Analog HD USB Video Capture Device

Model 2231

Hardware Manual

Ver. 1.0.1 | February 2020

SENSORAY | embedded electronics

Designed and manufactured in the U.S.A

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Limited warranty

Sensoray Company, Incorporated (Sensoray) warrants the hardware to be free from defects in material and workmanship and perform to applicable published Sensoray specifications for two years from the date of shipment to purchaser. Sensoray will, at its option, repair or replace equipment that proves to be defective during the warranty period. This warranty includes parts and labor.

The warranty provided herein does not cover equipment subjected to abuse, misuse, accident, alteration, neglect, or unauthorized repair or installation. Sensoray shall have the right of final determination as to the existence and cause of defect.

As for items repaired or replaced under warranty, the warranty shall continue in effect for the remainder of the original warranty period, or for ninety days following date of shipment by Sensoray of the repaired or replaced part, whichever period is longer.

A Return Material Authorization (RMA) number must be obtained from the factory and clearly marked on the outside of the package before any equipment will be accepted for warranty work. Sensoray will pay the shipping costs of returning to the owner parts that are covered by warranty. A restocking charge of 25% of the product purchase price will be charged for returning a product to stock.

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System requirements

USB 2.0 high speed port is required. Model 2231 is a bus powered device. It is not recommended to plug the 2231 into USB hubs, since some of those do not provide sufficient bandwidth. If used, the hubs must be powered, capable of providing standard device current of 0.5 A.

Supported operating systems:
Windows 7, 8, 10;
Linux 2.6, 3.x, 4.x.

Block diagram

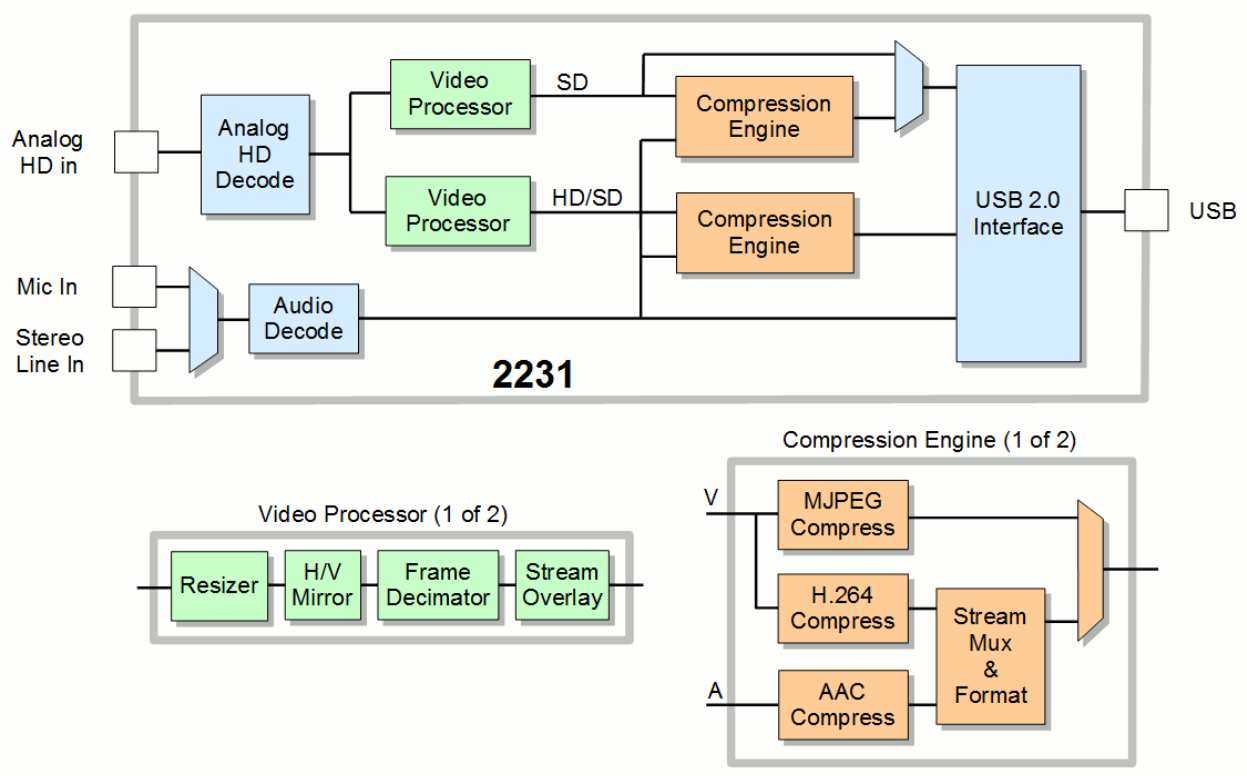


Fig.1. Model 2231 block diagram.

Connectors

All mating connectors use crimping contacts Molex 0500798100 for 26-28 AWG wire. Contacts labeled "reserved" should be left unconnected.

JP1, video inputs/output

Molex 0532610671. Mating part: Molex 51021-0600.

Pin	Signal
1	composite out[1)]
2	ground
3	video input 1
4	ground
5	video input 2
6	ground

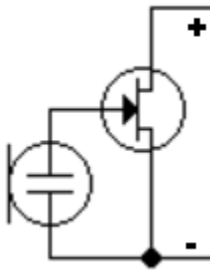
Notes.
1. With composite input source only.

JP2, audio inputs

Molex 0532610771. Mating part: Molex 51021-0700.

Pin	Signal
1	ground
2	microphone in +
3	microphone in -
4	ground
5	line input right
6	ground
7	line input left

Note: microphone input expects an electret condenser microphone, for example, CUI CMA-4544PF-W, as shown below.



JP6, interfaces

Molex 0532611071. Mating part: Molex 51021-1000.

Pin	Signal
1	RS-232 TX[1)]
2	RS-232 RX[1)]
3	ground
4	I2C SCL[1)]
5	I2C SDA[1)]
6	ground
7	ground
8	USB data -
9	USB data +
10	USB +5V (V_{BUS})

Notes:

1. Functionality not implemented in standard firmware.
2. USB port is a device.

Specifications

Video Input/Output	
Input video formats	HD-TVI, HD-CVI, AHD, composite (NTSC/PAL)
Maximum input resolution/frame rate	1920x1080p30
Video output	NTSC/PAL (for NTSC or PAL input formats)
Recorded video streams	
H.264	configurable, up to HP@ L3 (MP4, AVI, transport stream)
JPEG	Single snapshots, AVI
Raw (uncompressed)	UYVY (scaled down)
Electrical, mechanical and environmental	
Dimensions	48x25x10 mm (without a heat sink)
Mass	16 g (without a heat sink)
Operating temperature	0º to 70º C. Please see "Thermal considerations" section.
Interface	USB 2.0
Power	USB bus powered, not to exceed 2.5 W

Software

Software (Windows and Linux)	
Driver	UVC video
SDK	Library wrappers around the DirectShow (Windows) or V4L2 (Linux) APIs

Firmware updates

Model 2231 features flash memory that contains the firmware used to operate the hardware on the device. This firmware can updated in the field to fix problems or add new features.

Firmware is updated by selecting an Update option in the demo application available as part of the SDK, or by calling the corresponding SDK function. Upon those actions the device reconnects as a USB mass storage device with the name Update2263. (If the AutoPlay menu appears, choose the “Open folder to view files option”). In this mode, a new firmware file may be copied to the Update2263 folder. While the file is being written to the flash memory, the red LED blinks. Do not unplug the device while the red LED is blinking. After the update is complete, the Update2263 folder is closed, and the 2231 reconnects as a UVC device. To cancel the update mode without updating firmware, right click the Update2263 removable device in Computer and click Eject. In the unlikely event that a firmware update was interrupted in a way that prevents the device from operating, an original firmware mode (Safe Boot mode) is available. Original firmware is loaded in case the new image is corrupt. Running firmware version can be detected using the demo application, or by calling the corresponding SDK function.

Thermal Considerations

Measures must be taken to remove about 1 W of heat from the integrated circuit U1 on the video processor board (marked as model 2960). The implementation choice depends on the mechanical and environmental requirements of the particular application.

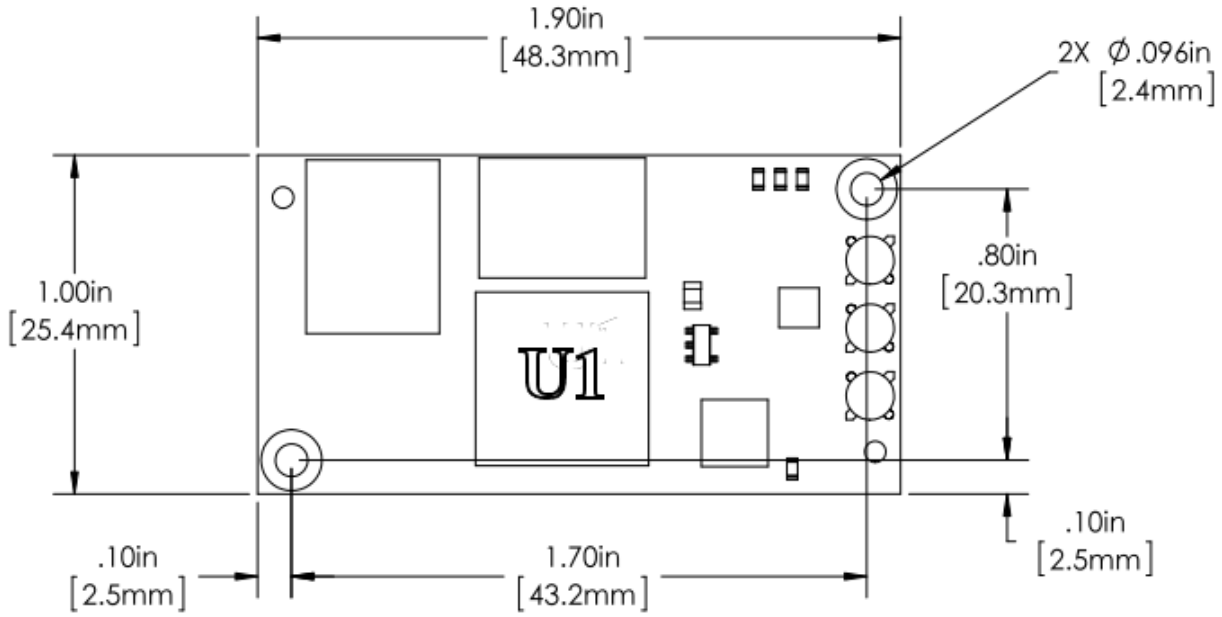


Fig.2. Location of U1 on model 2960 board.

One approach is to use a miniature self-adhesive heat sink, for example Advance Thermal Solutions ATS-54150D-C1-R0.

Alternatively, a heat conducting path may be provided between U1 and the product's enclosure. To ensure good thermal contact and avoid damaging the device we recommend using Bergquist (or equivalent) thermal pads with the highest thermal conductivity possible (5.0 W/m*K), for example, GPHC5.0 or GP5000S35 of the smallest possible thickness.

In any case the temperature of U1 should not exceed 85°C during operation.

Revision history

Version	Notes
1.0.1, February 2020	Minor edits and clarifications.
1.0.0, Sptember 2018	Initial release.