

MAX9288 GMSL Deserializer Board  
[GMI-9288]  
(Board Model Number: NV016-A)  
Hardware Specification

Rev. 1.0

NetVision Co., Ltd.

Update History

Revision	Date	Note	
1.0	2020/07/14	New File (Equivalent to Japanese version 3)	H. Suzuki

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# 1. Overview

This document is a hardware specification of GMI-9288 / NV016-A (MAX9288 GMSL Deserializer board). This board converts serial video signals transmitted in Maxim's GMSL standard to MIPI signals. This board is used by connecting to our SVM-MIPI board.

【Figure 1】 Block Diagram

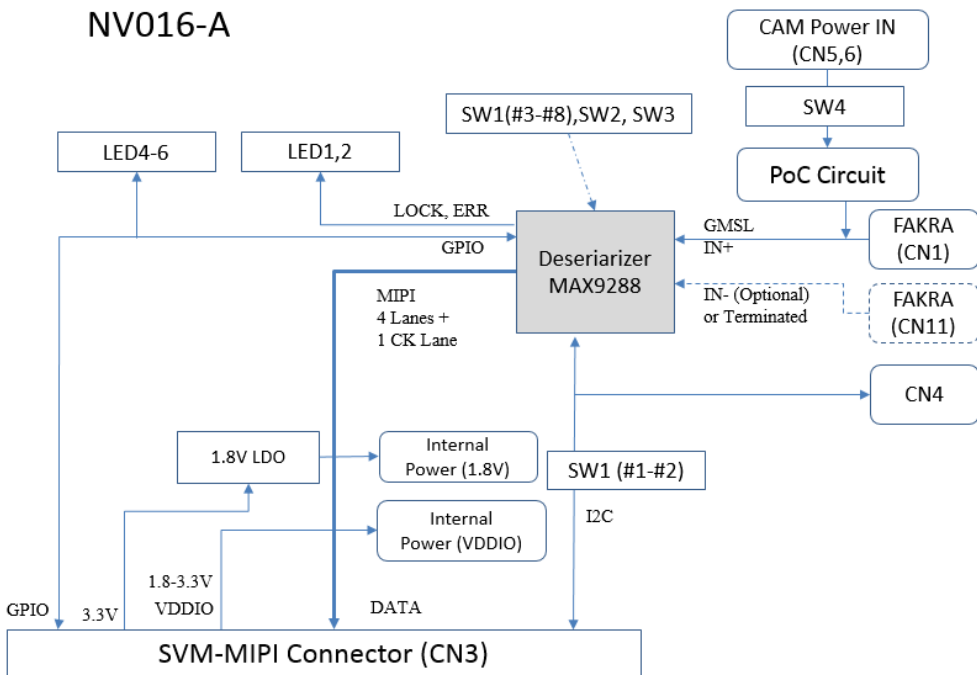
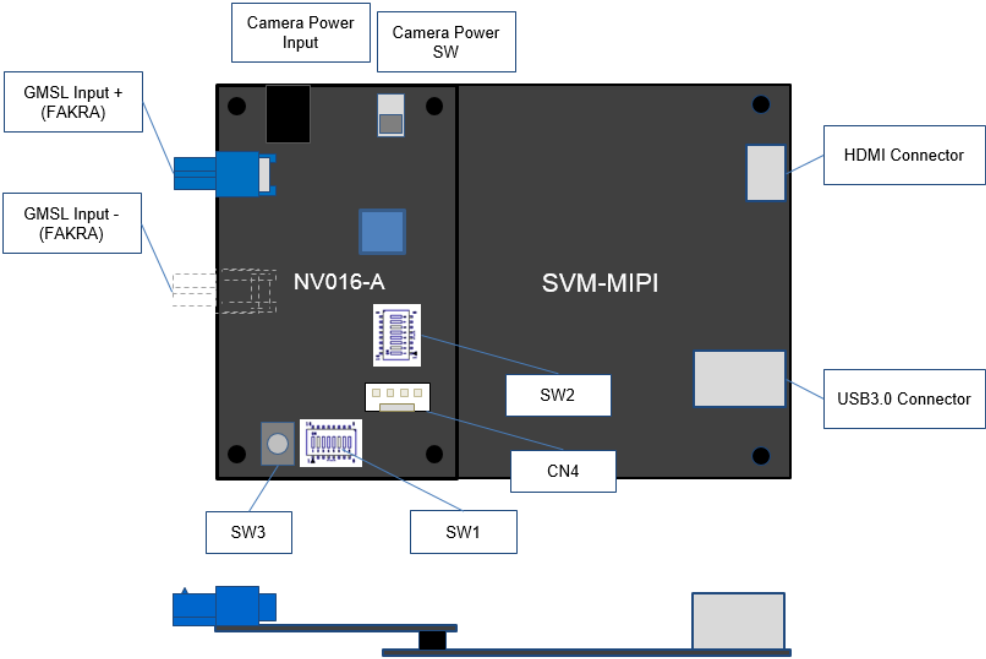


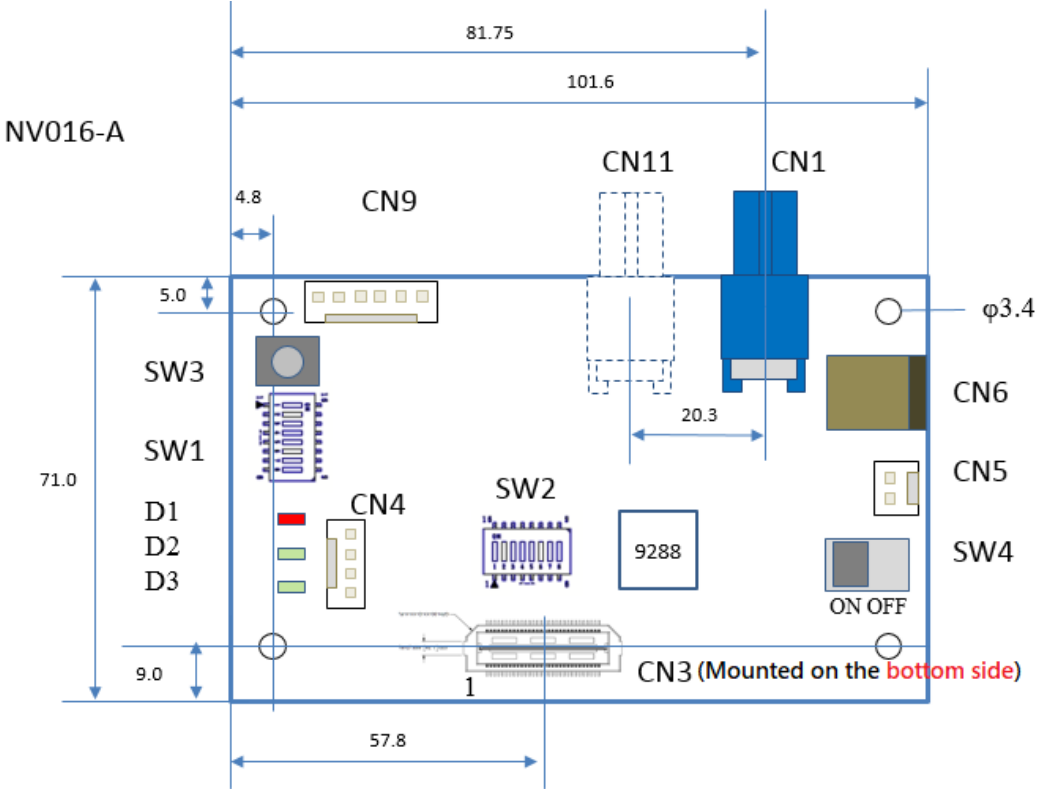
Fig. 1 shows the block diagram of this board. This board is mounted Maxim’s Deserializer IC MAX9288, and it is possible to convert GMSL signals to MIPI, register settings of MAX9288 combined with SVM-MIPI board, and I2C / GPIO back-channel communication through GMSL signal line. The MIPI signal output connector is a common interface of our SV series, and can be used by directly connecting to SVM-MIPI. Two patterns (CN1 and CN11) of input connectors are prepared, but only CN1 is mounted in the standard shipping state to support video reception by COAX connection. Since CN1 is connected to IN+ of the MAX9288 and CN11 is connected to IN-, it is also possible to receive video by STP using two FAKRA connectors by changing some mounted components.

Fig. 2 shows the board connection image of this board and SVM-MIPI. As shown, both boards are connected with a 60-pin connector (CN3). Since the screw hole positions are common, they can be fixed with a spacer or the like. The layout of the connectors on this board is shown in Fig. 3. The pin numbers and pin assignments of the connectors are shown later in the "Connector Details" section.

【Figure 2】 Boards Connection Image



【Figure 3】 The layout of the connectors

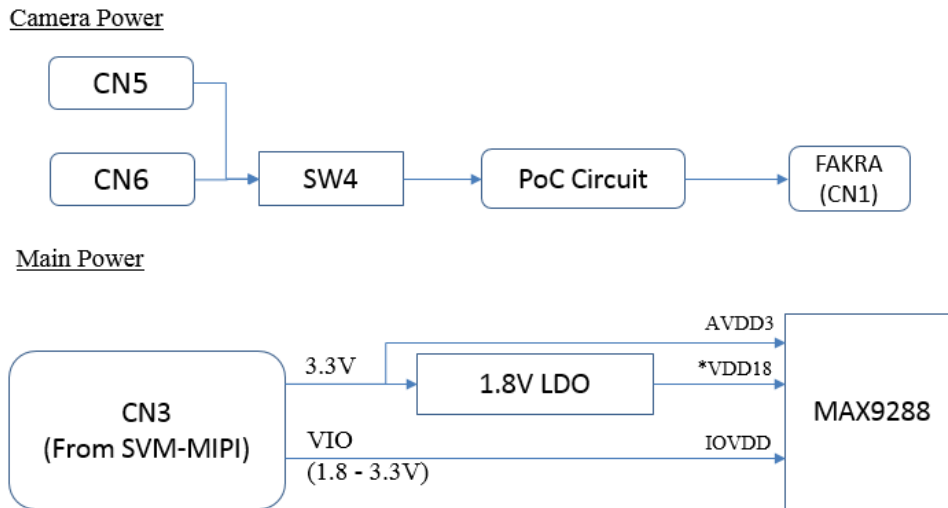


\* CN9 and CN11 are not mounted as standard

## 2. Details

### 2.1. Power System

【Figure 4】 Power System Diagram



The power supply system of this board has two types: Camera Power supply supplied to the camera through PoC (Power Over Coax) circuit and Main Power supply to drive IC. The camera power is input from CN5 or CN6 (DC jack) and overlaps core wire of CN1 through filter. Since it is separated from the main power supply, there is no restriction on the power supply order. The power supply of the camera can be turned ON / OFF by switch SW4 on the board.

Main power is supplied from the connected monitoring board such as SVM-MIPI through CN3. This board requires three power supplies of 3.3V, 1.8V, and IO power supply. As shown in Fig. 4, 1.8V power supply is generated from 3.3V by LDO on the board.

## 2.2. Serial (UART / I2C) Communication

The Deserializer IC (MAX9296A) on this board has UART / I2C bus, which allows you to change the register settings of IC and perform serial communication with the serializer and target devices through a GMSL cable.

【Figure 5】 Serial Bus Part Block Diagram

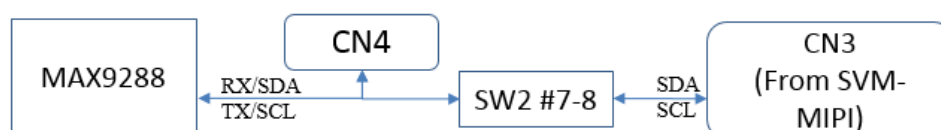


Fig. 5 shows a block diagram of the serial bus part on the board. The MAX9288 UART / I2C bus has the same pin assigned as a dual-purpose pin. The SVM-MIPI board only supports I2C, and the serial bus of this board can be connected to the SVM-MIPI I2C bus through the switch SW1. When controlling I2C from SVM-MIPI, set #1 and #2 of SW1 to ON. When performing I2C or UART communication externally, set #1 and #2 of SW1 to OFF and use connector CN4. The IO voltage of the serial bus changes according to the VDDIO (IO voltage of SVM-MIPI).

## 2.3. Connector List

CN#	Mounted State	Description	Model Number
CN1		GMSL2 Input (Coax)	FA1-NCRP-PCB-8 (FAKRA)
CN3		MIPI output Connect with SVM-MIPI	QTH-030-01-L-D-A
CN4		Serial communication input / output	171825-4
CN5		Camera power input 1	22-04-1021
CN6		Camera power input 2	MJ-179PH Center +
CN7	Un-mounted	GPIO Input / Output	A2-6PA-2.54DSA(71)
CN9	Un-mounted	Expansion connector	171825-6
CN11	Un-mounted	(Unused)	FA1-NCRP-PCB-8

- Mounted State apply to NV016-A.

- The expansion connector (CN9) is for board-to-board communication in multi-channel capture systems and for future expansion.

- The serial communication I / O connector (CN4) is directly connected to MAX9288 I2C/UART bus.

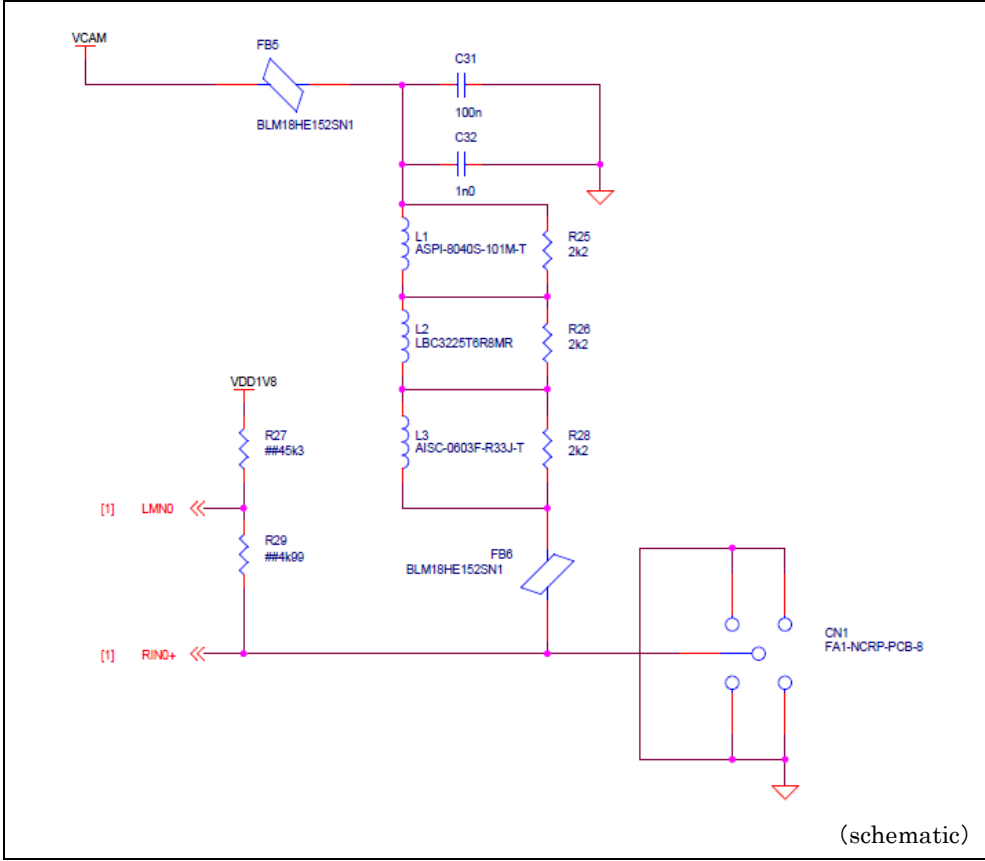
**2.4. Connector Details**

The top view of the connector and pin assignments (excerpted from the circuit diagram) are shown below. Parts starting with ## in the circuit diagram indicate un-mounted parts.

(Signal Name)

Name	Description
VDDIO	IO Power
VCAM	Camera Power
TX_SCL / RX_SDA	Serial Signal Lines
RIN0 + / -	GMSL Signal Lines

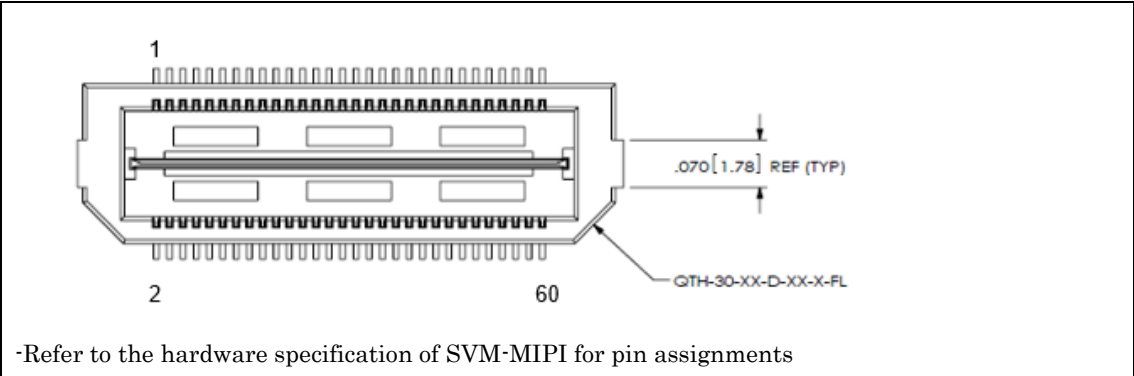
•CN1, CN11 (FA1-NCRP-PCB-8)



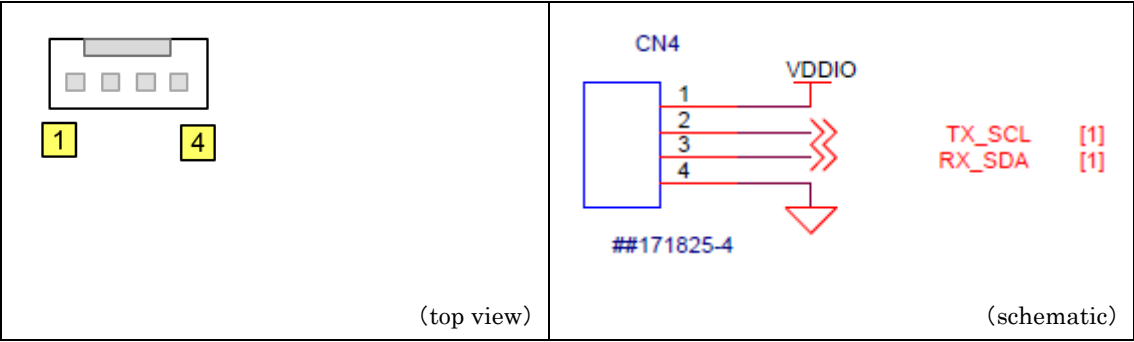
-CN11 is not mounted at shipping.



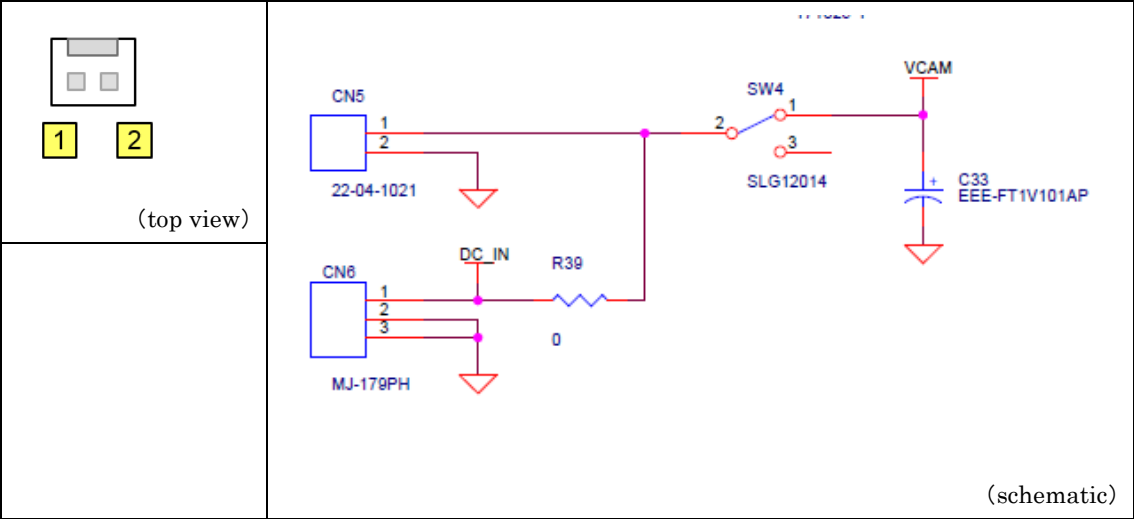
•CN3 (QTH-030-01-L-D-A)



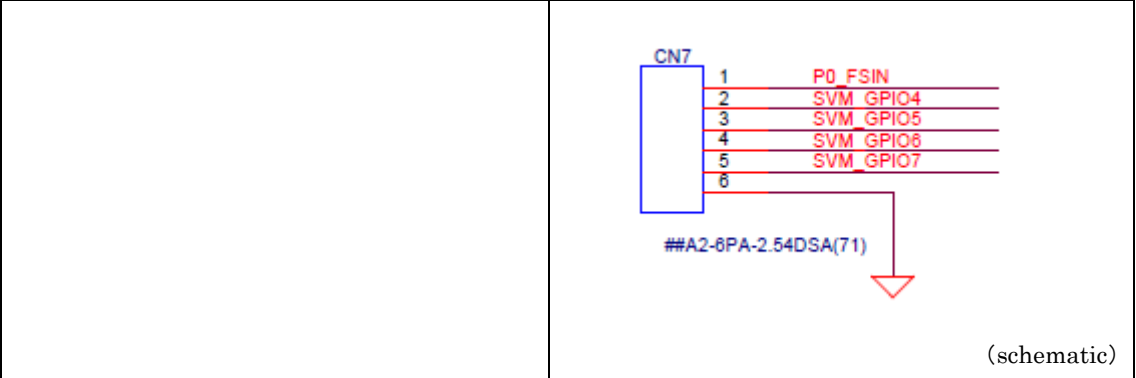
•CN4 (171825-4 / TE Connectivity)



•CN5 (22-04-1021 / Molex), CN6(MJ-179PH / Marushin)

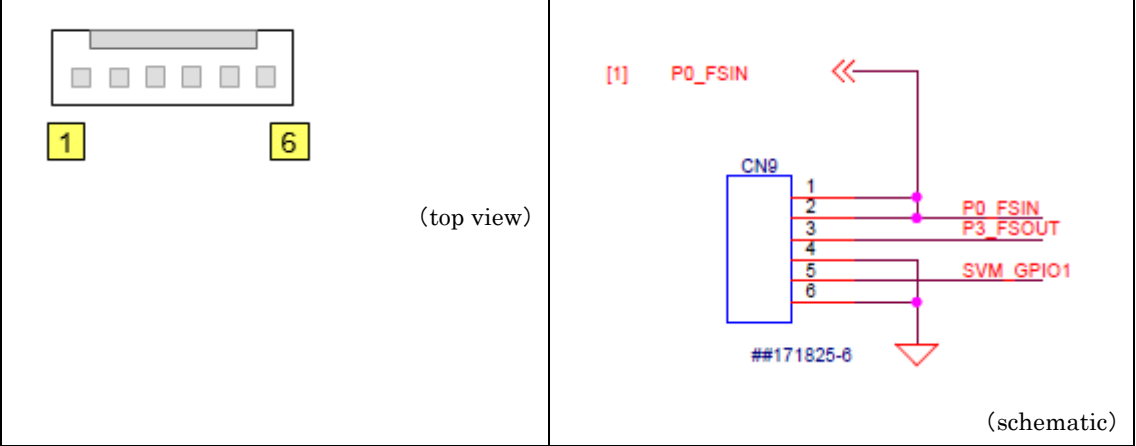


•CN7 (A2-6PA-2.54DSA(71) / HRS)



- P0\_FSIN: Connects to GPI pin through pin #2 of CN3 and #8 of SW1.
- SVM\_GPIO #4,5,6,7: Connect to pins #14,16, 20, 22 of CN3

•CN9 (171825-6 / TE Connectivity)



- P0\_FSIN: Connects to GPI pin through pin #2 of CN3 and #8 of SW1
- P3\_FSOUT: Connects to pin #10 of CN3
- SVM\_GPIO1: Connects to pin #4 of CN3

## 2.5. DIP Switch Settings

Two 8-bit DIP switches (SW1, SW2) and push switch (SW3) are mounted on this board. The Deserializer function and I2C address can be set with these switches. Refer to the MAX9288 data sheet for details on the operation of each function.

- SW1

SW#	Name	Description
1	BWS	Set Bus Width Select input status.
2		SW#1   SW#2   OFF   OFF   High-bandwidth Mode (BWS = Z) ON   OFF   32-bit Mode (BWS = H) OFF   ON   24-bit Mode (BWS = L)
3	DRS	Select DRS pin status. ON: High pixel clock rate mode (DRS = L) OFF: Low pixel clock rate mode (DRS = H)
4	I2CSEL	Select I2C / UART function. ON: I2C interface (I2CSEL = H) OFF: UART interface (I2CSEL = L)
5	EQS	Select EQS pin status. ON: (EQS = H) OFF: (EQS = Z)
6	HIM	Set High Immunity Mode. ON: High Immunity Mode (HIM = H) OFF: Legacy Reverse Control Mode (HIM = L)
7	MS	Set Mode Select input status. ON: Bypass Mode (MS = H) OFF: Base Mode (MS = L)
8	GPI	Select GPI pin input. ON: Input the external trigger (P0_FSIN signal input from CN9) OFF: L input (GPI is 10k pulldown)

- Only SW#2, #4, #6, #7 are ON as default.

- The CDS pin of MAX9288 is fixed H by a jumper resistor.

- BWS and HIM must be set correctly to perform BCC communication.

- SW2

SW	Name	Description
1	ADD0	Set the I2C device address. (ON: H, OFF: L)
2	ADD1	
3	ADD2	
4	CX/TP	Sets the state of the CX/TP pin. ON: (CX/TP = H) OFF: (CX/TP = Open)
5	GPIO0	When ON, connect GPIO0 of MAX9288 and GPIO4 of SVM-MIPI.
6	GPIO1	When ON, connect GPIO1 of MAX9288 and GPIO5 of SVM-MIPI.
7	SCL	When ON, connect SCL of MAX9288 and SCL of SVM-MIPI.
8	SDA	When ON, connect SDA of MAX9288 and SDA of SVM-MIPI.

- Only SW#4, #7, #8 are ON as default.

- SW3

MAX9288 PWDN pin is set low while the button is pressed.

## 2.6. LED Indicator

This board is mounted 6 LEDs. Each function is shown in the table below.

LED#	Name	Description
D1	LOCK	When PLL is locked, lights up.
D2	ERR	When there is a transfer error, lights up.
D3	POWER	When power (3.3V) is supplied, lights up.
D4-6	GPIO4-6	Indicates the status of GPIO4-GPIO6 pins of SVM-MIPI.

## 3. Usage Procedure

The procedure for using this board connected with the SVM-MIPI board is explained below.

- Check that the DIP SW on this board is set appropriately.
- Connect the camera to CN1.
- (If necessary) Supply the camera power from CN5 or CN6 and turn on SW4.
- Check the SVM-MIPI IO power supply (VDDIO) is set properly.
- Connect SVM-MIPI and this board.
- Insert the USB cable into SVM-MIPI and connect it to your PC.

- Check that the power indicator (D3) on this board is lit.
- (If necessary) Write the MAX9288 or camera register settings from a PC to SVM-MIPI board.

This completes the setup of this board. The subsequent steps are the same as when connecting the camera to SVM-MIPI, so follow the instructions for using SVM-MIPI.

#### 4. Specifications

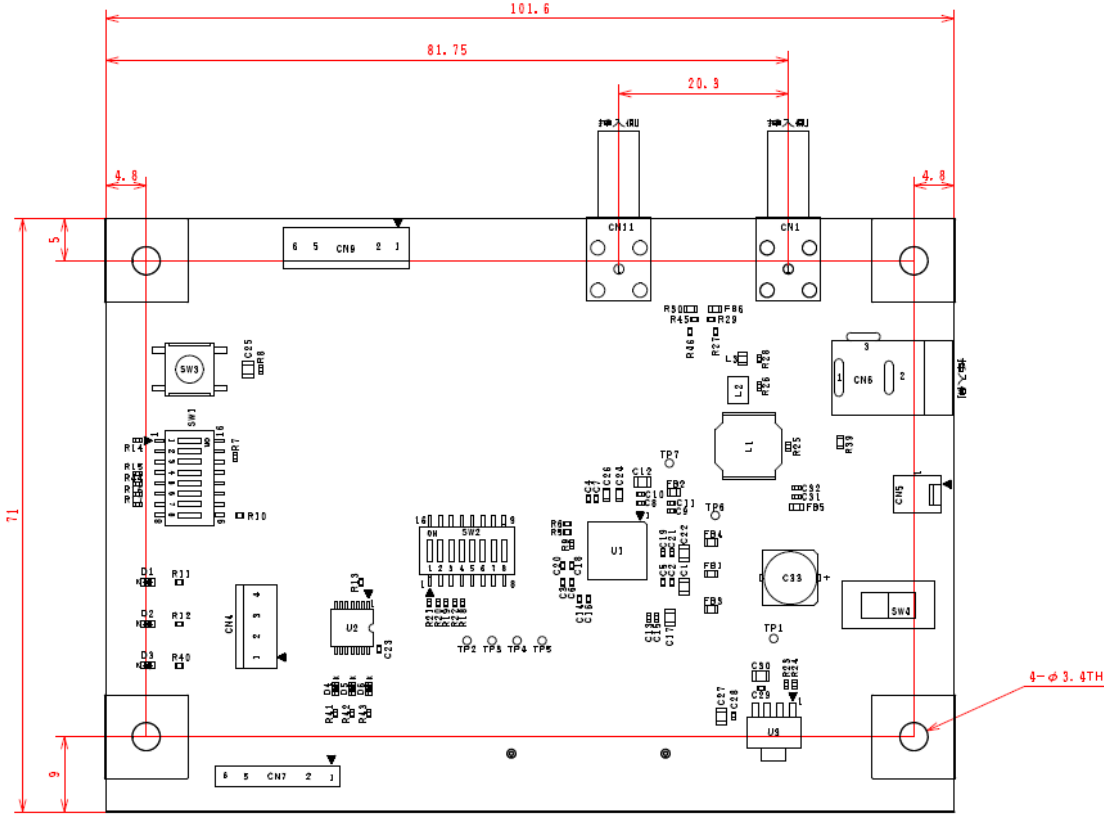
Item	Value	Description
Board Dimensions	71.0 x 101.6 mm	Value without connector
Power for Deserializer	DC +3.3V	Via CN3, supplied from the capture board SVM-MIPI (3.3V), etc.
IO Power	DC +3.3V or 1.8V	Via CN3, supplied from the capture board SVM-MIPI (VDDIO), etc.
Camera Power	DC +5 - 12V	Supplied from CN5 or CN6 connector, but cannot connect both at the same time. PoC output from FAKRA connector Power supply voltage depends on connected camera
Image Input	GMSL single-ended input	Refer to MAX9288 data sheet for supported serializers. CN1 FAKRA standard connector available as single-ended input When CN11 is mounted, it can support differential input with FAKRA x2 by changing some parts.
Image Output	MIPI CSI-2 The pixel format etc. follow the setting of MAX9288	Interface follows SVM-MIPI
Serial communication	I2C / UART	UART is possible only when directly connected to CN4.

\* The above specifications apply only to model number GMI-9288 / NV016-A.

5. Appendix

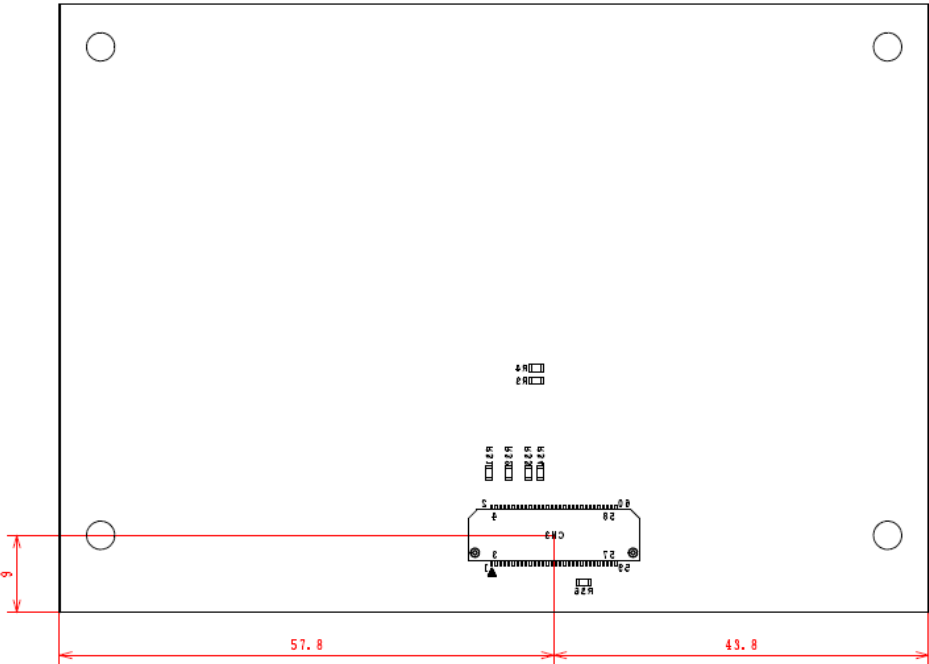
5.1. Figure of Board Dimensions

(Top side / Part view)



- The bottom two fixing holes are connected to GND. The top two are unconnected.

(Bottom side / Part view)



5.2. Board Photo

