

OpenCable™ Specifications

Out-of-Band Transfer Interface Specification

OC-SP-OOB-I01-051118

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.

- Draft** A document in specification format considered largely complete, but lacking review by Members and vendors. Drafts are susceptible to substantial change during the review process.

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1 PREFACE

1.1 Scope

This document specifies the content and implementation of the out-of-band (OOB) transfer interface.

This document does not specify any other interfaces of the Object Carousel generator or the headend equipment.

1.1 Introduction and Purpose

This document specifies the interface for the transfer of XAIT information from an OCAP Object Carousel generator to headend equipment.

1.2 Requirements

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

“MUST” / “SHALL”	This word or the adjective “REQUIRED” means that the item is an absolute requirement of this specification.
“MUST NOT” / “SHALL NOT”	This phrase means that the item is an absolute prohibition of this specification.
“SHOULD”	This word or the adjective “RECOMMENDED” 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 or the adjective “OPTIONAL” 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.

- [OCAP] OpenCable Application Platform, OCAP1.0, OC-SP-OCAP1.0-I16-050803, August 3, 2005, Cable Television Laboratories, Inc.
- [CCIF] CableCARD Interface 2.0 Specification, OC-SP-CCIF2.0-I03-051117, November 17, 2005, Cable Television Laboratories, Inc.

2.2 Reference Acquisition

CableLabs Specifications:

- Cable Television Laboratories, Inc., 858 Coal Creek Circle, Louisville, CO 80027; Phone 303-661-9100; Fax 303-661-9199; Internet: <http://www.cablelabs.com/>

3 TERMS AND DEFINITIONS

This specification uses the following terms and definitions:

XAIT Extended Application Information Table, signaling unbound OCAP applications

4 ABBREVIATIONS AND ACRONYMS

This specification uses the following abbreviations and acronyms:

AIT	Application Information Table, signaling service-bound OCAP applications
IB	In-band
CVT	Code Version Table
OC	Object Carousel
OCAP	OpenCable Application Platform
OOB	Out-of-band
PID	Packet Identifier
TS	Transport Stream
XAIT	Extended Application Information Table

5 OVERVIEW

The system context showing the relationship between the Object Carousel Generation, Headend Equipment, Delivery System and the use of the XAIT transfer interface is shown in Figure 5–1.

This specification allows for the substitution of either the Object Carousel generator or the Headend equipment with test equipment.

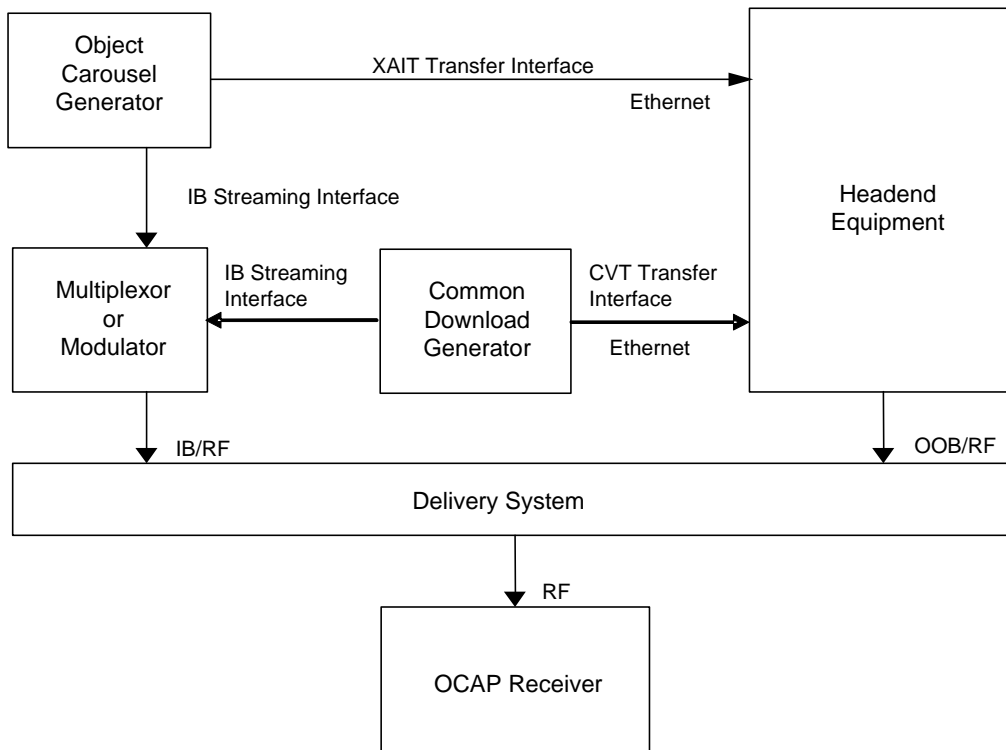


Figure 5–1 - System Overview

5.1 XAIT interface

The Object Carousel Generator typically provides output through two interfaces:

- An IB streaming interface, delivering a continuous playout of one or more Object Carousels, optionally combined with PAT, PMT and other SI. This is delivered over ASI or Gigabit Ethernet to a modulator or multiplexer to be inserted into the delivery system as part of an IB Transport Stream.
- An OOB transfer interface delivering XAIT signaling to the Headend equipment. This is delivered each time the XAIT signaling is changed using an HTTP 1.1 transaction to Headend equipment.

The Headend equipment inserts the XAIT information into the delivery system as part of the OOB information flow.

5.2 CVT Interface

This interface is designed to support the CVT method of the "Download Protocols" of Common Download delivery as defined in [CCIF] section 9.19.

The Common Download generator typically provides output through two interfaces:

- An IB streaming interface, delivering a continuous playout of one or more Data Carousels containing code images, optionally combined with other stream components. The resulting Transport Stream is delivered over ASI or Gigabit Ethernet to a modulator or multiplexer to be inserted into the delivery system as part of an IB Transport Stream.
- A CVT transfer interface, delivering CVT signaling to the Headend equipment. This is delivered each time the CVT is changed using an HTTP 1.1 transaction to Headend equipment.

The Headend equipment inserts the CVT information into the delivery system as part of the OOB information flow.

5.3 Future versions (Informative)

Future versions of this specification will include support for multiple XAITs and support for OOB Object Carousels.

6 XAIT INTERFACE

6.1 Introduction

The XAIT is generated as a series of one or more sections carrying an XAIT table as defined in [OCAP] section 11.2.2.3.

Note that the Source Ids and Component Tags used to identify an Object Carousel in the XAIT must match the signaling of the of the Transport Stream in which the Object Carousel is carried after processing by the delivery system.

6.2 Packaging and Delivery

The Object Carousel generator transfers the XAIT as a "transport stream kit". A transport stream kit consists of a number of data files and a control file. Each data file contains one or more MPEG-2 sections, carried into one or more 188-byte MPEG-2 transport stream packets. The control file is an XML file that identifies the components carried in the data files and defines the recommended delivery characteristics for the sections. The format of the control file that is relevant to this interface is defined by the DTD in Section 7 of this document.

The Object Carousel generator SHALL transfer the XAIT to the Headend equipment whenever the XAIT is changed. To carry the XAIT, the Object Carousel generator SHALL create a control file, called "stream-control" and a single data file containing a packetized XAIT table. The control file SHALL reference the single data file by its file name. The Object Carousel generator SHALL create a zip archive containing the two files and transfer it using an HTTP 1.1 POST transaction to a nominated URL.

To transfer the XAIT to the third party equipment, the transport stream generator SHALL perform an HTTP 1.1 POST transaction to a nominated URL. The HTTP 1.1 POST request has the following parameters:

Table 6-1 - XAIT Transport Stream Kit

Name	Type	Value
XAIT	String	This is set to "yes" to indicate that the transaction is being used to transfer XAIT information.
KIT	"application/x-zip-compressed"	This contains the zip archive containing the transport stream kit containing the XAIT.

If the Headend equipment returns an HTTP failure code or fails to respond, the transport stream generator MAY, depending on the circumstance, attempt to transfer the XAIT subsequently until the XAIT is successfully transferred.

7 TRANSPORT STREAM KIT CONTROL FILE DEFINITION

```

<!ELEMENT ocplay (streamset)>
<!ELEMENT streamset (stream*)>
<!ATTLIST streamset bitrate          CDATA    #IMPLIED
                    description       CDATA    #IMPLIED
                    maxsectionsperpacket NMTOKEN #IMPLIED>

<!ELEMENT stream (streamcomponent*)>
<!ATTLIST stream pid          NMTOKEN #REQUIRED
                    bitrate    CDATA    #IMPLIED>

<!ELEMENT streamcomponent ANY>
<!ATTLIST streamcomponent
                    filename      CDATA    #REQUIRED
                    contenttype   (si|dsmcc) #IMPLIED
                    repeatperiod  CDATA    #IMPLIED
                    size           NMTOKEN  #IMPLIED
                    description    CDATA    #IMPLIED>

```

Attribute	Units
bitrate	integer denoting bits per second
description	textual description
maxsectionsperpacket	natural number denoting how many sections may be placed in a transport stream packet; a value of zero indicates that a packet shall not contain data from more than one section
pid	natural number denoting pid value; XAITs will be carried on 0x1FFC
filename	name of the data file containing the packetized data for the component
repeatperiod	real number denoting the time in seconds between successive transmissions of the content if this component
size	size of this component in bytes

8 CVT TRANSFER INTERFACE

8.1 Content

The CVT information is delivered as a series of `code_version_table()` data structures as defined in [CCIF] section 9.19.3.5. These are delivered in a single table format defined in Table 8–1.

Table 8–1 - cvt_set_table

Syntax	# of Bits	Mnemonic
<pre>cvt_set_table() { number_of_cvts total_cvt_bytes for (l=0;l<number_of_cvts;l++) { code_version_table() } }</pre>	<p>16</p> <p>16</p>	<p>Uimssf</p> <p>Uimssf</p>

Note that the `frequency_vector`, `transport_value` and `PID` defined in each CVT must reference the configuration of the IB streams that carry the Common Download data in the delivery system.

8.2 Implementation

The Common Download generator SHALL transfer the CVT to the Headend equipment whenever the Common Download is changed.

The Common Download generator SHALL transfer the information using an HTTP 1.1 POST transaction to a nominated URL. The HTTP 1.1 POST request has the following parameters:

Name	Type	Value
CVTSET	String	This is set to "yes" to indicate that the transaction is being used to transfer CVT information.
DATA	(any)	This contains the <code>cvt_set_table</code> data structure

If the Headend equipment returns an HTTP failure code or fails to respond, the transport stream generator MAY, depending on the circumstance, attempt to repeat the transfer until the data is successfully transferred.