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API for controlling the AudioComm from the Host Computer

This document details how the AudioComm can be controlled from a host that has USB capabilities.

The API incorporating this command set is downloadable from www.storm-interface.com.

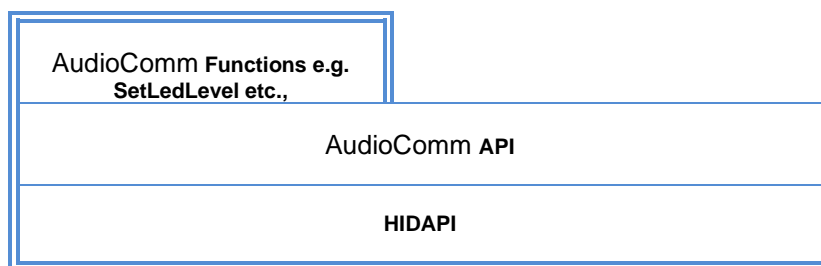
Host API Library - Overview

The Host API Library is a middleware application between the host application and the AudioComm. This is available as a download together with the HIDAPI library.

- The API library allows for the host application to invoke the AudioComm functions as listed. It encapsulates all the communications to USB and provides a simple API for the host application developers.
- HIDAPI - This is a third party library, which allows an application to interface with USB HID-Compliant devices on Windows, Linux, and Mac OS X. While it can be used to communicate with standard HID devices like keyboards, mice, and Joysticks, it is most useful with custom (Vendor-Defined) HID devices. This allows for host software to scan for the device using its VID/PID.

The AudioComm uses USB for communicating with the host. It includes an HID-compliant device. One advantage of using this implementation, which uses only HID interfaces, is that no drivers are required on the host system.

The protocol for communicating with host is described fully in the following pages. The basic architecture is shown below.



With this approach the developer does not need to worry about the communication at low level.

The library can be ported to your specific platform if required.

Currently the library has been tested on Windows and Linux (Ubuntu) platform.

Device Communications and Message Format

The AudioComm uses the ASCII/binary Message format described below. Every message that is sent from a host should be acknowledged with the control byte ACK (0x06). A retransmission should be initiated if an NAK (0x15) is received or if no acknowledge is received at all.

Message Formats

A	Alpha character, 'A'-'Z' and 'a' - 'z'
C	Control character one byte in length.
H	Hexadecimal characters, '0'-'9', 'A'-'F'
N	Numeric character, '0'-'9'
S	Special characters, entire character set 0x00 - 0xFF

ASCII Message Format

	Message Field	Type	Length	Description
1	STX	C	1	Control character Start of Text = 0x02
2	Message Id	H	2	Defines the type of message and format of the data field
3	Data Length	H	2	Hexadecimal value represented in ASCII defines the number of bytes in the data field. '00' to 'FF'. Maximum data field size is 256 bytes.
4	Data Field	S	var	In binary format
5	ETX	C	1	Control character ETX = 0x03
6	LRC	C	1	Longitudinal Redundancy Check Digit, calculated on all previous data including STX

Controlling the AudioComm from the Host Computer

Message Definitions and Error Codes

Here is a general table describing the message Ids, more detailed descriptions for each message Id follows. When a message is one way only, the Message Id. is the same for both the message and response.

ID.	Message	Description
01	Device Status Request	Host to AUDIOCOM keypad – Output the firmware version and all currently selected parameters
02	LED Brightness	Host to AUDIOCOM keypad – adjust led brightness. (default: 6)
03	Reserved	
04	Reserved	
05	Load New code table	Host to AUDIOCOM keypad – Load new code table
06	Reserved	
07	Keypad Table	Host to AUDIOCOM keypad – Select layout table 0 – Default Table 1 – Alternate Table 2 – Customised
08	Reserved	
09	Write to default	Host to AUDIOCOM – AudioCom writes configuration data from ram to flash.
10	Reset to factory default	Host to AUDIOCOM – Reset device back to factory default
11	Reserved	
12	Enable BSL	Host to AUDIOCOM – Sets the AudioCom to detect the device loader for firmware loading
13	Reserved	
14	Set serial Number	Host To AUDIOCOM – Sets the Serial Number (only used for factory)
15	Get Jack Status	Host To AUDIOCOM – Gets the status of Jack

Error Code

Every response message contains one of the following error codes:

00	No error
01	Command not recognized
02	Command not support at this stage
03	Parameter not supported
04	Hardware fault

List of Messages

(Structure of Messages from Host to AudioComm is on the following pages)

ID	Name	Description
01	Device Status Request	Output the firmware version & selected parameters
02	LED Brightness	Adjust volume key led brightness.
03	Reserved for future use	
04	Reserved for future use	
05	Load New code table	Load new code table
06	Reserved for future use	
07	Keypad Table	Select layout code table
08	Reserved	
09	Write to default	AudioComm writes configuration data from ram to flash
10	Reset to factory default	Reset device back to factory default
11	Reserved for future use	
12	Enable BSL	Sets the AudioComm to detect the device loader for firmware loading
13	Reserved for future use	
14	Set Serial number	Sets the serial number of device, only used for factory
15	Get jack status	Retrieves the status of the Jack

Device Status (01)

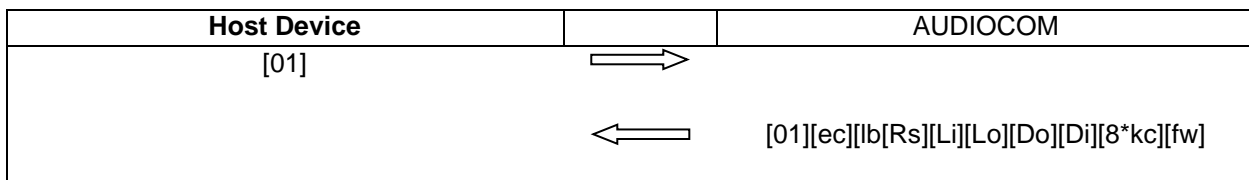
Host sends this message to request the status of the AUDIOCOM keypad

AUDIOCOM Status Response

Secure device sends this message to Host in response to the Device Status message.

	Data Field	Type	Length	Description
ec	Error Code	SH	2	
Lb	Volume Key LED Brightness	SN	1	Value (0 – 9)
Jl	Jack led brightness	SN	1	Value (0 – 9)
Li	Reserved_1	SN	1	Reserved_1
Lo	Reserved_2	SN	1	Reserved_2
Di	Reserved_3	SN	1	Reserved_3
Do	Reserved_4	SN	1	Reserved_4
Js	Jack status	SN	1	Retrieves the status of Jack: 0 – Jack out, 1- Jack In
Kt	Keypad Table	SN	1	0 – Default Table 1 – Alternate Table 2 – Customised Table
Kc	Keycode	SH	8	Customised keycode for each key
fw	Firmware Version	ANS	20	Left justified, if Firmware Version is less than 20 then just add enough spaces after the Firmware Version until this field is completed, for instance, “123456” becomes: “123456 ”

Host sends this message to request information from the AUDIOCOM



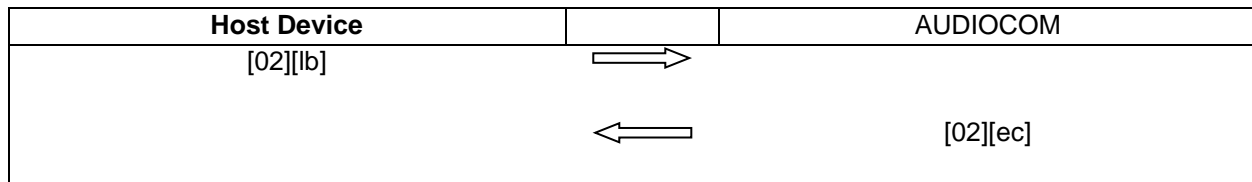
LED Brightness Command (02)

Host sends this message to control brightness of LEDs

	Data Field	Type	Length	Description
1	Select LED	SN	1	0 – Volume key led, 1 – Jack Led
2	LED brightness	SN	1	0-9

LED Brightness Command Response

	Data Field	Type	Length	Description
ec	Error Code	H	2	



Note: LED brightness of 0 value indicates LEDs are off

LED brightness of 9 value indicates full brightness



reserved (03)



Reserved (04)

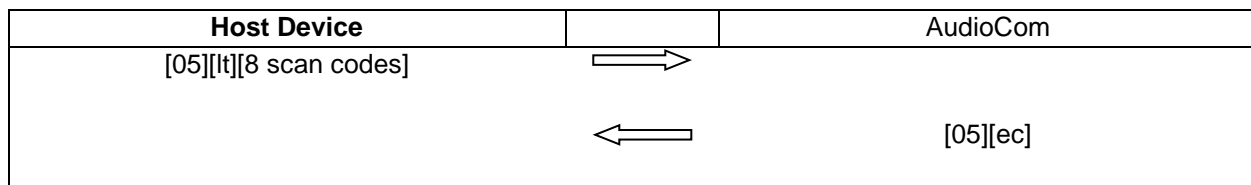
Load New Key Code Table Command (05)

Host sends this message to Load New Code Table

	Data Field	Type	Length	Description
1	Load New Code Table	SH	8	Key Code Table:

Load New Table Command & Response

	Data Field	Type	Length	Description
ec	Error Code	H	2	



Note: Length is always 8,

Format of table is as follows:

<modifier for key 1><code for Key 1><modifier for key 2><Code for Key 2>.....etc

The code table is specified in the user manual together with the modifier code. For example to program the following for 4 way :

Key 1 – A

Key 2 – a

Key 3 – 9

Key 4 - !

<0xE1><0x04><0x00><0x04><0x00><0x26><0xE5><0x1E>

Note: 8 bytes must be sent, for unused key code pad the values with 0x00.

Note: For shift modifiers there is a left and right modifiers value defined. So we can use 0xE1 – Left Shift and 0xE5 – Right shift. Similarly there is left and right Alt



Reserved (06)

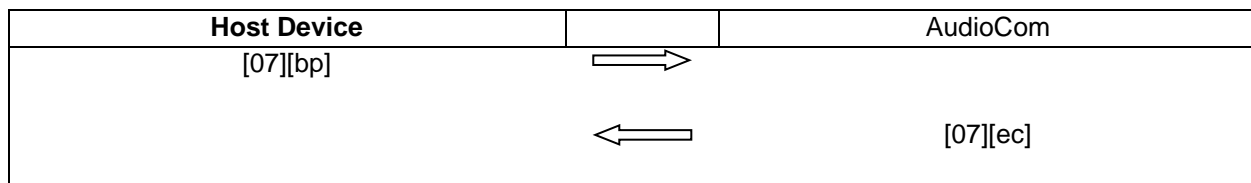
Keypad Table Command (07)

Host sends this message to set code table to be used.

	Data Field	Type	Length	Description
1	Code Table	SN	1	0 – Default Table 1 – Alternate Table 2 – Customised Table

Keypad Command & Response

	Data Field	Type	Length	Description
ec	Error Code	H	2	





Reserved (08)

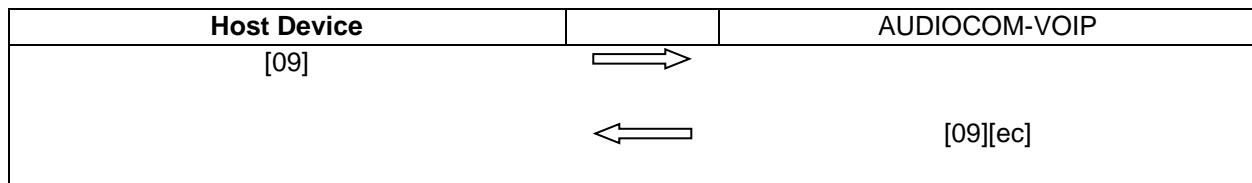
Write Config Data To Flash command (09)

Host sends this command to request the AUDIOCOM to write the configuration data from RAM to FLASH.

This command has no data associated with it.

RAM to FLASH Command & Response

	Data Field	Type	Length	Description
ec	Error Code	H	2	



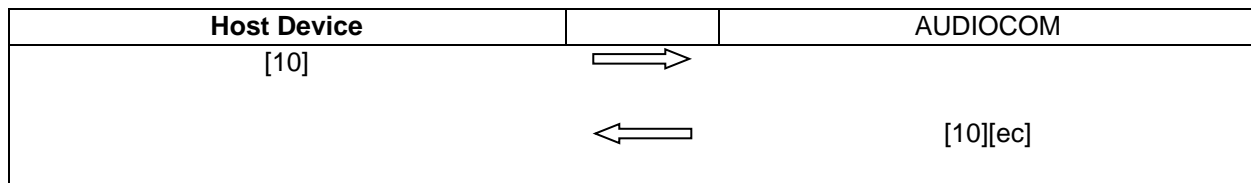
Reset To Factory Default command (10)

Host sends this command to request the AUDIOCOM to reset parameters back to factory default.

This command has no data associated with it.

Reset To Factory Default Command & Response

	Data Field	Type	Length	Description
ec	Error Code	H	2	

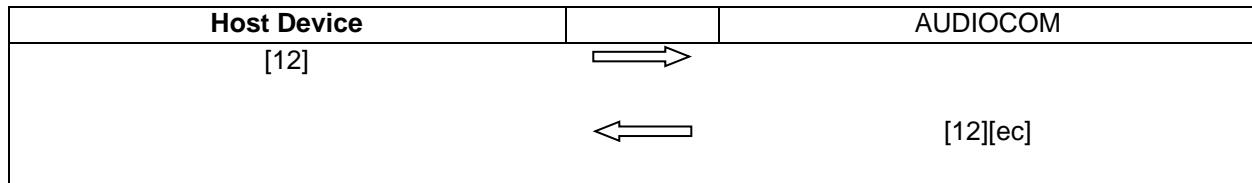


Enable BSL Command (12)

Host sends this command to request the AUDIOCOM to start downloader

Enable BSL Command & Response

	Data Field	Type	Length	Description
ec	Error Code	H	2	





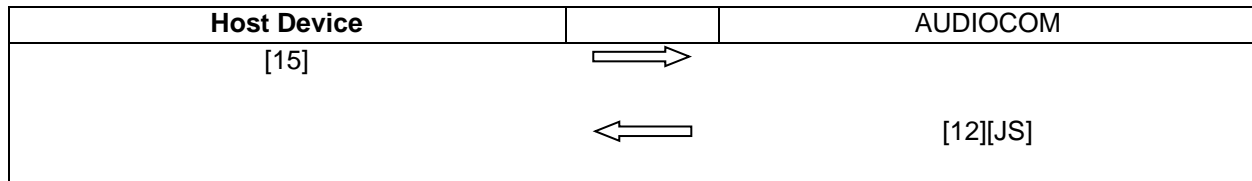
Reserved (13)

JACK Status (15)

Host sends this command to request the AUDIOCOM to retrieve jack status

Jack Status **Command & Response**

	Data Field	Type	Length	Description
ec	Error Code	H	2	



JS – Jack Status

Jack IN – 1

Jack Out - 0

Change History

Instructions for	<u>Date</u>	<u>Version</u>	<u>Details</u>
API	15 Aug 24	1.0	First Release (split out from Tech Manual)

API	<u>Date</u>	<u>Version</u>	<u>Details</u>
	5 Apr 19	1.0	First Release