SLOVENSKI STANDARD

SIST EN 50090-7-1:2005

september 2005

Stanovanjski in stavbni elektronski sistemi (HBES) – 7-1. del: Upravljanje sistema – Upravljalni proces

Home and Building Electronic Systems (HBES) – Part 7-1: System management – Management procedures

ICS 97.120

Referenčna številka
SIST EN 50090-7-1:2005(en)

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 50090-7-1

February 2004

ICS 97.120

Supersedes R205-011:1996

English version

Home and Building Electronic Systems (HBES)
Part 7-1: System management - Management procedures

Systèmes électroniques pour les foyers domestiques et les bâtiments (HBES)
Partie 7-1: Management système - Procédures de management

Elektrische Systemtechnik für Heim und Gebäude (ESHG)
Teil 7-1: Systemmanagement - Managementverfahren

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CENELEC

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

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Contents

Foreword

This European Standard was prepared by the Technical Committee CENELEC TC 205, Home and Building Electronic Systems (HBES) with the help of CENELEC co-operation partner Konnex Association (formerly EHBESA).

The text of the draft was submitted to the Unique Acceptance Procedure and was approved by CENELEC as EN 50090-7-1 on 2003-12-02.

This European Standard supersedes R205-011:1996.

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The following dates were fixed:

– latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2004-12-01
– latest date by which the national standards conflicting with the EN have to be withdrawn	(dow)	2006-12-01

EN 50090-7-1 is part of the EN 50090 series of European Standards, which will comprise the following parts:

Part 1: Standardisation structure
Part 2: System overview
Part 3: Aspects of application
Part 4: Media independent layers
Part 5: Media and media dependent layers
Part 6: Interfaces
Part 7: System management
Part 8: Conformity assessment of products
Part 9: Installation requirements

Introduction

The management procedures capture the dynamics of managing distributed resources on the network in terms of abstract procedures. On the network itself, a procedure consists of a sequence of telegrams, exchanged between two partners: the management client and the management server.

The management client is a powerful device with 'controller' functionality, typically but not exclusively PC-based. Except for network-oriented management, the server is always one particular 'target device'. In the former case, it is in fact the network as a whole which acts as partner or server. Ultimately, of course, the response to a client request is always generated by the individual devices connected to the network, either one or many. In addition to its run-time behaviour (based on group communication), every device moreover supports a rich management server profile to this purpose. One important objective of this part “Management Procedures” is precisely to allow a concise description of such a profile. It is clear that the information about the full set of management procedures supported by a particular device or implementation, tells us significantly more about the device than merely the list of services through which this is realised.

Note that in general, one single device may well implement both client as well as server functionality. For and during the execution of one particular management procedure, however, one device takes on one single role.

1 Scope

This international standard establishes general principles for network- and device-management shared by and independent of the installation mode. The goal is to standardize the interaction, between a management client and a management server, that shall lead to the successful configuration of the devices. In this way, these management procedures thus specify the highest level communication requirements between a management client and a management server. These requirements specify

a) the **sequence** of messages that shall be exchanged between a management client and a management server, and

b) the **contents** and **interpretation** of the transported data, and

c) the **action** to take based on these data (setting internal resources, state machines, physical actions, …), and

d) the error and exception handling.

The management procedures base on the application layer services.

Some management procedures solely base on the use of one or a sequence of dedicated application layer services to achieve the required goal. For these, the documents EN 50090-4-1 and EN 50090-4-2 provide sufficient information for the underlying mechanisms.

Other management procedures additionally use the application layer services to access internal data in the management server to achieve the required goal. These data are laid down as objects as specified in EN 50090-3-2.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 50090-1 [1)] *Home and Building Electronic Systems (HBES) – Part 1: Standardisation structure*

EN 50090-3-2:2004 *Home and Building Electronic Systems (HBES) – Part 3-2: Aspects of application – User process for HBES Class 1*

EN 50090-4-1:2004 *Home and Building Electronic Systems (HBES) – Part 4-1: Media independent layers – Application layer for HBES Class 1*

EN 50090-4-2:2004 *Home and Building Electronic Systems (HBES) – Part 4-2: Media independent layers – Transport layer, network layer and general parts of data link layer for HBES Class 1*

3 Terms and definitions and abbreviations

3.1 Terms and definitions

For the purposes of this part the terms and definitions given in EN 50090-1 and the following apply.

3.1.1
network
a combination of several transmission links connected at individual points by electrical or optical means as part of an installation, system, appliance or component

3.1.2
Bus Access Unit (BAU)
the bus access unit contains all protocol layers plus the optional internal user application

3.1.3
device
product
HBES Products consist of devices in the form of hardware, firmware and their associated software

3.1.4
management procedures
the dynamics of managing distributed resources on the network in terms of abstract procedures between two partners: the management client and the management server

3.1.5
management client
a powerful device with 'controller' functionality, typically but not exclusively PC-based

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1) At draft stage.

3.1.6
management server
always one particular device that acts as target device. Except for network-oriented management, where it is in fact the network as a whole which acts as partner or server

3.1.7
network management
describes the device independent management procedures on the network. These are e.g. reading / writing the individual address, scanning the network. For these procedures no knowledge of the single devices is required

3.1.8
device management
describes the procedures to access one specific device. These procedures describe e.g. the load procedures, reading the state. For these procedures a detailed knowledge of the device is required

3.1.9
communication mode
kind of object on which the communication relies, through relationship between communication points: one-to-many connectionless (multicast), one-to-all connectionless (broadcast), one-to-one connectionless, one-to-one connection-oriented

3.1.10
Group Address Table (GrAT)
the shared resource of both the Link Layer and the group oriented Transport Layer; used by the Link Layer as a look up reference to check whether it should pass a received frame to the upper layers or not and used by the group oriented Transport Layer to map an incoming LSAP (Group Address) to a TSAP in receiving direction and vice versa in sending direction

3.1.11
Group Object Association Table
the resource of the Application Layer that stores the relationship between Transport Layer Service Access Points (TSAPs) and Application Layer Service Access Points (ASAP), as needed when mapping the Multicast Communication Mode messages A_GroupValue_Read and A_GroupValue_Write to T_Data_Group messages and vice versa

NOTE 1 The TSAP is an index in the Group Address Table. The ASAP is the Group Object number. The lowest ASAP is 0.

NOTE 2 The ASAP is a unique identifier for a group object to the Application Layer. Please refer as well to the Application Layer specifications in EN 50090-4-1. The ASAP is thus a group object number.

3.1.12
application program
the element within an installed system (i.e. in a device) which performs information processing for a particular application. Ensures the operations needed to execute the application

3.1.13
Physical External Interface (PEI)
the physical and electrical interface situated in a device between the bus access unit and any hardware performing applicative functionality

3.1.14
PEI Type
the physical and logical identifier of the configuration of the PEI to enable hardware compatibility recognition

3.1.15
External Message Interface (EMI)
the collection of messages that together build a generic message interface to each protocol layer of a BAU and any applicative functionality

3.2 Abbreviations

ASAP	Application Layer Service Access Points
BAU	Bus Access Unit
DoA	Domain Address field in the frame
DoA_Device	Domain Addresses of the Device of which the individual address is read; it is contained in the response if the device is on Powerline
EMI	External Message Interface
GrAT	Group Address Table
IA	Individual Address of the sender
PEI	Physical External Interface
PPPP	Individual address of the device, in the response
RCo	Point-to-Point, Connection-oriented Communication Mode to a remote device
RCoV	Point-to-Point, Connection-oriented Communication Mode with verification to a remote device
RCl	Point-to-Point, Connection-less Communication Mode to a remote device
SA	Source Address of the sender
SN	Serial Number field in the frame
SN_Device	Serial Number of the Device of which the individual address is to be read
TL	Transport Layer
TSAPs	Transport Layer Service Access Points

4 Network management procedures

4.1 General

The network management procedures describe the device independent management procedures. These procedures shall be used to configure the network, and to get the information about the configuration of the network and connected devices.

For these procedures no knowledge of the single devices is required. They will work with every device connected to the network [2)]. Both management server and management client shall be based on the use of the dedicated application layer services which are specified in EN 50090-4-1 for this purpose. Every individual management procedure below contains a dedicated subclause “Used management services” referencing - by name - the application layer services used. The procedures work independent of the location of the management client in the network. Some procedures require the preceding configuration of routers and domain addresses via other procedures.

2) The management server functionality has to be implemented.

4.2 NM_IndividualAddress_Read

4.2.1 Description

This network management procedure shall be used to read out the individual addresses of all the devices, which are in programming mode.

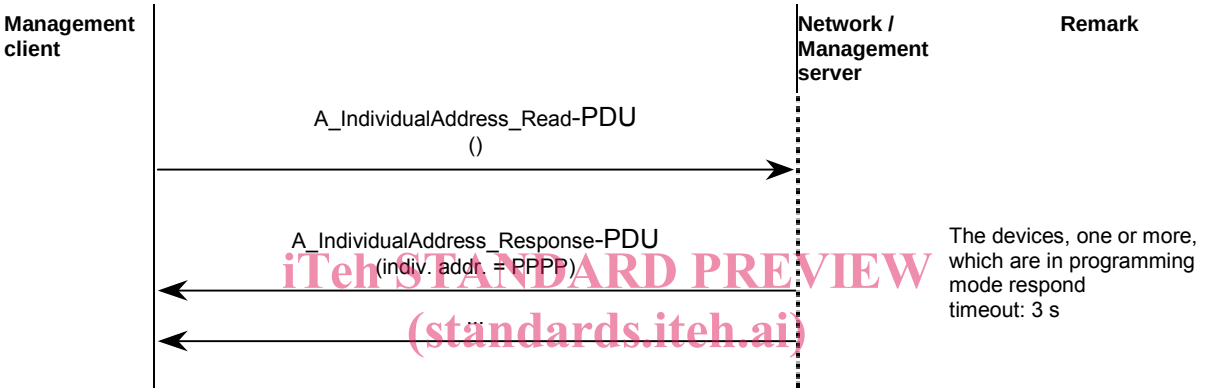
This procedure works independently of the configuration of the individual address of the router. When applicable this procedure shall be preceded by the configuration of the domain address.

4.2.2 Used management service

The NM_IndividualAddress_Read procedure shall use the following management service:

– A_IndividualAddress_Read

4.2.3 Sequence



4.2.4 Exception handling

Always wait until the timeout has elapsed. Collect all responses during this timeout.

If no A_IndividualAddress_Response is received, no device is in programming mode.
If one A_IndividualAddress_Response is received, exactly one device is in programming mode.
If more than one response is received, several devices are in programming mode.
If two or more responses with the same individual address are received, there is more than one device with the same individual addresses.

Do not evaluate Layer-2 repetitions.

4.3 NM_IndividualAddress_Write

4.3.1 Description

This network management procedure shall be used to write the individual address of one single device which is in programming mode.

The procedure shall wait until exactly one device is in programming mode. It shall check that no other device has the same individual address and only one device is in programming mode. The procedure shall check if the programming was successful and switch off the programming mode by executing a restart of the device.

When applicable this procedure shall be preceded by the configuration of the individual addresses of the installed routers and the domain addresses.

4.3.2 Used management services

The NM_IndividualAddress_Write procedure shall use the following management services:

- A_IndividualAddress_Read
- A_IndividualAddress_Write
- A_DeviceDescriptor_Read
- A_Restart
- A_Connect

4.3.3 Sequence

Management client		Network / Management server	Remark
1. Verify if individual address exists:			
	A_Connect-PDU (indiv. addr. = PPPP) →		negative A_Connect.Lcon ⇒ individual address not used
if positive A_Connect.Lcon is received			
	A_DeviceDescriptor_Read-PDU () →		
	← A_DeviceDescriptor_Response-PDU (mask version)		no A_DeviceDescriptor_Response received ⇒ individual address not used
endif			
	A_Disconnect_Req () →		

Management client		Network / Management server	Remark
2. Wait until device is in programming mode:			
repeat until one A_IndividualAddress_Response is received			
	A_IndividualAddress_Read-PDU () →		
	← A_IndividualAddress_Response-PDU (indiv. addr. = AAAA)		One or more responses may be received from different devices timeout: 1 s
	... ←		
if more than one response is received ⇒ more than one device in programming mode			
end repeat			