and maintenance effort.

With the EIB Tool Environment (ETE) EIBA offers an open software development and connectivity framework with standard API's.

Easy Configuration

Not only PC-based tools may exploit the network management features of EIB devices: any sufficiently powerful EIB device may itself act as a configuration controller. This allows for "plug, touch and play" *Easy Configuration* for smaller installations, aimed at the professional contractor.

The consumer dimension

A good deal of the power and flexibility of EIB was so far accessible to the expert user only. In combination with the Home Assistant software platform for PC's, the EIB Home Management specification will open this "hidden" potential to the occupant as well.

Corresponding ranges of white goods have been announced by several manufacturers, with brown goods to follow soon.

EIB inside!

EIB products are also marketed by EIBA associated companies under various brand names including:

- Domotik
- ImmoCAD
- Home Electronic System (HES)
- i-bus EIB
- Instabus
- Powernet
- Tebis

etc. ❒