

MAX96716A GMSL2 Deserializer Board
(GMI-96716A / NV019-C)
Hardware Specification

Rev. 1.0

NetVision Co., Ltd.

Update History

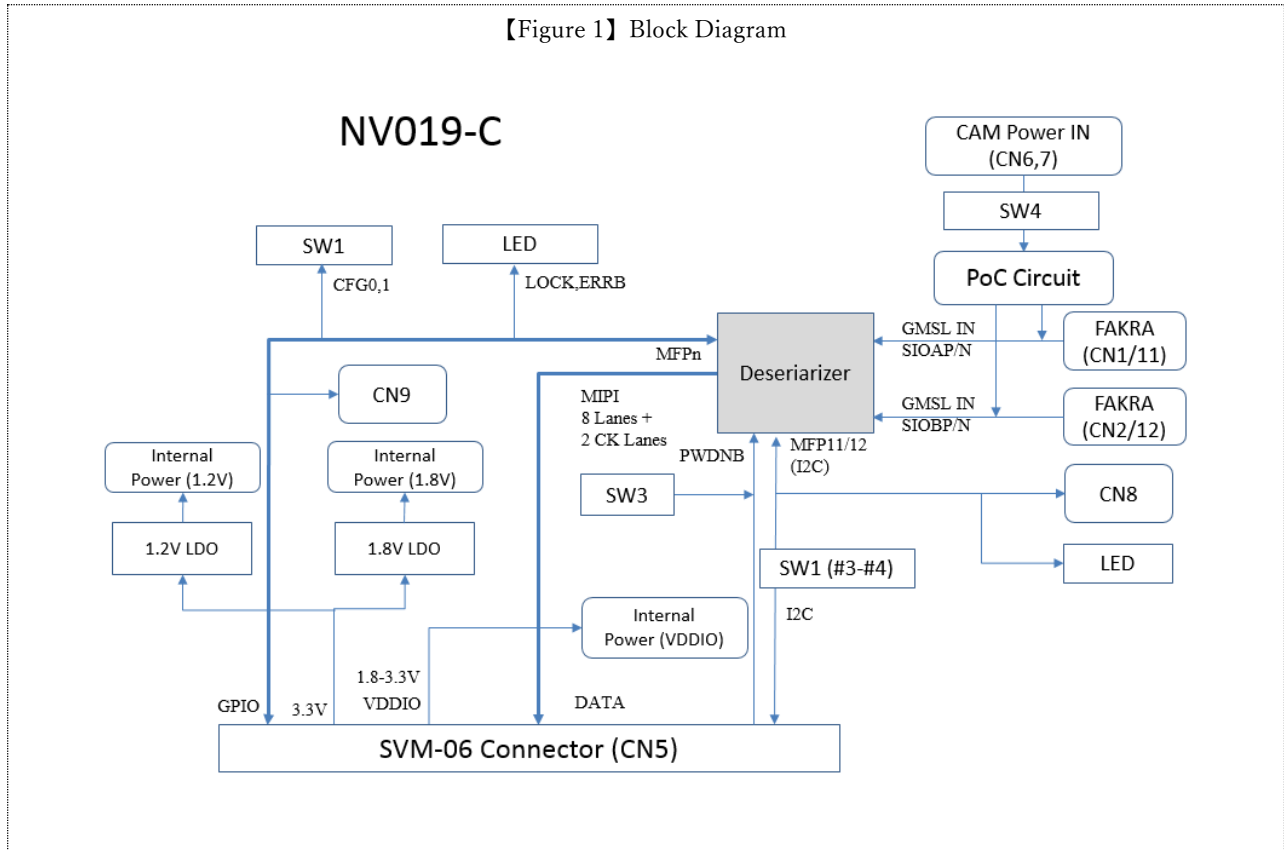
Revision	Date	Note	
1.0	May.19,2022	New File (Translation of Japanese edition ver.3)	R. Sugo

Index

1. Overview	3
2. The Shape of The Board	5
2.1 Connector Arrangement Diagram	5
2.2 The Photo of The Board	6
3. Details	7
3.1 Power System	7
3.2 Serial (I2C) Communication	8
3.3 MIPI CSI-2 Output	8
3.4 PoC Circuit	9
3.5 Connector List	9
3.6 Connector Details	10
3.7 Switch Settings	12
3.8 LED Indicator	13
3.9 GPIO	13
4. Specifications	14
5. Appendix	15
5.1 Figure of Board Dimensions	15
5.2 When Using Two FAKRA Connectors as Differential Input	16

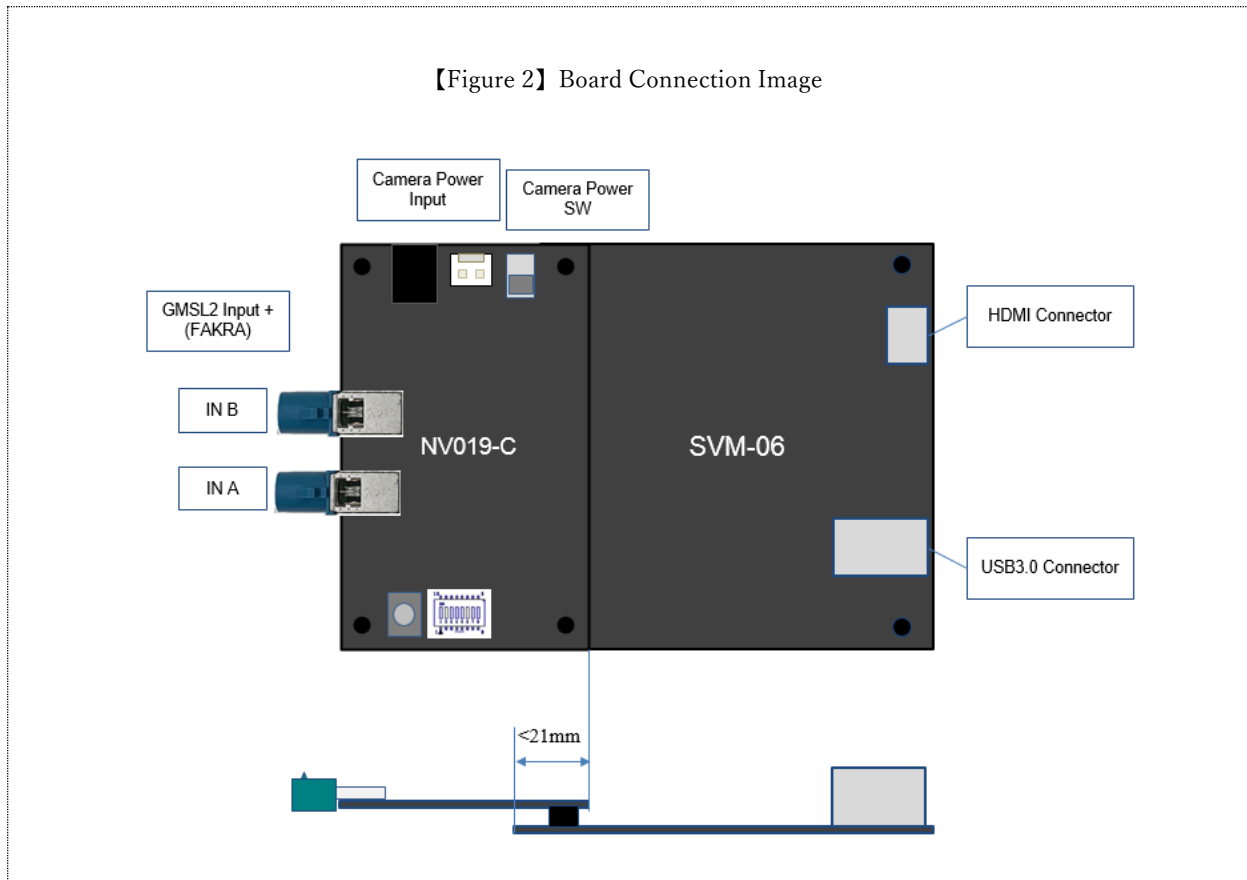
1. Overview

This document is a hardware specification of GMI-96716A / NV019-C “MAX96716A GMSL2 deserializer board”. GMI-96716A(NV019-C) board converts serial video signal transmitted by Analog Devices (Maxim Integrated) GMSL2 standard to MIPI signals and connects to our SVM-06 board.



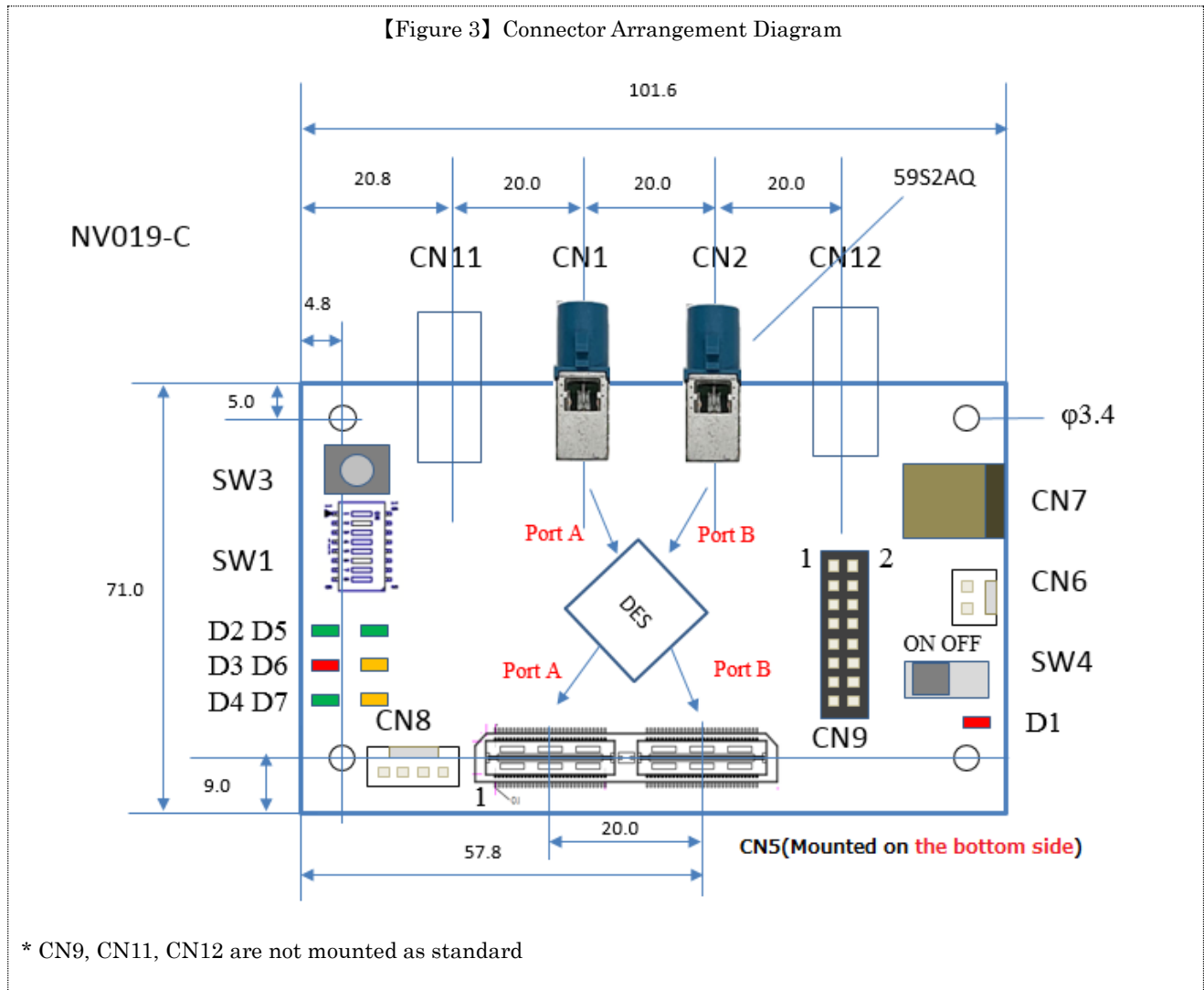
【Figure 1】 shows the block diagram. This board equipment with the Analog Devices (Maxim Integrated) deserialiser IC MAX96716A, which converts GMSL2 signals to MIPI. And this board enable MAX96716A resistor setting and I2C back-channel communication through the GMSL2 signal line in combination with our SVM-06. The MIPI signal output connector is a common interface of our SV series, and can be used by directly connecting to SVM-06 etc. This board has two FAKRA connectors (single-ended transfer) as input for GMSL signals, and PoC (Power over Coax) circuit, so it is ideal for connection with automotive cameras. Since two FAKRA connectors are mounted as inputs, two channels of GMSL2 signals can be input simultaneously.

【Figure 2】 shows the connection image of this board and SVM-06. As shown, both boards are connected with a 120-pin connector (CN5). Since the screw hole positions are common, they can be fixed with a spacer or the like.

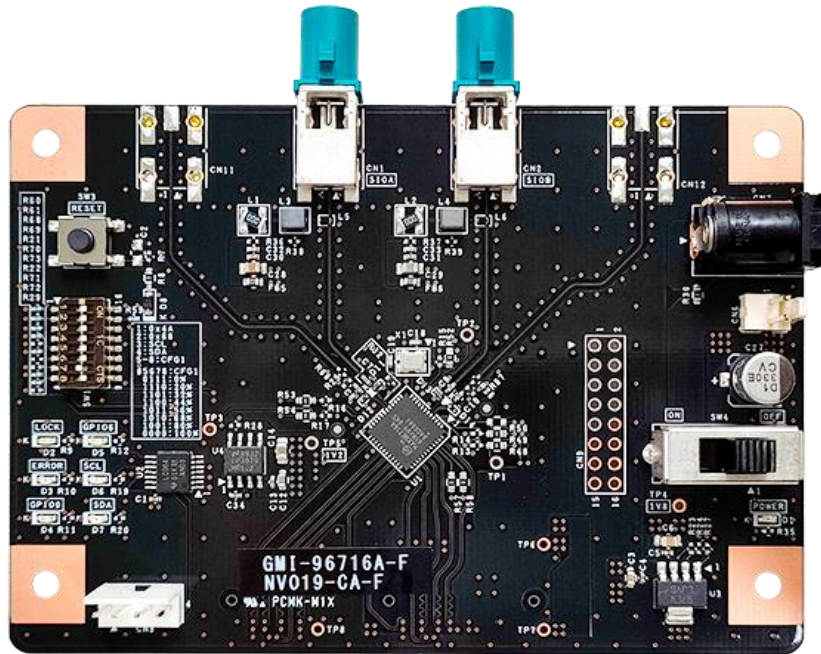


2. The Shape of The Board

2.1 Connector Arrangement Diagram

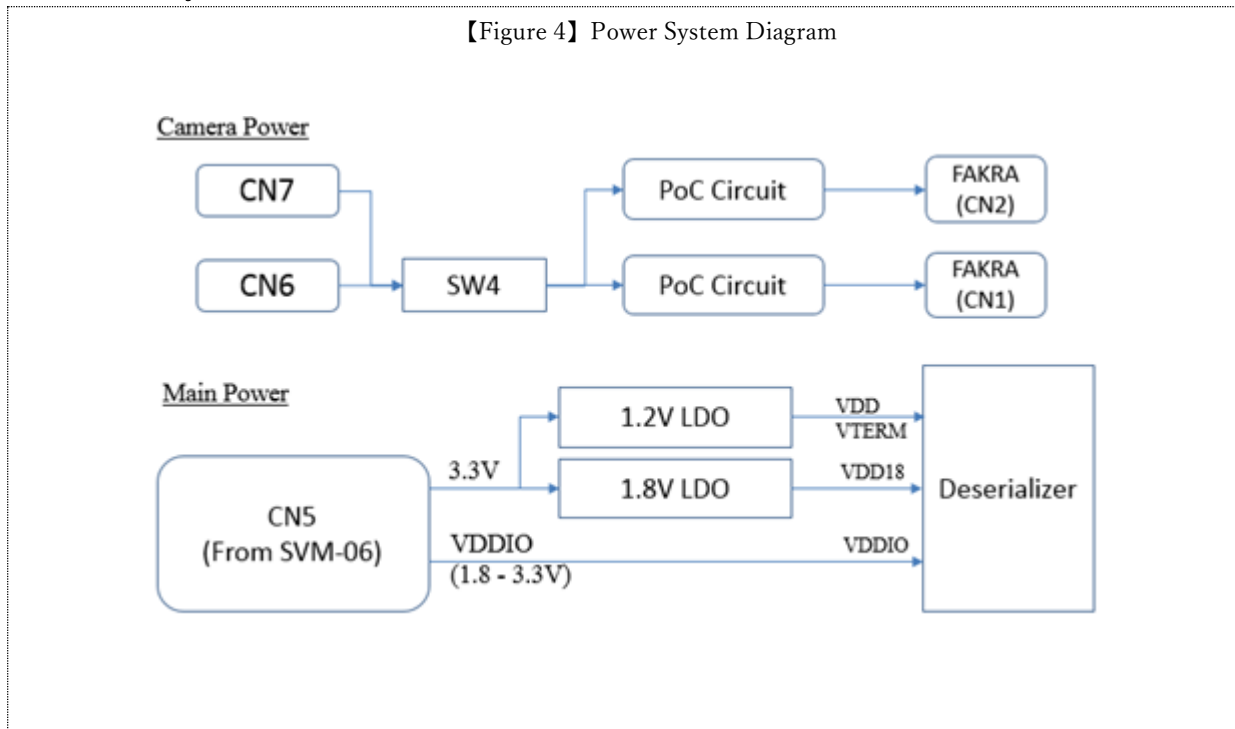


2.2 The Photo of The Board



3. Details

3.1 Power System

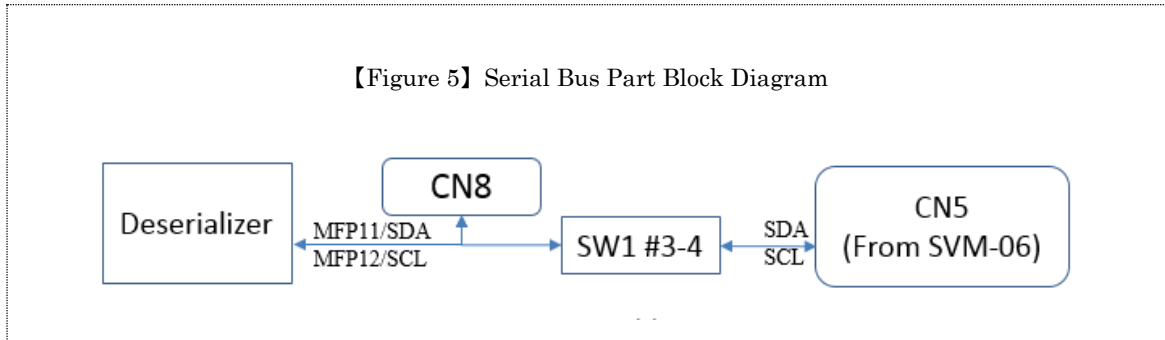


The power supply system is divided into two types; one is camera power supply (VCAM) which is supplied to the camera through PoC (Power over Coax) circuit, and another is main power supply to drive IC. The camera power is input from CN6 or CN7 (DC jack) and overlaps the GMSL signal line (CN1-CN2 core wire) through PoC 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.

The main power supply is supplied through CN5 from the connected capture board such as SVM-06. This board requires three types of power supplies of 1.8V, 1.2V, and IO power supply. The 1.8V and 1.2V power supplies are generated by LDOs. Provides 1.2V for the VDD power supply of the MAX96716A. Therefore, set REG_ENABLE and REG_MNL as specified in the device datasheet at the time of operation.

3.2 Serial (I2C) Communication

The deserializer IC (MAX96716A) has an I2C bus, which allows you to change the register settings of the IC and perform serial communication with the serializer and target devices through a GMSL cable.



【Figure 5】 shows a block diagram of the serial bus part. The serial bus can be connected to the I2C bus of SVM-06 through switch SW1, since SVM-06 only supports I2C. When controlling I2C with SVM-06, set SW1 # 3 and # 4 to ON. When performing I2C communication from outside, set SW1 # 3 and # 4 to OFF and use connector CN4. The IO voltage of the serial bus is linked with VDDIO (IO voltage of SVM-06).

3.3 MIPI CSI-2 Output

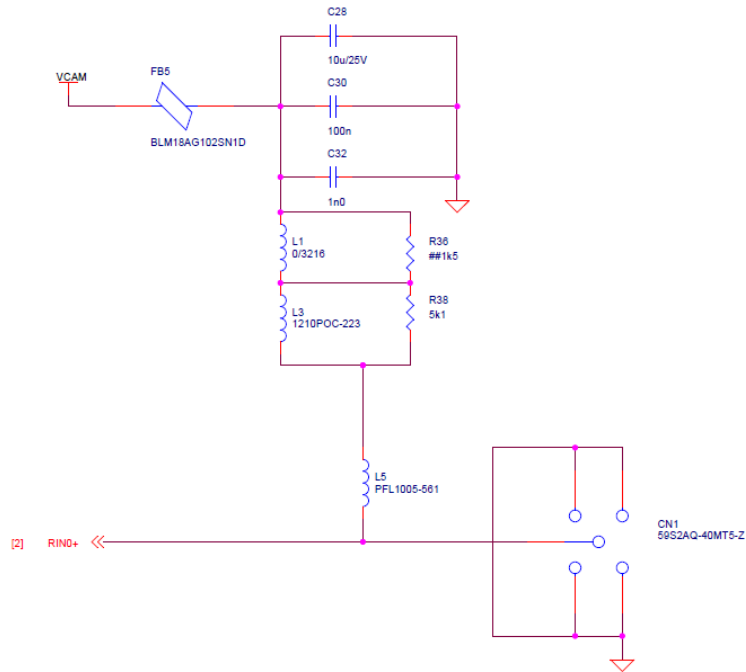
MAX96716A has 2-port MIPI CSI-2 outputs, and all are connected to the 120pin connector CN5. The port B of the MIPI output corresponds to 61pin – 120pin, and the port A corresponds to 1pin - 60 pin. **Normally use the output of port B**, because SVM-06 supports input from 61 - 120 pin as standard.

The following table shows the MAX96716A output and CN5 MIPI input lane assignments. Note that these are different from the ones of the old board model NV019-A. Lane polarity is in phase.

Port	MAX9296A	SVM-06	CN5
A	CKA	MIPI_CLK2	13,15
A	DA1	MIPI_D6	19,21
A	DA2	MIPI_D8	25,27
A	DA3	MIPI_D5	1,3
A	DA4	MIPI_D7	7,9
B	CKB	MIPI_CLK1	73,75
B	DB0	MIPI_D1	61,63
B	DB1	MIPI_D3	37,39
B	DB2	MIPI_D2	79,81
B	DB3	MIPI_D4	85,87

3.4 PoC Circuit

The GMSL2 input (CN1, CN2) has a PoC (Power over Coax) filter circuit. The figure below shows the circuit diagram of the PoC filter.



3.5 Connector List

CN#	Mounted State	Description	Model Number
CN1		GMSL2 Input+	59S2AQ-40MT5-Z
CN2		(Coax)	(FAKRA)
CN5		MIPI Output Connect to SVM-06	QTH-060-01-L-D-A
CN6		Camera power input 1	22-04-1021
CN7		Camera power input 2	PJ-202A 2.1mm, Center+
CN8		I2C Input and Output	171825-4
CN9	Un-mounted	GPIO Input and Output	PRPC008DAAN-RC
CN11	Un-mounted	GMSL2 Input-	59S2AQ-40MT5-Z
CN12			(FAKRA)

- Mounted states apply to NV019-C.

- CN11 and CN12 are not used for coaxial cable input.

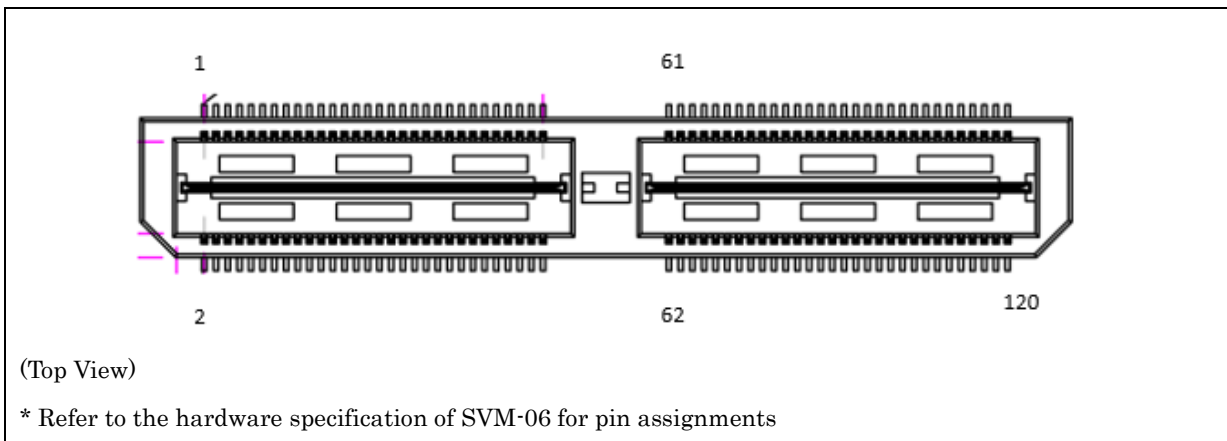
3.6 Connector Details

The top view (outline) of the connectors and pin assignments (excerpted from the circuit diagram) are shown below. Parts starting with ## in the circuit diagram indicate unmounted parts.

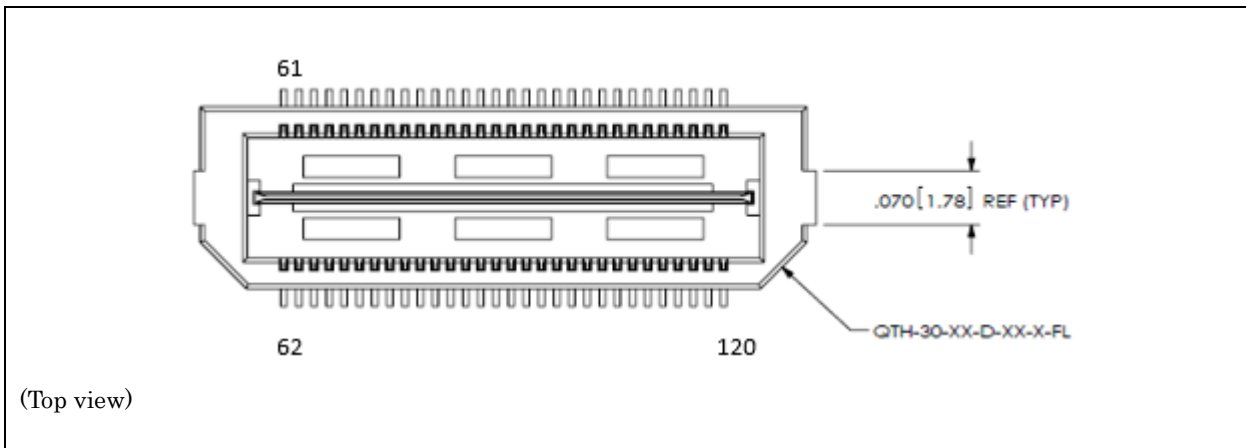
(Signal Name)

Name	Description
VDDIO	IO Power
VCAM	Camera Power
TX_SCL / RX_SDA	Serial Signal Lines
DSER_MFPn	Directly connected to GPIOn pin of CN5 Connected to MAX96716A MFPn pins through jumper resistors
SVM_VSYNC	VSYNCOUT signal line of CN5 (SVM-06 connector)
SVM_CKOUT	CKOUT signal line of CN5

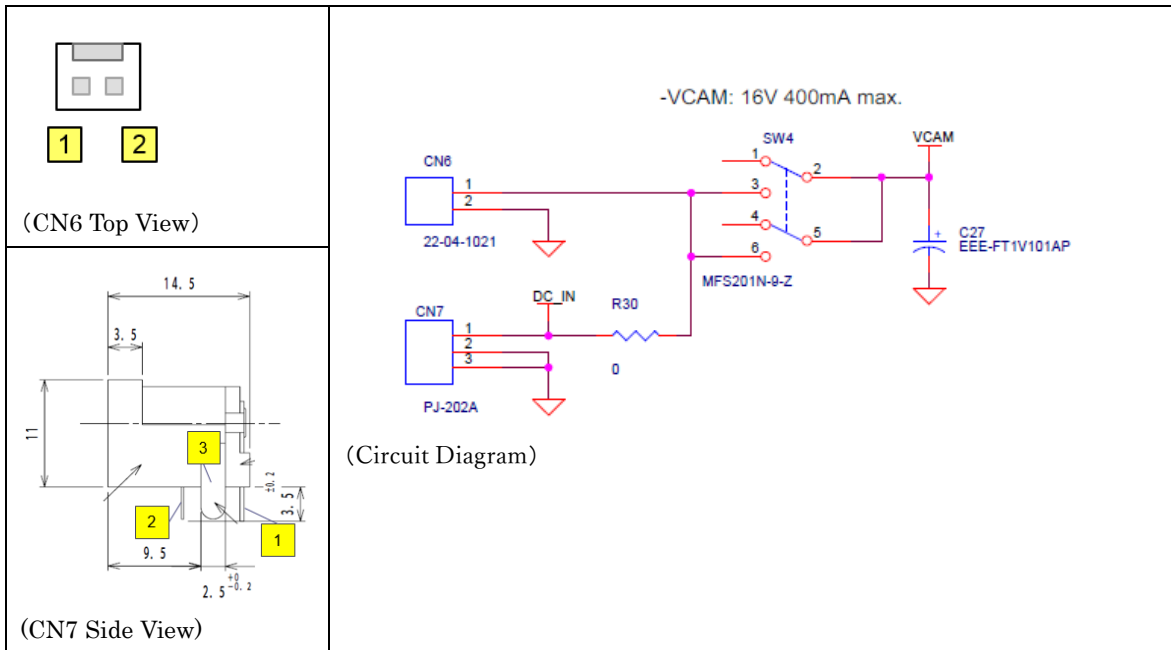
•CN5 (QTH-060-01-L-D-A)



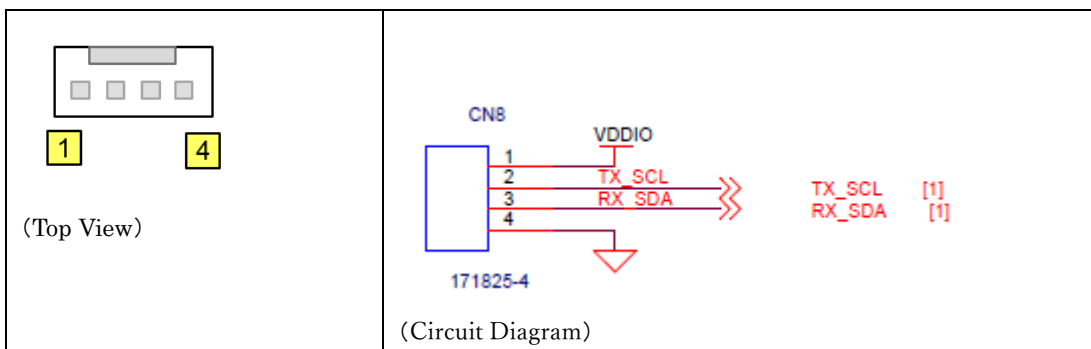
•CN5 (in the case of implementing QTH-030-01-L-D-A)



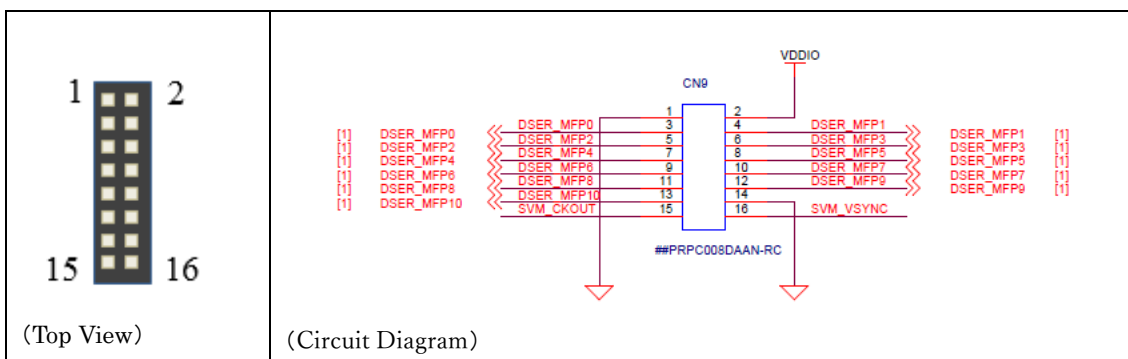
•CN6 (22-04-1021 / Molex), CN7(PJ-202A)



•CN8 (171825-4 / TE Connectivity)



•CN9 (PRPC008DAAN-RC)



3.7 Switch Settings

This board has an 8-bit DIP switch (SW1) and push switch (SW3), and can set the deserializer function and I2C address. Refer to the MAX96716A data sheet for details on the operation of each function.

- SW1

SW #	Name	Description
1	ADDR0	ADDR0 ADDR1 I2C Address
2	ADDR1	OFF OFF 0x28 ON OFF 0x2A OFF ON 0x4C
3	SCL	ON: Connect I2C bus of CN3 and I2C bus of deserializer
4	SDA	OFF: Disconnect the I2C bus
5	CFG1	#5 #6 #7 #8
6		OFF OFF OFF OFF COAX/Pixel/6G
7		OFF OFF OFF ON COAX/Pixel/3G
8		OFF OFF ON OFF COAX/Tunnel/6G OFF ON OFF OFF COAX/Tunnel/3G

- If not specified at the time of manufacture, only SW#3 and #4 are ON by default.

- The silk of the CFG1 is incorrect; the correct one is the above settings in this specification.

- SW3

When pressed, the PWDNB pin of the MAX96716A is set to L.

- SW4

Switches the camera power (VCAM) ON / OFF.

3.8 LED Indicator

This board is mounted 7 LEDs. Each function is shown in the table below.

LED #	Name	Description
D1	POWER	When power (3.3V) is supplied, lights up.
D2	LOCK	When the MFP1 / LOCK pin is H, lights up.
D3	ERR	When the MFP4/ERRB pin is L, lights up.
D4	GPIO0	When the MFP0/GPIO0 pin is L, lights up.
D5	GPIO6	When the MFP6/GPIO6 pin is L, lights up.
D6	SCL	When the SCL pin is L, lights up.
D7	SDA	When the SDA pin is L, lights up.

- The silk of D4 is incorrect; the correct one is "GPIO0".

3.9 GPIO

The MFPn pin of the deserializer IC (MAX96716A) is connected to the GPIO_n (refer to the circuit diagram for pin numbers) of connector CN5 via a jumper resistor, enabling control with SVM-06. Also, GPIO connection can be disconnected by leaving the R48-58 unmounted.

4. Specifications

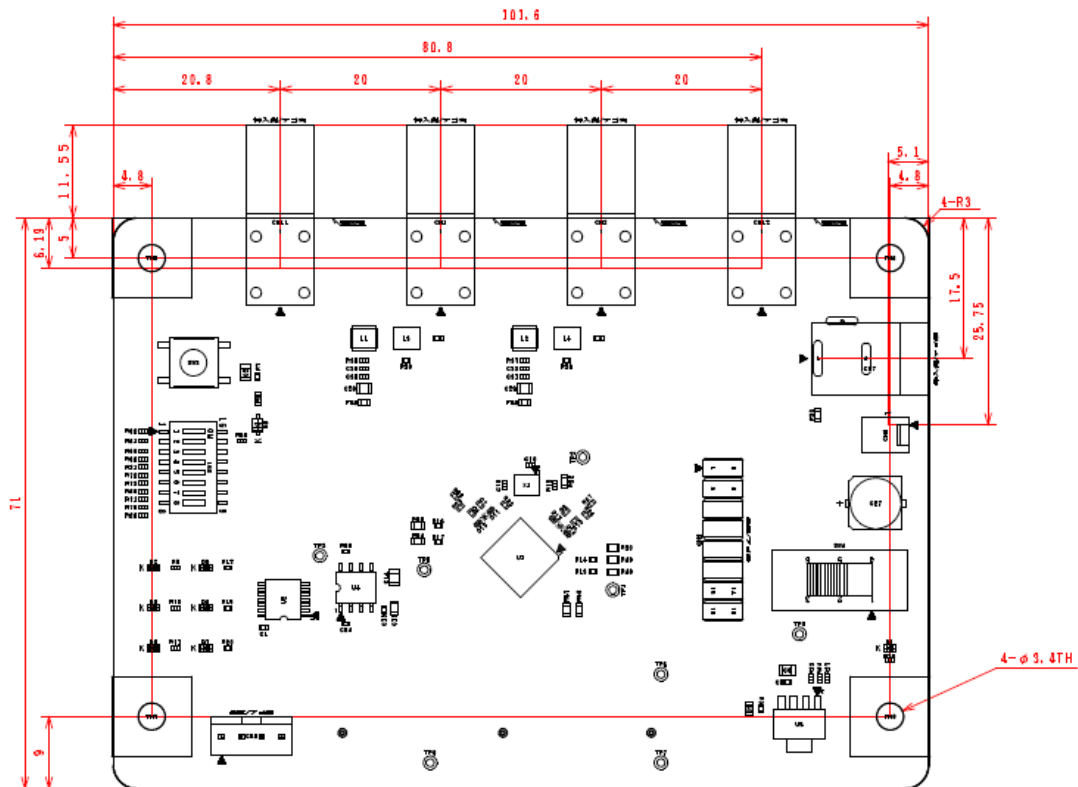
Item	Value	Description
Board Dimensions	71.0 x 101.6 mm	Value without connectors
Power for Deserializer	DC +3.3V	Via CN3, supplied from SVM-06 (3.3V).
IO Power	DC +3.3V or 1.8V	Via CN3, supplied from SVM-06 (VDDIO).
Camera Power	DC +5 - 16V Max.400mA	Supplied from CN5 or CN6 connector, but cannot be connected simultaneously. PoC output from FAKRA connector. Power supply voltage depends on connected camera.
Image Input	GMSL2 single-ended input 1 - 2 systems	Refer to MAX96716A data sheet for supported serializers. FAKRA connectors CN1-CN2 are available as single-ended input.
Image Output	MIPI CSI-2 4+1 lanes x 2 systems Pixel format etc. follow the setting of MAX96716A	Interface is in accordance with SVM-06.
Serial communication	I2C	I2C bus is directly connected to CN4

- The above specifications apply only to model number NV019-C.

5. Appendix

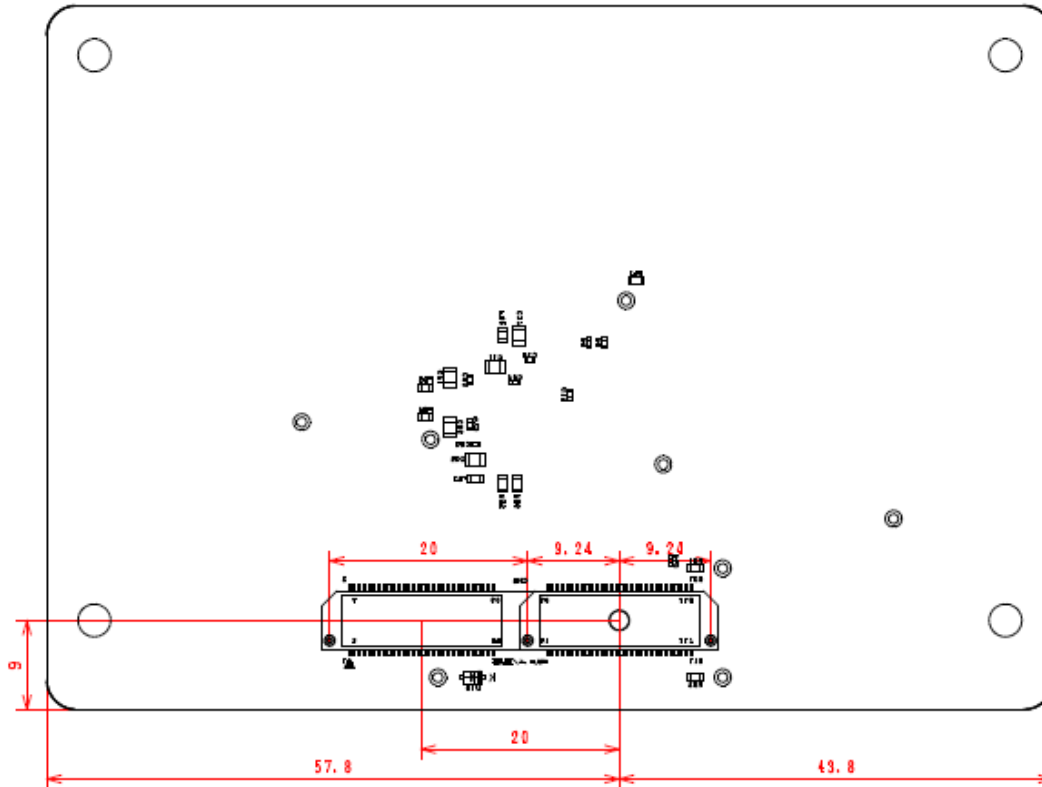
5.1 Figure of Board Dimensions

(Top Side / Part View)



- The lower two fixing holes are connected to GND. The upper two are not connected.

(Bottom Side / Part View)



5.2 When Using Two FAKRA Connectors as Differential Input

When modifying a board with coaxial cable specification, remove L5 and R25, and mount R66 (0Ω) to connect RIN0- input to CN11. Similarly, by removing L6 and R26, and mounting R67 (0Ω), RIN1- input is connected to CN12. This allows for connection to an external serializer as a +/- pair.

Since the wiring length of +/- is different, please adjust it with the board connected to or the cable. The wiring length is as shown below. The relative dielectric constant of material is $\epsilon=4.3$.

Wire Name	Wire Length (mm)	Margin of Error (mm)
RIN0+	39.7266	
RIN0-	51.6513	11.9247
RIN1+	40.3987	
RIN1-	50.4436	10.0449