MAX96717 GMSL2 Serializer Board

(GMO-96717 / NV026-C)

Hardware Specification

Ver. 1.0

NetVision Co., Ltd.

Update History

Revision	Date	Note	
1.0	May. 15., 2026	New File (Translation of Japanese edition ver.5)	R. Sugo

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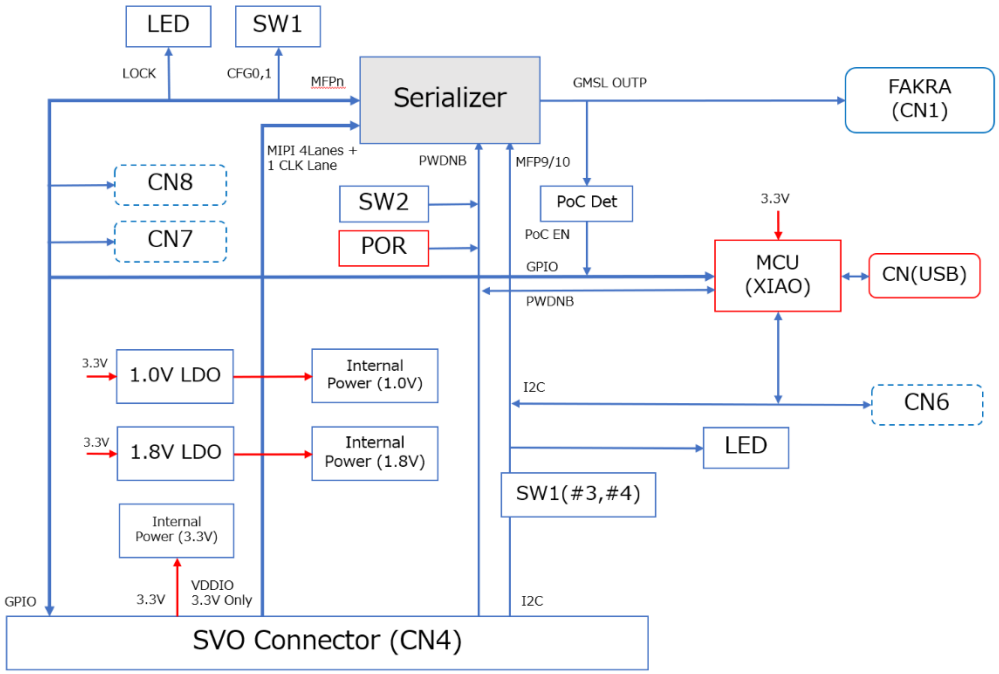
1. Overview

The GMO-96717 / NV026-C is equipped with an Analog Devices GMSL2 serializer IC. This board converts video signals input through MIPI CSI-2 into GMSL2 output. It provides one GMSL2 output channel and an input connector for connection to our MIPI generator board (hereafter referred to as the SV board). This board is ideal for emulating GMSL2 cameras when combined with the SV board.

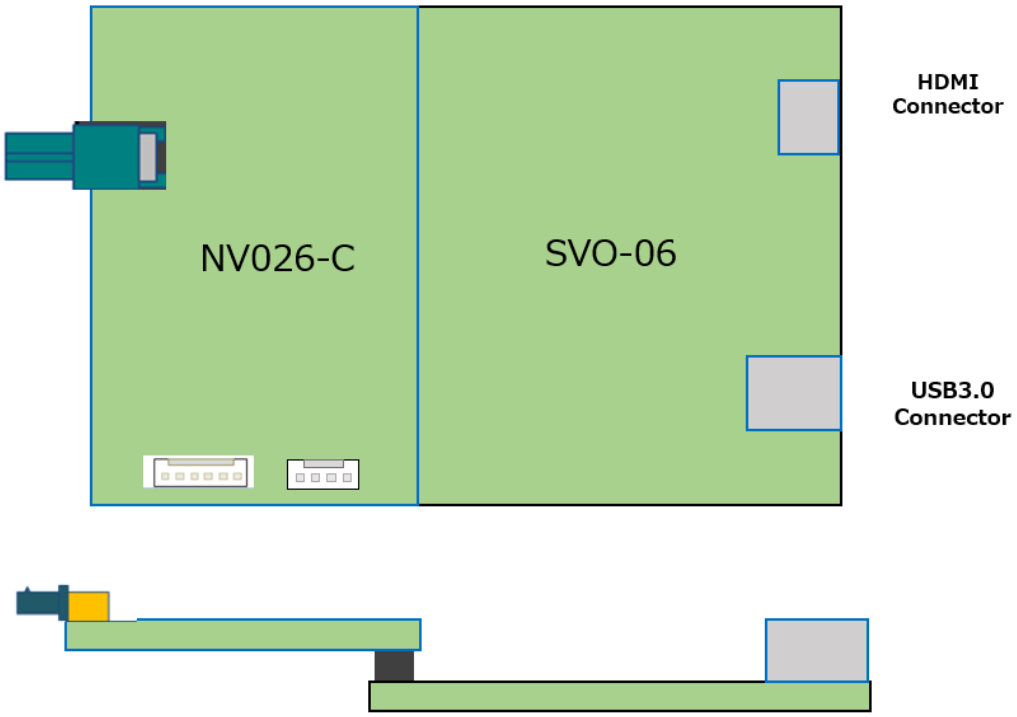
【Block diagram】



The block diagram of this board is shown above. The board is equipped with the MAX96717 GMSL2 serializer IC from Analog Devices. A microcontroller is also mounted on the board for functions such as I2C slave operation, allowing back-channel communication from the connected device to the camera.

The following figure shows an example connection between this board and an SV board. Both boards have the same mounting-hole positions, allowing them to be fixed together using spacers.

【Board connection image】



1.1 Differences From the NV026-B Board

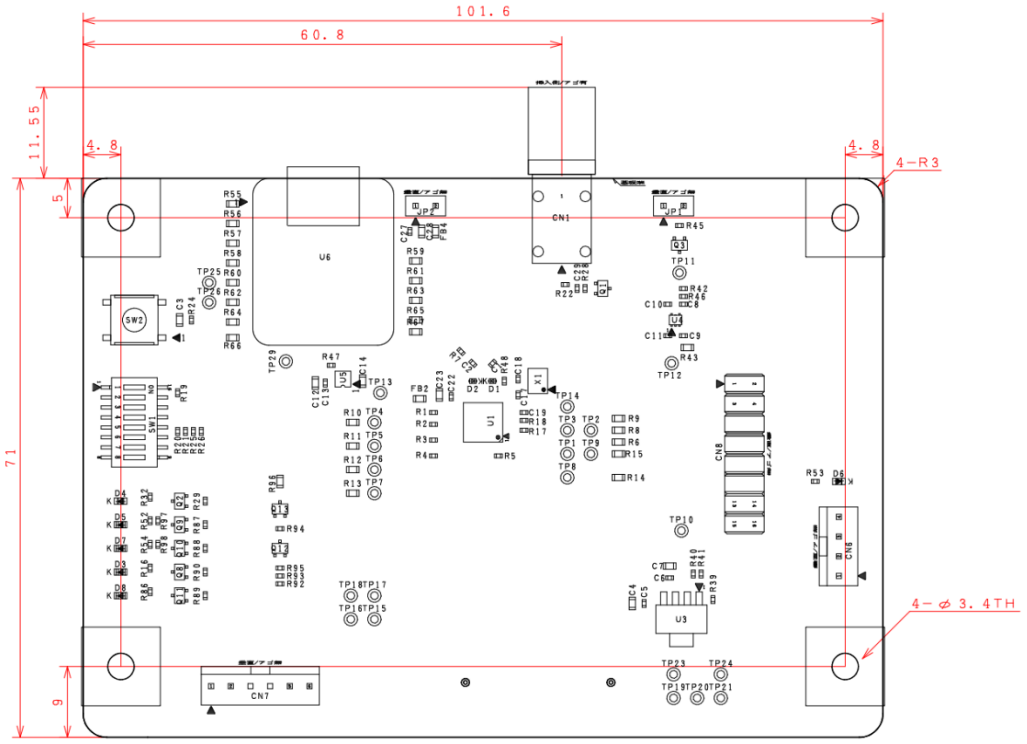
The NV026-C board is an improved version of the previous NV026-B board. The main differences between the two boards are as follows:

1. The onboard microcontroller is changed from the SAM microcontroller to the XIAO RP2040 microcontroller.
2. A PoC detection circuit is now included, allowing a power-on reset to be issued to the serializer.
3. To improve operational stability, the VDDIO voltage is fixed at 3.3V.
   - For operation with an SV board, set the SV board's VDDIO to 3.3V.
4. The pseudo-differential connector is removed.

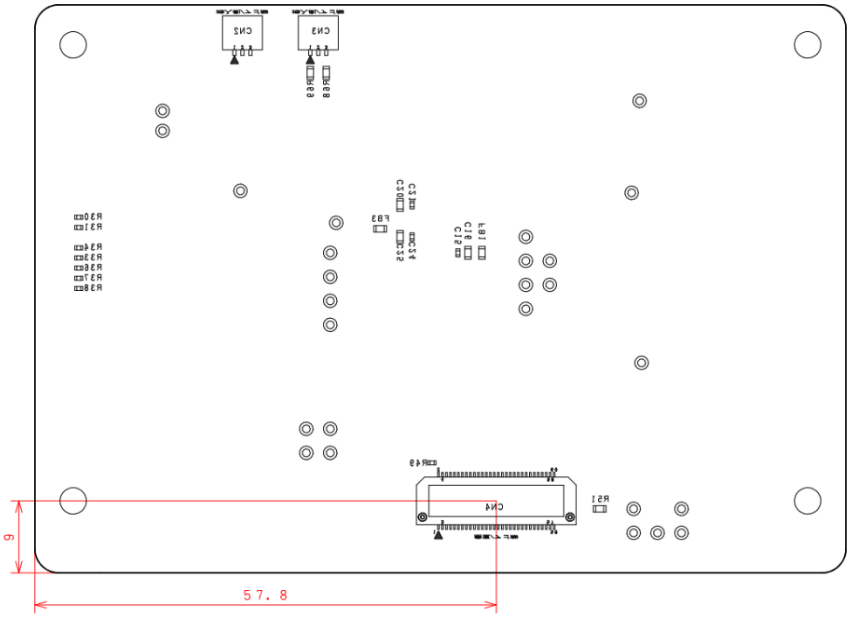
2. Board Layout

2.1 Connector Layout

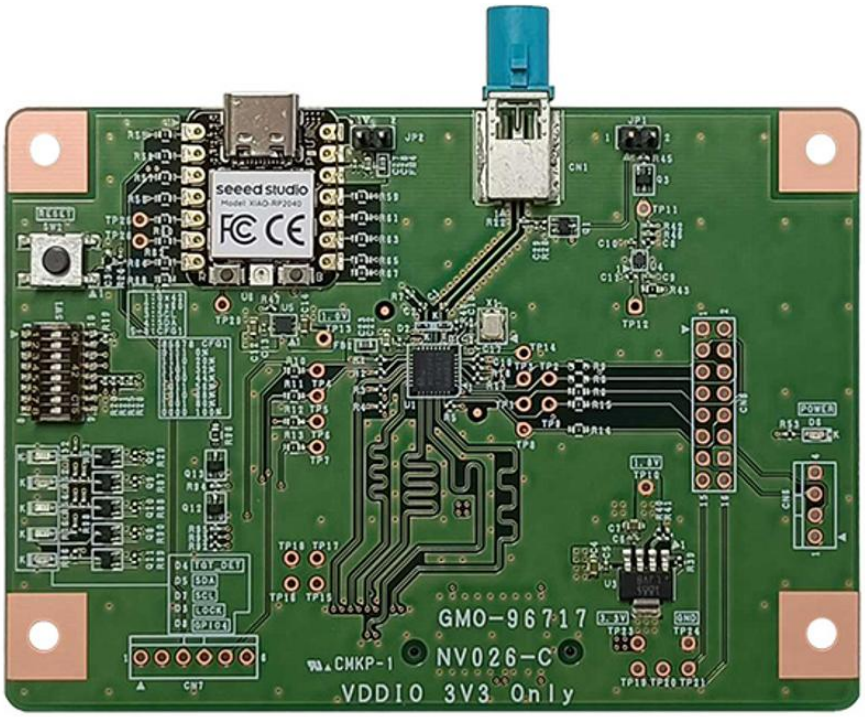
The layout of the main connectors is shown in the figure below. The pin numbers and pin assignments for each connector are provided in the "Connector Details".

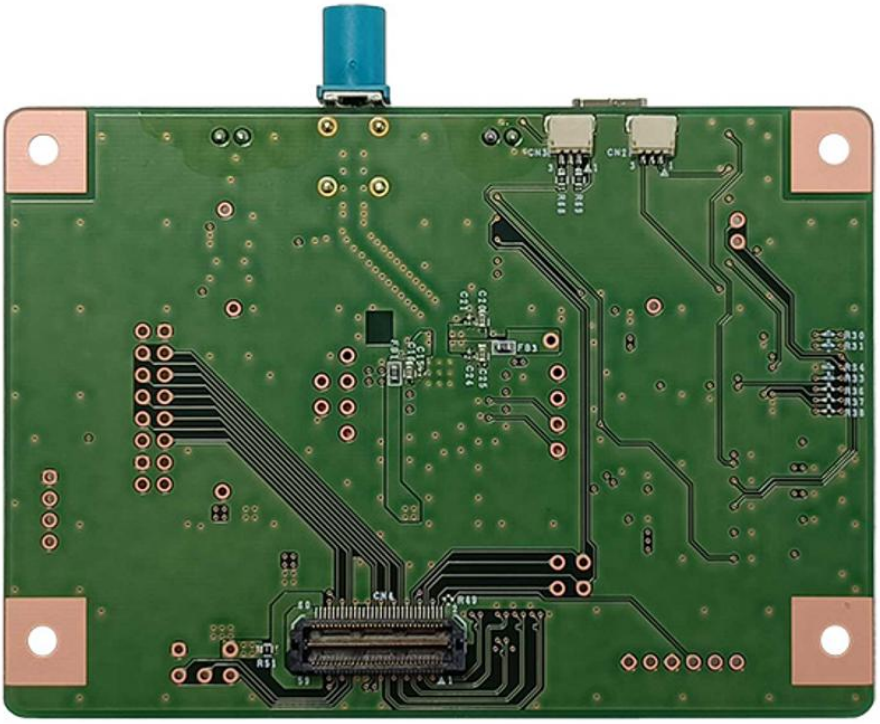


- CN6, CN7, and CN8 are not mounted.



2.2 Board Photos



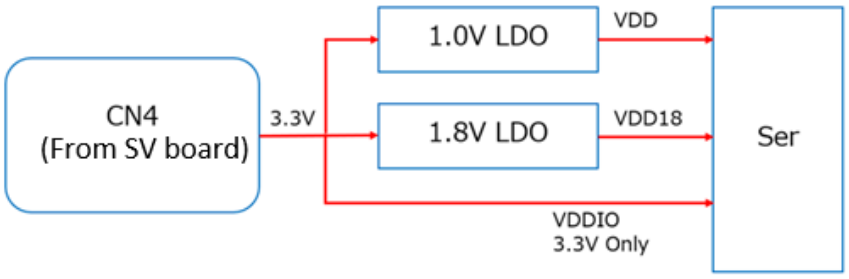


3. Details

3.1 GMSL2 Output

This board is equipped with one GMSL2 output connector.

3.2 Power Supply System



Power for this board is supplied from an SVO-06 or other video output board through connector CN4. This board requires three power rails: 1.8V, 1.0V, and an I/O supply. As shown above, the 1.8V and 1.0V rails are generated by LDO regulators on the board. Since 1.0V is supplied to the MAX96717 VDD power rail, the REG_ENABLE and REG_MNL settings are not required. The VDDIO voltage is fixed at 3.3V.

3.3 Serial (I2C) Communication

The serializer IC on this board (MAX96717) includes an I2C bus, which allows register configuration of the IC as well as serial communication with the deserializer and target devices through the GMSL cable.

The I2C bus configuration on this board is shown in the figure above. The serializer's I2C bus uses the MFP9 and MFP10 pins and can be connected to the I2C bus of the SV board (CN4) through the on-board switch SW1. When controlling the I2C from the SV board, set SW1 #3 and #4 to ON. For external I2C communication, set SW1 #3 and #4 to OFF and use connector CN6. The I/O voltage for the I2C bus is fixed at 3.3V.

This board includes a microcontroller (XIAO RP2040) for camera-emulation applications. Its I2C bus is connected to the board's I2C bus, allowing I2C response emulation when a program is implemented on the microcontroller.

3.4 MIPI CSI-2 Input

The MAX96717 provides a single-port MIPI CSI-2 input, and all lanes are connected to the 60pin connector CN4 on this board.

The lane mapping between the MAX96717 input and the MIPI input of CN4 is shown in the table below. Note that the default register settings differ from this assignment. The polarity (+/–) of each lane follows the MAX96717 default configuration.

MAX96717	SV board	CN4 Pin#
CK	MIPI_CLK1	13,15
D1	MIPI_D1	1,3
D3	MIPI_D2	19,21
D0	MIPI_D3	7,9
D2	MIPI_D4	25,27

3.5 Connector List

CN#	Mounted state	Description	Model number
CN1		GMSL2 output+	59S2AQ-40MT5-Z
CN2		MCU debug UART port	SM03B-SRSS-TB
CN3		MCU debug SWD port	SM03B-SRSS-TB
CN4		SV board connection interface	QTH-030-01-L-D-A
CN6	Un-mounted	I2C input and output connector	171825-4
CN7	Un-mounted	Synchronization connector	171825-6
CN8	Un-mounted	GPIO input and output	PRPC008DAAN-RC
-	MCU module board	MCU flash programming and UART port	(USB Type-C)

- CN6 is directly connected to the I2C bus of the serializer IC (MAX96717).
- CN7 is a connector intended for inter-board communication in multi-board output systems and for future feature expansion.

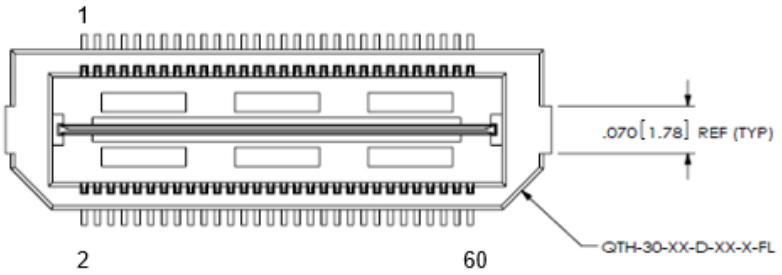
3.6 Connector Details

The top view outline of the connectors on this board and the corresponding pin assignments (excerpted from the schematic) are shown below.

- Signal line

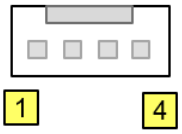
Name	Description
CAM_SCL / CAM_SDA	I2C serial signal lines (Connected to serializer)
VSYNC_OUT	VSYNCOUT signal lines of the CN4 (SV board connector)
CLKOUT	CKOUT signal lines of the CN4
SVO_Pn	GPIO signal lines of the CN4

- CN4 (QTH-030-01-L-D-A)

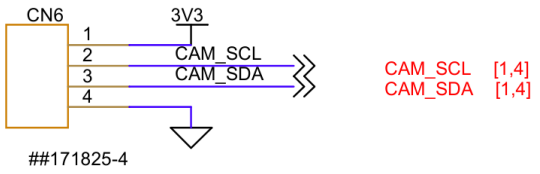


* Pin assignment is provided in the SV board hardware specification.

- CN6 (171825-4)

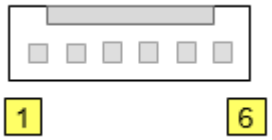


(Top view)

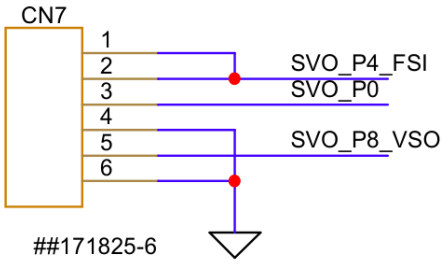


(Schematic)

- CN7 (171825-6)

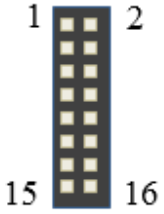


(Top view)

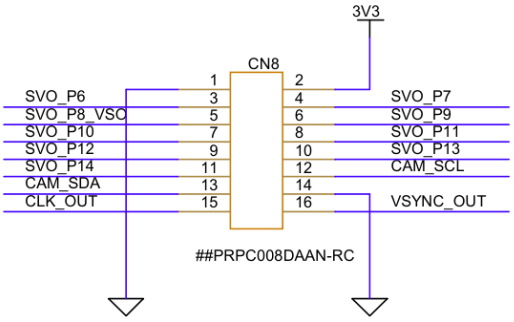


(Schematic)

- CN8 (PRPC008DAAN-RC)



(Top view)



(Schematic)

3.7 Switch Settings

This board is equipped with a configuration switch (SW1) for the serializer and a reset switch (SW2). When SW2 is operated, the MAX96717 PWDNB pin is driven to the L state. The functions of SW1 are listed in the table below.

SW #	Name	Description
1	CFG0	SW#1 | SW#2 | Addr | RoR/Xtal
2		OFF | OFF | 0x40 | RoR
		ON | OFF | 0x42 | RoR
		OFF | ON | 0x40 | Xtal
3	SCL	ON: Connects the CN4 I2C bus to the serializer's I2C bus.
4	SDA	OFF: Disconnects the I2C bus.
5	CFG1	SW#5 | #6 | #7 | #8 |
6		OFF | ON | ON | ON | Reserved (0%)
7		ON | ON | ON | OFF | Reserved (20%)
8		ON | ON | OFF | ON | Reserved (32%)
		ON | ON | OFF | OFF | Reserved (44%)
		ON | OFF | ON | ON | COAX/3Gbps/Tunnel (56%)
		ON | OFF | ON | OFF | COAX/6Gbps/Tunnel (68%)
		ON | OFF | OFF | ON | COAX/3Gbps/Pixel (80%)
		OFF | OFF | OFF | OFF | COAX/6Gbps/Pixel (100%)

- The default configuration has SW#2-5 and #8 set to ON.

3.8 Jumper Settings

JP#	Name	Description
JP1	CAM_DET	1-2 Shorted: Deasserts the serializer RESET after the ECU power input is detected. 1-2 Open: Deasserts the serializer RESET in sync with this board's power on, regardless of the ECU power input. (Default)
JP2	MCU_POWER	1-2 Shorted: Connects the MCU module 3.3V supply to the board's 3.3V supply. (Default) Open this jumper only when writing firmware. 1-2 Open: Isolates the MCU module 3.3V supply from the board's 3.3V supply. Open this jumper when writing firmware via USB.

3.9 LED Indicator

LED #	Name	Description
D3	LOCK	Lights when the MAX96717 MFP3/LOCK pin is in the H state.
D4	TGT_DET	Lights when a DC voltage (> 4 V) is superimposed on the GMSL2 output.
D5	SDA	Lights when the MAX96717 I2C bus SDA pin is in the L state.
D6	POWER	Lights when the board power (3.3 V rail) is supplied.
D7	SCL	Lights when the MAX96717 I2C bus SCL pin is in the L state.
D8	GPIO4	Lights when the MAX96717 MFP5 pin is in the L state.

3.10 GPIO

On this board, the serializer IC (MAX96717) MFPn pins are connected to the GPIO pins of connector CN4 (pin numbers: see schematic) through jumper resistors, allowing control from the SV board. The connection between the serializer MFP pins and the SV board GPIO pins is removed by omitting resistors R6-15.

The PoC voltage detection signal from the coaxial cable is routed to the on-board microcontroller. For details of the GPIO signal connections, refer to the schematic.

- Serializer - SV board pin connections

MAX96717	SV board	Description
MFP0	SVO_P6	Connected through jumper resistors
MFP1	SVO_P7	Un-mounted
MFP2	SVO_P9	Un-mounted
MFP3	SVO_P10	Connected through jumper resistors
MFP4	SVO_P8_VSO	Connected through jumper resistors
MFP5	SVO_P4_FSI	Connected through jumper resistors
MFP6	SVO_P12	Connected through jumper resistors
MFP7	SVO_P13	Connected through jumper resistors
MFP8	SVO_P14	Connected through jumper resistors

4. MCU

4.1 MCU Default Operation

The Flash ROM is erased. All I/O pins are in a High-Z state with a weak pull-down (approximately 50kΩ - 80kΩ).

4.2 MCU Programming Procedure

Firmware is written through the Type-C interface or via JTAG. When connecting via USB to write firmware, be sure to set JP2 to the open position. For details on programming the MCU Flash ROM, refer to the XIAO RP2040 web page.

5. Specifications

Item	Value	Description
Board dimensions	101.6 x 71.0 mm	Values do not include connectors.
Serializer power supply	DC +3.3V	The 3.3V power is supplied from the SV board or other video output boards through CN4, and is stepped down by the on-board LDO.
I/O voltage	DC +3.3V	The I/O voltage needs to match that of the SVO-06 or other video output boards.
PoC input voltage	0 - 20V	Inside the board, it is used only for PoC voltage detection.
Image input	MIPI CSI-2 1-4 Lanes + CLK	The signal is input through CN4. For details on supported formats, refer to the MAX96717 specifications. The connector interface follows that of the SV board.
Image output	GMSL2 single-ended output	The signal is output from connector CN1.
Serial communication	I2C communication	It can be connected to the I2C bus of either CN4 or CN6.

- The above specifications apply only to model GMO-96717 / NV026-C.
- When connecting to an SV board, the SV board must be configured for Continuous Clock mode.
- Hot-plugging is not supported. Do not connect or disconnect CN1 while the target device is powered on, or CN4 while the SV board is powered on.