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SENSORAY CO., INC.

PCI JPEG Frame Grabber

Model 617 (Rev.A)

July 2003

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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, or $105, whichever is less, will be charged for returning a product to stock.

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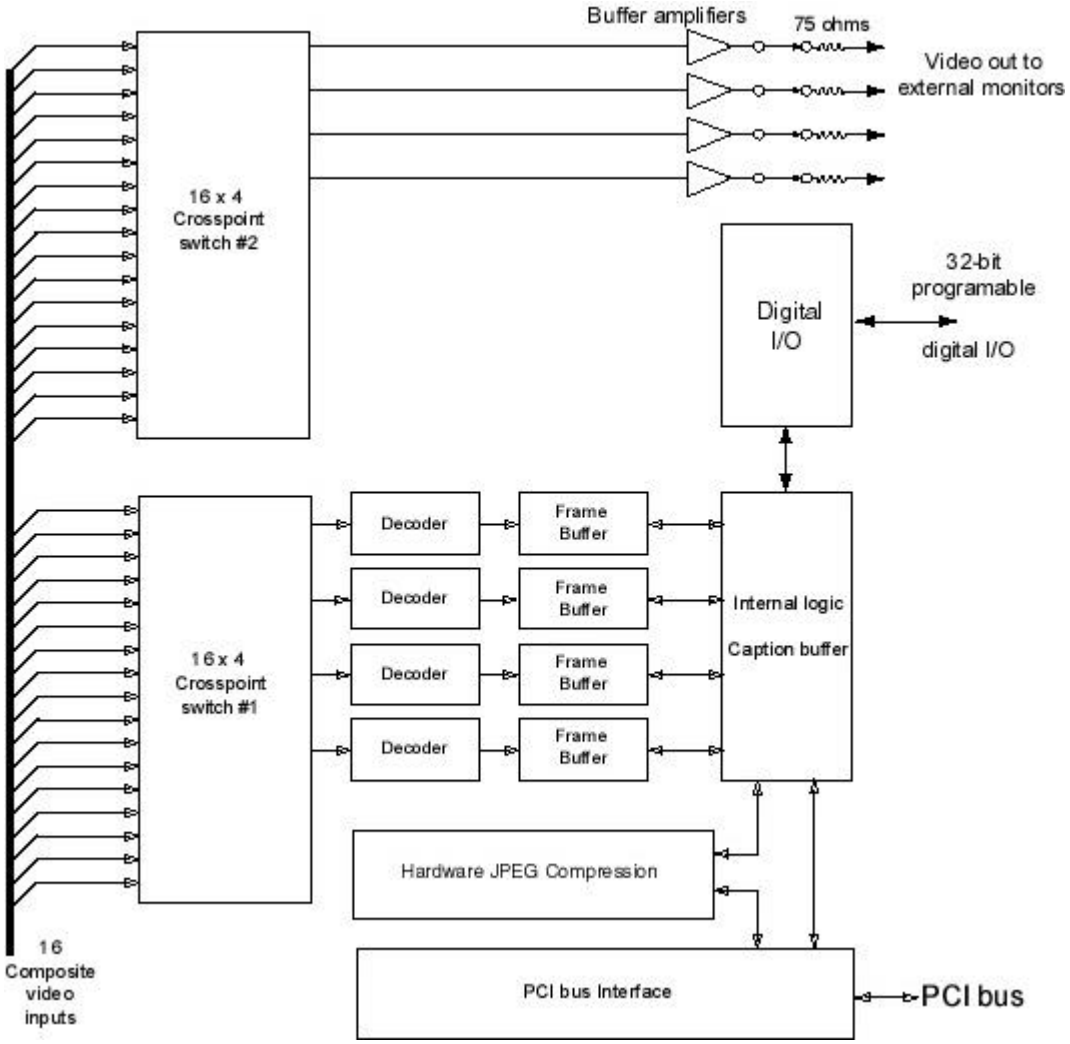
Special handling instructions

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.
- Remove power from the equipment before installing or removing the circuit board.

Introduction

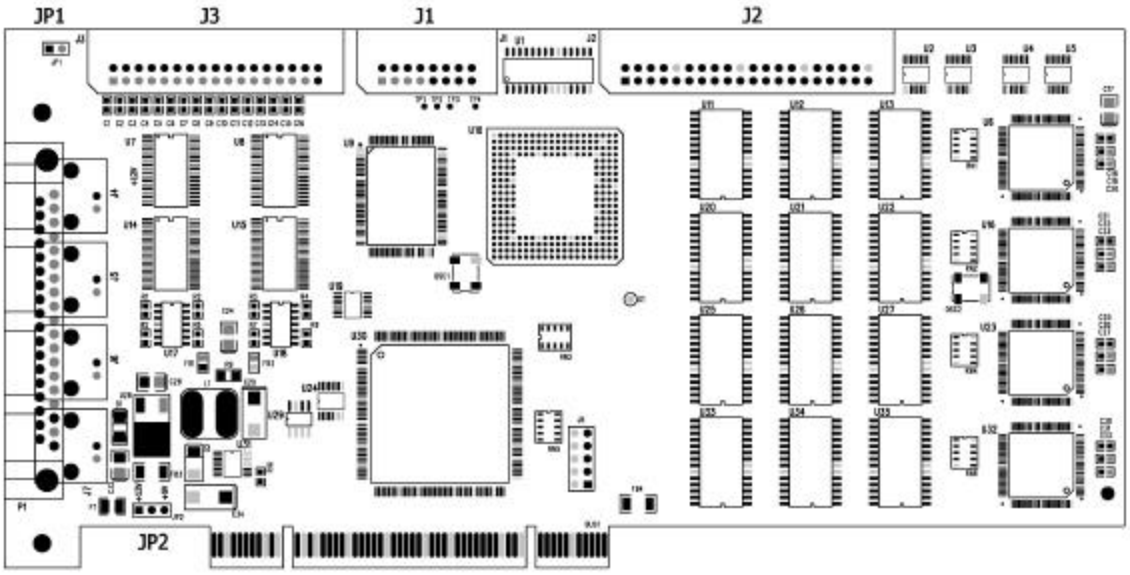
Model 617 allows simultaneous capture of full or half resolution (640x480 or 320x240) JPEG compressed images and scaled down uncompressed bitmaps from up to 16 asynchronous standard video sources at a combined frame rate of 30 frames per second for NTSC or PAL/SECAM. The bitmaps may be used for visual monitoring or motion detection. An optional text caption (64 characters), modified on a frame to frame basis, may be overlaid on the compressed image. The order in which input channels are being processed is controlled by the application software and is completely arbitrary, which allows individual capture rates for different channels, if necessary.



As could be seen from the block diagram, model 617 implements a 16x4 crosspoint video switch and 4 separate video capture channels (decoders) with individual frame buffers. This allows cycling through all 16 input channels at a full capture rate.

A second 16x4 crosspoint video switch is used to route any four input channels to external video monitors. Each of the four video outputs could be individually turned on or off, which allows connecting the outputs of multiple 617's to the same monitor.

Model 617 also features a 32-bit digital I/O bus, where each bit can be individually programmed as input or output.



A less expensive, 4 input channel board (617-4) is available, featuring a higher maximum capture rate (120 fps in 320x240 mode).

Operation

The JPEG compression engine provides main synchronization for all board's components. At the start of every frame the board generates an interrupt. There is a very narrow time window (less than 2 milliseconds) during which the driver has to prepare the board for the next compression pass: the crosspoint switch has to be switched, an input channel has to be selected, the caption text and settings have to be uploaded. As long as under Windows operating systems the communication between the driver and the application can not be ensured within this time constraint, the approach of the command queue is implemented in the software. The commands are placed into the queue by the application, and retrieved from it by the driver, as necessary. The command specifies the channel (camera) to capture from, caption text and parameters, image parameters, such as brightness, contrast, saturation, hue, compression factor. If a command is not present in the queue by the time the interrupt occurs, the next frame is skipped.

The captured data is placed into the buffer queue, from where the application retrieves the data as needed.

Various features (operation modes) are selected in software by means of S617_SetMode function or by setting corresponding fields in the COMMAND structure. Those controlled by S617_SetMode function cannot be changed on a frame to frame basis. Those controlled by COMMAND structure can be changed on a frame to frame basis. See the Software Reference Manual for the details.

Switching of the video output channels and digital I/O read/write operations are performed synchronously to image capture (once per captured frame).

System Requirements

A Pentium III CPU with 128 MB of RAM is required. When using multiple boards in the system, hard drive access time may become an issue. Fast hard drive (UDMA/66 or faster) is recommended.

Specifications

Video sources	NTSC, PAL, SECAM, RS-170, CCIR
Video inputs	16 (or 4 for a 4-input board) analog composite; 75 Ω termination
Video outputs	4 analog composite with individual on/off capability; 75 Ω output impedance
Output formats	Compressed image: JPEG; 640x480 or 320x240. Uncompressed image: RGB (24 bits/pixel), Y8 (8 bits/pixel), YCrCb (16 bits/pixel); 256x192 or 128x96.
A/D resolution: luminance channel chrominance channel	 8 bit 8 bit
Capture rate	30 fps (all resolutions, 16-input board; 640x480, 4-input board); 120 fps (320x240, 4-input board)
General purpose I/O	32 bits, individually programmed as inputs or outputs. 5 V CMOS logic levels. Output current: ±10 mA. Voltage levels at max current: low < 0.7V, high > 4V. All pins have a 100 kΩ pull up to +5V. All pins are configured as inputs after power up.
Bus requirements	PCI, 33 MHz, 32-bit, 3 or 5 V signaling. A +3V power supply is required [1].
Power consumption	1.5 A (max) @ +3V
Operating temperature	0°C to 70°C

Notes:

1. A version of the board that does not require a +3V power supply is available from Sensoray by special order.

Connectors

Input video (flat cable), J3.

Pin	Signal	Pin	Signal
1	Ground	2	Video input 1
3	Ground	4	Video input 2
5	Ground	6	Video input 3
7	Ground	8	Video input 4
9	Ground	10	Video input 5
11	Ground	12	Video input 6
13	Ground	14	Video input 7
15	Ground	16	Video input 8
17	Ground	18	Video input 9
19	Ground	20	Video input 10
21	Ground	22	Video input 11
23	Ground	24	Video input 12
25	Ground	26	Video input 13
27	Ground	28	Video input 14
29	Ground	30	Video input 15
31	Ground	32	Video input 16
33	N/C	34	N/C

Input video (DB37), J7.

Pin	Signal	Pin	Signal
1	Video out 3	20	Video out 2
2	Ground	21	Video out 1
3	Video out 0	22	Video in 16
4	Ground	23	Video in 15
5	Ground	24	Video in 14
6	Ground	25	Video in 13
7	Ground	26	Video in 12
8	Ground	27	Video in 11
9	Ground	28	Video in 10
10	Ground	29	Video in 9
11	Ground	30	Video in 8
12	Ground	31	Video in 7
13	Ground	32	Video in 6
14	Ground	33	Video in 5
15	Ground	34	Video in 4
16	Ground	35	Video in 3
17	Ground	36	Video in 2
18	Ground	37	Video in 1
19	Ground		

Note: The four channel version has 4 BNC female input connectors instead of a DB37 connector.

Output video (flat cable), J1.

Pin	Signal	Pin	Signal
1	Ground	2	Video out 0
3	Ground	4	Video out 1
5	Ground	6	Video out 2
7	Ground	8	Video out 3
9	N/C	10	N/C
11	N/C	12	N/C
13	N/C	14	N/C
15	N/C	16	N/C

Digital I/O (flat cable), J2.

Pin	Signal	Pin	Signal
1	VIO[1]	2	DIO0
3	DIO1	4	DIO2
5	DIO3	6	DIO4
7	DIO5	8	DIO6
9	DIO7	10	Ground
11	VIO[1]	12	DIO8
13	DIO9	14	DIO10
15	DIO11	16	DIO12
17	DIO13	18	DIO14
19	DIO15	20	Ground
21	VIO[1]	22	DIO16
23	DIO17	24	DIO18
25	DIO19	26	DIO20
27	DIO21	28	DIO22
29	DIO23	30	Ground
31	VIO[1]	32	DIO24
33	DIO25	34	DIO26
35	DIO27	36	DIO28
37	DIO29	38	DIO30
39	DIO31	40	Ground

Notes:

1. VIO can be selected to be either +5V or +12V with the jumper JP2. It is protected with the resettable fuse with the trip current of 0.5A.

Jumpers

1. JP1 – installed shunt connects board's analog ground to the mounting bracket.
2. JP2 – selects between +5V and +12V connected to DIO pins of the digital I/O connector (J2).

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