NXP Semiconductors

UM11933: RPi-CAM-MIPI Board User Manual

RPi-CAM-MIPI overview

The RPi-CAM-MIPI kit is an MIPI CSI camera adapter board designed to connect different kinds of camera sensors with the ON Semiconductor IAS interface. The bypassable on-board ISP (ON Semiconductor AP1302) chip allows it to be used with a wide range of SoCs.

This document includes the RPi-CAM-MIPI introduction and board setup and configurations and provides detailed information on the overall design and usage of the RPi-CAM-MIPI board from a hardware system perspective.

Acronyms and abbreviations

Acronyms and abbreviations lists and explains the acronyms and abbreviations used in this document.

Acronyms and abbreviations

Term	Description
BGA	Ball Grid Array
CSI-2	Camera Serial Interface 2
DNP	Do Not Populate
HS	High-Speed
I2C	Inter-Integrated Circuit
FD	Flexible Data rate
GPIO	General-Purpose Input/Output
ISP	In-System Programming
LDO	Low Dropout Regulator
MIPI	Mobile Industry Processor Interface
LED	Light-Emitting Diode

Related documentation

Related documentation lists and explains the additional documents and resources that you can refer to for more information on the RPi-CAM-MIPI board. Some of the documents listed below may be available only under a Non-Disclosure Agreement (NDA). To request access to these documents, contact your local Field Applications Engineer (FAE) or sales representative.

Related documentation

Document	Description	Link/how to access
i.MX 93 Applications Processor Reference Manual	This document is intended for system software and hardware developers and application programmers who want to develop products with the i.MX 93 MPU.	IMX93RM
i.MX 93 Industrial Application Processors Data Sheet	This document provides information about electrical characteristics, hardware design considerations, and ordering information.	IMX93IEC
i.MX93 Hardware Developer's Guide	This document aims to help hardware engineers design and to test their i.MX 93 processor-based designs. It provides information about board layout recommendations and design checklists to ensure first-pass success and avoidance of board bring-up problems.	IMX93HDG

Board kit contents

Board kit contents lists the items included in the RPi-CAM-MIPI board kit.

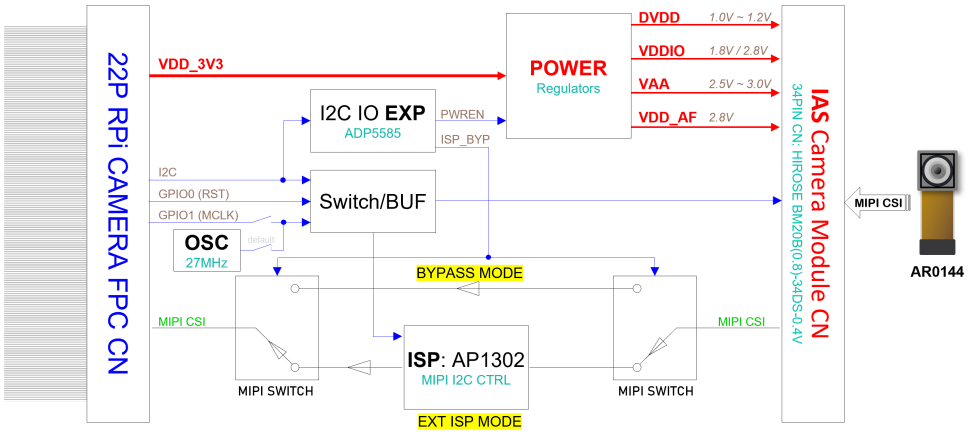
Board kit contents

Item description	Quantity
RPi-CAM-MIPI	1

Item description	Quantity
AR0144 CMOS sensor	1
22-pin / 0.5-mm pitch FPC cable	1
RPI-CAM-MINISAS	1

Block diagram

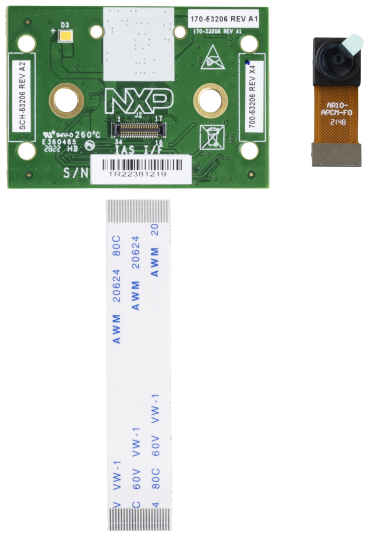
RPI-CAM-MIPI block diagram shows the RPI-CAM-MIPI block diagram.



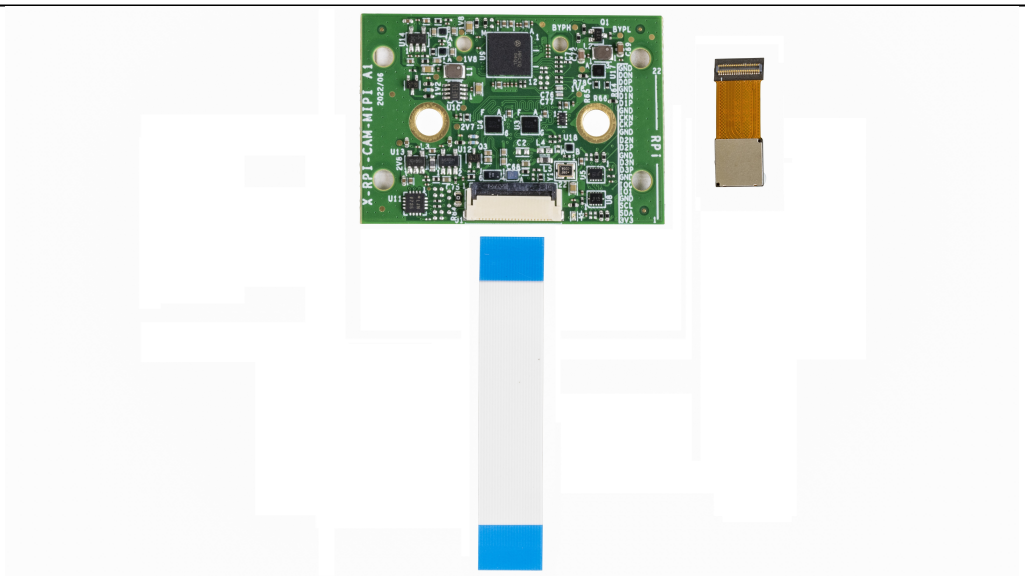
RPI-CAM-MIPI block diagram

Board pictures

RPI-CAM-MIPI BOTTOM view and RPI-CAM-MIPI TOP view show the top-side and bottom-side view of the RPi-CAM-MIPI board, AR0144 camera, and FPC cable. RPI-CAM-MINISAS is the converter board which can support a 22-pin FPC connector converted to a MiniSAS connector, or a MiniSAS connector converted to a 22-pin FPC connector.

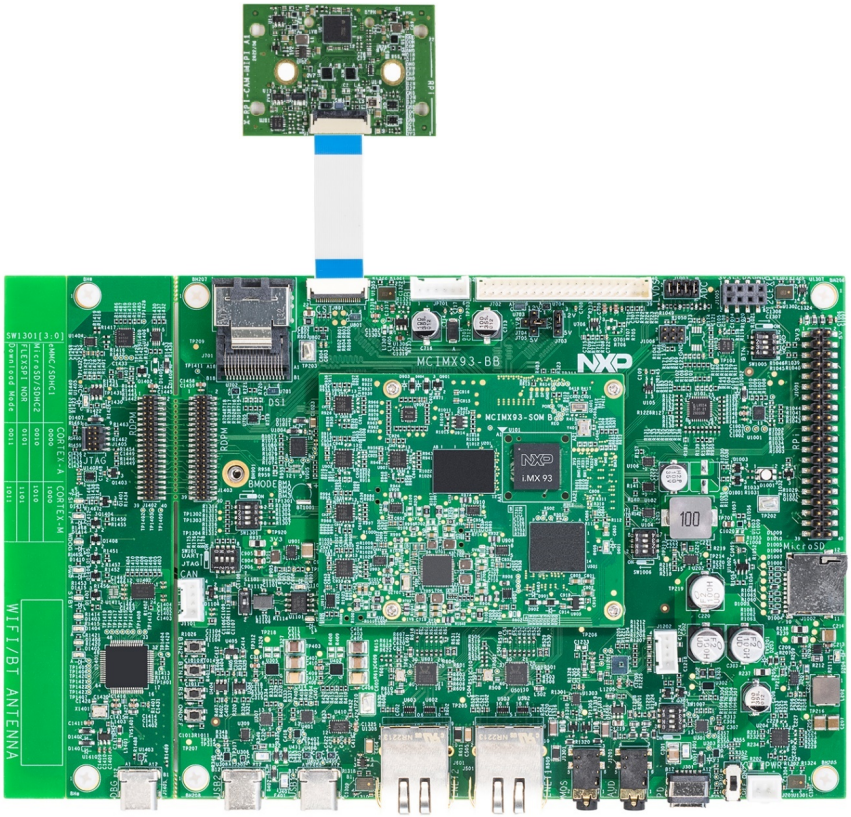


RPI-CAM-MIPI BOTTOM view



RPI-CAM-MIPI TOP view

RPI-CAM-MIPI connection with MCIMX93-EVK shows the connection between the RPi-CAM-MIPI board and the MCIMX93-EVK board.



RPI-CAM-MIPI connection with MCIMX93-EVK

Board features

MCIMX93-EVK features lists the features of RPI-CAM-MIPI.

MCIMX93-EVK features

Board feature	Target processor feature used	Description
Interfacing with the main board	-	A 22-pin connector is used for the RPI-CAM-MIPI board. A 22-pin / 0.5-mm FPC cable is used between RPI-CAM-MIPI and the main board.

Board feature	Target processor feature used	Description
Power	3.3 V	The RPI-CAM-MIPI board can be powered by 3.3 V from the motherboard.
I^2C	I^2C	RPI-CAM-MIPI is configured through the I^2C interface on the motherboard.
MIPI CSI	MIPI CSI	• It is compliant with MIPI-CSI2 specification v1.2. • Four MIPI CSI data lanes plus one clock lane are used.
IO0/IO1	GPIO	• The default IO0 is used as a reset signal for the RPI-CAM-MIPI board. • IO1 is configured as a camera MCLK signal, but on-board 27 MHz is used as the MCLK by default.

Connectors

See RPI-CAM-MIPI connection with MCIMX93-EVK for the connector position on the board. RPI-CAM-MIPI connectors describes the RPI-CAM-MIPI board connectors.

RPI-CAM-MIPI connectors

Connector	Description	Connector type	Reference section
J1	RPi interface connected with motherboard	22-pin FPC connector	22-pin RPi interface
J2	IAS-compatible interface for camera	B2B 34-pin connector	Camera interface IAS

Flash LEDs

The RPI-CAM-MIPI board has a Light-Emitting Diode (LED) D3, which can be used as a camera flash LED or as a torch.