

ANSI/CTA Standard

USB Carkit Specification

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(Formulated under the cognizance of the CEA's Mobile Electronics Committee, which is now known as CTA's **R6 Portable, Handheld and In-Vehicle Electronics Committee.**)

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Foreword

This standard was developed under the auspices of the Consumer Electronics Association (CEA) R6 Mobile Electronics Committee.

The On-The-Go (OTG) Supplement to the Universal Serial Bus (USB) 2.0 Specification has a number of features that make OTG an attractive wired interface for cell phones, including:

- limited host capability for point to point connection between portable devices
- small connectors
- low power features

However, most cell phones have the added requirement that they need to connect to carkits through their wired interface. A carkit is an after-market device that is installed in a car. It contains a speaker and a microphone, and draws current from the car power adapter. A carkit acts as a speaker-phone attachment to a cell phone, and allows hands free operation of a cell phone. A carkit can also be built in to a car stereo system.

If a cell phone has a Mini-USB or Mini-USB Carkit Class Connector (Mini-USB-cr) receptacle, then the options for connecting the phone to a carkit include:

- transfer digital audio between the phone and the carkit using the USB interface
- add a separate connector to the phone for transferring analog audio signals to the carkit
- multiplex the analog audio signals over the mini-USB receptacle on the phone

The first option would add complexity to the carkit, since the carkit would have to include a USB host controller, frequency reference, audio codecs, memory, software driver, etc.

The second option would add additional complexity and size to the phone. Most phones have only one data connector right now, so adding a second data connector is not an attractive option.

The third option provides the least complex solution for both the phone and the carkit. The phone can use a single connector for both digital data and analog audio, thus minimizing both size and complexity. The carkit can implement analog audio signaling, without including codecs or a USB controller.

CEA-936-A supersedes CEA-936.

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USB CarKit Specification

1 Scope

CEA-936-A defines a standard method for routing audio and Universal Asynchronous Receiver Transmitter (UART) signals through a USB receptacle on a phone to a USB analog carkit and to other accessories such as chargers and RS232 devices.

This specification is intended for developers of On-The-Go (OTG) transceivers, cell phones, carkits, and car stereos.

2 References

2.1 Normative References

The following references 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 Section 2.1.1 .

2.1.1 Normative Reference List

- On-The-Go Supplement Revision 1.0a, USB Developers Forum, www.usb.org/developers/docs.html
- Mini-B Connector Engineering Change Notice, USB Developers Forum, www.usb.org/developers/docs.html
- Dallas Semiconductor Application Note 27, Maxim Integrated Circuits, www.maxim-ic.com/appnotes.cfm/appnote_number/542
- CEA-2011, OTG Transceiver Specification, Global Engineering Documents, <http://global.ihs.com>
- UTMI+ Low Pin Interface (ULPI) Specification, Rev 1.1, www.ulpi.org

2.1.2 Normative Reference Acquisition

CEA Standards:

- Global Engineering Documents, World Headquarters, 15 Inverness Way East, Englewood, CO USA 80112-5776; Phone 800-854-7179; Fax 303-397-2740; Internet <http://global.ihs.com>; Email global@ihs.com

2.2 Informative References

- USB 2.0 Specification, USB Developers Forum, www.usb.org/developers/docs.html

3 Acronyms

These acronyms are used in CEA-936-A:

ACK	Acknowledge
CEA	Consumer Electronics Association
CMR	Common Mode Rejection
CR	Carriage Return
CRC	Cyclic Redundancy Check
EMI	Electromagnetic Interference
ESC	Escape
ESD	Electrostatic Discharge
GND	Ground
GPS	Global Positioning System
IC	Integrated Circuit
LSB	Least Significant Byte
MIC	Microphone
MSB	Most Significant Byte
NAK	Negative Acknowledge
NSUP	Not Supported
PC	Personal Computer
OTG	On-The-Go
RXD	Receive Data
SE0	Single Ended Zero
SE1	Single Ended One
SHLD	Shield
SPKR	Speaker
TXD	Transmit Data
UART	Universal Asynchronous Receiver Transmitter
USB	Universal Serial Bus
WRT	With Respect To