

# Aptina MT9D131 Image Sensor Headboard

## Features

- Superior low-light performance
- Electronic rolling shutter (ERS), progressive scan
- Automatic image correction and enhancement, including lens shading correction
- Arbitrary image decimation with anti-aliasing
- Integrated real-time JPEG encoder
- Integrated microcontroller for flexibility
- Selectable output data formats: ITU-R BT.601 (YCbCr), 565RGB, 555RGB, 444RGB, JPEG 4:2:2, JPEG 4:2:0, and raw 10-bit
- Power on indicator
- Optional clock switch: switch between system clock and external clock
- Selectable power inputs: use on-board regulators or external power inputs

## Applications

- Network security cameras
- ePTZ cameras
- Wireless cameras
- Consumer video products
- High-resolution security cameras

## General Description

The Aptina image sensor headboard is an easy-to-use front-end camera board. When connecting to either a Aptina DEMO2 board or a third-party companion controller board, it allows the user to capture a scene and to change the basic settings of the sensor for evaluation purposes.

Aptina's MT9D131 image sensor headboard contains Aptina's MT9D131 CMOS image system-on-chip (SOC) sensor, an optical lens, and the circuits connecting the image sensor to a parallel 26-pin connector.

The Aptina Imaging MT9D131 is a 1/3.2 inch, 2-megapixel, CMOS image sensor with an integrated advanced camera system. The camera system features a microcontroller (MCU) and a sophisticated image flow processor (IFP) with a real-time JPEG encoder.

Figure 1: MT9D131 Headboard



The sensor has specifically been designed to provide advantages for surveillance applications including electronic pan-tilt-zoom (ePTZ), low noise, fast frame rates, and small form factors.

The Aptina MT9D131 is easy to design-in and delivers exceptional imaging performance in low-light situations. The excellent low-light performance of MT9D131 is one of the hallmarks of DigitalClarity—Aptina's breakthrough low-noise CMOS imaging technology that achieves CCD image quality (based on signal-to-noise ratio and low-light sensitivity) while maintaining the inherent size, cost, power consumption, and integration advantages of CMOS.

**Table 1: Parameters**

<b>MT9D131 CMOS Image Sensor</b>	
Optical format	1/3.2-inch (4:3)
Active pixels	1600 x 1200 pixels (UXGA)
Pixel size	2.8µm × 2.8µm
Color filter array	RGB Bayer pattern
Shutter type	Electronic rolling shutter (ERS)
Maximum data rate/ master clock	80 MPS/ 6–80 MHz
Frame rate	15 fps at full resolution, 30 fps in preview mode, (800 x 600)
ADC resolution	10-bit
Supply voltage	Analog 2.5–3.1V Digital 1.7–1.95V I/O 1.7–3.1V PLL 2.5–3.1V
Power consumption	348mW at 15 fps, full resolution 223mW at 30 fps, preview mode
Package	48- pin LCC
<b>Mechanical</b>	
Dimensions	71.1mm L × 48.3mm W × 38mm H (with lens)/ 22mm H (without lens)
Weight	45.3g (with lens) 22.6g (without lens)
Connectivity	Parallell conector: 26-pin POS straight CONN HEADER
<b>Optical</b>	
Focal length	4.5mm
F/#	2.0
Design image circle	6.0mm
Distortion	–1.9%
Total optical path length	26.5mm
Relative illumination at full field	74%
IR cut-off filter	Integrated on lens elements
<b>Environmental</b>	
Operating temperature	0 °C to + 70 °C
RoHS compliant	Yes

## Ordering Information

For ordering information, please contact your local Aptina sales representative. This information can be found at <http://www.aplina.com>.

**Table 2: Available Part Numbers**

<b>Part Number</b>	<b>Description</b>
MT9D131L12STCH ES	MT9D131 image sensor headboard (LLCC package)
MT9D131C12STCH ES <sup>1</sup>	MT9D131 image sensor headboard (CLCC package)

Notes: 1. This part number will replace MT9D131L12STCH ES after March 2007.

## Sensor Headboard Images

Figure 2: Block Diagram

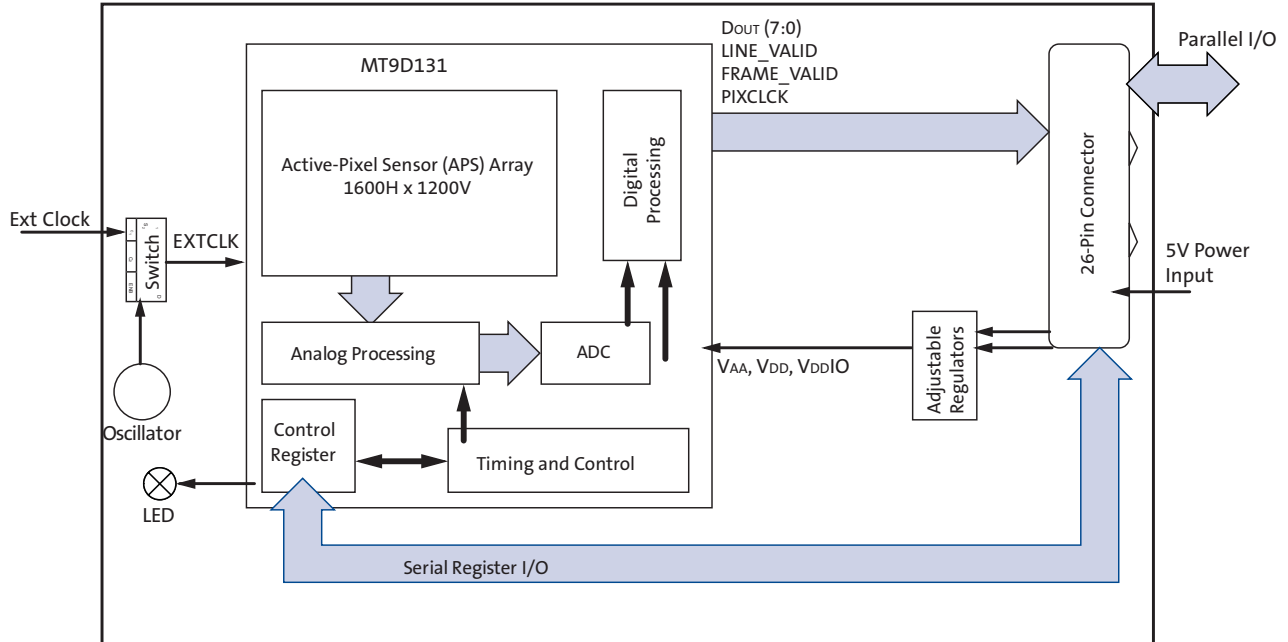
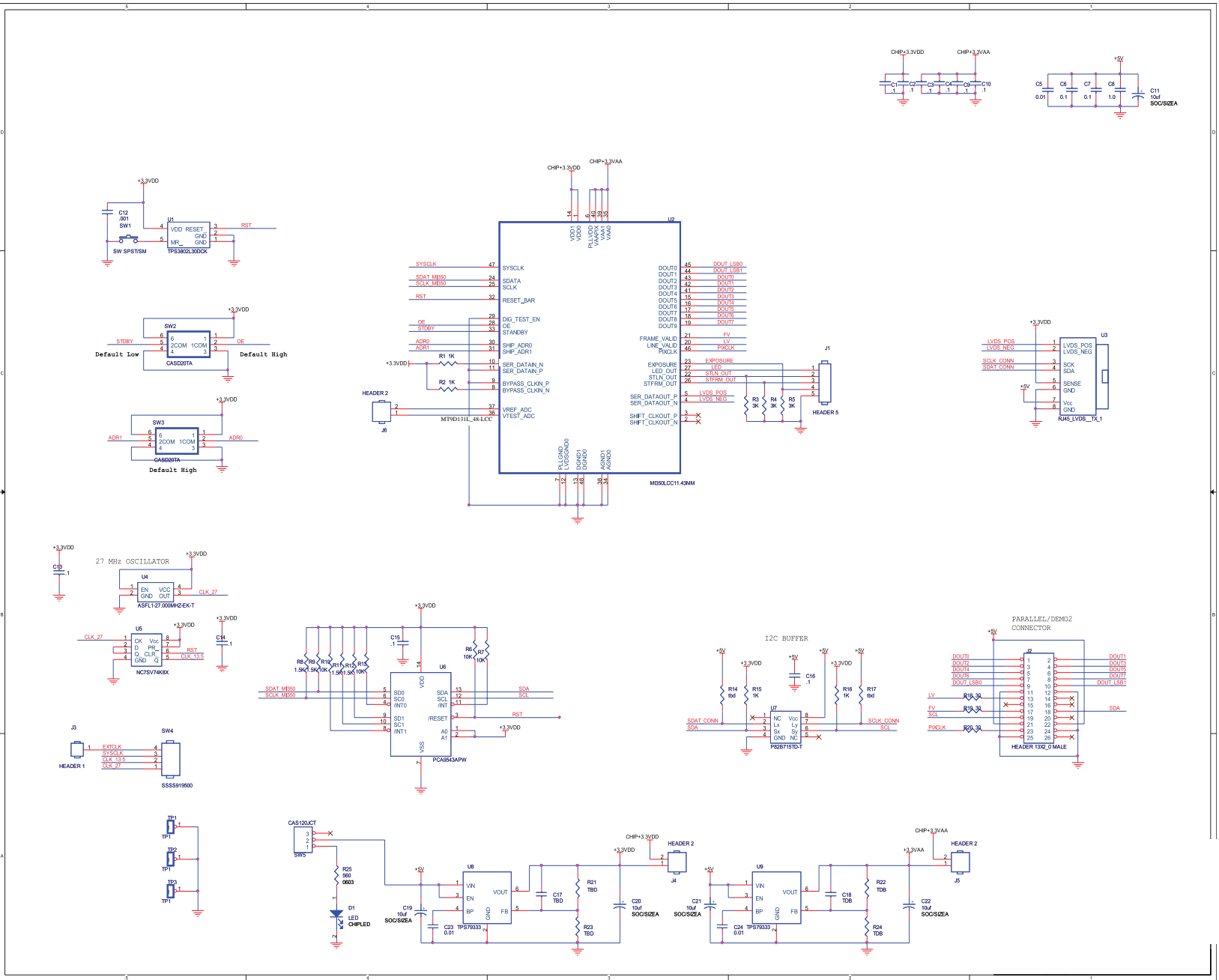


Figure 3: MT9D131 Headboard Schematics



## Silk Screen Top and Bottom Views

Figure 4: MT9D131 Sensor Headboard: Top View

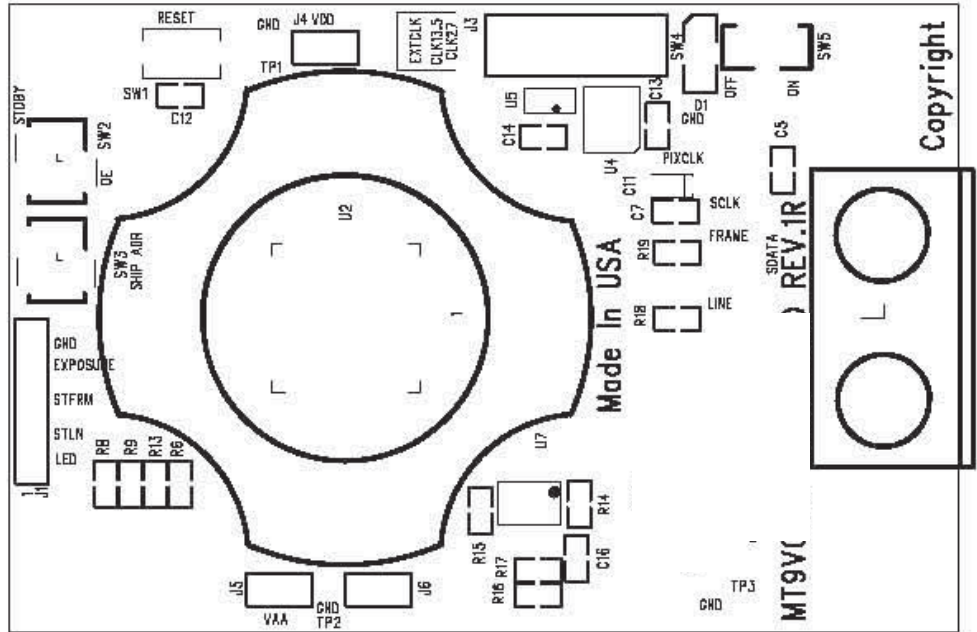
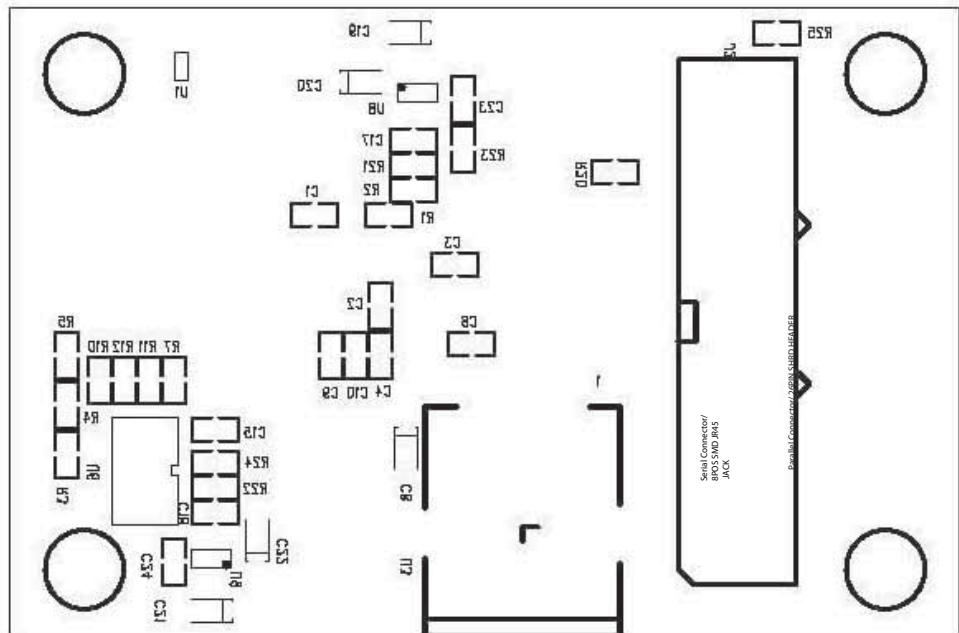


Figure 5: MT9D131 Sensor Headboard: Bottom View

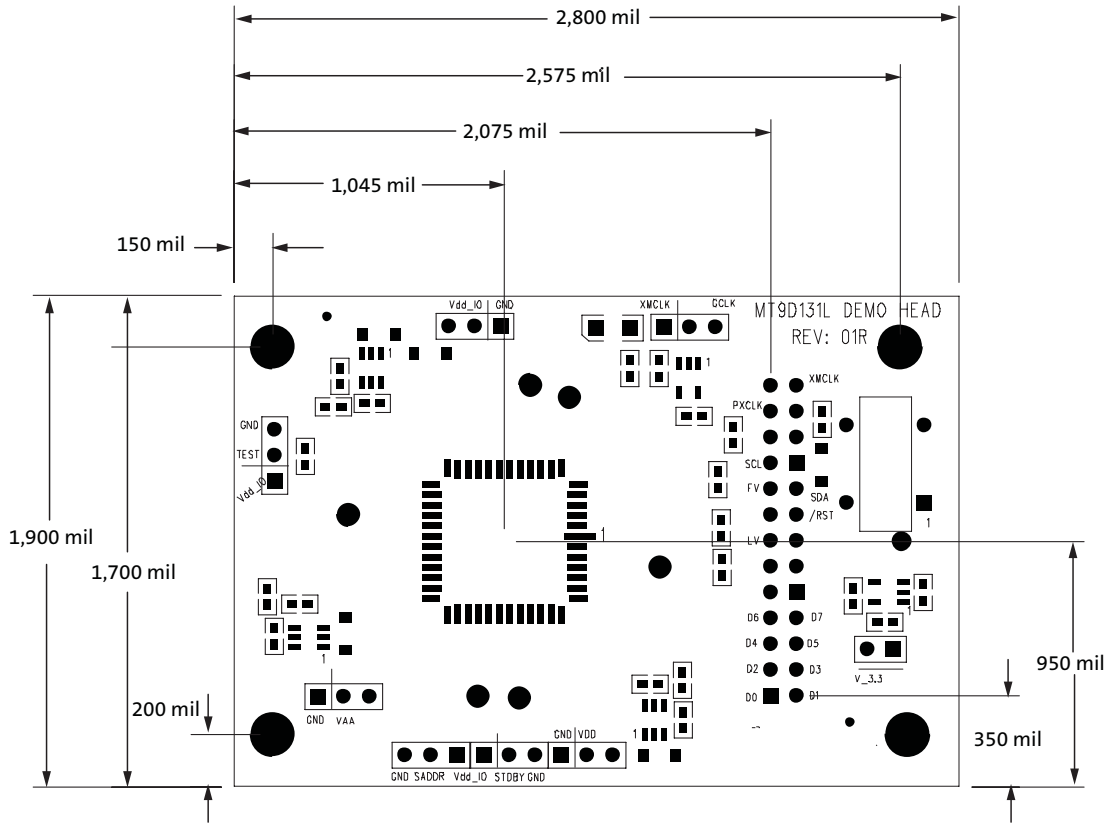


## Bill of Materials List

Table 3: Bill of Materials

Item	Qty	Reference Designator	Description	Part Number	Manufacturer/ Distributor
1	3	C14, C20, C35	CAP .22pF 0603	ECJ-1VC1H220J	Panasonic/DIGIKEY
2	4	C16, C19, C23, C36,	CAP .01uF 0603	ECJ-1VB1C103K	Panasonic/DIGIKEY
3	14	C4, C6, C7, C8, C9, C10, C12, C17, C18, C29, C31, C32, C33, C34	CAP .1uF 0603	ECJ-1VB1C104K	Panasonic/DIGIKEY
4	10	C5, C28, C30, C11, C13, C15, C21, C22, C37, C38	CAP TANT 10UF 10V SMD	T491A106K010AT	Kemet/DIGIKEY
5	1	D1	LED Green	LN1351CTR	AVX/DIGIKEY
6	4	R3, R4, R5, R11	RES 30Ω 0603	ERJ-3GEYJ300V	Panasonic/DIGIKEY
7	1	R19	RES 560Ω 0603	ERJ-3GEYJ561V	Panasonic/DIGIKEY
8	1	R20	RES 1KΩ 0603	ERJ-3GEYJ102V	Panasonic/DIGIKEY
9	4	R12, R14, R15, R17	RES 1.5KΩ 0603	ERJ-3GEYJ152V	Panasonic/DIGIKEY
10	5	R2, R13, R16, R18, R19	RES 10KΩ 0603	ERJ-3GEYJ103V	Panasonic/DIGIKEY
11	3	R7, R10, R21	RES 30KΩ 0603	ERJ-3GEYJ303V	Panasonic/DIGIKEY
12	3	R6, R8, R22	RES 50K POT	ST5ETP503	BG Components/ DIGIKEY
13	1	U4	AptinaSensor 48LLCC_11	MT9D131L_48LLCC	Aptina Technology
14	3	U6, U8, U12	VOLT REG ADJ SOT-23-6	TPS79301DBVR	DIGIKEY
15	1	U7	REG LDO 3.3V SOT-23-5	REG102NA-3.3	IT/DIGIKEY
16	1	U3	IC BUFF S. TRIGGER SOT-23-5	SN74AUC1G17DBVR	DIGIKEY
17	1	U11	IC I2C SWITCH 4CH 16-TSSOP	PCA9543APW-T	Philips/DIGIKEY
18	1	U2	Socket Dip8	ED90032-ND	DIGIKEY
19	1	JP3	Header 2	PBC36SAAN	DIGIKEY
20	7	J1, J3, J4, J5, J6, J7, J8	Header 3	PBC36SAAN	Panasonic/DIGIKEY
21	1	J2	CONN 26P SHRD HEADER	N2526-6002RB	DIGIKEY
22	1		PCB	MT9D131L Rev.1R	
23	1		Lens	DSL115	Sunex
24	1		Lens back plate	MILE2 - C-mount	Aptina
25	1		Lens holder	CM1 + LA-D-M12x.5	Aptina
26	1		O-ring	H1X23	Eric's West
27	8		Jumper	N2526-6002RB	DIGIKEY

## Mechanical Drawing



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## Revision History

<b>Rev. C</b> .....	<b>8/10</b>
• Updated to non-confidential	
<b>Rev. B</b> .....	<b>7/10</b>
• Updated to Aptina template	
<b>Rev. A</b> .....	<b>7/05</b>
• Initial release	