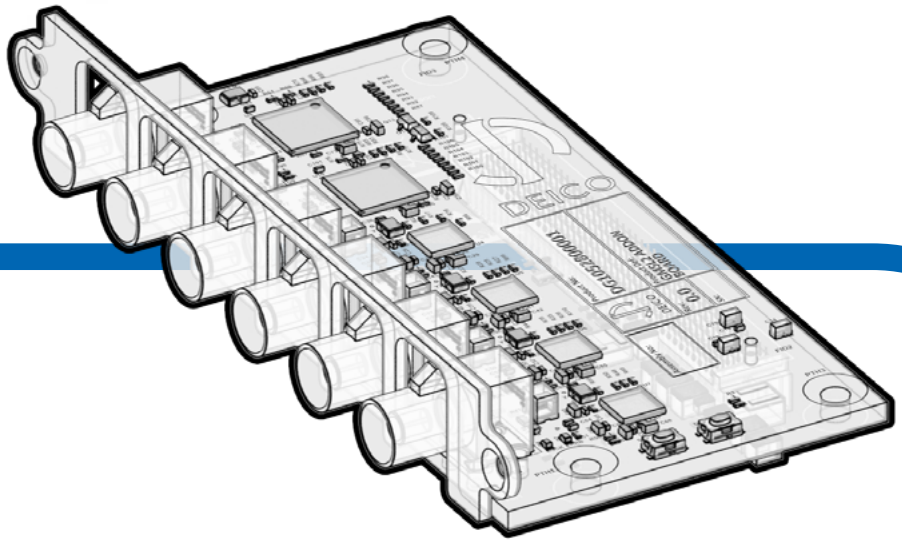
Datasheet



DE160300

GMSL2 Module Jetson Xavier

DEICO

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Contents

1. Description

DE160300 GMSL2 Module Jetson Xavier is an add-on board for the PXIe Jetson AGX Xavier Module that converts HDMI and CSI-2 signals into GMSL2 outputs. It features two video output channels for HDMI operation, designed for use with GMSL2-compatible displays. Additionally, it includes four video input channels for CSI-2 operation, which support camera modules with GMSL2 outputs. Figure below illustrates the overall block diagram.

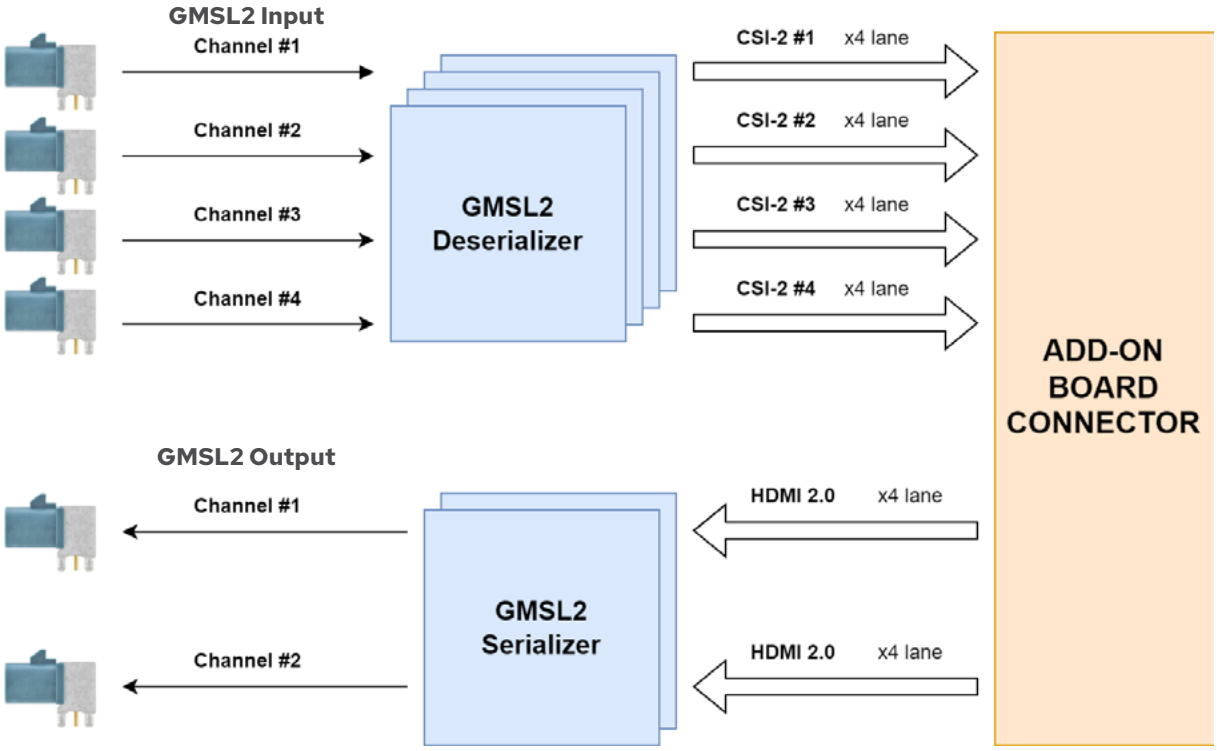

Figure 1: DE160300 Block Diagram

1.1. Key Features

- Two video output channels
  - Supports HDMI v1.4b/v2.0a input signals
  - 3 Gbps or 6 Gbps forward-link rates GMSL2 output
- Four video input channels
  - 3 Gbps GMSL2 input which can support up to 8 MP imagers
  - High-speed MIPI output (MIPI D-PHY v1.2)
  - Supports Power over Coax (PoC)
  - Compatible with variety of camera modules

2. Hardware Overview

2.1. Circuitry

DE160300 GMSL2 Module for Jetson Xavier features four independent GMSL2 video input channels. Each channel is processed by a deserializer IC, converting the incoming GMSL2 signal into a four-lane CSI-2 output for high-speed image data transfer to the Jetson Xavier. The module is compatible with any GMSL2-compliant camera, providing flexibility for integration into diverse imaging applications.

The GMSL-2 system consists of a deserializer and a serializer. Serializers are commonly integrated into camera modules where they convert sensor data into a serialized stream transmitted over a single coaxial cable.

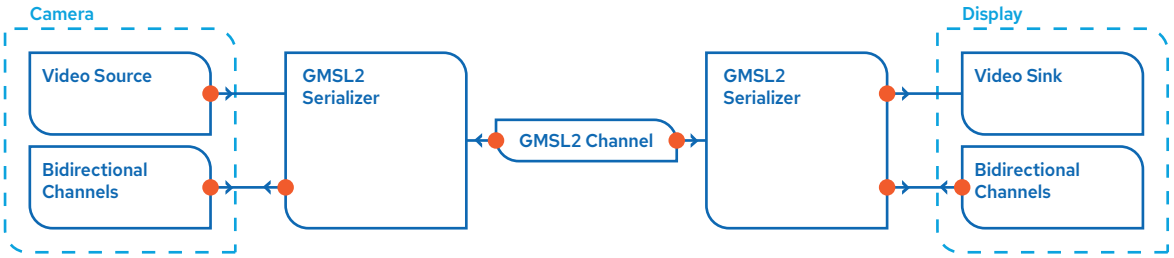

Figure 2: GMSL2 System Block Diagram

Since these camera modules have only one FAKRA connector, power must also be delivered through the same connection. To facilitate this, the deserializer—any design capable of receiving a video stream—provides the necessary power by biasing the data stream, typically with 12 V. This is achieved using a Power over Coax (PoC) circuit implemented on the deserializer side.

DE160300 GMSL2 Module Jetson Xavier also provides two channels of GMSL2 video output, with each channel converting HDMI 2.0 video data streamed from the carrier board into a GMSL2 output. This conversion is performed by the serializer IC. The GMSL2 output can then be connected to any GMSL2 serializer, typically used in display boards. In this case, the “video output” circuitry acts as a serializer for the GMSL2 system.

Figure below shows the front view of DE160300 GMSL2 Module Jetson Xavier attached to DE160200 PXIe Jetson AGX Xavier Module. Two leftmost FAKRA connectors are used for “video output”, while four rightmost FAKRA connectors are used for “video input” (camera input).

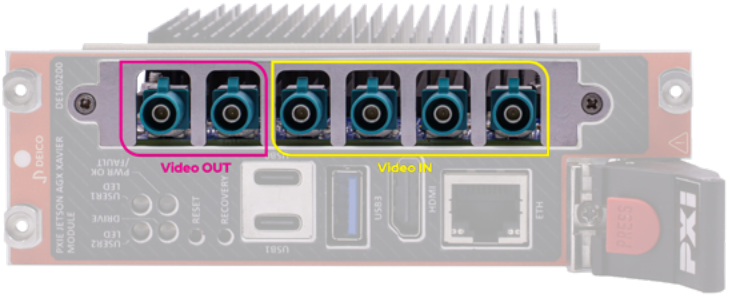

Figure 3: Front View of the DE160200 PXIe Jetson Xavier Module with DE160300 GMSL2 Add-on Board

2.2. Electrical

The power supply requirements of the DE160300 module are given in Table 1.

Table 1: Power Supply Requirements

Specification	Min	Typical	Max	Units
Carrier Board Power Supply Current of +5 V (In Full Operation)	-	-	3	A
Carrier Board Power Supply Current of +3.3 V (In Full Operation)	-	-	1.6	A
Carrier Board Power Supply Current of +1.8 V (In Full Operation)	-	-	0.92	A

2.3. Physical

The DE160300 is designed to interface with the DE160200 PXIe Jetson AGX Xavier Module.

2.4. Environmental

The environmental specifications of the module are given in Table 2.

Table 2: Environmental Specifications

Specification	Condition	Value
Operating Humidity	Relative, non-condensing	10% - 90%
Storage Humidity	Relative, non-condensing	5% - 95%
Operating Temperature	Forced-air cooling from chassis	0°C - +40°C
Storage Temperature	–	-40°C - +85°C

3. Signal Connections

To support GMSL2 interfaces for both video input and output configurations, the DE160300 GMSL2 Module Jetson Xavier utilizes all CSI-2 and HDMI-related signals from the carrier board. Each deserializer channel requires a dedicated CSI-2 clock pair, resulting in the use of four CSI-2 clock pairs—leaving four other clock pairs unused.

I2C3 is employed for communication with both the deserializer and serializer ICs. Additionally, two GPIO signals are used to enable power to the add-on board, while two others control MOSFETs that provide the necessary HDMI signal termination.

The add-on board connector pinout is given in Table 3.

Table 3: The Add-on Board Connector Pinout

Pin	A	B	C	D	E	F
1	CSI1_D1_P	GND	CSI3_D1_P	GND	DP0_AUX_CH_EXT_P	GND
2	CSI1_D1_N	GND	CSI3_D1_N	GND	DP0_AUX_CH_EXT_N	GND
3	GND	CSI1_D0_P	GND	CSI3_D0_P	GND	HDMI_DP0_TX3_EXT_P
4	GND	CSI1_D0_N	GND	CSI3_D0_N	GND	HDMI_DP0_TX3_EXT_N
5	N/C	GND	N/C	GND	HDMI_DP0_TX2_EXT_P	GND
6	N/C	GND	N/C	GND	HDMI_DP0_TX2_EXT_N	GND
7	GND	CSI0_D1_P	GND	CSI2_D1_P	GND	HDMI_DP0_TX1_EXT_P
8	GND	CSI0_D1_N	GND	CSI2_D1_N	GND	HDMI_DP0_TX1_EXT_N
9	CSI0_D0_P	GND	CSI2_D0_P	GND	HDMI_DP0_TX0_EXT_P	GND
10	CSI0_D0_N	GND	CSI2_D0_N	GND	HDMI_DP0_TX0_EXT_N	GND
11	GND	CSI0_CLK_P	GND	CSI2_CLK_P	GND	DP1_AUX_CH_EXT_P
12	GND	CSI0_CLK_N	GND	CSI2_CLK_N	GND	DP1_AUX_CH_EXT_N
13	CSI5_D1_P	GND	CSI7_D1_P	GND	HDMI_DP1_TX3_EXT_P	GND
14	CSI5_D1_N	GND	CSI7_D1_N	GND	HDMI_DP1_TX3_EXT_N	GND
15	GND	CSI5_D0_P	GND	CSI7_D0_P	GND	HDMI_DP1_TX2_EXT_P

Pin	A	B	C	D	E	F
16	GND	CSI5_D0_N	GND	CSI7_D0_N	GND	HDMI_DP1_TX2_EXT_N
17	N/C	GND	N/C	GND	HDMI_DP1_TX1_EXT_P	GND
18	N/C	GND	N/C	GND	HDMI_DP1_TX1_EXT_N	GND
19	GND	CSI4_D1_P	GND	CSI6_D1_P	GND	HDMI_DP1_TX0_EXT_P
20	GND	CSI4_D1_N	GND	CSI6_D1_N	GND	HDMI_DP1_TX0_EXT_N
21	CSI4_D0_P	GND	CSI6_D0_P	GND	DP0_HPD_LS_EXT	GND
22	CSI4_D0_N	GND	CSI6_D0_N	GND	DP1_HPD_LS_EXT	N/C
23	GND	CSI4_CLK_P	GND	CSI6_CLK_P	GND	N/C
24	GND	CSI4_CLK_N	GND	CSI6_CLK_N	GND	N/C
25	N/C	GND	N/C	GND	N/C	GND
26	I2C3_DAT	GND	N/C	GND	N/C	GND
27	I2C3_CLK	N/C	N/C	N/C	GND	N/C
28	N/C	N/C	AVDD_CAM_2V8_ENABLE/GPIO36	N/C	GND	N/C
29	N/C	N/C	VDD_SYS_ENABLE/GPIO25	GND	N/C	GND
30	N/C	GND	DMIC_IN_CLK/GPIO09	GND	N/C	GND
31	N/C	N/C	DMIC_IN_DAT/GPIO08	N/C	GND	N/C
32	GND	N/C	GND	N/C	GND	N/C
33	N/C	N/C	N/C	GND	N/C	GND
34	N/C	N/C	N/C	GND	N/C	GND
35	N/C	N/C	N/C	N/C	GND	N/C
36	N/C	N/C	N/C	N/C	N/C	GND
37	GND	N/C	N/C	N/C	GND	VDD_5V0
38	VDD_3V3	GND	N/C	N/C	GND	VDD_5V0
39	VDD_3V3	GND	GND	GND	GND	VDD_5V0
40	VDD_3V3	GND	VDD_1V8	VDD_1V8	GND	VDD_5V0

N/C: not connected.

4. Safety Guidelines

ESD can damage electronic components without adequate protection and may cause permanent damage to the device.