

# CTA Standard

**IP-Based Digital Telephony for the  
Versatile Home Network**

**CTA-851.1-A R-2014**

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**Consumer  
Technology  
Association™**

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# **IP-Based Digital Telephony for the Versatile Home Network**

## **FOREWORD**

This standard was developed under the auspices of the R-7.4 Joint CEA/VESA Subcommittee.

The Video Electronics Standards Association (VESA) established the VESA Home Network (VHN) Committee in 1995 to develop architecture for a digital, broadband home network. The VHN standard was initially developed by the VESA Home Network Committee. However, it was never ratified as a VESA standard.

In June 1999, the Consumer Electronics Association (CEA) established the R7 Committee to help harmonize the several efforts being undertaken to develop home networking standards. In January 2000, the Board of Directors of VESA and the Board of Directors of the Consumer Electronics Association agreed to merge the VESA Home Network and the CEA R7 Committee, by establishing the CEA R7.4 Subcommittee.

After publication of CEA-851, the "VHN Home Network Specification," in October, 2000, R7.4 immediately began work on expanding and augmenting Version 1 of the standard. In order to avoid delays in making new material available, as new sections are developed, they will be issued as separate standards in the 851 series. This standard, CEA-851.1-A, specifies the implementation of digital telephony in the VHN.

## **1. INTRODUCTION**

This standard defines IP-based telephony for the Versatile Home Network (VHN). Note that digital telephony does not require the use of the Internet Protocol suite; however, we leave discussion of implementing non-IP telephony on the VHN to a later version of this Standard.

We note first that, as the VHN is an IP-based internet, it is capable of transporting any IP traffic, regardless of the interpretation of the packet contents. Thus, IP-based telephony transport is “native” to the VHN, and the VHN is transparent to the transport of “telephony” packets. However, as with other services that may be provided using the VHN, control signals for IP telephony require some attention.

In addition, as telephony usually implies connectivity to a public telephone network outside the home, it will be necessary for the IP telephony end device (which may not be a traditional telephone set) to have a logical interface with software that will probably reside on an access-backbone interface or an access-component interface, such as a Residential Gateway or a cable modem. While it is beyond the scope of this Standard to specify the architecture or operation of these devices, we feel it is important to require the presence of certain software on the access interfaces.

## **2. GENERAL**

### **2.1 Scope**

This standard addresses IP-based digital telephony (sometimes referred to as “Voice over IP”) on the VHN. As the VHN is inherently digital it does not address analog telephony; nor does it address non-packet digital telephony, such as the streaming service provided by ISDN. However, future versions of this standard may address non-IP telephony.

Although this Standard has been issued as a separate document, it is an integral part of CEA-851, “VHN Home Network Specification.” Requirements and specifications in CEA-851 also implicitly apply to the functions and devices described in this Standard, unless there specifically stated otherwise.

Also, note that this Standard defines the requirements for implementing a telephony function on a VHN. As such, it is not a device description. Any VHN device that implements telephony is also expected to implement all other parts of CEA-851 that are applicable and appropriate for such a device. For example, CEA-851 requires that a VHN device support a web server; thus, any device implementing the telephony function, as described in this Standard, would be expected to include a web server that would conform to the requirements in CEA-851.

### **2.2 Normative References**

The following standards contain provisions that, through reference in this text, constitute normative provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards listed in Sec. 2.2.1. If the referenced standard is dated, the reader is advised to use the version specified.

#### 2.2.1 Normative Reference List:

1. CEA-851, “VHN Home Network Specification,” October 2000.
2. IETF RFC 2543, “SIP: Session Initiation Protocol,” March 1999.

#### 2.2.2 Normative Reference Acquisition:

CEA standards can be ordered from Global Engineering Documents, <http://global.ihs.com/>.

IETF RFCs may be downloaded from <http://www.rfc-editor.org/>.

### **2.3 Informative References**

The following documents contain information that is useful in understanding this standard. Some of these documents are drafts of standards that may become normative references in a future release of this standard.

2.3.1 Informative Document List:

3. ITU-T Recommendation H.323, "Packet-based multimedia communication systems".
4. IETF RFC 1889, "RTP: A Transport Protocol for Real-Time Applications," January 1996.

2.3.2 Informative Document Acquisition:

ITU-T

International Telecommunications Union, Place des Nations, CH-1211 Geneva 20, Switzerland; Phone +41 22 730 5111; Fax +41 22 733 7256; Internet <http://www.itu.ch/publications/bookstore.html>; Email [itumail@itu.int](mailto:itumail@itu.int).

IETF

IETF RFCs may be downloaded from <http://www.rfc-editor.org/>.

## **2.4 Symbols and Abbreviations**

|       |  |
|-------|--|
| IETF  | Internet Engineering Task Force        |
| ISDN  | Integrated Services Digital Network    |
| ITU   | International Telecommunications Union |
| POTS  | Plain Old Telephone Service            |
| RTP   | Real-time Transport Protocol           |
| SIP   | Service Initiation Protocol            |
| SONET | Synchronous Optical Network            |
| VHN   | Versatile Home Network                 |

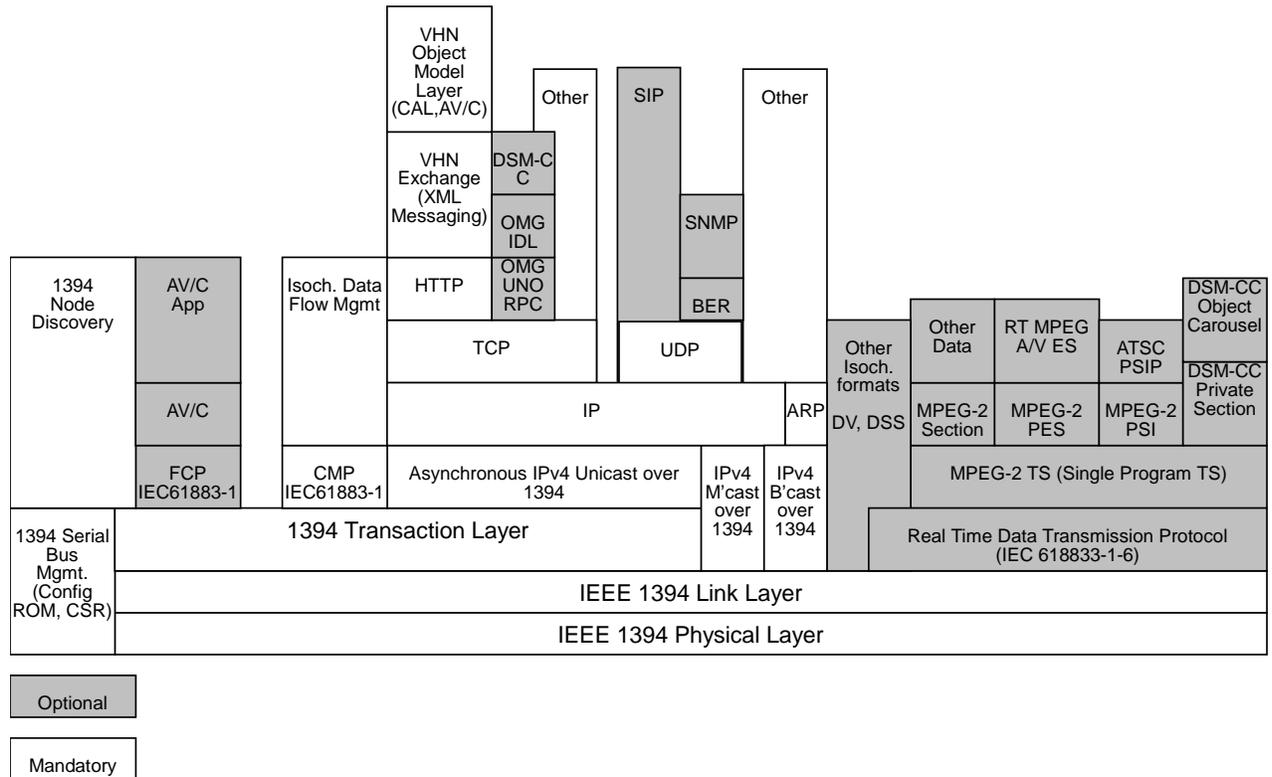
## **2.5 Compliance Notation**

As used in this document, "*shall*" and "*must*" denote a mandatory provisions of the standard. "*Should*" denotes a provision that is recommended but not mandatory. "*May*" denotes a feature whose presence does not preclude compliance that may or may not be present at the option of the implementer. "*Optional*" denotes items that may or may not be present in a compliant DTV.

### 3. IP-based Digital Telephony

IP-based telephony in the VHN, as described in Annex A, is affected by implementation of the following requirements:

1. All telephony end devices on the VHN **shall** implement the SIP [2] protocol, known heretofore as a “SIP stack.”
2. All telephony control signals and all packets, including signals that are inherently isochronous, such as voice or video, or other telephony user traffic **shall** be carried only as asynchronous packets on the IEEE 1394b backbone and on IEEE 1394a component networks of the VHN. As the SIP protocol assumes asynchronous service, use of the IEEE 1394 isochronous service for IP-based digital telephony is not supported in this Standard; if a user prefers to implement telephony on the IEEE 1394 isochronous channels, it is the responsibility of the user to define the interfaces between asynchronous services and the IEEE 1394 isochronous stream, as well to manage IP telephony as an IEEE 1394 isochronous service (i.e. to define allocation of bandwidth, channel numbers, and applications that control user access to telephony services).
3. If a VHN implements IP telephony within the home, it **shall** host the required SIP software, including a SIP proxy server, on a networked device.
4. Connection to the public telephone network is effected through an access-backbone interface or an access-component interface. Note that the internal architecture of such devices is outside the scope of this Standard; nevertheless, we require that if such a device is connected to the VHN to effect an IP telephony connection to the public telephone network, that device **shall** host a SIP proxy server, and any other SIP software necessary to realize an IP telephony connection to the public telephone network.
5. These specifications require modifications to the VHN Protocol Stack (Figure 6 in CEA-851 [1]). These changes are reflected in the revised Protocol Stack Figure 1 below.



**Figure 1 Revised VHN Protocol Stack (replaces Figure 6 in CEA-851)**

## **ANNEX A: IP-Based Telephony**

### **(Informative)**

#### ***A.1 Introduction***

In this section we address the implementation of IP-based digital telephony on the VHN. Note that digital telephony does not require the use of the Internet Protocol suite<sup>1</sup>; however, we leave discussion of implementing non-IP telephony on the VHN to a later version of this Standard.

We first note that, as the VHN is an IP-based internet, it is capable of transporting any IP traffic, regardless of the interpretation of the packet contents. Thus, IP-based telephony transport is “native” to the VHN, and the VHN is transparent to the transport of “telephony” packets. However, as with many other services that may be provided over the VHN, control signals for IP telephony require some attention.

In addition, as telephony usually implies connectivity to a public telephone network outside the home, it will be necessary for the IP telephony end device (which may not be a traditional telephone set) to have a logical interface with software that will probably reside on an access-backbone interface or an access-component interface, such as a Residential Gateway or a cable modem. While it is beyond the scope of this Standard to specify the architecture or operation of these devices, we feel it is important to require the presence of certain software on the access interfaces.

#### ***A.2 Assumptions***

We begin by stating some assumptions underlying the telephony specifications in this Standard:

##### ***A.2.1 Digital Telephony (not POTS)***

As the VHN is a *digital* network, we assume that specifications for telephony exclude analog systems, such as “Plain Old Telephone Service” (POTS). At this time, almost all telephony is analog, but the presence of digital telephony is expected to grow over the next several years. For the transition period between analog and digital telephone systems it is suggested that digital systems have “friendly” codec(s) for existing analog devices such as fax/modem devices. We confine our discussion to the integration of these emerging digital telephony technologies into the VHN.

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<sup>1</sup> For instance, ISDN uses synchronous streams that are circuit-switched, rather than packet-switched.