

MAX9295A GMSL2 Serializer Board

[GMO-9295A]

(Board model number NV026-A)

Hardware Specification

Rev.1.0

NetVision Co., Ltd.

Update History

Revision	Date	Note	
1.0	2020/05/14	New file (Equivalent to Japanese version 1.)	H. Suzuki

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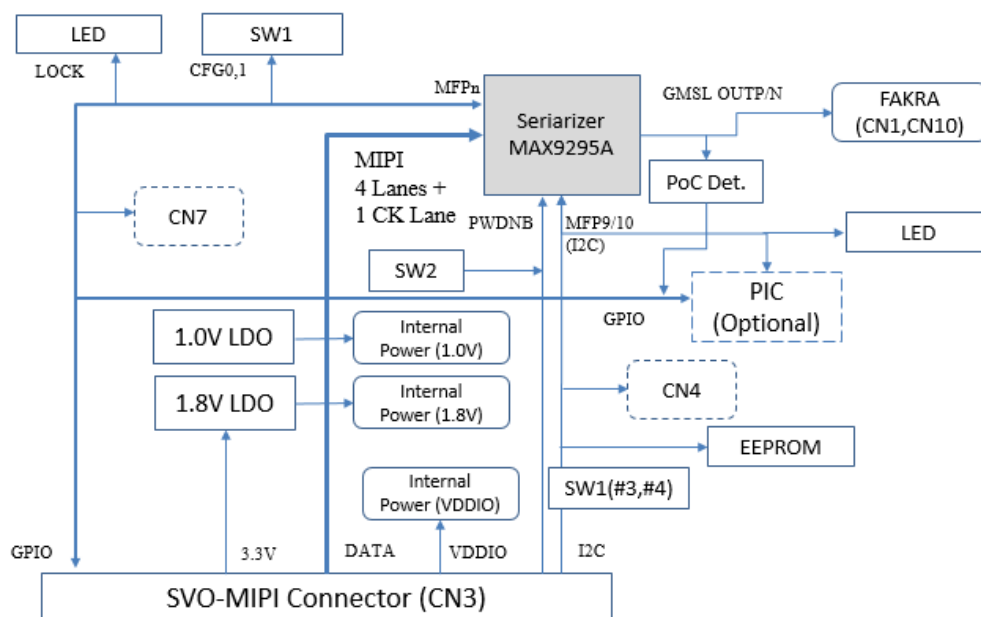
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1. Overview

This document is the hardware specifications of the MAX9295A GMSL2 serializer board "GMO-9295A". This board is equipped with Maxim's GMSL2 serializer MAX9295A and is a board for converting the video signal input by MIPI to the GMSL2 signal.

This board has one system of GMSL2 output and a connector for connecting to our SVO-MIPI board. It can be applied to emulation of GMSL2 camera combined with SVO-MIPI.

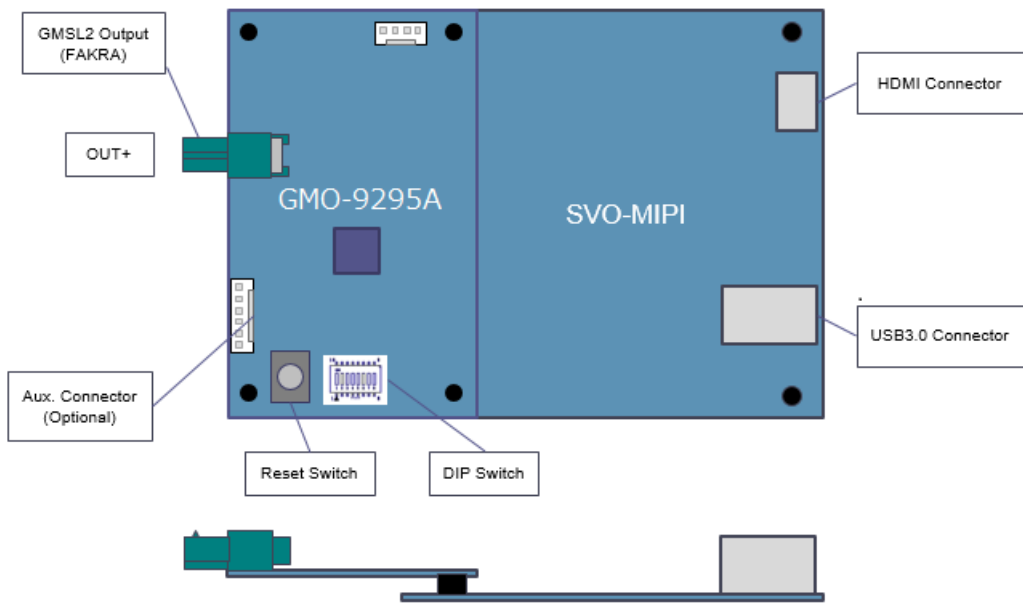
GMO-9295A Block Diagram



The block diagram of this board is shown above. Maxim serializer IC MAX9295A is mounted on this board and can convert MIPI CSI-2 signal to GMSL2 signal and output video signal in combination with SVO-MIPI. This board is suitable for the GMSL2 camera emulation system because it has a pattern on which the microcomputer can be mounted for applications such as I2C slaves.

The figure below shows the connection image between this board and SVO-MIPI. Since the screw hole positions are common to both boards, they can be fixed with spacers.

Connection Image

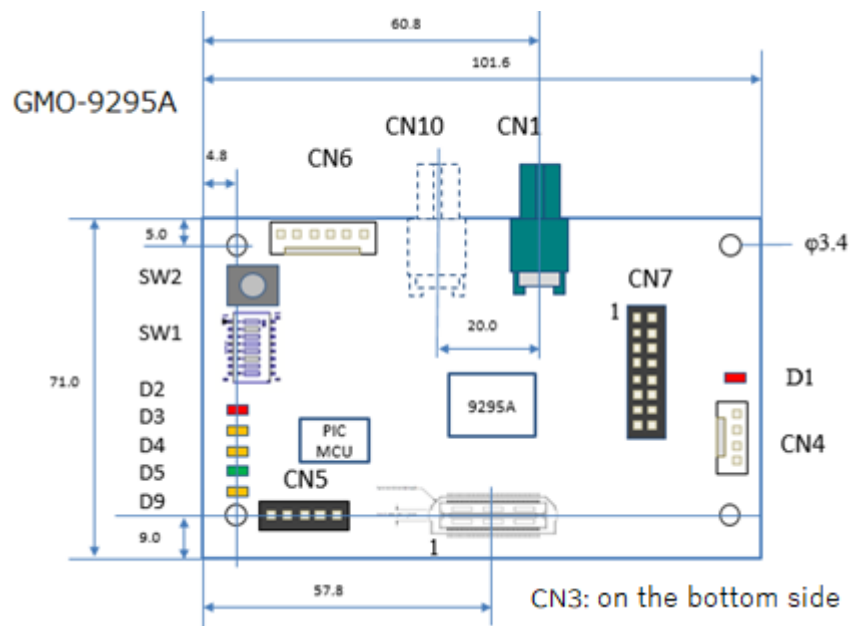


2. Shape of Board

2.1. Connector Layout Diagram

The figure below shows the arrangement of the main connectors on this board. PIN numbers and pin assignments are shown in “Connector Details” section.

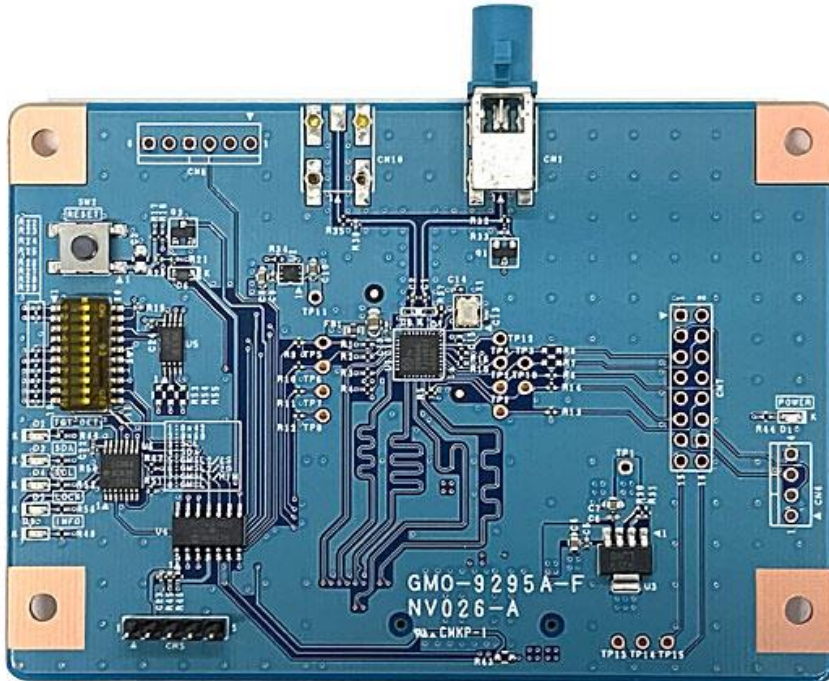
Main Connector Layout Diagram



* Only main connectors are shown.

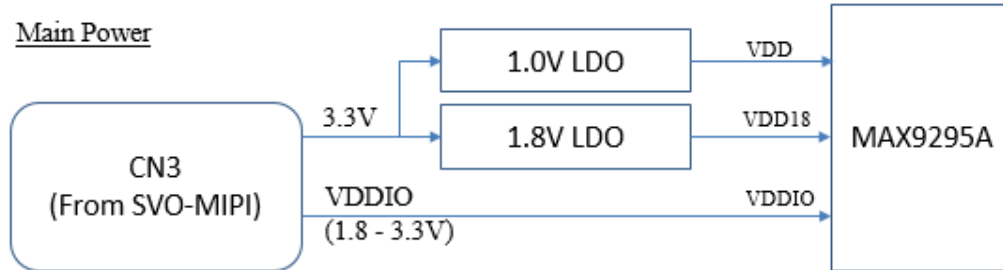
* CN4, CN6, CN7, CN10 are not mounted.

2.2. Photo of Board



3. Details

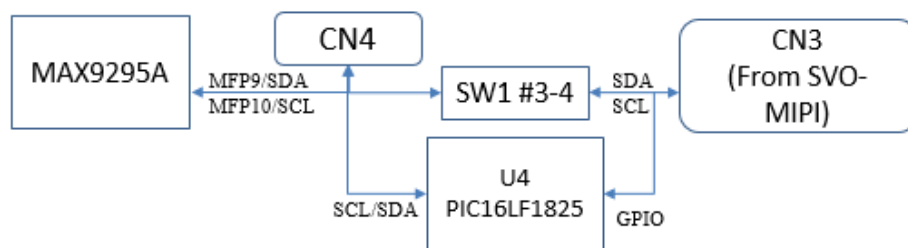
3.1. Power



The power supply for this board is supplied from a video output board such as SVO-MIPI via CN3. This board requires three power supplies: 1.8V, 1.0V and IO power supply. As shown in the above figure, 1.8V and 1.0V power supplies are generated by LDO on the board. Since the MAX9295A VDD power supply is 1.0V, it is not necessary to set REG_ENABLE and REG_MNL.

3.2. Serial (I2C) Communication

The serializer IC (MAX9295A) on this board has an I2C bus, and it is possible to change the IC register settings and perform serial communication with the deserializer and target device via the GMSL cable.



The above figure is a block diagram of the serial bus part on the board. SVO-MIPI supports I2C, and the serial bus of GMO-9295A can be connected to the I2C bus of CN3 (SVO-MIPI) through the switch SW1. When controlling I2C from SVO-MIPI, set # 3 and # 4 of SW1 to ON. When performing I2C communication from the outside, set them to OFF and use connector CN4. The serial bus IO voltage works in linkage with VDDIO (SVO-MIPI IO voltage).

This board has the microcomputer (U4) pattern in consideration of applications such as camera emulation. The I2C bus of the microcomputer is connected to that of this board, and it is possible to emulate the I2C response by implementing the program of the microcomputer.

3.3. MIPI CSI-2 Input

MAX9295A has a 1-port MIPI CSI-2 input and all lanes connect to the 60-pin connector CN3 on this board. The table below shows the lane assignments of the MAX9295A input and the CN3 MIPI input. Please note that the default value and the assignment of the register are different. The polarities in the lane are in phase.

MAX9295A	SVO-MIPI	CN3
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

3.4. Connector List

CN#	Mounted State	Description	Model Number
CN1		GMSL2 output +	59S2AQ-40MT5-Z
CN3		For SVO-MIPI Connection	QTH-030-01-L-D-A
CN4	Unmounted	I2C I/O connector	171825-4
CN5		For implement PIC ICSP	M20-9990545
CN6	Unmounted	Expansion connector	171825-6
CN7	Unmounted	GPIO I/O connector	PRPC008DAAN-RC
CN10	Unmounted	GMSL2 output -	59S2AQ-40MT5-Z

- Mounted state applies to GMO-9295A-F.

- The I2C I/O connector (CN4) is directly connected to the I2C bus of the serializer IC MAX9295A.

- Expansion connector (CN6) is a connector for board-to-board communication in the output system using multiple boards and for future expansion.

- CN10 is not used for coaxial cable output.

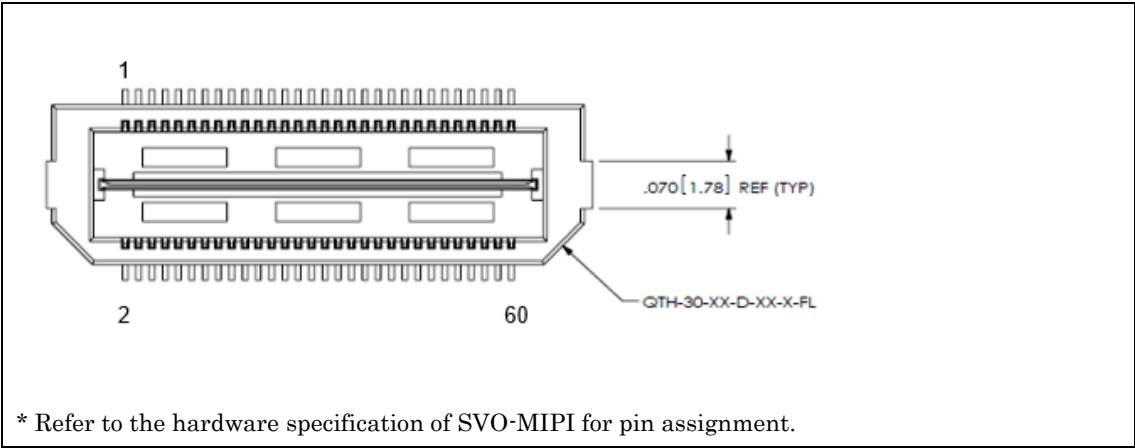
3.5. Connector Details

Below is a figure of the connector on the top side of this board (outline) and pin assignment (excerpts from the schematic).

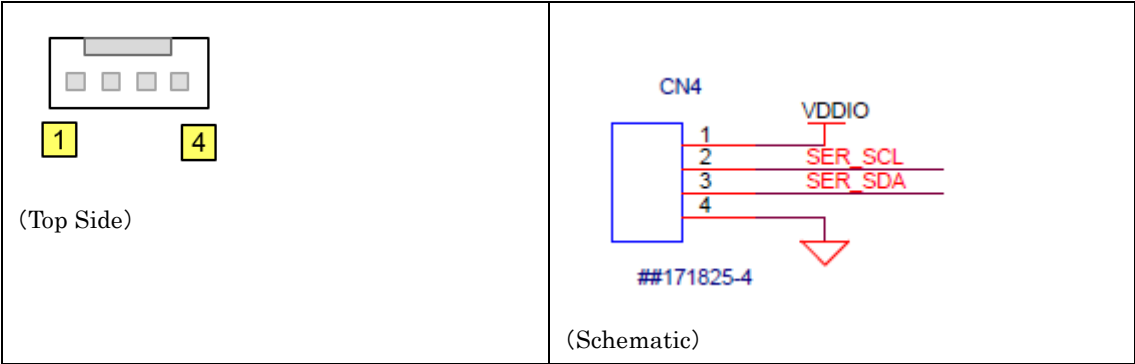
(Meaning of Signal Line)

Signal Line	Meaning
VDDIO	IO power supply
CAM_SCL / CAM_SDA	Serial signal line
SER_MFPn	Directly connected to GPIO (6+n) pin of CN3 Connects to MAX9295A MFPn pins through jumper resistors
VSYNC_OUT	VSYNCOUT signal line of CN3 (SVO-MIPI connector)
CLKOUT	CKOUT signal line of CN3

•CN3 (QTH-030-01-L-D-A)

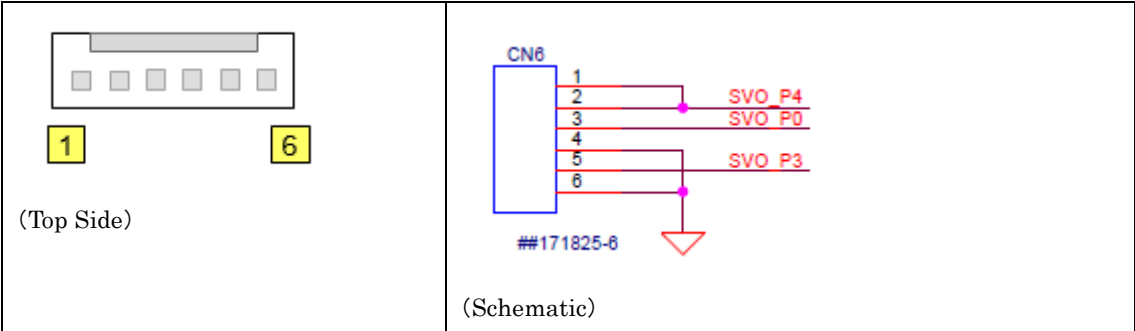


•CN4 (171825-4 / TE Connectivity)



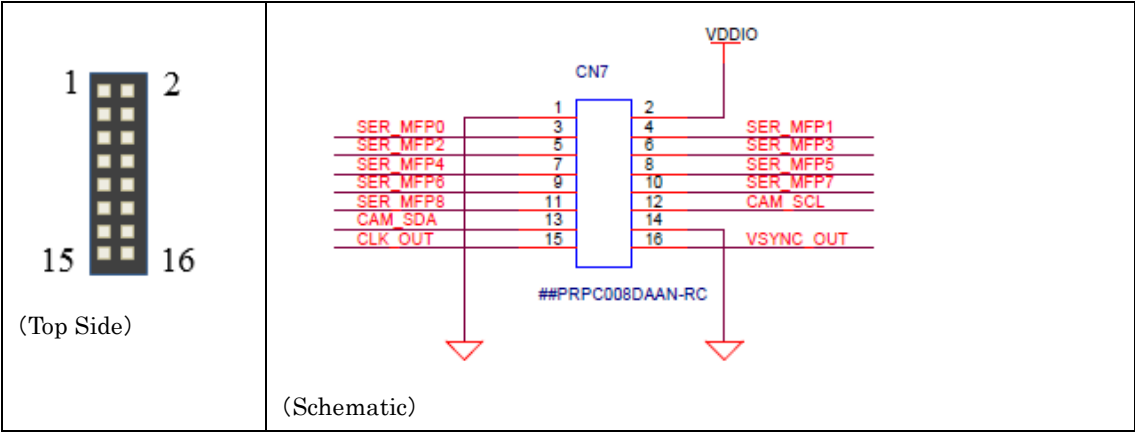
- It is directly connected with the MAX9295A I2C bus.
- The connector is not mounted.

•CN6(171825-6 / TE Connectivity)



- The connector is not mounted.

•CN7 (PRPC008DAAN-RC)



- The connector is not mounted.

3.6. Switch Settings

The switch SW1 for serializer setting and the reset switch SW2 are mounted on this board. When you push SW2, the PWDNB pin of MAX9295A is pulled low.

The functions of SW1 are as shown in the table below.

SW#	Name	Description
1	ADDR0	ADDR0 ADDR1 ADDR2 I2C Address OFF OFF OFF 0x40 ON OFF OFF 0x42 OFF ON OFF 0x60
2	ADDR1	
3	SCL	ON: Connecting the I2C bus of CN3 with that of the deserializer
4	SDA	OFF: Disconnect I2C bus
5	CFG1	SW#5 #6 #7 #8
6		ON OFF OFF OFF GMSL2, 6Gbps
7		OFF ON OFF OFF GMSL2, 3Gbps
8		ON OFF ON OFF GMSL1, HIM Enabled ON OFF OFF ON GMSL1, HIM Disabled (COTP = COAX fixed)
9	MCU_SW1	(Reservation)
10	MCU_SW2	(Reservation)

- By default only SW #3, #4 and #5 are ON.

- #9 and #10 are connected to microcomputer for the I2C emulation. Set them to OFF when you don't use it.

3.7. LED Indicator

LED#	Name	Description
D1	POWER	Lights when the board power (3.3V) is supplied.
D2	TGT_DET	Lights when DC voltage (> 4V) is superimposed on the GMSL2 output.
D3	SCL	Lights when the SCL pin of I2C bus of MAX9295A is L.
D4	SDA	Lights when the SDA pin of I2C bus of MAX9295A is L.
D5	LOCK	Lights when the MFP3/LOCK pin of I2C bus of MAX9295A is H.

3.8. GPIO

On this board, the MFPn pin of the serializer IC (MAX9295A) is connected to the GPIO (6 + n) of the connector CN3 (refer to the schematic for the pin number) via a jumper resistor, and it is possible to control from SVO-MIPI. GPIO can be disconnected by not mounting R6-14.

4. Specification

Item	Value	Description
Board Dimensions	101.6 x 71.0 mm	Value without connector
Power for serializer	DC +3.3V	Supplied from the power supply (3.3V) of the video output board such as SVO-MIPI via CN3, step down with internal LDO.
IO Power	DC +1.8V or +3.3V	Set to +3.3V for PIC program
Image input	MIPI CSI-2 1-4 Lanes + CLK	Input from CN3 Refer to the MAX9295A standard for details on supported formats. Connector interface depends on SVO-MIPI.
Image output	GMSL2 Single-ended Output	Output from CN1
Serial communication	I2C	I2C bus outputs to CN3 and CN4. It has the pattern that can be implemented to the PIC microcomputer (PIC16LF1825T) to emulate the I2C communication response of the camera.

- The above specifications apply only to GMO-9295A-F.

- When connecting with SVO-MIPI, it is necessary to set SVO-MIPI to Continuous Clock.

5. Appendix

5.1. Figure of Board Dimensions

(Top Side / Part View)

