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M3A-2114G22

Product Standards

32172/32173 Group Evaluation Board

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M32R Technical Support,
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Summary of changes

Version	Date	Content
1.00	'01.11.2	Made.
1.11	'03.8.29	Added connection diagram and component table.
1.12	'03.11.10	Corrected terminal names of M32172 in connection diagram.

Contents

1	OVERVIEW	2
1.1	OUTLINE OF THE M3A-2114	2
1.2	SYSTEM CONFIGURATION	2
1.3	EXTERNAL SPECIFICATIONS	3
1.4	EXTERNAL VIEW	4
1.5	BLOCK DIAGRAM	5
1.6	SYSTEM CONFIGURATION USING THE M3A-2114	6
1.7	ABSOLUTE MAXIMUM RATINGS	8
1.8	OPERATING CONDITIONS	8
2	FUNCTIONAL DESCRIPTION	9
2.1	OUTLINE FUNCTIONS	9
2.1.1	Limitations on Functionality	9
2.2	SPECIFICATION OF THE OPERATION CHECK CONNECTOR	10
2.3	POWER SUPPLY CONFIGURATION	11
2.4	FP SELECT CIRCUIT	13
2.5	MOD SELECT CIRCUIT	15
2.6	SERIAL INPUT/OUTPUT CIRCUIT (SI/O0)	16
2.7	RTD COMMUNICATION PORTS	18
2.8	OSCILLATOR CIRCUIT	20
2.9	DISPLAY LEDES	21
2.10	INTERFACING TO SERIAL ROM PROGRAMMER (SI/O1)	22
2.11	PORT INPUT CONTROL CIRCUIT	23
2.12	ANALOG PORT INPUT CONTROL CIRCUIT	24
2.13	INTERFACING TO A CAN-INSTALLED SYSTEM	25
2.14	SPECIFICATIONS OF THE JTAG CONNECTOR	28

Appendix

Appendix 1	Pin Layout of the Operation Check Connector	-----	Appendix 1-1
-	For M32172F2VFP/M32173F2VFP	-----	Appendix 1-2
Appendix 2	Connection diagram and Component table	-----	Appendix 2-1

1 Overview

1.1 Outline of the M3A-2114

The M3A-2114, an evaluation board computer for the M32R/ECU #4 (hereafter abbreviated as the M32R/ECU), is provided for developing and evaluating the M32R/ECU application software. It is designed in such a way that you can experience the operation of the M32R/ECU core and the peripheral I/O functions it supports. Furthermore, it comes with a dedicated, simplified version of debugger (M3A-2190), use of which provides you with a pseudo-debugging environment.

* Caution: The M32R/ECU here represents the M32R/ECU #4 or M32R/ECU #4Light or M32R/ECU #4PD.

<Product type name>	<Useful MCU>
M3A-2114G02 =>	M32R/ECU #4 (M32170F3VFP, M32170F4VFP, M32170F6VFP) Socket mounted
M3A-2114G12 =>	M32R/ECU #4Light (M32171F3VFP, M32171F4VFP) Socket mounted
M3A-2114G22 =>	M32R/ECU #4PD (M32172F2VFP, M32173F2VFP) Socket mounted

1.2 System Configuration

The diagram below shows a general configuration of the evaluation system built around the M3A-2114.

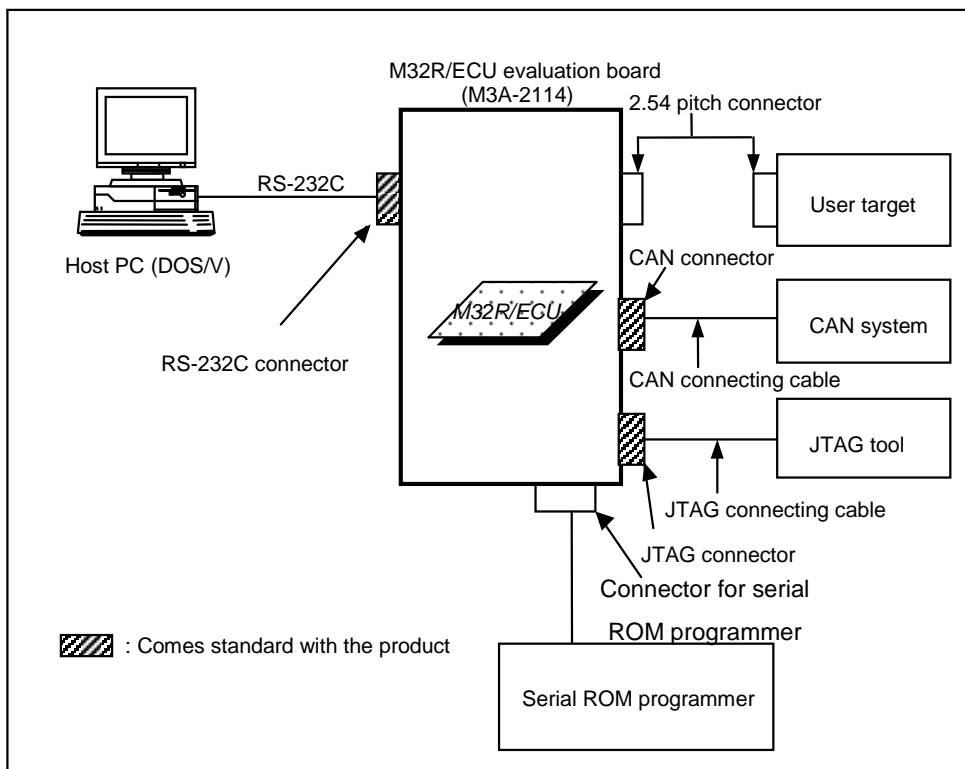


Figure 1.2.1 System Configuration

1.3 External Specifications

Table 1.3.1 lists external specifications of the M3A-2114.

Table 1.3.1 External Specifications

No.	Item	Content
1	RS-232C interface (CN4)	Used to serially communicate with the host PC (DOS/V)
2	RTD line connector (CN5)	Used to control the M32R/ECU's internal RTD from a RTD monitor tool
3	Operation check connectors (CN9, CN10)	Used to connect to the user target for evaluation of the M32R/ECU
4	CAN connector (CN7)	Used for CAN communication with other systems
5	JTAG connector (CN8)	Used to connect to JTAG tool
6	Connector for serial ROM programmer (CN6)	Used to control flash rewrite from a serial ROM programmer
7	5 V power supply connector (CN2)	Used to supply 5 V operating power for the board 1) Input voltage range: 4.75 V to 5.25 V
8	AVCC power supply connector (CN1)	Used to supply AVCC operating power for the board 1) Input voltage range: 4.75 V to 5.25 V
9	3.3 V power supply connector (CN3)	Used to supply 3.3V operating power for the board 1) Input voltage range: 3.14 V to 3.46 V
10	3.3 V power supply circuit	Generates 3.3 V operating power for the M32R/ECU from the 5 V power supply
11	Toggle switch	Consists of nine toggle switches used for the following functions: 1) M32R/ECU mode switching (0 V, 5 V) (toggle switch: red x 1) 2) Connected to M32R/ECU ports P130–137 for input control (toggle switch: yellow x 8)
12	Reset switch	Used to reset the M32R/ECU
13	Display LED	Consists of nine LEDs used to indicate the following: 1) Power input status judgment (LED: red x 1) 2) Connected to M32R/ECU ports P110–117 for indication of operating status (LED: red x 8)
14	Volume control	Connected to M32R/ECU ports AD0IN0-AD0IN3 for input control
15	External dimensions	Dimensions: 220 mm x 140 mm Mounting method: Mounted on both sides Board configuration: single board

1.4 External View

The diagram below shows an external view of the evaluation board.

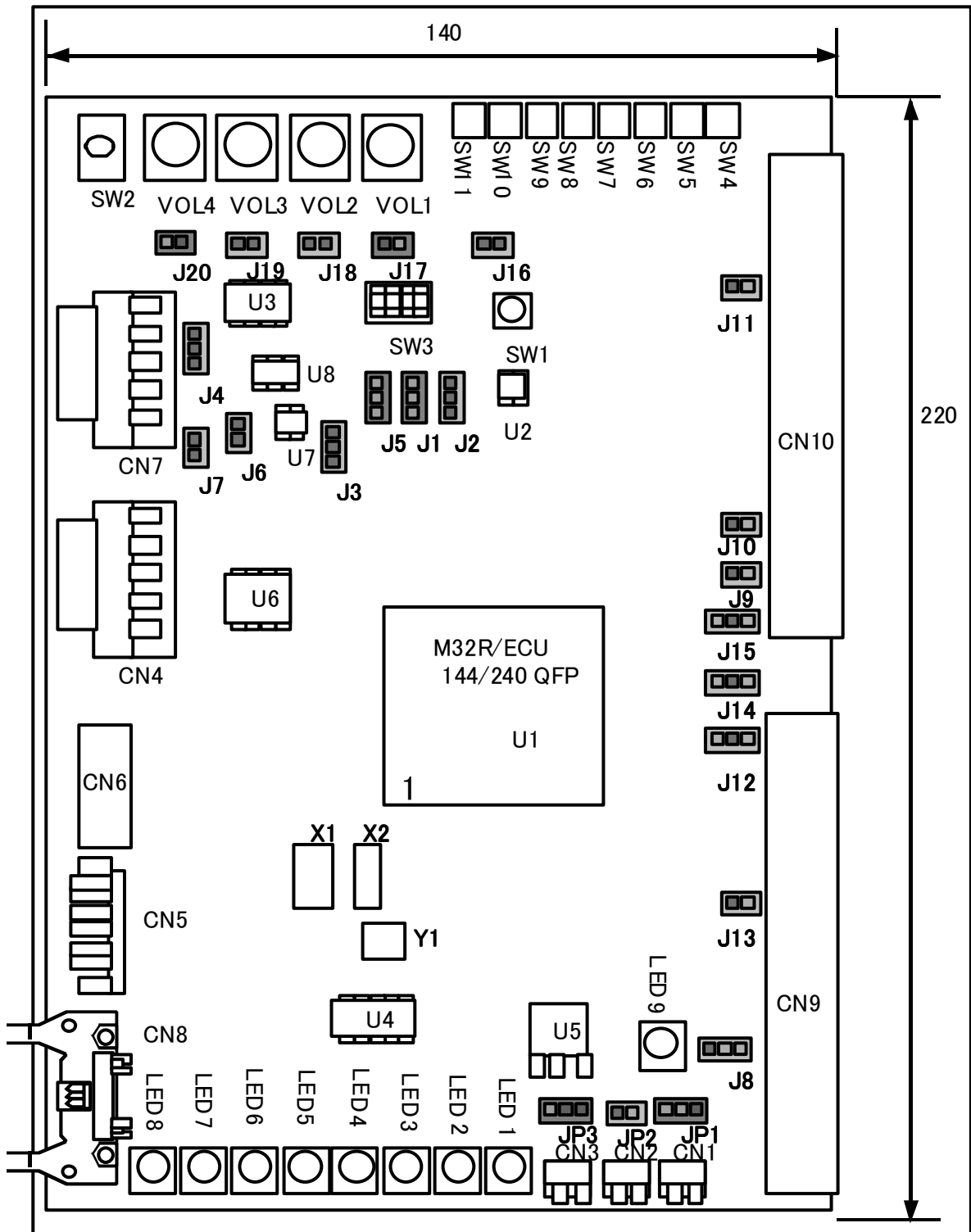
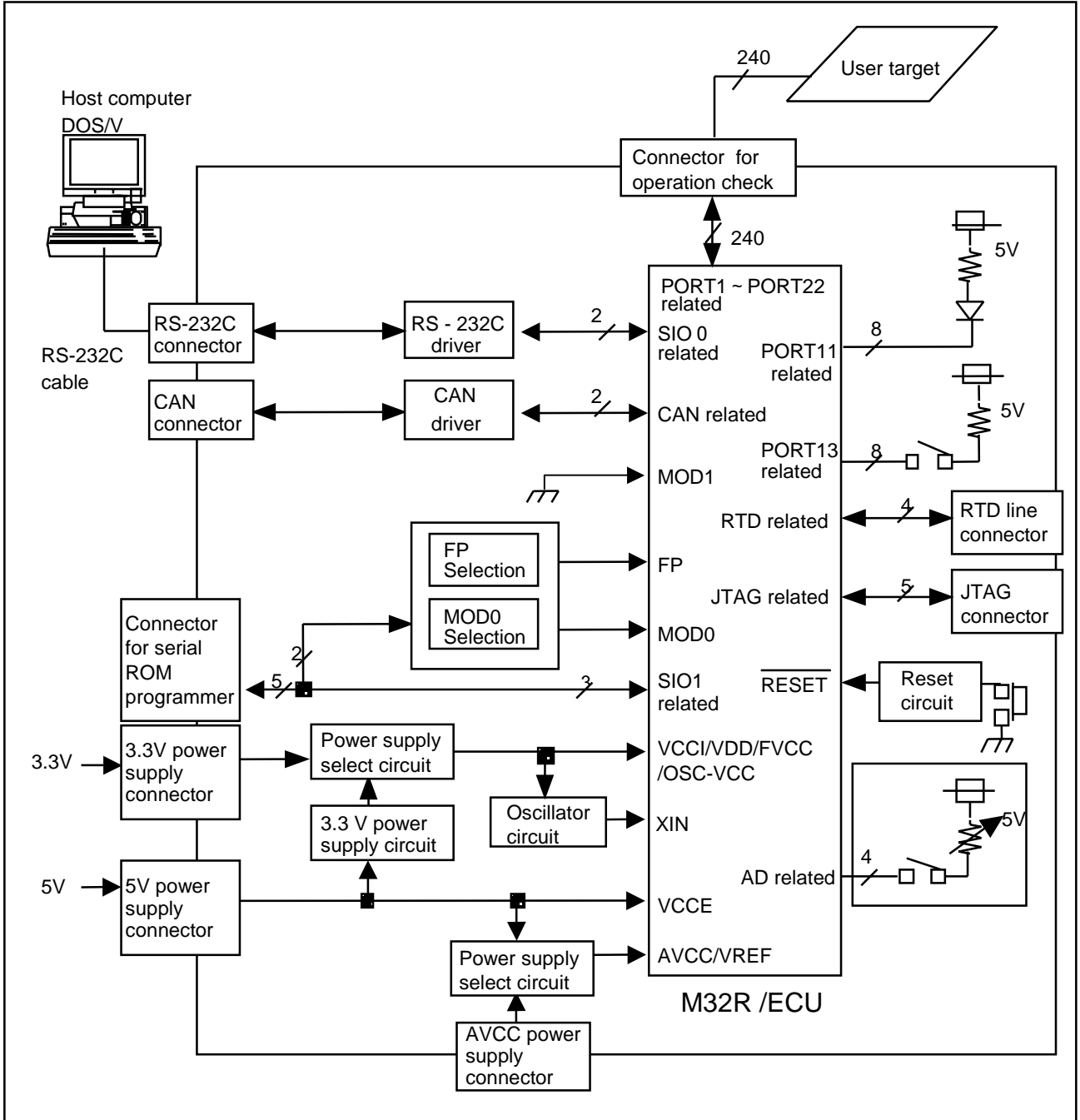


Figure 1.4.1 External View

1.5 Block Diagram

Shown below is a block diagram of the evaluation system.

Figure 1.5.1 System Block Diagram



1.6 System Configuration using the M3A-2114

Connect the M3A-2114 to the host PC (DOS/V) and RTD monitor tool, etc.
Shown below are connection diagrams for each purpose of use.

(1) Serial communication via UART

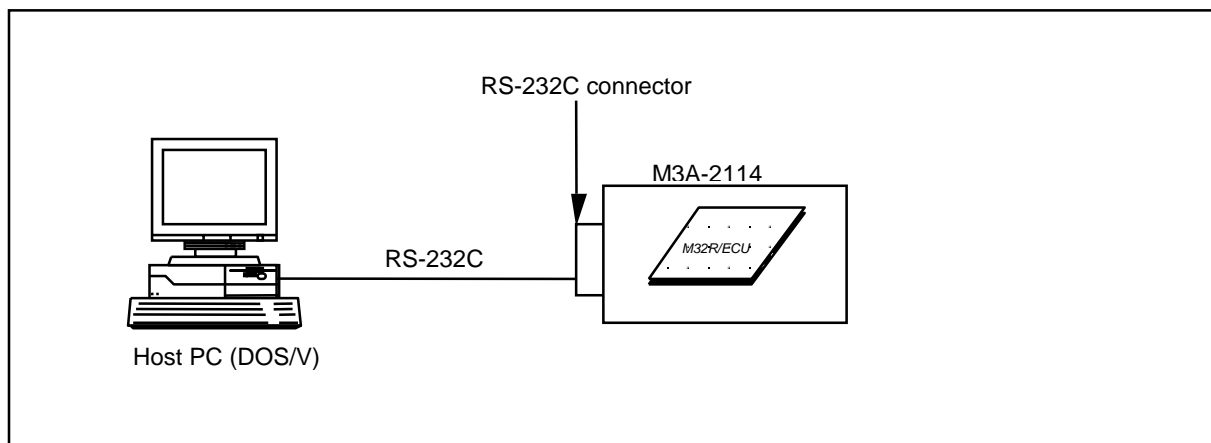


Figure 1.6.1 M3A-2114 Connection Diagram (1)

(2) RAM monitor using a RTD monitor tool

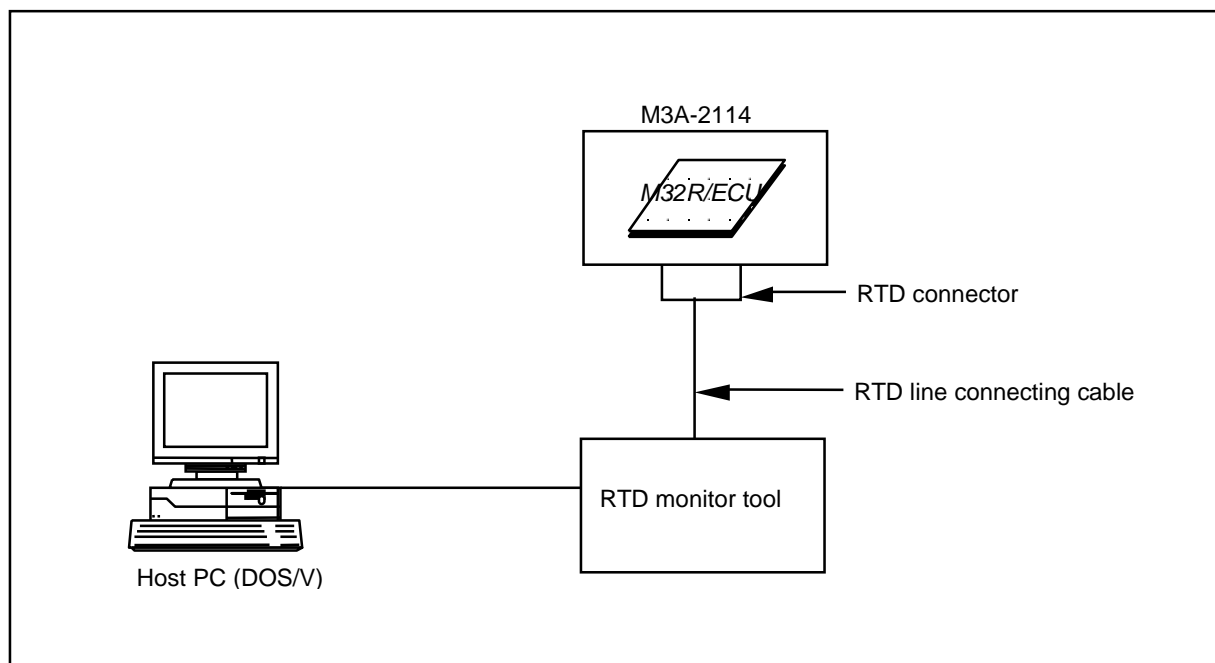


Figure 1.6.2 M3A-2114 Connection Diagram (2)

(3) When connecting to a CAN-installed system

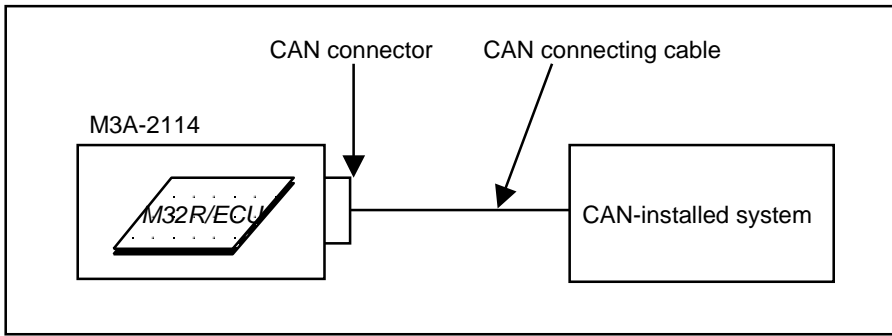


Figure 1.6.3 M3A-2114 Connection Diagram (3)

(4) When connecting to the user target (during single-chip mode)

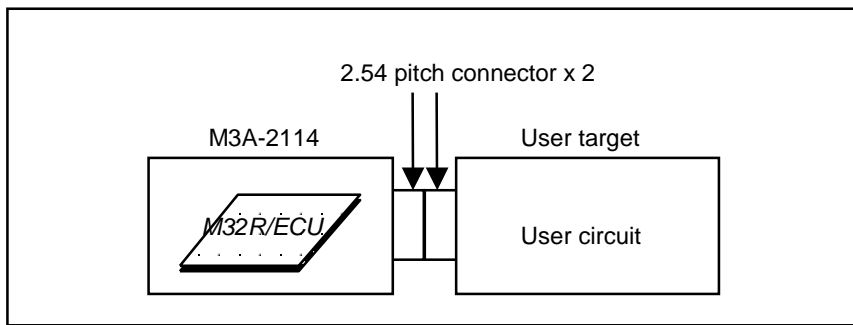


Figure 1.6.4 M3A-2114 Connection Diagram (4)

(5) Flash memory rewrite using a serial ROM programmer

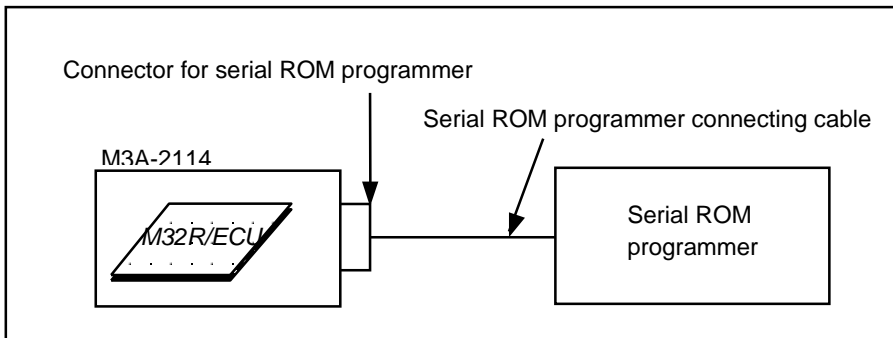


Figure 1.6.5 M3A-2114 Connection Diagram (5)

(6) Connecting to JTAG tool

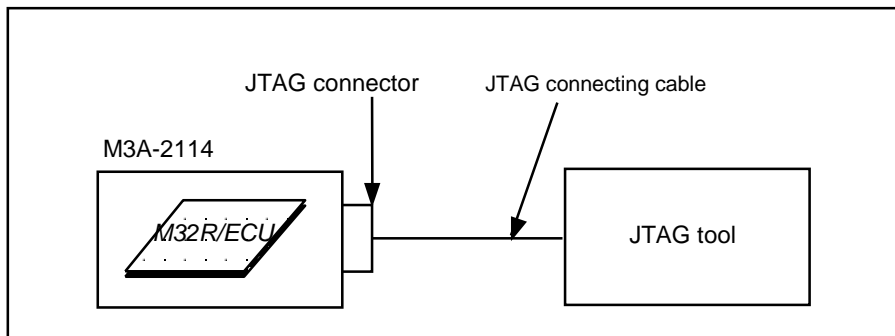


Figure 1.6.6 M3A-2114 Connection Diagram (6)

1.7 Absolute Maximum Ratings

The table below shows the absolute maximum ratings of the M3A-2114.

Table 1.7.1 Absolute Maximum Ratings

Symbol	Item	Rated	Condition
VCCE	5 V power supply	-0.3V~ +6.5V	Relative to VSS
AVCC	AVCC power supply	-0.3V~ +6.5V	Relative to VSS
VCCI	3.3V power supply	-0.3V~ +3.6V	Relative to VSS
Tstg	Storage ambient	0°C~ +70°C	No dewdrops allowed. Corrosive gas environment not accepted.

1.8 Operating Conditions

The table below shows the recommended operating conditions for the M3A-2114

Table 1.8.1 Operating Conditions

Symbol	Item	Rated	Condition
VCCE	5 V power supply	5V±5%	Relative to VSS
AVCC	AVCC power supply	5V±5%	Relative to VSS
VCCI	3.3V power supply	3.3V±5%	Relative to VSS
Topr	Operating ambient	0°C~ +70°C	No dewdrops allowed. Corrosive gas environment not accepted.

2 Functional Description

2.1 Outline Functions

The following outlines the functions of the M3A-2114.

1) Flash memory rewrite function

Rewrites the M32R/ECU's internal flash memory by using JTAG, UART, or serial ROM programmer.

2) Single-chip mode function

Executes the M32R/ECU program.

3) Additional function 1 (RTD communication port)

A port is provided to monitor the internal RAM by using the M32R/ECU's RTD communication function. When combined with a RTD monitor tool, it helps to verify the contents of RAM.

4) Additional function 2 (CAN port)

A port is provided to communicate with a CAN-installed system by using the M32R/ECU's CAN communication Function.

5) Additional function 3 (JTAG port)

A port is provided to communicate with a JTAG tool by using the M32R/ECU's JTAG function.

2.1.1 Limitations on Functionality

The following describes limitations on the functionality of the M3A-2114G22.

1) M32R/ECU's P114/TO4/SCLKI5 (pin 101) and P117/TO7/RXD5 port (pin 104)

These pins are connected to CMOS gate inputs on the board. When using these pins for input, pull them to the power supply or ground through resistors before use.

2) D-A converter on M32R/ECU's DA0 (/AD1IN4) (pin 56) and DA1 (/AD1IN5) (pin 57)

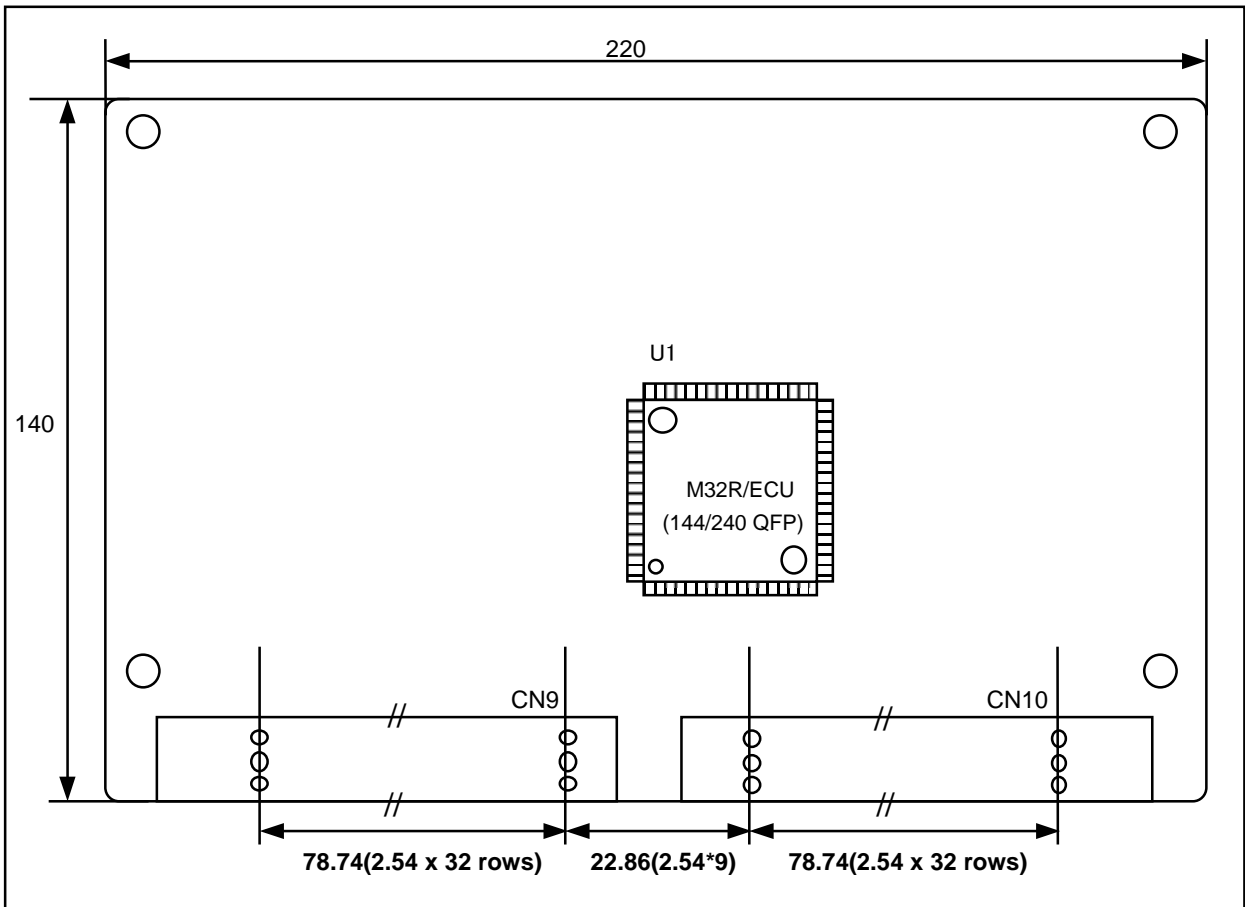
These pins function as analog inputs for pin level monitoring purpose or as outputs for the D-A converter. Please keep this in mind and make sure the input/output data will not conflict.

2.2 Specification of the Operation Check Connector

All ports on the M32R/ECU are connected to the operation check connector. Except those used for JTAG and MCU control, all ports of M32R/ECU connected to the extension connector. This connector consists of two pieces of the PCN10-128S-2.54DSA, a 2.54-mm contact pitch, 128-pin (4 x 32) connector made by Hirose Electric Co., or equivalent, connecting between the M32R/ECU and the user target during target evaluation.

Pin assignments of the operation check connector are shown in Appendix 1. Note that VDD is connected to VCCI.

Figure 2.2.1 Arrangement of the Operation Check Connector



2.3 Power Supply Configuration

The power to the M32R/ECU can be supplied from three sources independently of each other for the functional evaluation of the actual M32R/ECU chip: 5 V and 3.3 V digital power supplies and an analog power supply. The diagram and table below show a power supply configuration and the configuration of each power supply connector, respectively.

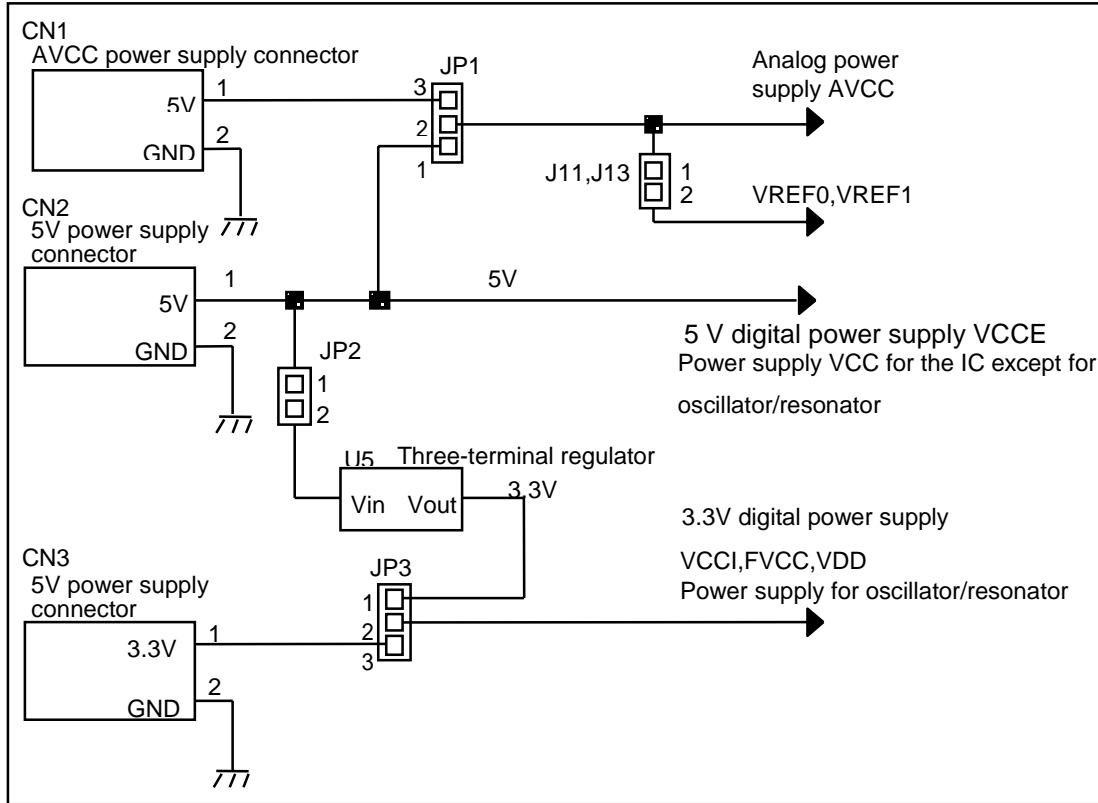


Figure 2.3.1 Power Supply Configuration

Table 2.3.1 Pin Assignments of the AVCC Power Supply Connector (CN1)

Pin number	Signal name	Function
1	5V	Analog power supply
2	GND	Ground

Table 2.3.2 Pin Assignments of the 5V Power Supply Connector (CN2)

Pin number	Signal name	Function
1	5V	5 V digital power supply
2	GND	Ground

Table 2.3.3 Pin Assignments of the 3.3V Power Supply Connector (CN3)

Pin number	Signal name	Function
1	3.3V	3.3 V digital power supply
2	GND	Ground

(1) Method for using the 5 V digital power supply

Feed the power directly from the 5 V power supply connector (CN2).

(2) Method for using the 3.3 V digital power supply

For the 3.3 V digital power supply, use jumpers (JP3 and JP2) to feed the power from the 3.3 V power supply connector (CN3) or the three-terminal voltage regulator as selected.

Jumper usage conditions are shown below.

Table 2.3.4 Jumper Usage Conditions (JP3)

JP3 connecting	Purpose of use
Shorted between 1–2	Power from the three-terminal voltage regulator is used (JP2 must be shorted between 1–2)
Shorted between 2–3	Power from the 3.3 V power supply connector (CN3) is used

(3) Method for using the analog power supply

For the analog power supply, use a jumper (JP1) to feed the power from the analog power supply connector (CN1) or the 5 V power supply connector (CN2) as selected.

Jumper usage conditions are shown below

Table 2.3.5 Jumper Usage Conditions (JP1)

JP1 connecting	Purpose of use
Shorted between 1–2	Power from the 5 V power supply connector (CN2) is used
Shorted between 2–3	Power from the analog power supply connector (CN1) is used

(4) Method for using the VREF power supply

For the VREF power supply, use jumpers (J11 and J13) so that the power can be fed from the analog power supply.

Jumper usage conditions are shown below.

Table 2.3.6 Jumper Usage Conditions (J11,J13)

J11,J13 connecting	Purpose of use
Shorted between 1–2	Power from the analog power supply is used
Open	Power from an external source is used

2.4 FP Select Circuit

The FP select circuit is used to rewrite the M32R/ECU's internal flash memory. Use a jumper (J2) to enable or disable FP from the connector for the serial ROM programmer.

A FP switching block diagram is shown below.

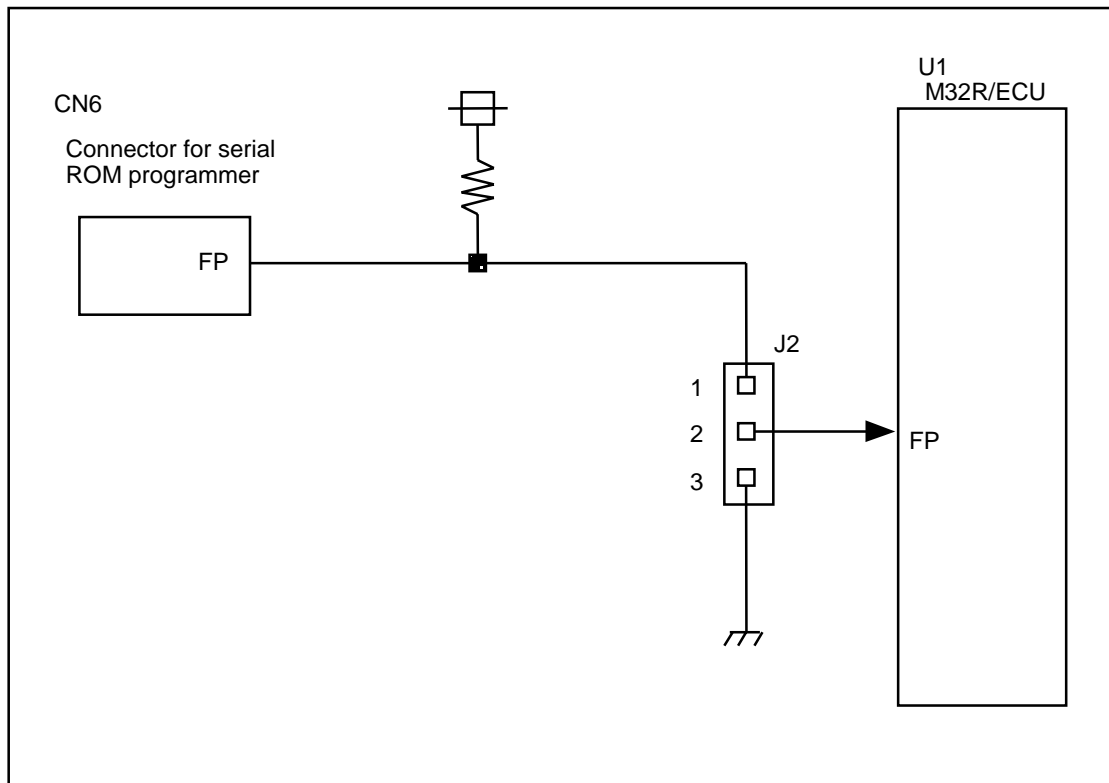


Figure 2.4.1 FP Switching Configuration

Jumper usage conditions are shown below.

Table 2.4.1 Jumper Usage Conditions (J2)

J2 connecting	Purpose of use
Shorted between 1-2	Flash rewrite using M3A-2114 alone or a serial ROM programmer is enabled
Shorted between 2-3	Flash rewrite is disabled
Open	Use inhibited

Table 2.4.2 Pin Assignments of the Serial ROM Programmer Connector (CN6)

Pin number	Signal	Function
1	TXD	Transmit data
2	RXD	Receive data
3	SCLK	Synchronizing clock
4	BUSY	Transmit/receive mode control
5	MOD0	Selector
6	FP	Flash rewrite control
7	RESET	Reset
8	GND	Ground

2.5 MOD Select Circuit

Used to set M32R/ECU operation mode. The power supply for MOD0 is fed from the selector switch (SW2) or serial ROM programmer connector (CN6) as selected by a jumper (J1). The selector switch (SW2) is configured to select between 0 V and 5 V. The power supply for MOD1 is fixed to 0 V.

A MOD switching block diagram is shown below.

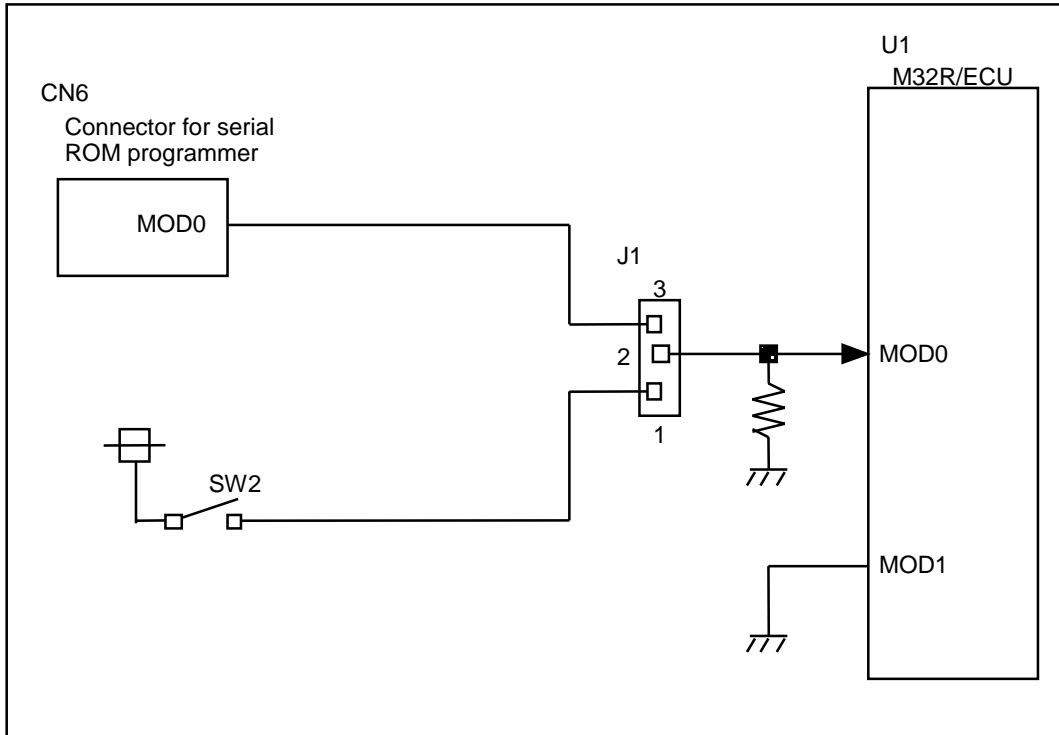


Figure 2.5.1 MOD Switching Configuration

M32R/ECU mode conditions that can be set using MOD0 and MOD1 are shown below.

Table 2.5.1 MOD Conditions

MOD0 (V)	MOD1 (V)	Function
0	0	<ul style="list-style-type: none"> When flash rewrite disabled: Single-chip mode When flash rewrite enabled: Flash rewrite + single-chip mode
5	0	<ul style="list-style-type: none"> When flash rewrite disabled: Processor mode When flash rewrite enabled: Flash rewrite from ROM boot + single-chip mode

Jumper usage conditions are shown below.

Table 2.5.2 Jumper Usage Conditions (J1)

J1 connecting	Purpose of use
Shorted between 1–2	MOD0 control by switch SW2
Shorted between 2–3	MOD0 control by serial ROM programmer
Open	Fixed to 0 V

2.6 Serial Input/Output Circuit (SI/OO)

The M32R/ECU's SIO0 is used to interface between the host PC (DOS/V) and M3A-2114 via the host PC's RS-232C. Of the RS-232C control signals, only TXD and RXD are used for connection to the host PC (DOS/V). The unused signals CTS and RTS are coupled directly to configure a loopback circuit. The other unused signals DSR and DTR are also configured the same way.

A serial input/output control block configuration is shown below.

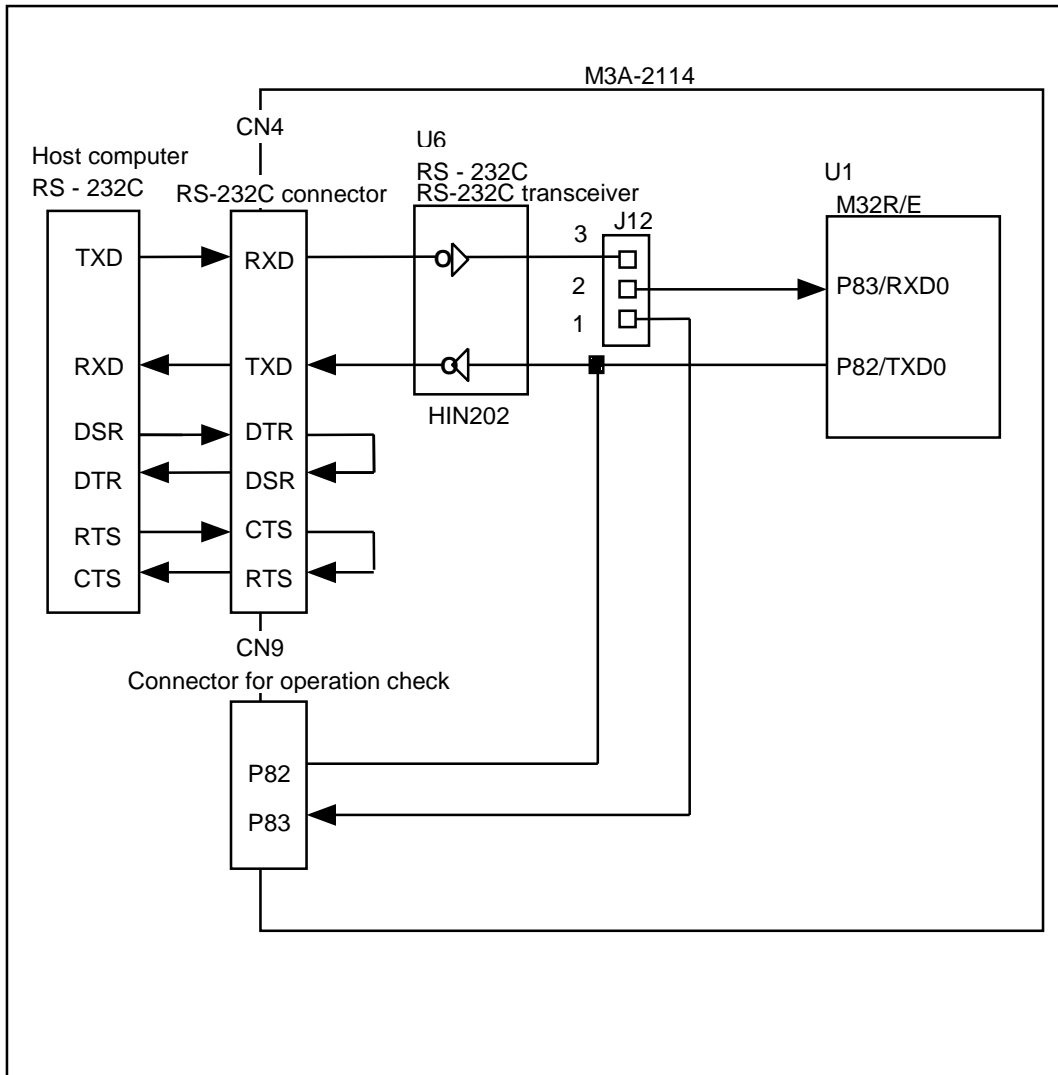


figure 2.6.1 Serial Input/output Control Block Configuration

Table 2.6.1 Pin Assignments of the RS-232C Connector (CN4)

Pin number	Signal	Function
1	DCD	Unused
2	RXD	Receive data
3	TXD	Transmit data
4	DTR	Connected to DSR
5	SG	Ground
6	DSR	Connected to DTR pin
7	RTS	Connected to CTS pin
8	CTS	Connected to RTS pin
9	RI	Unused

The RXD0 pin used for serial communication is configured to be left open using a jumper (J12).
 Jumper usage conditions are shown below.

Table 2.6.2 Jumper Usage Conditions (J12)

J12 connecting	Purpose of use
Shorted between 2–3	RXD function used by RS-232C
Shorted between 1–2	P83/RXD0 left open for use by operation check connector (CN9) (RXD function not used by RS-232C)

2.7 RTD Communication Ports

Whether communication is performed and whether a command is executed are verified by observing the RTDACK signal. The diagram below shows how the M32R/ECU and RTD communication ports are connected.

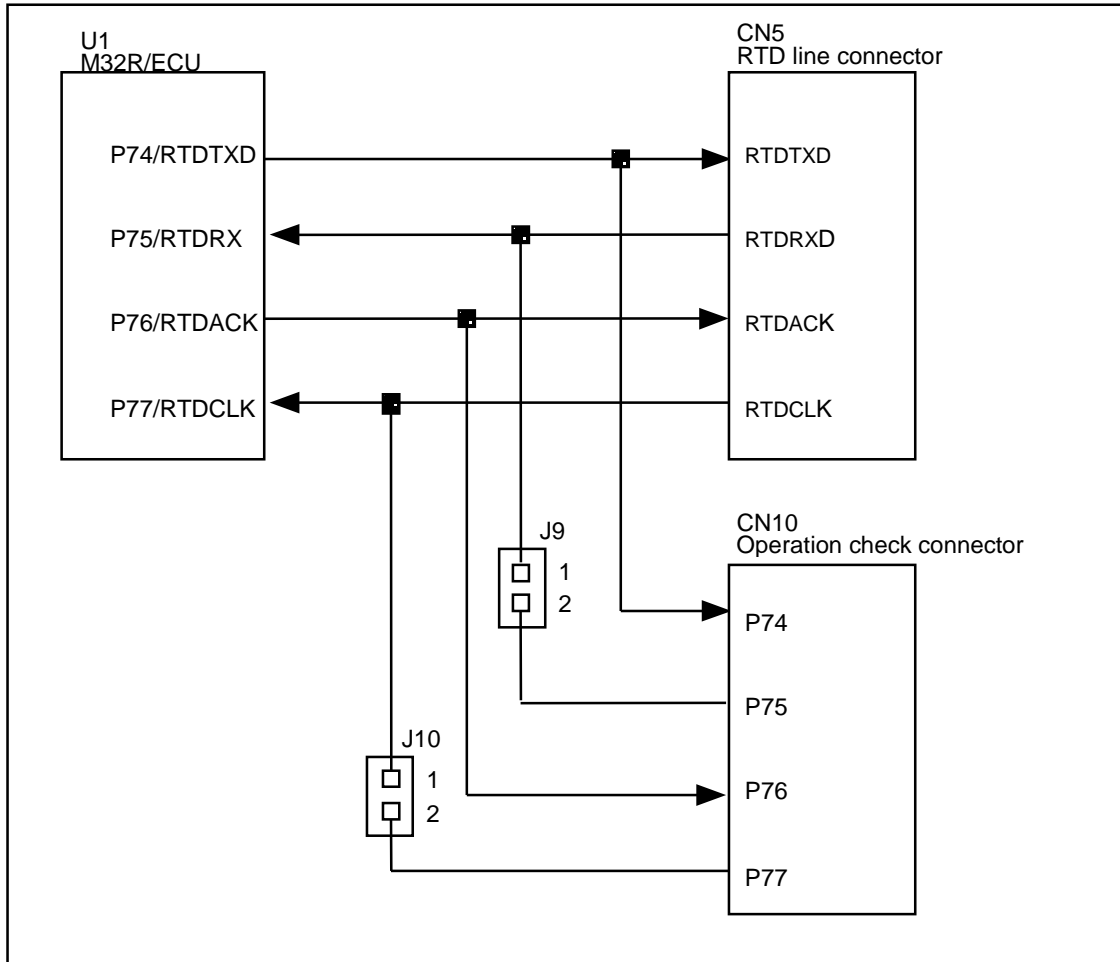


Figure 2.7.1 Connector Connection Diagram

Table 2.71. Pin Assignments of the RTD Communication Connector (CN5)

Pin number	Signal name	Function
1	RTDTXD	RTD Transmit data
2	RTDRX	RTD Receive data
3	RTDCLK	RTD clock
4	RTDACK	RTD acknowledge
5	GND	Ground

The RTDRXD and RTDCLK pins used for RTD communication are configured to be left open by using jumpers for RTD communication line (J9 and J10).

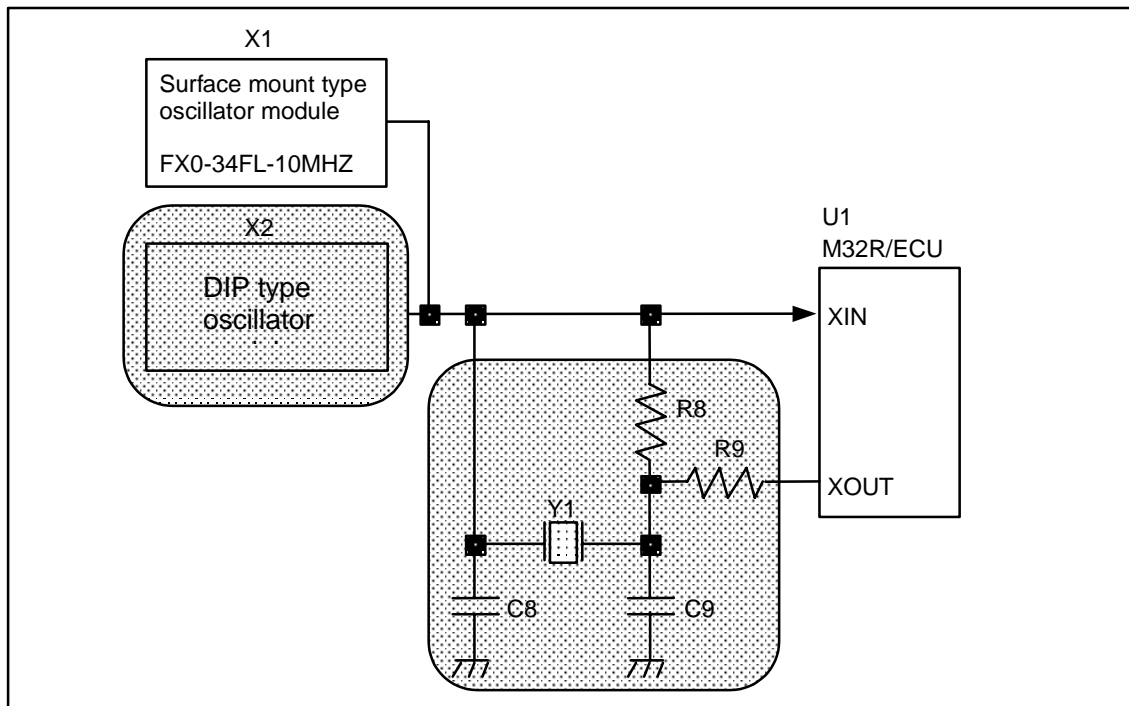
Jumper usage conditions are shown below.

Table 2.7.2 Jumper Usage Conditions (J9,J10)

J9, J10 connecting	Purpose of use
Shorted between 1-2	RTD communication function used
Open	RTD communication function not used

2.8 Oscillator Circuit

The oscillator circuit is configured using a 10 MHz oscillator module.
Shown below is a block diagram of the oscillator circuit.




Note:  consists of only a pattern. To use the resonator Y1, add resistors (R8, R9) and capacitors (C8, C9).

Figure 2.8.1 Block Diagram of the Oscillator Circuit

2.9 Display LEDs

The display LEDs are used to indicate the status of M32R/ECU ports P110–P117.

Shown below is a block diagram of the display LEDs.

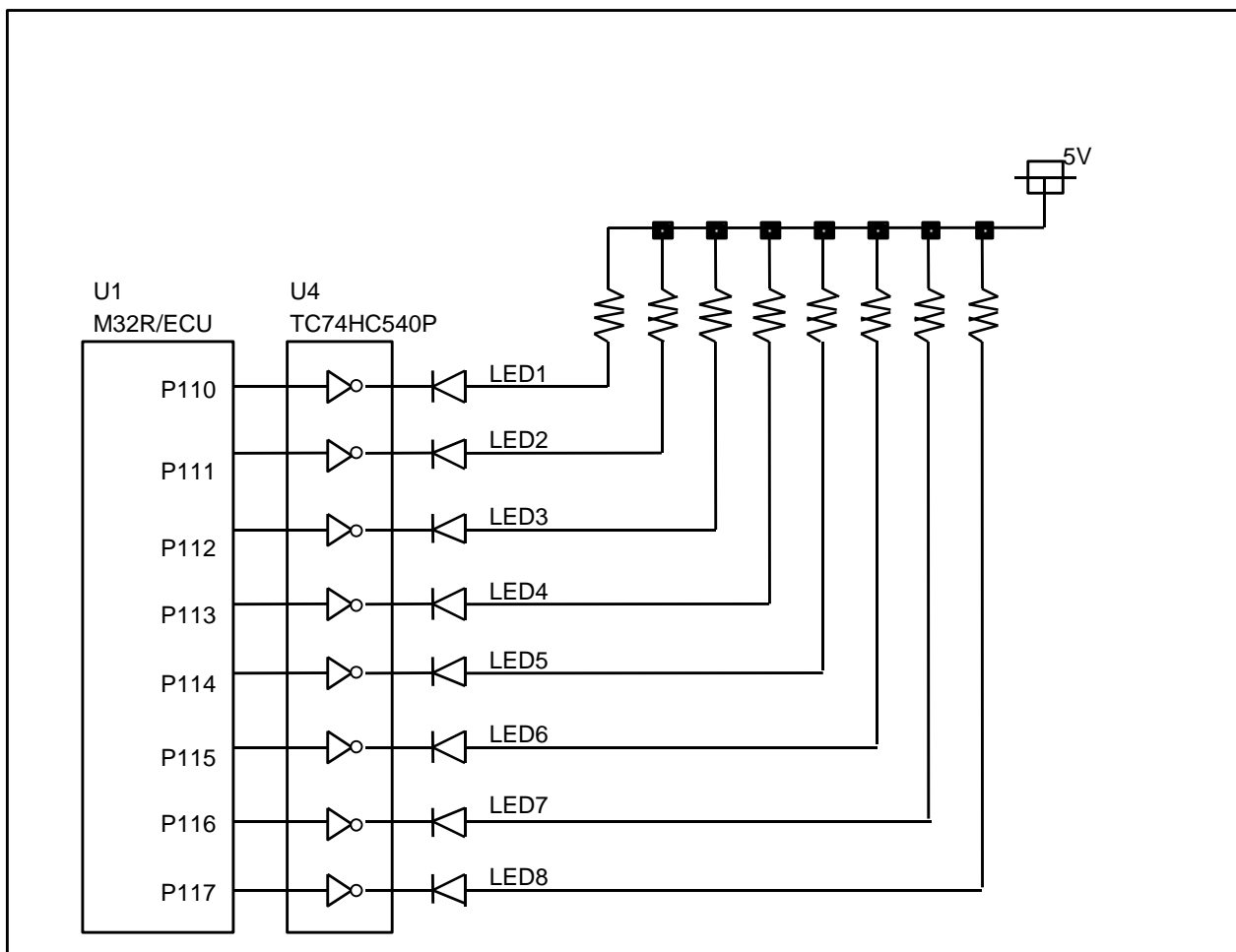


Figure 2.9.1 Block Diagram of the Display LEDs

Table 2.9.1 Functions of Display LEDs

LED name	Corresponding M32R/ECU port	ON condition	Light-emitting
LED1	P110	H	Red
LED2	P111	H	Red
LED3	P112	H	Red
LED4	P113	H	Red
LED5	P114	H	Red
LED6	P115	H	Red
LED7	P116	H	Red
LED8	P117	H	Red

Note: Case of using M3A-2114G22, do not use the functions of SCLKI5 and RXD5. Refer to Chapter 2.1.1.

2.10 Interfacing to Serial ROM Programmer (SI/O1)

When using a serial ROM programmer to rewrite the flash memory, the M3A-2114 is interfaced to the serial ROM programmer using the M32R/ECU's SIO1.

The diagram below shows how the M32R/ECU and serial ROM programmer are connected.

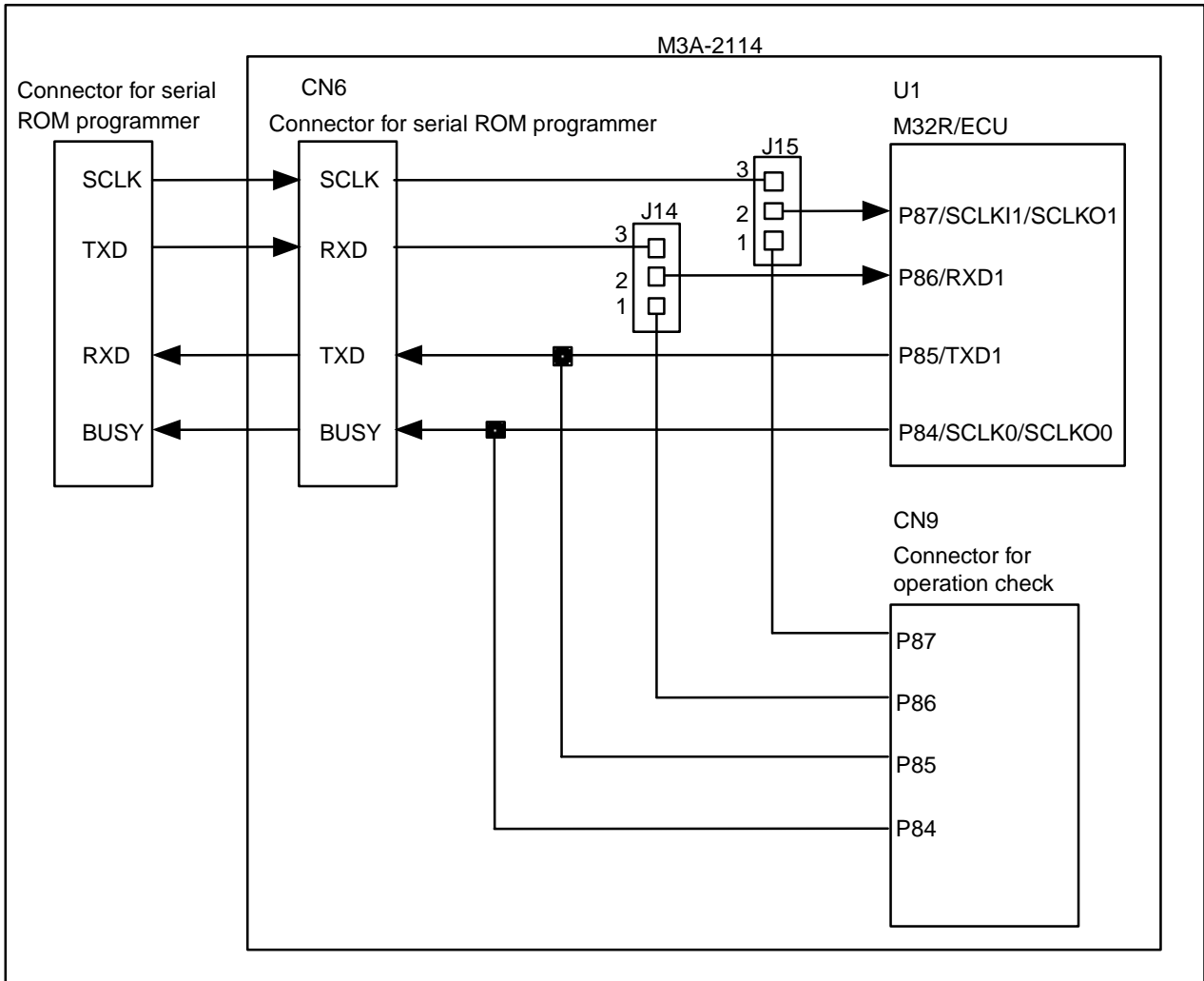


Figure 2.10.1 Connector Connection Diagram

The RXD1 and SCLKI1 pins used by the serial ROM programmer are configured to be left open by using jumpers J14 and J15, respectively.

Jumper usage conditions are shown below.

Table 2.10.1 Jumper Usage Conditions (J14,J15)

J14, J15 connecting conditions	Purpose of use
Shorted between 2-3	Flash rewrite controlled from serial ROM programmer connector (CN6)
Shorted between 1-2	P86/RXD1 and P87/SCLKI1/SCLKO1 are left open for use by operation check connector (CN9)

2.11 Port Input Control Circuit

The port input control circuit is used to control the status of M32R/ECU ports P130–P137 using select switches (SW4–SW11). Shown below is a block diagram of the port input control circuit.

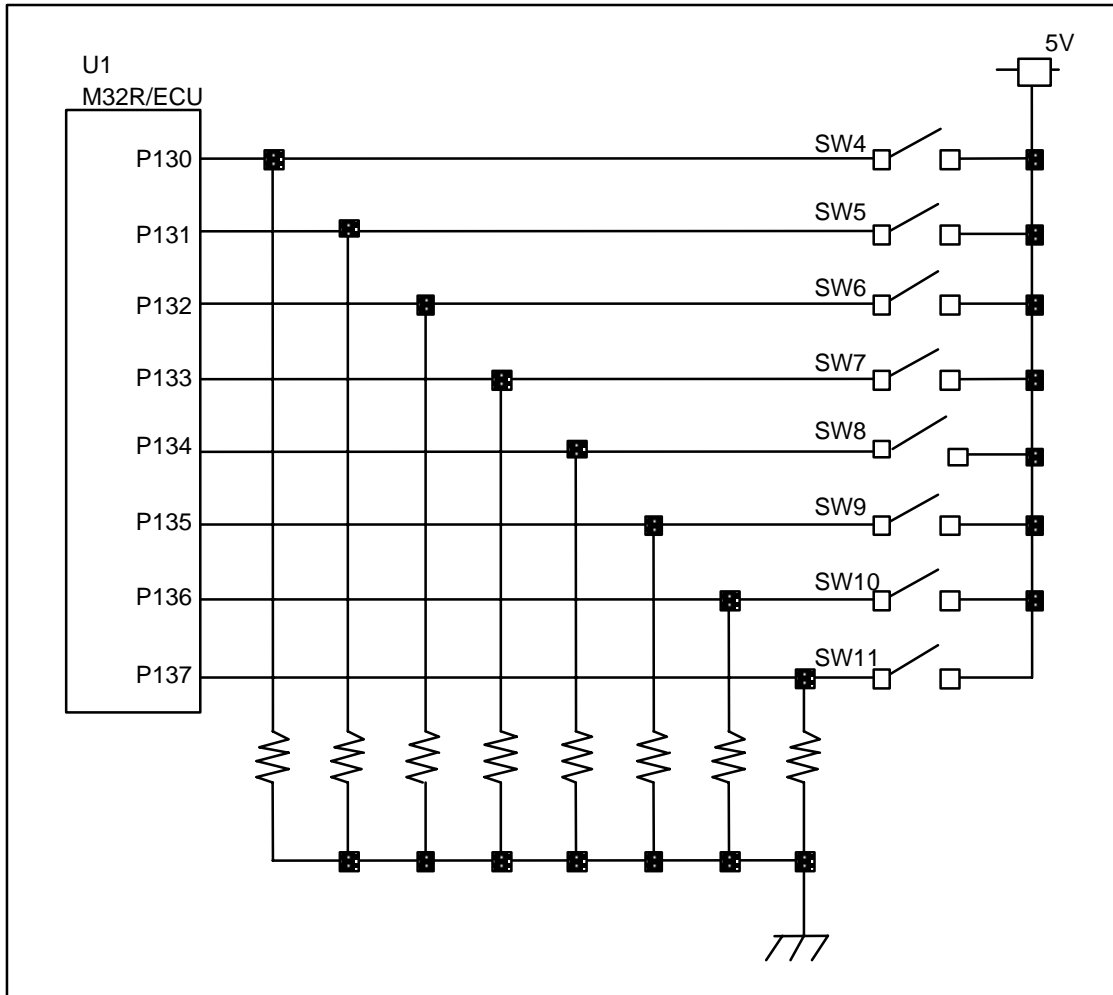


Figure 2.11.1 Block Diagram of the Port Input Control Circuit

Select switch name	Corresponding M32R/ECU port
SW4	P130
SW5	P131
SW6	P132
SW7	P133
SW8	P134
SW9	P135
SW10	P136
SW11	P137

Table 2.11.1 Relationship between Select Switches and M32R/ECU Ports

2.12 Analog Port Input Control Circuit

The analog port input control circuit is used to control the status of M32R/ECU ports AD0IN0 (AN0) ^{note)} through AD0IN3 (AN3) using volume (variable resistor) controls VOL1–VOL4.

Shown below is a block diagram of the analog port input control circuit.

Note: When the MCU is the M32170F6VFP, ports are labeled AD0INx; when the MCU is the M32171F3VFP, ports are labeled ANx.

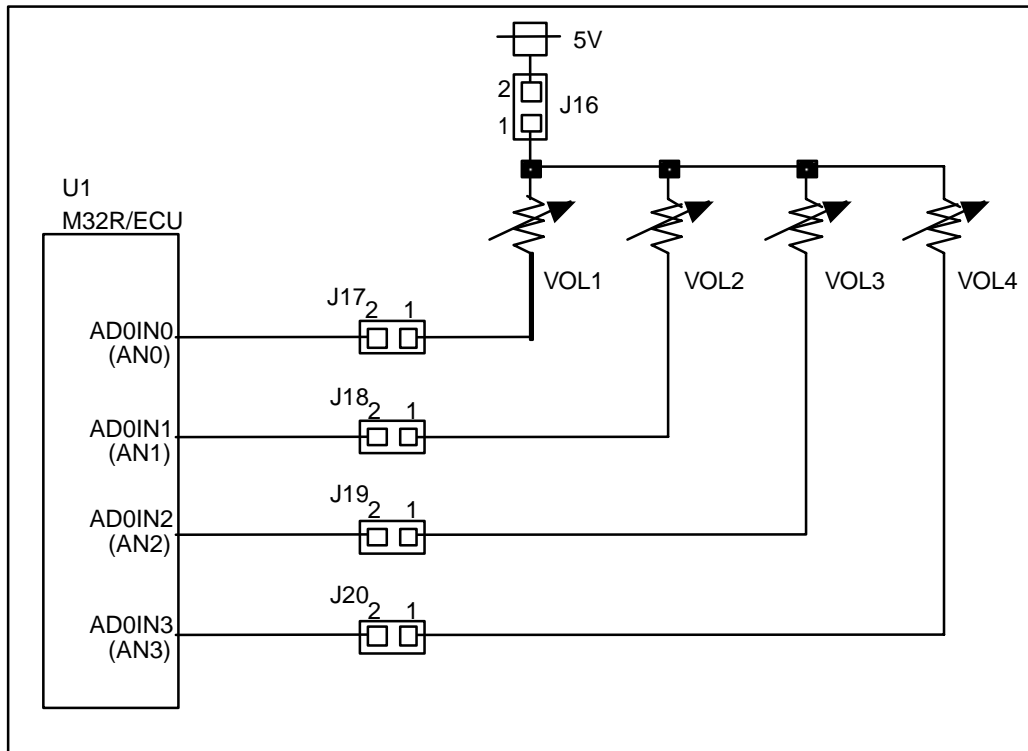


Figure 2.12.1 Block Diagram of the Analog Port Input Control Circuit

Table 2.12.1 Relationship between Volume Controls and M32R/ECU Ports(VOL1–VOL4)

Select switch name	M32170/M32172/M32173/M32174 Port name	M32171 port name	Jumper name
VOL1	AD0IN0	AN0	J17
VOL2	AD0IN1	AN1	J18
VOL3	AD0IN2	AN2	J19
VOL4	AD0IN3	AN3	J20

Table 2.12.2 Jumper Usage Conditions (J16)

J16 connecting condition	Description
Shorted between 1–2	Power from the analog power supply is used
Open	Power from an external source is used

Table 2.12.3 Jumper Usage Conditions (J17-J20)

J17-J20 connecting condition	Description
Shorted between 1–2	Volume controls (VOL1–VOL4) are used
Open	Volume controls (VOL1–VOL4) are not used

2.13 Interfacing to a CAN-installed System

The M32R/ECU's internal CAN is used for interfacing to a CAN-installed system.

This interface is configured to have two types of CAN drivers.

- 1) High-speed (1M baud) type CAN driver, the PCA82C250 made by Philips (U7 on the board)
- 2) Low-speed (125K baud) type CAN driver, the PCA82C252 made by Philips (U8 on the board)

The diagram below shows how the M32R/ECU and CAN ports are connected.

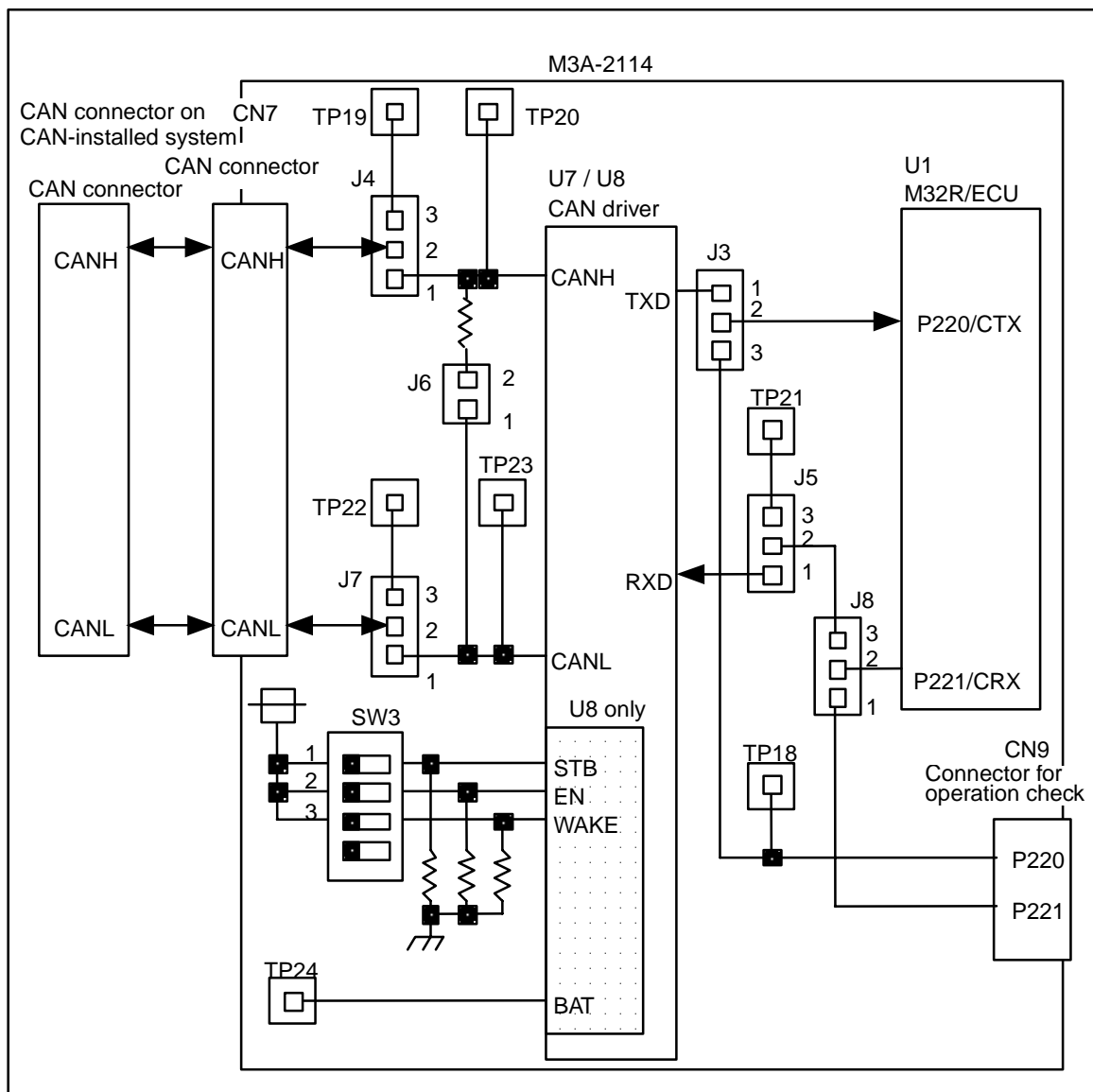


Figure 2.13.1 Connector Connection Diagram

Table 2.13.1 Pin Assignments of the CAN Connector

Pin number	Signal name	Function
1	-	Idle pin
2	CANL	Low-level CAN input/output port
3	GND	Ground
4	-	Idle pin
5	-	Idle pin
6	-	Idle pin
7	CANH	High-level CAN input/output port
8	-	Idle pin
9	-	Idle pin

(1) Method for selecting CAN connector connection (J4, J7)

The interface is configured to allow the CAN transmission path to be altered using jumpers.

Jumper usage conditions are shown below.

Table 2.13.2 Jumper Usage Conditions (J4, J7)

J3, J7 connecting conditions	Purpose of use
Shorted between 1–2	CAN communication function using the mounted CAN connector is used
Shorted between 2–3	CAN communication function using TP20 (CANH) and TP23 (CANL) connected to another CAN connector is used

(2) Method for selecting on-board driver (J3, J5, J8)

The interface is configured to allow the destination to which the CAN communication pins (CTX, CRX) are connected to be altered using jumpers.

Table 2.13.3 Jumper Usage Conditions (J3, J5)

J4, J6 connecting conditions	Purpose of use
Shorted between 1–2	CAN communication function using the mounted CAN driver is used (J8 must be shorted between 2–3)
Shorted between 2–3	CAN communication function using TP18 (CTX) and TP21 (CRX) connected to another CAN driver is used

(3) Method for selecting terminating resistor (J6)

The interface is configured to allow the terminating resistor for the CAN transmission path to be altered using a jumper.

Table 2.13.4 Jumper Usage Conditions (J6)

J5 connecting conditions	Purpose of use
Shorted between 1–2	Mounted terminating resistor is used
Open	Mounted terminating resistor is not used

(4) Method for using CAN driver (U8) (J6)

BAT, STB, EN, and WAKE on the CAN driver (U8) are controlled by switch (SW3) and test pin (TP24).

Switch usage conditions are shown below.

Table 2.13.5 Switch Usage Conditions (SW3)

connecting conditions	Purpose of use
OFF	Fixed to 0 V
ON	Fixed to 5 V

2.14 Specifications of the JTAG Connector

Prepare a connector for connecting to JTAG tools. The connector (NFP-34A-0132-BS made by Yamaichi Electric or equivalent) is comprised of staggered 2.54-mm, 34-pin (4 row) through holes.

Pin assignments of this connector are shown below.

Table 2.15.1 Pin Assignments of the JTAG Connector (CN8)

Pin number	Signal name	Function	Pin number	Signal name	Function
1	JTCK	Test clock	18	-	Idle pin
2	GND	Ground	19	-	Idle pin
3	JTDO	Test data output	20	GND	Ground
4	VCCE	User system power supply monitor	21	-	Idle pin
5	JTMS	Test mode select	22	-	Idle pin
6	JDBI	Break request	23	GND	Ground
7	RESET	Test reset	24	-	Idle pin
8	JTRST	CPU reset	25	-	Idle pin
9	JTDI	Test data input	26	GND	Ground
10	GND	Ground	27	-	Idle pin
11	-	Idle pin	28	GND	Ground
12	GND	Ground	29	-	Idle pin
13	-	Idle pin	30	GND	Ground
14	GND	Ground	31	-	Idle pin
15	-	Idle pin	32	-	Idle pin
16	-	Idle pin	33	-	Idle pin
17	GND	Ground	34	-	Idle pin

Appendix 1. Pin Layout of the Operation Check Connector

- Pin Layout of the Operation Check Connector for the M32172F2VFP/M32173F2VFP

Pin Layout of the Operation Check Connector for the M321712F2VFP/M32173F2VFP (1/4)

Pin layout of CN9			
Pin number	Pin name	Pin number	Pin name
1	N.C	33	P20
2	N.C	34	P21
3	N.C	35	P22
4	N.C	36	P23
5	VSS	37	VCCE
6	P43	38	VSS
7	P44	39	P24
8	P45	40	P25
9	P46	41	P26
10	P47	42	P27
11	P220	43	P00
12	P221	44	P01
13	N.C	45	P02
14	N.C	46	P03
15	N.C	47	P04
16	N.C	48	P05
17	VSS	49	P06
18	VSS	50	P07
19	N.C	51	VCCE
20	N.C	52	VSS
21	VCCI	53	P10
22	VSS	54	P11
23	N.C	55	P12
24	VSS	56	P13
25	P30	57	P14
26	P31	58	P15
27	P32	59	P16
28	P33	60	P17
29	P34	61	VCCE
30	P35	62	VCCE
31	P36	63	AN0
32	P37	64	AN1

Pin Layout of the Operation Check Connector for the M32172F2VFP/M32173F2VFP (2/4)

Pin layout of CN9			
Pin number	Pin name	Pin number	Pin name
65	AN2	97	N.C
66	AN3	98	VCCI
67	AN4	99	VSS
68	AN5	100	N.C
69	AN6	101	N.C
70	AN7	102	N.C
71	AN8	103	N.C
72	AN9	104	N.C
73	AN10	105	N.C
74	AN11	106	N.C
75	AN12	107	N.C
76	AN13	108	P174
77	AN14	109	P175
78	AN15	110	N.C
79	VSS	111	N.C
80	VCCE	112	N.C
81	VSS	113	N.C
82	N.C	114	VCCE
83	N.C	115	VSS
84	N.C	116	P82
85	N.C	117	P83
86	N.C	118	P84
87	N.C	119	P85
88	N.C	120	P86
89	N.C	121	P87
90	N.C	122	N.C
91	N.C	123	N.C
92	N.C	124	N.C
93	N.C	125	N.C
94	N.C	126	VCCI
95	N.C	127	VSS
96	N.C	128	VCCI

Pin Layout of the Operation Check Connector for the M32172F2/M32173F2VFPVFP (3/4)

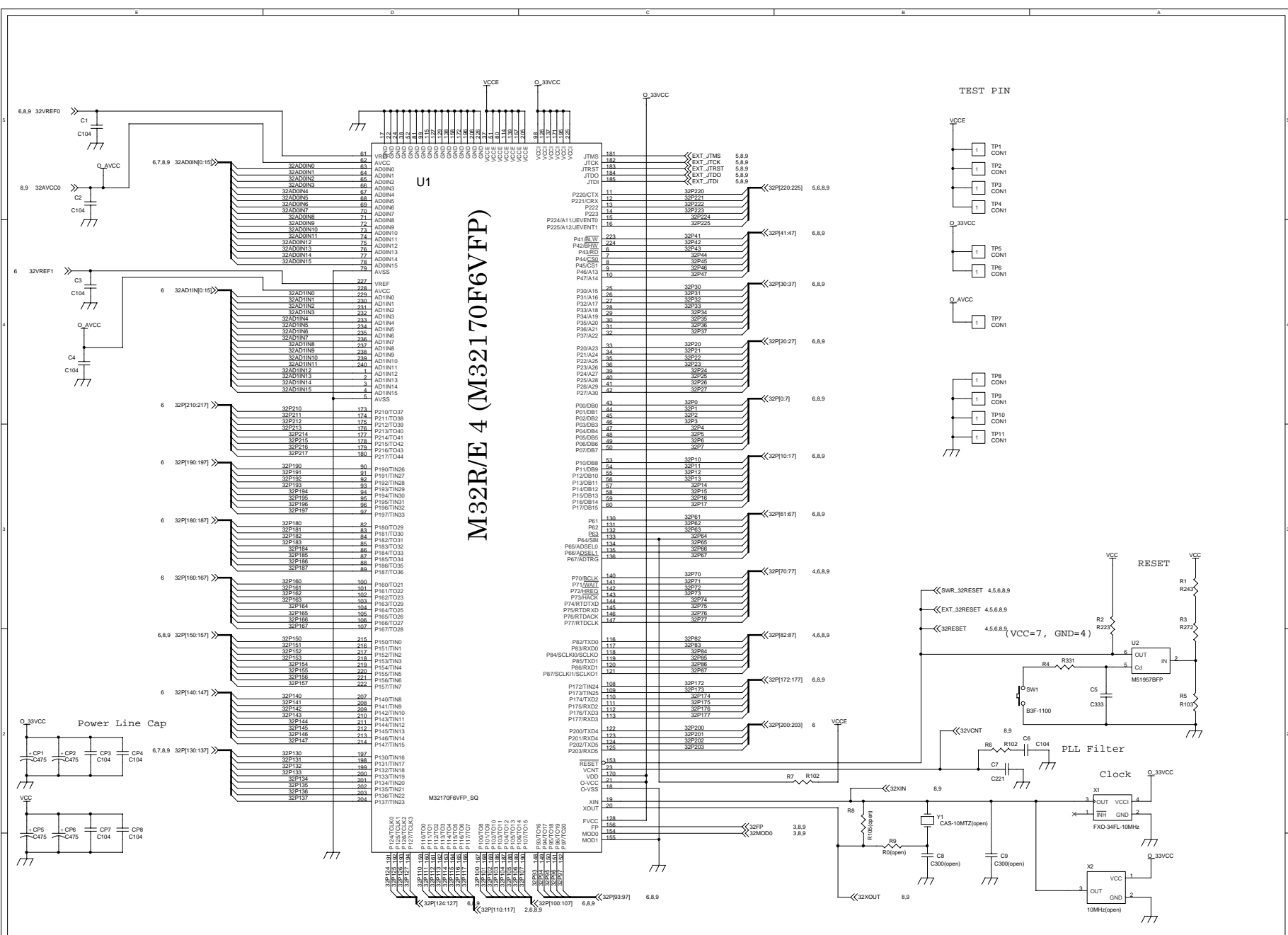
Pin layout of CN10			
Pin number	Pin name	Pin number	Pin name
1(129)	VSS	33(161)	P112
2(130)	P61	34(162)	P113
3(131)	P62	35(163)	P114
4(132)	P63	36(164)	P115
5(133)	P64	37(165)	P116
6(134)	N.C	38(166)	P117
7(135)	N.C	39(167)	P100
8(136)	N.C	40(168)	P101
9(137)	VCCI	41(169)	P102
10(138)	VSS	42(170)	VCCI
11(139)	VCCE	43(171)	VCCI
12(140)	P70	44(172)	VSS
13(141)	P71	45(173)	N.C
14(142)	P72	46(174)	N.C
15(143)	P73	47(175)	N.C
16(144)	P74	48(176)	N.C
17(145)	P75	49(177)	N.C
18(146)	P76	50(178)	N.C
19(147)	P77	51(179)	N.C
20(148)	P93	52(180)	N.C
21(149)	P94	53(181)	N.C
22(150)	P95	54(182)	N.C
23(151)	P96	55(183)	N.C
24(152)	P97	56(184)	N.C
25(153)	RESET	57(185)	N.C
26(154)	N.C	58(186)	P103
27(155)	N.C	59(187)	P104
28(156)	N.C	60(188)	P105
29(157)	VCCE	61(189)	P106
30(158)	VSS	62(190)	P107
31(159)	P110	63(191)	P124
32(160)	P111	64(192)	P125

Pin Layout of the Operation Check Connector for the M32172F2VFP/M321732VFP (4/4)

Pin layout of CN10			
Pin number	Pin name	Pin number	Pin name
65(193)	P126	97(225)	VCCI
66(194)	P127	98(226)	VSS
67(195)	VCCI	99(227)	VCCE
68(196)	VSS	100(228)	VCCE
69(197)	P130	101(229)	N.C
70(198)	P131	102(230)	N.C
71(199)	P132	103(231)	N.C
72(200)	P133	104(232)	N.C
73(201)	P134	105(233)	N.C
74(202)	P135	106(234)	N.C
75(203)	P136	107(235)	N.C
76(204)	P137	108(236)	N.C
77(205)	VCCE	109(237)	N.C
78(206)	VSS	110(238)	N.C
79(207)	N.C	111(239)	N.C
80(208)	N.C	112(240)	N.C
81(209)	N.C	113	N.C
82(210)	N.C	114	N.C
83(211)	N.C	115	N.C
84(212)	N.C	116	N.C
85(213)	N.C	117	N.C
86(214)	N.C	118	N.C
87(215)	P150	119	N.C
88(216)	N.C	120	N.C
89(217)	N.C	121	N.C
90(218)	P153	122	N.C
91(219)	N.C	123	N.C
92(220)	N.C	124	N.C
93(221)	N.C	125	N.C
94(222)	N.C	126	N.C
95(223)	P41	127	N.C
96(224)	P42	128	N.C

Appendix 2.

Connection diagram and Component table



M32R/E 4 (M32170F6VFP)

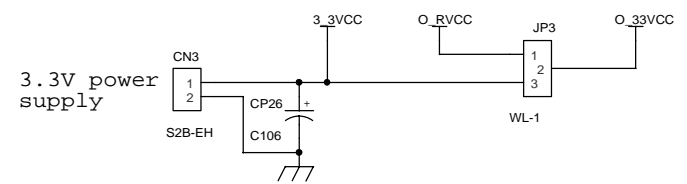
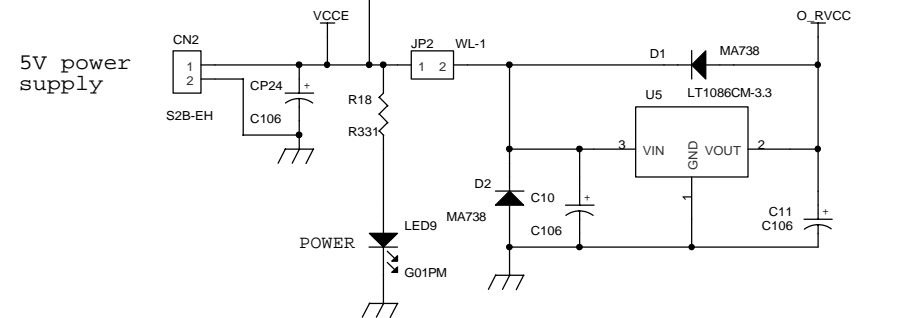
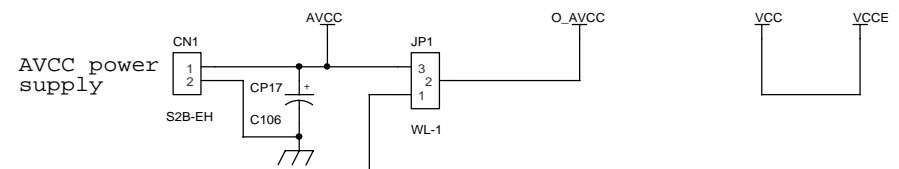
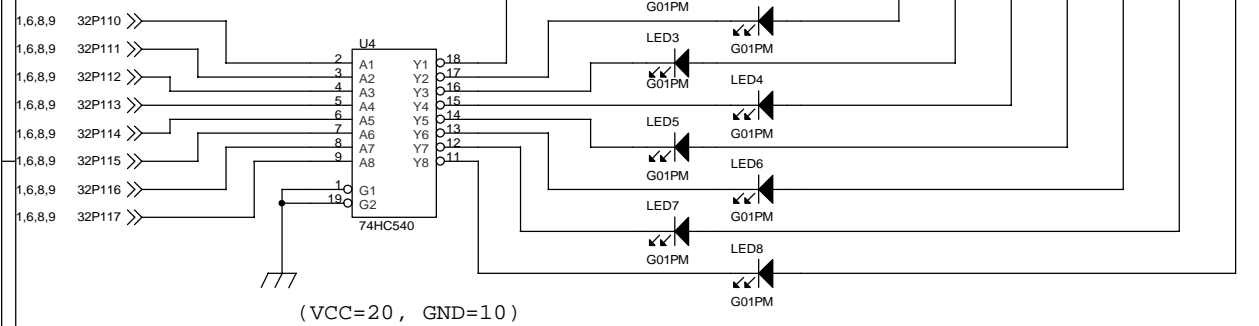
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	DATE	01.3.28			

RENESAS SOLUTIONS CORPORATION			
DRAWN	CHECKED	DESIGNED	APPROVED

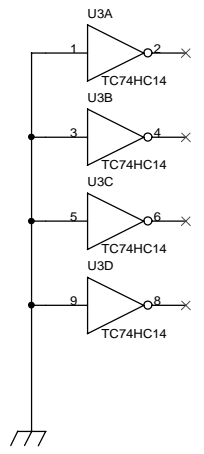
M3A-2114 (1/9)
M32170F6VFP block
(240 QFP)

DK30063

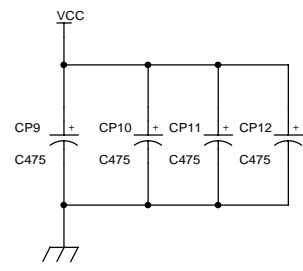
Display LED



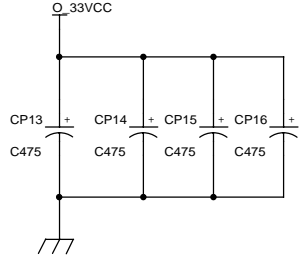
N.C.



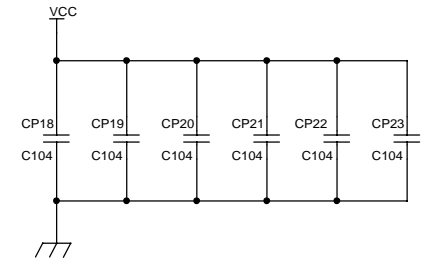
Power Line Cap (Board 5VCC)



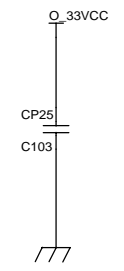
(Board 3.3VCC)



Power Line Cap (IC 5VCC)

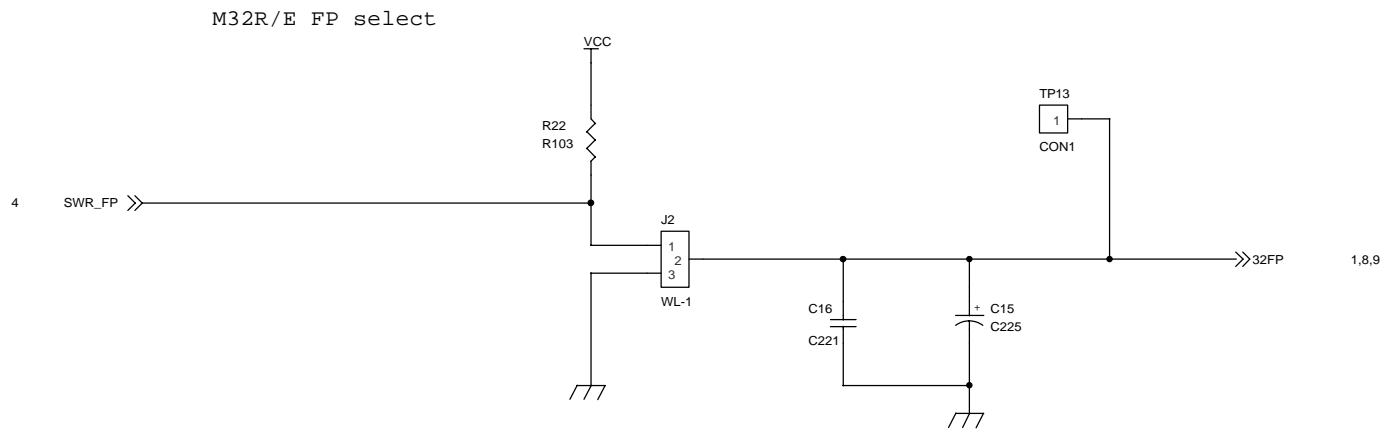
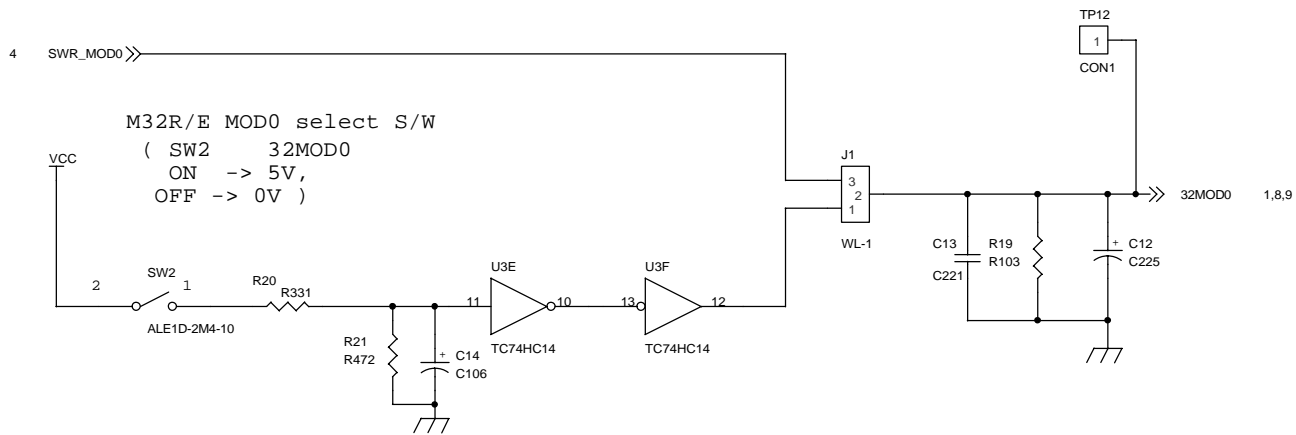


Power Line Cap (Clock)



CHANGE

		RENESAS SOLUTIONS CORPORATION				M3A-2114 (2/9)
SCALE		DRAWN	CHECKED	DESIGNED	APPROVED	Power Supply/LED
DATE	01.3.28					DK30063



CHANGE

RENESAS SOLUTIONS CORPORATION

M3A-2114

MOD0/FP block (3 / 9)

SCALE

DRAWN

CHECKED

DESIGNED

APPROVED

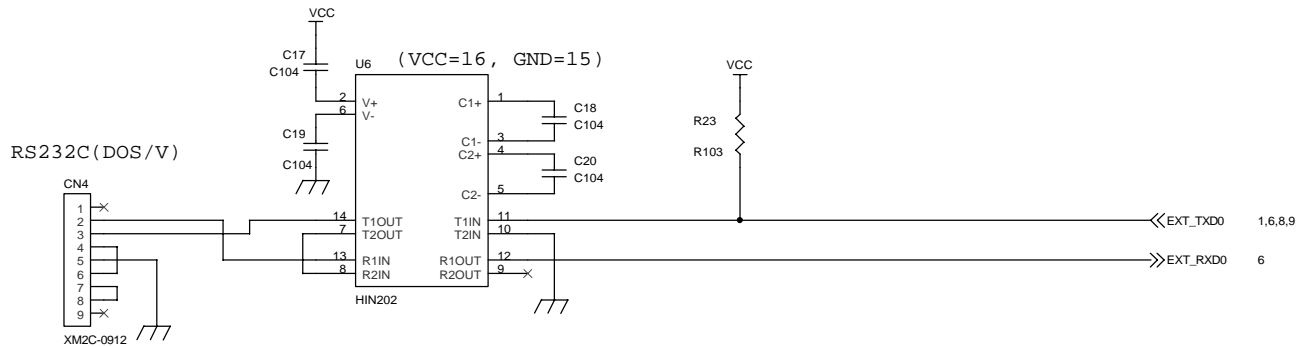
DATE

01.3.28

DK30063

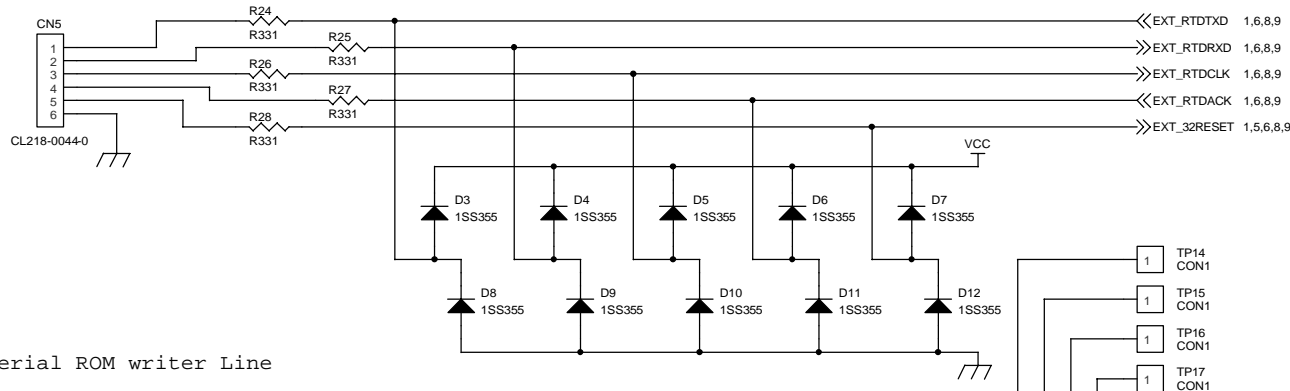
- 1 : DCD
- 2 : RXD
- 3 : TXD
- 4 : DTR
- 5 : SG
- 6 : DSR
- 7 : RTS
- 8 : CTS
- 9 : RI

RS232C (DOS/V)



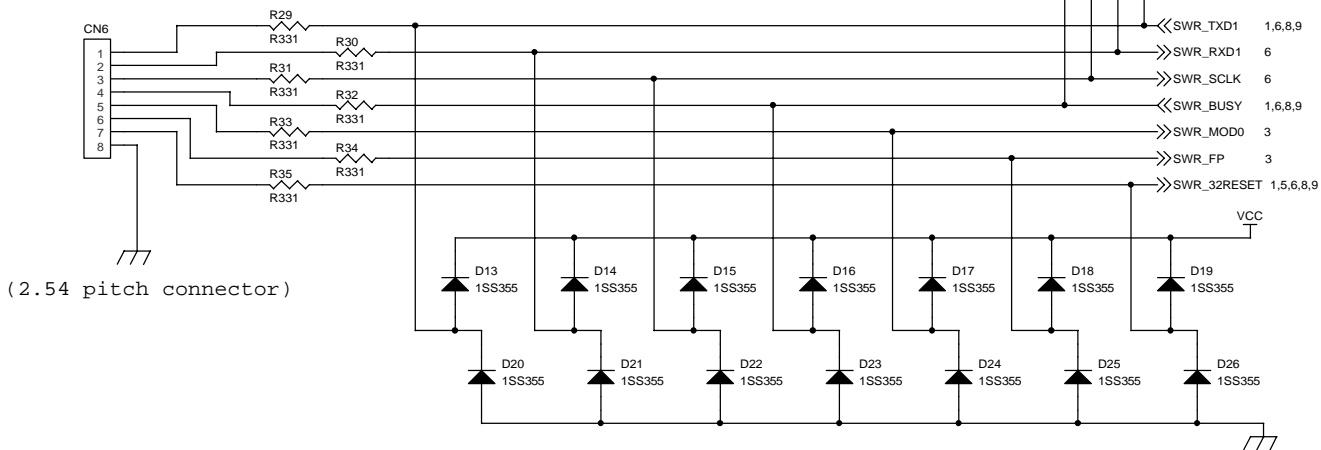
- 1 : RTD TXD
- 2 : RTD RXD
- 3 : RTD CLK
- 4 : RTD DACK
- 5 : RESET
- 6 : GND

RTD Line



Serial ROM writer Line

- 1 : TXD
- 2 : RXD
- 3 : SCLK
- 4 : BUSY
- 5 : MOD0
- 6 : FP
- 7 : RESET
- 8 : GND

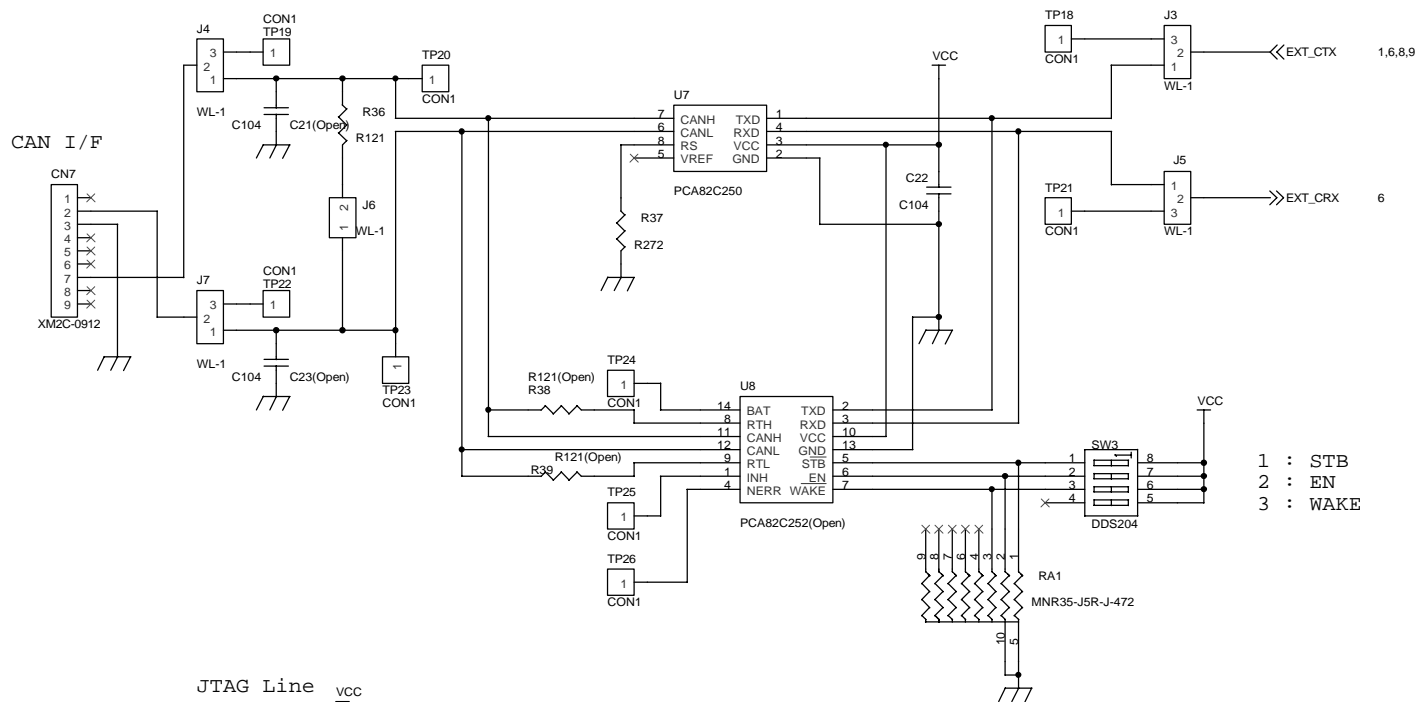


(2.54 pitch connector)

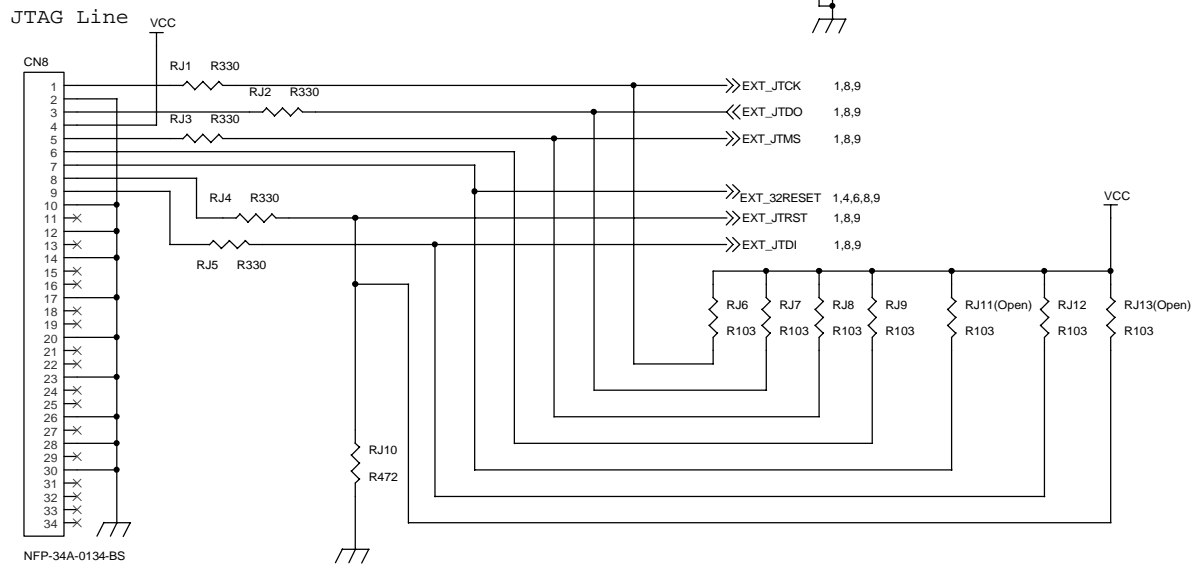
CHANGE

		RENASAS SOLUTIONS CORPORATION				M3A-2114 (4/9)
SCALE		DRAWN	CHECKED	DESIGNED	APPROVED	RS232C/RTD/Serial Writer
DATE	01.3.28					DK30063

- 1 :
- 2 : CANL
- 3 : GND
- 4 :
- 5 :
- 6 :
- 7 : CANH
- 8 :
- 9 :



- 1 : JTCK
- 2 : GND
- 3 : JTDO
- 4 : VCC
- 5 : JTMS
- 6 : (JDBI)
- 7 : RESET
- 8 : JTRST
- 9 : JTDI
- 10 : GND



CHANGE

RENESAS SOLUTIONS CORPORATION

M3A-2114
CAN/JTAG

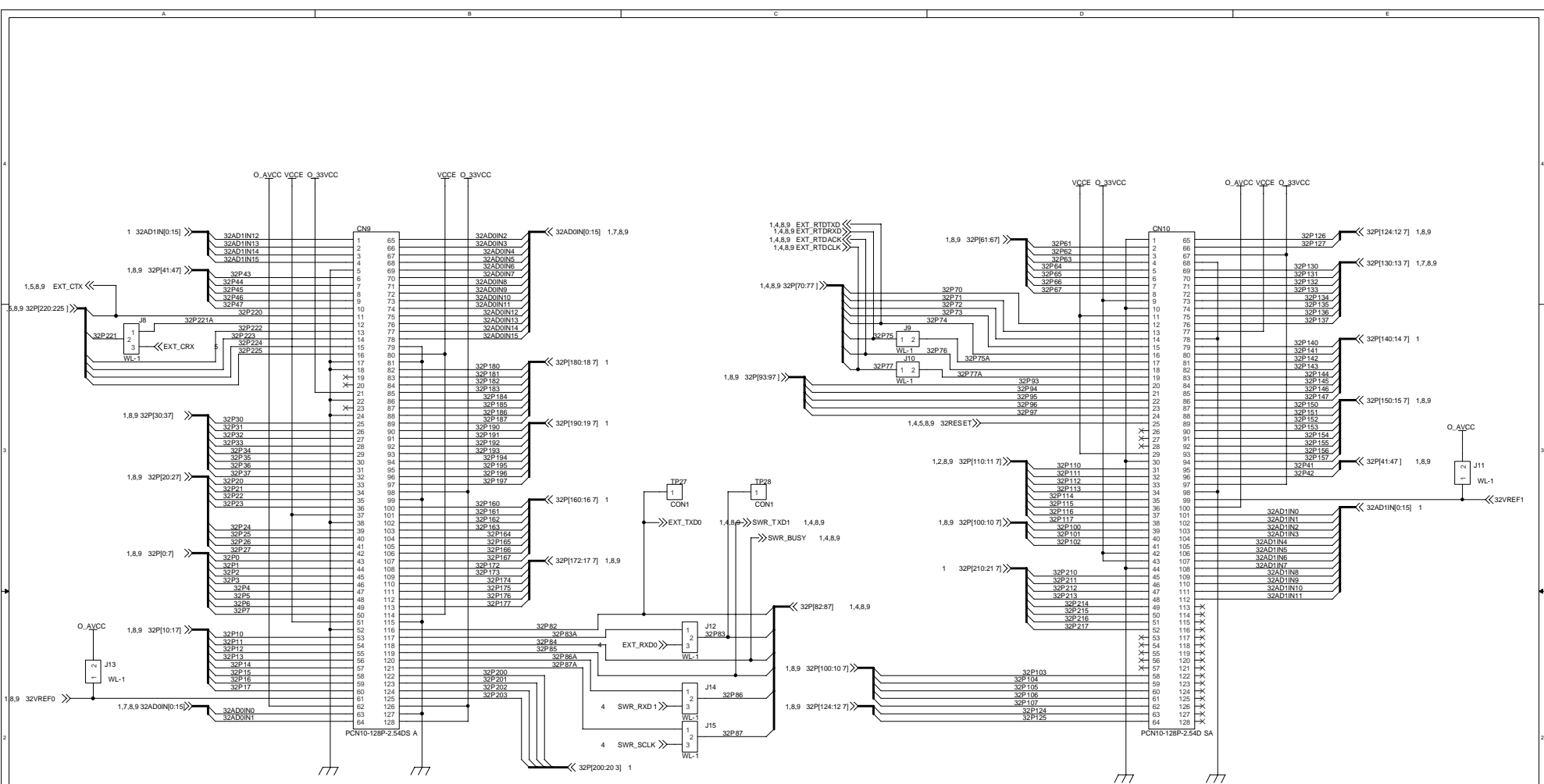
(5/9)

SCALE

DRAWN CHECKED DESIGNED APPROVED

DATE 01.3.28

DK30063

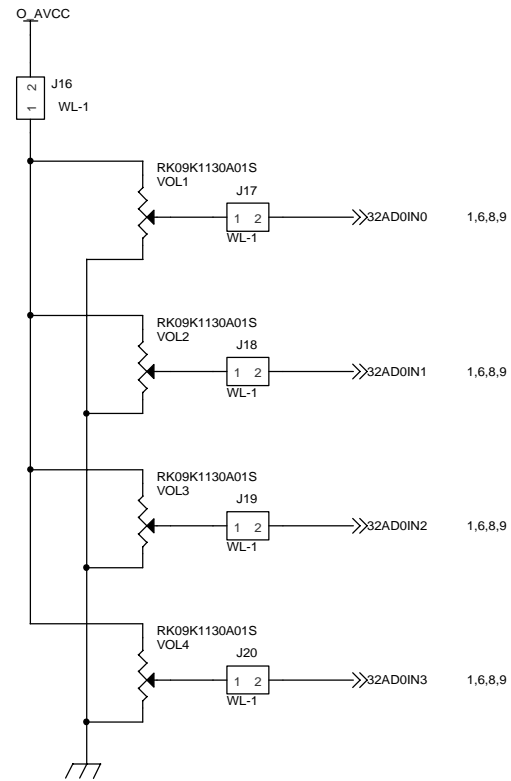
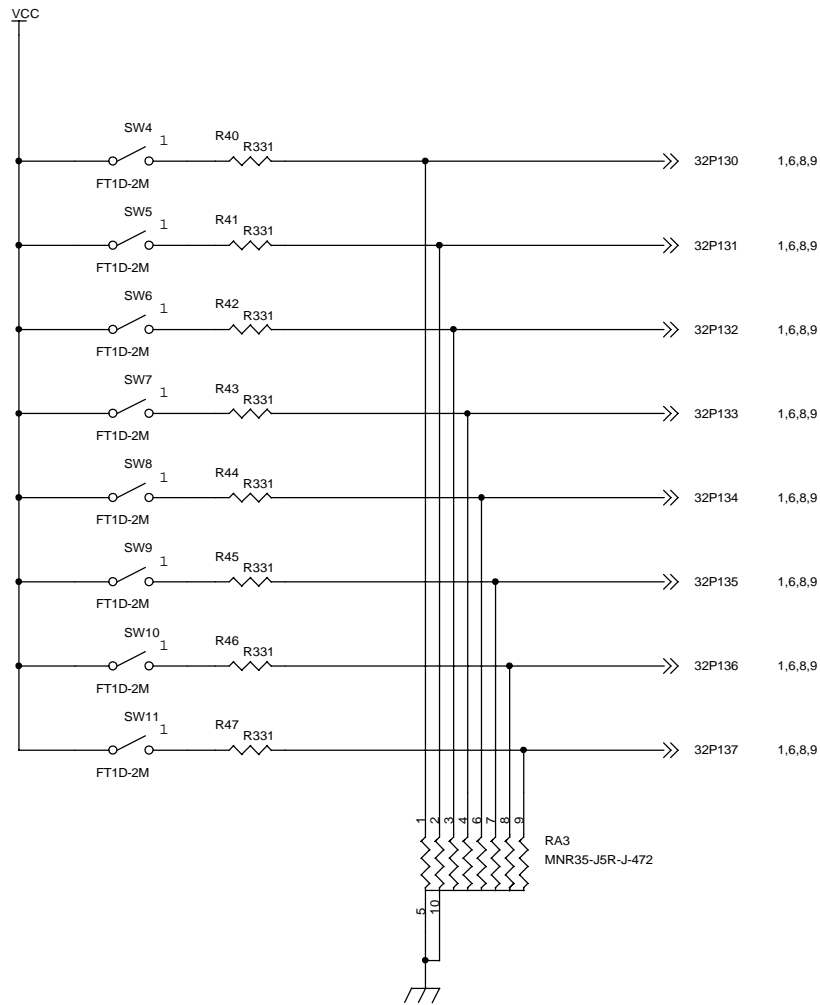


CHANGE	SCALE	
	DATE	01.3.28

RENESAS SOLUTIONS CORPORATION			
DRAWN	CHECKED	DESIGNED	APPROVED

M3A-2114 (6 / 9)
EXTENSION CONNECTOR

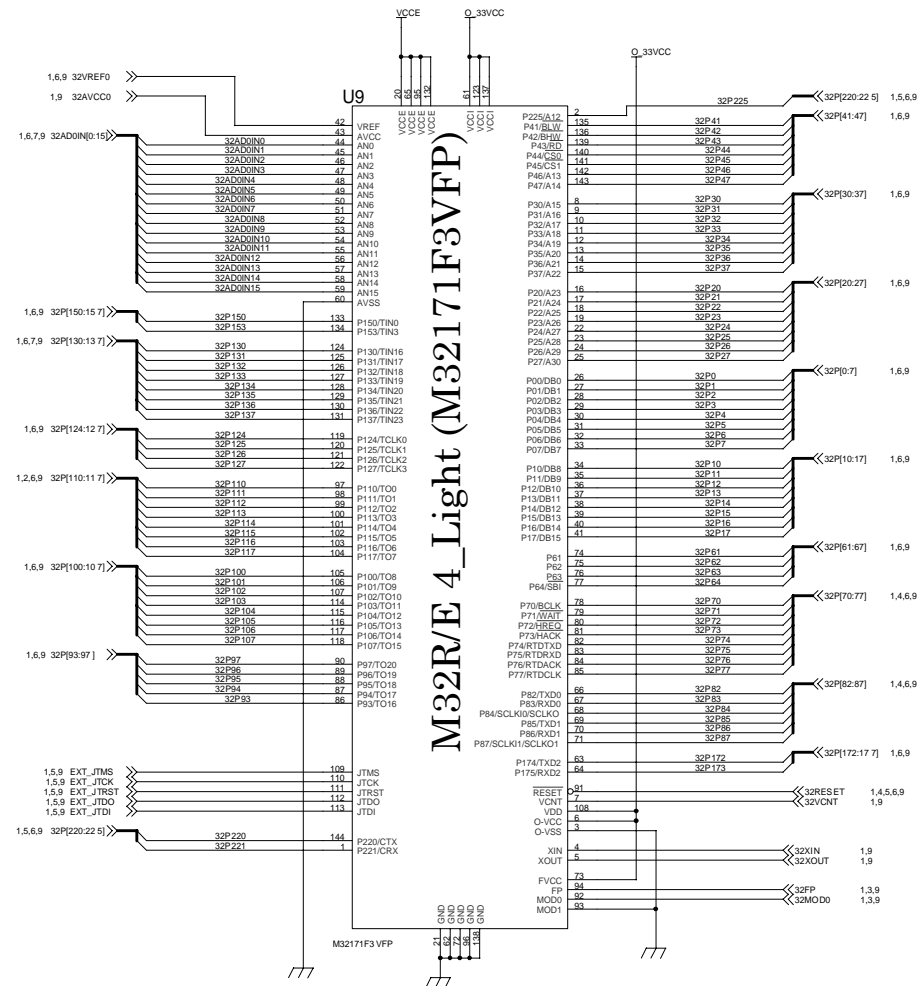
DK30063



CHANGE

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DATE	01.3.28				

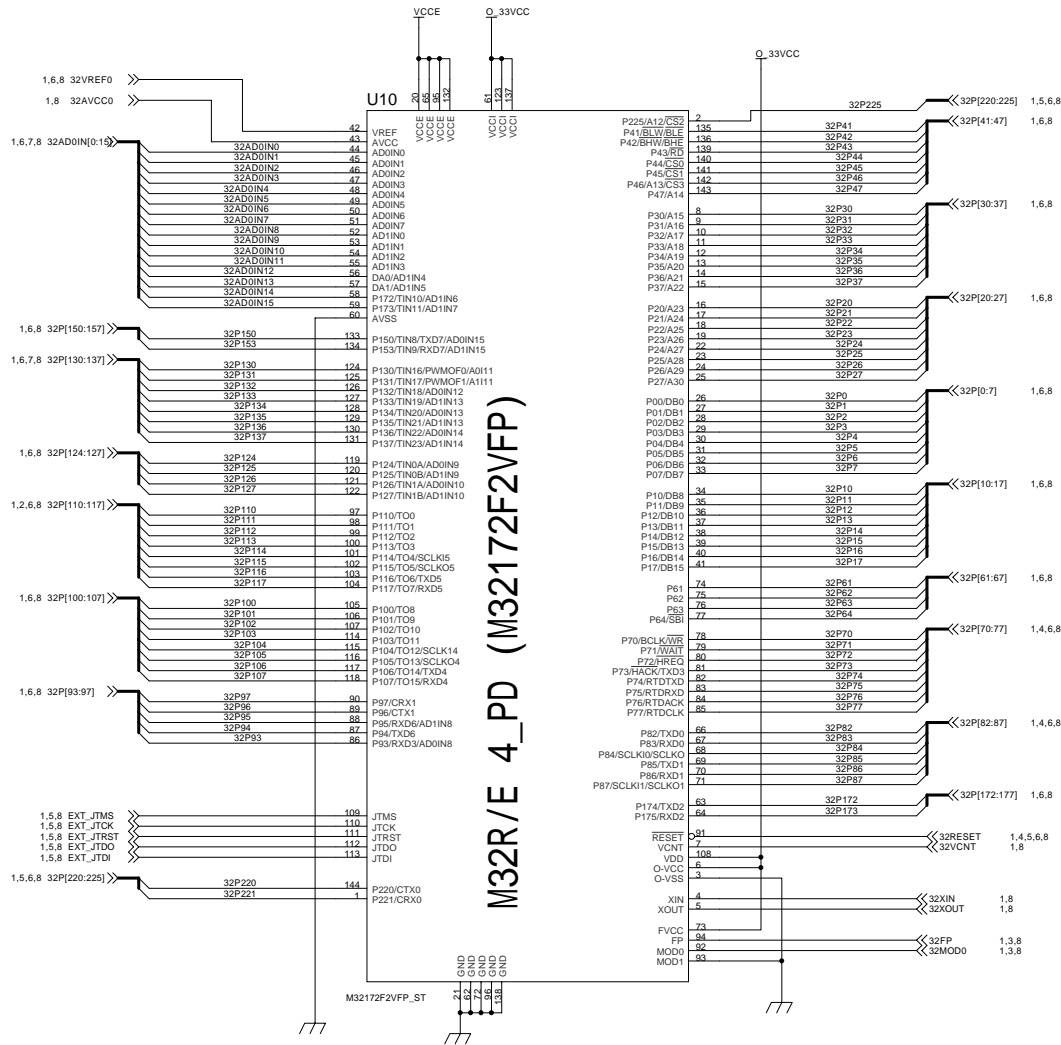
M3A-2114 (7/9)
S/W block
DK30063



CHANGE

		RENESAS SOLUTIONS CORPORATION			
SCALE		DRAWN	CHECKED	DESIGNED	APPROVED
DATE	01.3.28				

M3A-2114 (8/9)
M32171F3VFP block
(144 QFP)
DK30063



M32R/E 4_PD (M32172F2VFP)

CHANGE	MITSUBISHI ELECTRIC CORPORATION				M3A-2114 (9/9) M32172F2VFP block (144 QFP)	
	SCALE		DRAWN	CHECKED	DESIGNED	APPROVED
	DATE	01.3.28 (03.10.20)				
DK30063						

Component Table

Renesas Solutions Corporation

Part name		Part specification				No. of pcs. per unit	Supplied by	Remarks
Item number	Product name	Part number	Part type name	Manufacturer name	Mounting instruction			
1	M32R/ECU #4	U1	M32173F2VFP (M32172F2VFP)	Renesas	Socket mounted	1		
	Microcomputer socket		NQPACK144SD,HQPACK144SD	Sankyo kasei		1pc.Each		
2	Reset IC	U2	M51957BFP	Renesas	Attached directly	1		
3	Driver IC	U3	TC74HC14F	Toshiba	Attached directly	1		
4	LED Driver IC	U4	TC74HC540F	Toshiba	Attached directly	1		
5	Three-terminal regulator	U5	LT1086CM-3.3	Linear	Attached directly	1		
6	RS-232C Driver IC	U6	HIN202CB	Intersil	Attached directly	1		
7	CAN Driver IC	U7	PCA82C250T	Philips	Attached directly	1		
8	CAN Driver IC	U8			Not mounted			Pattern only
9	Oscillator	X1	FXO-31FL-10MHz	Kinseki	Attached directly	1		
10	Oscillator	X2			Not mounted			Pattern only
11	Resonator	Y1			Not mounted			Pattern only
Supplements: When two types of parts are shown for the same item, the one shown in the upper row has priority			Date of creation		Title	M32R/ECU#4 PD Evaluation Board M3A-2114G22		
			2002-10-8					
Revision:			Created by	Checked by	Component table number	PPL-M3A-2114G22-A (1 / 5)		

Component Table

Renesas Solutions Corporation

Item number	Part name		Part specification			No. of pcs. per unit	Supplied by	Remarks
	Product name	Part number	Part type name	Manufacturer name	Mounting instruction			
12	LED	LED1~LED9	G-01PR	Nikkai	Careful with polarity	9		
13	Switch (push type)	SW1	B3F-1100	Omron	Attached directly	1		
14	Switch	SW2	ALE1D-2M4-10	Fujisoku	Attached directly	1		
15	DIP switch	SW3	DSS204	Fujisoku	Attached directly	1		
16	Switch	SW4~SW11	FT1D-2M	Fujisoku	Attached directly	8		
17	Switch cover	Used for SW2	AZ4002 (red)	Fujisoku	Attached directly	1		Red (used for SW2)
18	Connector	CN2	S2B-EH	J.S.T.	Attached directly	1		
19	Connector	CN4,CN7	XM2C-0912	Omron	Attached directly	2		
20	Screw	Used for CN4,CN7	XM2Z-0023	Omron		4		
21	Connector	CN5			Not mounted			Pattern only
22	Connector	CN6			Not mounted			Pattern only
23	Connector	CN8	NFP-34A-0132-BS	Yamaichi	Attached directly	1		
24	Connector	CN9,CN10			Not mounted			Pattern only
Supplements: When two types of parts are shown for the same item, the one shown in the upper row has priority.			Date of creation		Title	M32R/ECU#4 PD Evaluation Board M3A-2114G22		
			2002-10-8					
Revision:			Created by	Checked by	Component table number	PPL-M3A-2114G22-A		

Component Table

Renesas Solutions Corporation

Item number	Part name		Part specification			No. of pcs. per unit	Supplied by	Remarks
	Product name	Part number	Part type name	Manufacturer name	Mounting instruction			
25	Jumper pin	JP1,3,J1~5,7,8,J12,14,15	FFC-3AMEP1	Honda Tsushin	Attached directly	12		
26	Jumper pin	JP2, J6,9~11,13,J16~20	FFC-2AMEP1	Honda Tsushin	Attached directly	11		
27	Diode	D1, D2	MA738	Matsushita	Attached directly	2		
28	Diode	D3~D26	1SS355	Rohm	Attached directly	24		
29	Laminated ceramic capacitor	C1~C4,C6, CP18~CP23 C17~C23,CP3,CP4,CP7,CP8,	GRM40F104Z50 (0.1uF)	Murata	Attached directly	20		C21,C23 are not mounted
30	Laminated ceramic capacitor	C5	GRM40F333Z50 (0.033uF)	Murata	Attached directly	1		
31	Laminated ceramic capacitor	C7,C13,C16	GRM40CH221J50 (220pF)	Murata	Attached directly	3		
32	Laminated ceramic capacitor	C8,C9			Not mounted			Pattern only
33	Laminated ceramic capacitor	CP25	GRM40F103Z50 (0.01uF)	Murata	Attached directly	1		
34	Tantalum electrolytic capacitor	C10,C11,CP17,CP24,CP25,C14	F941D106MC (10uF)	Nichikon	Attached directly	6		
Supplements: When two types of parts are shown for the same item, the one shown in the upper row has priority.			Date of creation		Title	M32R/ECU#4 PD Evaluation Board M3A-2114G22		
			2002-10-8					
Revision:			Created by	Checked by	Component table number	PPL-M3A-2114G22-A		

Component Table

Renesas Solutions Corporation

Item number	Part name		Part specification			No. of pcs. Per unit	Supplied by	Remarks
	Product name	Part number	Part type name	Manufacturer name	Mounting instruction			
35	Tantalum electrolytic capacitor	CP1,CP2,CP5,CP6,CP9~CP16	269M2502 475M720 (4.7uF)	Matsuo	Attached directly	12		
36	Tantalum electrolytic capacitor	C12,C15	F941V225MC (2.2uF)	Nichikon	Attached directly	2		
37	Resistor	R1	MCR10-EZH-F-2402 (24KΩ)	Rohm	Attached directly	1		
38	Resistor	R2	MCR10-EZH-J-223 (22KΩ)	Rohm	Attached directly	1		
39	Resistor	RJ13			Not mounted			
40	Resistor	R4,R20,R24~R35, R40~R47,R10~R18	MCR10-EZH-J-331 (330Ω)	Rohm	Attached directly	31		
41	Resistor	R5	MCR10-EZH-F-1002 (10KΩ)	Rohm	Attached directly	1		
42	Resistor	R6,R7	MCR10-EZH-J-102 (1KΩ)	Rohm	Attached directly	2		
43	Resistor	R8			Not mounted			Pattern only
44	Resistor	R9			Not mounted			Pattern only
45	Resistor	R21, RJ10	MCR10-EZH-J-472 (4.7KΩ)	Rohm	Attached directly	2		
Supplements: When two types of parts are shown for the same item, the one shown in the upper row has priority.			Date of creation		Title	M32R/ECU#4 PD Evaluation Board M3A-2114G22		
			2002-10-8					
Revision:			Created by	Checked by	Component table number	PPL-M3A-2114G22-A		

Component Table

Renesas Solutions Corporation

Item number	Part name		Part specification			No. of pcs. per unit	Supplied by	Remarks
	Product name	Part number	Part type name	Manufacturer name	Mounting instruction			
46	Resistor	R19,R22,R23,RJ6~RJ9,RJ11,12	MCR10-EZH-J-103 (10KΩ)	Rohm	Attached directly	9		
47	Resistor	R36,R38,R39	MCR10-EZH-J-121 (120Ω)	Rohm	Attached directly	3		
48	Resistor	R37,R3	MCR10-EZH-J-272 (2.7KΩ)	Rohm	Attached directly	2		
49	Resistor	RJ1~RJ5	MCR10-EZH-J-330 (33Ω)	Rohm	Attached directly	5		
50	Variable resistor	VOL1,VOL2,VOL3,VOL4	RK09K1130A01S	ALPS	Attached directly	4		
51	Resistor array	RA1,RA3	MNR35-J5R-J-472 (4.7KΩ)	Rohm	Attached directly	2		
52	Test pin	TP1~TP28	ST-1-1	Mac8	Attached directly	6		TP2,4~7,9,11~26 are not mounted
53	Rubber foot		TM-166-3 (black)	3M		5		
54	RS-232C cable		KRS-403XR1K	Sanwa Supply		1		9-pin D-sub (female) 1.5m
55	5V supply cable		HER-2 (connector)	J.S.T.		1		30cm
56	DIC connector	JP1~3,J1~20	DIC-130	Honda Tushin		23		
Supplements: When two types of parts are shown for the same item, the one shown in the upper row has priority			Date of creation		Title	M32R/ECU#4 PD Evaluation Board M3A-2114G22		
			2002-10-8					
Revision:			Created by	Checked by	Component table number	PPL-M3A-2114G22-A		