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Home and building electronic systems (HBES) - Technical Report 11: Management

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ICS:

97.120	Avtomatske krmilne naprave za dom	Automatic controls for household use
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CENELEC

R205-011

REPORT

October 1996

Descriptors: Home and building electronic systems (HBES), home electronic systems

English version

**Home and Building Electronic Systems (HBES)
Technical Report 11:
Management**

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This CENELEC Report has been prepared by Technical Committee CENELEC TC 205, Home and Building Electronic Systems (HBES). It was approved by CENELEC on 1995-11-28.

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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

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

Foreword

This Technical Report has been prepared by the Technical Committee CENELEC TC 205 (former TC 105), Home and Building Electronic Systems (HBES). It was decided to ask BT for publication during a voting plenary meeting on September 12 and October 18 and 19, 1995.

It was approved for publication as R205-011 by the CENELEC Technical Board on 1995-11-28.

The final intent of TC 205 is to develop a unique standard, with possible use of different media. The following structure of the series of standards *EN 50090 Home and Building Electronic Systems (HBES)* has been decided:

- 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 dependent layers
- Part 6: Interfaces
- Part 7: Management

Nevertheless, due to historical and market reasons, a first step was taken that allows three different implementations for some parts of the standard, the other parts being common. It is expected that a future version of the HBES standard will only propose one unique implementation, including the existing common parts. For the time being, TC 205 had agreed that the existing different implementations are described in European Prestandards (ENVs).

The three implementations are:

- implementation 1: BatiBUS;
- implementation 2: EIB;
- implementation 3: EHS.

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The use of one implementation in a specific ENV requires the use of the same implementation throughout the whole series.

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As decided during the meeting of TC 205 held on March 28 and 29th 1995, in accordance with the TC 205 standardization structure as approved by the Technical Board, and in line with TC 205's approach initiated and exposed three years ago as laid down in the CENELEC IT Strategy Plan, the following documents - which were expected to become parts of the EN(V) 50090 series and which describe the protocols of the three proposed HBES implementations BatiBUS, EIB and EHS - had been submitted to vote at plenary meetings of TC 205, in accordance with subclause 7.2 of the CEN/CENELEC Internal Regulations Part 2:

- prENV 50090-3-3 Aspects of application - Application Layer
- prENV 50090-4 Transport Layer and Network Layer
- prENV 50090-5-2 Media and media dependent layers - Network based on twisted pair, Class 1
- prENV 50090-6-3 Interfaces - Media interfaces
- prENV 50090-7 Management

The comments expressed by some National Committees during these meetings reflected the reluctance to the principle of endorsing three existing systems as a step to coming to a unique solution.

Despite the public commitment of the consortia supporting these systems to converge on a unique system, a commitment proven already by the acceptance of:

- EN 50090-2-1 System overview - Architecture
- EN 50090-2-2 System overview - General Technical requirements
- EN 50090-3-1 Aspects of application - Introduction to the application structure
- EN 50090-3-2 Aspects of application - User process
- R205-001 Applications and requirements - Class 1
- R205-002 Guidelines for the professional installation of Twisted Pair cables Class 1
- R205-004 Applications and requirements - Class 2 and 3

as well as by the ongoing work in TC 205, none of the arguments put forward could change the opinion of these National Committee delegations.



A formal vote at the meetings showed that there was not sufficient consensus to have the prENVs approved. Therefore the Technical Board decided to publish these documents as CENELEC Reports:

R205-007	Aspects of application - Application Layer
R205-008	Transport Layer and Network Layer, Class 1
R205-009	Media and media dependent layers - Network based on Twisted Pair, Class 1
R205-010	Interfaces - Medium Interface, Twisted Pair, Class 1
R205-011	Management

This Technical Report contains clauses which may be subject to Intellectual Property Rights (IPR)¹⁾.

In accordance with CEN/CENELEC Memorandum 8, the Central Secretariat received a declaration from the three consortia whose protocols are described in this Technical Report, i.e. BCi, EHSA and EIBA, the details of which have been made available to the CENELEC membership.

For full details or IPR conditions the three consortia can be contacted at the following addresses:

BatiBus club international (BCi)
11, rue Hamelin
F-75783 PARIS CEDEX 16

European Home System Association (EHSA)
Excelsiorlaan 11 - Bus 1
B-1930 ZAVENTEM

European Installation Bus Association (EIBA)
Avenue de la Tanche 5
B-1160 BRUSSELS

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¹⁾ As defined in CEN/CENELEC Memorandum No 8.

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1 Scope

This Technical Report describes the management specifications of the three implementations.

2 Normative references

This European Prestandard 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 Prestandard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

EN 50090-2-1	Home and Building Electronic System (HBES) - Part 2-1: System overview - Architecture
R205-007:1996	Home and Building Electronic System (HBES) - Technical Report R205-007: Aspects of application - Application Layer
R205-009:1996	Home and Building Electronic System (HBES) - Technical Report R205-009: Network based on Twisted Pair, Class 1

3 Definitions

Terms used in the descriptions of the three implementations are defined in the relevant subclauses.

4 Abbreviations

4.1 General

PDU Protocol Data Unit

4.2 Abbreviations for implementation 1

none

4.3 Abbreviations for implementation 2

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APCI	Application Protocol Control Information
BCU	Bus Coupling Unit
CD	Complex Device
ETS	EIB Tool Software
PEI	Physical External Interface
SD	Simple Device

4.4 Abbreviations for implementation 3

ATD	Application Title Directory
CoD	Complex Device
CLSE	Command Language Service Element
DvC	Device Co-ordinator
FC	Feature Controller
ICM	Information Channel Manager
LMSE	Local Management Service Element
MdC	Medium Controller
Rtr	Router
SiD	Simple Device
TP	Twisted Pair
UBUI	Universal, Bi-directional User Interface
UI	User Interface

5 Management implementations

5.1 Implementation 1

5.1.1 Introduction

The purpose of this clause is to define the tools and services required to implement, maintain and measure the performance of services and protocols used by HBES Implementation 1.

The operations used by management correspond to services that are defined in this document.

These services are of the type :

- xx-read** Reading of the value of one or more attributes of one or more objects of a Device
- xx-write** Writing of the value of one or more attributes of one or more objects of a Device
- xx-report** reporting of the value or change of value of one or more attributes of one or more objects of a Device.

The use of these services is identical to that of the Application Layer services.

The data involved are exchanged by the various services through PDUs (Protocol Data Unit).

Several different services can use a given PDU.

The management **protocol** defines the way to use the PDUs for the various services and how to use the parameters and services of the Data Link Layer.

5.1.2 Services used by management

5.1.2.1 Introduction

Each device of the control system has a communication interface whose functionalities are structured as layers, the functions of each layer being based on those provided by the lower layers.

The communication functions performed by the various layers are managed at the level of each layer by a Layer Management Entity (LME).

These layer management entities are included in the standardization since they are involved in the interworking between devices.

However, the system management functions which are not involved in interworking are excluded from the standardization and are performed by the automatic control device which, depending on the implementations, may make services more or less sophisticated:

Although these LME's affect the communication functions of the various layers, they do not themselves have specific communication functions. These functions are provided by the Application Layer.

5.1.2.2 Application Layer management entity

To perform its functions, the application level of the HBES environment makes use of the various service primitives and objects defined in 5.1 of R205-007:1996.

The LME performs a few functions which need services.

The services defined in the rest of this clause provide time management functions, a 'sleep' function, a system status function, a system configuration function, a supervision and alarm function, a functional identification function and a 'supported services' function.

5.1.2.2.1 Time-read service

Through this service, a Device can ask for the time and date from a device with the corresponding network management function.

Primitives: time_read_req
time_read_ind

Service procedure :

managing device	Application	managed device
time_read_ind	<- <-	<- <- time_read_req

5.1.2.2.2 Time report service

Through this service, a device can send the time and date to all the devices of the network.

Primitives : time_req
time_ind

Service procedure :

managing device	Application	managed device
time_req	-> ->	-> -> time_ind

5.1.2.2.3 Idling (sleep) service

Through this service, a Device can deactivate remote devices. This deactivation limits the power consumption of a device. An idle device no longer transmits or receives frames and is thus considered to be momentarily absent from the network. A device is activated again after a time delay which should be comprised between 15 and 16 seconds.

Primitives : sleep_req
sleep_ind

Service procedure :

managing device	Application	managed device
sleep_req	-> ->	sleep_ind

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5.1.2.2.4 System status transmission service

Through this service, a controller type Device can send information concerning its presence or absence to all the devices connected to the bus, to allow the automatic control of these different devices to react properly.

Primitives : syst_status_req
syst_status_ind

Service procedure :

managing device	Application	managed device
syst_status_req	-> ->	-> -> syst_status_ind

5.1.2.2.5 System configuration read service

See 5.1 of R205-007:1996 for the user configuration read service: it has the same PDU, corresponding to frame 43 (only replace "user" by "system").

Parameters are :

System : parameters linked to extended addressing mode.

5.1.2.2.6 System configuration write service

See 5.1 of R205-007:1996 for the user configuration read service: it has the same PDU, corresponding to frame 43 (only replace "user" by "system").

5.1.2.2.7 System configuration report service

See 5.1 of R205-007:1996 for the user configuration read service: it has the same PDU, corresponding to frame 43 (only replace "user" by "system").

5.1.2.2.8 Supervision configuration service.

Function: This service serves to set the rate of use of the supervision transmission service and to set the start of its transmission using the synchronization pulse.

Primitives : sup_conf_req
sup_conf_ind

Service procedure :

managing device	Application	managed device
sup_conf_req	-> ->	-> -> sup_conf_ind

NOTE: the transmission rate corresponds to a time base known by the automatic control devices.

5.1.2.2.9 Supervision configuration and immediate response service

Function : This service is similar to the supervision configuration service; it also includes an immediate response request.

Primitives : sup_conf_imm_req
sup_conf_imm_ind

Service procedure :

managing device	Application	managed device
sup_conf_imm_req	-> ->	-> -> sup_conf_imm_ind

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5.1.2.2.10 Supervision synchronisation service

Function : This service provides a synchronisation mechanism for the supervision transmission service.

Primitives : sup_synch_req
sup_synch_ind

Service procedure :

managing device	Application	managed device
sup_synch_req	-> ->	-> -> sup_synch_ind

5.1.2.2.11 Supervision transmission service

Function : this service is used to respond to the supervision configuration service :

it is either sent in response to a configuration request with immediate response, or sent recurrently after a supervision configuration.

Primitives : sup_req
sup_ind

Service procedure :

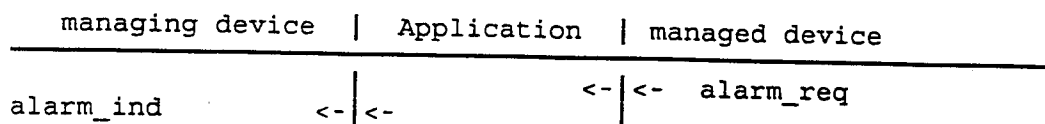
managing device	Application	managed device
sup_ind	<- <-	<- <- sup_req

5.1.2.2.12 Alarm transmission service

Function: this service is used to give off an alarm.

Primitives : alarm_req
alarm_ind

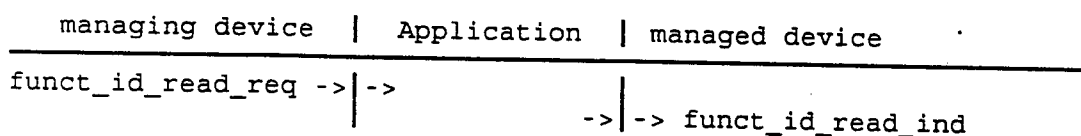
Service procedure :

**5.1.2.2.13 Functional Identification read service**

Through this service, a Device can ask for the functional identification from other devices of the network.

Primitives : funct_id_read_req
funct_id_read_ind

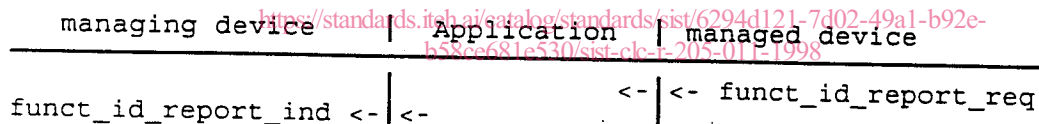
Service procedure :

**5.1.2.2.14 Functional Identification report service**

Through this service, a Device can send his functional identification (manufacturer, type and serial number information,...) to other devices of the network.

Primitives : funct_id_report_req
funct_id_report_ind

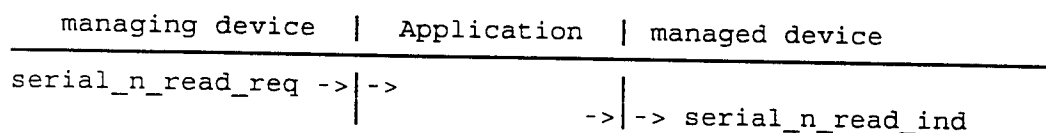
Service procedure :

**5.1.2.2.15 Serial number read service**

Through this service, a Device can ask for the serial number from another device of the network.

Primitives : serial_n_read_req
serial_n_read_ind

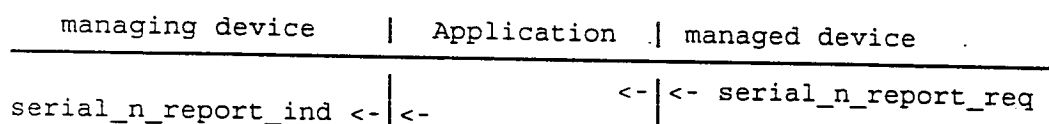
Service procedure :

**5.1.2.2.16 Serial number report service**

Through this service, a Device can provide its serial number.

Primitives : serial_n_report_req
serial_n_report_ind

Service procedure :



5.1.2.2.17 Supported services request service

Functions : Through this service, a Device is asked to respond by sending all the frames he sends in normal operation ; frame 6 will be sent last.

Primitives : supported_sce_req
supported_sce_ind

Service procedure :

managing device	Application	managed device
supported_sce_req ->		-> supported_sce_ind

5.1.2.3 Data link layer management entity

To perform its functions, the data link level of the HBES environment makes use of the different primitives defined in 5.1 of R205-009:1996.

The layer management entity (LME) performs a few functions which need services.

The services defined in the rest of this clause provide functions associated with collision counter and transmission error management. They also provide functions associated with the MAC address management.

5.1.2.3.1 Diagnostic read service

Functions: Through this service, a remote user can request information associated with Device medium access management.

Primitives : diag_read_req
diag_read_ind

Service procedure :

managing device	Application	managed device
diag_read_req ->		-> diag_read_ind

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5.1.2.3.2 Diagnostic report transmission service

Functions : Through this service, a Device can respond to a diagnostic request, by transmitting information relative to its medium access.

Primitives : diag_report_req
diag_report_ind

Service procedure :

managing device	Application	managed device
diag_report_ind <- <-		<- <- diag_report_req

5.1.2.3.3 Address request service

Functions : Through this service, a remote user can request a MAC address.

Primitives : addr_req_req
addr_req_ind

Service procedure :

managing device	Application	managed device
addr_req_ind <- <-		<- <- addr_req_req

5.1.2.3.4 Address write service

Functions : Through this service, a device can set a MAC address into another device

Primitives : addr_write_req
addr_write_ind

Service procedure :

managing device	Application	managed device
addr_write_req	-> ->	-> -> addr_write_ind

5.1.2.3.5 Address acknowledge service

Functions : Through this service, a remote user can acknowledge the setting of a MAC address (via a former addr_write service)

Primitives : addr_ack_req
addr_ack_ind

Service procedure :

managing device	Application	managed device
addr_ack_ind	<- <-	<- <- addr_ack_req

5.1.2.3.6 Address negative acknowledge service

Functions : Through this service, a remote user can give a negative acknowledge to the setting of a MAC address (via a former addr_write service)

Primitives : addr_nak_req
addr_nak_ind

Service procedure :

managing device	Application	managed device
addr_nak_ind	<- <-	<- <- addr_nak_req

5.1.2.3.7 Address write to serial number service

Functions : Through this service, a device of a given serial number can be given an address or his address can be changed (the serial number may be read or reported via the serial-number read and report services)

Primitives : addr_write_sn_req
addr_write_sn_ind

Service procedure :

managing device	Application	managed device
addr_write_sn_req	-> ->	-> -> addr_write_sn_ind

5.1.2.4 Physical layer management entity

The physical layer management entity provides no function.

5.1.3 Management Protocol.

The protocol specification provides a set of communication rules in terms of exchanged data units and procedures to be supported by application entities.

This protocol specification consists of :

- the description of the various protocol data units (PDU) exchanged between communicating entities. This description include encoding data rules.
- the description of protocol procedures in terms of interactions between the primitives of each of the application services and the primitives of the associated data link services.

5.1.3.1 Protocol data units (A_PDU)

syntax is identical to that defined in 5.1 of R205-007:1996.

PDU Types

The PDUs specified allow the transfer of information associated with the objects.

The PDU type used depends directly on the value of the following fields:

- destination type,
- source type,
- message type,
- length.

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List of PDUs used by Network management :

TIME_pdu	[Frame 12]	
SYST_STATUS_pdu	[Frame 05]	standards.iteh.ai/catalog/standards/sist/6294d121-7d02-49a1-b92e-b58ce681e530/sist-clc-r-205-011-1998
PARAM_pdu	[Frames 43, 43-a, ..., 43-i]	
SUP_CONF_pdu	[Frames 16-1, 32-1]	
SUP_pdu	[Frames 15-1, 30]	
SUPPORTED_pdu	[Frame 54]	
DIAG_pdu	[Frame 06]	

The types of PDUs are described below. Their encoding is described in annex A.

PDU of the TIME_pdu type

This PDU is used for the time report service for all the Devices.

PDU of the SYST_STATUS_pdu type

This PDU is used for system status distribution service.

PDU of the PARAM_pdu type

This PDU is associated with a Device and is used for the system and user configuration services.

PDU of the SUP_CONF_pdu type

This PDU is used for the supervision configuration service. Supervision allows one or more devices to be supervised by another one. The supervision configuration service give to these devices the necessary informations to realize it.

PDU of the SUP_pdu type

This PDU is used for the supervision transmission service. It allows one or more device to be supervised by another one.

PDU of the SUPPORTED_pdu type

This PDU is used to request the transmission of the supported frames and services.

PDU of the DIAG_pdu type

This PDU is associated with a Device and is used for the diagnostic report service, following a diagnostic request, for example.

(This response, if associated with a periodic interrogation of the device, can be used for the purpose of monitoring the correct operation of this object).

5.1.3.2 Protocol procedures

The protocol procedures are used to specify the interactions between the Network management services and the data link level services.

In addition, the service procedures describe the projections on the data link services in terms of primitives, parameters and used PDUs.

The empty PDUs are indicated as "no data". The PDUs also have a reference to their description (as a frame number).

Projection onto the data link services

The service primitives defined at the level of the Network management are the request primitives (xxx_req) and the corresponding indication primitives (xxx_ind).

The calling of a service primitive xxx_req results in the calling of a data link primitive: L_MESSAGE_REQ.

The feedback of the L_MESSAGE_IND primitive corresponds to calling a service xxx_ind.

The complete projection of the parameters as well as the description of the data of the PDUs are in annex A, as frames.

The next tables show the main parameters and associate a number of frame to each service primitive.