FPD-Link Ⅲ Serializer Board
FPO-913A
(Board model number NV021-A)
Hardware Specification

Rev.3.0.

NetVision Co., Ltd.

Update History

| Revision	Date	Note	
1.0	2018/06/11	New file (Equivalent to Japanese version 1)	S. Usuba
2.0	2019/02/12	Fix in connector list and SW1 description	S. Usuba
3.0	2020/05/18	Correct errors	H. Suzuki

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1.　　Overview

This specification is a hardware specification of NV021-A (FPD-Link III Serializer substrate). NV021-A (hereinafter referred to as this board) is equipped with the TI company Serializer DS90UB913A, converting a video signal input from in the parallel format to FPD-Link III signal. This board has a coaxial-output connector of the Fakra standard and a connector to connect to our SVO (SVO-03 etc.) series board. It can be applied to the emulation of the FPD-Link III camera combined with the SVO board.

Block diagram
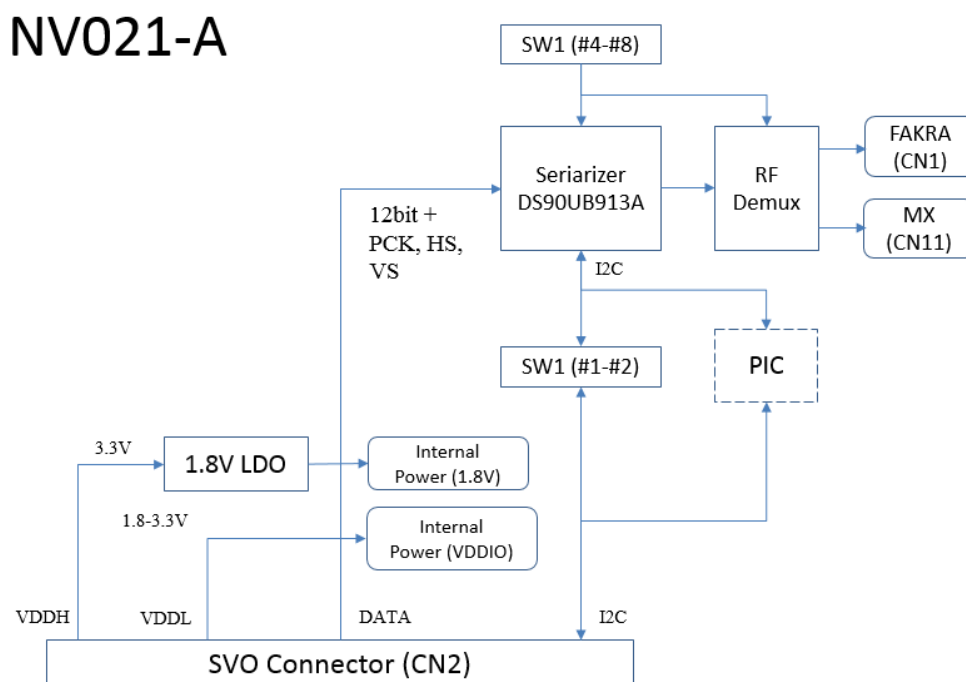
A block diagram of this board is shown in the figure above. This board is equipped with a FPD-Link III serializer, and supports video signals up to 12bit parallel, maximum pixel clock 100MHz (maximum transfer rate depends on the setting of the connected board). The output connector of the parallel signal has a common interface with the SV series, and it is possible to use it directly connected with our board such as SVO-03.

The output connector implements the FAKRA standard connector (single-ended transfer) and the MX49 Connector (differential transfer). The switching of the output connector is done by setting the SW1.

Board connection image
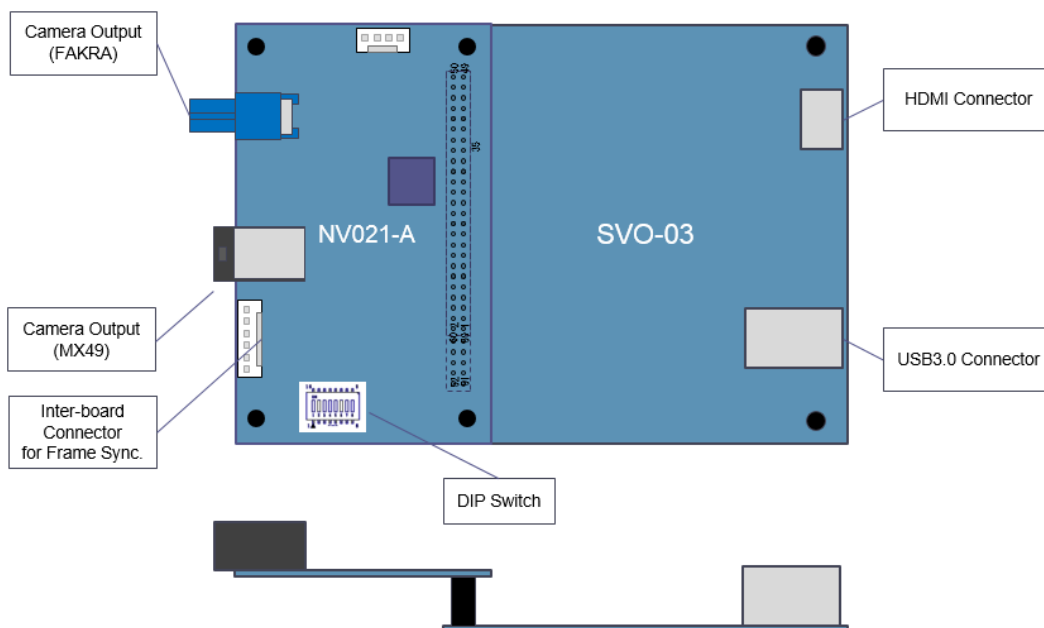
The Board connection image of the board and the SVO-03 board is shown in the figure above. As shown in the figure, both substrates are connected via a 50-pin pin socket (CN2). Since the screw hole position is common on both substrates, it is possible to fix both substrates with a spacer or the like.
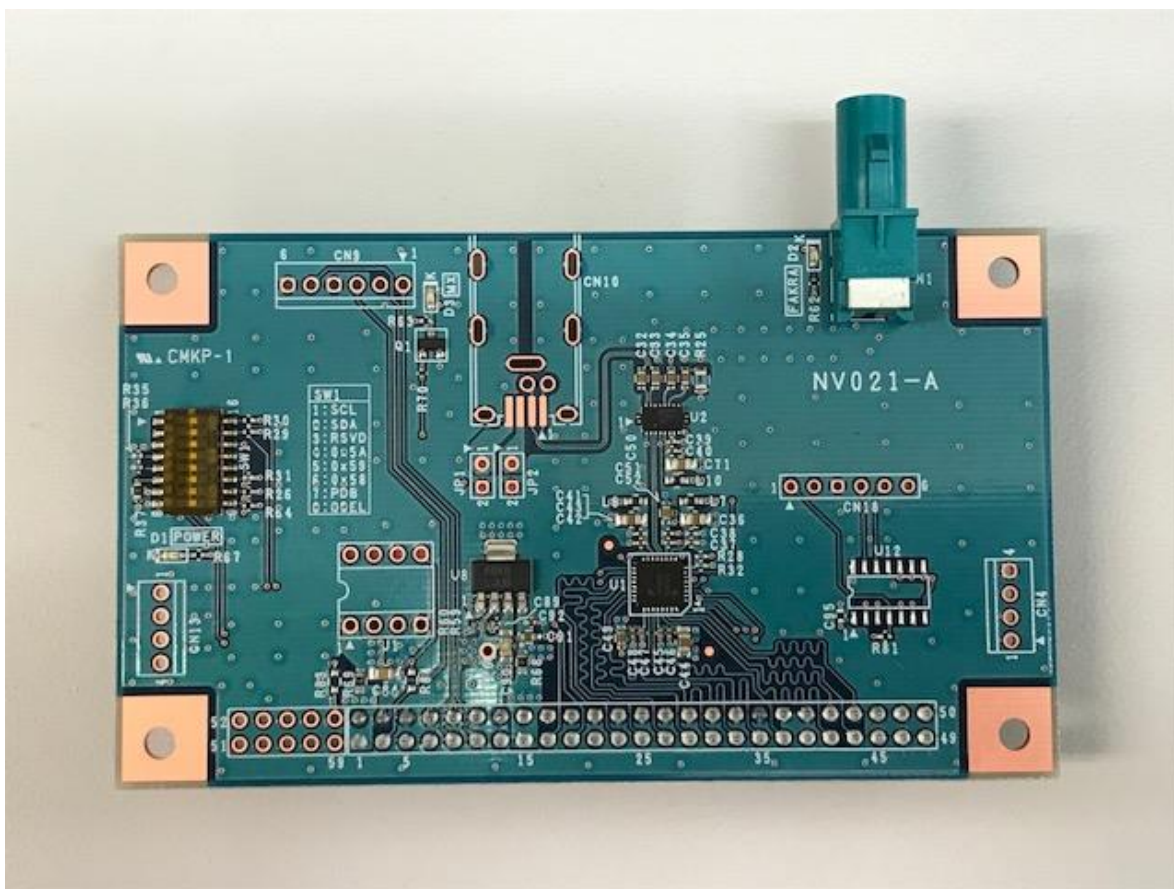
2.　　　Board shape

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 connector layout diagram
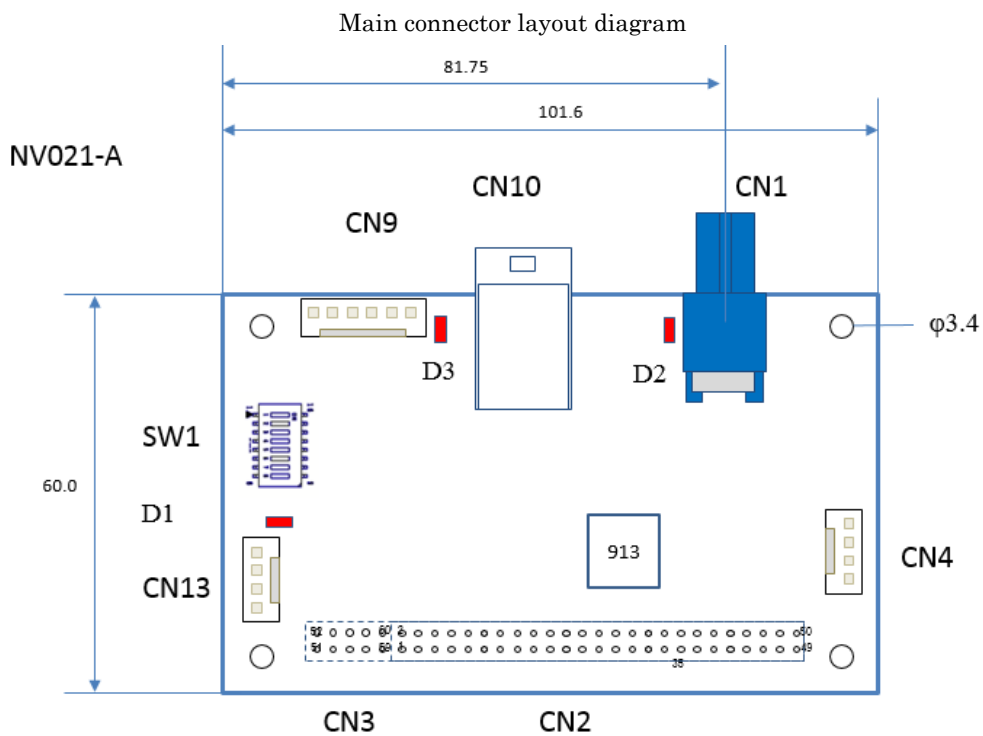
　* CN3, CN4, CN9, CN10, CN13 not implemented

2.2. Board Photos

3. Details

3.1. Connector List

CN#	Implementation State	Description	Model number
CN1		FPD-Link III output connector (coax)	FA1-NCRP-PCB-8 (FAKRA)
CN2		Parallel I/O connector	C-00086
CN3	Unimplemented		N/A
CN4	Unimplemented	I2C I/O connector	171825-4
CN9	Unimplemented	Synchronous wiring connector	171825-6
CN10	Unimplemented	FPD-Link III output connector (differential)	MX49004HQ1
CN13	Unimplemented	Expansion connector	171825-4
CN18	Unimplemented	ISP connector	A2-6PA-2.54DSA(71)

- Synchronous wiring Connector (CN9) is connectors for inter-board communication of the output system using multiple boards, and future expansion.
- The expansion connector (CN13) is directly connected to the DS90UB913A GPIO pin.
- The I2C I/O connector (CN4) is directly connected to the DS90UB913A I2C bus.
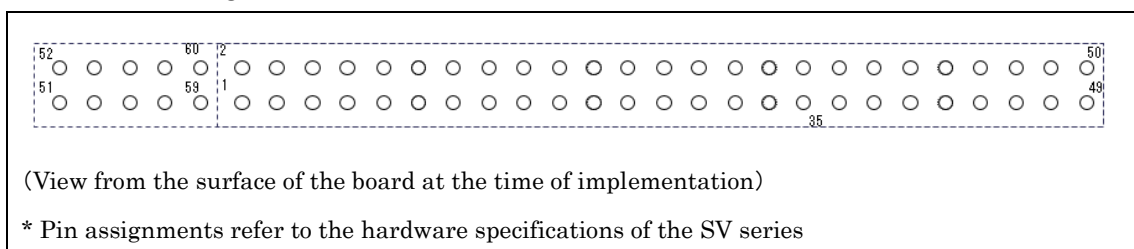

3.2.　　Connector Details

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

・CN1 (FA1-NZRP-PCB-8)

（schematic）
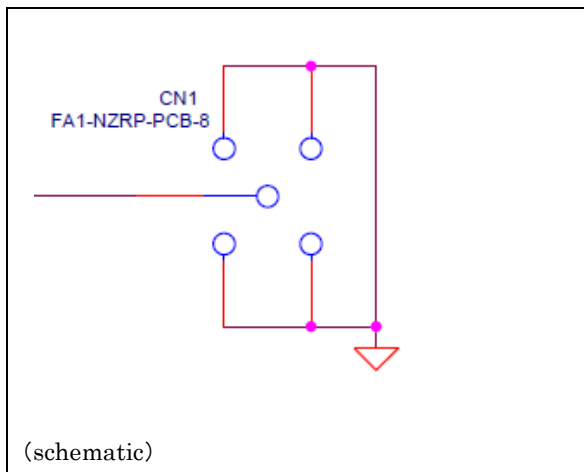
- If it is output in a single-ended, it is output to this connector.
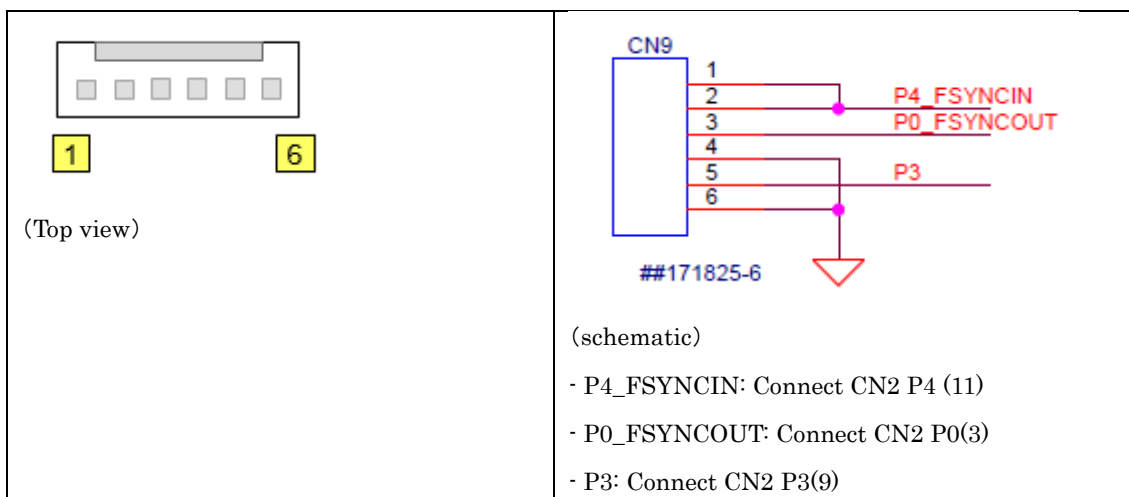

・CN2（C-00086 = Right below）、CN3（Left below）

（View from the surface of the board at the time of implementation）

* Pin assignments refer to the hardware specifications of the SV series

- Connect and use the CN2 and the SVO board.
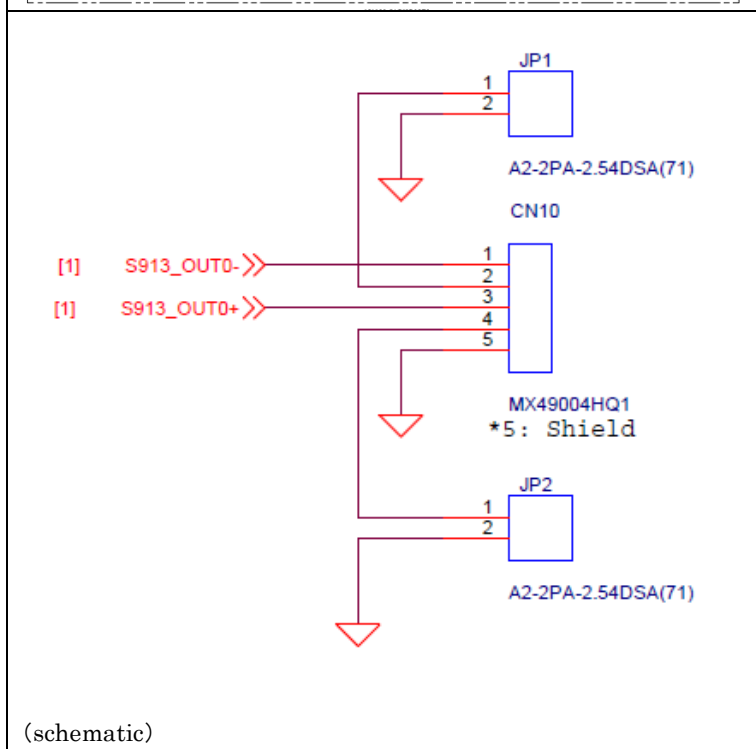
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・CN4 (171825-4 / TE Connectivity)

（Top view）

（schematic）
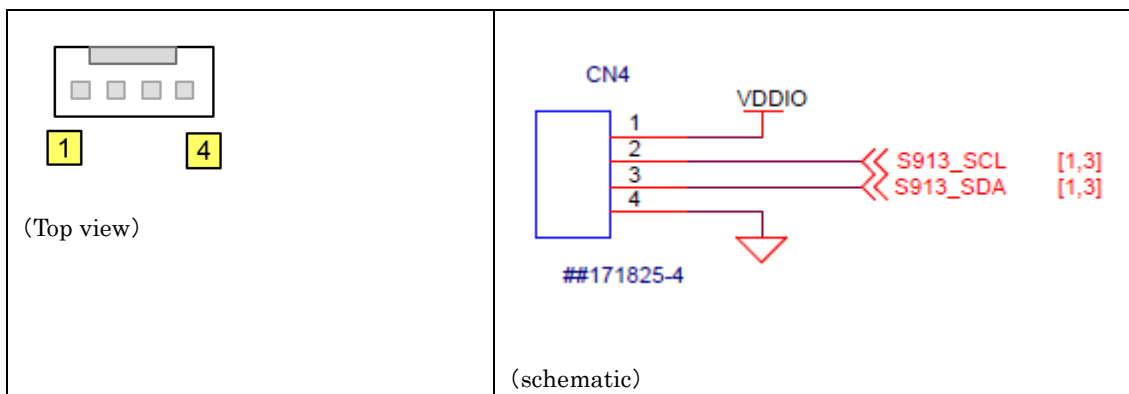
- It is directly connected with the DS90UB913A I2C bus.

- The connector is not implemented.

・CN9 (171825-6 / TE Connectivity)

（Top view）

（schematic）

- P4_FSYNCIN: Connect CN2 P4 (11)

- P0_FSYNCOUT: Connect CN2 P0(3)

- P3: Connect CN2 P3(9)

- If you want to synchronize frames between multiple SVO-03 boards, you can do this through this connector. The frame synchronization function is custom-enabled.

- The connector is not implemented.

・CN10 (MX49004HQ1 / JAE): The connector is not implemented.

(Top view)

(schematic)
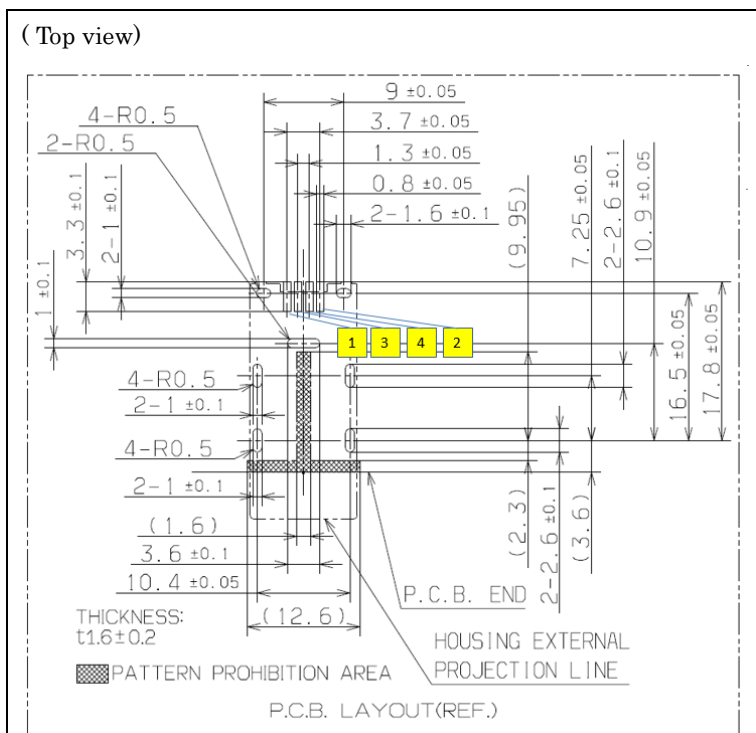
- If the output is differential, it is output to this connector.

- Specifies the connection between the power pin and GND in JP1 and JP2.

- Usually not implemented. If implemented, JP1: Open, JP2: Short circuit.

・CN13 (171825-4 / TE Connectivity)

（Top view）

（schematic）
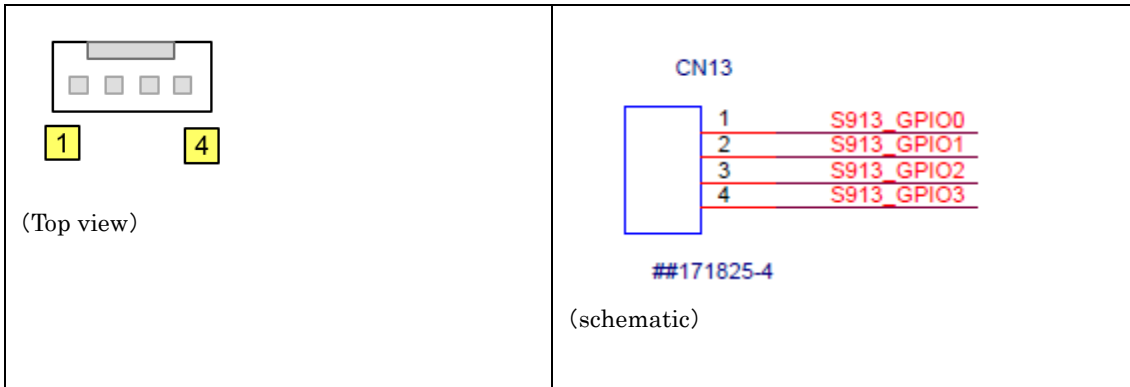
- It is directly connected with the GPIO pin of DS90UB913A. The connector is not implemented.

3.3.　DIP Switch Settings

An 8-bit DIP switch (SW1) is implemented on this board, allowing the initial configuration of the serializer DS90UB913A , the I2C address.

3.3.1.　SW1 (DS90UB913A / I2C Connection Settings)

SW#	Name	Description
1	I2C_SCL	When the dip switch is on, the I2C bus which is output to CN2(SVO
2	I2C_SDA	side), and the DS90UB913A I2C bus are connected. If off, both I2C buses will be disconnected.
3	(Reserved)	(Reserved)
4	IDX0	Specifies the I2C address of the DS90UB913A.
5	IDX1	IDX0	IDX1	IDX 2	
6	IDX2	ON	OFF	OFF	I2C Address = 0x5A OFF	ON	OFF	I2C Address = 0x59 OFF	OFF	ON	I2C Address = 0x58
7	PDB	Set the power down mode. ON: Power down (LED D6 off) OFF: Normal operation (LED D6 on)
8	COAX/STP	Select the output connector and differential/single-ended. ON: Differential output (CN10) OFF: Single-ended coaxial output (CN1)

*The default is I2C_SCL (1), I2C_SDA (2), IDX2 (6) only on.

3.4.　LED Indicator

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

LED#	名前	機能
D1	POWER	If the 3.3V is supplied, it will be lit.
D2	FAKRA	If single-ended output (FAKRA connector output), it will be lit.
D3	MX	If differential signal output (MX Connector output), it will be lit.

3.5.　I2C Bus

Although this board has one I2C bus, it is possible to detach the I2C bus between the serializer and the SVO board (connector CN2 side) to prevent I2C address contention. By setting the switch SW1 #1 and #2 to ON, the SVO board and the serializer's I2C bus are connected. The I2C bus in the serializer is also connected to the connector CN4.

This board provides a pattern that allows you to implement PIC microcontrollers and ISP connectors in case you need to set the initial board startup or implement an I2C slave. This PIC microcontroller is not usually implemented.

3.6.　Power
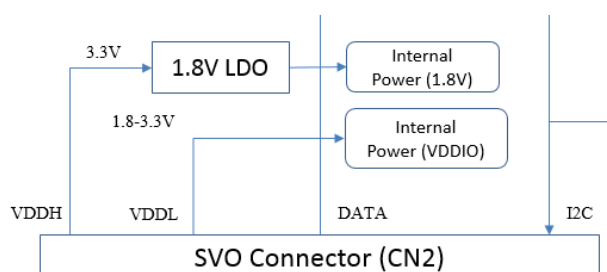
The power supply of this board is supplied by two power supplies (VDDH, VDDL) connected to the connector CN2. The VDDH is connected to a 1.8 v LDO, and both 3.3 V and 1.8 v are used as power supplies for IC. Therefore, the VDDH voltage of the SVO board must be set to 3.3 V and be connected.

The VDDL is used as the IO voltage of the serializer. The signal voltage entered in CN2 or CN4 should be adjusted to the VDDL. VDDL can be set to 1.8 V, 2.8 V and 3.3 v.

3.7.　　Serializer output
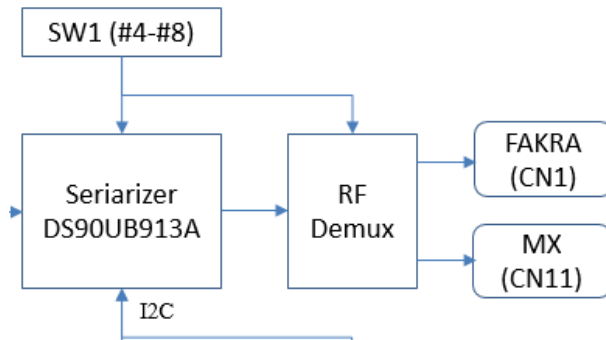
　　This board has a coaxial (CN1), differential (cn11) FPD-Link III output, and this is achieved by branching the serializer output with an RF demultiplexer. Simultaneous output of coaxial and differential is not possible. The output connector is specified by setting the SW1, and depending on this setting, either LED D2 (coaxial) or D3 (differential) is illuminated.

4.　　Specifications

Item	Value	Description
Board Dimensions	101.6 x 60.0 mm	Value without connector
Power for Serializer	DC +3.3V	Power of SVO-03 video output board via CN2 Supply from VDDH.
IO Power	DC +3.3V / 1.8V	Power of SVO-03 video output board via CN2 Supply from VDDL.
Image Input	Parallel signal	Input from CN2 For more information, see DS90UB913A standards The interface of the connector follows svo-03
Image Output	FPD-Link III Single-ended or coax	The output connector is selected by DIP SW.
Serial communication	I2C	I2C signal input is CN2 or CN4. There is a pattern that can be mounted on a PIC microcomputer (PIC16F1503) for emulation of the camera's I2C communication response.

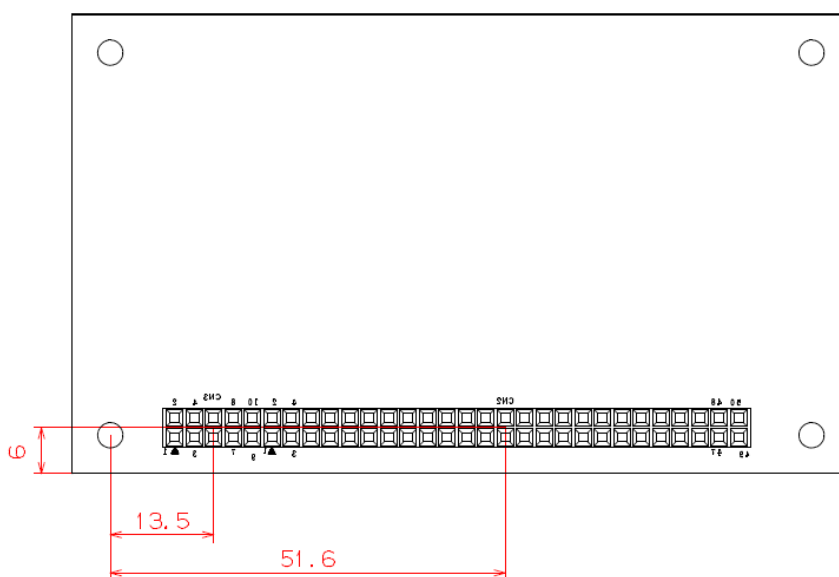* The above specifications apply only to model number NV021-A.

5. Appendix

5.1. Figure of board dimensions

（Top side / Part view）
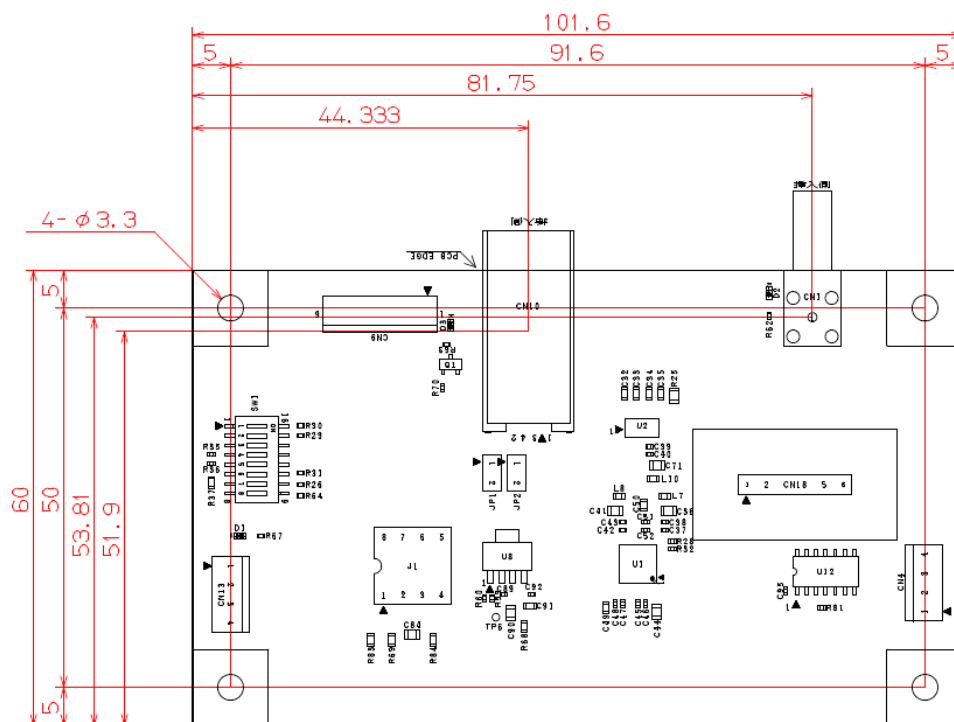
（Bottom side / Part view）

5.2.　　　PIC Microcomputer Peripheral circuit diagram