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SENSORAY CO., INC.

PC/104+ Frame Grabber

Model 311 (Rev.D)

June 25, 2001

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Limited warranty

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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

The 311 PC104+ frame grabber allows the capture of monochrome and color images from a variety of analog video sources into computer memory (RAM). The 311 is designed to work with standard TV signal sources, compatible to the following video standards:

- color: NTSC-M, NTSC-Japan, PAL-B, PAL-D, PAL-G, PAL-H, PAL-I, PAL-M, PAL-N, SECAM;
- monochrome: CCIR, RS-170.

The 311 digitally locks to the incoming video signals providing a stable output regardless of the signal source. The input's 4:1 multiplexer allows the selection between four composite or three composite and one Y/C (S-Video) analog video inputs, which makes it possible to connect up to four video sources to the frame grabber. The signal components (luminance and chrominance) are digitized with two separate 8-bit A/D converters. Low-pass filtering and double over-sampling of the input signal provide precise digitization with no aliasing artifacts. The digital signal is then scaled and/or cropped to the desired dimensions, if necessary. The scaled image is transferred to the host RAM using the PCI bus mastering mode, which requires minimum CPU attention. An on-board FIFO provides necessary buffering, minimizing the probability of image loss.

An 8-bit general purpose I/O port allows interfacing of the 311 to external hardware, which could be used, for example, for triggered image acquisition.

System Requirements

The 311 is designed to work with 32-bit, 33 MHz, 5 V PC/104+ bus. An important system requirement is fast PCI-to-DRAM transfer. Some PC/104+ CPU designs may not provide bandwidth sufficient for image transfer, which may result in image corruption.

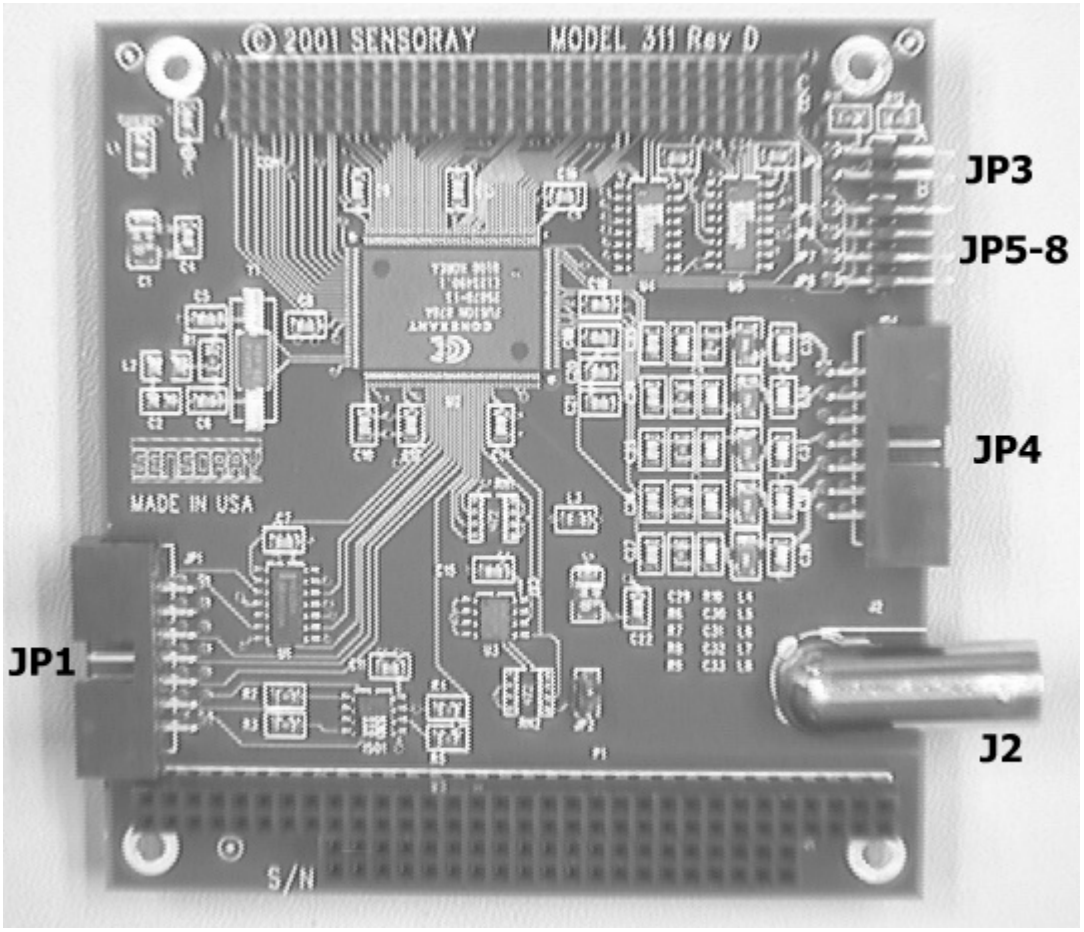
Specifications

Video sources	NTSC, PAL, SECAM, RS-170, CCIR
Video inputs	4 analog composite video; 1 analog Y/C (S-video) [1].
Output formats	RGB (15, 16, 24, 32 bits/pixel), Y8 (8 bits/pixel), YCrCb (16 bits/pixel)
Output resolution (max), pixels	754x480 (NTSC, RS-170), 922x576 (PAL, SECAM, CCIR)
A/D resolution: luminance channel chrominance channel	 8 bit 8 bit
Capture rate	Real time [2]: 30 fps (NTSC, RS-170), 25 fps (PAL, SECAM, CCIR)
General purpose I/O port	4 output and 4 input lines, TTL/CMOS, 1 optocoupled interrupt input (can be used as an additional general purpose input). (14 pin ribbon cable connector).
Bus requirements	PC104+, 33 MHz, 32-bit, 5 V
Power consumption	300 mA (max) @ +5V
Operating temperature	0°C to 70°C

Notes:

1. An S-video input can be used in place of 1 composite input.
2. The capture rate may be limited by the PCI-to-DRAM transfer bandwidth provided by the particular CPU design.

Connectors



Video inputs (JP4)

Pin	Signal	Pin	Signal
1	Video4	2	GND
3	Video3	4	GND
5	-	6	GND
7	Video2	8	GND
9	Video1	10	GND
11	C	12	GND
13	Y	14	GND

Notes:

1. Pins 1 and 13 are connected internally.
2. Pin 9 is connected to the signal pin of the BNC connector (J2).

GPIO inputs (JP1)

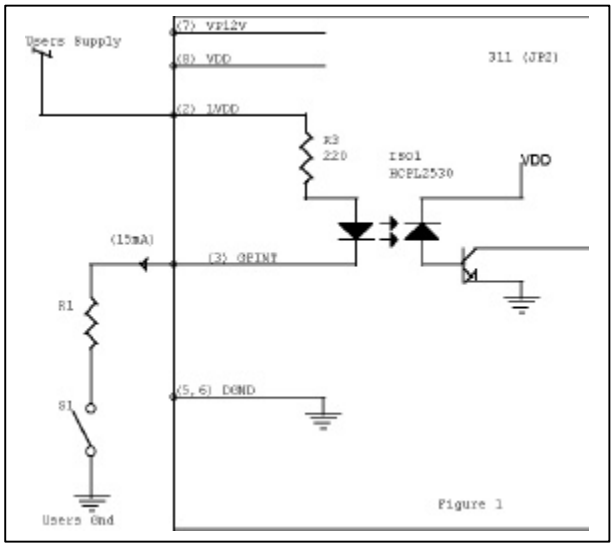
Pin	Signal	Pin	Signal
1	GPI0	2	LVDD
3	GPINT	4	GPO3
5	GND	6	GND
7	+12V	8	+5V
9	GPO2	10	GPI3
11	GPI2	12	GPI1
13	GPO0	14	GPO1

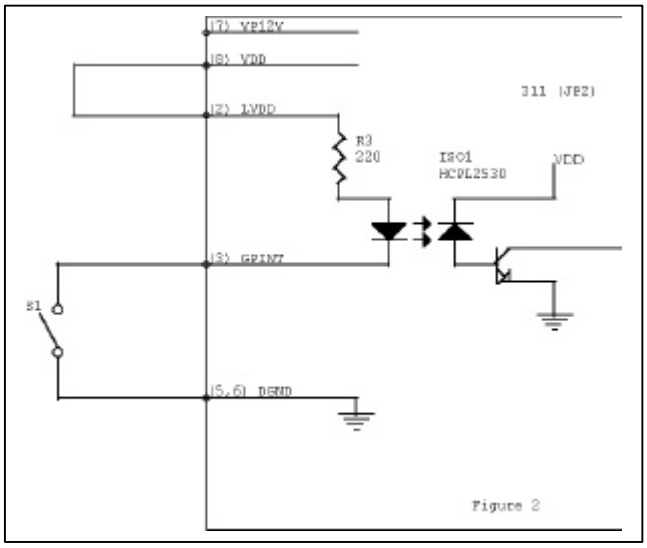
Notes:

1. GPO0-GPO3 – TTL outputs.
2. GPI1-3 – CMOS inputs.
3. GPI0, GPINT – optocoupled.

Optocoupled GPIO signals

Two of the GPIO signals (GPI0 and GPINT) are optocoupled. The following figures illustrate the use of





optocoupled inputs.

For complete isolation the input should be connected as shown in Figure 1. Supply voltage for the optocoupler LED is provided on LVDD (pin 2). If a 5 Volt supply is used, then R1 is not necessary, as the internal resistor R3 limits the current. If a higher voltage is used, then the value of R1 must be calculated to limit the current flowing through the LED to approximately 15mA.

If complete isolation is not required, then the LED can be powered from the 5 Volt output, VDD (pin 8), as shown in Figure 2. The input is then has to be pulled down to the 311's digital ground, GND (pins 5 and 6).

For the details on how to use GPINT see the SX11 SDK Software Manual.

Slot and interrupt selection

JP3 (also marked A and B) is used to select the PC104+ module slot number. Refer to the table below for the correct jumper setting.

Module Slot #	JP3	
	Jumper B inserted	Jumper A inserted
0	Yes	Yes
1	Yes	No
2	No	Yes
3	No	No

Jumpers JP5-JP8 are used to select an interrupt line used by the frame grabber. Refer to the table below for the jumper settings.

Interrupt line used	Jumper inserted
INTA	JP5
INTB	JP6
INTC	JP7
INTD	JP8

Note. Model 311 frame grabber does not require an interrupt line use for image capture. If, however, it is preferred to use interrupts, one has to make sure that the interrupt line selected by the jumpers on the 311 is not used by other hardware.

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