CI Plus Specification

v2.0.1 (2019-05)

**CI Plus Specification.
Extensions for Implementation Using the Universal Serial Bus.**

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Contents

1   Scope

This specification provides the description of a CI Plus LLP implementation for a device supporting the USB form factor, profiles the TS 103 605 [4] specification and specifies the form factor(s) (PCMCIA or USB) that such a CI Plus LLP compliant device can support.

2   References

[1]   CI Plus Specification v1.3.2 (2015-03): "Content Security Extensions to the Common Interface".

[2]   CI Plus Specification v1.4.3 (2017-11): "Content Security Extensions to the Common Interface".

[3]   Universal Serial Bus Specification, Revision 2.0.
http://www.usb.org/developers/docs/usb20_docs/usb_20_081018.zip

[4]   ETSI TS 103 605 v1.1.1 (2018-10): "Digital Video Broadcasting (DVB); Second Generation Common Interface (CI); Implementation Using the Universal Serial Bus (USB)".
https://www.etsi.org/deliver/etsi_ts/103600_103699/103605/01.01.01_60/ts_103605v010101p.pdf

[5]   ETSI TS 103 205 v1.2.1 (2015-11): "Digital Video Broadcasting (DVB); Extensions to the CI Plus Specification".
https://www.etsi.org/deliver/etsi_ts/103200_103299/103205/01.02.01_60/ts_103205v010201p.pdf

[6]   EN 50221:1996 (February, 1997): "Common Interface Specification for Conditional Access and other Digital Video Broadcasting Decoder Applications".
https://www.dvb.org/resources/public/standards/En50221.V1.pdf

[7]   ETSI TS 103 205 v1.4.1 (2019-05): "Digital Video Broadcasting (DVB); Extensions to the CI Plus Specification".
https://www.etsi.org/deliver/etsi_ts/103200_103299/103205/01.04.01_60/ts_103205v010401p.pdf

[8]   CI Plus Licensee Specification, available under licence from the CI Plus Trust Authority.

3   Definitions, symbols and abbreviations

3.1   Definitions

For the purposes of the present document, the following terms and definitions apply in addition to those defined in CI Plus Specification 1.3 [1] and CI Plus Specification 1.4 [2]:

USB CI Plus Slot: A USB Standard-A receptacle interface compliant with clause 6.5.3 of USB 2.0 [3] providing CI Plus functionality in compliance with the present document.

USB CI Plus CICAM: A CICAM supporting the USB form factor as specified in TS 103 605 [4] and the present document.

USB CI Plus Device: A USB CI Plus Host or a USB CI Plus CICAM.

USB CI Plus Host: A Host supporting the USB form factor as specified in TS 103 605 [4] and the present document.

3.2   Abbreviations

For the purposes of the present document, the following abbreviations apply in addition to those defined in CI Plus Specification 1.3 [1] and CI Plus Specification 1.4 [2]:

USB   Universal Serial Bus

3.3   Use of Words

The word *shall* is used to indicate mandatory requirements strictly to be followed in order to conform to the specification and from which no deviation is permitted *(shall* equals *is required to)*.

The word *should* is used to indicate that among several possibilities one is recommended as particularly suitable, without mentioning or excluding others; or that a certain course of action is preferred but not necessarily required *(should* equals *is recommended that)*.

The word *may* is used to indicate a course of action permissible within the limits of the specification *(may* equals *is permitted to)*.

4 USB Form Factor

This chapter profiles the TS 103 605 [4] specification and provides the description of a CI Plus LLP implementation for a device supporting the USB form factor.

A USB CI Plus Device shall implement all the mandatory requirements as specified in the CI Plus Specification 1.4 [2] except where otherwise specified in the present document.

4.1 Resource support

Table 4.1: Mandatory resources

Resource Name	Identifier	Class	Type	Version	Comment	Specification
Resource Manager	00 01 00 41	1	1	1		EN 50221 [6]
Application Information	00 02 00 45	2	1	5		TS 103 205 [7]
Conditional Access Support	00 03 00 41	3	1	1		EN 50221 [6]
Host Control	00 20 00 43	32	1	3		TS 103 205 [5]
Date-Time	00 24 00 41	36	1	1		EN 50221 [6]
MMI	00 40 00 41	64	1	1	High-Level only	EN 50221 [6]
Low Speed Communication	00 60 60 04	96	384	4	Where Host IP support exists	TS 103 205 [5]
Content Control	00 8C 10 04	140	64	4		TS 103 205 [7]
Host Lang & Country	00 8D 10 01	141	64	1		CI Plus 1.3 [1]
CICAM Upgrade	00 8E 10 01	142	64	1		CI Plus 1.3 [1]
Operator Profile	00 8F 10 02	143	64	2		TS 103 205 [5]

A USB CI Plus Host shall support the mandatory resources listed in Table 4.1 on all its USB CI Plus Slots. All resource versions listed in Table 4.1 shall be supported.

A USB CI Plus Host that supports an IP connection shall support the Low Speed Communication resource version 4 as defined in TS 103 205 [5] with device type 0x60 (IP connection) on all its USB CI Plus Slots.

A USB CI Plus Host shall support the MMI resource version 1 as defined in EN 50221 [6] on all its USB CI Plus Slots. Only the support of High-Level MMI is required. The support of Low Level MMI is not required.

A USB CI Plus Host may support lower versions of mandatory resources on its USB CI Plus Slot(s).

NOTE: This enables CI Plus Hosts to use the same CI Plus LLP implementation for both USB and PCMCIA CI Plus Slots.

A USB CI Plus Host that does not support lower versions of a mandatory resource shall respond with a session_status set to 'F0' when a CICAM requests the opening of that resource with a version lower than supported.

A USB CI Plus Host supporting one or more PCMCIA CI Plus Slots shall support all resource versions listed in Table 4.1 of CI Plus Specification 1.4 [2] on all its PCMCIA CI Plus Slots as defined in Annex E.18.2 of CI Plus Specification 1.3 [1]).

A USB CI Plus Host supporting multiple CI Plus Slots may support different optional resources (any resource not listed in Table 4.1) on each CI Plus Slot.

When requesting a session for a resource listed in Table 4.1, a USB CI Plus CICAM shall use the version of the resource listed in that table or a higher version if supported by the USB CI Plus CICAM and offered by the USB CI Plus Host.

Clause 6.3.3 of TS 103 605 [4] shall not apply and clause 8 of TS 103 605 [4] is optional.

For the avoidance of doubt:

- A USB CI Plus Host that supports an IP connection shall support the Low Speed Communication (LSC) resource as defined in clause 4.3 of CI Plus Specification 1.4 [2] on all its USB CI Plus Slots.
- A USB CI Plus CICAM shall comply with clause 4.3 of CI Plus Specification 1.4 [2].
- A USB CI Plus Device may support the Networking Interface as specified in clause 8 of TS 103 605 [4].

The modifications to resources and APDUs defined in clauses 6.3.1, 6.3.2 and 6.3.4 of TS 103 605 [4] shall apply.

For a USB CI Plus CICAM to self-reset and guarantee that it will be correctly re-enumerated by the USB CI Plus Host, it shall behave as if it was extracted and inserted again. The extraction can be achieved by disconnecting the pull-up resistor in the D+ line of the interface (see clauses 7.1.5, 7.1.7.3 of Universal Serial Bus Specification, Revision 2.0 [3]) and the insertion by re-activating the pull-up resistor. At which point the USB reset sequence (clause 7.1.7.5 of Universal Serial Bus Specification, Revision 2.0 [3]) and subsequent enumeration should continue as normal.

4.2   URI support

A USB CI Plus Host shall implement version 0x04 of the URI as specified in TS 103 205 [7] on all its USB CI Plus Slots.

A USB CI Plus Host is not required to support lower versions of URI on its USB CI Plus Slot(s).

4.3   Command Interface

In order to meet the timing requirements specified by CI Plus Specification 1.4 [2], such as those defined for the CCK refresh and URI refresh protocols, a USB CI Plus Device may need to prioritise USB bulk transfers for the Command Interface endpoints over USB bulk transfers for the USB Media Interface endpoints.

4.4   Media Interface

A USB CI Plus CICAM shall provide one and only one Media Interface as defined in clause 7 of TS 103 605 [4].

For its Media Interface, a USB CI Plus CICAM shall support USB 2.0 high-speed bulk endpoints as defined in clause 5.8 of USB 2.0 [3]. A USB CI Plus CICAM shall support the transfer of media at speeds of at least 96 Mbit/s in each direction on the Media Interface. To ensure transfer performance of encapsulated MPEG-TS packets over the Media Interface, the USB CI Plus CICAM should return fragments of the same size as those received from the USB CI Plus Host.

If the USB CI Plus CICAM implements watermarking as described in clause 5.2 of TS 103 205 [5], the CICAM should avoid the insertion or deletion of MPEG-TS packets whenever possible, for optimal USB CI Plus Host buffer management. Nevertheless, if the USB CI Plus CICAM implements watermarking by adding additional transport packets encapsulated in additional fragments that are significantly shorter than other fragments, then such short fragments should not be returned more frequently than the video frame rate.

A USB CI Plus Host shall support USB 2.0 high-speed operation as defined in USB 2.0 [3] and clause 7 of TS 103 605 [4].

If a USB CI Plus Host needs to minimize bandwidth usage and system load, then it is permitted to filter out null packets and Audio and/or Video Elementary Streams of the non-selected service(s). A USB CI Plus Host is not required to support multi stream functionality as defined in clause 5.1 CI Plus Specification 1.4 [2] for the sole purpose of PID filtering.

A USB CI Plus Host is not required to support Host Service Shunning (as specified in clause 10 of CI Plus Specification 1.3 [1]) on its USB CI Plus Slot(s).

A USB CI Plus Device shall always set the protocol_version to zero in the transmitted fragment_header().

A USB CI Plus Device shall ignore the protocol_version of the received fragment_header().

4.5   Optional Functionalities

A USB CI Plus Device may support any of the optional functionalities listed in clause 5 of CI Plus Specification 1.4 [2] and as modified by TS 103 605 [4].

5   Form Factor Support

This chapter specifies CI Plus slot form factor support for USB CI Plus Devices compliant with the present document.

A USB CI Plus CICAM shall support the USB form factor as specified in TS 103 605 [4], in compliance with the present document, and shall not support the PCMCIA form factor as specified in EN 50221 [6].

A USB CI Plus Host shall provide at least one USB CI Plus Slot with the USB form factor as specified in TS 103 605 [4], in compliance with the present document. A USB CI Plus Host may provide CI Plus slots with the PCMCIA form factor as specified in EN 50221 [6], in compliance with the CI Plus Specification 1.4 [2]. A USB CI Plus Host may support one CI Plus slot or multiple CI Plus slots, with the same or different form factors.

History

<table>
<tr><td colspan="3" align="center">Document history</td></tr>
<tr><th>Version</th><th>Date</th><th>Description</th></tr>
<tr><td>2.0.1</td><td>16-May-2019</td><td>Introduction of the USB form factor.</td></tr>
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