96B-MEZ-CAM1

User Manual V0.1

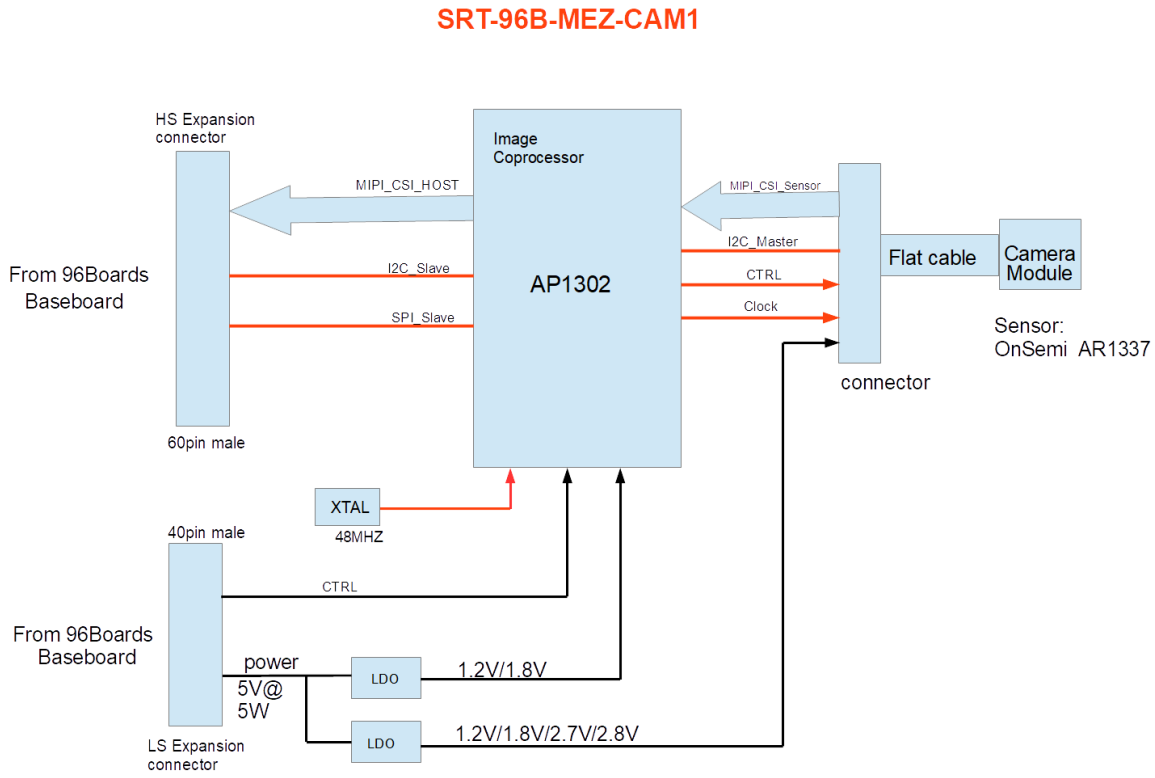
1. Introduction

Shiratech Solutions 96B-MEZ-CAM1 is 96Boards compatible mezzanine board that provide camera module. This board include High speed and Low speed connectors to connect to standard 96Board (AVENGER Baseboard)

The board include the main IC's:

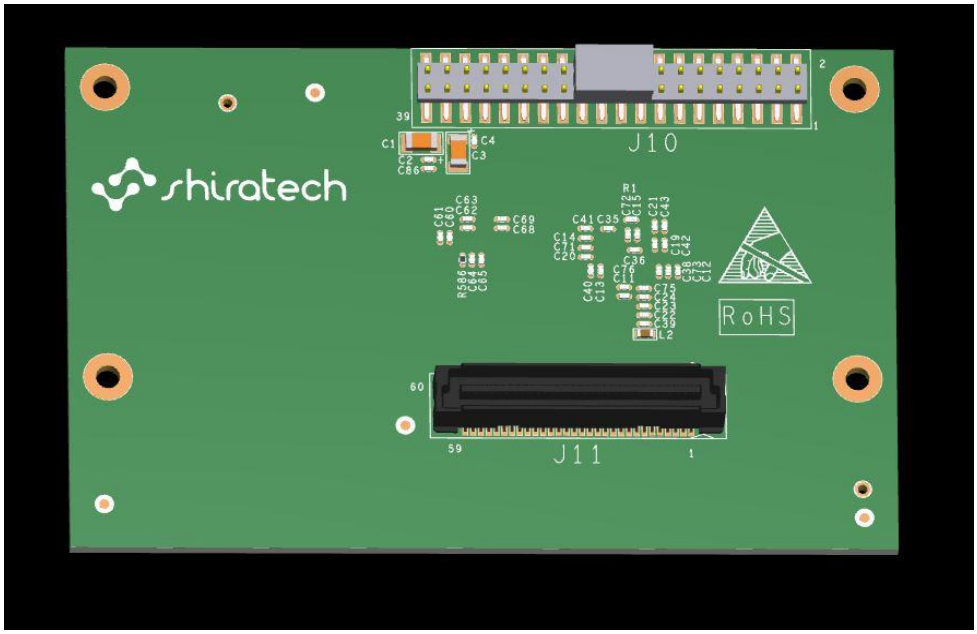
- AR1337 – Camera module of TRULY that include On-Semi CMOS imaging 13MP sensor. It connect to J12 (Via 30pin flat cable)
- AP1302 – Image Coprocessor (ON-Semi)

2. Functional Block Diagram

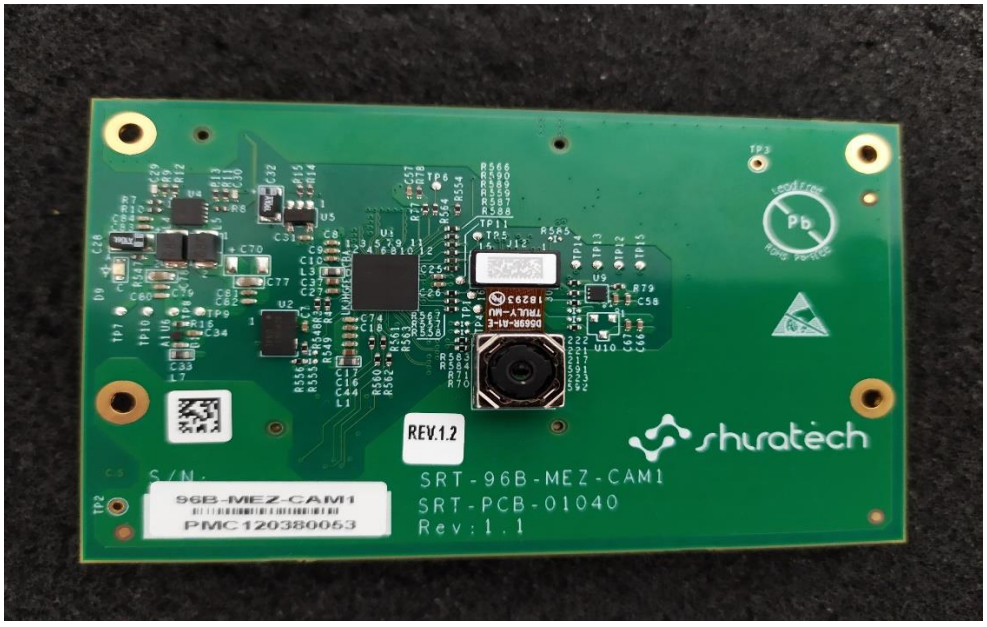


3. Data flow (Video)

Video flow from camera module to AP1302 through standard MIPI bus (High speed video lines) via J11 high speed expansion connector to AVENGER Baseboard.

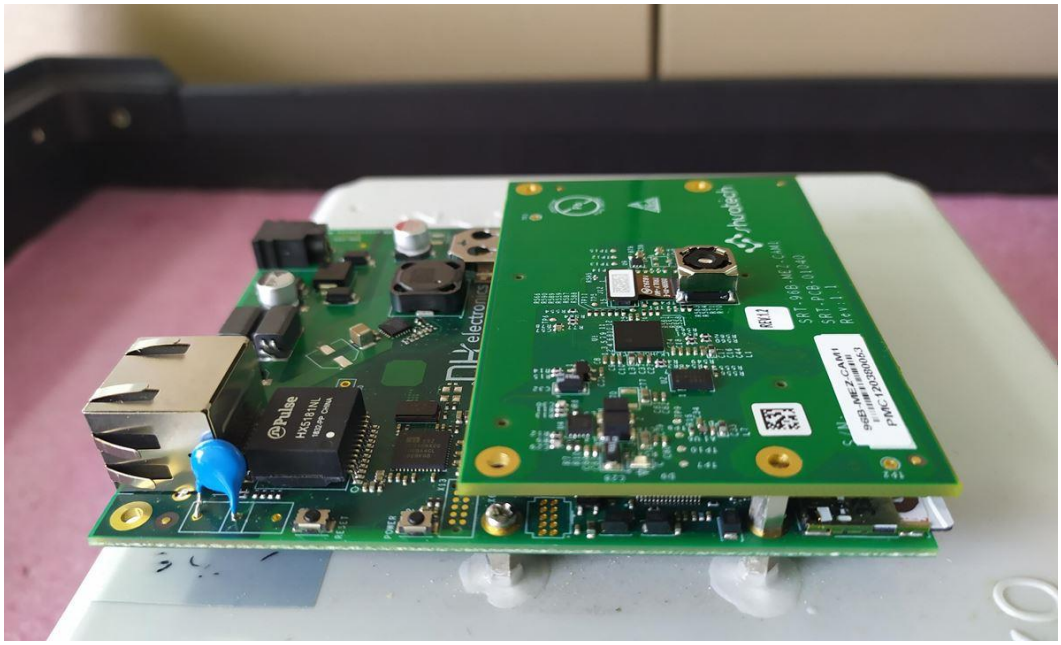


J11 (HS) and J10 (LS) both Male connectors on bottom PCB side

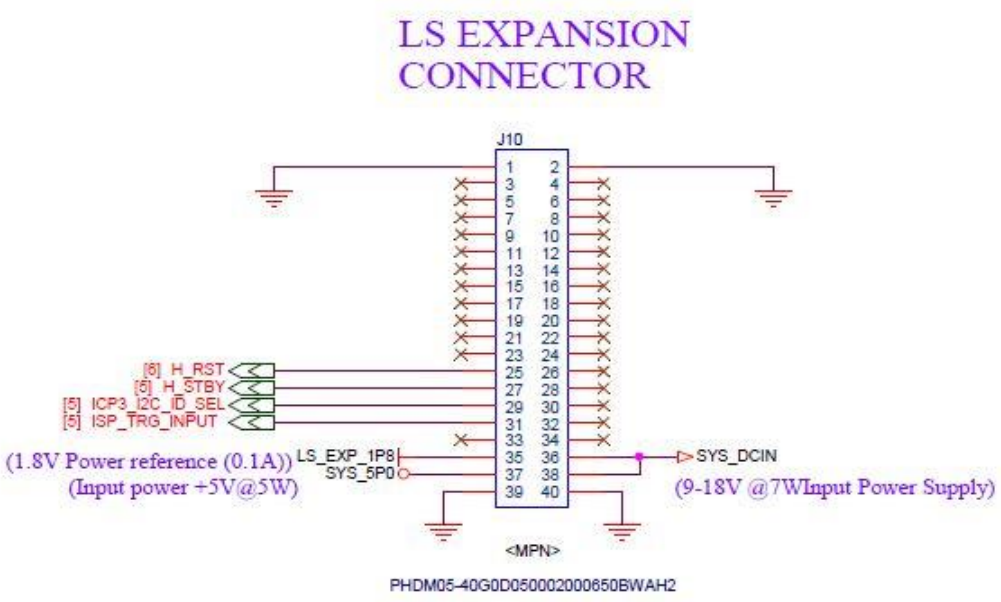


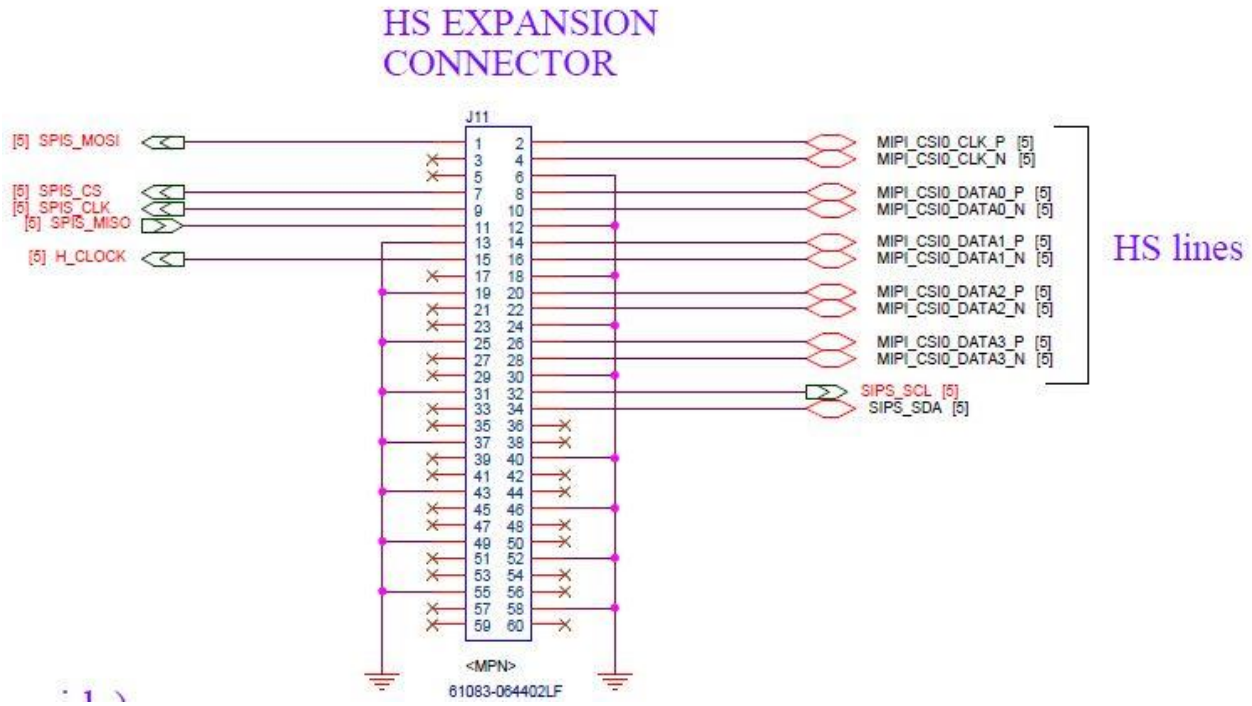
Camera module on PS

AVENGER Baseboard



AVENGER Baseboard and 96B-MEZ-CAM1 on top of it




HS EXPANSION CONNECTOR
J11
[5] SPIS_MOSI
[5] SPIS_CS
[5] SPIS_CLK
[5] SPIS_MISO
[5] H_CLOCK
1 2
3 4
5 6
7 8
9 10
11 12
13 14
15 16
17 18
19 20
21 22
23 24
25 26
27 28
29 30
31 32
33 34
35 36
37 38
39 40
41 42
43 44
45 46
47 48
49 50
51 52
53 54
55 56
57 58
59 60
<MPN>
61083-064402LF
MIPI_CSI0_CLK_P [5]
MIPI_CSI0_CLK_N [5]
MIPI_CSI0_DATA0_P [5]
MIPI_CSI0_DATA0_N [5]
MIPI_CSI0_DATA1_P [5]
MIPI_CSI0_DATA1_N [5]
MIPI_CSI0_DATA2_P [5]
MIPI_CSI0_DATA2_N [5]
MIPI_CSI0_DATA3_P [5]
MIPI_CSI0_DATA3_N [5]
SIPS_SCL [5]
SIPS_SDA [5]
HS lines

AP1302

Advanced Image Coprocessor for ON Semiconductor's Sensors

6.5 mm x 6.5 mm Package Data Sheet

ORDERING INFORMATION

Table 1. AVAILABLE PART NUMBERS

Part Number	Description
AP1302CSSL00SMGA0	6.5x 6.5 x 0.8(mm) VFBGA Package Part
AP1302CSSL00SMGAH-E	Product demo board
AP1302CSSL00SMGAD3-E	Demo kit

Table 2. KEY PERFORMANCE PARAMETERS

Parameter		Value
Primary camera interface		Up to 4-lane MIPI (up to 1.2 Gbps/lane)
Primary camera input format		RAW6, RAW8, RAW10, RAW12
Output interface		Up to 4-lane MIPI (up to 1.2 Gbps/lane)
Output format		YUV422, YUV420, 888RGB, 565RGB, 555RGB, JPEG, RAW8, RAW10, RAW12, MJPEG
Secondary camera interface		Up to 3-lane MIPI (up to 1.2 Gbps/lane)
Secondary camera input format		RAW6, RAW8, RAW10, RAW12
Maximum resolution		4224x3156 (13 Mp)
Maximum frame rate		30 fps at 13Mp, 120 fps at 1080p
Maximum output clock frequency		MIPI clock up to 600 MHz (1200 Mbps DDR)
Maximum color processing frequency		450 Mpixels per second
Supply voltage	CORE	1.2V nominal ± 5%
	I/O	1.8V nominal ± 10%
	PLL	1.2V nominal ± 5%
	MIPI	1.2V ± 5%
Operating temperature		-30°C to +70°C (ambient) -30°C to +85°C (junction)
Process		55nm
ESD Susceptibility		2000V HBM

Features

- Optimized for operation with ON Semiconductor's Clarity+™ Pixel technology sensors as well as Bayer pattern CMOS Image Sensors (CIS)
- Up to 13 Mp (4224x3156) sensor support
- Designed to support ON Semiconductor sensors that provide video interlaced HDR (iHDR).
- 450 Mp/second processing (13Mp at 30/1080p at 120/720p at 240 – subject to sensor limitations

This document contains information on a new product. Specifications and information herein are subject to change without notice.

ON Semiconductor®

www.onsemi.com

Features

- Color gaining and gamma correction
- Frame rate reduction, image resizing and clipping
- Auto exposure, auto white balance, auto focus, auto flicker detection and mitigation
- Adaptive Tone Mapping, Local Tone Mapping
- Face detection
- Smooth digital zoom and panning
- OSD, special effects
- Test pattern generator
- Programmable JPEG encoder with EXIF header support
- Scalado SpeedTags™ Encode support
- Two-wire serial interface (I²C) for sensor and peripheral control and register access supporting Standard (100kbps), Fast mode (400kbps), FM+ (1Mbps) and HS (3.4 Mbps)
- Dual on-chip 32-bit RISC processor cores
- Dual sensor support (second camera or 3D bridge application)
- 6 MIPI data lanes shared between two sensor interfaces (4+2/ 3+3)
- Four-wire serial interface (SPI slave) for register access supporting up to 25 Mbps
- 12 GPIOs (shared functionality with SPI master and slave, second I²C master)
- Fail-safe IO, programmable slew-rate control

Applications

- IoT
- Drones
- Machine vision
- AR/VR/MR
- Video conferencing

Note: ON Semiconductor will only support its own image sensors on this device.

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