USB HD Audio/Video Codec Model 2263
Hardware Manual
Ver.1.0.1 | October 2013

SENSORAY | embedded electronics

Designed and manufactured in the U.S.A

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Special handling instructions

The circuit board contains CMOS circuitry that is sensitive to Electrostatic Discharge (ESD). Special care should be taken in handling, transporting, and installing circuit board to prevent ESD damage to the board. In particular:

- Do not remove the circuit board from its protective anti-static bag until you are ready to install the board into the enclosure.
- Handle the circuit board only at grounded, ESD protected stations.

Introduction

Model 2263 is an audio/video capture and playback device. It supports a multitude of analog and digital sources, ranging from SD composite (NTSC, PAL) to full HD digital (DVI, 1080i).

Model 2263 outputs simultaneous compressed and low-latency uncompressed (preview) video streams. In case of HD input source the preview stream is scaled down and the frame rate may be decimated to fit into the bandwidth available with USB 2.0.

For compressed streams the choice of H.264 or MJPEG video compression types is available. Compression type, target bitrate and resolution are controlled with provided API.

Model 2263 captures audio from a stereo line input or audio embedded in the digital input stream. Output audio formats are uncompressed PCM or AAC.

The output containers are mp4, transport stream (.TS), and AVI.

The board can perform as a decoder for all supported compression types (decoding is guaranteed only for streams captured with model 2263).

The board implements USB 2.0 high speed interface which also provides power for the device. A "Y" USB cable is provided to satisfy power requirements.

Model 2263 is available in the enclosure (2263S), or as an OEM board (2263).

System Requirements

A basic model 2263 application (capture of a compressed stream and preview of the uncompressed) will work on a Pentium III class processor since no significant processing is required from the host . A high speed USB 2.0 port is required. A second USB port is required for power only.

RAM size is dictated more by an operating system and application requirements. An average desktop should not have problems running a 2263 application. Embedded CPUs sometimes are limited by the peripherals performance. Please contact Sensoray for an evaluation 2263 unit to test it with an embedded CPU of your choice.
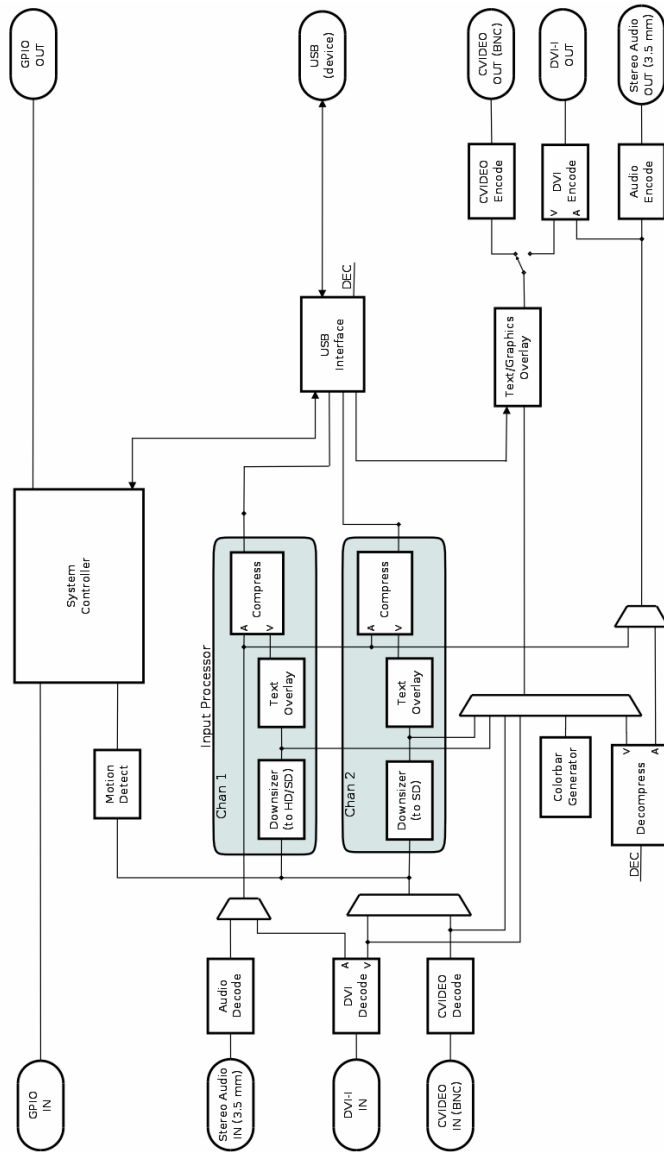
Block diagram

Fig 1. Model 2263 block diagram.

Connectors

Enclosed version connectors

Video In   Audio In   DVI In

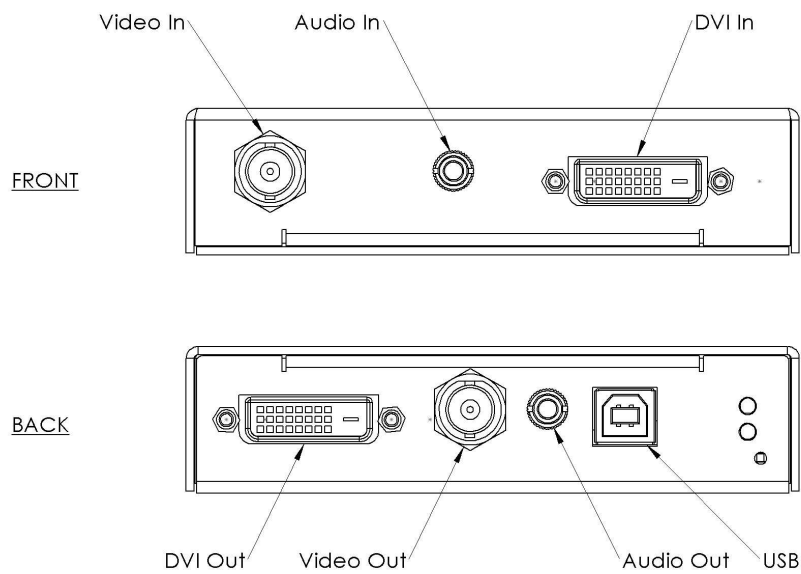FRONT

BACK

DVI Out   Video Out   Audio Out   USB

Fig. 2. Front and back connectors placement (model 2263S shown).

The front panel connectors are (left to right):

- composite video input (BNC),
- analog audio inputs (3.5 mm stereo jack),
- analog/digital input (DVI)[1].

The back panel connectors are (left to right):

- digital output (DVI),
- composite video output (BNC),
- analog audio output (3.5 mm stereo jack),
- USB connector (high retention).

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[1] **A**dditional interfaces are supported with the use of widely available adapters, for example, DVI-to-VGA, etc. Please refer to the list of supported input signals in Specifications table.

Additionally there are 2 LED indicators on the back panel – top (green, power on) and bottom (red, safe boot mode), and access to the safe boot button. Please refer to "Safe boot" section for details.

OEM version connectors

OEM versions of the board contain headers exposing additional optional features, P2 and P3. The signals are only available in special versions of the board. Please contact Sensoray for availability. Minimum order quantitites may apply.

Serial Interfaces, USB

Connector P2 – USB, serial interfaces

Pin	Signal	Pin	Signal
1	RS-232 TX	2	RS-232 RX
3	GND	4	GND
5	RS-422 RX+	6	RX-422 RX-
7	RS-422 TX+	8	RS-422 TX-
9	USB power (+5V)	10	USB power (+5V)
11	USB power (+5V)	12	GND
13	USB Data + (DP)	14	GND
15	USB Data – (DM)	16	GND

Notes:

1. RS-232 and RS-422 are available only in the Ethernet version of the product, model 2463.

2. USB power is input for model 2263 and output for model 2463.

General Purpose Inputs/Outputs (GPIO)

Model 2263 has 1 general purpose input (GPI), and one general purpose output (GPO). The GPO is optoisolated. The GPI may be used in either galvanically coupled or optoisolated mode.

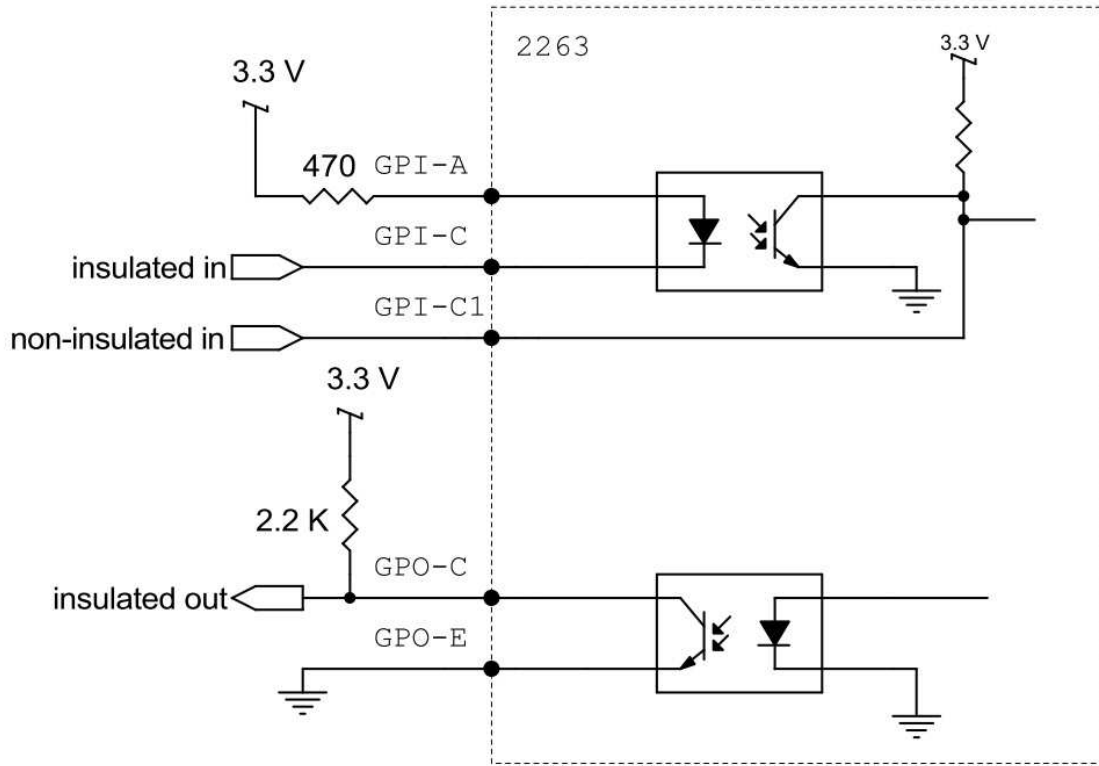The optoisolated GPIO and the recommended circuits are shown on Fig.3.

Fig.3. Optoisolated GPIO.

The GPI-C1 is a galvanically connected GPI. It provides a simple way of communicating to the 2263 in the cases when optical isolation is not required, by means of shorting this signal to the ground. Please see the Software Reference for the details.

Conenctor P3 – GPIO, SD card interface

Pin	Signal	Pin	Signal
1	SD card, Data0	2	SD card, Data1
3	SD card, Clock	4	GND
5	SD card, Command	6	3.3 V
7	SD card, Data2	8	SD card, Data3
9	GPI, C1	10	GND
11	GPI, A	12	GPI, C
13	GPO, C	14	GPO, E
15	GND	16	not connected

Safe Boot

Model 2263 supports field updates of the firmware. Firmware updates are posted on the 2263 web page as they become available. Update procedures are described in Linux and Windows Software Manuals.

In case the firmware update procedure is unsuccessful for some reason, there is a way to boot the original firmware (perform a safe boot) and repeat the update. To boot original firmware press the button located behind the hole in the back panel (using a toothpick, paper clip or a similar instrument) and plug in the USB cable while the button is pressed. A red indicator light will turn on in a safe boot mode. After the firmware upgrade is performed the unit's power needs to be cycled to force the boot of new firmware.

Specifications

Inputs	
Video, analog	composite (BNC connector, 75 Ω), NTSC/PAL; S-video (DVI connector, with adapter, 75 Ω), NTSC/PAL; VGA (DVI connector, with adapter, 75 Ω); component (DVI connector, with adapter, 75 Ω).
Video, digital	DVI (DVI-I connector). Supported resolutions: 720x480i60, 720x576i50, 1280x720p30(25), 1920x1080i60(50).
Audio, analog	stereo line in, 3.5 mm jack, 10 kΩ
Outputs	
Video, analog	composite (BNC connector), NTSC/PAL
Video, digital	DVI (DVI-I connector)
Audio, analog	stereo line out, 3.5 mm jack
Digital compressed video	
H.264	HP@L3 (.mp4, .ts or AVI)
MJPEG	single snapshots, AVI
Electrical	
Host Interface	USB 2.0, high speed
Power	bus powered, requires a Y-cable; consumed power TBD
Mechanical and Environmental	
Dimensions	4.75 x 3.25 x 1.125 inch (enclosure); 4.45 x 4.75 x 0.80 inch (PCB, including connectors).
Mass	board – 90 g; in enclosure – 190 g.
Operating temperature	0° to 70° C

Revision history

Release	Notes
Ver.1.0.1, October 2013	Output formats list modified.
Ver.1.0.0, July 2013	Initial release.