

MAX9295A GMSL2 Serializer Board
(GMO-9295A / NV026-B)
Hardware Specification
Rev.1.0

NetVision Co., Ltd.

Update History

Revision	Date	Note	
1.0	Oct.19, 2021	New file (Translation of Japanese edition ver.1)	H. Suzuki

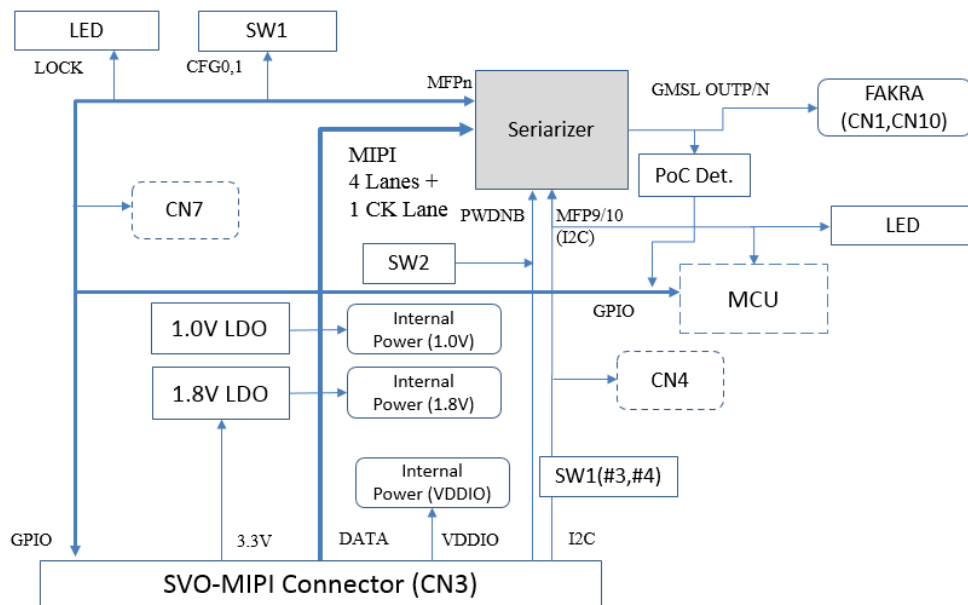
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1. Overview

This document is a hardware specification of MAX9295A GMSL2 serializer board GMO-9295A / NV026-B. This board is equipped with Maxim's GMSL2 serializer IC and converts the video signal input by MIPI CSI-2 to the GMSL2 signal. This board has one system of GMSL2 output and an input connector for connecting to our SVO-03-MIPI board. It can be applied to emulation of GMSL2 camera combined with SVO-03-MIPI.

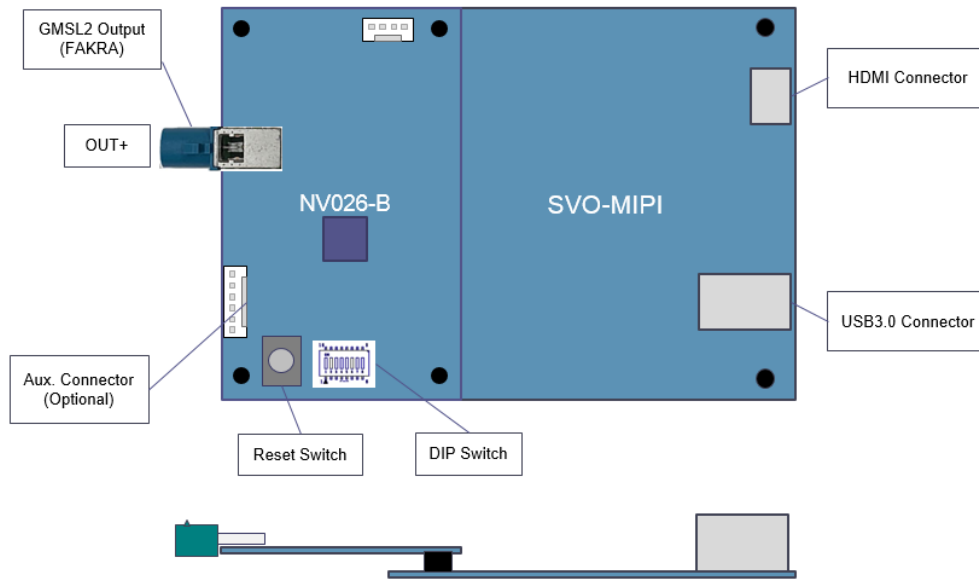
Block Diagram



The block diagram of this board is shown above. Maxim serializer IC MAX9295A is mounted on this board. Since it also has a pattern on which the microcomputer can be mounted for applications such as I2C slave, back-channel communication from the destination device to the camera can also be supported.

The figure below shows the connection image between this board and SVO-03-MIPI. Since the screw hole positions are common to both boards, they can be fixed with spacers.

Connection Image



1.1. Differences From NV026-A

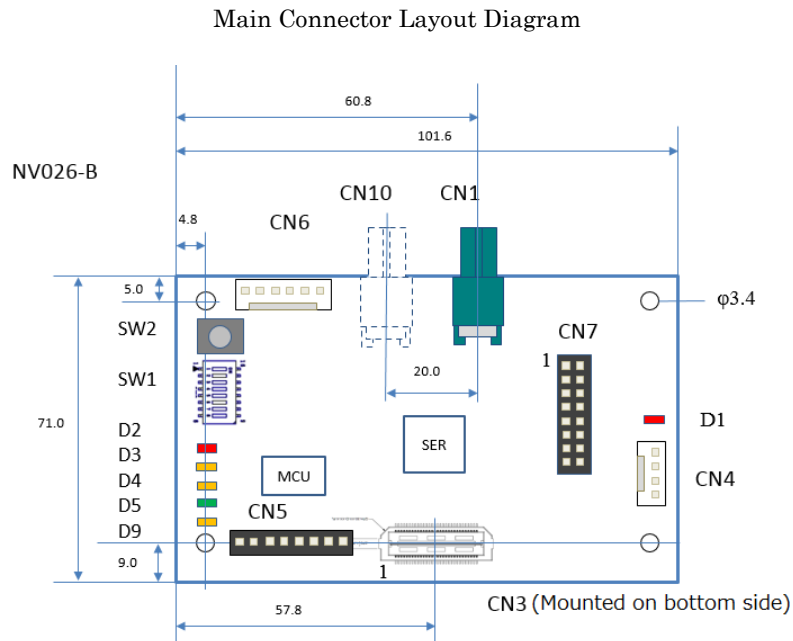
This NV026-B board is an improved version of the NV026-A board. The main differences between the two boards are as follows.

1. DIP SW settings were changed so that all combinations of CFG1 pins can be used.
2. The mounted microcontroller was changed from PIC microcontroller to SAM microcontroller.
3. The board pattern of the GMSL2 line was improved.
4. A jumper resistor was inserted to disconnect the VDDIO and 3.3V power supply from CN3.

2. Shape of Board

2.1. Connector Layout Diagram

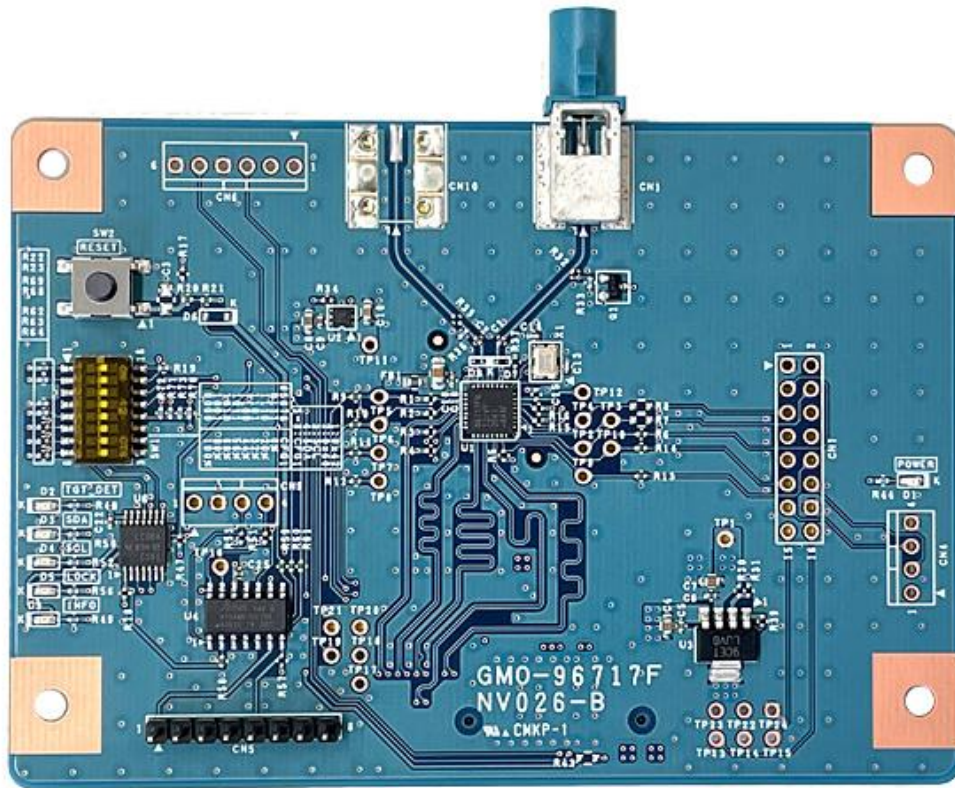
The figure below shows the arrangement of the main connectors on this board. PIN numbers and pin assignments are shown in “Connector Details” section.



* Only main connectors are shown.

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

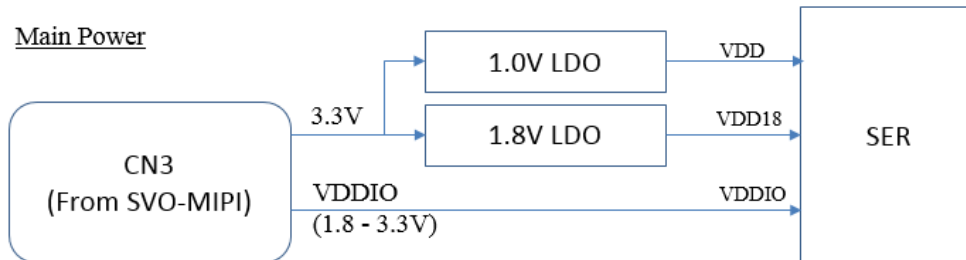
2.2. Board Photo



* GMO-96717x and GMO-9295x are a common board. The photo shows GMO-96717F.

3. Details

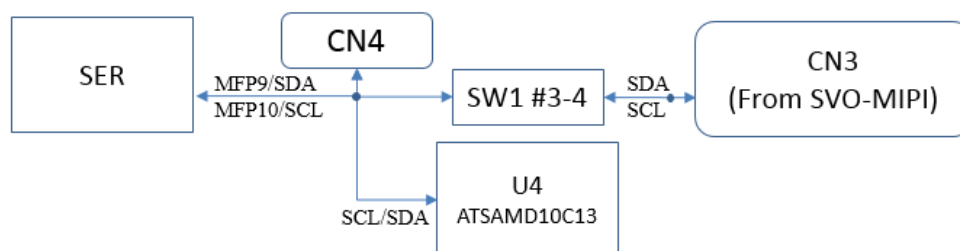
3.1. Power



The power supply for this board is supplied from a video output board such as SVO-03-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 I2C bus on this board is shown in the figure above. MFP9, 10 pins are used as the I2C bus of serializer, and it can be connected to the I2C bus of CN3 (SVO-03-MIPI) through the switch on the board SW1. When controlling I2C from SVO-03-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 IO voltage of I2C bus is linked with VDDIO (IO voltage of SVO-03- MIPI).

For camera emulation applications, this board has a microcontroller (U4) pattern. The I2C bus of

the microcontroller is connected to the I2C bus of this board, and emulation of the I2C response is possible by implementing the program of the microcontroller.

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 MIPI input of CN3. Please note that the default value of the register and the assignment are different. The polarity (+/-) of each lane is same as the default value of MAX9295A.

MAX9295A	SVO-03-MIPI	CN3 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

3.4. Connector List

CN#	Mounted State	Description	Model Number
CN1		GMSL2 output +	59S2AQ-40MT5-Z
CN3		For SVO-03-MIPI Connection	QTH-030-01-L-D-A
CN4	Unmounted	I2C I/O connector	171825-4
CN5		For writing SAM microcontroller	M20-9990845
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 NV026-B / 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 for board-to-board communication in the output system using multiple boards, and for future expansion.

- CN10 is not used for coaxial cable output.

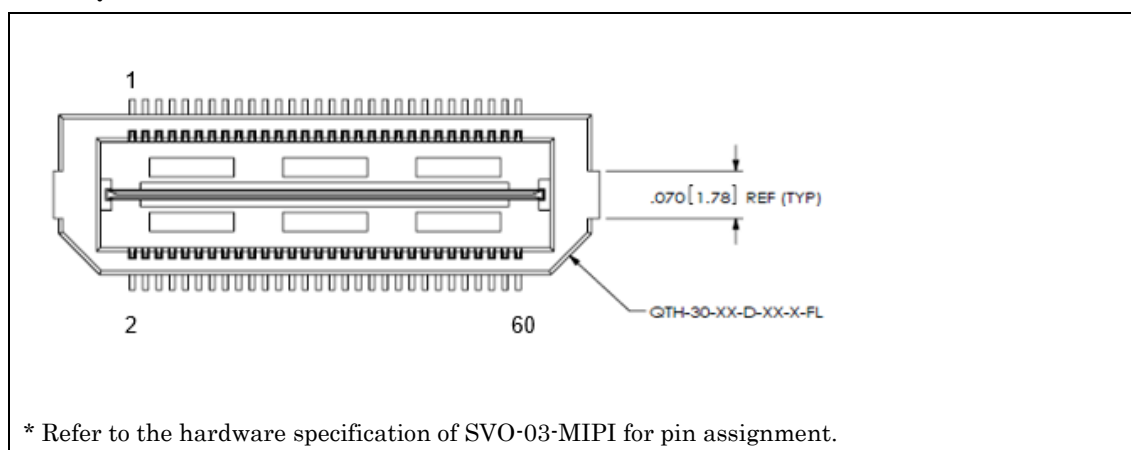
3.5. Connector Details

The figures of the connectors on the top side of this board (outline) and pin assignment (excerpts from the schematic) are shown below.

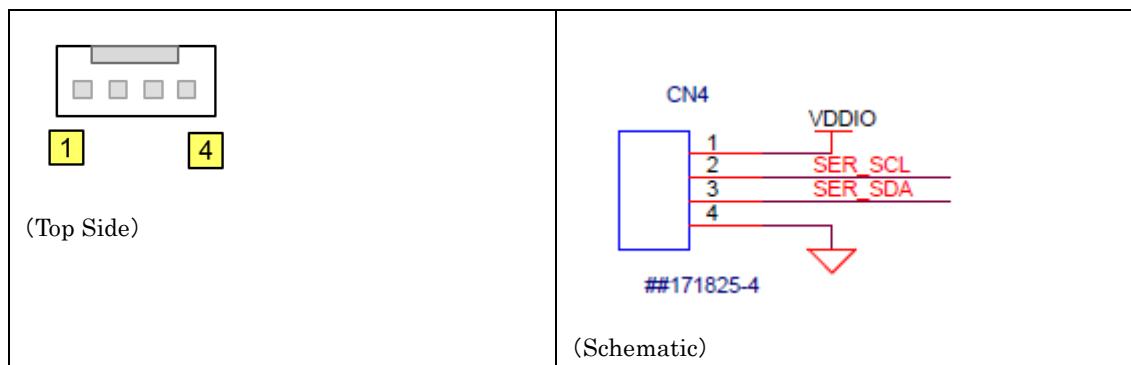
(Meaning of Signal Line)

Name	Description
VDDIO	IO power supply
CAM_SCL / CAM_SDA	I2C serial signal line (connected to the serializer)
SER_MFPn	Directly connected to GPIO (6+n) pin of CN3 Connected to MAX9295A MFPn pins through jumper resistors (MFP1, MFP2 are not connected)
VSYNC_OUT	VSYNCOUT signal line of CN3 (SVO-03-MIPI connector)
CLKOUT	CKOUT signal line of CN3

•CN3 (QTH-030-01-L-D-A)



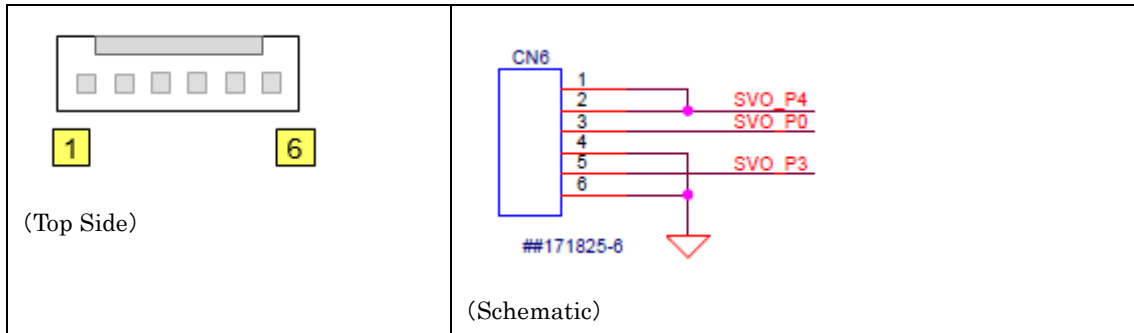
•CN4 (171825-4 / TE Connectivity)



- It is directly connected with the MAX9295A I2C bus (MFP9,10).

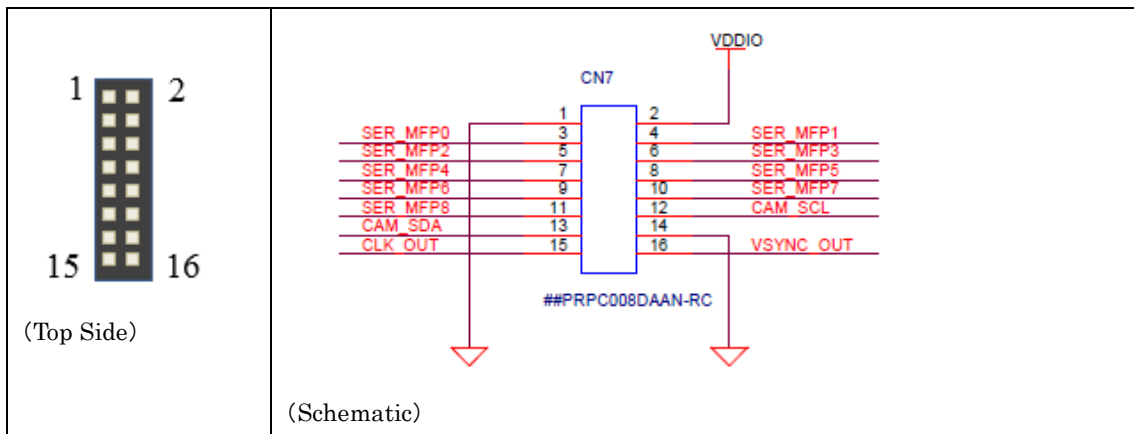
- This connector is not mounted.

•CN6(171825-6 / TE Connectivity)



- This connector is not mounted.

•CN7 (PRPC008DAAN-RC)



- This connector is not mounted.

3.6. Switch Settings

This board has a switch SW1 for serializer settings and a reset switch SW2. While SW2 is pressed, PWDNB pin of MAX9295A is low.

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

SW#	Name	Description
1	CFG0	SW#1 SW#2 I2C Address
2		OFF OFF 0x40 ON OFF 0x42 OFF ON 0x60
3		SCL
4	SDA	OFF: Disconnect I2C bus
5	CFG1	SW#5 #6 #7 #8
6		OFF ON ON ON COAX/GMSL2/6Gbps (0%)
7		ON ON ON OFF COAX/GMSL1/HIM Enable (20%)
8		ON ON OFF ON COAX/GMSL1/HIM Disable (32%) ON ON OFF OFF STP/GMSL2/6Gbps (44%) ON OFF ON ON STP/GMSL2/3Gbps (56%) ON OFF ON OFF STP/GMSL1/HIM Enable (68%) ON OFF OFF ON STP/GMSL1/HIM Disable (80%) OFF OFF OFF OFF COAX/GMSL2/3Gbps (100%)

- If not specified at the time of order, SW#3, #4, #6, #7, #8 are ON by default.

3.7. LED Indicator

LED#	Name	Description
D1	POWER	Lights when the board power (3.3V) is supplied.
D2	TGT_DET	Lights when a 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 MAX9295A is H.

3.8. GPIO

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-03-MIPI. In addition, the connection between the MFP pin of the serializer and GPIO of SVO-03-MIPI can be disconnected by not mounting R6-14.

The GPIO4 pin (14) of the SVO-03-MIPI goes to L level when it detects the PoC voltage input to the coaxial cable. If no PoC voltage is detected, the GPIO4 pin goes to H level (pull-up). But, since the PoC circuit of this board does not consume current, the time when the PoC voltage is low may become longer depending on the circuit on the deserializer side. The PoC detection signal is also input to the microcontroller on the board. Refer to the schematic for details on GPIO signal connections.

4. Specification

Item	Value	Description
Board Dimensions	101.6 x 71.0 mm	Value without connector
Power for serializer	DC +3.3V	Via CN3 Supplied from the power supply (3.3V) of SVO-03-MIPI, step down with internal LDO.
IO Power	DC +1.8V or +3.3V	
PoC Input Voltage	0-16V	Only used for PoC voltage detection in the inside of the board. (Threshold voltage is about 4V)
Video Input	MIPI CSI-2 1-4 Lanes + CLK	Input from CN3 Refer to the datasheet of MAX9295A for details on supported formats. The connector interface is corresponding to SVO-03-MIPI.
Video Output	GMSL2 Single-ended Output	Output from CN1
Serial Communication	I2C Communication	I2C bus connected to CN3 and CN4.

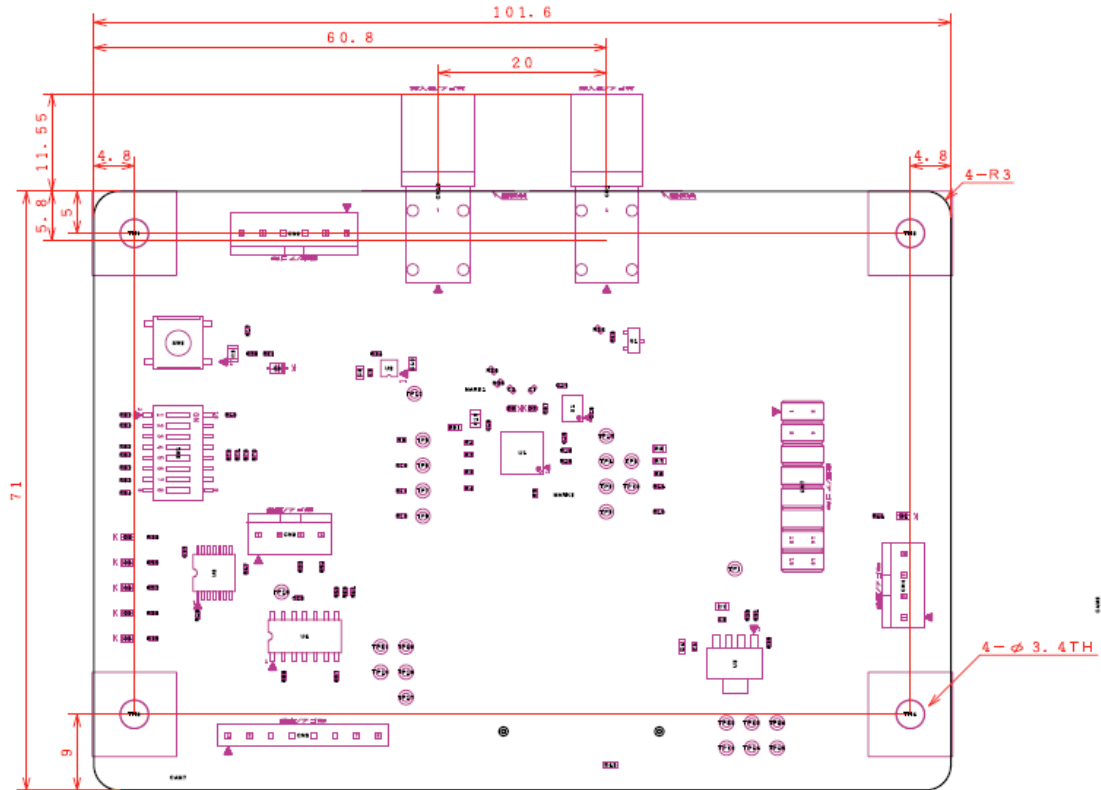
- The above specifications apply only to NV026-B / GMO-9295A-F.

- When connecting with SVO-03-MIPI, it is necessary to set SVO-03-MIPI to Continuous Clock.

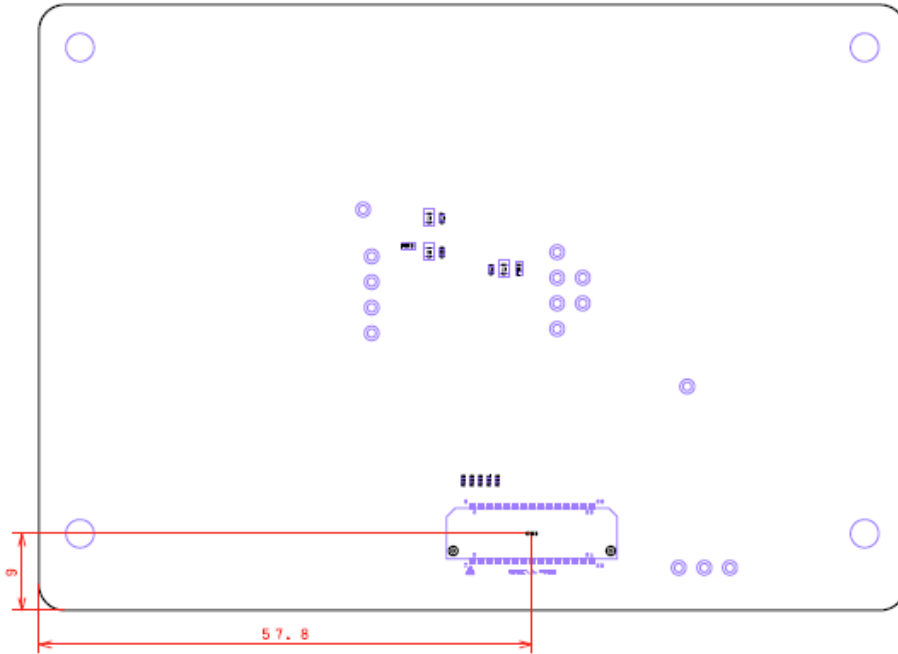
5. Appendix

5.1. Board Dimensions

(Top Side / Part View)



(Bottom Side / Part View)



5.2. Microcomputer Peripheral Schematic

