AGX ORIN MIPI CSI-2 Bridge Board

P/No: FC-AGX-LHMM

Compatible Cameras:

- LVDS Cameras
  - Sony • Tamron • KT&C • Videology • Wonwoo • Skoopia
- HDMI Cameras
  - Sony HDMI Block Cameras
- 22-pin MIPI CSI-2 Cameras (AstrOptix Orin Super Carrier, Jetson Orin Nano Super Dev Kit and Raspberry Pi 5 pinout Compatible)

Supported Host Platforms:

- NVIDIA Jetson AGX Orin Developer Kit

KEY FEATURES

- **Multi-Interface Camera Integration:** Integrates LVDS–MIPI CSI-2, HDMI–MIPI-CSI-2, 2-channel native MIPI CSI-2 interfaces on a single board, fully utilizing all four 4-lane MIPI CSI-2 interfaces on the NVIDIA Jetson AGX Orin.
- **LVDS Camera Interface**
  1. Converts LVDS camera video output to 4-lane MIPI CSI-2
  2. Independent Camera power switch and I²C-to-UART bridge (3.3V CMOS) for VISCA control, with provision for external on board UART connector for camera control
- **HDMI Camera Interface**
  1. Converts HDMI camera video output to 4-lane MIPI CSI-2
  2. Independent Camera power switch and I²C-to-UART bridge (3.3V CMOS) for VISCA control, with provision for external onboard UART connector for camera control
- **Two Native MIPI CSI-2 Interface**
  1. Two Native 22-pin, 4-lane MIPI CSI-2 pass-through connector for direct sensor integration
- **Electrical & Protection**
  1. Wide-range 12–24V DC input
  2. Reverse-voltage and transient-voltage protection
  3. Power-status LEDs
- **Mechanical & Environmental**
  1. Compact 84.87 × 61.95 mm form factor
  2. Board weight: 33.4g
  3. Operating temperature: –20°C to +85°C
- **RoHS compliant.**

APPLICATIONS

- AI Edge Computing and Multi-Sensor Vision Analytics
- UAV / ISR Multi-Camera Payloads
- Robotics and Autonomous Platforms
- Industrial & Machine Vision Systems
- Defense Surveillance and Reconnaissance Systems
- Medical & Diagnostic Imaging Instruments
- Security and Perimeter Surveillance Cameras
- Research, Development & Rapid Prototyping
- Security and Surveillance Cameras
- Broadcast and Multimedia Streaming

PRODUCT DESCRIPTION

A single-board camera integration platform built for the NVIDIA Jetson AGX Orin, engineered to bring every major camera interface — LVDS, HDMI and two native MIPI CSI-2 — onto one design, making full use of all four 4-lane MIPI CSI-2 interfaces the AGX Orin has to offer.

At its core, the board bridges LVDS and HDMI camera video output into 4-lane MIPI CSI-2, giving system integrators a direct path to connect industry-standard block cameras without custom bridging hardware of their own. Both interfaces share a dedicated I²C-to-UART bridge (3.3V CMOS) for VISCA control, with an onboard connect available for external camera control when needed. Rounding out the interface set, a two native 22-pin, 4-lane MIPI CSI-2 pass-through connector supports direct integration of MIPI sensors, for applications that don't need format conversion at all.

Built for demanding environments, the board runs on a wide-range 12–24V DC input, with reverse-voltage and transient-voltage protection guarding against field power faults, and power-status LEDs for at-a-glance diagnostics. Its compact 84.87 mm × 61.95 mm footprint and 33.4g weight suit space-constrained embedded enclosures, while a –20°C to +85°C operating range and RoHS compliance support deployment across industrial, defense, and outdoor vision systems.

Ideal for: multi-sensor embedded vision systems, UAV and defense payloads, and industrial camera integration projects requiring flexible support for LVDS, HDMI and two native MIPI camera sources on a single Jetson AGX Orin platform.

Technical specifications

PARAMETER	DETAILS
Input Voltage	12–24 V DC regulated, wide-input (Molex Micro Lock Plus 2-pin connector)
Camera Interface	4 independent ports: LVDS–MIPI CSI-2 (30-pin KEL, LVDS Single mode), HDMI–MIPI CSI-2 (30-pin KEL, HDMI), 2 X Native MIPI CSI-2 (22-pin FPC)
MIPI CSI-2 Output	AGX Orin camera expansion connector compatible — 120-pin Samtec QTH-060 series, 4 X 4 lane MIPI CSI-2
I²C Architecture	3 independent I²C MUX ICs, each dedicated to a camera port group: TCA9546 for LVDS camera + control and MIPI_CAM0, TCA9543 for HDMI camera + control, another TCA9543 for MIPI_CAM1
Supported Video Format	Up to 4K 60fps (camera dependent)
Camera Control	VISCA over UART (3.3 V CMOS) bridged to I²C (host) for LVDS/HDMI ports
Indicators	Power LED (Green)
Board Dimensions (L × W)	84.87 × 61.95 mm
Weight	33.4 g
Operating Temperature	−20 °C to +85 °C
Compliance	MIPI CSI-2 Specification, RoHS
Recommended Supply	12 V / 3 A regulated (wide-input 12–24 V tolerant)

Camera Interface Specification

PORT 1 — LVDS-MIPI CSI-2 BRIDGE

PARAMETER	DETAILS
Validated Cameras	Sony FCB-EV9520L / FCB-EV9500L, Tamron MP3010M-EV, KT&C ATC-HZ5540T-LP, Videology 24Z2.1W-10XLVDS-462
Camera Interface	30-pin KEL, LVDS (Single mode) micro-coaxial interface
Supported Video Format	Up to Full HD 1080p 60 fps (camera dependent)
Camera Control	VISCA over UART (3.3 V CMOS) bridged to I^2C (host) via I^2C multiplexer

PORT 2 — HDMI-MIPI CSI-2 BRIDGE

PARAMETER	DETAILS
Validated Cameras	Sony FCB-ER9500 / FCB-ER8530 / FCB-EW9500H
Camera Interface	30-pin KEL, HDMI micro- coaxial interface
Supported Video Format	Up to 4K 60 fps (camera dependent)
Camera Control	VISCA over UART (3.3 V CMOS) bridged to I^2C (host) via I^2C multiplexer

PORT 3 — Native MIPI CONNECTOR - 0

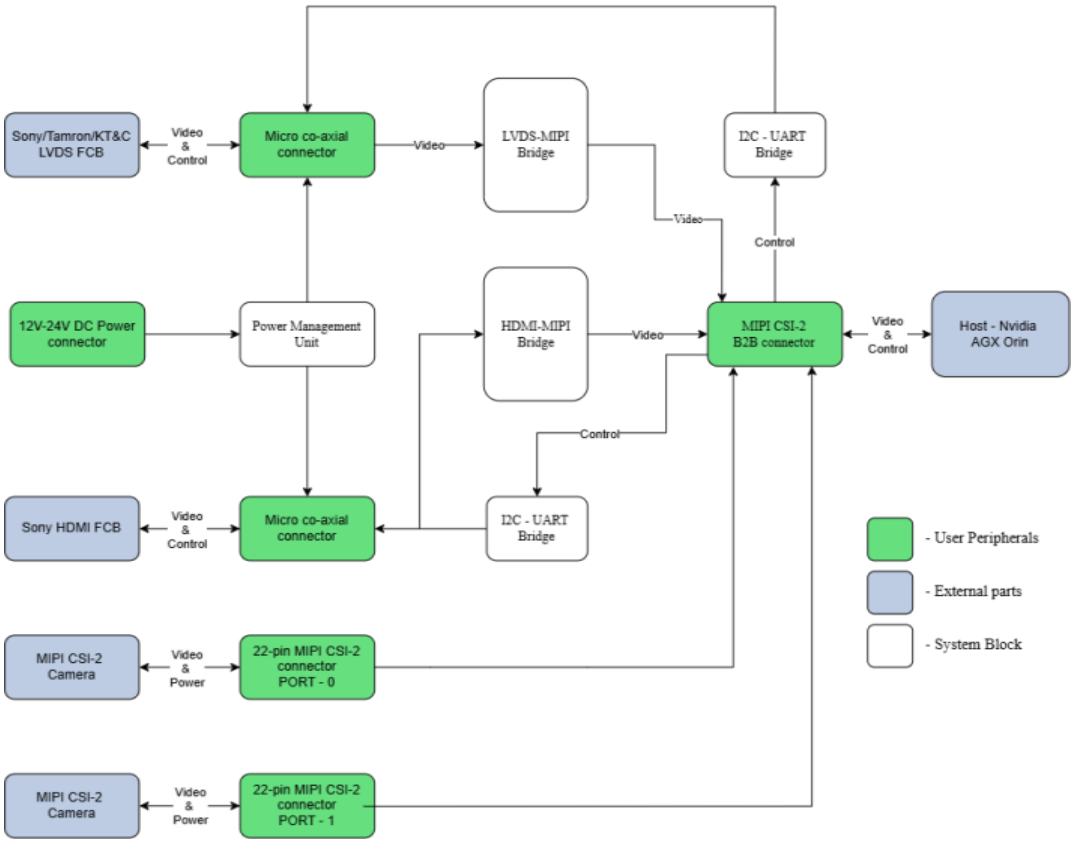
PARAMETER	DETAILS
Connector Type	22-pin FPC, straight, 4-lane MIPI CSI-2
Signal Path	Direct pass-through — no protocol conversion
Compatibility	Any native MIPI CSI-2 camera / sensor module (4-lane)

PORT 4 — Native MIPI CONNECTOR - 1

PARAMETER	DETAILS
Connector Type	22-pin FPC, straight, 4-lane MIPI CSI-2
Signal Path	Direct pass-through — no protocol conversion
Compatibility	Any native MIPI CSI-2 camera / sensor module (4-lane)

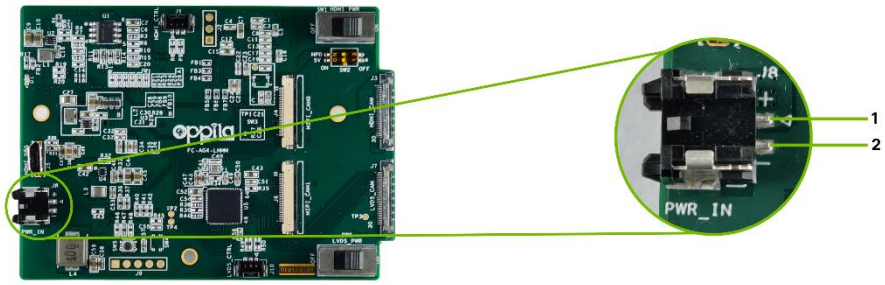
System Architecture

BOARD BLOCK DIAGRAM



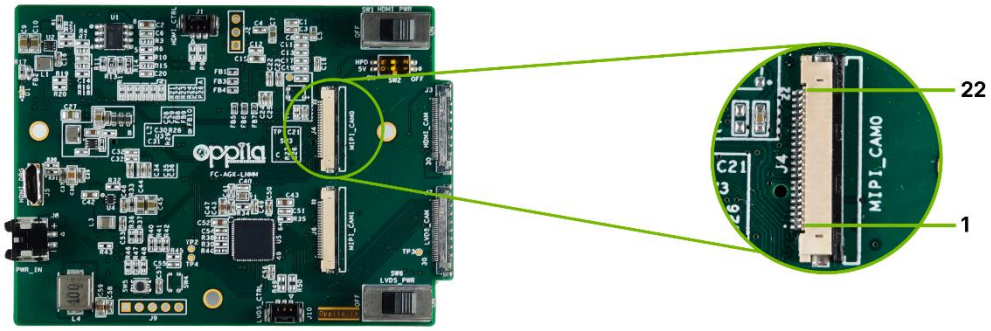
Pinout Descriptions

POWER CONNECTOR — J8



PIN	SIGNAL
Pin 1	+VIN
Pin 2	GND

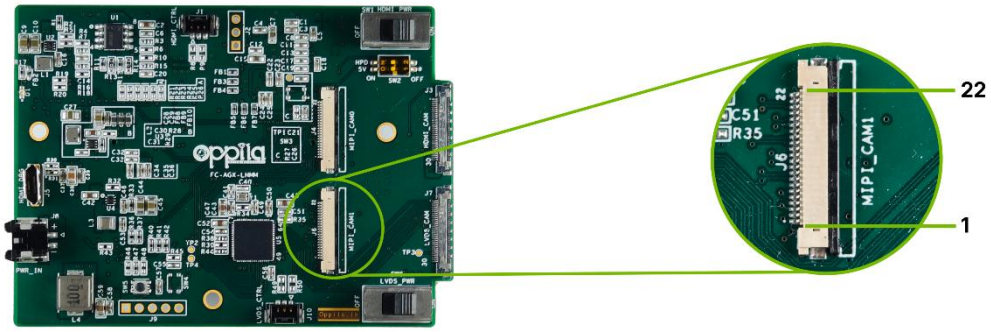
MIPI CSI - 2 CAMERA CONNECTOR PORT 0 — J4



PIN	SIGNAL
Pin 1	3V3
Pin 2	I2C_DATA
Pin 3	I2C_CLK
Pin 4	GND
Pin 5	CAM0_POWER DOWN
Pin 6	CAM0_MCLK
Pin 7	GND
Pin 8	CSI_5_D1_P
Pin 9	CSI_5_D1_N
Pin 10	GND
Pin 11	CSI_5_D0_P

PIN	SIGNAL
Pin 12	CSI_5_D0_N
Pin 13	GND
Pin 14	CSI_4_CLK_P
Pin 15	CSI_4_CLK_N
Pin 16	GND
Pin 17	CSI_4_D1_P
Pin 18	CSI_4_D1_N
Pin 19	GND
Pin 20	CSI_4_D0_P
Pin 21	CSI_4_D0_N
Pin 22	GND

MIPI CSI - 2 CAMERA CONNECTOR PORT 1— J6

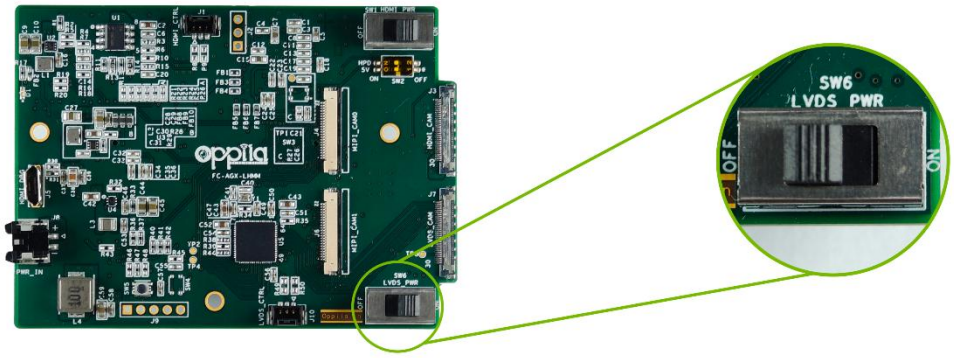


PIN	SIGNAL
Pin 1	3V3
Pin 2	I2C_DATA
Pin 3	I2C_CLK
Pin 4	GND

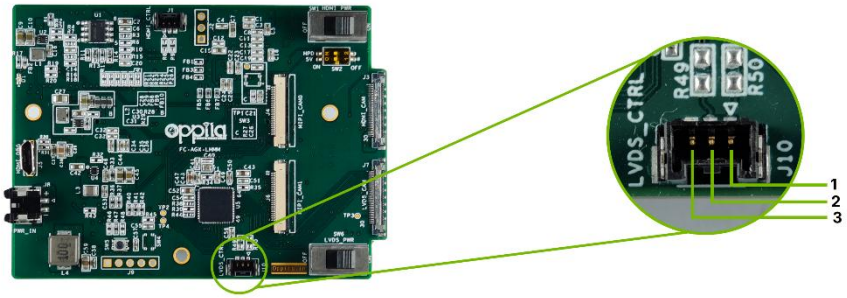
PIN	SIGNAL
Pin 12	CSI_7_D0_N
Pin 13	GND
Pin 14	CSI_6_CLK_P
Pin 15	CSI_6_CLK_N

Pin 5	CAM3_POWER DOWN	Pin 16	GND
Pin 6	NC	Pin 17	CSI_6_D1_P
Pin 7	GND	Pin 18	CSI_6_D1_N
Pin 8	CSI_7_D1_P	Pin 19	GND
Pin 9	CSI_7_D1_N	Pin 20	CSI_6_D0_P
Pin 10	GND	Pin 21	CSI_6_D0_N
Pin 11	CSI_7_D0_P	Pin 22	GND

LVDS CAMERA POWER SWITCH — SW6

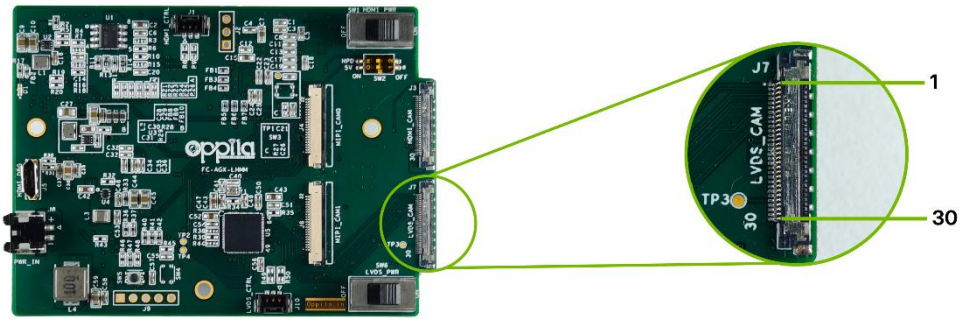


LVDS CAMERA UART CONNECTOR — J10



PIN	SIGNAL
Pin 1	TX
Pin 2	RX
Pin 3	GND

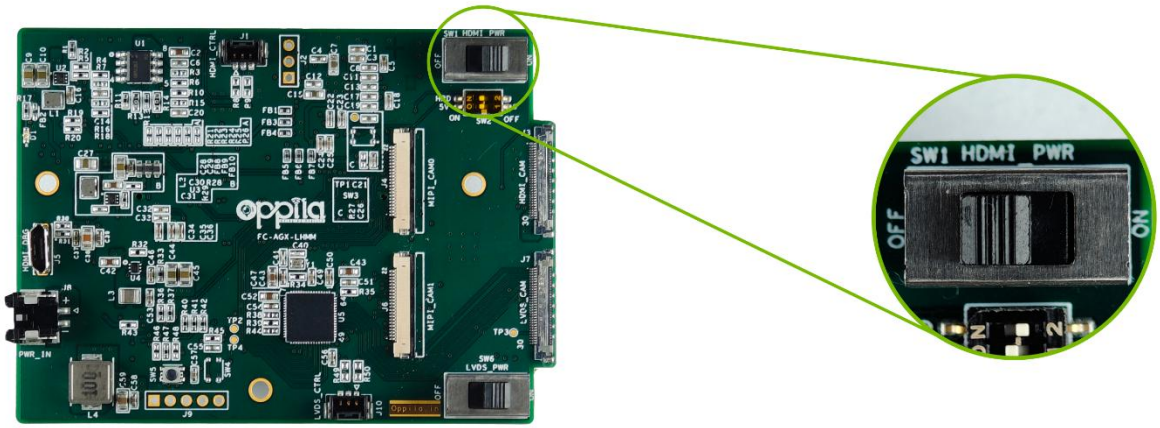
LVDS CAMERA CONNECTOR — J7



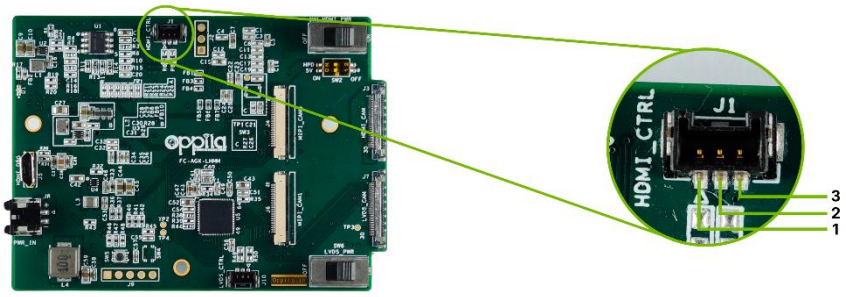
PIN	SIGNAL
Pin 1	LVDS_D3_P
Pin 2	LVDS_D3_N
Pin 3	LVDS_CLK_P
Pin 4	LVDS_CLK_N
Pin 5	LVDS_D2_P
Pin 6	LVDS_D2_N
Pin 7	LVDS_D1_P
Pin 8	LVDS_D1_N
Pin 9	LVDS_D0_P
Pin 10	LVDS_D0_N
Pin 11	GND
Pin 12	CAM_TXD
Pin 13	CAM_RXD
Pin 14	DC_IN
Pin 15	DC_IN

PIN	SIGNAL
Pin 16	DC_IN
Pin 17	DC_IN
Pin 18	DC_IN
Pin 19	GND
Pin 20	GND
Pin 21	NC
Pin 22	NC
Pin 23	NC
Pin 24	NC
Pin 25	NC
Pin 26	RESET
Pin 27	NC
Pin 28	NC
Pin 29	NC
Pin 30	NC

HDMI CAMERA POWER SWITCH — SW1

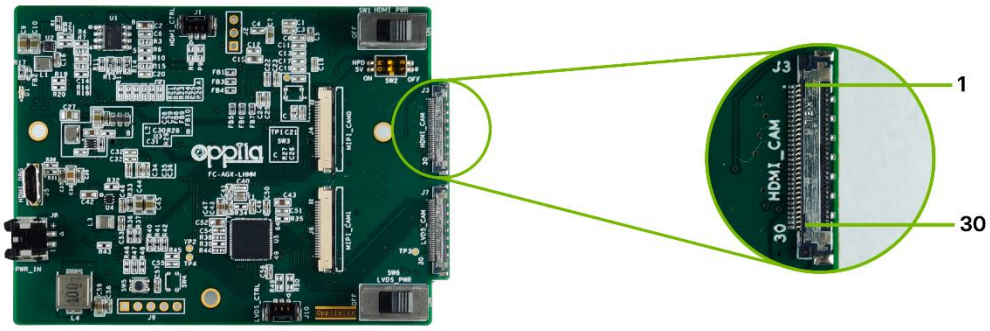


HDMI CAMERA UART CONNECTOR — J1



PIN	SIGNAL
Pin 1	TX
Pin 2	RX
Pin 3	GND

HDMI CAMERA CONNECTOR — J3

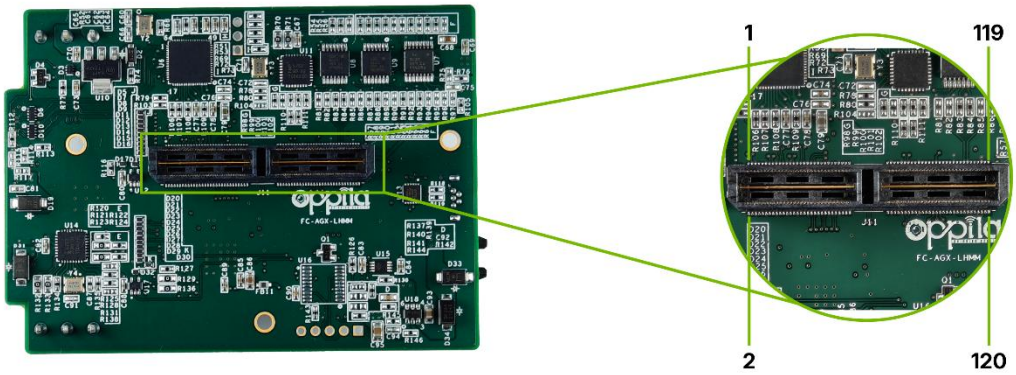


PIN	SIGNAL
Pin 1	GND
Pin 2	HDMI_CLK_N
Pin 3	HDMI_CLK_P
Pin 4	GND
Pin 5	HDMI_D0_N
Pin 6	HDMI_D0_P
Pin 7	GND
Pin 8	HDMI_D1_N
Pin 9	HDMI_D1_P
Pin 10	GND
Pin 11	HDMI_D2_N
Pin 12	HDMI_D2_P
Pin 13	GND

PIN	SIGNAL
Pin 16	NC
Pin 17	HDP / NC
Pin 18	HDP_5V / NC
Pin 19	GND / NC
Pin 20	GND / NC
Pin 21	NC
Pin 22	NC
Pin 23	GND / NC
Pin 24	CAM_RXD
Pin 25	CAM_TXD
Pin 26	NC
Pin 27	DC_IN
Pin 28	DC_IN

Pin 14	NC	Pin 29	DC_IN
Pin 15	NC	Pin 30	DC_IN

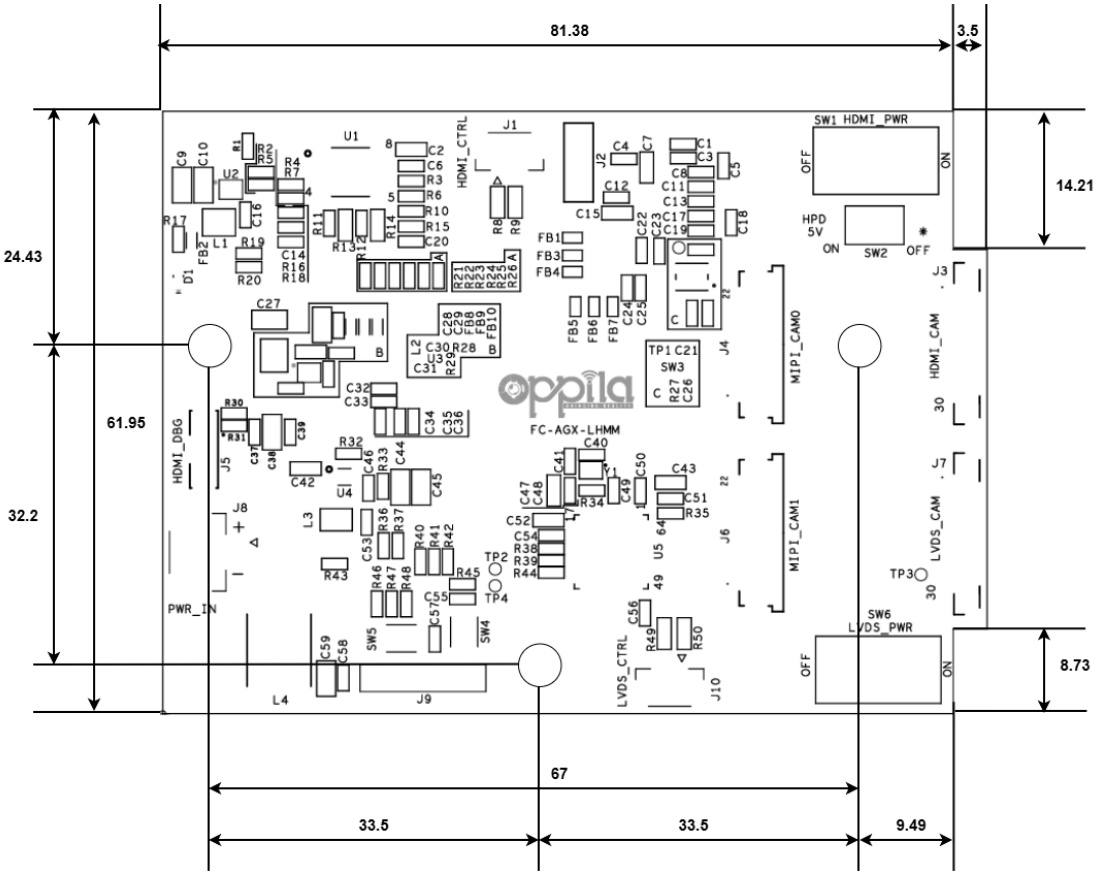
MIPI CSI - 2 CAMERA CONNECTOR — J11



PIN	SIGNAL	PIN	SIGNAL
Pin 1	CSI_0_D0_P	Pin 31	CSI_2_D1_P
Pin 2	CSI_1_D0_P	Pin 32	CSI_3_D1_P
Pin 3	CSI_0_D0_N	Pin 33	CSI_2_D1_N
Pin 4	CSI_1_D0_N	Pin 34	CSI_3_D1_N
Pin 5	GND	Pin 35	GND
Pin 6	GND	Pin 36	GND
Pin 7	CSI_0_CLK_P	Pin 37	CSI_4_D0_P
Pin 8	NC	Pin 38	CSI_6_D0_P
Pin 9	CSI_0_CLK_N	Pin 39	CSI_4_D0_N
Pin 10	NC	Pin 40	CSI_6_D0_N
Pin 11	GND	Pin 41	GND
Pin 12	GND	Pin 42	GND
Pin 13	CSI_0_D1_P	Pin 43	CSI_4_CLK_P
Pin 14	CSI_1_D1_P	Pin 44	CSI_6_CLK_P
Pin 15	CSI_0_D1_N	Pin 45	CSI_4_CLK_N
Pin 16	CSI_1_D1_N	Pin 46	CSI_6_CLK_N
Pin 17	GND	Pin 47	GND
Pin 18	GND	Pin 48	GND
Pin 19	CSI_2_D0_P	Pin 49	CSI_4_D1_P
Pin 20	CSI_3_D0_P	Pin 50	CSI_6_D1_P
Pin 21	CSI_2_D0_N	Pin 51	CSI_4_D1_N
Pin 22	CSI_3_D0_N	Pin 52	CSI_6_D1_N
Pin 23	GND	Pin 53	GND
Pin 24	GND	Pin 54	GND
Pin 25	CSI_2_CLK_P	Pin 55	NC
Pin 26	NC	Pin 56	NC
Pin 27	CSI_2_CLK_N	Pin 57	NC
Pin 28	NC	Pin 58	NC
Pin 29	GND	Pin 59	CSI_5_D0_P
Pin 30	GND	Pin 60	CSI_7_D0_P

PIN	SIGNAL	PIN	SIGNAL
Pin 61	CSI_5_D0_N	Pin 91	CAM0_MCLK
Pin 62	CSI_7_D0_N	Pin 92	HDMI_CAM_RST
Pin 63	GND	Pin 93	CAM0_PWDN
Pin 64	GND	Pin 94	NC
Pin 65	NC	Pin 95	LVDS_CAM_RST
Pin 66	NC	Pin 96	NC
Pin 67	NC	Pin 97	NC
Pin 68	NC	Pin 98	NC
Pin 69	GND	Pin 99	GND
Pin 70	GND	Pin 100	GND
Pin 71	CSI_5_D1_P	Pin 101	NC
Pin 72	CSI_7_D1_P	Pin 102	NC
Pin 73	CSI_5_D1_N	Pin 103	NC
Pin 74	CSI_7_D1_N	Pin 104	NC
Pin 75	I2C_GP3_CLK	Pin 105	I2C_GP9_CLK
Pin 76	NC	Pin 106	NC
Pin 77	I2C_GP3_DAT	Pin 107	I2C_GP9_DAT
Pin 78	NC	Pin 108	NC
Pin 79	GND	Pin 109	NC
Pin 80	GND	Pin 110	NC
Pin 81	NC	Pin 111	NC
Pin 82	NC	Pin 112	NC
Pin 83	NC	Pin 113	NC
Pin 84	NC	Pin 114	NC
Pin 85	NC	Pin 115	GND
Pin 86	NC	Pin 116	GND
Pin 87	I2C_GP2_CLK	Pin 117	NC
Pin 88	CAM1_MCLK	Pin 118	NC
Pin 89	I2C_GP2_DAT	Pin 119	NC
Pin 90	CAM1_PWDN	Pin 120	NC

MECHANICAL DETAILS



KIT CONTAINS

CATEGORY	PARAMETER	DETAILS
Standard package	Bridge Board	AGX ORIN MIPI CSI-2 Camera bridge board
	Power Cable	Crimped 2-pin DC power cable
	Documentation	Product datasheet (digital copy)
Optional accessories	Co-axial Cable	30-pin micro-coaxial cable (optional)
	FPC Cable	22-pin MIPI CSI-2 FPC cable (optional)
	Mounting Hardware	Screws and spacers for camera mounting (optional)

For more details: AGX MIPI CSI-2 Bridge Board [LHMM] Documentation

CONTACT US

For custom product requirements, please reach out:

Purchase Support: info@oppila.in

Technical Support: support@oppila.in