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Technical Specification

Digital Video Broadcasting (DVB); IEEE 1394 Home Network Segment

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650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - NAF 742 C
Association à but non lucratif enregistrée à la
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Foreword

This Technical Specification (TS) has been produced by Joint Technical Committee (JTC) Broadcast of the European Broadcasting Union (EBU), Comité Européen de Normalisation ELECtrotechnique (CENELEC) and the European Telecommunications Standards Institute (ETSI).

NOTE: The EBU/ETSI JTC Broadcast was established in 1990 to co-ordinate the drafting of standards in the specific field of broadcasting and related fields. Since 1995 the JTC Broadcast became a tripartite body by including in the Memorandum of Understanding also CENELEC, which is responsible for the standardization of radio and television receivers. The EBU is a professional association of broadcasting organizations whose work includes the co-ordination of its members' activities in the technical, legal, programme-making and programme-exchange domains. The EBU has active members in about 60 countries in the European broadcasting area; its headquarters is in Geneva.

European Broadcasting Union
CH-1218 GRAND SACONNEX (Geneva)
Switzerland
Tel: +41 22 717 21 11
Fax: +41 22 717 24 81

Founded in September 1993, the DVB Project is a market-led consortium of public and private sector organizations in the television industry. Its aim is to establish the framework for the introduction of MPEG-2 based digital television services. Now comprising over 200 organizations from more than 25 countries around the world, DVB fosters market-led systems, which meet the real needs, and economic circumstances, of the consumer electronics and the broadcast industry.

1 Scope

The present document covers a wired Home Network Segment based on IEEE 1394 technology, as described in the Architecture Framework document [1]. The present document concentrates on how IP traffic for DVB services will be carried over IEEE 1394 technology. This covers the encapsulation of IP packets in the IEEE 1394 Serial Bus packets. All the IP related functionality such as initial registration and configuration (including IP address assignment) are covered in other standards. In terms of the IPI Architecture document, the present document pertains to the interfaces IPI-1, IPI-2 and IPI-3.

It is not the intention to come up with a completely new standard but to refer as far as possible to existing standards. The present document should meet the existing commercial requirements as defined in CM255rev4 (see Bibliography).

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication and/or edition number or version number) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies.

[1] ETSI TR 102 033 (V1.1.1): "Digital Video Broadcasting (DVB); Architectural framework for the delivery of DVB-services over IP-based networks".

[2] IEEE P1394.1 (2001): "High Performance Serial Bus Bridges Working group".

[3] ETSI TS 101 225 (V1.1.1): "Digital Video Broadcasting (DVB); Home Local Network Specification based on IEEE 1394".

[4] IETF RFC 2734 (1999): "IPv4 over IEEE 1394".

[5] IETF RFC 2855 (2000): "DHCP for IEEE 1394".

[6] IETF RFC 2998 (2000): "A Framework for Integrated Services Operation over Diffserv Networks".

[7] IETF RFC 3246 (2002): "An Expedited Forwarding PHB (Per-Hop Behavior)".

[8] IETF RFC 2597 (1999): "Assured Forwarding PHB Group".

3 Abbreviations

For the purposes of the present document, the following abbreviations apply:

DHCP	Dynamic Host Configuration Protocol
DSCP	Diffserv Codepoint
DVB	Digital Video Broadcasting
HNCD	Home Network Connecting Device
HNS	Home Network Segment
IEEE	Institute of Electrical and Electronics Engineers
IETF	Internet Engineering Task Force
IHDN	In-Home Digital Network
IP	Internet Protocol
IPI	Internet Protocol Infrastructure
QoS	Quality of Service

4 Topology of an IEEE1394 Home Network Segment

Based on the description of a Home Network Segment (HNS) in the architectural framework specification [1], an IEEE 1394 - HNS consists of one IEEE 1394 bus. The physical topology of an IEEE 1394 bus is a tree structure.

The description of the Home Reference Model in the architectural framework specification [1], furthermore introduces a so-called Home Network Connecting Device (HNCD). An HNCD can act as a bridge, router or gateway and connects HNSs with each other. Based on this, an HNCD connecting two IEEE 1394 buses with each other will contain a bridge component based on the IEEE 1394 bus bridge specification [2].

The general specification of the IEEE 1394 media and connectors, physical layer, and data link layer, can be found in clause 3.1 through 3.3 of the DVB-IHDN Home Local Network specification [3].

5 Carriage of IP-based Traffic

Within the context of the architectural framework specification [1], all IP-based traffic will be carried transparently over an IEEE 1394 network. Therefore the interfaces IPI-1, IPI-2, and IPI-3 on an IEEE1394 - HNS, shall comply to the IETF specification IPv4 over IEEE 1394 [4].

For the addressing of devices on an IEEE 1394 network, some fields of DHCP have to be filled in a specific way, due to the fact that IEEE 1394 uses a different link layer addressing method than conventional IEEE802/Ethernet. Therefore, all the IP-based traffic shall also comply to the IETF specification DHCP for IEEE 1394 [5]. This means that this IETF specification has to be supported on the interfaces IPI-1, IPI-2, and IPI-3 in case of an IEEE 1394 - HNS.

All other IP-based functionality required to carry IP traffic over an IEEE 1394 - HNS and via an HNCD connecting two IEEE 1394 buses or an IEEE 1394 bus with another type of HNS can be found in the network provisioning and IP addressing specification Draft IPI2001-071 (see Bibliography).

6 QoS

Because it is expected that the IP traffic transported on a network will consist of types with varying importance, priority levels shall be given to the different traffic types. Therefore all traffic on the interfaces IPI-1, IPI-2, and IPI-3 has to be marked to ensure consistency. The marking shall be based on the DiffServ CodePoint (DSCP) marking method [6] as is shown in table 1.

Table 1: DSCP Values and corresponding IEEE 1394 transaction code

Traffic type	IP DSCP value	Corresponding IP precedence	Per hop behaviour	Corresponding IEEE1394 transaction code
Voice bearer	0b101110	0b101	EF [7]	0x0A
Video bearer (high priority)	0b100010	0b100	AF41 [8]	0x0A
Video bearer (lower priority)	0b100100	0b100	AF42	0x0A
Voice and video signalling	0b011010	0b011	AF31	0x01
Best effort data	0b000000	0b000	-	0x01
NOTE: In the context of DVB, the Voice bearer is used to identify DVB audio services.				

For a HNS based on IEEE 1394 these DSCP values are used to map a traffic type on the corresponding IEEE 1394 transaction code. The IEEE 1394 transaction codes are described in the IETF specification IPv4 over IEEE 1394 [2].

Annex A (informative): Bibliography

CM255rev4 (03/2001): "Commercial Requirements for Multimedia Services over Broadband IP in a DVB Context".

Draft IPI2001-071: "Network Provisioning and IP Addressing".

History

Document history		
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