

NV023-W / GMO-96701-W
(GMSL Serializer Board (dual outputs))
Hardware Specification

Rev.1.0

NetVision Co., Ltd.

Update History

Revision	Date	Note	
1.0	5 Mar. 2021	New file (Translated Japanese specification ver.3)	H. Suzuki

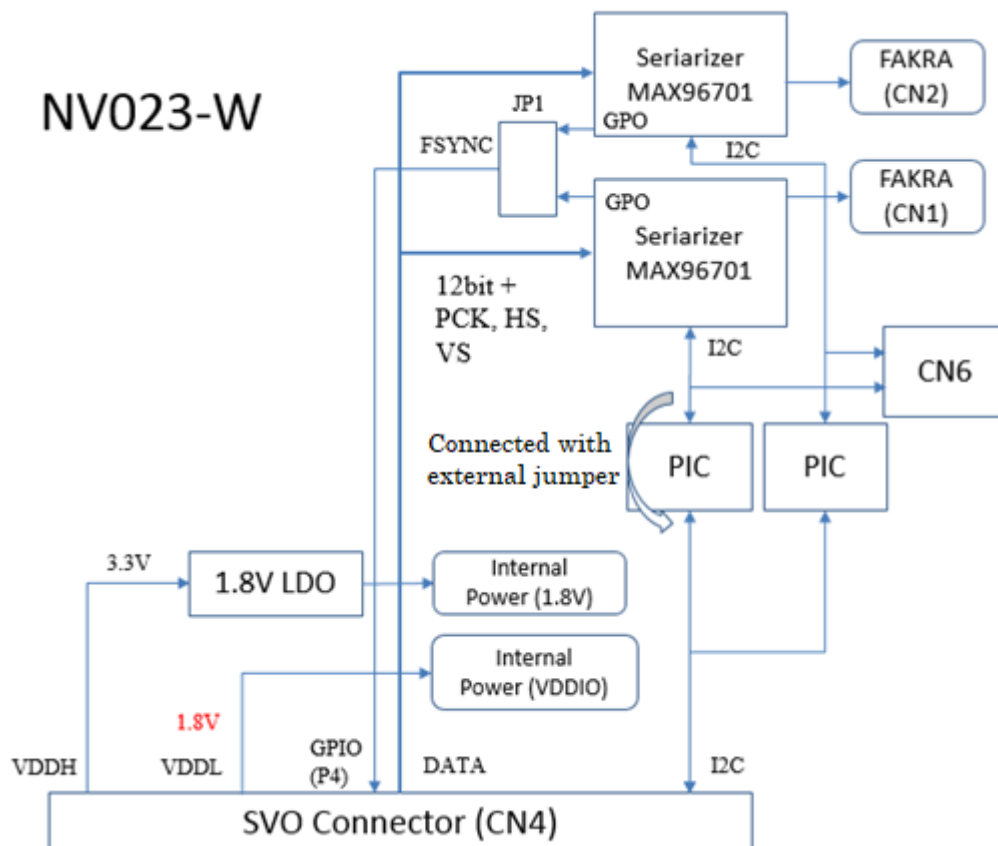
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1. Overview

This is a hardware specification of GMO-96701-W / NV023-W (GMSL Serializer board (dual outputs)). This board is mounted two the MAXIM company Serializer MAX96701 and convert a video signal input from in the parallel format to 2system of GMSL signal. This board has 2 FAKRA standard coaxial-output connectors and an input connector for connecting with our SVO-03 board. Also, this board is mounted PIC microcomputers (PIC16LF1825) for camera I2C emulation, so it is possible to operate including I2C command response. By combining this board with SVO-03 board, it can be applied to emulation of GMSL cameras.

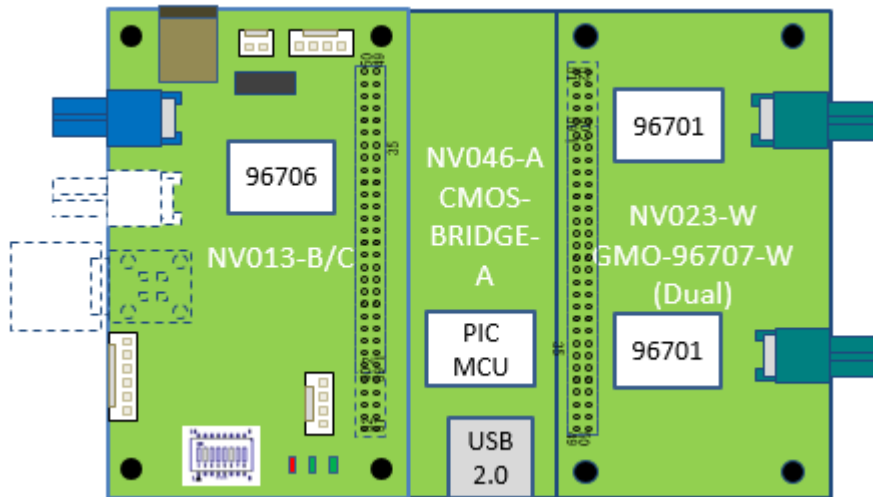
Block Diagram



The block diagram of this board is shown above. This board is mounted two GMSL serializer MAX96701, and supports video signals of 12bit parallel, maximum pixel clock 116MHz (maximum transfer rate depends on the setting). The input connector of the parallel signal is a common interface with our SV series, and it is possible to use it directly connected with our board such as SVO-03. As the output connector, this is mounted the FAKRA standard connector (single-ended transfer).

This board has two outputs, but the same input is connected to the two serializers. Therefore, unless you change the crossbar setting of the serializer IC, the same data will be output to both GMSL outputs.

Board Connection Image

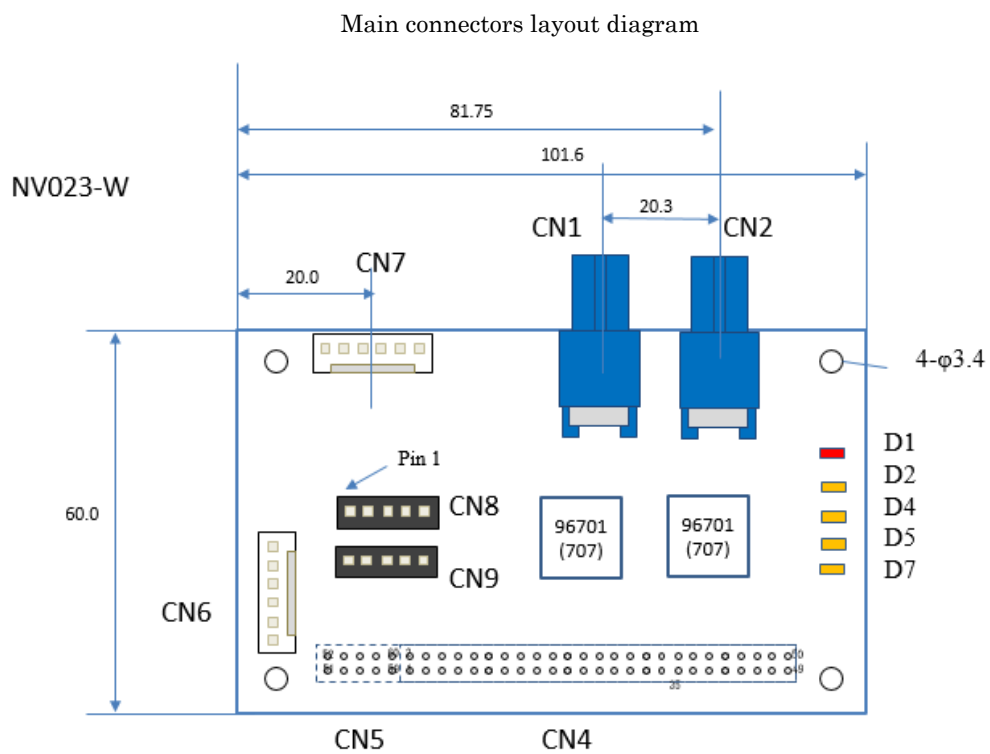


The board connection image of this board, NV046-A board and NV013-B/C board is shown in the figure above. As shown in the figure, this board and NV046-A are connected via a 50-pin socket (CN4). Since the screw hole position is common, it is possible to fix them with spacers or the likes.

2. Board shape

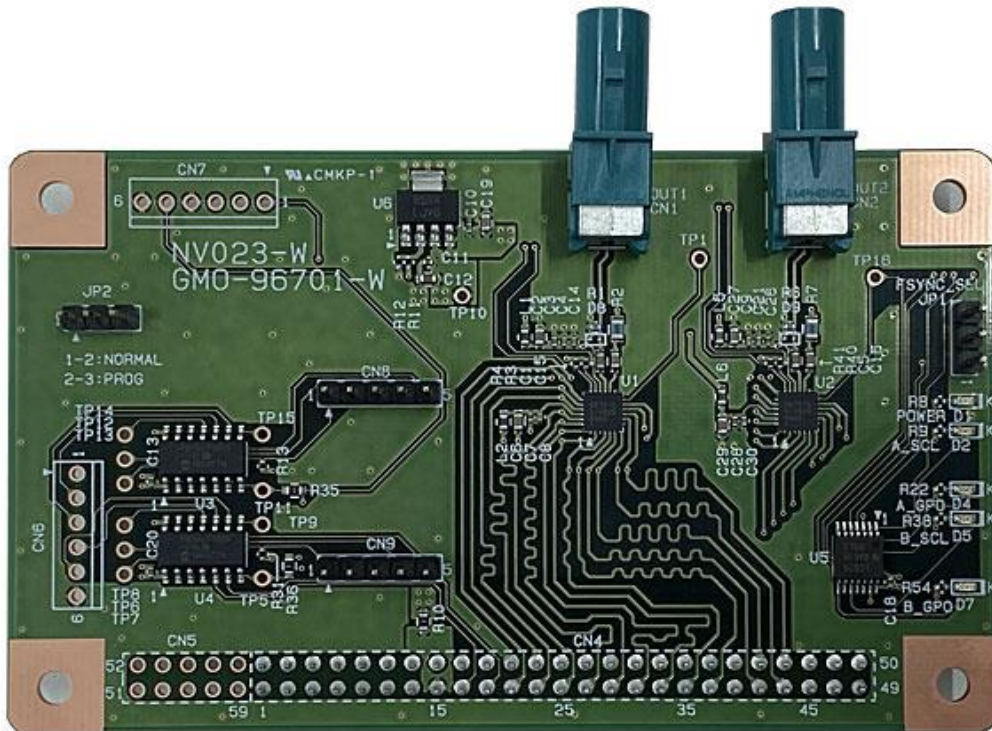
2.1. Connector layout diagram

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



* CN5, CN6, CN7 are not mounted.

2.2. Board Photo



3. Details

3.1. Connectors List

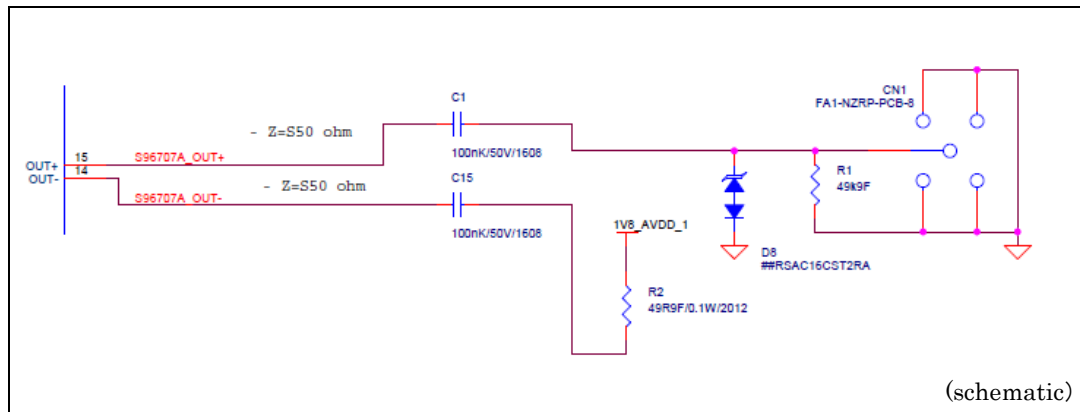
CN#	Mounted State	Description	Model number
CN1		For GMSL output 1 (coax)	FA1-NCRP-PCB-8 (FAKRA standard)
CN2		For GMSL output 2 (coax)	FA1-NCRP-PCB-8 (FAKRA standard)
CN4		For Parallel input and output	C-00086
CN5	Un-mounted		N/A
CN6	Un-mounted	For I2C input and output	171825-6
CN7	Un-mounted	For synchronous wiring	171825-6
CN8		For ICSP (CN1 side PIC)	M20-9990545
CN9		For ICSP (CN2 side PIC)	M20-9990545

- The I2C I/O connector (CN6) is directly connected to MAX96701 I2C bus.
- Synchronous wiring Connector (CN7) is for inter-board communication in the output system using multiple boards. Normally not used.

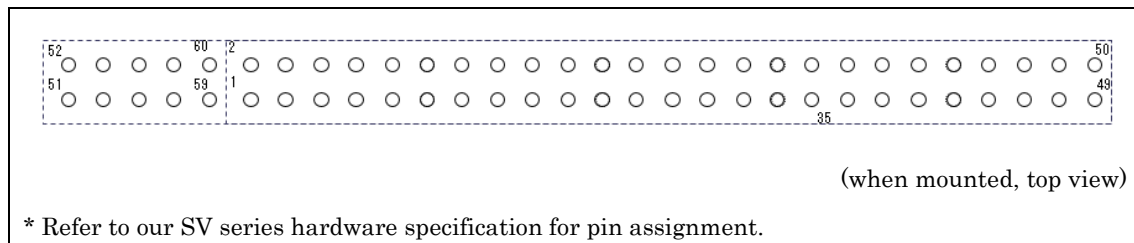
3.2. Connectors Details

The figures below show the top view (outline) and the pin assignments (excerpts from the schematic).

- CN1, CN2 (FA1-NZRP-PCB-8): Excerpts from the schematic

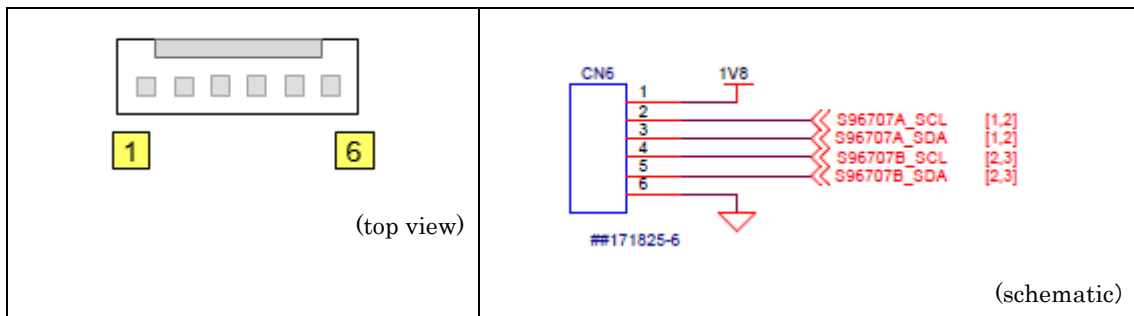


- CN4(C-00086 / Right), CN5(Left)



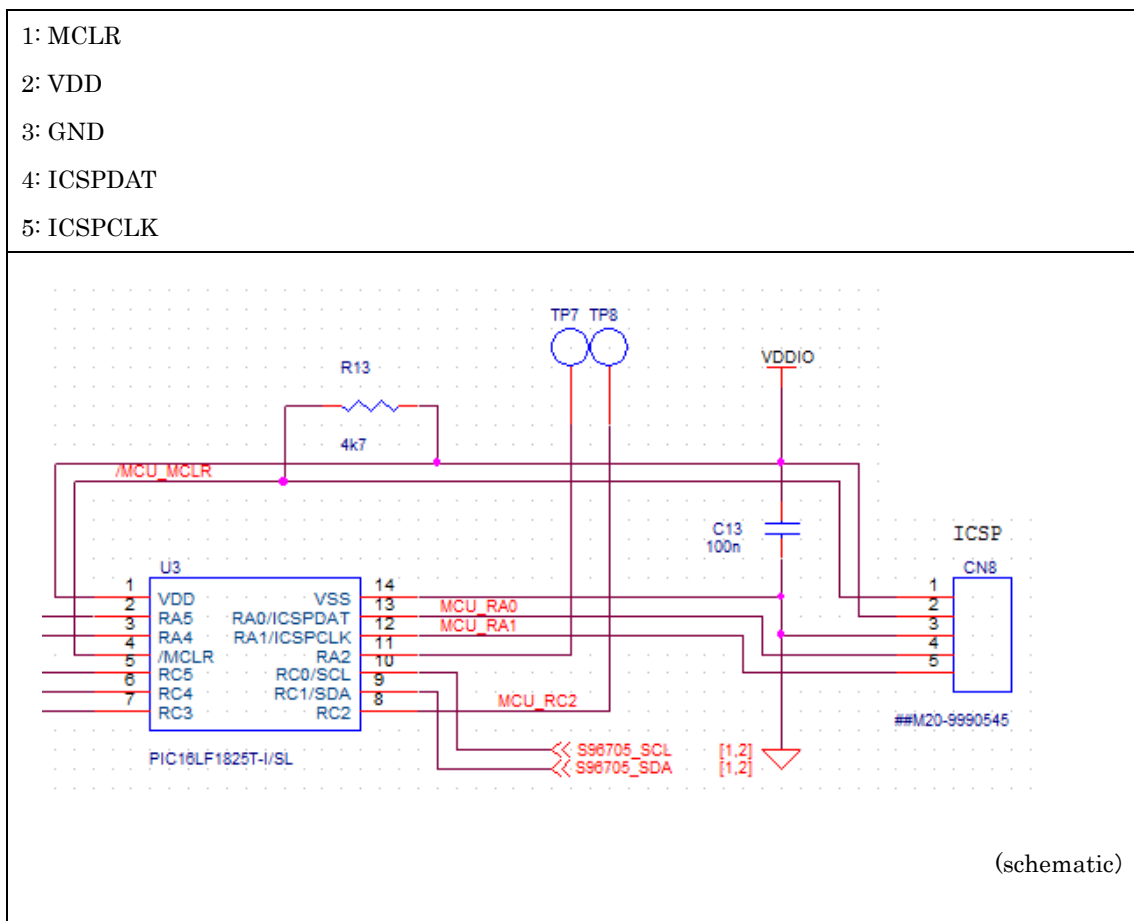
- Connected CN4 and a video output board such as SVO-03 or an interface-connection board such as NV046-A.

•CN6 (171825-6 / TE Connectivity)



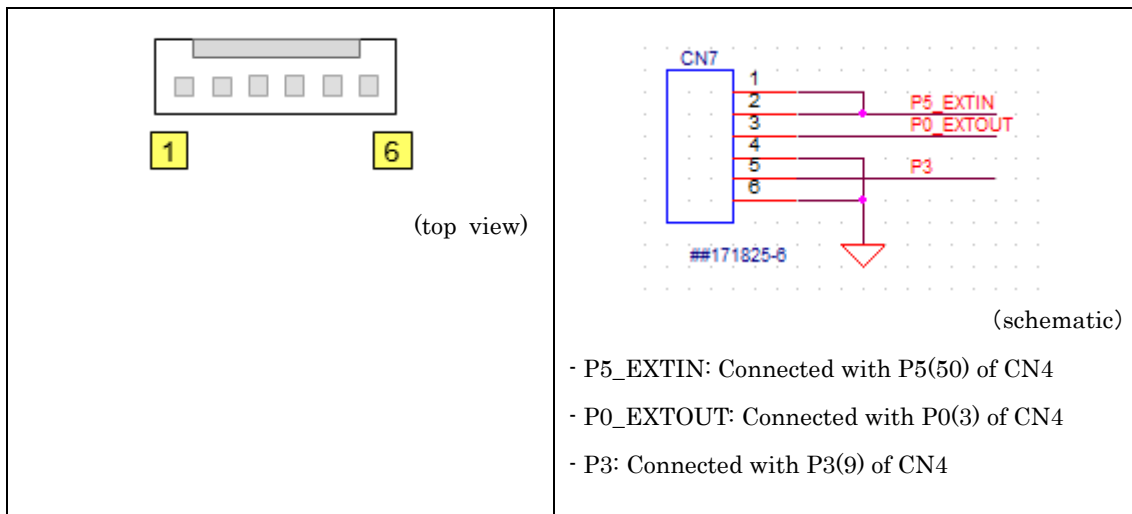
- Directly connected to CN1 side of MAX96701 I2C bus.
- Not mounted.

•CN8, CN9 (M20-990545)



- An ordinary 2.54mm pitch pin header can be mounted. The microcomputer can be written with Microchip PICkit 4 or other.

•CN7 (171825-6 / TE Connectivity)



- Not mounted.
- When frame synchronization is needed between multiple SVO-03 boards, synchronous wiring can be performed via this connector.

3.3. Jumper Settings

- JP1: FSYNC Connection Settings

1-2 short-circuit: Connect the GPO/HIM pin of MAX96701 on CN1 side to P4 (11 pin) of CN4.

2-3 short-circuit: Connect the GPO/HIM pin of MAX96701 on CN2 side to P4 (11 pin) of CN4.

- JP2: Microcomputer Programming Settings

1-2 short-circuit: The setting for normal operation

2-3 short-circuit: The setting when writing a microcomputer.

3.4. LED Indicator

LED#	Name	Description
D1	POWER	Lights when 3.3V power (VDDH) is supplied.
D2	A_SCL	Lights when the SCL signal line of I2C bus of CN1 side is L.
D4	A_GPO	Lights when the GPO output of MAX96701 of CN1 side is L.
D5	B_SCL	Lights when the SCL signal line of I2C bus of CN2 side is L.
D7	B_GPO	Lights when the GPO output of MAX96701 of CN2 side is L.

3.5. I2C Bus

This board has three systems of I2C buses. I2C bus of MAX96701 on CN1 side and MAX96701 on CN2 side, and I2C bus connected to CN4 are disconnected.

SCL / SDA pins of I2C bus of MAX96701 correspond to LEDs D2, D3, D5, and D6, so the presence or absence of I2C communication from the connected deserializer is visible.

The function that transfers data sent from I2C bus of MAX96701, to CN4 (I2C pass through) is implemented by PIC microcomputer. Please refer to Appendix for the schematic around the PIC microcomputer.

3.6. Power Supply

The power supply for this board is supplied from two systems of power supplies (VDDH, VDDL) connected to connector CN4. VDDH is connected to 1.8V LDO, and both 3.3V and 1.8V are used as power supply for IC or other. Set VDDH voltage of SVO board to 3.3V before connect it.

VDDL is used as the IO voltage of the serializer. Because IO voltage of serializer IC MAX96701 is 1.8V, please set VDDL of SVO board to 1.8V to use.

3.7. Serializer Output

Two MAX96701 are mounted on this board, and OUT+ terminals are output to CN1 and CN2 respectively. OUT- terminal is connected to 1.8V through resistance R2 (49.9 Ω).

3.8. Microcomputer Operation

PIC microcomputers are mounted on this board for each serializer. By default, the firmware that performs the following operations has been written. **When rewriting the microcomputer, please use Low Voltage Programming Mode.**

(1) HIM Setting

HIM (High Immunity Mode) of MAX96701 is set by I2C bus. When this board is powered on, microcomputer sends HIM setting of MAX96701 according to the state of the port.

If the RA0 pin is connected to GND when the board is powered on, High Immunity Mode is disabled. If the RA0 pin is open, High Immunity Mode is enabled. It is possible to connect the RA0 pin to GND by shorting pins 3-4 of the ICSP connector.

(2) I2C Slave

When the RA1 pin is connected to GND, the I2C data response to slave addresses 0x10 - 0x1F sent by the MAX96701 is performed. It always responds ACK for Write access and returns 0xFF for Read

access. If the RA1 pin is open at power-on, I2C slave is disabled (default).

4. Specifications

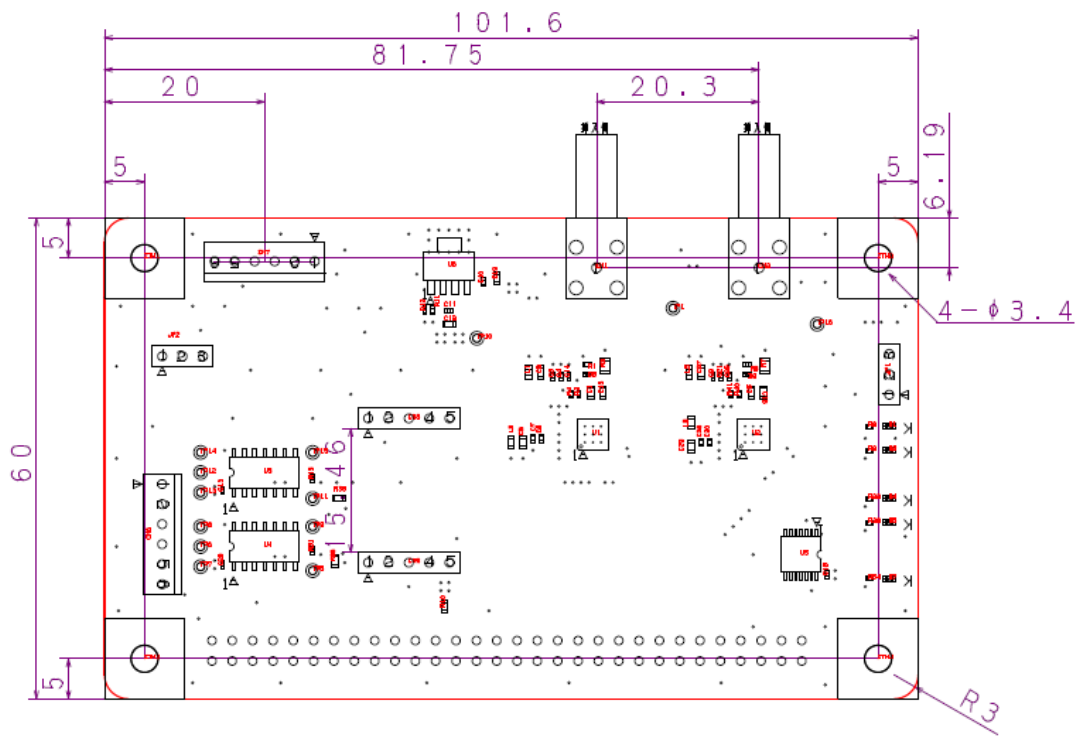
Item	Value	Description
Board Dimensions	101.6 x 60.0 mm	Value without connector
Power for Serializer	DC +3.3V	Via CN4, Supplied from SVO-03 board power supply (VDDH) Stepped down to 1.8V internally
IO Power	DC +1.8V	Via CN4, Supplied from SVO-03 board IO power supply (VDDL)
Image Input	Parallel signal	Input from CN4 Refer to MAX96701 standard for supported formats Connector pin assignment is according to SVO-03
Image Output	GMSL, coaxial (FAKRA connector)	Outputs the same signal to two ports (two serializers are mounted)
Serial communication	I2C communication	I2C input/output buses are independent. However, I2C pass-through operation is possible only from the serializer to CN4 (SCL max. 200kHz). Serializer's I2C bus is connected to CN6.

- The above specifications apply only to model number NV023-W.

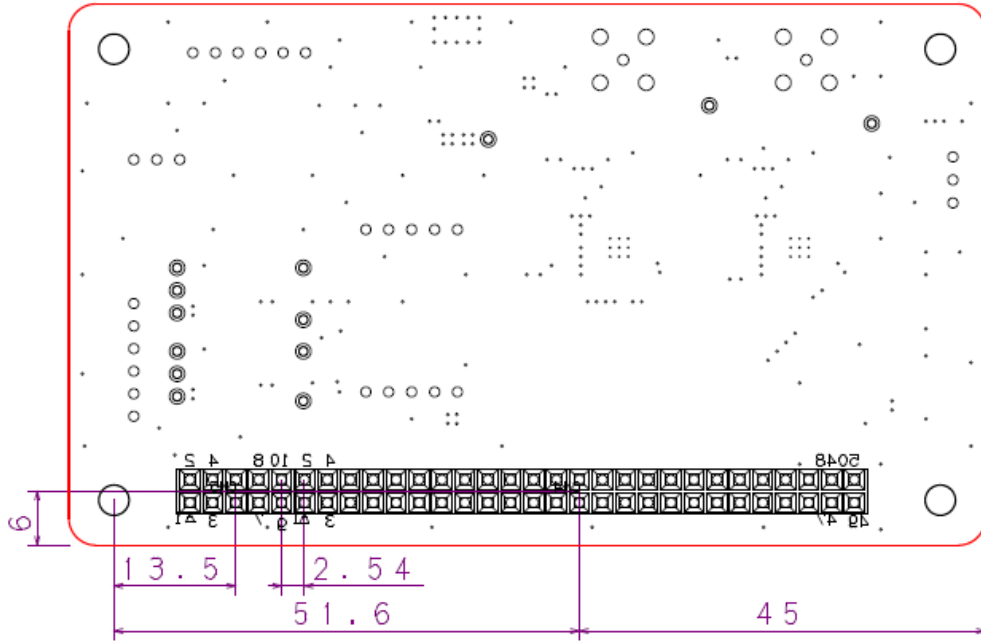
5. Appendix

5.1. Figure of Board Dimensions

(Top side / Parts view)



(Bottom side / Parts view)



5.2. Schematic Around the PIC Microcomputer.

