SEMB1402
IoT-Engine RZ/A2M
H/W Specification
Rev1.00 20180907

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Shimafuji Electric Inc.
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Notices on use and handling

You should follow those remarks to use this product safely. If you are not following those remarks, you may cause electrical shock, injury, fire or trouble.

Lightning

While lightning has occurred , never installing the product or connecting cables, it may cause an electrical shock by the thunderbolt.

Handle with care

Does not either drop, hit or give a strong shock to the product.

Caution to electrostatic discharge

This product is mounted electrostatic sensitive parts.
The parts are possibly destroyed by electrostatic discharge; do not touch directly to contact area of the connectors and the parts.

Caution to connect or dis-connect cables

First turn off the power to this product to connect connecters on board and cables. If connecting or dis-connecting cables to this board without turn off the power, it may destroy this board and connected product.

Pay attention to touch this product

While the product is turned on or straight after the operation, it may cause an electrical shock or scald. (Some parts become higher temp.)

Unplug the Power source

Immediately unplug from the Power source when it smells or smokes. If continually keep supply power on while it smells or smokes, it may cause fire, an electrical shock or serious influence on this board and other equipments.

Do not use or store in the following places.

-Do not expose in direct sunlight
-Do not place where the temperature changes rapidly and wets with dew.
-Do not expose to rain or moisture.
-Do not place rolled or vibrated.
-Do not place dusty or carpet laid places cause electrostatic obstacles.
-Do not place where corrosive gas outbreaks.
-Do not directly place this product on the electro conductive materials (it may cause trouble)

Remark on operation of this product

The maximum operating temperature of this board is 40 degrees Celsius on case; it has to operate under this temperature (it may need air cooling system to operate in high temp.)

Revision history

Revision	Release date	Revised contents	Remarks
Rev1.00	2018/09/07	New Release	

Content

1. OVERVIEW

This document is the H/W Specifications for the SEMB-1402. (IoT-Engine RZ/A2M, hereinafter referred to as “this board”)

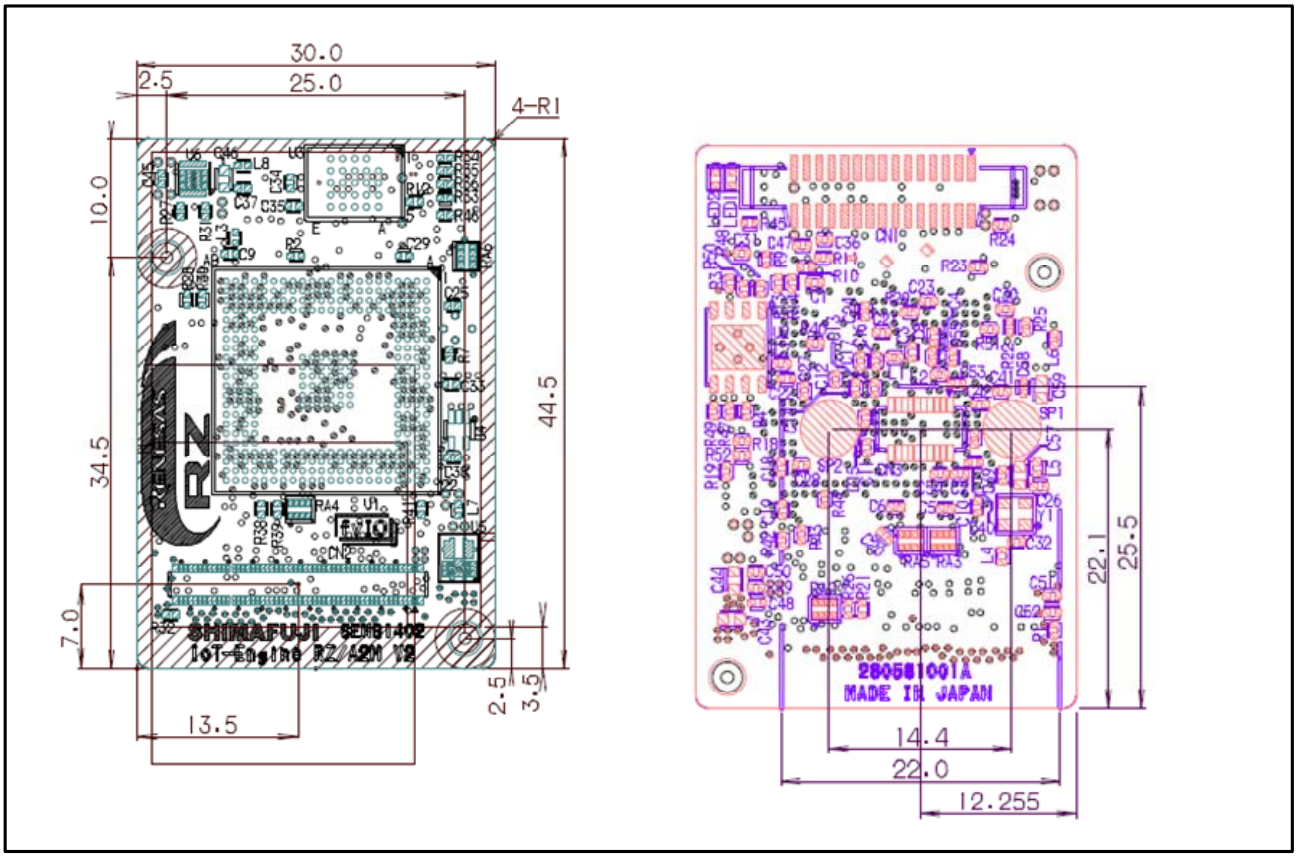
2. SPRCIFICATIONS

Specification list

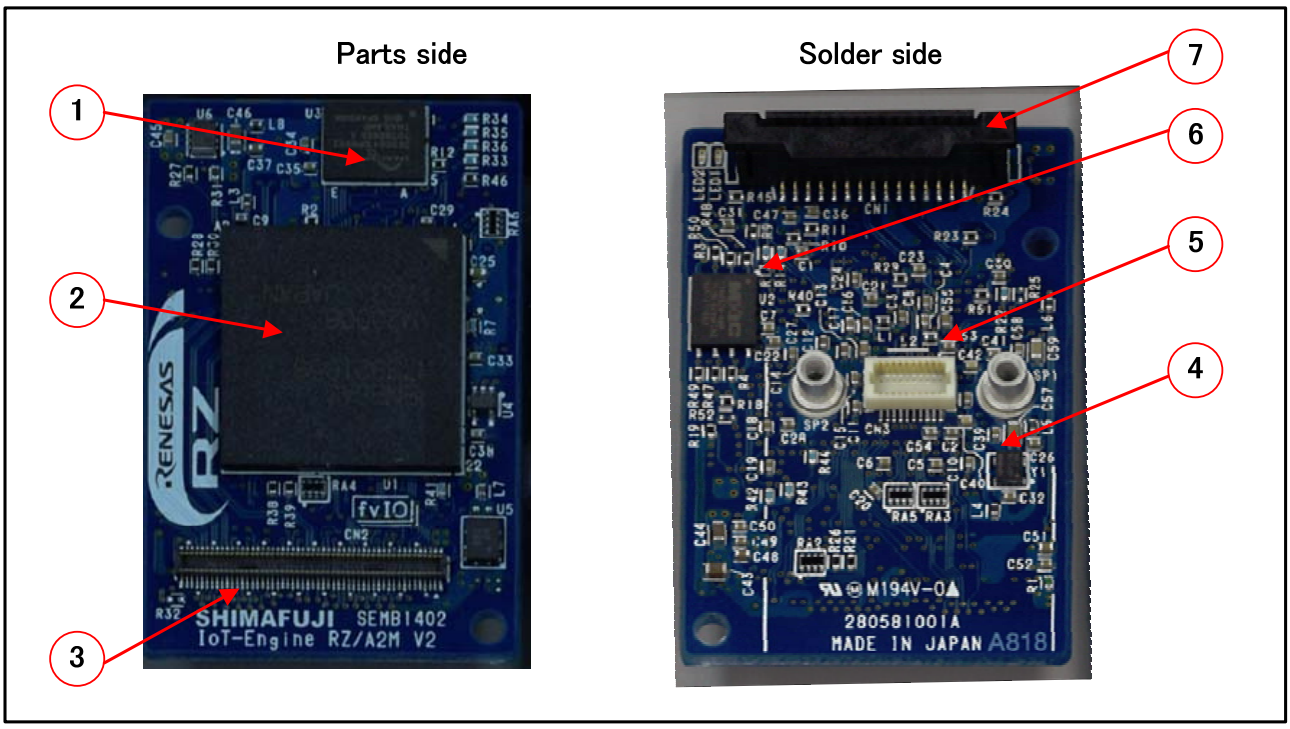
Function Module		Characteristic / Function outline
Power supply		Supplied through IoT-Engine standard 100Pconnector DVCC = 3.3V,　AVCC = Not use,　VBAT = not use
CPU		R7S921053VCBG CPU Cortex-A9 (528MHZ MAX) Internal Memory 4 M Byte
CPU　Clock	Main	24MHz (Oscillator)
Connector	IoT-Engine	DF40C-100DP-0.4V
	WiFi	20P3.0-JMCS-G-TF
	MIPI	1-1734248-5
Memory	ROM	Serial Flash 8MByte (MX25L6433FZNI-08G)
	RAM	Hyper RAM 8Mbyte (S27KS0641DPBHV020)
LED		3.3V IO 2bit
Operation Temp		TBD
Board External Size		30mm×44.5mm t = 1.6mm

3. BOARD

3.1. BOARD SIZE



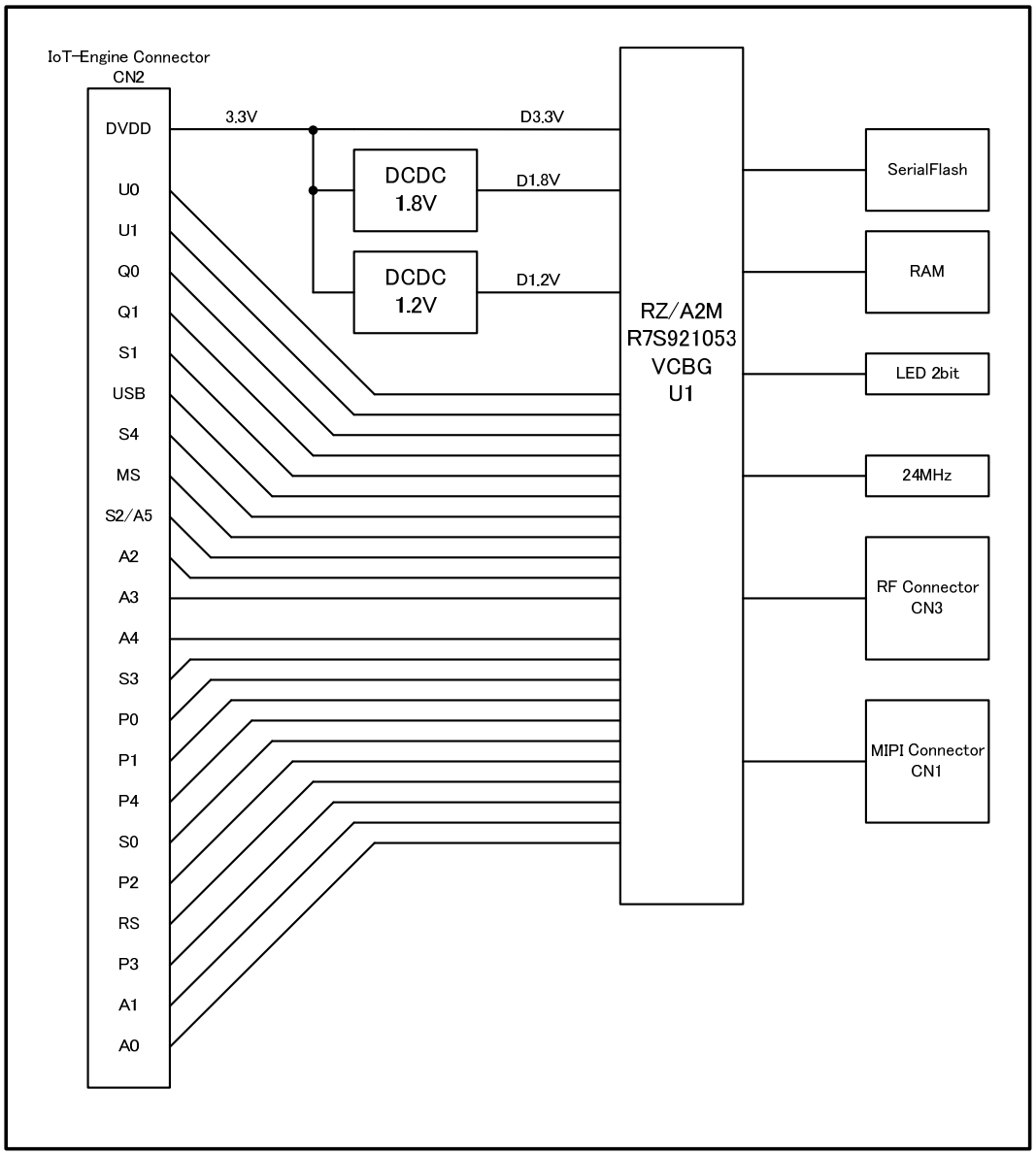
3.2. EXTERNAL VIEW



No.	Component Description
1	Hyper RAM
2	RZ/A2M
3	IoT-Engine Connector
4	Oscillator 24MHz
5	RF Connector
6	Serial Flash ROM
7	MIPI Connector

4. BLOCK DIAGRAM

This board block diagram.



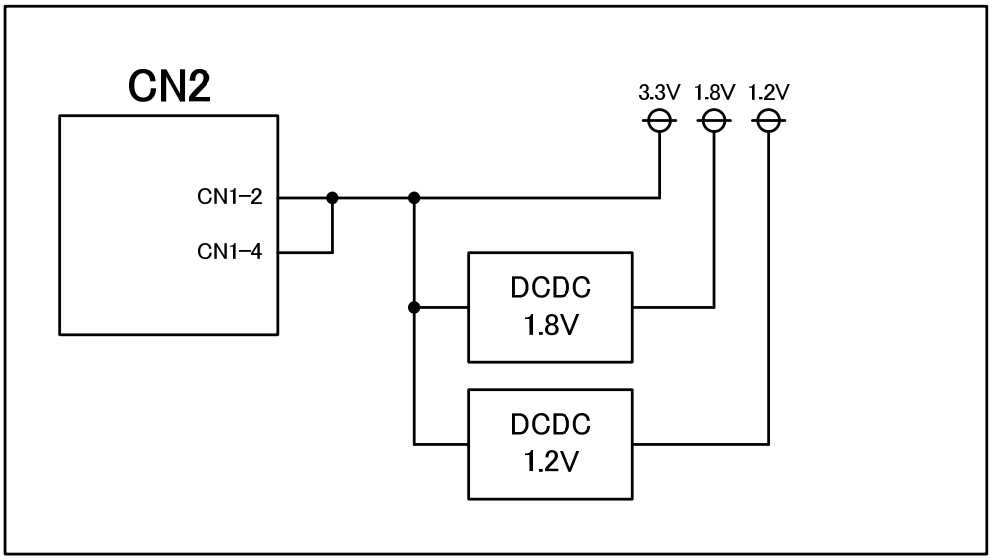
5. FUNCTIONS

5.1. POWER SUPLLY

The power is supplied through IoT-Engine standard 100P connector (CN2).
When 3.3V supplied, this board convert 1.8V and 1.2V by power IC on this board.

- Input Voltage : D3.3V (+3%, -3%) Max. Current TBD

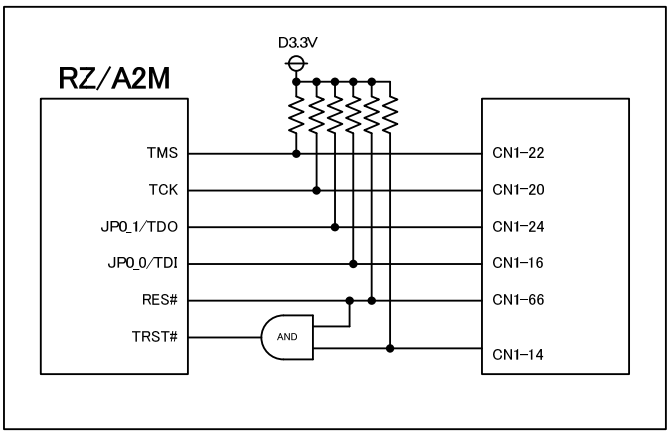
Power supply structures



5.2. RESET AND JTAG

This board Reset and JTAG signal are connected to CN2 connector.

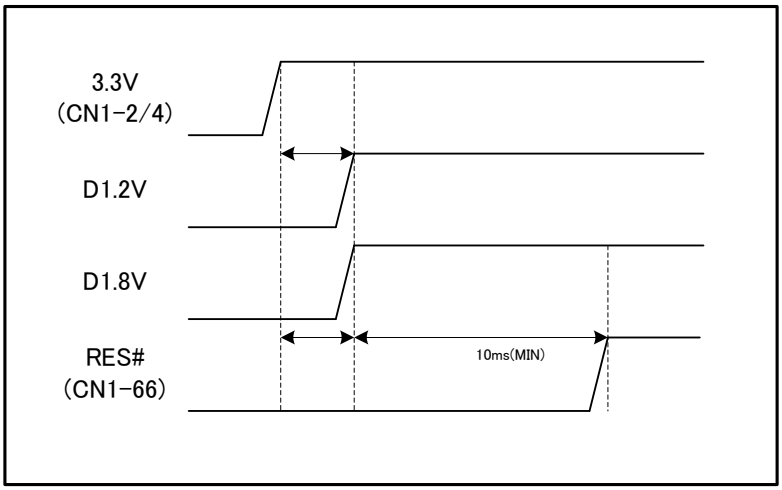
Reset and JTAG structure



This board needs RES# pin and TRST# pin in low level for a certain period when turn on the power. If RES# pin and TRST# pin become high kevel before power, the Initialization may not be performed properly.

Please refer low level period below timing chart and on RZ/A2M HW specification.

Startup power Sequence timing chart

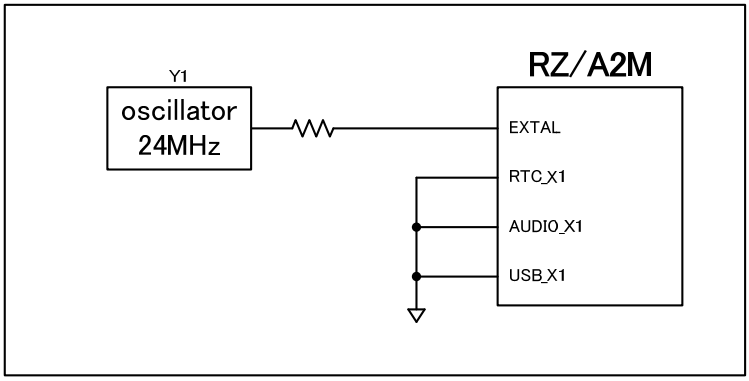


5.3. CLOCK

This board installed an oscillator for R7S921053 system clock.

- oscillator (Y1): ASDMB-24.000MHZ-LY-T (Abracon)

The clock structures



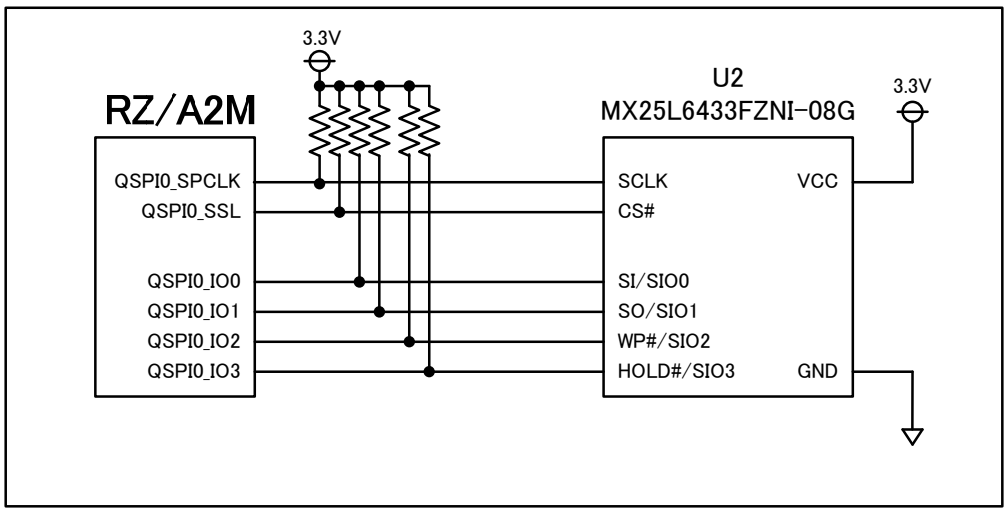
5.4. SERIAL FLASH ROM

This board is mounted a Serial Flash ROM (64MB) to save boot up programs.

- Serial Flash ROM (U2): MX25L6433FZNI-08G (Macronix)

Note: This board has a type of flash memory without the Reset pin.
If the power is turned off or reset with the serial flash set to “Quad mode” after 1st booting, the serial flash does not meet the settings required to boot system, and there is a risk that the boot will not be able to boot normally.

The Serial Flash ROM structures

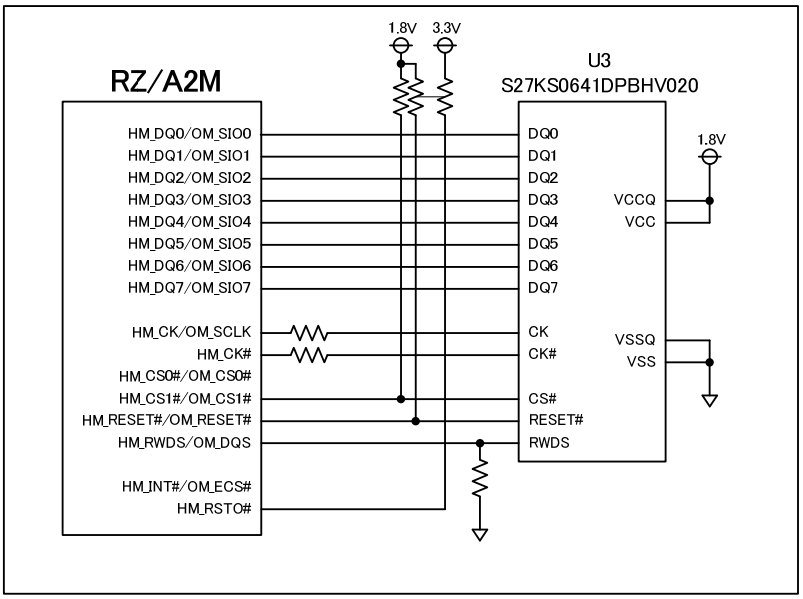


5.5. RAM

This board is mounted a HyperRAM(64Mbit) as general-purpose memory.

- HyperRAM (U3): S27KS0641DPBHV020 (Cypress)

The HyperRAM structure

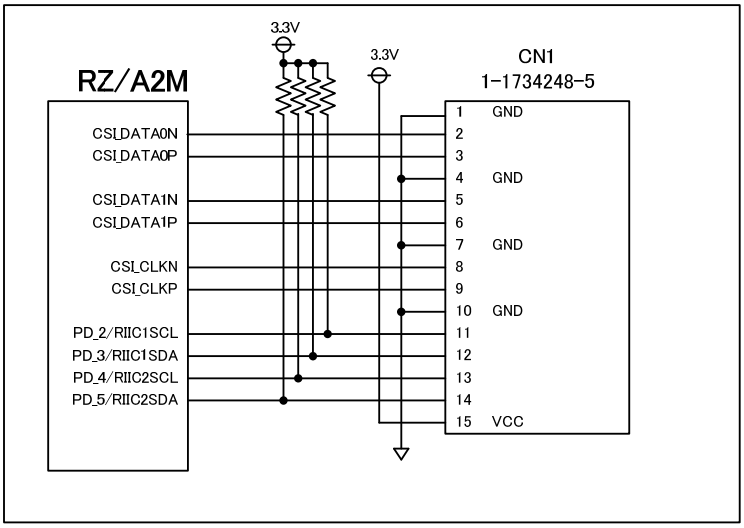


5.6. MIPI

This board is mounted an FFC connector for MIPI CSI-2 I/F.
It can use 1mm pitch flexible cable.

- MIPI connector (CN1): 1-1734248-5 (TE)

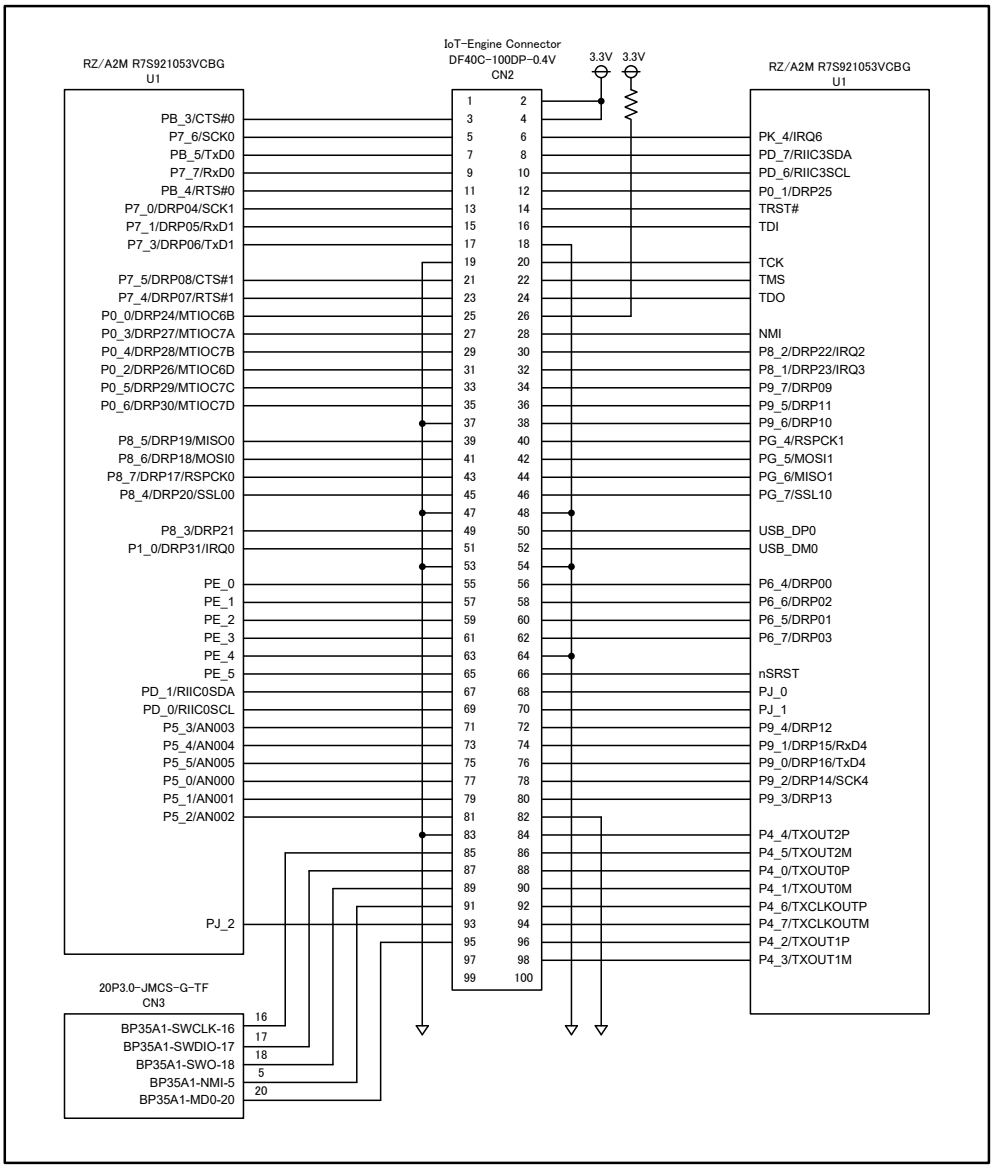
The MIPI connector structure



5.7. IoT-Engine

This board is mounted an IoT-Engine standard connector.
It can use to connect to IoT-Engine standard base board..

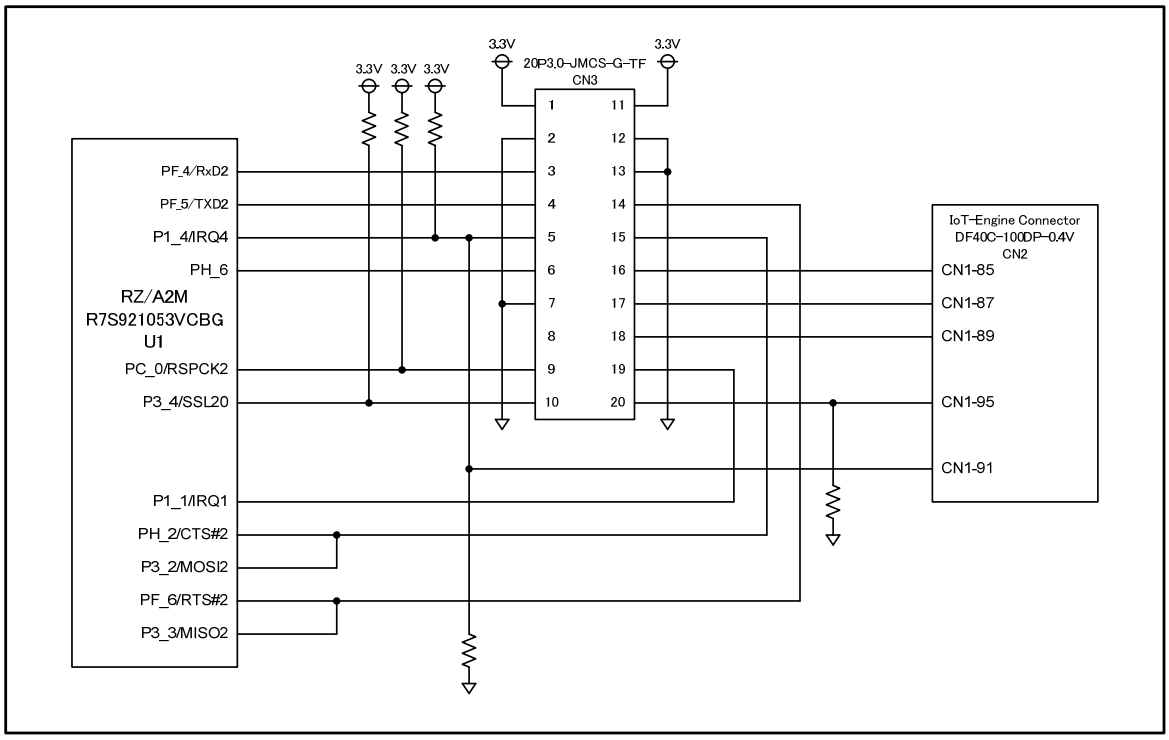
- IoT-Engine connector (CN2) : DF40C-100DP-0.4V (Hirose)
- Applicable connector (Base side): DF40HC(3.0)-100DS-0.4V (Hirose)



5.8. WiFi

This board is mounted an extension connector for IoT-Engine WiFi ESP32(SEMB1401-1).
Attention : the IO input/output settings, when connect the IoT-Engine WiFi ESP32.

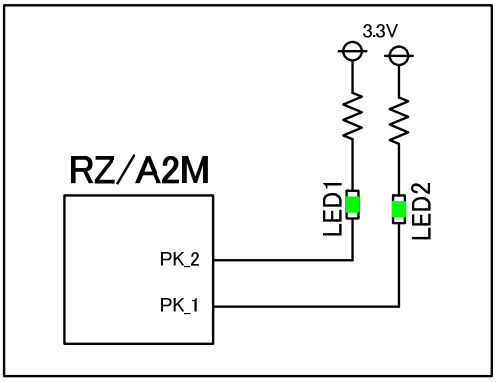
The WiFi structures



5.9. LED

This board is mounted 2 LEDs.
The LED illuminate to when the cathode pins become low.

The LED structures



6. CONNECTORS

6.1. CONNECTOR LIST

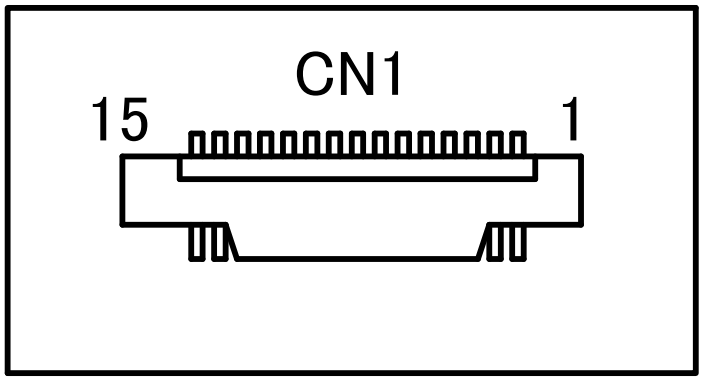
Connector list

CN-NO.	Connector Model Number	Remarks
CN1	1-1734248-5	MIPI
CN2	DF40C-100DP-0.4V	IoT-Engine
CN3	20P3.0-JMCS-G-TF	RF

6.1.1. CN1

PART NO. : 1-1734248-5

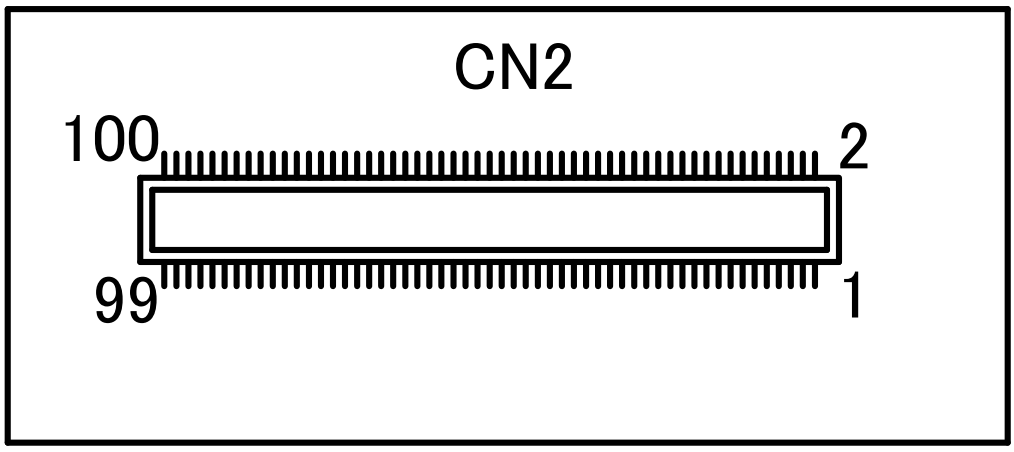
Pin No.	Signal Name	Remarks
1	GND	
2	CSI_DATA0N	
3	CSI_DATA0P	
4	GND	
5	CSI_DATA1N	
6	CSI_DATA1P	
7	GND	
8	CSI_CLKN	
9	CSI_CLKP	
10	GND	
11	PD_2/RIIC1SCL	PU
12	PD_3/RIIC1SDA	PU
13	PD_4/RIIC2SCL	PU
14	PD_5/RIIC2SDA	PU
15	3.3V	



6.1.2. CN2

PART NO. : DF40C-100DP-0.4V

Pin No.	Signal Name	Remarks	Pin No.	Signal Name	Remarks
1	Open		2	3.3V	
3	PB_3/CTS#0		4	3.3V	
5	P7_6/SCK0		6	PK_4/IRQ6	
7	PB_5/TxD0		8	PD_7/RIIC3SDA	
9	P7_7/RxD0		10	PD_6/RIIC3SCL	
11	PB_4/RTS#0		12	P0_1/DRP25	
13	P7_0/DRP04/SCK1		14	TRST#	
15	P7_1/DRP05/RxD1		16	TDI	
17	P7_3/DRP06/TxD1		18	GND	
19	GND		20	TCK	
21	P7_5/DRP08/CTS#1		22	TMS	
23	P7_4/DRP07/RTS#1		24	TDO	
25	P0_0/DRP24/MTIOC6B		26	PU	3.3V
27	P0_3/DRP27/MTIOC7A		28	NMI	
29	P0_4/DRP28/MTIOC7B		30	P8_2/DRP22/IRQ2	
31	P0_2/DRP26/MTIOC6D		32	P8_1/DRP23/IRQ3	
33	P0_5/DRP29/MTIOC7C		34	P9_7/DRP09	
35	P0_6/DRP30/MTIOC7D		36	P9_5/DRP11	
37	GND		38	P9_6/DRP10	
39	P8_5/DRP19/MISO0		40	PG_7/SSL10	
41	P8_6/DRP18/MOSI0		42	PG_6/MISO1	
43	P8_7/DRP17/RSPCK0		44	PG_5/MOSI1	
45	P8_4/DRP20/SSL00		46	PG_4/RSPCK1	
47	GND		48	GND	
49	P8_3/DRP21		50	USB_DP0	
51	P1_0/DRP31/IRQ0		52	USB_DM0	
53	GND		54	GND	
55	PE_0		56	P6_4/DRP00	
57	PE_1		58	P6_6/DRP02	
59	PE_2		60	P6_5/DRP01	
61	PE_3		62	P6_7/DRP03	
63	PE_4		64	GND	
65	PE_5		66	nSRST	
67	PD_1/RIIC0SDA		68	PJ_0	
69	PD_0/RIIC0SCL		70	PJ_1	
71	P5_3/AN003		72	P9_4/DRP12	
73	P5_4/AN004		74	P9_1/DRP15/RxD4	
75	P5_5/AN005		76	P9_0/DRP16/TxD4	
77	P5_0/AN000		78	P9_2/DRP14/SCK4	
79	P5_1/AN001		80	P9_3/DRP13	
81	P5_2/AN002		82	AGND	
83	GND		84	P4_4/TXOUT2P	
85	CN2-16		86	P4_5/TXOUT2M	
87	CN2-17		88	P4_0/TXOUT0P	
89	CN2-18		90	P4_1/TXOUT0M	
91	CN2-5/ P1_4/IRQ4		92	P4_6/TXCLKOUTP	
93	PJ_2		94	P4_7/TXCLKOUTM	
95	CN2-20		96	P4_2/TXOUT1P	
97	Open		98	P4_3/TXOUT1M	
99	Open		100	A3.3V	未使用


CN2
100
2
99
1

6.1.3. CN3

PART NO. : 20P3.0-JMCS-G-TF

Pin No.	Signal Name	Remarks	Pin No.	Signal Name	Remarks
1	3.3V		11	3.3V	
2	GND		12	GND	
3	PF_4/RxD2		13	GND	
4	PF_5/TXD2		14	PF_6/RTS#2/P3_3/MISO2	
5	CN1-91/P1_4/IRQ4		15	PH_2/CTS#2/P3_2/MOSI2	
6	PH_6	PU	16	CN1-85	
7	GND		17	CN1-87	
8	GND		18	CN1-89	
9	PC_0/RSPCK2	PU	19	P1_1/IRQ1	PD
10	P3_4/SSL20	PU	20	CN1-95