

MAX96706 GMSL Deserializer Board
GMI-96706
(Board model number NV013-B)
Hardware Specification

Rev. 1.0

NetVision Co., Ltd.

Update History

Revision	Date	Note	
1.0	2018/04/24	New file (Equivalent to Japanese version 2)	S. Usuba

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1. Outline

This specification is a hardware specification of the NV013-B "MAX96706 GMSL deserializer Board". "MAX96706 GMSL Deserializer substrate" (hereinafter referred to as this substrate) converts the video of the serial signal transmitted by Maxim's GMSL standard (reference: MAX9271A / MAX9273A) to a parallel signal. It is a conversion board for connecting and using our SV series (SVM-03/03U/SVI-06 etc.).

【figure 1】 block diagram

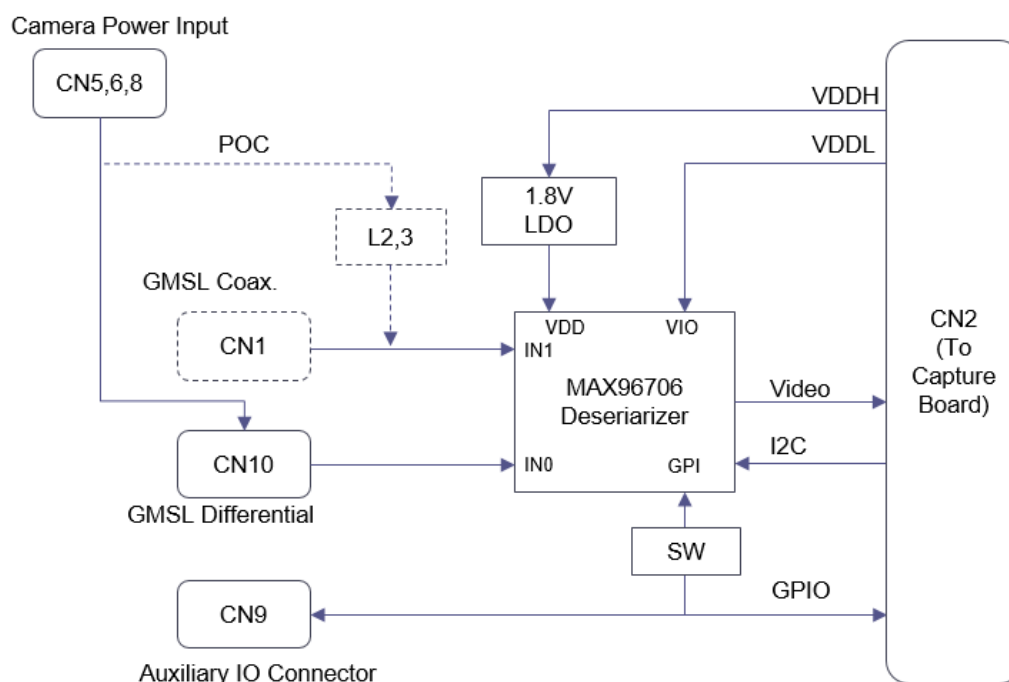


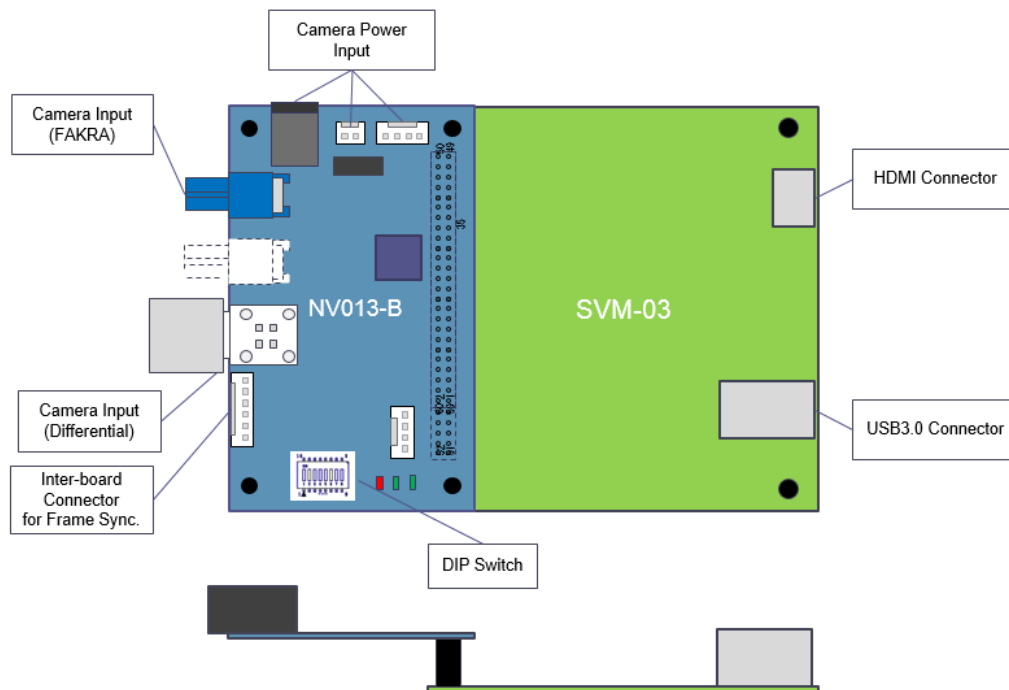
Fig. 1 shows a block diagram of the board. This board is equipped with the maxim company Deserializer IC MAX96706, serial-parallel conversion of GMSL video signal up to 116MHz pixel clock, the register setting of MAX96706 combined with the SVM-03 board is possible, I2C/GPIO communication via GMSL signal line is possible. The output connector of the parallel signal is a common interface of our SV series, and it is possible to use it directly with SVM-03. It implements the FAKRA standard connector (single-ended transfer) and LVDS Connector (differential transfer) as input for serial signals and is ideal for connecting to automotive cameras.

The input connector implements FAKRA (CN1) and HSD (CN10). CN10 is connected to the IN0 of MAX96706, and CN1 is connected to IN1. Therefore, when using the CN1 side, the I2C setting from the capture board etc. is required.

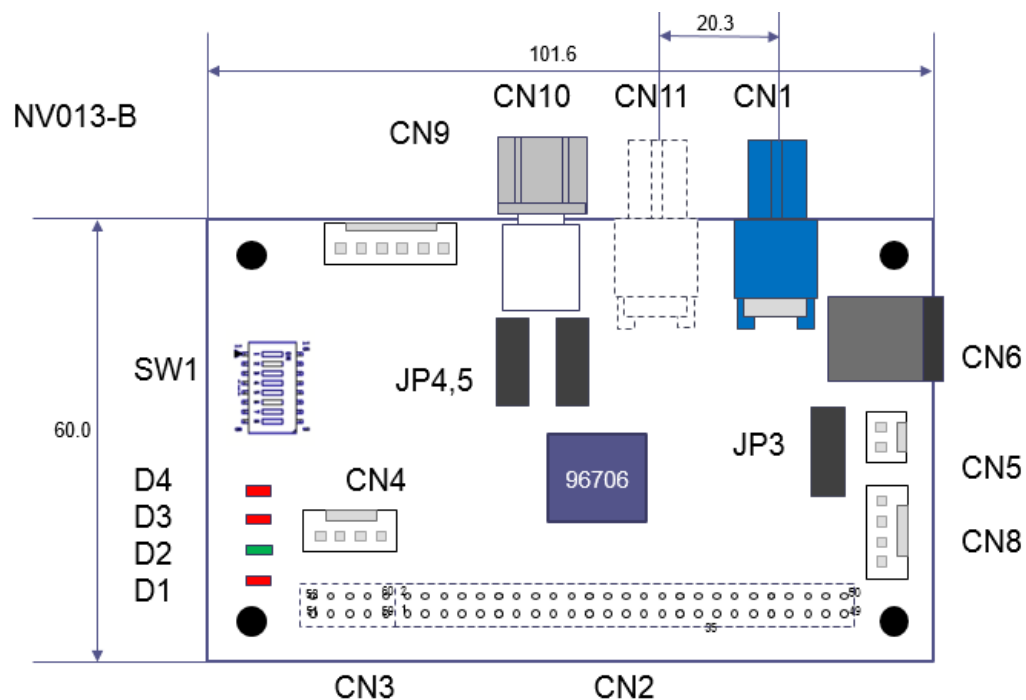
MAX96706 's GPI pin can be connected to the GPIO of the external IO connector and the SV series substrate, so the camera synchronization function using multiple NV013-B substrates simultaneously is configurable. [Figure 2] shows the board connection image of the substrate and the SVM-03 board. As shown in the figure, both substrates are connected via a 50-pin pin socket (CN2). Since the screw

hole position is common on both substrates, it is possible to fix both substrates with a spacer or the like. The arrangement diagram of the connector on this board is shown in Fig. 3. PIN numbers and pin assignments are shown later in the "connector Details section".

【Figure 2】 board connection image



【Figure 3】 Connector arrangement diagram



* CN1, CN4, CN8, CN11, D4 not implemented

2. Details

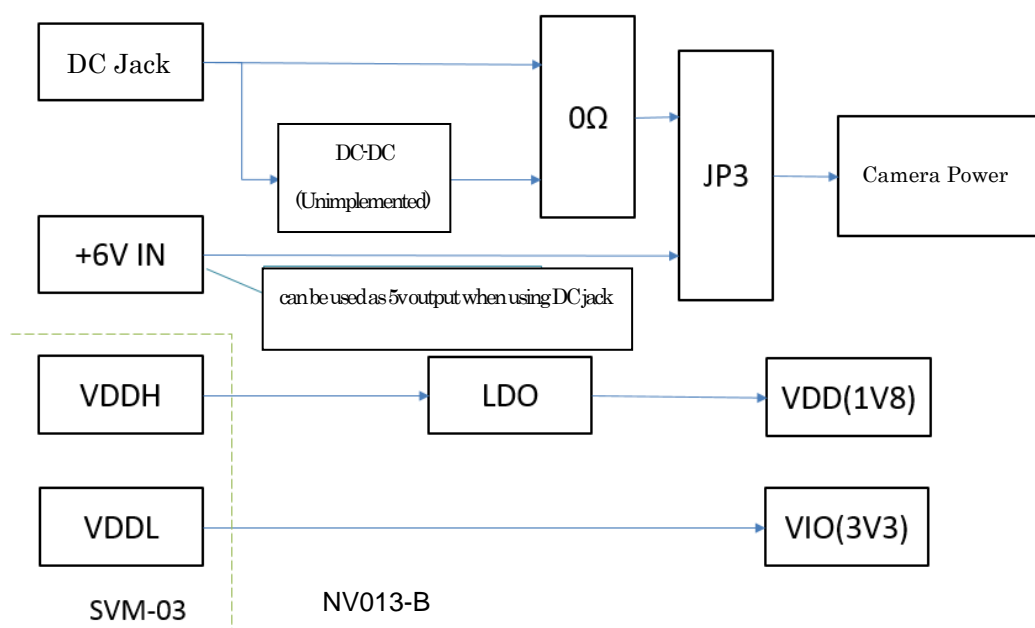
2.1. Power System

This substrate is equipped with a 1.8 v regulator (LDO), which supplies power to the core voltage of the Deserializer IC. The power supply (core voltage, IO voltage) of the IC is supplied from the SV board such as SVM-03 through the connector CN2. At this time, the VDDH and VDDL of the SV board correspond to the core voltage and IO voltage of the board. The VDDH and VDDL are usually set to 3.3 V.

In addition, the power for the camera can be output (in the case of using a differential connector) on the GMSL cable in this substrate. In addition, in the case of FAKRA connector use, the GMSL cable can be superimposed on the power supply for the camera (it is necessary to change the component implementation). This power supply is supplied from CN5, CN6, or CN8. Because the camera power supply and the IC are divided in a DC through a capacitor, it does not matter the power of the IC and the order of power for the camera.

Figure 4 shows a block diagram of the power system of the board. If you use the DC Jack (CN6) to connect the AC adapter, in preparation for future expansion, this substrate has a DC converter pattern that allows 12v input, and the voltage is switched by the jumper resistor mounted on the substrate. In NV013-B, the jumper is set to the DC Jack side, so you can supply the camera power via the DC Jack by implementing CN6. Whether you use a DC jack or a connector as a camera power source is determined by the jumper JP3.

【Figure 4】 Power system diagram



2.2. Serial (UART / I2C) communication

The Deserializer IC (MAX96706) of this substrate has an UART / I2C bus, which has an UART communication function between the serializer and the target device through the configuration change in the IC and the GMSL cable. Because UART/I2C cannot be used at the same time, the UART/I2C is selected by DIP SW on this substrate.

【Figure 5】Serial Bus part block diagram

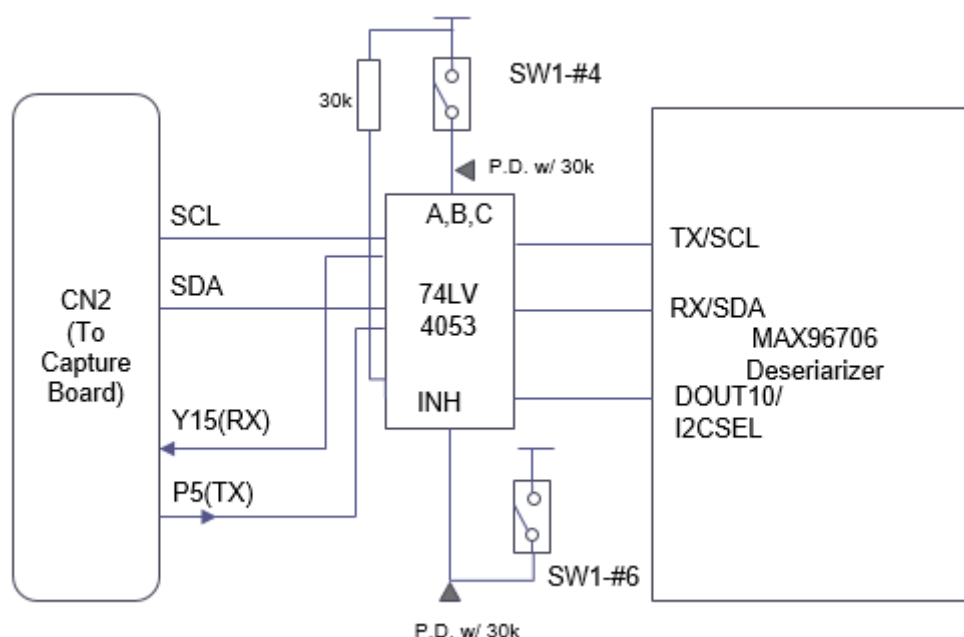


Fig. 5 shows a block diagram of the serial bus part on the NV013-B board. The MAX96706 I2C/UART is assigned the same pin as a combined function pin. Because the connector of the SV series is assigned the I2C/UART pin on the specification of the capture board separately, the bus is switched by the analog switch 4053 (SN74LV4053A) as shown in the figure. For serial communication from the capture board side, DIP SW must be set appropriately.

Also, if serial communication between the target camera and the MAX96706, the MAX96706 MS/HVEN pin must be H, this is done by switching the DIP SW (see section 2.5). Note that the MS/HVEN pin is not connected to the connector on the capture board side.

2.3. Connector List

CN#	Implementation State	Description	Model number
CN1		GMSL Input (Coax)	FA1-NCRP-PCB-8 (FAKRA)

CN2		Parallel output	C-00086
CN3	Unimplemented	(N/A)	N/A
CN4	Unimplemented	Serial I/O	171825-4
CN5		Camera Power Input 1	22-04-1021
CN6		Camera Power Input 2	MJ-179P Center +
CN8		Camera Power Input 3	171825-4
CN9		Expansion Connector	171825-6
CN10		GMSL Input (Differential)	D4S20L-40MA5-B (HSD)
CN11	Unimplemented	(N/A)	FA1-NCRP-PCB-8

* Implementation states apply to NV013-B.

The expansion connector (CN9) is a connector for inter-board communication and future expansion in a multi-channel uptake system. The I2C I/O connector (CN4) is directly connected to the MAX96706 I2C bus.

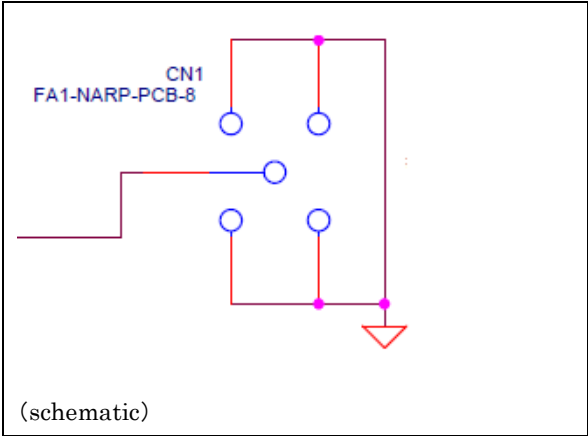
2.4. Connector Details

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

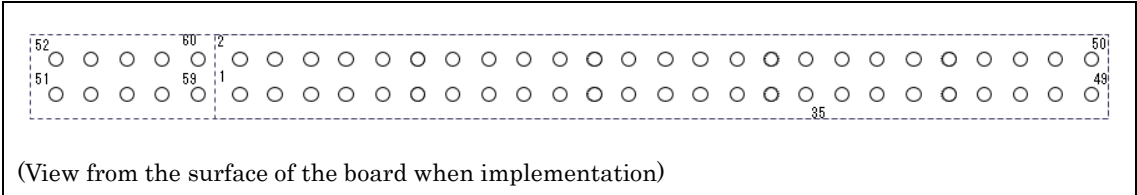
(Pin assign explanatory notes)

name	Description
VDDIO	IO Power
VCAM	Camera Power
TX_SCL / RX_SDA	Serial signal lines
P0 - P5	General-purpose IO Port for SV Board (CN2 Direct connection)
RIN0+/-	GMSL signal lines

•CN1, CN11 (FA1-NCRP-PCB-8)



•CN2(C-00086 = Right below)、CN3(left below)

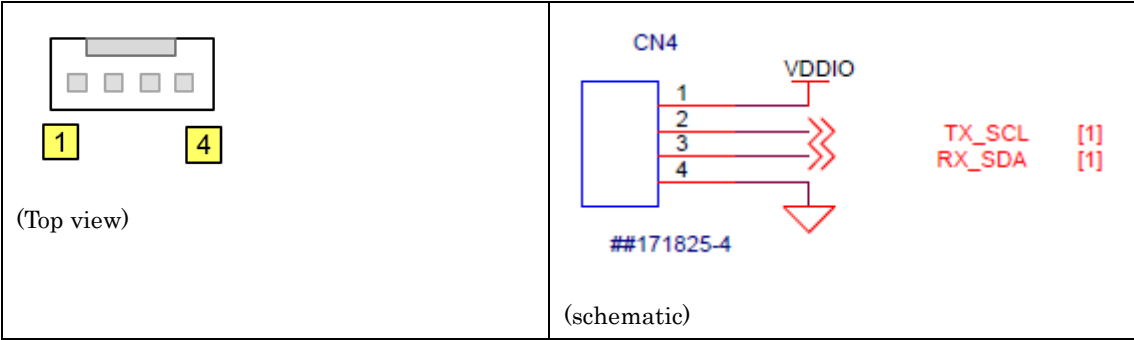


Connector		C-00086					
Pin#	Name	DIR	Description	Pin#	Name	DIR	Description
1	VDDL	POWER	Target IO Power Supply (1.8V or 3.3V)	2	GND	–	–
3	P0	OUT	NC	4	GND	–	–
5	P1	OUT	DOUT11/CXTP/DE (DE output)	6	GND	–	–
7	P2	OUT	NC	8	GND	–	–
9	P3	IN	NC	10	GND	–	–
11	P4	IN	NC	12	HSYNC	OUT	DOUT12/HS
13	VSYNC	OUT	DOUT13/VS	14	XRST	IN	/PWDN (MAX96706 Reset Signal)
15	VDDH	POWER	Target Power Supply (3.3V)	16	GND	–	–
17	SDA	IO	SDA	18	GND	–	–
19	SCL	IO	SCL	20	GND	–	–
21	DCK	OUT	PCLKOUT (Pixel Clock Output)	22	GND	–	–
23	Y0	OUT	DOUT0	24	GND	–	–

25	Y1	OUT	DOUT1	26	GND	–	–
27	Y2	OUT	DOUT2	28	GND	–	–
29	Y3	OUT	DOUT3	30	GND	–	–
31	Y4	OUT	DOUT4	32	GND	–	–
33	Y5	OUT	DOUT5	34	GND	–	–
35	Y6	OUT	DOUT5	36	GND	–	–
37	Y7	OUT	DOUT7	38	GND	–	–
39	CLKOUT	IN	NC	40	GND	–	–
41	Y8	OUT	DOUT8	42	Y9	OUT	DOUT9
43	Y10	OUT	DOUT10/I2CSEL	44	Y11	OUT	DOUT11/CXTP/DE
45	Y12	OUT	DOUT12/HS	46	Y13	OUT	DOUT13/VS
47	Y14	OUT	NC	48	Y15	OUT	TX
49	+3.3V	–	NC	50	P5	IN	RX

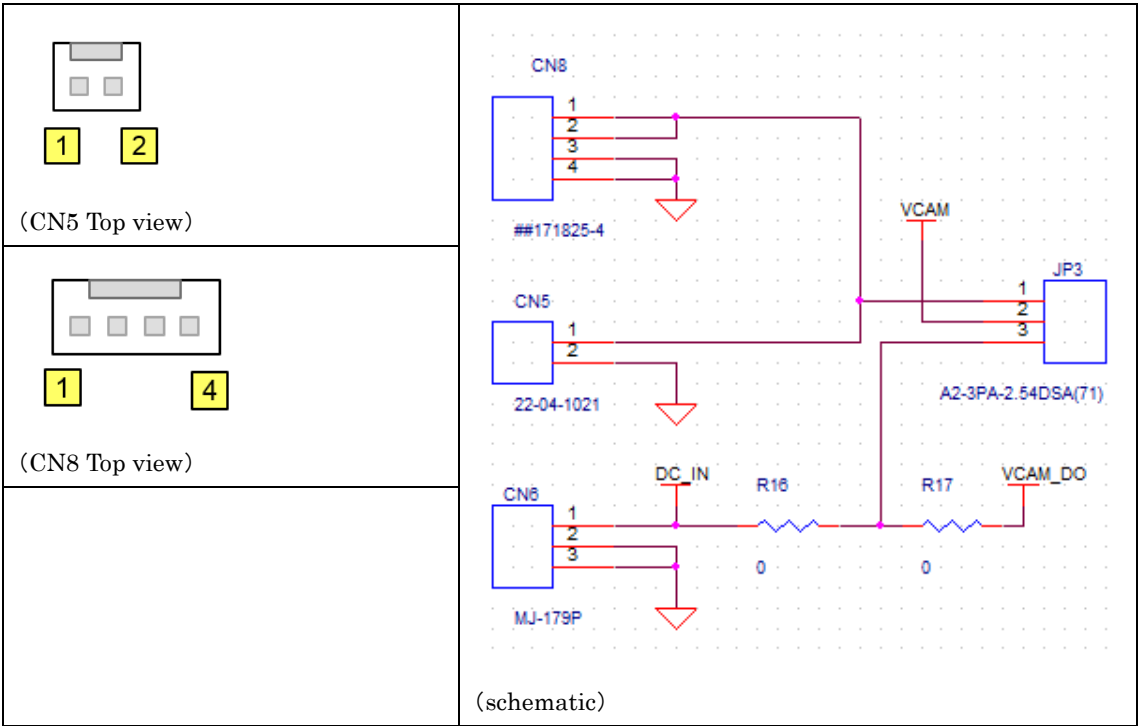
- Direction: Shows in/out from NV013-B.

•CN4 (171825-4 / TE Connectivity)

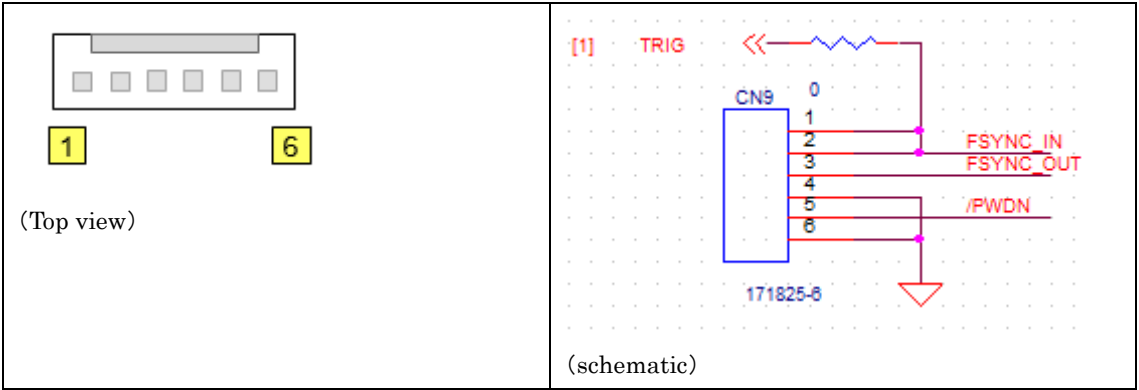


- CN4 is directly connected to the MAX96706 terminal.

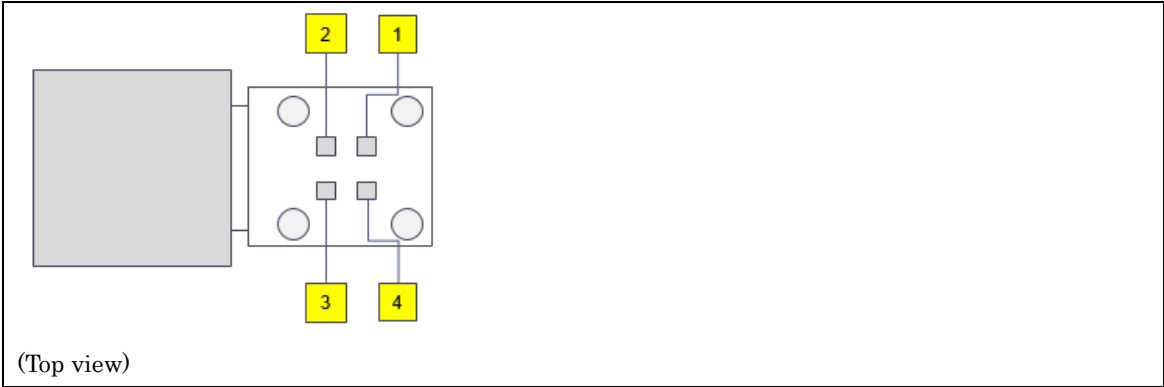
•CN5 (22-04-1021 / Molex), CN6(MJ-179P / Marushin), CN8(171825-4 / TE Connectivity)

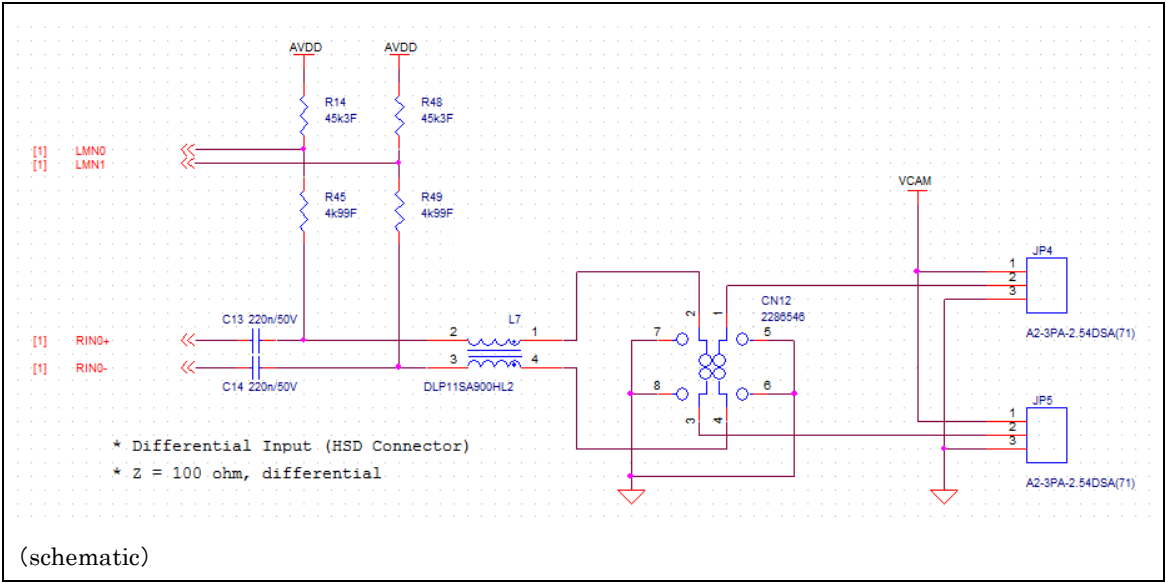


•CN9 (171825-6 / TE Connectivity)



•CN10 (2286546 / TE Connectivity)





2.5. DIP Switch Settings

The 8-bit DIP switch (SW1) is implemented on this substrate, and it is possible to configure the Deserializer function and the I2C address. See the MAX96706 Data sheet for detailed operation of each function.

SW#	Name	Description
1	ADD0	Set the device address.
2	ADD1	Set the device address. ADD1, ADD0 = {OFF, OFF} -> Address 58h ADD1, ADD0 = {OFF, ON} -> Address 5Ah ADD1, ADD0 = {ON, OFF} -> Address 5Ch ADD1, ADD0 = {ON, ON} -> Address 5Eh
3	CX/TP	Specifies the input signal specification. ON: Coaxial input (CX/TP = H) OFF: Differential input (CX/TP = L) - If you want to input from the CN1 side, you need to switch the MAX96706 register "GMSL_IN_SEL" bit.
4	I2CSEL	Select the I2C/UART function. ON: I2C Interface (I2CSEL = H) OFF: UART Interface (I2CSEL = L)
5	I2C_INH	ON: Detaches the I2C/UART connection between CN2 and MAX96706. OFF: Connect the I2C/UART signal between CN2 and MAX96706. - When exchanging I2C/UART signals externally and directly from the CN4, turn it on.
6	HIM	Set the High Immunity Mode ON: High Immunity Mode (HIM = H) OFF: Legacy Reverse Control Mode (HIM = L)
7	MS	ON: Bypass Mode OFF: Base Mode
8	GPI	Select the GPI pin input. ON: Input external trigger (FSYNC_IN signal entered from CN9) OFF: L input (10k pulldown)

- As for the default, only 4 is ON

- The operating mode of the MAX96706 by the DIP switch is applied in the power-up state

2.6. LED Indicator

Three LEDs are mounted on this board. Each function is shown in the table below.

LED#	名前	機能
D1	ERR	Lights up if there are no transfer errors. - The silk on the board is "PASS", but it only lights up if an error is detected.
D2	LOCK	If the PLL is locked, it will be lit.
D3	POWER	If the power (VDDH) is supplied, it will be lit.
D4	LFLT	It will light if the Line Fault state.(If supported) (This is an optional feature and must be specified during production.)

2.7. Power Selector jumper

JP3 is a jumper that selects the power input connector for the target device.以 Set the jumper as below.

Active input Connector	Jumper settings
CN5 or CN8	JP3: 1-2 Short Circuit
CN6	JP3: 2-3 Short Circuit

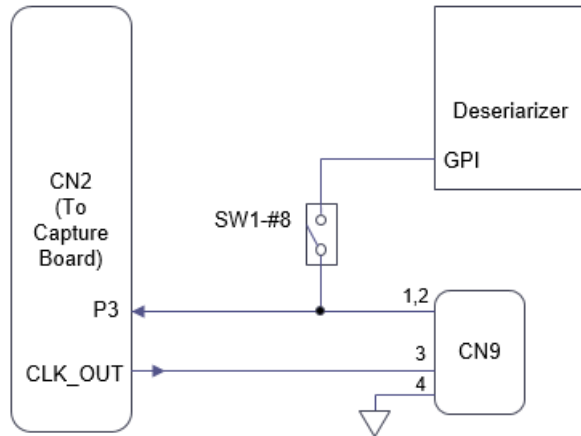
JP3, JP4 is a jumper that chooses the power output polarity of the HSD connector. If you want to power output to the target through the HSD connector, set the jumper as follows:

Output to HSD	Jumper settings
Pin 1: GND Pin 3: GND (No power output)	JP4: 2-3 Short Circuit JP5: 2-3 Short Circuit
Pin 1: VCAM Pin 3: GND	JP4: 1-2 Short Circuit JP5: 2-3 Short Circuit
Pin 1: GND Pin 3: VCAM	JP4: 2-3 Short Circuit JP5: 1-2 Short Circuit

2.8. GPI PIN Wiring

MAX96706 's GPI pin can be connected to the GPIO of the external IO connector and the SV series substrate, allowing the camera synchronization function to be configured with multiple NV013-B

substrates simultaneously. The wiring around GPI pin is as follows. "P3" is CN2 9-pin and "CLK_OUT" is CN2 39 pins.



3. Procedure for use

The following procedure describes how to use the board when connected to the SVM-03 board.

- Ensure that the DIP SW on this board is set appropriately.
- Ensure that the target power (VDDH, VDDL) of the SVM-03 is set to 3.3 v.
- Connect the SVM-03 with the board.
- Insert the USB cable into the SVM-03 and connect it to the PC.
- Ensure that the power indicator (D4) on this board is lit.
- Connect the camera to the CN1.
- Supply camera power in CN5 or CN8.

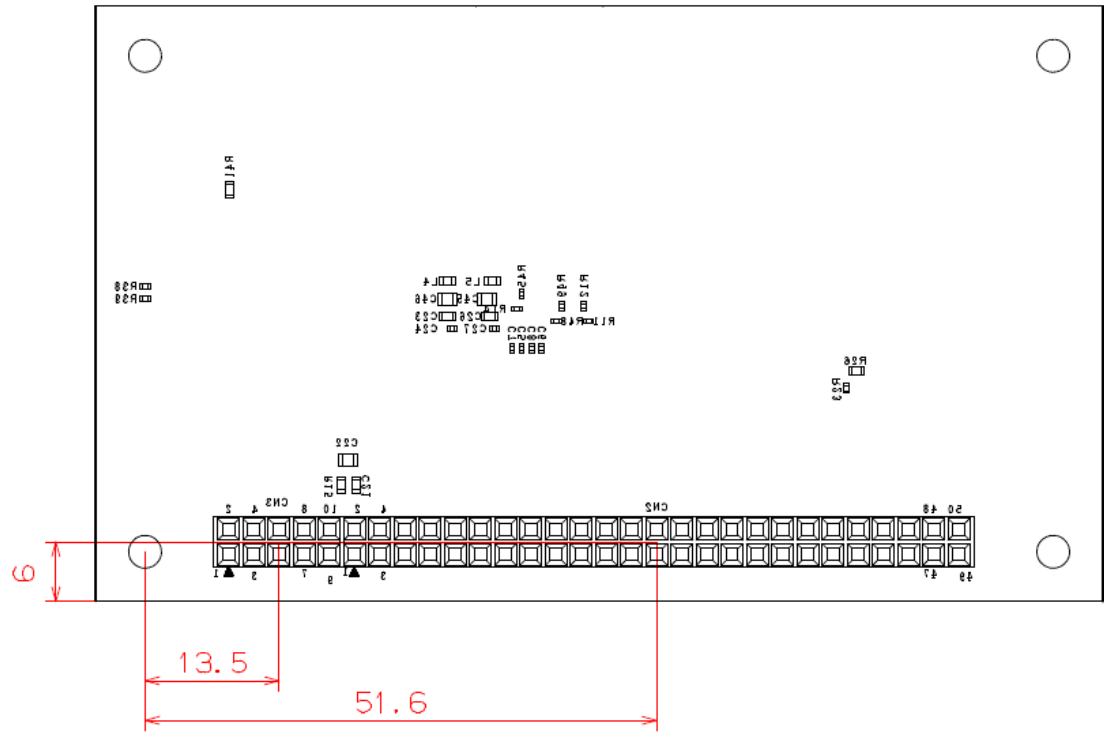
The above items will complete the setup of this board. After that it is the same when you connect a camera to SVM-03. Follow the instructions on how to use SVM-03.

4. Salient Points

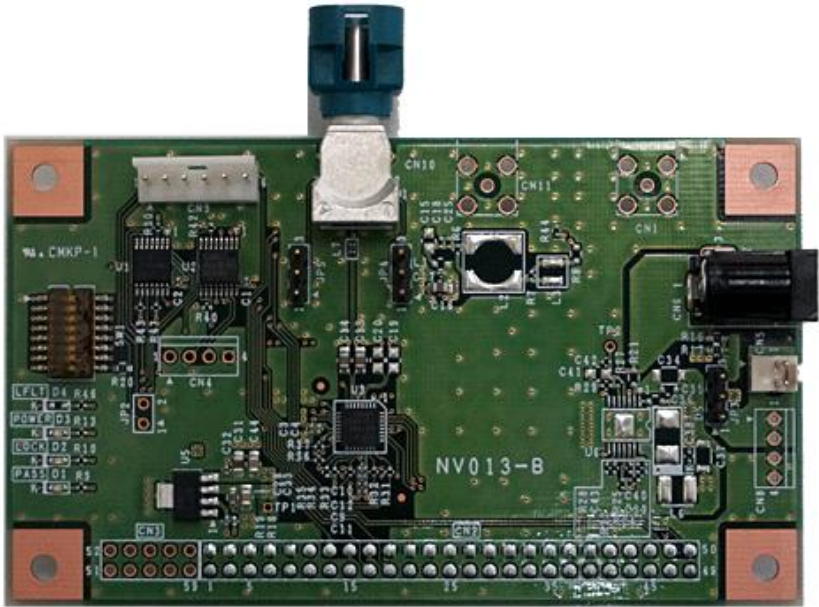
Item	Value	Description
Board Dimensions	60.0 x 101.6 mm	Value without connector
Power for Deserializer	DC +3.3V	Via CN2, supplied from the capture board SVM-03U, etc(VDDH).
IO Power	DC +3.3V or 1.8V	Via CN2, supplied from the capture board SVM-03U, etc(VDDL).
Camera Power (optional)	DC +5 - +9V	Supplied from CN5 or CN8 connector. If CN6 is implemented, the AC adapter is supported. POC Output from FAKRA connector Supply voltage follows camera
Image Input	GMSL single-ended input or differential input	Serializer MAX96705 Compatible CN1 FAKRA standard connector is available as single-ended input CN10 HSD connector is available as a differential input Differential input with two FAKRA connectors in the CN11 implementation is also available
Image Output	Parallel Signal Format follows max96706 settings	The interface is the standard specification of SVM-03
Serial communication	UART/I2C selectable	DIP SW operation is required when operating in Bypass mode

* The above specifications apply only to model number NV013-B.

(Solder side/Part view)



5.2. Board Photos

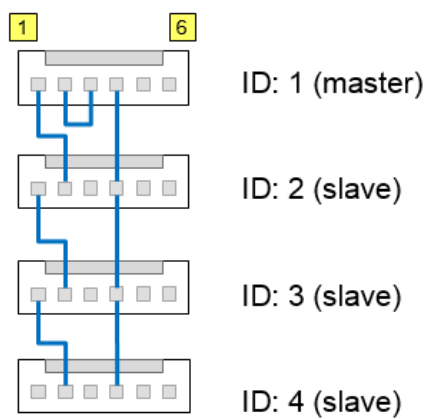


5.3. Wiring diagram with 4 CH synchronous uptake system

By wiring via CN9, you can share the GPI pin signal on multiple boards. A multi-CH synchronous capture system can be constructed by using the corresponding camera by entering the frame synchronization signal in the GPI pin.

The following is a reference material.

CN9 Board Wiring Diagram



CN8 power supply Wiring Diagram (Reference)

