NV024-S / GMO-96705-S
(GMSL Serializer Board)

Hardware Specification

Rev.1.0.

NetVision Co., Ltd.

Update History

Revision	Date	Note	
1.0	2020/06/25	New file (Equivalent to Japanese version 2)	H. Suzuki

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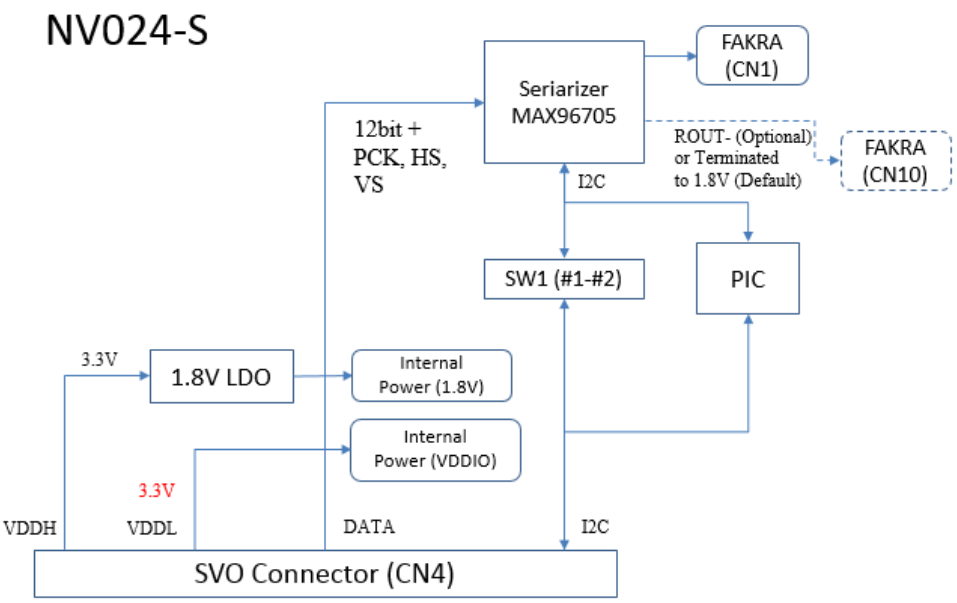
1. Overview

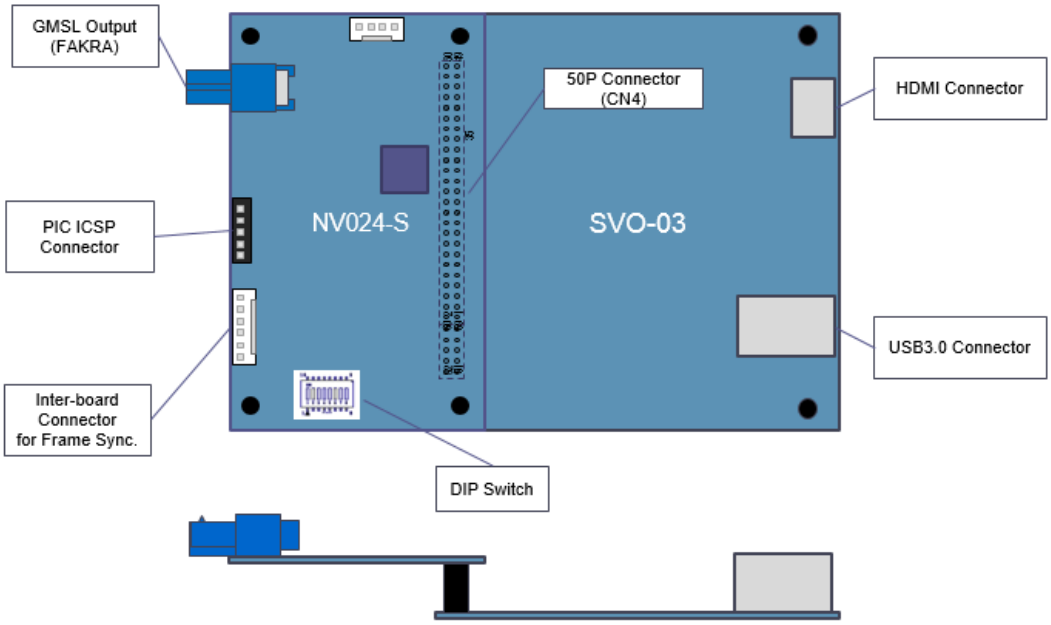
This is a hardware specification of GMO-96705-S / NV24-S (GMSL Serializer board). This board is mounted the MAXIM company Serializer MAX96705, converting a video signal input from in the parallel format to GMSL signal. This board has a FAKRA standard coaxial-output connector and an input connector for connecting with our SVO-03 board, and also has a PIC microcomputer (PIC16LF1825) mounted for camera I2C emulation. This enables operations including I2C command response. By combining this board with the 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 GMSL serializer MAX96705, 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 has a common interface with 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).

Board Connection Image



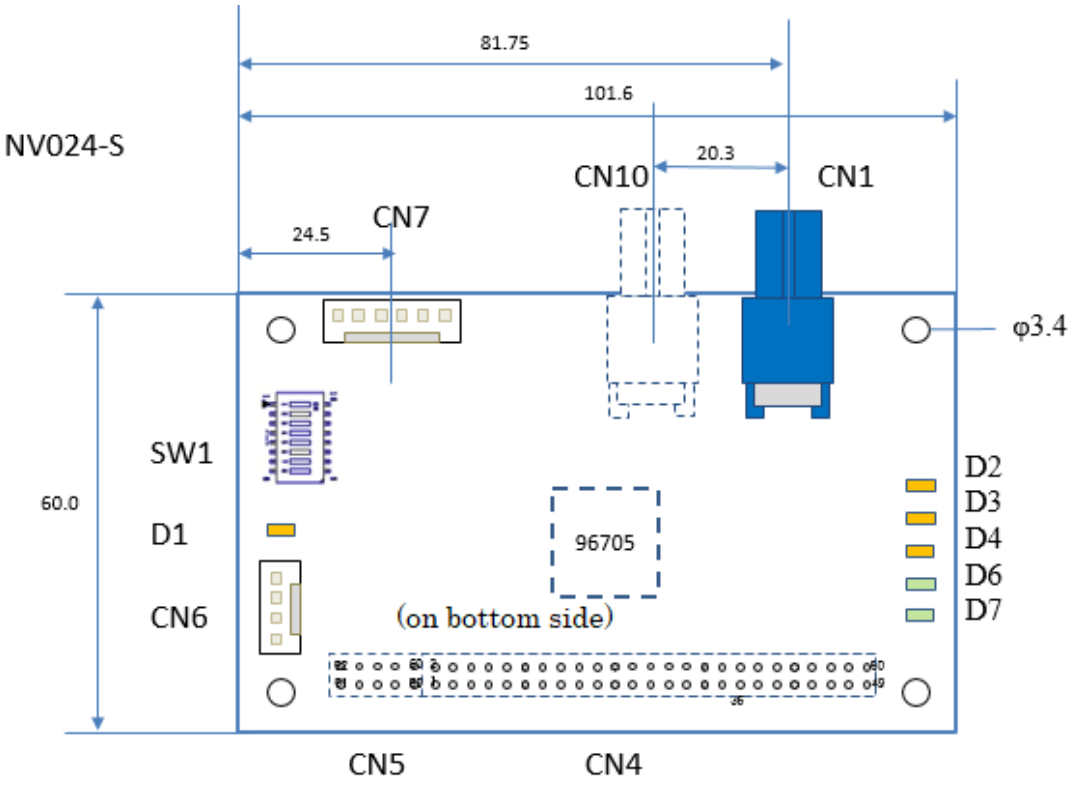
The board connection image of this board and SVO-03 board is shown in the figure above. As shown in the figure, both boards are connected via a 50-pin socket (CN4). Since the screw hole position is common, it is possible to fix them with spacers or the likes.

2. Board shape

2.1. Connector layout diagram

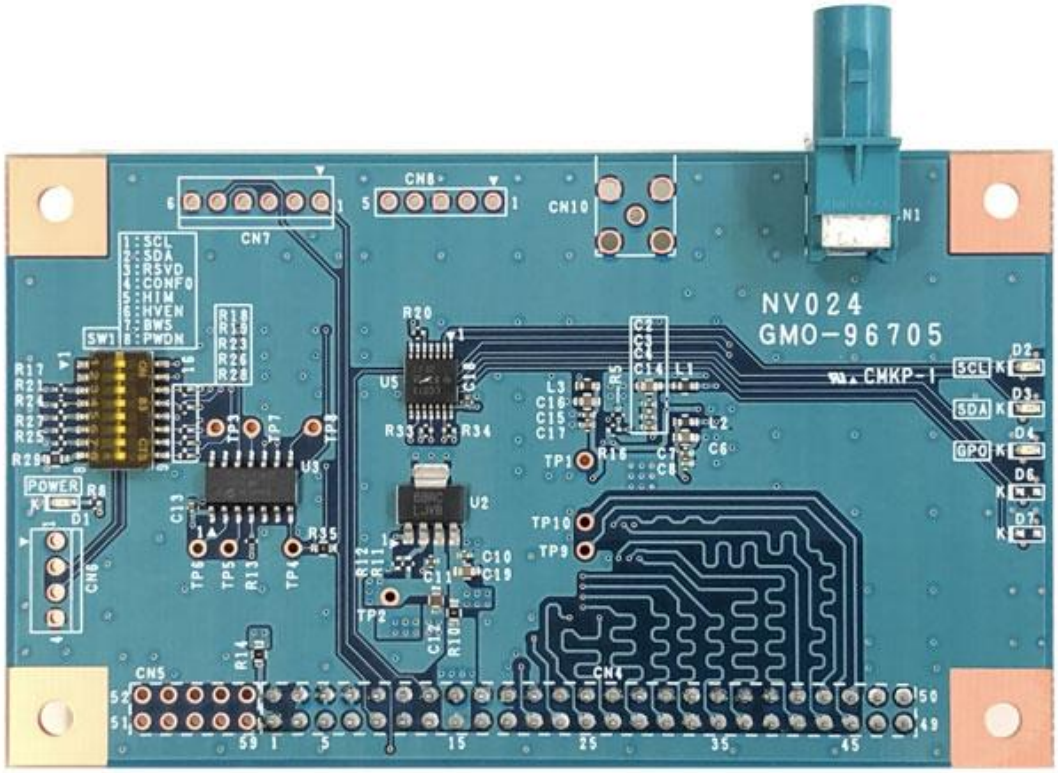
The figure below shows the arrangement of the main connectors on this board. PIN numbers and pin assignments are shown in the connector details section.

Main connectors layout diagram



- CN5, CN6, CN10 are not mounted
- D6, D7 are not mounted
- Depending on the requirements, the mounted connector may differ from the image above.

2.2. Board Photo



3. Details

3.1. Connectors List

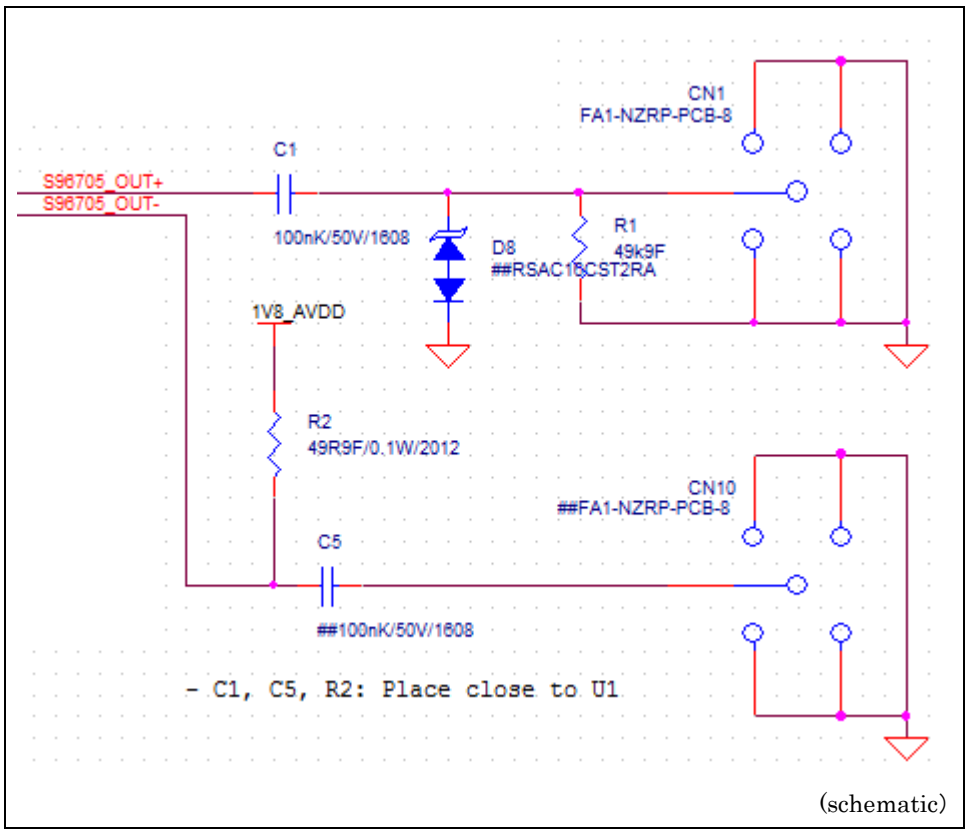
CN#	Mounted State	Description	Model number
CN1		For GMSL output (coax)	FA1-NCRP-PCB-8 (FAKRA standard)
CN4		For Parallel input and output	C-00086
CN5	Unimplemented		N/A
CN6	Unimplemented	For I2C input and output	171825-4
CN7		For synchronous wiring	
CN8		For ICSP	
CN10	Unimplemented	For GMSL output (differential)	FA1-NCRP-PCB-8 (FAKRA standard)

- Synchronous wiring Connector (CN7) is for inter-board communication in the output system using multiple boards, or for future expansion.
- The I2C I/O connector (CN6) is directly connected to MAX96705 I2C bus.

3.2. Connectors Details

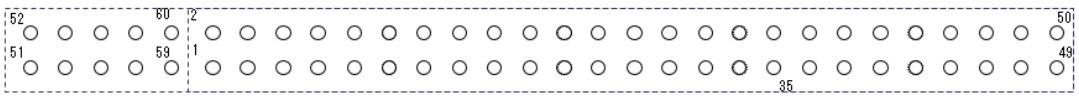
The figures below show the view from top (outline) when the connector is mounted on this board and the pin assignments (excerpts from the schematic).

・CN1, CN10 (FA1-NZRP-PCB-8)



(schematic)

・CN4(C-00086 / Right)、CN5(Left)

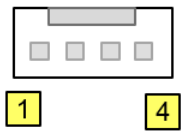


(top view)

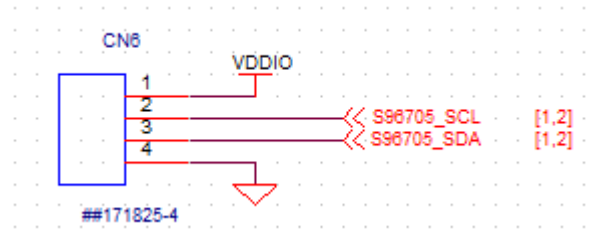
* Refer to the SVO series hardware specification for pin assignment.

- Connect CN4 and SVO board

・CN6 (171825-4 / TE Connectivity)



(top view)

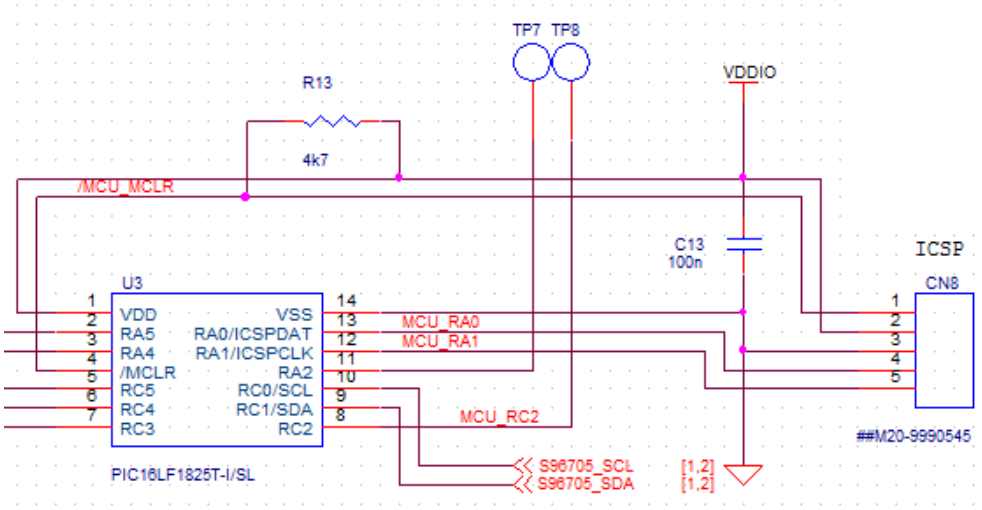


(schematic)

- Directly connected to the MAX96705 I2C bus.

- Not mounted.

・CN8 (M20-990545)



(schematic)

1: MCLR

2: VDD

3: GND

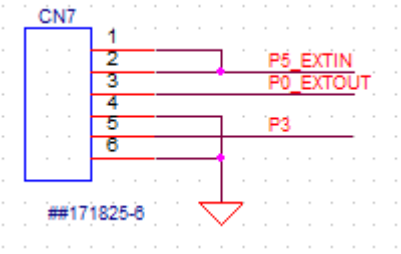
4: ICSPDAT

5: ICSPCLK

- a normal 2.54mm pitch pin header can be connected. Microcomputer can be written by Microchip company's PICkit 4 or the like.

・CN9 (171825-6 / TE Connectivity)

(top view)



(schematic)

- P5_EXTIN: Connect with P5(50) of CN4
- P0_EXTOUT: Connect with P0(3) of CN4
- P3: Connect with P3(9) of CN4

- When it is necessary to synchronize the frame between multiple SVO-03 boards, via this connector the synchronization wiring is performed. The frame sync function is custom.
- Not mounted.

3.3. DIP Switch Settings

An 8-bit DIP switch (SW1) is mounted on this board, allowing the initial configuration of Serializer MAX96705 and the I2C address setting.

・ SW1 (MAX96705 / I2C Connection Settings)

SW#	Name	Description
1	I2C_SCL	ON: The I2C bus output to CN2 (SVO side) and the MAX96705 I2C bus are connected. OFF: Both I2C buses are disconnected.
2	I2C_SDA	
3	CONF0	ON: CONF0 = L OFF: CONF0 = H
4	LCCEN	ON: LCCEN = H OFF: LCCEN = L
5	GPO_HIM	ON: Pull up the GPO/HIM pin of MAX96705 with a 30kΩ resistor. OFF: Disconnects the pull-up resistor on the GPO / HIM pin of MAX96705.
6	HVEN	ON: HVEN = H OFF: HVEN = L
7	BWS	ON: BWS = L OFF: BWS = H
8	PWDN	ON: PWDN = L OFF: PWDN = H

* Only #1-4 and #6 are ON as default.

3.4. LED Indicator

LED#	Name	Description
D1	POWER	Lights when 3.3V power (VDDL) is supplied.
D2	SCL	Lights when the SCL signal line of the I2C bus is L.
D3	SDA	Lights when the SDA signal line of the I2C bus is L.
D4	GPO	Lights when the GPO output of MAX96705 is L.
D6	RC2	(Reserved) Not used. Not mounted.
D7	RC3	(Reserved) Not used. Not mounted.

3.5. I2C Bus

This board has one system of I2C bus, but the I2C bus between the serializer and the SVO board (connector CN4 side) can be disconnected to prevent I2C address conflict. By setting #1 and #2 of SW1 to ON, I2C buses of SVO board and the Serializer are connected. The serializer's I2C bus is also connected to the connector CN4.

Each pin of the I2C bus corresponds to LED D2, D3, and it is possible to visually check the presence or absence of I2C communication from Deserializer.

In addition, a PIC microcomputer is mounted in case the initial setting at board startup or I2C Slave mounting is required. The I2C bus of the PIC microcomputer is directly connected to the MAX96705 I2C bus. Please refer to Appendix for the schematic around the PIC microcomputer.

3.6. Power

The power supply for this board is supplied from two power supplies (VDDH, VDDL) connected to connector CN2. VDDH is connected to 1.8V LDO, and both 3.3V and 1.8V are used as power supply for IC. Set VDDH voltage of SVO board to 3.3V before power on.

VDDL is used as the IO voltage of the Serializer. Set VDDL to 3.3V or 1.8V. (VDDL = 3.3V is recommended.)

3.7. Serializer output

OUT1+ terminal of MAX96705 is output to CN1. OUT - terminal is connected to 1.8V through resistance R2 (49.9 Ω). Normally it supports coaxial output using FAKRA connector.

It is also possible to output OUT - terminal to CN10 by changing the mounting of parts. When performing differential output using CN1 and CN10, mount C5 and CN10, and do not mount R2.

4. Specifications

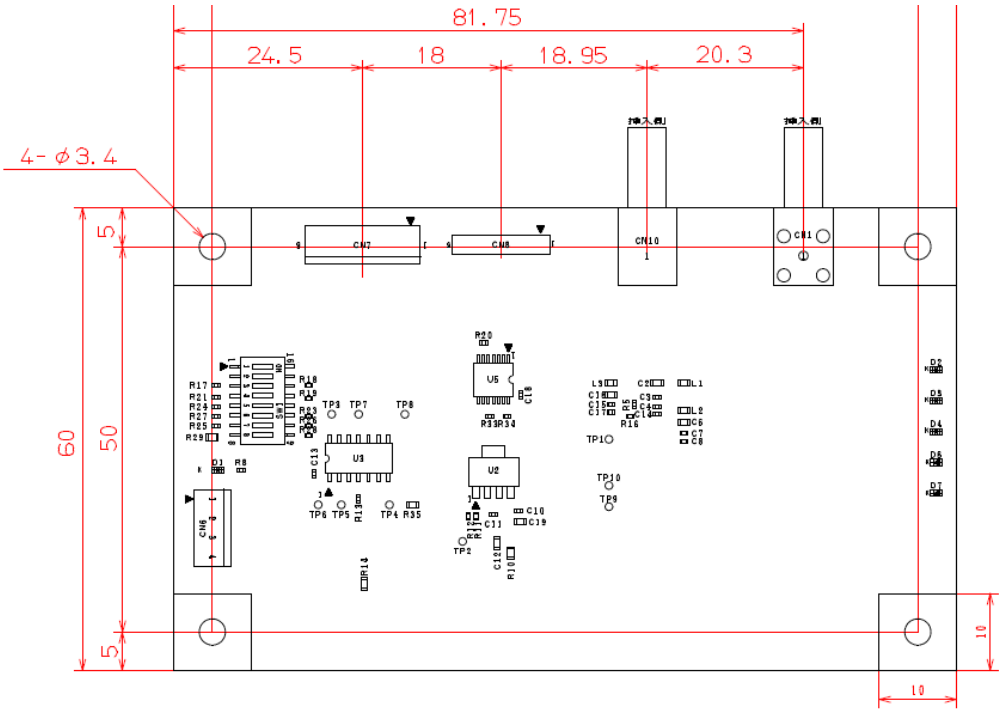
Item	Value	Description
Board Dimensions	101.6 x 60.0 mm	Value without connector
Power for Serializer	DC +3.3V	Supplied from SVO-03 board power supply (VDDH) via CN4
IO Power	DC +3.3V or 1.8V	Supplied from SVO-03 board power supply (VDDL) via CN4. Normally set to 3.3V.
Image Input	Parallel signal	Input from CN4 Refer to MAX96705 standard for supported formats Connector pin assignment is according to SVO-03
Image Output	GMSL, coaxial (FAKRA connector)	Differential output with FAKRA x2 is also possible by replacing parts
Serial communication	I2C communication	I2C signal is input from CN4(SVO side connector) or CN6. As the application to emulation of I2C communication response of camera, PIC microcomputer is mounted to allow to process I2C data.

* The above specifications apply only to model number NV024-S.

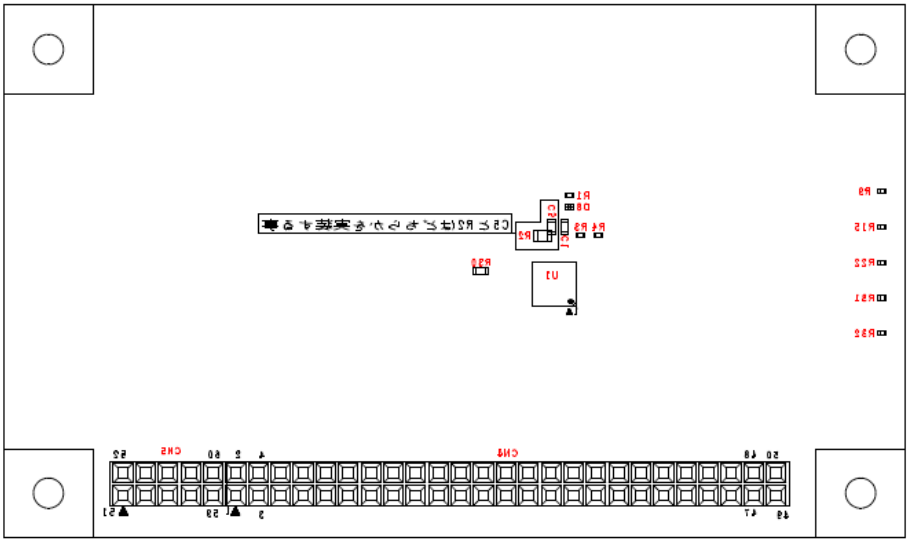
5. Appendix

5.1. Figure of Board Dimensions

(Top side / Part view)



(Bottom side / Part view)



5.2. Schematic Around the PIC Microcomputer.