SLOVENSKI STANDARD
SIST EN 50090-2-1:1997

01-avgust-1997

Home and building electronic systems (HBES) - Part 2-1: System overview - Architecture

Home and Building Electronic Systems (HBES) -- Part 2-1: System overview - Architecture

Elektrische Systemtechnik für Heim und Gebäude (ESHG) -- Teil 2-1: Systemübersicht - Architektur

Systèmes électroniques pour les foyers domestiques et les bâtiments (HBES) -- Partie 2-1: Vue d'ensemble du système - Architecture

Ta slovenski standard je istoveten z: EN 50090-2-1:1994

ICS:

97.120	Avtomatske krmilne naprave za dom	Automatic controls for household use

SIST EN 50090-2-1:1997   **en**

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 50090-2-1

September 1994

English version

Home and Building Electronic Systems (HBES)
Part 2-1: System overview — Architecture

Systèmes électroniques pour les foyers domestiques et les bâtiments (HBES) Partie 2-1: Vue d'ensemble du système Architecture

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This European Standard was approved by CENELEC on 8 December 1993. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

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Ref. No. EN 50090-2-1:1994 E

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Foreword

This European Standard has been prepared by CENELEC TC 105, Home and Building Electronic Systems (HBES).

It was submitted to the unique acceptance procedure and was approved by CENELEC as EN 50090-2-1 on 1993-12-08.

The following dates were fixed:

- latest date of publication of an identical national standard   (dop) 1994-12-01

- latest date of withdrawal of conflicting national standards   (dow) 1994-12-01

EN 50090-2-1 is part of the EN 50090 series of European Standards, which will comprise the following parts:

Part 1:   Standardization structure

Part 2:   System overview

Part 3:   Aspects of application

Part 4:   Transport layer and network layer

Part 5:   Media and media dependant layers

Part 6:   Interfaces

Part 7:   System management

EN 50090-2-1 uses the concepts and definitions given in   EN 50090-1 (in preparation) and is partly based on the work of ISO/IEC JTC1/SC25. It takes into account the CENELEC Technical Report R105-001:1992, "Applications and requirements - Class 1".

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1 Scope

This European Standard specifies the general features and architecture of the HBES.

The object is:

- to define new terms for use in the EN 50090 series;

- to give general information and advice on the required HBES features and its architecture;

- to specify the HBES model;

- to specify the basic functional structure of an HBES with its reference points and interfaces.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

EN 27498   Information processing systems - Open Systems interconnection - Basic Reference Model (ISO 7498: 1984 + A1: 1987).

3 Definitions

For the purpose of this standard the following definitions apply. Note that the definitions given in EN 50090-1[1] also apply to this standard.

3.1 Definitions from EN 27498

The following terms defined in EN 27498 apply to this standard:

application entity
application process
application service element, ASE
connection-mode communication
connectionless-mode communication
data-link-service-data-unit
flow control
network service data unit, (N)-SDU
OSI environment, OSIE
segmenting
user element
service access point

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[1] EN 50090-1 will provide for an overview of the complete series EN 50090 and will be published later. Currently it is a draft

3.2   Additional definitions

For the purpose of this standard the following definitions apply in addition:

3.2.1   domain: Range of validity.

> NOTE: When the term is used for a more specific concept, it should be qualified.
> Examples are application domain (the range including OSI layer seven and above),
> user domain (the range above OSI layer seven)

3.2.2   topology: The structure of the communication paths between the medium attachment points.

> NOTE: Examples of topologies are: bus, ring, star, tree.

3.2.3   repeater: A unit that regenerates or amplifies signals in order to extend the range of transmission between medium attachment points or to interconnect two network segments that use the same protocols.

3.2.4   HBES-application: Field of use of an HBES.

> NOTE: An HBES may support more than one application.

3.2.5   HBES-object: Set of data with associated functions applicable to it.

> NOTE: An HBES-object can be implemented in various ways.

3.2.6   HBES application object: An HBES application object is an HBES-object located within the HBES device application process.

3.2.7   device application process: An element within a device which performs information processing for a particular application. It can represent a manual, automated, computerised or physical process.

3.2.8   HBES device application process: That part of a device application process which is accessible through the HBES communication network.

> NOTE 1: An HBES device application process is built up with application objects.

> NOTE 2: The functionality of the HBES device application process is defined in this series of standards or in the appropriate product standards.

3.2.9   user process: That part of a device application process belonging to the real system environment, that is the user domain.

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3.2.10   HBES user process: That part of the HBES device application process belonging to the user domain of the HBES.

3.2.11   local application process: That part of an application process within a device which is not accessible through the HBES communication network. It is located inside the user domain.

3.2.12   connection: An association established between functional units for data transmission across a network (or part of a network) for the purpose of communication between the units. The association is explicitly established at some point in time, and exists until explicitly ended.

> NOTE: Data transmission includes, in this context, audio, video and other information in either analogue or digital form.

3.2.13   control channel: A communication channel that is established between two or more entities for the primary purpose of exchange of HBES control and monitoring messages.

3.2.14   information channel: A communication channel that is established between two or more entities for the primary purpose of exchange of information other than HBES control and monitoring messages.

> NOTE: Examples of such information are audio or video data, facsimile data and analogue speech signals.

3.2.15   circuit-switching transmission: Transmission using a channel that offers a continuous communication path, or time-multiplexed communication with fixed time slots having a constant communication bandwidth.

3.2.16   packet-switching transmission: Transmission that uses communication bandwidth in bursts. An entity transmitting data using packet-switching transmission organises the data in discrete "packets". Typically, two or more entities using packet-switching transmission share a communication channel. A protocol is required to resolve contention between transmitting entities to allow the orderly interleaving of packets from different entities.

3.2.17   network segment: A part of an HBES network that is within the domain of a single link layer instance.

3.2.18   unit: Piece of equipment.

3.2.19   network access unit (NAU): Piece of equipment which comprises the mechanical, electrical and communicational functions for an HBES connection. The NAU corresponds to one network service access point (NSAP) and can be uniquely identified by one ore more network addresses.

3.2.20 **transmission medium:** A physical medium that conveys signals.

NOTE: Often referred to as just medium.

4 **HBES reference model**

The HBES shall be designed in accordance with the OSI reference model (OSI/RM). The functionality of the OSI/RM is very general - and not all of this functionality is needed in the HBES reference model (HBES/RM). For this reason - also for reasons of protocol efficiency - some of the layers defined in the OSI/RM are null in typical implementations of HBES. In particular, some implementations have little or no functionality at one or more of the layers: Network, Transport, Session- and Presentation Layer. If a layer has no functionality of its own, then it is regarded as present, merely to map between the layer below and the layer above. This imposes no overhead on any implementation. Figure 1 depicts the overall structure of the HBES/RM. The power feed service is not shown in this figure. Layers between Data Link- and Application Layer may be null in some systems.
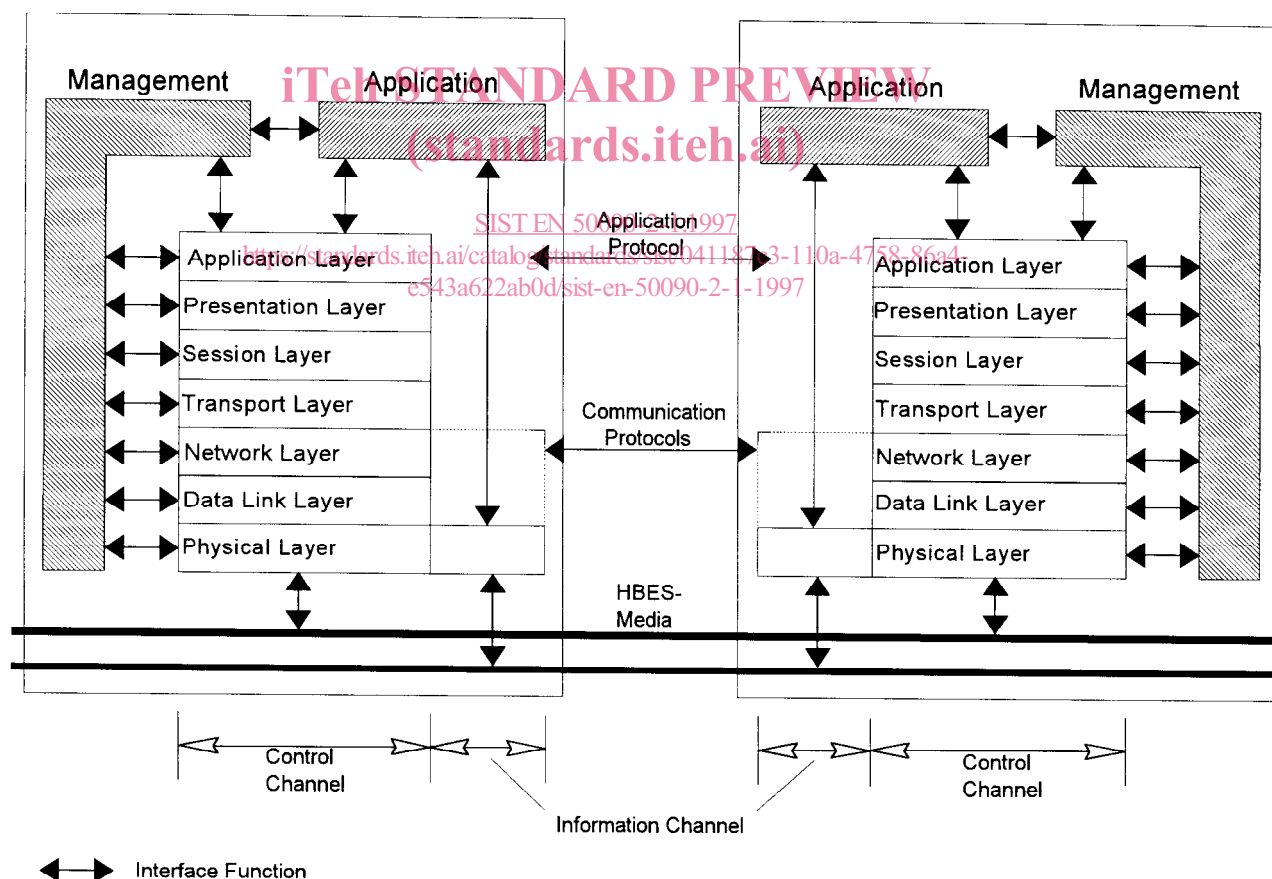
NOTE: The control channel and information channel(s) may be on the same or different media (which may be of different types).

Figure 1: Overview of the Home and Building Electronic System Reference Model

In some implementations all layers are contained within one piece of equipment. It is also possible to split the implementation across two (or more) pieces of equipment. To facilitate this, standardized interfaces are defined in later parts of this standard. The three standardized interface points are the medium interface, the universal interface (between Network and Transport Layer) and the process interface (above Application Layer). These are explained in clause 5.

The overall HBES/RM consists of three parts:

- communication;

- application;

- management.

These will be described below.

4.1 Communication

The HBES/RM defines layers which correspond to the general OSI reference model and in addition a management function.

In the HBES/RM a distinction is made between information and control channels. These channels are distinguished from an application point of view. For the control channel each layer identified within the communication part of the HBES/RM has a standardized functionality, whereas for information channels only the Physical Layer may have a standardized functionality. The control channel uses packet switching, whereas the information channel typically uses circuit switching.

Packet switching and circuit switching are communication services. HBES shall also offer a power feed service, from which units may draw their supply current.

HBES is a multimedia system in the sense that it may use one or more transmission media. Since different transmission media have different characteristics, the Physical Layer and Data Link Layer services can be distinct for optimization for different media. Above the Data Link Layer the services provided are medium independent. The performance characteristics may differ according to the medium used. For instance, the transfer capacity of power line is less than that of twisted pair.

The control channel is fundamental for the HBES and shall be realised by packet switching .

This subclause gives an overview of the functions of each layer. Other parts of the EN 50090 series will define the layers in more detail.

4.1.1 Physical Layer

The Physical Layer provides mechanical, electrical, functional and procedural means for physical communication between data link entities. A network may contain repeaters. Physical Layer entities are interconnected by means of a physical medium.

The Physical Layer may offer two modes of service. The control channel provides packet switching. Information channels provide circuit switching. Every information channel shall have an associated control channel to manage it (though the same control channel may manage several information channels). Not all Home and Building Electronic Systems media offer information channels. All Home and Building Electronic Systems shall at least offer one HBES control channel.

4.1.2 Data Link Layer

The Data Link Layer provides functional and procedural means for connectionless-mode service. It transfers information between network entities and optionally establishes, maintains and releases data link connections among network entities. A data link connection uses one or more physical connections. It is expected that all Data Link Layer implementations will be connectionless.

The Data Link Layer shall detect errors and shall offer error correction functionality. Uncorrected errors may be reported to the Network Layer. The Data Link Layer provides the means to access the medium, handling when necessary contention for access.

The Data Link Layer may also implement flow control to manage the rate of information transfer and sequence numbering to manage the ordering of data link service data units.

The Data Link Layer shall provide recognition of data link addresses, and may provide to the Network Layer confirmation of the success or non success of services requested by the Network Layer.

A Data Link Layer implementation may make use of bridges to link transparently several data links in tandem to provide a data link service.

4.1.3 Network Layer

The Network Layer provides the functional and procedural means for connectionless-mode or connection-mode service. It gives the transport entities independence of the route and of the topology of the network segment. This includes the case where several network segments are used in tandem or in parallel.

It makes invisible to transport entities how underlying resources such as data link connections are used to provide network services. The Network Layer may provide notification to the Transport Layer of errors which have been reported by the Data Link Layer, and also of protocol errors which may occur in the Network Layer.

The Network Layer may also implement flow control to manage the rate of information transfer and sequence numbering to control the ordering of network service data units.

The Network Layer shall provide recognition of network addresses, and may provide to the Transport Layer confirmation of the success or non success of services requested by the Transport Layer.

The Network Layer services are optional.

4.1.4 Transport Layer

The Transport Layer provides transparent transfer of data between session layer entities and relieves them from any concern with the detailed way in which reliable transfer of data is achieved.

All protocols defined in the Transport Layer have end-to-end significance, they are carried transparently across the network.

The dual purposes of Transport Layer is:

- to provide a connection-mode transport service over the connectionless network service;

- to provide data segmentation.

The Transport Layer services are optional.