TS-R-IN32M3-EC-E
Users Manual
(R-IN32M3-EC Evaluation Board)
Down Load version

Issued: Nov 4, 2014 (Version 2.2)

Tessera Technology Corporation

TS-TUM01647

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DECLARATION OF CONFORMITY

We, Product Compliance Division
TESSERA TECHNOLOGY INC.
4F, 2710-1 Noborito, Tama-ku, Kawasaki city, Kanagawa 214-0014 JAPAN
Phone:+81-44-271-7533 Fax: +81-44-271-7534

declare under our sole responsibility that the product
Product: Board test systems
Model: TS-R-IN32M3-EC Evaluation Board

to which this declaration relates is in conformity with the following standards of other normative documents
EN 61326-1:2006 (Class A and Basic immunity test requirements)
EN 61326-2-1:2006
EN 61000-3-2:2006+A1:2009+A2:2009
EN 61000-3-3:2008
EN 61000-4-2:2009 (contact: level 1 (±4kV))
EN 61000-4-3:2006+A1:2008+A2:2010 (80 – 1000Mhz, level 2 (3V/m) /
1.4 – 2.0GHz, level 2 (3V/m) /2.0 – 2.7GHz, level 1 (1V/m))
EN 61000:4-4:2012 (AC power ports: level 2 (±1kV))
EN 61000:4-5:2006 (AC power ports: level 2)
EN 61000:4-6:2009 (AC power ports: level 2 (3V))
EN 61000:4-11:2004
EN 55011:2009+A1:2010 (Group 1, Class A)

following the provisions of EC Council Directive
EMC Directive 2004/108/EC

Authorized Representative

Signature: Hitoshi Akimoto
Hitoshi Akimoto
TESSERA TECHNOLOGY INC.
The president

Date of Issue: 5-July-2013

TS-TER01757

Revision History

Version	Date	Description
Ver 1.0	13/3/29	Initial version
Ver 1.1	13/4/03	3. Specification Flash memory (Parallel) 12.2. Jumper/connecter Insert CN14
Ver 1.2	13/4/23	8.1 SW1 Mode Selection Mod SW1-6 -> SW1-7
Ver 1.3	13/6/14	12.3 MAC Addres Insert
Ver 1.4	13/6/28	9.2. External MCU Interface (I/F) Connector Listing correction
Ver 1.41	13/7/12	research and development Only Insert DECLARATION OF CONFORMITY Insert
Ver 1.5	13/8/07	8.1 SW1 Mode Selection Do not use → Instruction ram boot (Debug only)
Ver1.6	13/10/3	7.5 I/O Ports Change the connection of the connector(CN14)
Ver2.0	13/12/05	Title modify
Ver2.1	14/3/04	7.3 RJ-45 connector Color modify 12.3 add attention
Ver2.2	14/11/04	Company logo change

Table of contents

1. Application

This user's manual provides explanations for use of the R-IN32M3-EC evaluation board.

2. Summary

The R-IN32M3-EC board was developed for evaluating the R-IN32M3-EC device and offers the following interfaces:

- Ethernet/EtherCAT
- CC-Link　(Slave)
- USB Virtual COM (mini-B)
- I2C
- CSI
- CAN
- External memory (Parallel Flash) and external MCU interface
- External memory (Serial Flash)
- ICE(JTAG)
- and others

The conformance of the circuitry for CC-Link of this board is un-corresponding.
When you make CC-Link attach, please connect by a conversion cable.

3. Specification

Item	Specification		
Main ASSP *1	Renesas Electronics System LSI "R-IN32M3-EC" ARM Cortex-M3 32-bit RISC CPU with HW-RTOS（Hardware Real-Time OS） 1.3M-byte RAM large-capacity Operating frequency 100MHz On-chip 10Base-T/100Base-TX Ethernet PHY		
Ext. Memory/ Ext. Host	Flash memory (Serial)	32M x Dual, S25FL032P0XNFI010 equivalent	
	Flash memory (Parallel)	2M x 16bit, S29AL032D70TFI030 equivalent	
	EEPROM (when using EtherCAT)	16K x 1bit, AT24C16C-MEHM-T equivalent	
Interface	CSI	2Ch	7 x 1 pin, 2.54mm header
	I2C	2Ch	4 x 1 pin, 2.54mm header
	External Host MCU	1Ch	100-pin connector
	UART0	EIA-232E compliance (not mounted)	D-SUB 9-pin
	UART1	UART to USB	USB mini-B connector *2
	CAN	1Ch	CAN transceiver 4 x 1 pin, 2.54mm header
	Ethernet/EtherCAT	2Ch	RJ-45
	CC-Link	2Ch (not mounted)	Optical transceiver
		Slave x 1ch	35610-5253-B00 PE equiv.
	GPIO	14 ports	7 x 2 pin, 2.54mm header
	ICE (JTAG)	-	20-pin half-pitch connector (Trace supported)
	GPIO	8 green LEDs	
LED	Power Supply	1 red LED	
	Ext. MCU interface selection	1 green LED	
	Built in RJ45 connector	2 green and yellow LEDs per Ch	
	Optical (not mounted)	2 green LEDs per Ch	
	Ethernet/EtherCAT Monitor	3 green LEDs per Ch	
	EtherCAT Monitor	5 red and green LEDs	
	CC-Link	9 red and green LEDs	
	UART	2 green LEDs	
DIP-SW	Operation mode selection	8 bits (SW1)	
	CC-Link channel selection	2 rotary switches (SW4 and SW5)	
	CC-Link mode selection	2 rotary switches (SW2 and SW3)	
	GPIO	8 bits (SW6)	
Power Supply	AC Adapter	+5.0V +/- 5%, 2A or more (center plus)	
Operation Temp.	0 to +70 C		

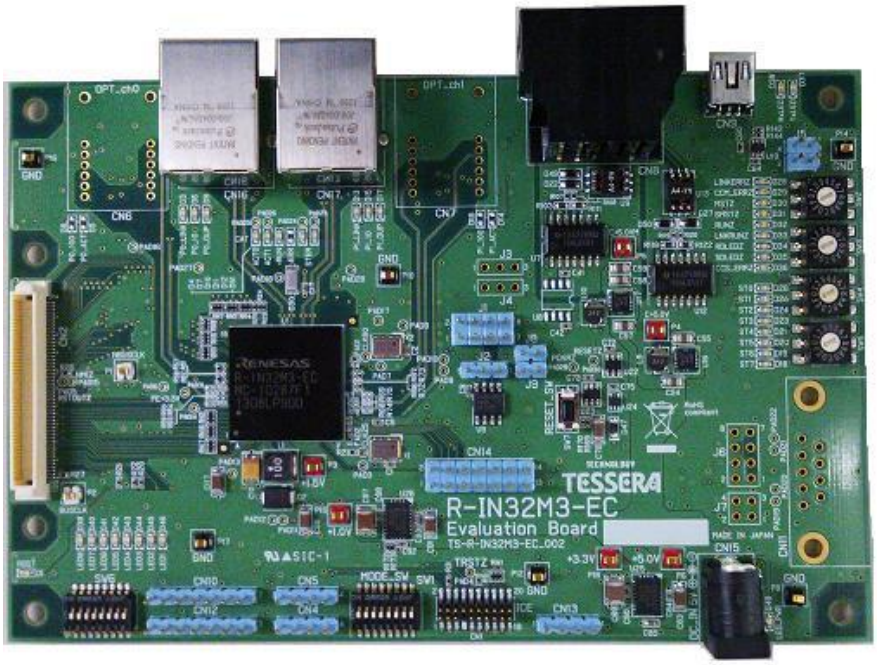
*1 -- ASSP means “Application Specific Standard Product,” a standard System LSI. Please refer to the Renesas datasheet and user’s manual for details concerning R-IN32M3-EC.

*2 -- The USB cable must be inserted and detached while the board is powered.

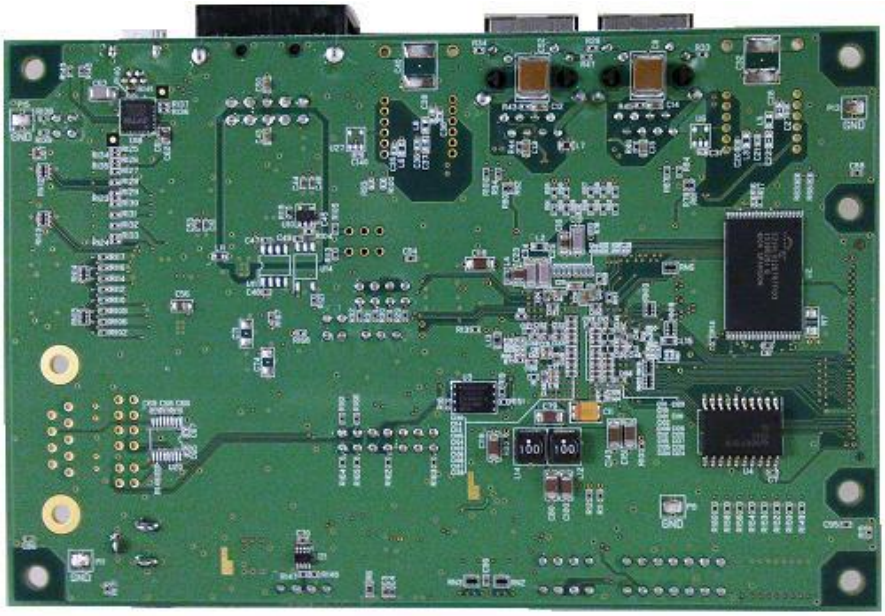
4. Board Outline

The following pages show photos of the board outline.

4.1. Board Component Side



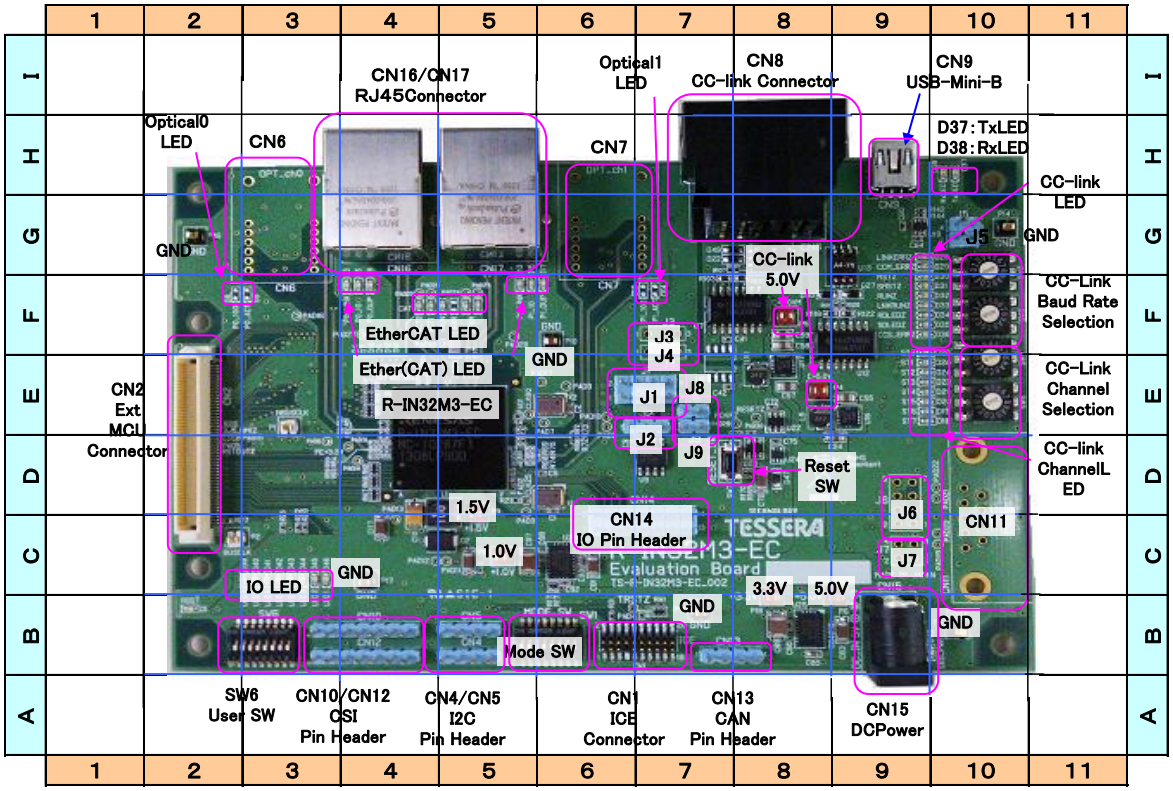
4.2. Board Soldering Side



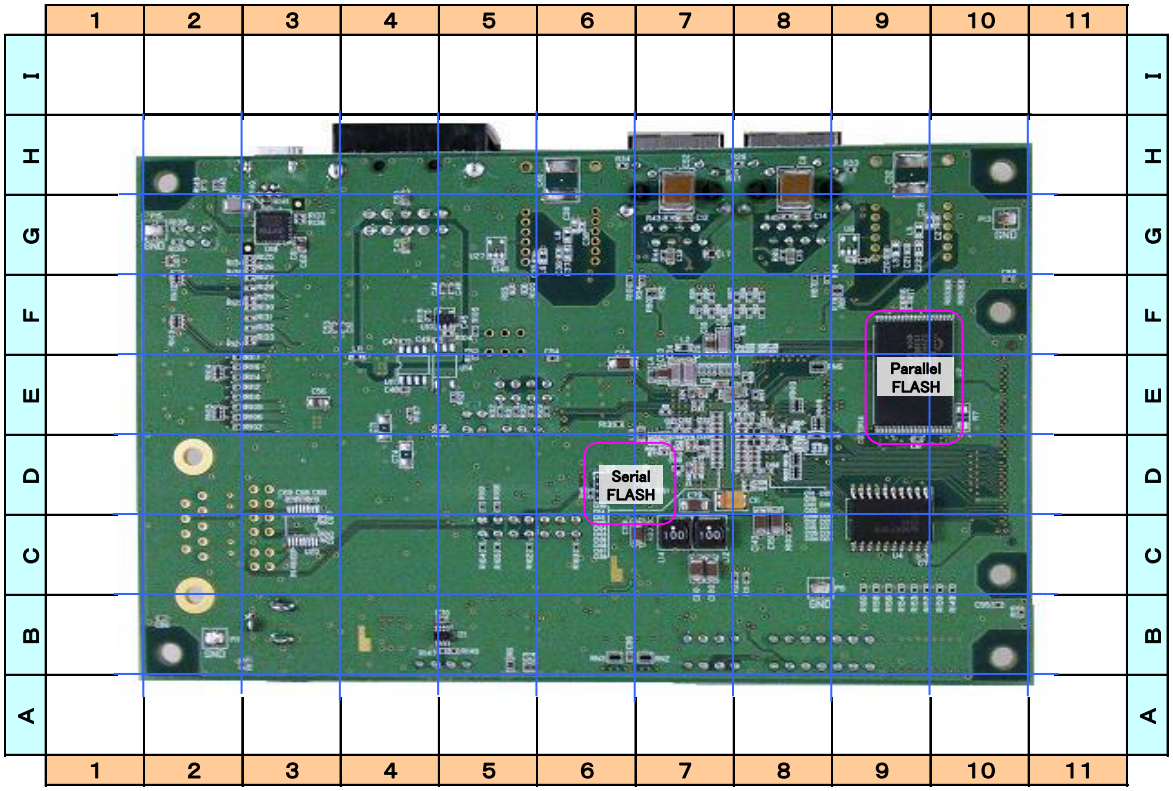
5. Component Names

Each component location is defined by the following grid coordinates, which are often used in the component description sections.

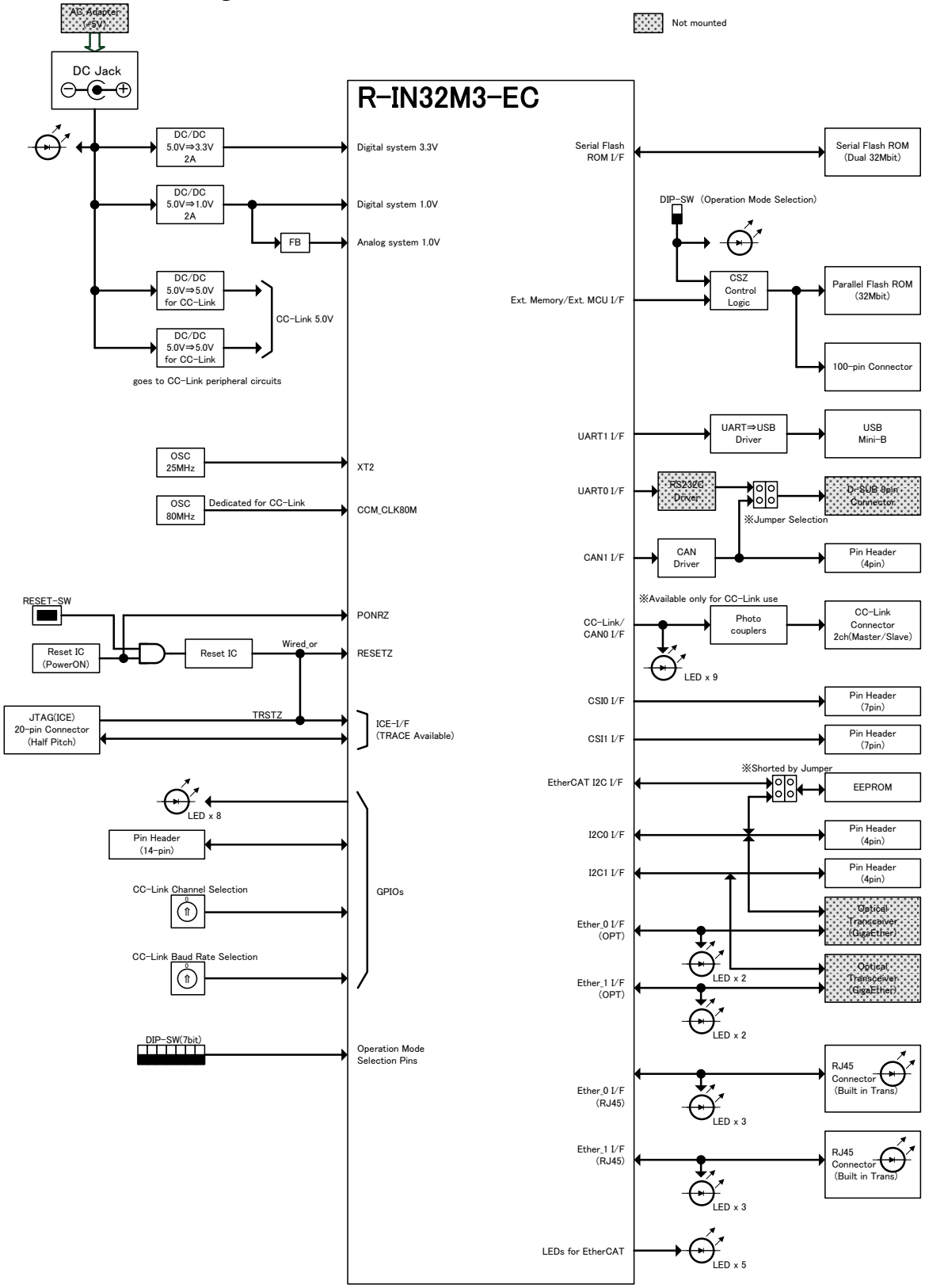
5.1. Component Side



5.2. Soldering Side



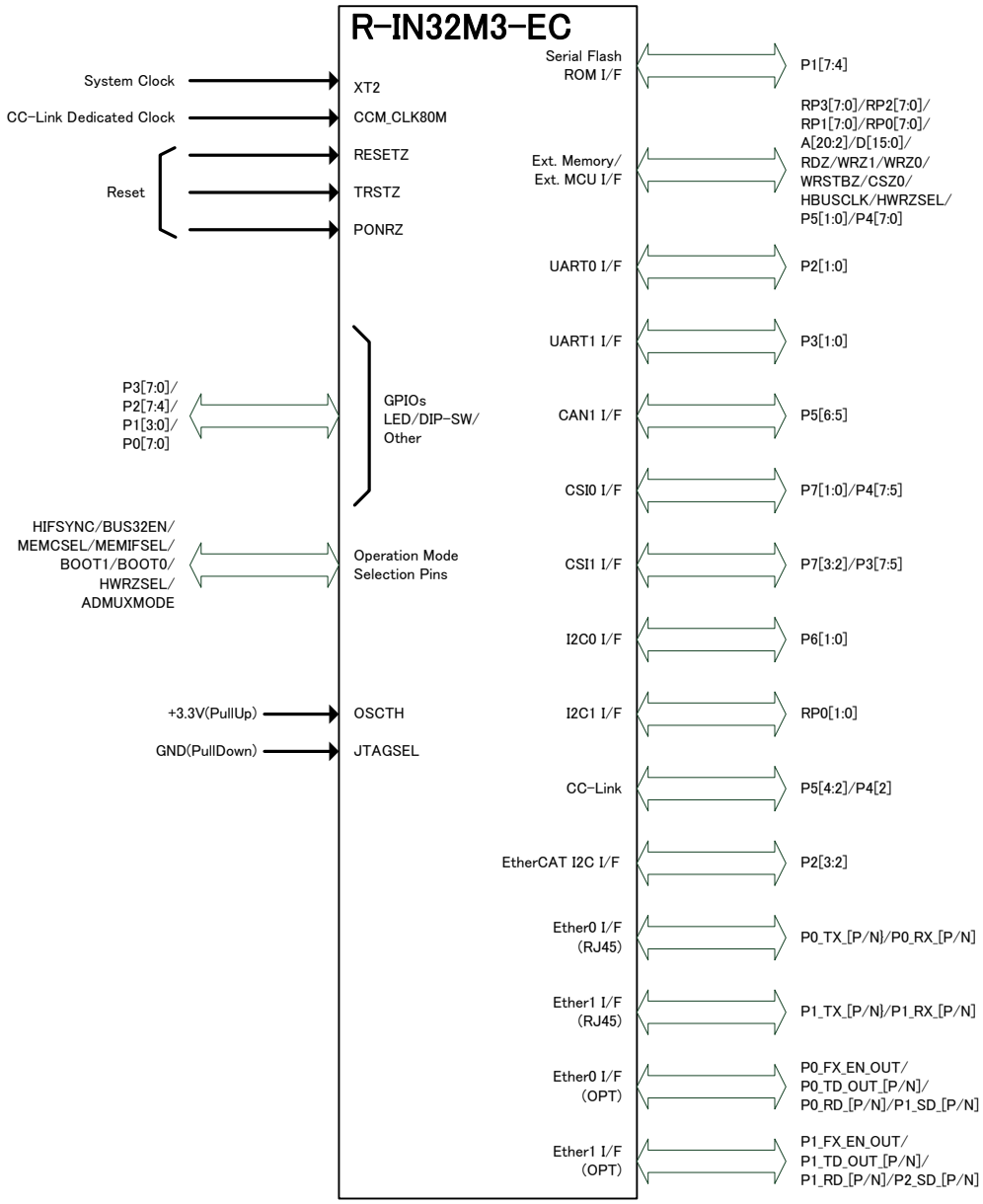
6. Board Block Diagram



7. Block Descriptions

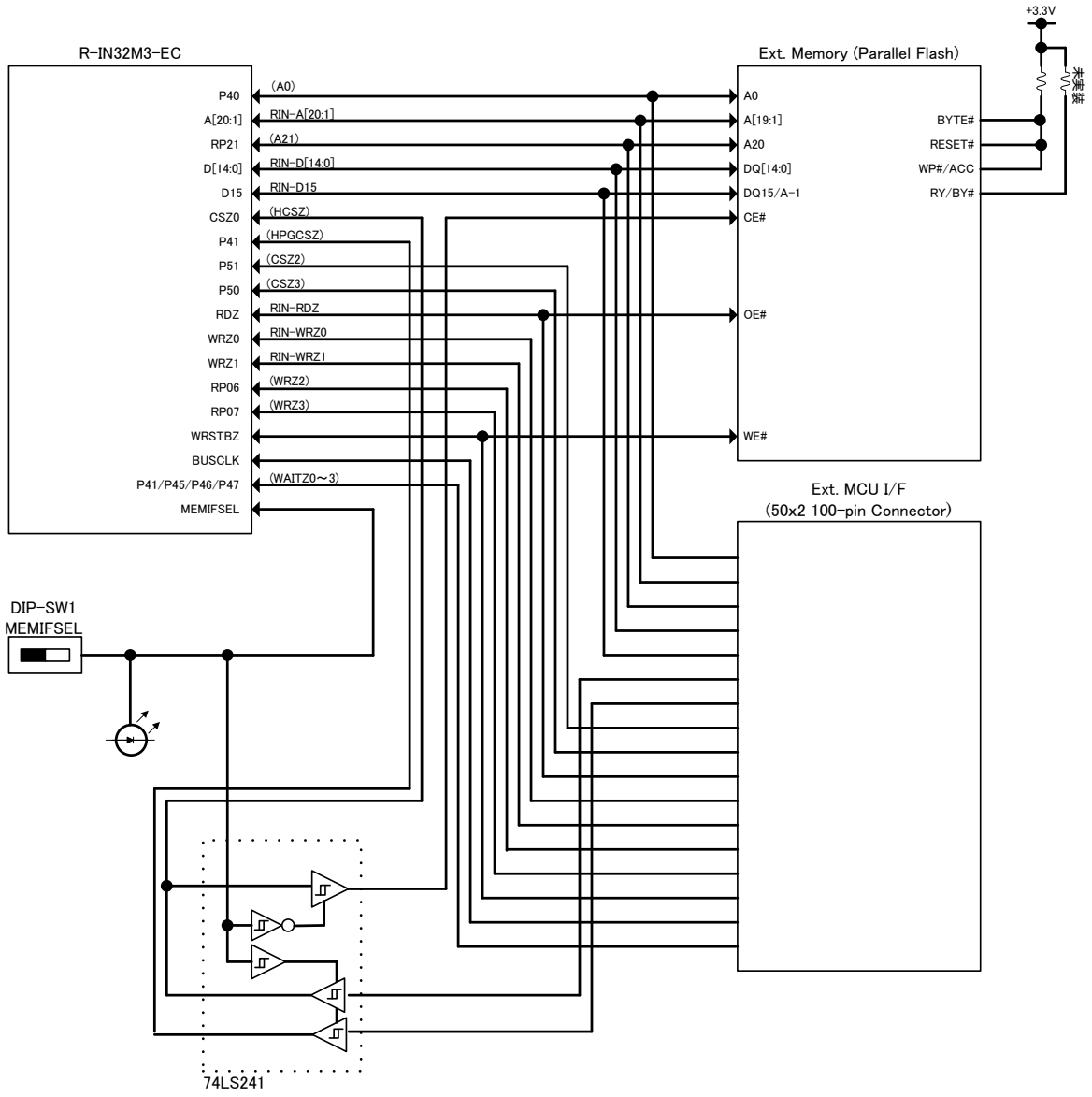
7.1. R-IN32M3-EC

Refer to the corresponding Renesas Electronics Corp. datasheet and user's manual for more details.



7.2. External Memory/External MCU Interface

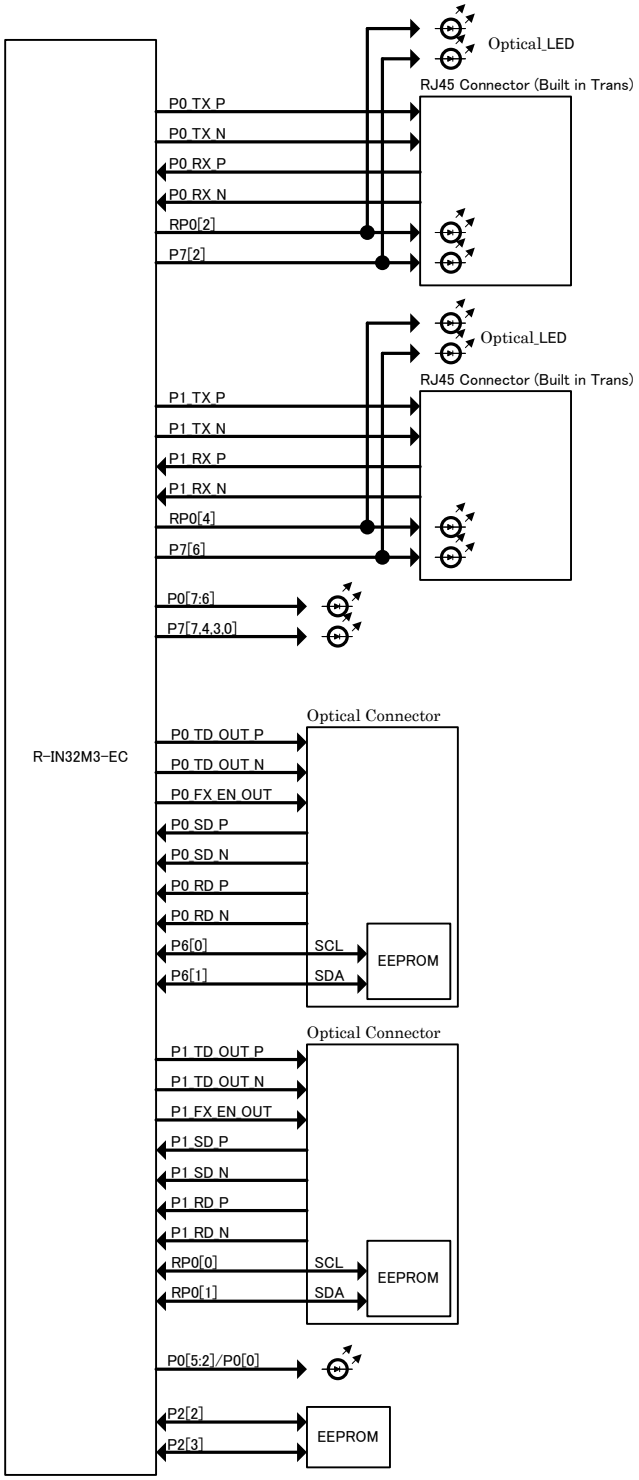
A flash memory (S29AL032D70TFI030 equivalent), is used for the external memory.
A 100-pin header (CN2) is available for interface with the external MCU.
DIP-SW (SW1) selects either external memory interface CSZ0 or external MCU interface HCSZ/HPGSCSZ.



7.3. Ethernet/EtherCAT

R-IN32M3-EC is equipped with on-chip 10/100Mbps Ethernet PHY. The board offers 2 channels of RJ45 connectors (CN16/CN17), which embed transformers. The board also offers 2 socket patterns for optical transceivers (CN6/CN7).

Please note that the optical transceiver components are not mounted.



The following LEDs are mounted for monitoring Ethernet.

※ Ethernet monitoring LEDs (RJ45 side)

Location on board:F-5

P0_10(Speed)	Green LED
P0_LINK(Link)	Green LED
P0_DUP(Dupex)	Green LED
P0_SPEED100LED	Yellow LED (in RJ-45 connector)
P0_ACTLEDZ	Green LED (in the RJ-45 connector)

Location on board:F-4

P1_10(Speed)	Green LED
P1_LINK(Link)	Green LED
P1_DUP(Dupex)	Green LED
P1_SPEED100LED	Yellon LED (in RJ-45 connector)
P1_ACTLEDZ	Green LED (in the RJ-45 connector)

※ Ethernet monitoring LEDs (Optical Transceiver Side)

Location on board:F-2

P0_100(Speed)	Green LED (not mounted)
P0_ACT(Act)	Green LED (not mounted)

Location on board:F-7

P1_100(Speed)	Green LED (not mounted)
P1_ACT(Act)	Green LED (not mounted)

※ EtherCAT monitoring LEDs

Location on board:F-4/F-5

ACT0(Link)	Green LED
ACT1(Link)	Green LED
RUN(Run)	Green LED
STER	Green LED : StateRUN, Red LED : CATLEDERR
ERR	Red LED (not mounted)

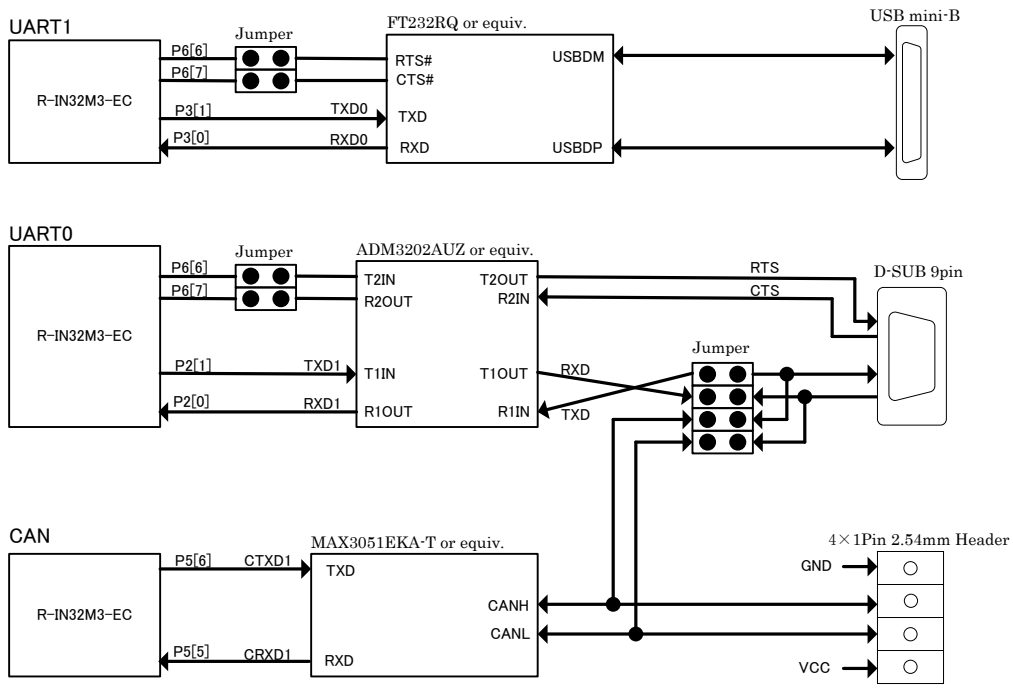
7.4. UART/CAN

UART0: The board offers an EIA-232E compliant transceiver chip via a D-SUB 9-pin connector (CN11) for the UART1 function of the R-IN32M3-EC chip, supporting the PC-communication in asynchronous mode.
Please note that D-SUB and other related components are not mounted.
TXD and TXD are wired by cross-connection.

UART1: The board offers an UART-to-USB chip for the UART0 function of the R-IN32M3-EC chip, supporting the PC-communication in asynchronous mode. A USB mini-B connector (CN9) is included for this connection.

CAN: The board offers a CAN driver chip for the R-IN32M3-EC chip, supporting CAN communication with a 4 x 1 pin header (CN13, 2.54 mm pitch).

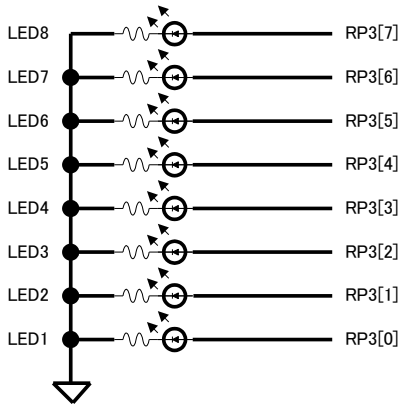
A jumper header pattern is available to select CAN or UART0 for the D-SUB connector (CN11). Please note that the jumper part is not mounted.



7.5. I/O Ports

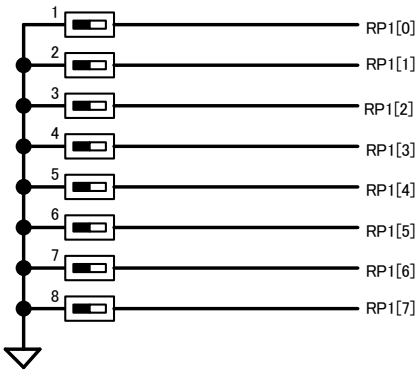
8 green LEDs, an 8-bit DIP switch (SW 6), and a14-hole pin header (CN14) are connected to I/O ports of the R-IN32M3-EC chip. LEDs turn on when respective ports are set to High. LED location on board: C-3

LED
(LED1～LED8)

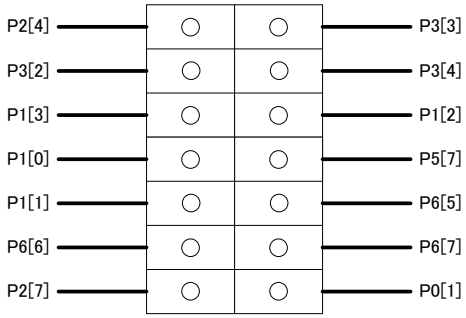


When you use each port connected to a DIP switch for a non-input function, please set the respective DIP switch to OFF.

DIP-SW
(SW6)

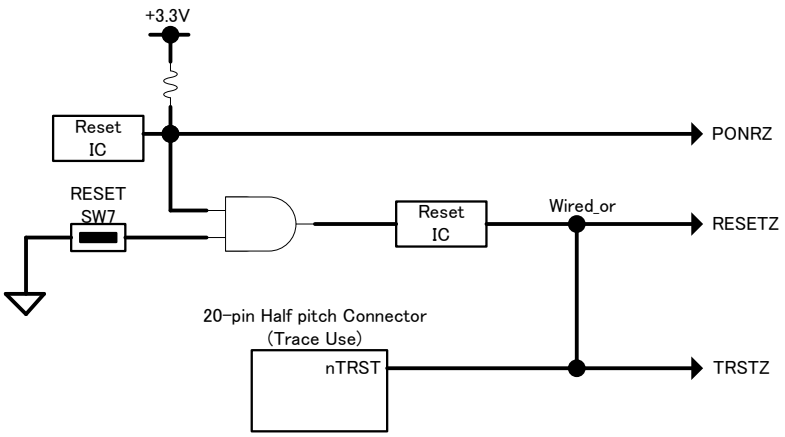


Pin Header
(CN14)



7.6. Reset

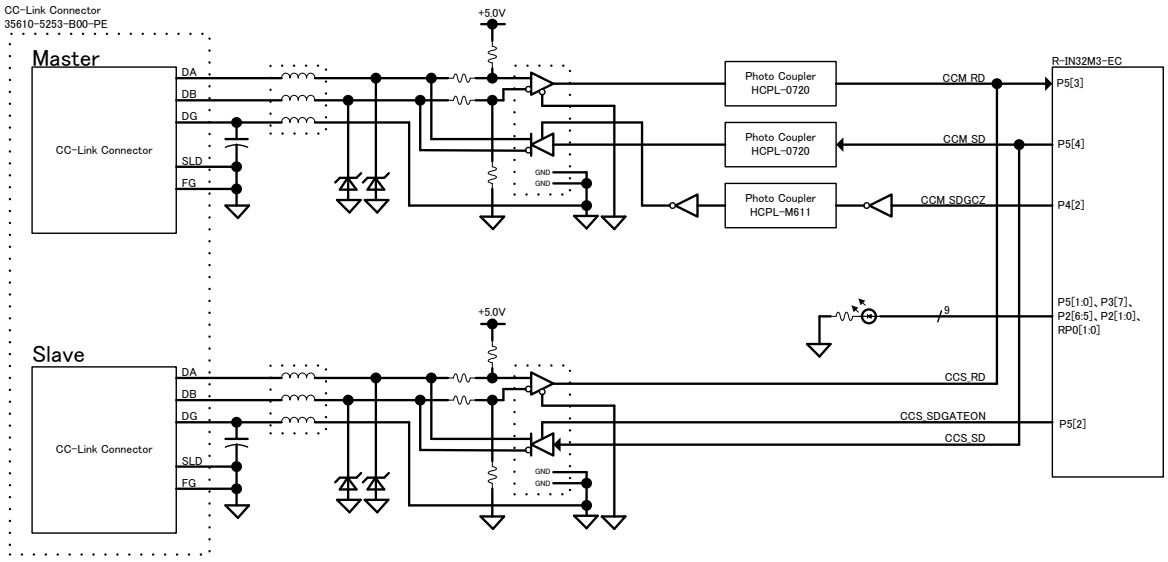
When the board is powered, push the reset button (SW7) or apply a reset signal via 20-pin half-pitch connector (CN1) to reset all board resources. During power-on reset, the on-chip RAM is also reset.



* PONRZ and RESETZ must be 20ms and 40ms LOW respectively during Power ON
* Push Switch SW7 must apply at least 20ms LOW.

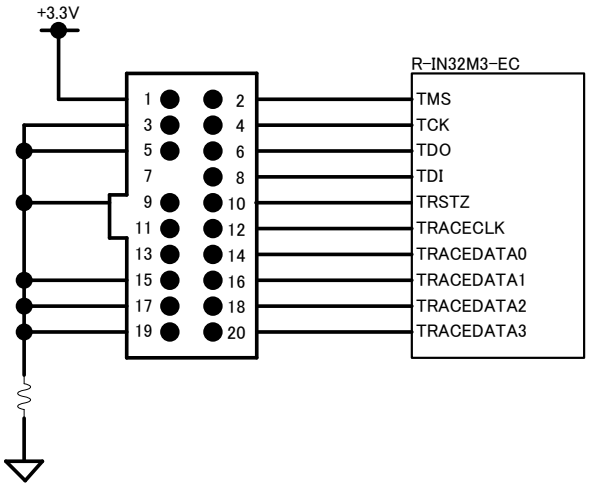
7.7. CC-Link (Slave)

The board offers photo-couplers and RS485 transceivers, and filters for the R-IN32M3-EC chip, supporting CC-Link (Slave) communication. Connector 35610-5253-B00-PE (CN8) is also mounted on the board; the upper side is the Don't Used and the lower side the Slave.



7.8. 20-pin Half Pitch Connector (trace supported)

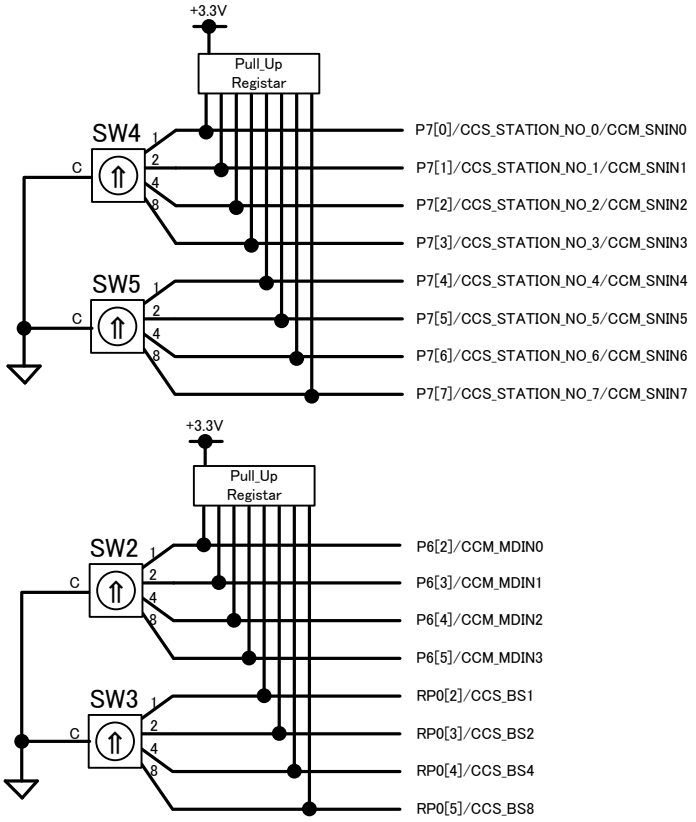
This connector connects ICE to the CPU in the R-IN32M3-EC chip.
The connector is a 10 x 2 pin header (CN1) with 1.27 mm pitch.
* To avoid incorrect insertion, pin 7 is pulled out.
* Signal TRSTZ is wired-OR connected to signal RESETZ pin.



7.9. Rotary Switches SW2 / SW3 / SW4 / SW5 for CC-Link setting.
Rotary switches SW4 and SW5 are provided for the CC-Link channel selection. Rotary switches SW2 and SW3 are provided for the CC-Link mode selection.

Each rotary switch has 4 settings. SW3 is assigned for Slave (lower 4 bits).

SW4 and SW5 are assigned for the channel selection (Slave).



8. DIP-SW Configuration

8.1. SW1　Mode Selection
Location: B-5
Board Silk: SW1
Part #: Omron A6HF-8102-PM (or equivalent part)
SW1 is an 8-bit DIP switch connected to the I/O ports of the R-IN32M3-EC chip. SW 1 defines the operation mode of the R-IN32M3-EC chip. The OFF and ON settings of the switch represent L- and H-levels respectively.

* Default factory setting: all OFF positions

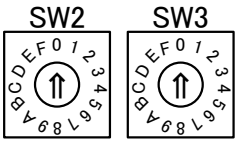
SW1		Level		Pin Name	Boot Mode Selection
2	1	2	1		
ON	ON	H	H	BOOT1 BOOT0	Instruction Ram Boot (Debug only)
ON	OFF	H	L		Ext. MCU Boot
OFF	ON	L	H		Ext. Serial Flash ROM Boot
OFF	OFF	L	L		Ext. Memory Boot

SW1 3	Level	Pin Name	Ext. Memory I/F Bus Width Selection
OFF	L	BUS32EN	16-bit Bus
ON	H		32-bit Bus
SW1 4	Level	Pin Name	Ext. Memory I/F Type Selection
OFF	L	MEMIFSEL	Slave Memory I/F
ON	H		Ext. MCU I/F
SW1 5	Level	Pin Name	Ext. MCU I/F HWRZ/HBENZ Selection
OFF	L	HWRZSEL	HBENZ is selected
ON	H		HWRZ is selected
SW1 6	Level	Pin Name	Ext. MCU I/F Operation Mode Selection
OFF	L	HIFSYNC	Asynchronous SRAM Interface
ON	H		Synchronous SRAM Interface
SW1 7	Level	Pin Name	Ext. Memory Controller Setting
OFF	L	MEMCSEL	Asynchronous SRAM MEMC
ON	H		Synchronous burst access MEMC
SW1 8	Level	Pin Name	Ext. Memory I/F Address MUX Selection
OFF	L	ADMUXMODE	Connect in parallel
ON	H		Address bus is MUXed on data bus

8.2. Switches SW2 and SW3: CC-Link Mode Selection
Location: F-10
Board Silk: SW2 and SW3
Part #: otax KUDR162SE / KUDR102SE (or equivalent parts)

Switches SW2 and SW3 are 4-bit rotary switches connected to I/O ports of the R-IN32M3-EC chip and are used to select the CC-Link operation mode. The I/O ports connected to the switches can be set to either input or output ports by software.

Note: When you use I/O ports connected to SW2 and SW3 as the output ports, SW2 and SW3 must be set to the "F" position.



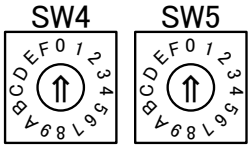
* Default factory setting: Both SW2 and SW3 are set to "F"

SW	Code	Position																Signal Name	R-IN32M3-EC Pin Name
		0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F		
2	1	●		●		●		●		●		●		●		●		CCM_MDIN0	P62
	2	●	●			●	●			●	●			●	●			CCM_MDIN1	P63
	4	●	●	●	●					●	●	●	●					CCM_MDIN2	P64
	8	●	●	●	●	●	●	●	●									CCM_MDIN3	P65
value of a port		0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F		

SW	Code	Position																Signal Name	R-IN32M3-EC Pin Name
		0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F		
3	1	●		●		●		●		●		●		●		●		CCS_BS1	RP02
	2	●	●			●	●			●	●			●	●			CCS_BS2	RP03
	4	●	●	●	●					●	●	●	●					CCS_BS4	RP04
	8	●	●	●	●	●	●	●	●									CCS_BS8	RP05
value of a port		0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F		

8.3. Switches SW4 and SW5: CC-Link Channel Selection
Location: E-10
Board Silk: SW4 and SW5
Part #: otax KUDR102SE (or equivalent part)

SW4 and SW5 are 4-bit rotary switches connected to I/O ports of the R-IN32M3-EC chip. The I/O ports connected to the switches can be set to either input or output ports by software.
* The LED will turn on when the respective switch is set to black dot positions.
Note: When you use I/O ports connected to SW4 and SW5 as the output ports, SW4 and SW5 must be set to the "F" position.



* Default factory setting: Both SW4 and SW5 are set to "F".

SW	Code	Position																Signal Name	R-IN32M3-EC Pin Name
		0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F		
4	1	●		●		●		●		●		●		●		●		CCS_STATION_NO_0/CCM_SNIN0	P70
	2	●	●			●	●			●	●			●	●			CCS_STATION_NO_1/CCM_SNIN1	P71
	4	●	●	●	●					●	●	●	●					CCS_STATION_NO_2/CCM_SNIN2	P72
	8	●	●	●	●	●	●	●	●									CCS_STATION_NO_3/CCM_SNIN3	P73
value of a port		0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F		

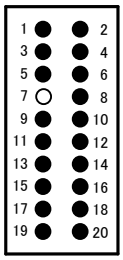
SW	Code	Position																Signal Name	R-IN32M3-EC Pin Name
		0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F		
5	1	●		●		●		●		●		●		●		●		CCS_STATION_NO_4/CCM_SNIN4	P74
	2	●	●			●	●			●	●			●	●			CCS_STATION_NO_5/CCM_SNIN5	P75
	4	●	●	●	●					●	●	●	●					CCS_STATION_NO_6/CCM_SNIN6	P76
	8	●	●	●	●	●	●	●	●									CCS_STATION_NO_7/CCM_SNIN7	P77
value of a port		0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F		

8.4. Switch SW6: User Setting
Location: B-2
Board Silk: SW6
Part #: Omron A6HF-8102-PM (or equivalent part)

SW6 is an 8-bit DIP switch connected to I/O ports of the R-IN32M3-EC chip. The I/O ports connected to the switch can be set to either input or output ports by software.
The OFF and ON settings of the switch represent L- and H-levels respectively.
Note: When you use I/O ports connected to SW6 as the output ports, the respective switch bits of SW6 must be set to OFF positions.
* Default factory setting: all OFF positions

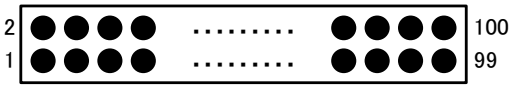
9. Connector Pin Definition

9.1. 20-pin Half-Pitch Connector (for Trace)
Location: B-6
Board Silk: CN1
Type: 10 × 2pin header, 1.27 mm pitch
Part #: SAMTEC FTSH-110-01-L-DV (or equivalent part)
* Pin 7 is removed to avoid incorrect insertion.



Pin #	I/O	Sig. Name	R-IN32M3-EC Pin Name	Pin #	I/O Dir.	Signal Name	R-IN32M3-EC Pin Name
1	–	(Vtref)	–	11	–	TgrPwr	–
2	Output	TMS	TMS	12	Input	TRACECLK	TRACECLK
3	–	GND	–	13	–	TgrPwr	–
4	Output	TCK	TCK	14	Input	TRACEDATA0	TRACEDATA0
5	–	GND	–	15	–	GND	–
6	Output	TDO	TDO	16	Input	TRACEDATA1	TRACEDATA1
7	–	–	–	17	–	GND	–
8	Input	TDI	TDI	18	Input	TRACEDATA2	TRACEDATA2
9	–	GND	–	19	–	GND	–
10	Output	nRESET	TRSTZ	20	Input	TRACEDATA3	TRACEDATA3

9.2. External MCU Interface (I/F) Connector
Location: E-1
Board Silk: CN2
Type: 50 x 2 pin header, 0.6 mm pitch
Part #: HRS FX8C-100P-SV1 (92) (or equivalent part)



External Memory I/F

Pin #	I/O Dir.	Signal Name	Pin #	I/O Dir.	Signal Name
1	–	+3.3V	2	–	+3.3V
3	Output	P40(A1)	4	Output	A2
5	Output	A3	6	Output	A4
7	Output	A5	8	Output	A6
9	Output	A7	10	Output	A8
11	Output	A9	12	Output	A10
13	Output	A11	14	Output	A12
15	Output	A13	16	Output	A14
17	Output	A15	18	Output	A16
19	Output	A17	20	Output	A18
21	Output	A19	22	Output	A20
23	–	GND	24	–	GND
25	I/O	D0	26	I/O	D1
27	I/O	D2	28	I/O	D3
29	I/O	D4	30	I/O	D5
31	I/O	D6	32	I/O	D7
33	I/O	D8	34	I/O	D9
35	I/O	D10	36	I/O	D11
37	I/O	D12	38	I/O	D13
39	I/O	D14	40	I/O	D15
41	–	GND	42	–	GND
43	Output	WRSTBZ	44	Input	P43(HBUSCLK) *2
45	Input	P45(WAITZ1) *2	46	Output	RSTOUTZ *2
47	Input	P46(WAITZ2) *2	48	Input	NMIZ *2
49	Output	P42(HERROUTZ) *2	50	Output	WRZ0/BENZ0
51	Input	P47(WAITZ3) *2	52	Input	P41(WAITZ)
53	Output	RDZ	54	Output	WRZ1/BENZ1
55	Output	RP21(A21)	56	I/O	RP34(D20)
57	Output	RP23(A23)	58	I/O	RP36(D22)
59	–	GND	60	–	GND
61	Output	RP24(A24)	62	I/O	RP35(D21)
63	Output	RP22(A22)	64	I/O	RP37(D23)
65	Output	RP25(A25)	66	I/O	RP10(D24)
67	Output	RP27(A27)	68	I/O	RP11(D25)
69	Output	RP26(A26)	70	I/O	RP12(D26)
71	Output	RP20(BCYSTZ)	72	I/O	RP13(D27)
73	I/O	RP30(D16)	74	I/O	RP14(D28)
75	I/O	RP32(D18)	76	I/O	RP15(D29)
77	I/O	RP33(D19)	78	I/O	RP16(D30)
79	I/O	RP31(D17)	80	I/O	RP17(D31)
81	Output	P51(CSZ2)	82	I/O	RP01 *2
83	–	GND	84	–	GND
85	Output	P50(CSZ3)	86	I/O	RP00 *2
87	Output	RP07(WRZ3/BENZ3)	88	Output	CSZ0 *2
89	Output	RP06(WRZ2/BENZ2)	90	Output	P44(CSZ1) *2
91	I/O	RP05 *2	92	Output	CSZ1(thru 241) *1
93	I/O	RP04 *2	94	I/O	RP02 *2
95	Output	CSZ0(thru 241) *1	96	Output	HWRZSEL *2
97	I/O	RP03 *2	98	Output	BUSCLK
99	–	+3.3V	100	–	+3.3V

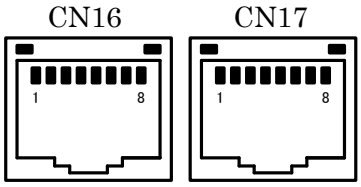
*1: The signal is output through 74S241.
*2: The signal is not used.

External MCU I/F

Pin #	I/O Dir.	Signal Name	Pin #	I/O Dir.	Signal Name
1	–	+3.3V	2	–	+3.3V
3	Input	P40(HA1)	4	Input	A2
5	Input	A3	6	Input	A4
7	Input	A5	8	Input	A6
9	Input	A7	10	Input	A8
11	Input	A9	12	Input	A10
13	Input	A11	14	Input	A12
15	Input	A13	16	Input	A14
17	Input	A15	18	Input	A16
19	Input	A17	20	Input	A18
21	Input	A19	22	Input	A20
23	–	GND	24	–	GND
25	I/O	HD0	26	I/O	HD1
27	I/O	HD2	28	I/O	HD3
29	I/O	HD4	30	I/O	HD5
31	I/O	HD6	32	I/O	HD7
33	I/O	HD8	34	I/O	HD9
35	I/O	HD10	36	I/O	HD11
37	I/O	HD12	38	I/O	HD13
39	I/O	HD14	40	I/O	HD15
41	–	GND	42	–	GND
43	Input	WRSTBZ(HWRSTBZ)	44	Input	P43(HBUSCLK)
45	Output	P45(WAITZ1) *2	46	Output	RSTOUTZ *2
47	Output	P46(WAITZ2) *2	48	Input	NMIZ *2
49	Output	P42(HERROUTZ)	50	Input	WRZ0(HWRZ0/HBENZ0)
51	Output	P47(WAITZ3) *2	52	Output	P41(HWAITZ)
53	Input	RDZ(HRDZ)	54	Input	WRZ1(HWRZ1/HBENZ1)
55	Input	RP21(A21) *2	56	I/O	RP34(D20)
57	Input	RP23(A23) *2	58	I/O	RP36(D22)
59	–	GND	60	–	GND
61	Input	RP24(A24) *2	62	I/O	RP35(D21)
63	Input	RP22(A22) *2	64	I/O	RP37(D23)
65	Input	RP25(A25) *2	66	I/O	RP10(D24)
67	Input	RP27(A27) *2	68	I/O	RP11(D25)
69	Input	RP26(A26) *2	70	I/O	RP12(D26)
71	Input	RP20(HBCYSTZ)	72	I/O	RP13(D27)
73	I/O	RP30(D16)	74	I/O	RP14(D28)
75	I/O	RP32(D18)	76	I/O	RP15(D29)
77	I/O	RP33(D19)	78	I/O	RP16(D30)
79	I/O	RP31(D17)	80	I/O	RP17(D31)
81	Input	P51(CSZ2) *2	82	I/O	RP01 *2
83	–	GND	84	–	GND
85	Input	P50(CSZ3) *2	86	I/O	RP00 *2
87	Input	RP07(HWRZ3/HBENZ3)	88	Input	CSZ0(HCSZ)
89	Input	RP06(HWRZ2/HBENZ2)	90	Input	P44(HPGCSZ)
91	I/O	RP05 *2	92	Input	CSZ1(thru 241) *2
93	I/O	RP04 *2	94	I/O	RP02 *2
95	Input	CSZ0(thru 241) *2	96	Output	HWRZSEL *2
97	I/O	RP03 *2	98	Output	BUSCLK *2
99	–	+3.3V	100	–	+3.3V

*2: The signal is not used.

9.3. Ethernet/Ether CAT Connectors
Location: H-4
Board Silk: CN16 / CN17
Type: RJ-45 (built-in transformer and LED)、2 units
Part #: KOWA ELECTRONIC 62F-1204GYD2 (or equivalent part)



CN16

Pin #	I/O Dir.	Signal Name	R-IN32M3-EC Pin Name
1	Output	TX+	P0_TX_P
2	Output	TX−	P0_TX_N
3	Input	RX+	P0_RX_P
4	−	−	−
5	−	−	−
6	Input	RX−	P0_RX_N
7	−	−	−
8	−	−	−

CN17

Pin #	I/O Dir.	Signal Name	R-IN32M3-EC Pin Name
1	Output	TX+	P1_TX_P
2	Output	TX−	P1_TX_N
3	Input	RX+	P1_RX_P
4	−	−	−
5	−	−	−
6	Input	RX−	P1_RX_N
7	−	−	−
8	−	−	−

9.4. I2C Connector
Location: B-5
Board Silk: CN4 and CN5
Type: 4 x 1 pin header (2 units), 2.54 mm pitch
Part #: HTK FFC-4AMEP1 (or equivalent part)

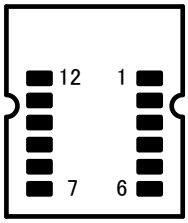
CN4

Pin #	I/O Dir.	Signal Name	R-IN32M3-EC Pin Name
1	−	GND	−
2	I/O	SCL0	RP00
3	I/O	SDA0	RP01
4	−	+3.3V	−

CN5

Pin #	I/O Dir.	Signal Name	R-IN32M3-EC Pin Name
1	−	GND	−
2	I/O	SCL0	P60
3	I/O	SDA0	P61
4	−	+3.3V	−

9.5. Ether(Net/CAT) Connector (Optical)
Location: H-3 and H-6
Board Silk: CN6 and CN7
Type: Optical Transceiver (2 channels)
Part #: AVAGO AFBR-5978Z (or equivalent part)
* Only print patterns, no components mounted



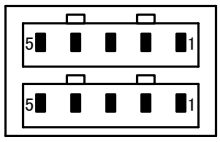
CN6

Pin #	I/O Dir.	Signal Name	R-IN32M3-EC Pin Name
1	I/O	Sda	P61
2	–	RxGND	–
3	–	RxVcc	–
4	Output	Sd	P0_SD_P/N
5	Output	Rdata–	P0_RD_N
6	Output	Rdata+	P0_RD_P
7	–	TxVcc	–
8	–	TxGND	–
9	Input	Txdis	P0_FX_EN_OUT
10	Input	Tdata+	P0_TD_OUT_P
11	Input	Tdata–	P0_TD_OUT_N
12	I/O	Scl	P60

CN7

Pin #	I/O Dir.	Signal Name	R-IN32M3-EC Pin Name
1	I/O	Sda	RP01
2	–	RxGND	–
3	–	RxVcc	–
4	Output	Sd	P1_SD_P/N
5	Output	Rdata–	P1_RD_N
6	Output	Rdata+	P1_RD_P
7	–	TxVcc	–
8	–	TxGND	–
9	Input	Txdis	P1_FX_EN_OUT
10	Input	Tdata+	P1_TD_OUT_P
11	Input	Tdata–	P1_TD_OUT_N
12	I/O	Scl	RP00

9.6. CC-Link Connector
Location: H-8
Board Silk: CN8
Type: 5-pin power clamp board mount head
Part #: 3M 35610-5253-B00 PE (or equivalent part)
＊A upper curtate is a lower-case a slave in a master(Don't Used).



Pin #	I/O Dir.	Signal Name
1	–	SLD
2	–	–
3	–	DG
4	I/O	DB
5	I/O	DA

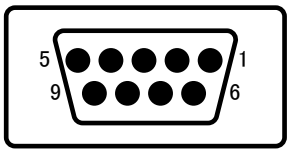
Pin #	I/O Dir.	Signal Name
1	–	SLD
2	–	–
3	–	DG
4	I/O	DB
5	I/O	DA

Since the above-mentioned splicing differs from spec, a cable splicing requires an attention.

9.7. UART Connector
Location: H-9
Board Silk: CN9
Type: USB mini-B
Part #: Molex 54819-0519 (or equivalent part)

Pin #	I/O Dir	Signal Name
1	–	(VBUS)
2	–	(ID)
3	I/O	D+
4	I/O	D–
5	–	GND

Location: C-10
Board Silk: CN11
Type: D-SUB 9-pin
Part #: HRS RDEF-9SE-LNA (50) (or equivalent part)
* This component is not mounted.



Pin #	I/O Dir.	Signal Name
1	–	(DCD)
2	O/O	TXD/CANL
3	I/O	RXD/CANH
4	–	(DSR)
5	–	GND
6	–	(DTR)
7	Input	CTS
8	Output	RTS
9	–	(RI)

9.8. CSI Connector
Location: B-4
Board Silk: CN10 and CN12
Type: 7 x 1 pin header (2 channels), 2.54mm pitch
Part #: HTK FFC-7AMEP1 (or equivalent part)

CN10

Pin #	I/O Dir.	Signal Name	R-IN32M3-EC Pin Name
1	I/O	CSISCK0	P45
2	–	GND	–
3	Input	CSISI0	P46
4	Output	CSISO0	P47
5	Output	CSICS00	P70
6	Output	CSICS01	P71
7	–	+3.3V	–

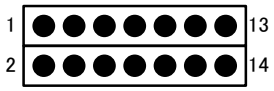
CN12

Pin #	I/O Dir.	Signal Name	R-IN32M3-EC Pin Name
1	I/O	CSISCK1	P35
2	–	GND	–
3	Input	CSISI1	P36
4	Output	CSISO1	P37
5	Output	CSICS10	P72
6	Output	CSICS11	P73
7	–	+3.3V	–

9.9. CAN Connector
Location: B-8
Board Silk: CN13
Type: 4 x 1 pin header, 2.54 mm pitch
Part #: HTK FFC-4AMEP1 (or equivalent part)

Pin #	I/O Dir.	Signal Name
1	–	GND
2	Input	CANH
3	Output	CANL
4	–	+3.3V

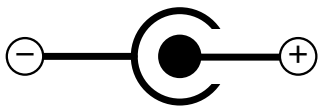
9.10. I/O Port Connector
Location: C-7
Board Silk: CN14
Type: 7 x 2 pin header, 2.54mm pitch
Part #: HTK FFC-14BMEP1 (or equivalent part)

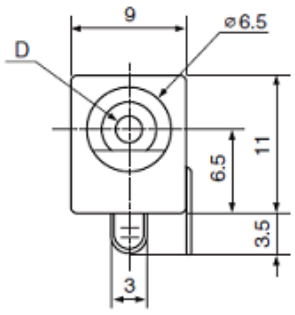


Pin #	I/O Dir.	Signal Name	R-IN32M3-EC Pin Name
1	I/O	Port1	P24
2	I/O	Port2	P33
3	I/O	Port3	P32
4	I/O	Port4	P34
5	I/O	Port5	P13
6	I/O	Port6	P12
7	I/O	Port7	P10
8	I/O	Port8	P57
9	I/O	Port9	P11
10	I/O	Port10	P65
11	I/O	Port11	P66
12	I/O	Port12	P67
13	I/O	Port13	P27
14	I/O	Port14	P01

* Default factory setting: 5-7 is shortened.

9.11. DC Power Jack
Location: B-9
Board Silk: CN15
Type: DC power jack
Part #: HOSIDEN HEC0470-01-630 (or equivalent part)





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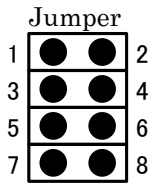
10. Jumper Setting

10.1. I2C for EtherCAT

Location: E-7
Board Silk: J1
Type: 4 × 2 pin header, 2.54mm pitch
Part #: HTK FFC-8BMEP1 (or equivalent part)

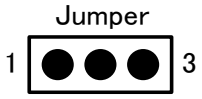


Jumper	Connection	
1 – 2	Short	EtherCAT R-IN32M3-EC P2[2] ⇔ EEPROM SCL
3 – 4	Short	EtherCAT R-IN32M3-EC P2[3] ⇔ EEPROM SDA
5 – 6	Short	I2C1 R-IN32M3-EC P6[0] ⇔ EEPROM SCL
7 – 8	Short	I2C1 R-IN32M3-EC P6[1] ⇔ EEPROM SDA

* Default factory setting: 1-2 and 3-4 are shortened.

10.2. EtherCAT EEPROM WP Pin

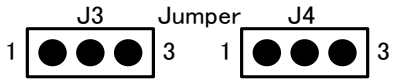
Location: D-7
Board Silk: J2
Type: 3 x 1 pin header, 2.54mm pitch
Part #: HTK FFC-3AMEP1 (or equivalent part)



Jumper	Connection	
1 – 2	Short	Write protect
2 – 3	Short	Write enable

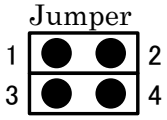
* Default factory setting: 2-3 is shortened.

10.3. EEPROM (Optical) Pin
Location: F-7/E-7
Board Silk: J3 and J4
Type: 3 x 1 pin header, 2.54mm pitch
Part #: HTK FFC-3AMEP1 (or equivalent part)
* The parts are not mounted



Jumper J3	SDA Connection	
1 – 2	Short	Optical_Ch1 ⇔ R-IN32M3-EC P6[1]
2 – 3	Short	Optical_Ch1 ⇔ R-IN32M3-EC RP0[1]
Jumper J4	**SCL Connection**	
1 – 2	Short	Optical_Ch1 ⇔ R-IN32M3-EC P6[0]
2 – 3	Short	Optical_Ch1 ⇔ R-IN32M3-EC RP0[0]

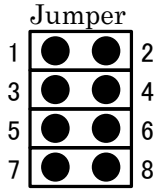
10.4. USB RTS and CTS Pins
Location: G-10
Board Silk: J5
Type: 2 x 2 pin header, 2.54mm pitch
Part #: HTK FFC-4BMEP1 (or equivalent part)



Jumper	Connection	
1 – 2	Short	Flow Control Available
3 – 4	Short	
1 – 3	Open	Flow Control Not Available
2 – 4	Short	

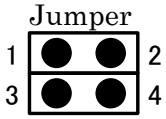
* Default factory setting: 1-3 is open and 2-4 is shortened.

10.5. UART / CAN Selection
Location: D-9
Board Silk: J6
Type: 4 x 2 pin header, 2.54mm pitch
Part #: HTK FFC-8BMEP1 (or equivalent part)
* The part is not mounted



Jumper	Connection	
1 – 2	Short	UART
3 – 4	Short	
5 – 6	Short	CAN
7 – 8	Short	

10.6. UART RTS and CTS Pins
Location: C-9
Board Silk: J7
Type: 2 x 2 pin header, 2.54mm pitch
Part #: HTK FFC-4BMEP1 (or equivalent part)
* The part is not mounted



Jumper	Connection	
1 – 2	Short	Flow control available
3 – 4	Short	
1 – 3	Open	Flow control not available
2 – 4	Short	

10.7. CC-Link/LED and I2C_1
Location: E-7
Board Silk: J8 and J9
Type: 2 x 1 pin header, 2.54mm pitch
Part #: HTK FFC-2BMEP1 (or equivalent part)

Jumper	Connection
Short	CC-Link LED Activity
Open	I2C_1 Activity

* Default factory setting: shortened.

11. Table of Unused Pins and Pads

11.1. Monitor Pins
The following table shows monitoring pins.
Test Pin Part #: MAC8 HK-5-G (Red/Black/White) (or equivalent part)

Device	Pin Name	Location	Note
Power Supply	C+5.0V	E-8	CC-Link Power
	C+5.0VM	F-8	CC-Link Power
	+5.0V	B-9	Power Supply
	+3.3V	B-8	I/O Power
	+1.0V	C-5	Core Power
	+1.5V	D-5	PHY Power (LX)
Ground	GND	G-2	Component Side
	GND	C-4	Component Side
	GND	F-6	Component Side
	GND	B-7	Component Side
	GND	G-10	Component Side
	GND	B-10	Component Side
	GND	G-2	Solder Side (no part)
	GND	B-2	Solder Side (no part)
	GND	G-10	Solder Side (no part)
	GND	C-8	Solder Side (no part)
R-IN32M3-EC	HBUSCLK	E-3	Clock for Ext. MCU
	BUSCLK	C-2	Clock for Ext. Memory

11.2. PAD Connection Pins
The following pins of the R-IN32M3-EC chip and others are connected to probing pads.
Type: test use 0.5mm pad

Device	Pin Name	PAD Pin #	PAD Connection State
R-IN32M3-EC	NMIZ	PAD15	-
	RSTOUTZ	PAD5	-
	EXTRES	PAD18	Connect to GND via Pull-down resister
	ATP	PAD17	Open
	TEST1	PAD11	Connect to GND
	TEST2	PAD12	Connect to GND
	TEST3	PAD13	Connect to GND
	TMC1	PAD6	Connect to GND
	TMC2	PAD7	Connect to GND
	TMODE0	PAD8	-
	TMODE1	PAD9	-
	TMODE2	PAD10	-
	XT1	PAD3	Connect to GND
	TESTDOUT5	PAD14	Open
	XT2	PAD2	-
	CCM_CLK80M	PAD1	-
	P02	PAD23	-
	P03	PAD24	-
	P04	PAD25	-
	P05	PAD26	-
	P06	PAD27	-
	P07	PAD28	-
Parallel_Flash	RY/BY#	PAD16	Connect to +3.3V via Pull-up register
Reset	PONRZ	PAD29	-
	RESETZ	PAD30	-
	TRSTZ	PAD4	-
D-SUB	PIN1	PAD22	Open
	PIN4	PAD20	Open
	PIN6	PAD21	Open
	PIN9	PAD19	Open
Power Supply	PE+3.3V	PAD31	Open

11.3. Unused Pins
The following R-IN32M3-EC pins are not used.

Pin Name	Unused Pin State
ATP	Open
TEST1	Connect to GND
TEST2	Connect to GND
TEST3	Connect to GND
TMC1	Connect to GND
TMC2	Connect to GND
TMODE0	Connect to GND
TMODE1	Connect to GND
TMODE2	Connect to GND
XT1	Connect to GND
TESTDOUT5	Open

12. Default factory setting

12.1. DIP-SW/Rotary-SW

SW	Value
SW1	All OFF
SW2	F
SW3	F
SW4	F
SW5	F
SW6	All OFF

12.2. Jumper/connecter

Jumper	Set
J1	1-2 : shortened 3-4 : shortened
J2	2-3 : shortened
J5	1-3 : open 2-4 : shortened
J8	shortened
J9	shortened
CN14	5-7 : shortened

12.3. MAC Address

We specify the MAC address with the sticker in the board solder side.

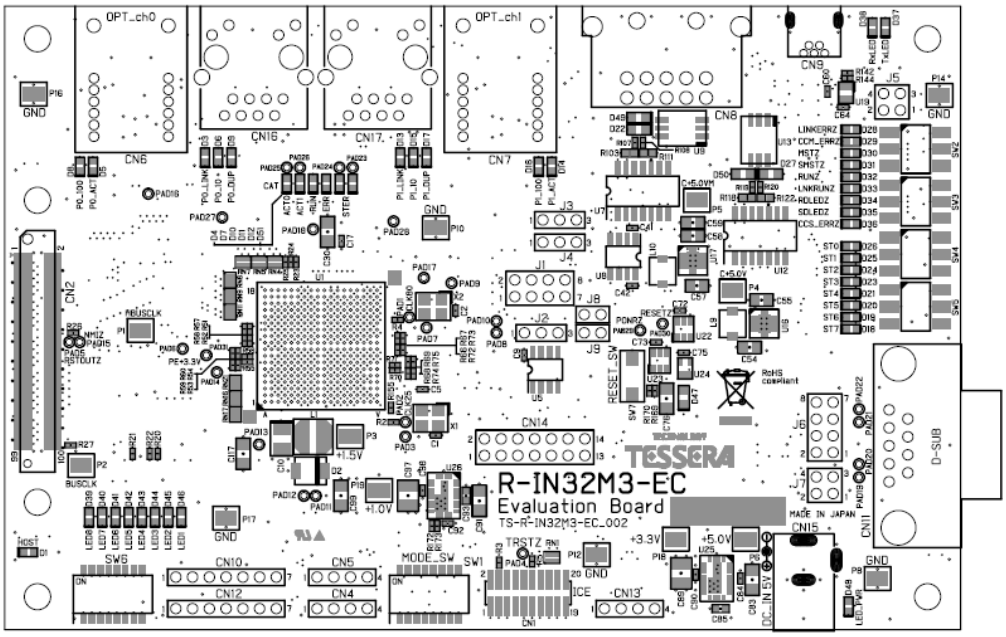
Moreover, it is stored in the following memory areas.

Serial flash memory : 6Byte from 0x003F_F000

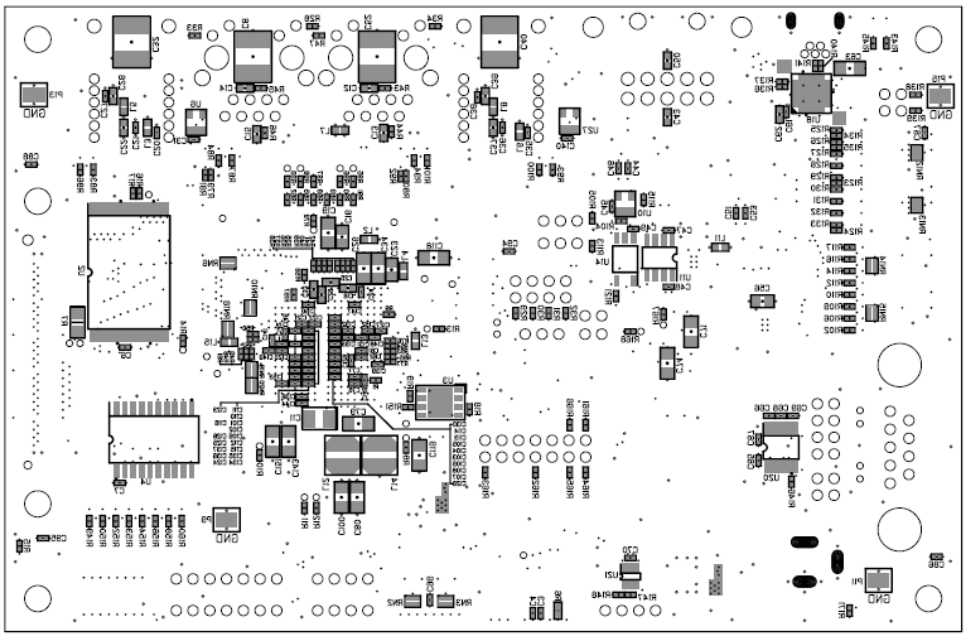
Attention:
When just use an MAC address; the address domain mentioned above
Please do not do removal or renewal.

13. Substrate outline drawing

(1) Board Component Side



(2) Board Soldering Side



(3) External configuration size