

# CM130 1.3Mpixel CMOS Imaging Camera

## Technical Reference Guide

PCB Rev 1.0



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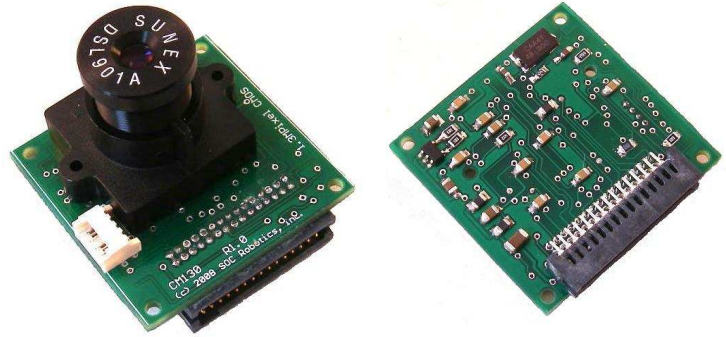
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## 1.0 Introduction

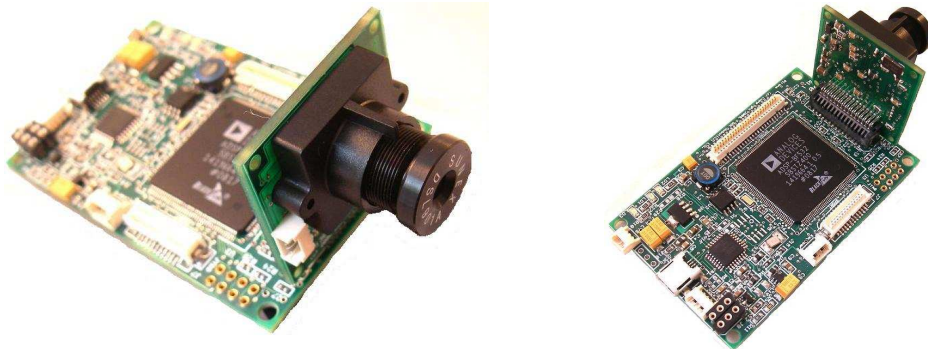
### Features:

- 1280x1024 pixel CMOS Image Camera
- X VGA and VGA modes supported
- Attaches to P1 or P0 Blackfin DSP Board
- 15fps X VGA, 30fps VGA
- Video decoder is OmniVision OV9620
- Programmed via I2C
- Sunex DSL901J Glass Lens with IR Cutoff
- Two different mounting options available
- Outputs several different data formats
- Extensive I2C parameter setup
- 3.3V and 2.5V operation 50ma
- Dimensions: 1.25x1.25 inch



### Hardware

The CM130 is a 1.3Mpixel color CMOS Image Camera daughter card that attaches to the video input port of the P1 or P0 Blackfin embedded processing board. The imaging chip is an OV9620. The lens is a Sunex DSL901A/J 2/3" all glass imager with 12mm focal length and a 3.0 F/#. The onboard OmniVision OV9620 CMOS imaging chip is programmable and supports several output data formats. See the OmniVision OV9620 datasheet for detailed technical information on the chip. The P1/P0 Boot Monitor includes complete source code to setup and configure the CM130 for real time DMA transfer of video to SDRAM.



The CM130 attached to the P0 Blackfin DSP board.

### Software

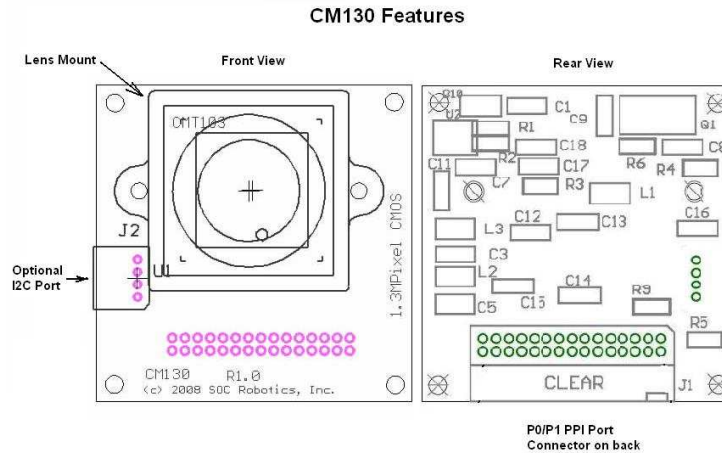
The CM130 is programmed by sending commands to the OV9620 via an I2C bus. The P1 or P0 is provided with a Boot Monitor application that sets up the CM130 by loading the correct parameters into the OV9620 registers. The P1/P0 Blackfin is programmed in C using either a Blackfin GNU C Compiler or the Analog Devices VisualDSP 4.5 Windows desktop C Compiler IDE. Complete source code for the CM130 setup procedure is provided. The P1/P0 Boot Monitor programs the CM130 and configures the Blackfin DMA registers to start real time DMA transfer of video data to SDRAM.

The example Project files that come with the CM130 were written using the Analog Devices VisualDSP Windows IDE. VisualDSP is a time limited free C development tool chain for the Blackfin DSP.

## 2.0 CM130 Detailed Description

### 2.1 Introduction

The CM130 is a 1.3Mpixel (1280x1024 pixels) color CMOS camera daughter card for the P1/P0 Blackfin DSP boards. The CMOS imaging chip is the OmniVision OV9620. The CM130 outputs a data with a resolution and format selected by programming registers in the OV9620.



### 2.2 CMOS Imaging Chip

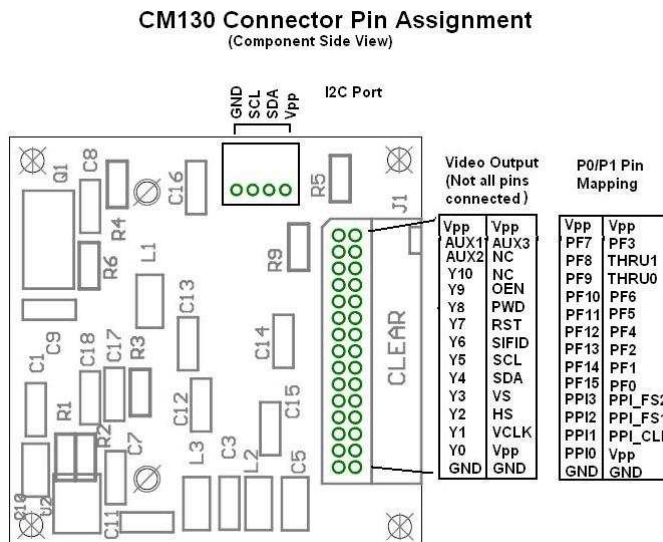
The CM130 uses the OmniVision OV9620. The OV9620 is configured by sending commands to it on its I2C interface. The OV9620 maximum pixel format is XVGA 1280x1024, 15fps at 10bit resolution. Refer to the OV9620 datasheet for detailed technical information. Two signals on the video output port connector are I2C lines. The OV9620's I2C slave address for write is 0x60 and read is 0x61.

### 2.3 I2C Connector Interface

An optional 4 pin connector J2 can be mounted on the CM130. The I2C signals are routed to this connector along with GND and VPP.

### 2.4 P1/P0 Connector Interface

The CM130 attaches to the P1/P0 on connector J1. The pin assignment for J1 is shown below with P1 pin mapping.



## **3.0 Software and Applications**

### **3.1 Introduction**

The CM130 is programmed by sending commands via I2C to the CMOS Imaging Camera that must be initialized before use. The OV9620 datasheet describes the mapping between chip functions and I2C commands. The Blackfin Boot Monitor implements a complete configuration setup of the OV9620. See the Boot Monitor source code for a detailed description of the command setup.

### **3.2 Application Description for P1**

The application example that sets up the CM130 in the P1 Boot Monitor sets the OV9620 default parameters, programs the DMA subsystem, sets all PPI pins to the correct setting and starts the DMA engine transferring decoded video to SDRAM. The user can select color or black and white and the video input channel. The application example is setup to handle SXGA (1280x1024) video streams. A different DMA configuration is required to VGA (640x480) video streams.

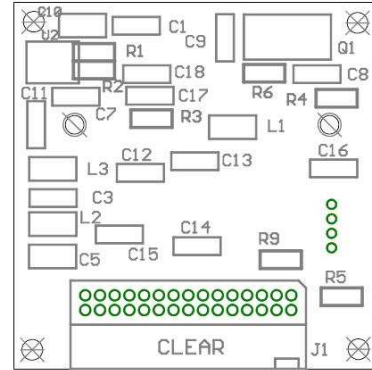
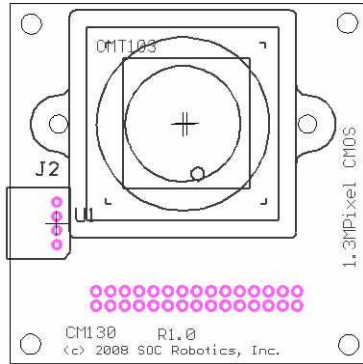
### **3.3 P0/P1 Processor Interaction**

Blackfin (P0, P1) processor family controls the CM130 via the I2C interface.

## Electrical and Mechanical Description

### Component Layout

Components are mounted on both sides of the board.



### Electrical Specifications

#### Electrical

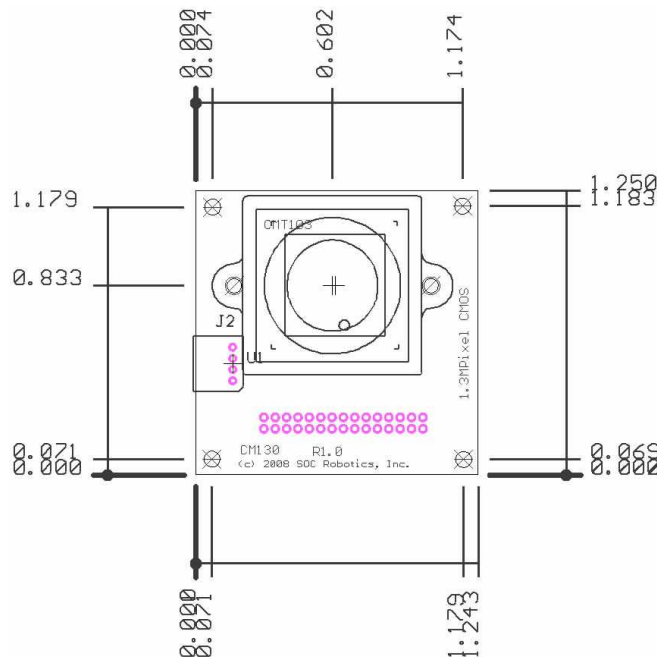
Logic Power: 3.3VDC

#### Mechanical

Dimensions: 1.25x 1.25 in  
Weight: 20 grams

### Mechanical Dimensions

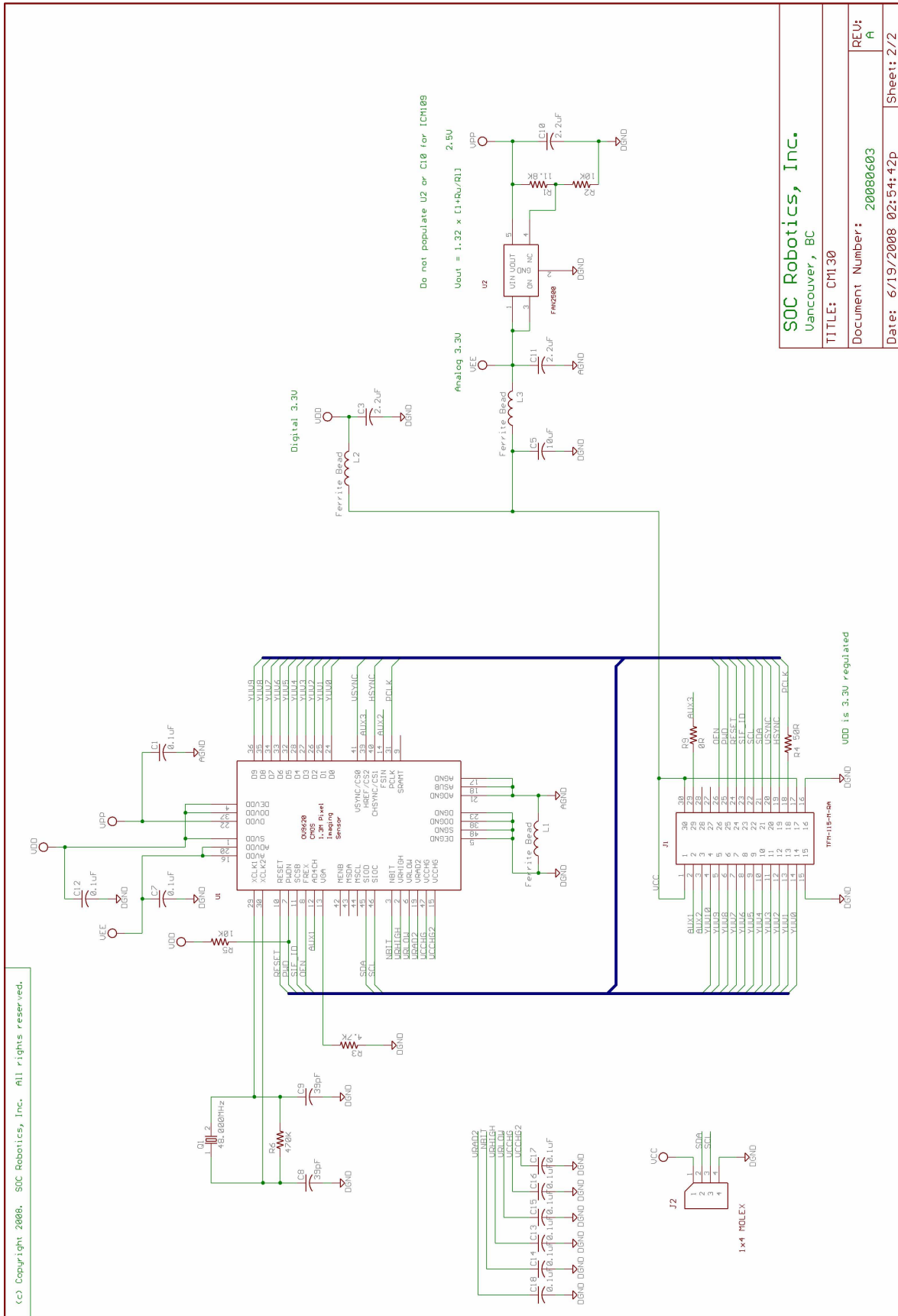
Board dimensions are stated in inches.



## CM130 Circuit Schematic

<p>(c) Copyright 2008. SOC Robotics, Inc. All rights reserved.</p>	<h1>1.3 MPixel CMOS Imager</h1>		
	<h2>CM130</h2>		
	<h3>PCB Rev 1.0</h3>		
	<p>SOC Robotics, Inc. Vancouver, BC</p>		
<p>TITLE: CM130</p>		<p>Document Number: 20080603</p>	<p>REU: A</p>
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**Notes:**