

OpenCable™ Specifications Host Extensions

OpenCable Host Home Networking Extension 2.0

OC-SP-HOST-HN2.0-I01-080418

ISSUED

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- Work in Progress** An incomplete document, designed to guide discussion and generate feedback, that may include several alternative requirements for consideration.
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1 SCOPE

1.1 Introduction and Overview

The OpenCable Host specification [HOST2.1] defines bidirectional digital set-top boxes (OCS2) and bidirectional integrated terminal devices (OCT2). This specification defines the requirements for either OCS2 or OCT2 devices to be extended to include IP-based Phase 2 home networking support and enable home networking features to be implemented using the OCAP Home Networking Extension specification [OCAP HN]. Phase 2 home networking includes support for new physical networks, QoS, and secure transmission of MSO premium content.

Three primary use cases are specifically supported to enable multi-room DVR functionality. The three use cases are:

- Playback of DVR-recorded content from a non-DVR device,
- Scheduling DVR recording from a non-DVR device,
- Trick Modes (Pause/rewind/fwd) from a non-DVR box.

1.2 Purpose of document

This specification defines minimum technical requirements that must be added to an OpenCable Host device to support OCAP Phase 2 Home Networking Extensions.

1.3 Requirements

Throughout this document, the words that are used to define the significance of particular requirements are capitalized. These words are:

“SHALL”	This word means that the item is an absolute requirement of this specification.
“SHALL NOT”	This phrase means that the item is an absolute prohibition of this specification.
“SHOULD”	This word means that there may exist valid reasons in particular circumstances to ignore this item, but the full implications should be understood and the case carefully weighed before choosing a different course.
“SHOULD NOT”	This phrase means that there may exist valid reasons in particular circumstances when the listed behavior is acceptable or even useful, but the full implications should be understood and the case carefully weighed before implementing any behavior described with this label.
“MAY”	This word means that this item is truly optional. One vendor may choose to include the item because a particular marketplace requires it or because it enhances the product, for example; another vendor may omit the same item.

2 REFERENCES

2.1 Normative References

In order to claim compliance with this specification, it is necessary to conform to the following standards and other works as indicated, in addition to the other requirements of this specification. Notwithstanding, intellectual property rights may be required to use or implement such normative references.

- [HOST2.1] OpenCable Host Device 2.1 Core Functional Requirements Specification, OC-SP-HOST2.1-CFR-I04-080404, April 4, 2008, Cable Television Laboratories, Inc.
- [OCAP1.0] OpenCable Application Platform Specification (OCAP), OC-SP-OCAP1.0.2-080314, March 14, 2008, Cable Television Laboratories, Inc.
- [OCAP HN] OCAP Home Networking Extension, OC-SP-OCAP-HNEXT-I03-080418, April 18, 2008, Cable Television Laboratories, Inc.
- [OCAP DVR] OCAP Digital Video Recorder (DVR), OC-SP-OCAP-DVR-I04-071220, December 20, 2007, Cable Television Laboratories, Inc.
- [HOST DVR] Host DVR Extension, OC-SP-HOST2-DVREXT-I01-050502, May 2, 2005, Cable Television Laboratories, Inc.
- [IEEE 802.3] IEEE 802.3-2002: IEEE Standard for information technology – Telecommunications and information exchange between systems – Local and metropolitan area networks – Specific requirements – Part 3: Carrier sense multiple access with collision detection (CSMA/CD) access method and physical layer specification, March 8, 2002.
- [IEEE 802.1D] IEEE 802.1D-2004 IEEE standard for local and metropolitan area networks--Media access control (MAC) Bridges (Incorporates IEEE 802.1t-2001 and IEEE 802.1w)
- [HNP2] OpenCable Home Networking Protocol 2.0, OC-SP-HNP2.0-I01-080411, April 11, 2008, Cable Television Laboratories, Inc.
- [RSD PROT] Reserved Services Domain Protocols 1.0 Specification, OC-SP-RSD-PROT-D01-080404, April 4, 2008, Cable Television Laboratories, Inc.
- [RSD TECH] Reserved Services Domain Technology 1.0 Specification, OC-SP-RSD-TECH-D01-080229, February 29, 2008, Cable Television Laboratories, Inc.
- [47CFR76] Code of Federal Regulations, Part 76, Subpart W - Encoding rules, §76.1908

2.2 Informative References

This following documents are informative references.

- [OCHN ARCH] OpenCable Home Networking Architecture 2.0 Technical Report, OC-TR-HN-ARCH2.0-D01-080418, April 18, 2008, Cable Television Laboratories, Inc.

2.3 Reference Acquisition

- Cable Television Laboratories, Inc., 858 Coal Creek Circle, Louisville, CO 80027; Phone 303-661-9100; Fax 303-661-9199; Internet: <http://www.cablelabs.com/>
- IEEE, www.ieee.org
- Code of Federal Regulations, National Archives and Records Administration, www.gpoaccess.gov/cfr/index.html

3 TERMS AND DEFINITIONS

This specification contains the following terms and definitions.

OpenCable Digital Media Player	An OpenCable Home Networking device capable of playing digital media across an IP-based network. It is a UPnP-compliant Digital Media Player with additional requirements imposed by OpenCable.
OpenCable Digital Media Server	An OpenCable Home Networking device capable of serving digital media across an IP-based network. It is a UPnP-compliant Digital Media Server with additional requirements imposed by OpenCable.

4 ABBREVIATIONS AND ACRONYMS

This specification uses the following abbreviations:

AV	Audio/Video
HNHost	Home Networking Host
LAN	Local Area Network
MAC	Media Access Control
OC-DMP	OpenCable Digital Media Player
OC-DMS	OpenCable Digital Media Server
OCAP	OpenCable Application Platform Specification
OCAPHN	OCAP Home Networking Extension

5 TECHNICAL REQUIREMENTS

This section contains the technical requirements for this specification.

5.1 General Requirements

5.1.1 OpenCable HOST 2.1 Compliance

The HNHost SHALL comply with all normative requirements in [HOST2.1].

If the HNHost implements Digital Video Recorder (DVR) functionality, the device SHALL comply with all normative requirements in [HOST DVR].

5.1.2 Middleware

The HNHost SHALL comply with all normative requirements of [OCAP HN].

The HNHost SHALL support the mapping between the OCAP Home Networking Extension API [OCAP HN] and LAN protocol messaging as defined in [HNP2].

5.2 Network Interface

5.2.1 Physical and MAC Layers

The HNHOST SHALL implement at least one physical network interface that meets the requirements as specified in [RSD TECH]. Such network interface is termed the RSD Technology interface.

The HNHost MAY provide a 10BASE-T / 100BASE-TX Ethernet physical interface and MAC layer for the LAN interface as specified in IEEE 802.3i and IEEE 802.3u [IEEE 802.3].

The HNHOST MAY implement bridging between multiple physical network interfaces as defined in [IEEE 802.1D].

5.2.2 Network Layer

The HNHost SHALL provide a network and transport layer for the LAN interface as specified in [HNP2].

5.3 Media Types

The HNHOST SHALL support rendering of AV media types and formats as specified in [HOST2.1], [OCAP1.0], and [HNP2]. This includes both broadcast streaming and monomedia-based content formats.

The HNHOST SHALL support serving of AV media types and formats as specified in [HOST2.1], [OCAP1.0], and [HNP2] if the device implements [HOST DVR]. This includes both broadcast streaming and monomedia-based content formats.

5.4 Quality of Service (QoS)

The HNHOST MAY implement RSD Manager and RSD Controller functionality as defined in [RSD PROT].

If the HNHost consists of only one RSD Technology interface or multiple non-bridged RSD Technology interfaces, then the HNHost MAY implement RSD Host functionality as defined in [RSD PROT].

If the HNHost implements multiple bridged RSD Technology interfaces, then the HNHOST MAY comply with the RSD Bridge functionality as defined in RSD-PROT Specifications [RSD PROT].

If the HNHost implements Ethernet interface that is bridged to the RSD Technology interface, then the HNHost MAY comply with the PSD Bridge functionality as defined in the [RSD PROT] specifications.

5.5 Content Security

The HNHOST SHALL follow encoding and distribution rules for distribution of protected cable-delivered content as specified by [47CFR76].

5.6 Device Interoperability

The HNHost SHALL comply with the requirements specified in [HNP2].

5.7 SNMP MIBs

The HNHost SHALL comply with the requirements specified in [HNP2].

5.8 Jitter

The HNHost performs the de-jitter operation. The MPEG standard allows only about 4-ms of jitter. Network jitter often may exceed this threshold. The HNHost provides a de-jitter buffer.

When operating as an OC-DMP, the HNHost SHALL support a de-jitter operation and provide a de-jitter buffer of at least 200 ms.

When operating as an OC-DMS, the HNHost SHALL maintain an index file based on PCR chunks and provide a de-jitter buffer of at least 200 ms.

