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RL78/G1D Group

RL78/G1D Evaluation Board User's Manual

RENESAS MCU
RL78 Family

Renesas Electronics
www.renesas.com

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1. Precaution against Electrostatic Discharge (ESD)

   A strong electrical field, when exposed to a CMOS device, can cause destruction of the gate oxide and ultimately degrade the device operation. Steps must be taken to stop the generation of static electricity as much as possible, and quickly dissipate it when it occurs. Environmental control must be adequate. When it is dry, a humidifier should be used. This is recommended to avoid using insulators that can easily build up static electricity. Semiconductor devices must be stored and transported in an anti-static container, static shielding bag or conductive material. All test and measurement tools including work benches and floors must be grounded. The operator must also be grounded using a wrist strap. Semiconductor devices must not be touched with bare hands. Similar precautions must be taken for printed circuit boards with mounted semiconductor devices.

2. Processing at power-on

   The state of the product is undefined at the time when power is supplied. The states of internal circuits in the LSI are indeterminate and the states of register settings and pins are undefined at the time when power is supplied. In a finished product where the reset signal is applied to the external reset pin, the states of pins are not guaranteed from the time when power is supplied until the reset process is completed. In a similar way, the states of pins in a product that is reset by an on-chip power-on reset function are not guaranteed from the time when power is supplied until the power reaches the level at which resetting is specified.

3. Input of signal during power-off state

   Do not input signals or an I/O pull-up power supply while the device is powered off. The current injection that results from input of such a signal or I/O pull-up power supply may cause malfunction and the abnormal current that passes in the device at this time may cause degradation of internal elements. Follow the guideline for input signal during power-off state as described in your product documentation.

4. Handling of unused pins

   Handle unused pins in accordance with the directions given under handling of unused pins in the manual. The input pins of CMOS products are generally in the high-impedance state. In operation with an unused pin in the open-circuit state, extra electromagnetic noise is induced in the vicinity of the LSI, an associated shoot-through current flows internally, and malfunctions occur due to the false recognition of the pin state as an input signal become possible.

5. Clock signals

   After applying a reset, only release the reset line after the operating clock signal becomes stable. When switching the clock signal during program execution, wait until the target clock signal is stabilized. When the clock signal is generated with an external resonator or from an external oscillator during a reset, ensure that the reset line is only released after full stabilization of the clock signal. Additionally, when switching to a clock signal produced with an external resonator or by an external oscillator while program execution is in progress, wait until the target clock signal is stable.

6. Voltage application waveform at input pin

   Waveform distortion due to input noise or a reflected wave may cause malfunction. If the input of the CMOS device stays in the area between V_{IL} (Max.) and V_{IH} (Min.) due to noise, for example, the device may malfunction. Take care to prevent chattering noise from entering the device when the input level is fixed, and also in the transition period when the input level passes through the area between V_{IL} (Max.) and V_{IH} (Min.).

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   Access to reserved addresses is prohibited. The reserved addresses are provided for possible future expansion of functions. Do not access these addresses as the correct operation of the LSI is not guaranteed.

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   Before changing from one product to another, for example to a product with a different part number, confirm that the change will not lead to problems. The characteristics of a microprocessing unit or microcontroller unit products in the same group but having a different part number might differ in terms of internal memory capacity, layout pattern, and other factors, which can affect the ranges of electrical characteristics, such as characteristic values, operating margins, immunity to noise, and amount of radiated noise. When changing to a product with a different part number, implement a system-evaluation test for the given product.

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Usage Notes of Evaluation Board
The regulations of international specifications and Japan's domestic laws restrict the usage of wireless receivers and transmitters.
Observe the specifications and laws of the country in which the RF transceiver is used.
Representative specifications for the band of 2.4 GHz are shown below.
Japan: ARIB STD-T66
United States: FCC 47CFR part15.207, part15.209 and part15.247
Europe: EN 300 328 and EN 301 489

1.   Overview

This document explains Renesas Electronics' RL78/G1D evaluation board (RTK0EN0001D01001BZ).

Figure 1-1 shows a block diagram of this evaluation board.
This evaluation board consists of a module on which the RL78/G1D is mounted (RTK0EN0002C01001BZ) and an extension board for Bluetooth Low Energy evaluation (R0K3ZBBBDBN00BR) with peripheral functions such as push switches and LEDs.
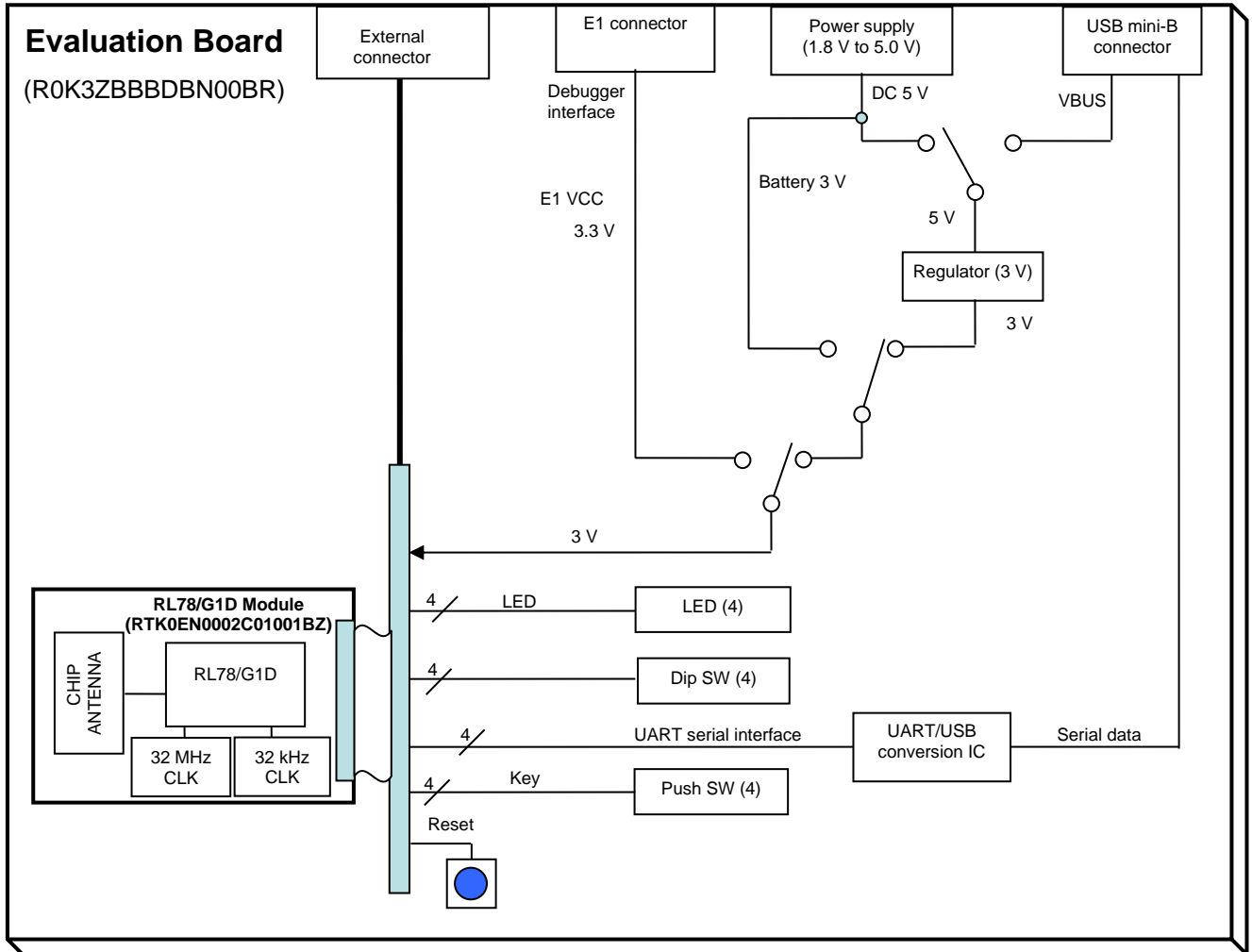

Figure 1-1 RL78/G1D Evaluation Board (RTK0EN0001D01001BZ) Block Diagram

1.1   Specification Outline

Table 1-1 shows the specifications of the RL78/G1D evaluation board.

Table 1-1 RL78/G1D Evaluation Board Specifications

Item	Contents
Wireless module	RL78/G1D module (RTK0EN0002C01001BZ)
USB communication	• USB interface USB mini-B connector UART0 on the RL78/G1D can be used as a USB input/output port by using a UART-USB conversion device. When the board is connected to a computer, the computer virtually handles the USB port as a COM port for communication by using a device driver.
Input functions	• RESET switch • DIP switch (4-pole switch) • Push switches (four)
Display	Four LEDs
Debug interface	2.54 mm pitch male connector with accidental insertion protection for connecting to an E1 emulator

Power supply voltage	One of the following power supplies can be selected by using slide switches. (For the slide switches, see *6. Power Supply*.)
	1. AC adapter 5.0 V or DC jack for battery box input
	   Power supply jack: OD φ 5.5 mm, ID φ 2.0 mm,
	                              outside: minus, inside: plus
	2. USB VBUS 5 V
	3. 3.3 V supplied from E1 emulator

Supply current	1 A or higher
Supply voltage for each part	Power supply for the RL78/G1D module: 1.8 V to 3.6 V
	Power supply for peripherals: 1.8 V to 3.6 V
Dimension	Board size: 55 mm × 90 mm × 18 mm
Operating ambient temperature/humidity	0°C to +60°C, 10% to 80% RH (non condensing)
Storage temperature	−15°C to +60°C, 10% to 80% RH (non condensing)

Note: This evaluation board does not include an AC adapter or battery box.

2. Detailed Specifications
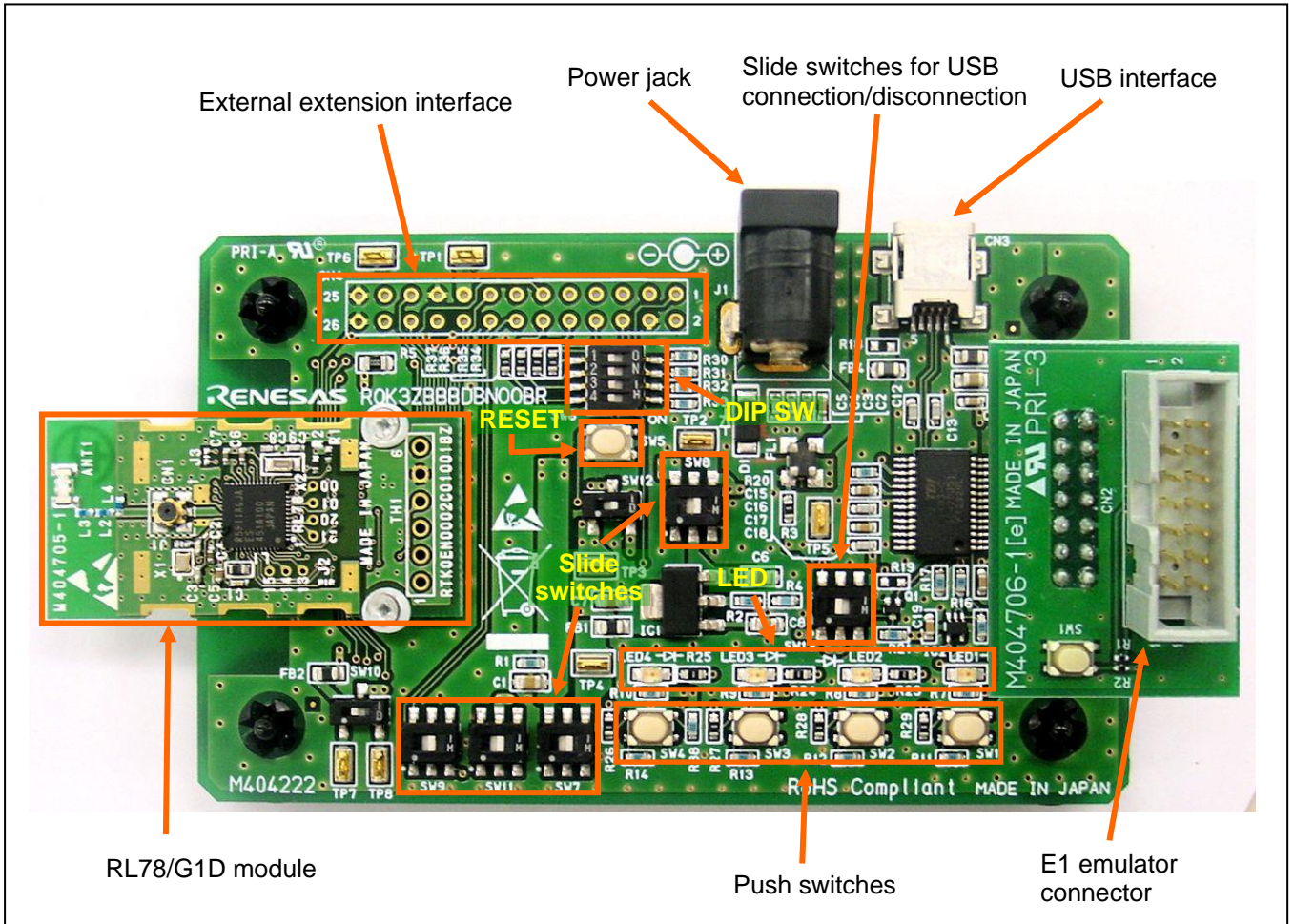
2.1 RL78/G1D Evaluation Board Appearance

Figure 2-1 Board Appearance

2.2   Descriptions of Each Part

(1) CN1 connector that connects the RL78/G1D module

The RL78/G1D module is connected to CN1 on the extension board for Bluetooth Low Energy evaluation.

Do not remove the module from the extension board. Otherwise, the module or the board might malfunction.

(2) Slide switches for switching the power supply (SW7, SW8, and SW11)

The power supply for the evaluation board can be selected by using slide switches. Four types of power supplies are provided: AC adapter input (DC 5 V) from the DC jack (J1), battery box input (DC plug 3 V), USB VBUS input (5 V), and E1 input (3.3 V) available when the E1 emulator is connected.

If the AC adapter input (DC 5 V) or USB VBUS input (5 V) is selected, 3.0 V is generated by a regulator.

The AC adapter DC input, VBUS input, and E1 are switched by using the slide switches. Battery box input (3.0 V) and E1 input (3.3 V) can also be switched by using the slide switches.

(3) I/O

The evaluation board has a USB interface, push switches, a DIP switch (SW6), and LEDs for I/O. The interface of the push switches, DIP switch, and LEDs can be electrically separated from the RL78/G1D module by removing the 0 Ω resistors.

(4) E1 emulator connector

The E1 connector is provided to connect the Renesas Electronics on-chip debugging emulator E1 (sold separately).

(5) RESET

The evaluation board has a RESET switch (SW5). Use this switch to reset the RL78/G1D module.

(6) External extension interface

External extension interface pins are provided on the evaluation board in order to connect the I/O ports of the RL78/G1D module to an external system.

3. Settings

3.1 Slide Switch Settings

Table 3-1 shows the functions implemented by using the slide switches on the evaluation board and their operations. In this table, the factory settings are shown in bold face and italicized. Figure 3-1 shows the positions at which the slide switches are placed, and Figure 3-2 shows the factory setting of the slide switches.

Table 3-1 Functions of Slide Switches on RTK0EN0001D01001BZ

No.	Function	1-2 connected (left)	2-3 connected (right)
SW7	Selects DC/VBUS or battery as the power supply.	Power is directly supplied from the battery.	*Power is supplied from the DC/VBUS via a regulator.*
SW8	Selects DC 5 V or VBUS as the power supply.	*Power is supplied from DC 5 V.*	Power is supplied from USB VBUS.
SW9	Switches between USB and external extension interface.	Connected to an external extension interface.	*Connected to a USB device.*
SW10	Switches the power supply line.	*Power is supplied to the module.*	The power supply line is left open. (Current consumption can be measured by using TP7 and TP8.)
SW11	Selects the E1 debugger (3.3 V) or another source as the power supply.	3.3 V is supplied directly from the E1 debugger.	*Power is supplied from a source other than the E1 debugger (3.3 V).*
SW12	Unused	Do not use this switch.	*Set this switch to the right.*
SW13	Connects or disconnects the USB interface.Note	*The USB interface is connected.*	The USB interface is disconnected.

Note: When not using the USB interface, set SW9 to '1-2 connected' and SW13 to '2-3 connected'; these disconnect the buffer power supply and prevent leak current flowing to the signal level conversion buffer connected between the RL78/G1D and UART-USB conversion IC.
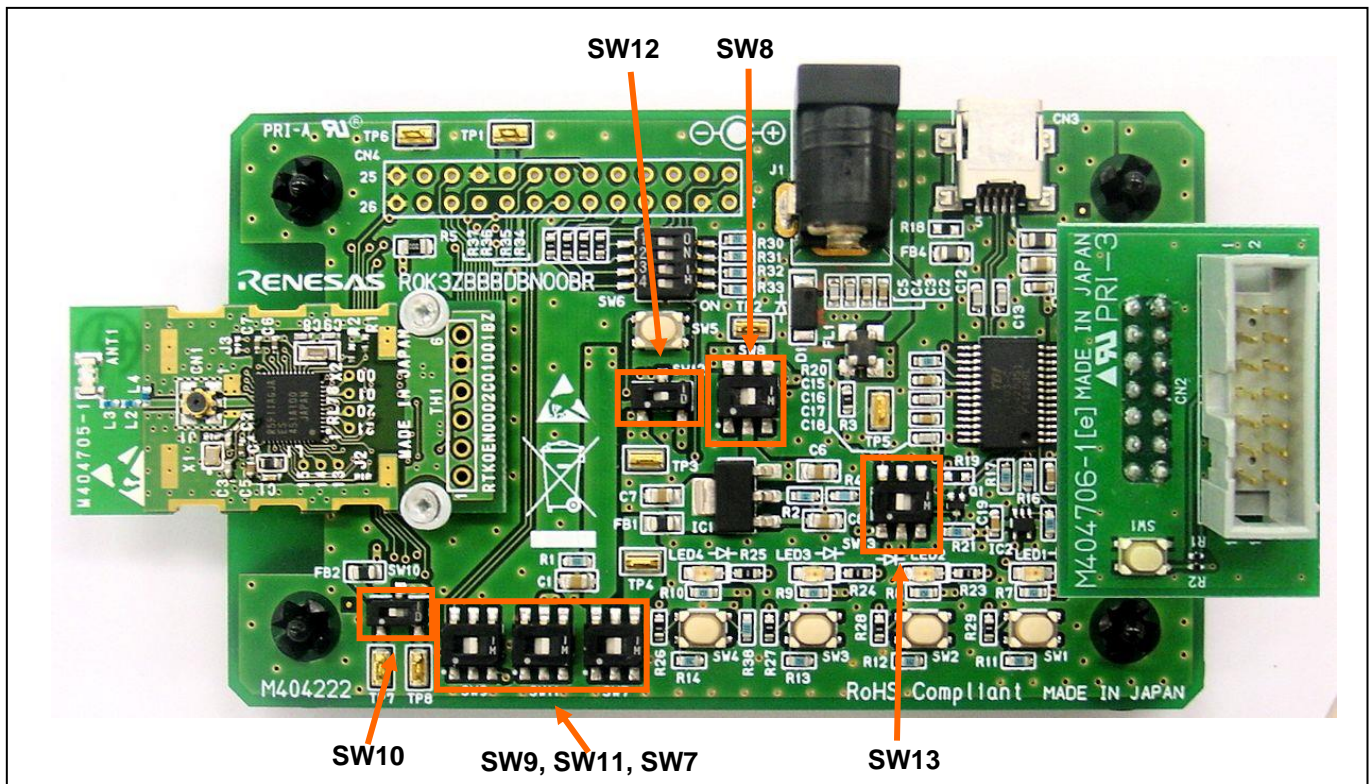

Figure 3-1 Mounting Positions of Slide Switches

Slide switches in the middle of the board

SW12

SW8

SW13

Slide switches at the bottom of the board

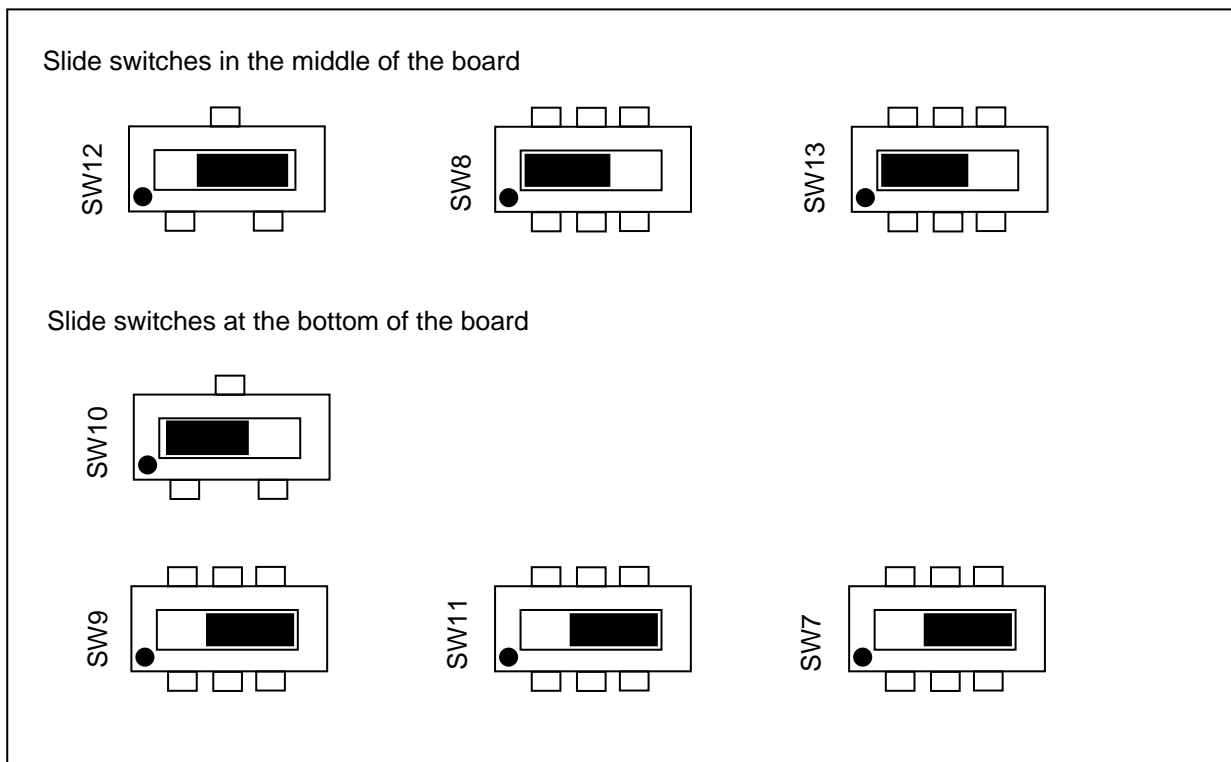SW10

SW9

SW11

SW7

Figure 3-2 Slide Switches Factory Settings

4.   Connector

4.1   RL78/G1D Module Interface

CN1 is used to connect the RL78/G1D module. Table 4-1 shows the assignment of the CN1 connector pins.

Table 4-1 Assignment of CN1 Connector Pins

Pin	Signal name	Pin	Signal name
1	VSS	13	P02/ANI17/ TXD1 / SW6-4
2	VDD	14	P10/SCK00/SCL00 / SW6-1
3	P40/TOOL0	15	GPIO0/TXSELH_RF / SW6-3
4	N.C.	16	P22/ANI2 / SW4
5	RESET	17	GPIO1/TXSELL_RF / SW6-2
6	N.C.	18	P23/ANI3 / SW3
7	P60/SCLA0 / LED4	19	N.C./ SW1
8	P61/SDAA0	20	P16/TI01/TO01/INTP5 / SW2
9	P03/ANI16/ RXD1 / LED3	21	VSS
10	P11/SI00/RXD0/SDA00 / RxD	22	P30/INTP3/RTC1HZ/UPON (VBUS detection)
11	P147/ANI18 / LED2	23	P120/ANI19 / LED1
12	P12/SO00/TXD0/TxD	24	N.C.

4.2   E1 Debug Interface

CN2 is used to connect Renesas Electronics on-chip debugging emulator E1 (sold separately) via conversion adapter. Table 4-2 shows the assignment of the CN2 connector pins when a conversion adapter is connected.

Table 4-2 Assignment of CN2 Connector Pins

Pin	Signal name	Pin	Signal name
1	N.C.	8	VDD
2	GND	9	VDD
3	N.C.	10	RESET#
4	N.C.	11	N.C.
5	TOOL0	12	GND
6	RESET_IN#	13	RESET#
7	N.C.	14	GND

4.3   USB Interface

CN3 is used to communicate with external devices by using the USB interface via a UART-USB conversion device. Table 4-3 shows the assignment of the CN3 connector pins.

Table 4-3 Assignment of CN3 Connector Pins

Pin	Signal name	Pin	Signal name
1	VBUS	4	N.C.
2	MD	5	GND
3	MP	6	CH

4.4   External Extension Interface

CN4 is provided as an external extension interface for when you want to connect and external device. Table 4-4 shows the assignment of the CN4 connector pins.

Table 4-4 Assignment of CN4 External Extension Connector Pins

Pin	Signal name	Pin	Signal name
1	P30/INTP3/RTC1HZ / UPON (VBUS detection)	14	P12/SO00/TXD0 / TxD
2	VCC3 (3V)	15	P120/ANI19 / LED1
3	P61/SDAA0	16	P11/SI00/RXD0/SDA00 / RxD
4	GND	17	VCC3
5	P23/ANI3 / SW3	18	N.C./ SW1
6	P10/SCK00/SCL00 / SW6-1	19	GND
7	P147/ANI18 / LED2	20	P16/TI01/TO01/INTP5 / SW2
8	GPIO1/TXSELL_RF / SW6-2	21	P40/TOOL0
9	P03/ANI16 /RXD1 LED3	22	RESET
10	GPIO0/TXSELH_RF / SW6-3	23	N.C.
11	P60/SCLA0 / LED4	24	5.0 V
12	P02/ANI17/SIO/TXD1 / SW6-4	25	GND
13	P22/ANI2 / SW4	26	GND

4.5   Extension Interface of RL78/G1D Module

Through-holes are provided as an extension interface if you want to use the module as a standalone device. Figure 4-1 shows the pin assignment of the through-hole. Use the pins of CN1 and the through-hole exclusively.
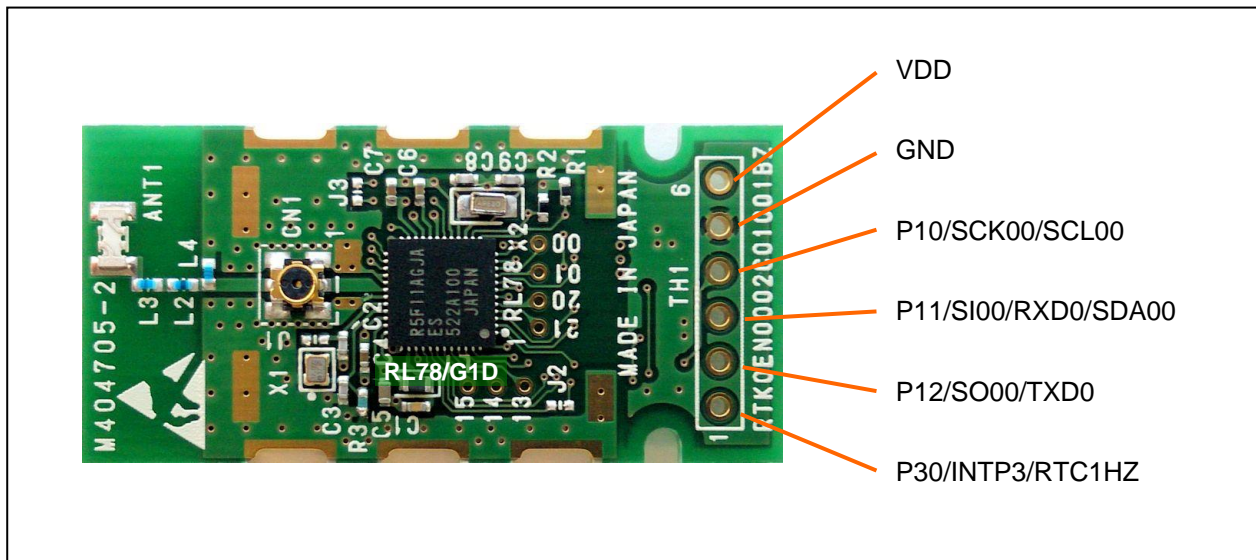
Figure 4-1 Assignment of Through-hole Pins

5. I/O

General-purpose ports on the RL78/G1D module are connected to the extension board for Bluetooth Low Energy evaluation via connectors. This section describes the interface for each I/O.

5.1 Push Switches

To use the push switches, enable the pull-up resistors incorporated in the RL78/G1D module. The level of the corresponding general-purpose ports becomes high when the switches are off and low when the switches are on. Table 5-1 shows the relationship between the push switch ports and the RL78/G1D module.

Table 5-1 Push Switches

	Pin No.	Port
SW1	CN1-19	N.C.
SW2	CN1-20	P16
SW3	CN1-18	P23
SW4	CN1-16	P22

Remark: Enable the on-chip pull-up resistor connected to P16 (in input mode) on the RL78/G1D. P22 is pulled up on the extension board for Bluetooth Low Energy evaluation. Connect a resistor of 100 kΩ to CN4 to pull up P23.

5.2 DIP Switch

To use the DIP switch, enable the pull-up resistors on the RL78/G1D module. The level of the corresponding general-purpose ports becomes high when the switch is set to off and low when the switch is set to on. At shipment, SW6-1 to SW6-4 are set to off. Table 5-2 shows the relationship between the DIP switch and the RL78/G1D module ports.

Table 5-2 DIP Switch

	Pin No.	Port
SW6-1	CN1-14	P10
SW6-2	CN1-17	–
SW6-3	CN1-15	–
SW6-4	CN1-13	P02

5.3 LEDs

The LEDs on the evaluation board are turned off when a high level is output to the corresponding general-purpose port and turned on when a low level is output.
Table 5-3 shows the relationship between the LEDs and the RL78/G1D module ports.

Table 5-3 LED

	Pin No.	Port
LED1	CN1-23	P120
LED2	CN1-11	P147
LED3	CN1-9	P03
LED4	CN1-7	P60

Remark: The LEDs become dim when the voltage is 2.2 V or lower.

5.4 USB Interface

By using a UART-USB conversion device, the evaluation board can use UART0 on the RL78/G1D to communicate with an external device. To communicate with a computer, connect a USB cable (A type male or mini-B male) to the CN3 connector. Communication with a computer does not require flow control.
A circuit to detect connection to a computer is also provided. When a low level is input to general-purpose port P30 on the RL78/G1D module, it indicates that the evaluation board is connected to the computer. When a high level is input, it indicates that the evaluation board is not connected.
When not using the USB interface, set the slide switch SW9 to '1-2 connected' and SW13 to '2-3 connected'; these disconnect the buffer power supply and prevent leak current flowing from the signal level conversion buffer between the RL78/G1D and UART-USB conversion IC.
Table 5-4 shows the relationship between the USB interface and the RL78/G1D module ports.

Table 5-4 USB Interface

	Pin No.	Port
UPON (VBUS detection)	CN1-22	P30
TxD	CN1-12	P12
RxD	CN1-10	P11

To communicate with an external device via the USB interface by using UART0 of RL78/G1D, a UART-USB conversion device driver must be installed in the computer. Install the driver referring to the appendix in this document.

For detailed specifications of UART-USB conversion, see the manual of the UART-USB conversion IC FT232RL (manufactured by Future Technology Devices International Ltd. in the UK).

6. Power Supply

6.1 Power Line System

The evaluation board operates on the power supply selected by using the slide switches: AC adapter input (DC 5 V) from the jack (J1), battery box input (DC plug 3 V), USB VBUS input (5 V), or E1 input (3.3 V; when the E1 emulator is connected). Do not select 5 V when connection is established by E1 emulator software.

When the AC adapter input (DC 5 V) or USB VBUS input (5 V) is selected, 3.0 V is generated by the regulator. Figure 6-1 shows the power line system.
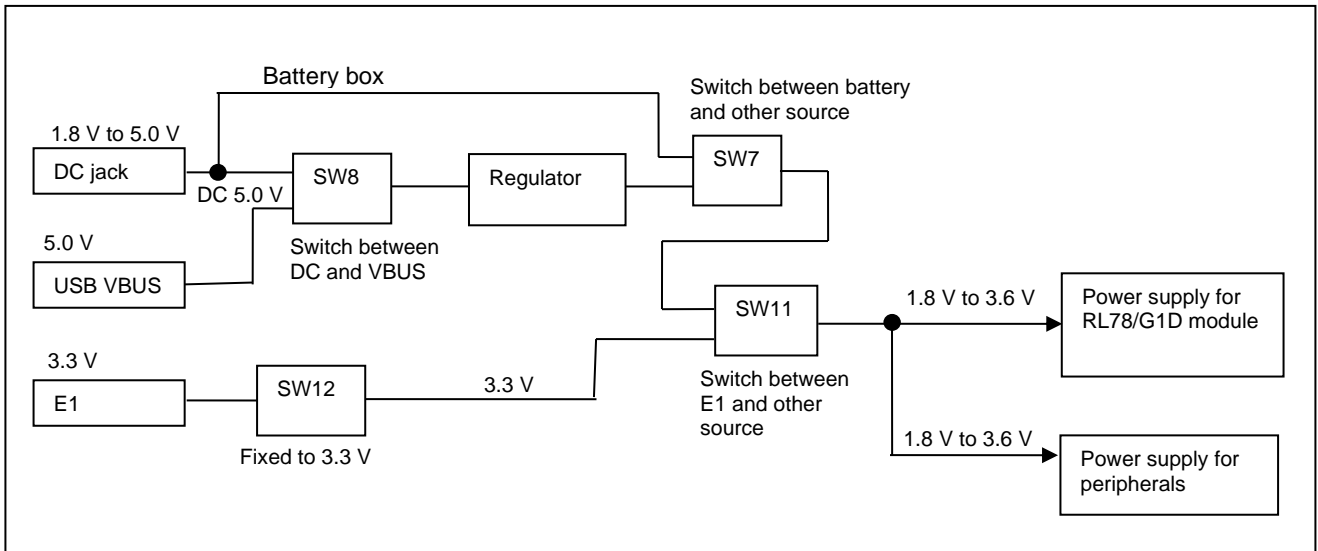

Figure 6-1 Power Line System

Table 6-1 shows operating modes and the settings of the slide switches for power supply input.

Table 6-1 Major Blocks Using Power Supply

Operating mode		Settings of slide switches			Host interface connection (P3_0)
		SW11	**SW7**	**SW8**	
Host interface used	DC 5 V power supply input	Pin 3 side (other power supply)	Pin 3 side (DC/VBUS)	Pin 1 side (DC 5 V)	L
	VBUS power supply input	Pin 3 side (other power supply)	Pin 3 side (DC/VBUS)	Pin 3 side (VBUS)	L
	Battery box input	Pin 3 side (other power supply)	Pin 1 side (battery)	–	L
	E1 power supply 3.3 V	Pin 3 side (E1 (3.3 V))	–	–	L
Host interface not used	DC 5 V power supply input	Pin 3 side (other power supply)	Pin 3 side (DC/VBUS)	Pin 1 side (DC 5 V)	H
	Battery box input	Pin 3 side (other power supply)	Pin 1 side (battery)	–	H
	E1 power supply (3.3 V)	Pin 1 side (E1 (3.3 V))	–	–	H

−: Setting not specified.
For SW12, see *3.1*.

6.2   DC Jack Input Power

Table 6-2 shows the specifications of the power input from the DC jack on the evaluation board.

Table 6-2 DC Jack Input Power

Item	Specification
Plug	OD φ5.5 mm, ID φ2.0 mm
Polarity of plug	Outside: minus, inside: plus
Input voltage	1.8 V to 5.0 V
Supply current	1 A or higher

7. Notes

This evaluation board includes the extension board for Bluetooth Low Energy evaluation and the RL78/G1D module, which are connected together via a connector and attached by screws and washers. Note that neither the extension board nor the module is covered by warranty if they are detached from each other.

Direction on WEEE (Waste Electrical and Electronic Equipment Directive)

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CAUTION

This equipment should be handled like a CMOS semiconductor device. The user must take all precautions to avoid build-up of static electricity while working with this equipment. All test and measurement tool including the workbench must be grounded. The user/operator must be grounded using the wrist strap. The connectors and/or device pins should not be touched with bare hands.

EEDT-ST-004-10

8. Circuit Diagrams

8.1 Diagram of RL78/G1D Module Connection

A diagram of the RL78/G1D module (RTK0EN0002C01001BZ) connection is shown on the next page.
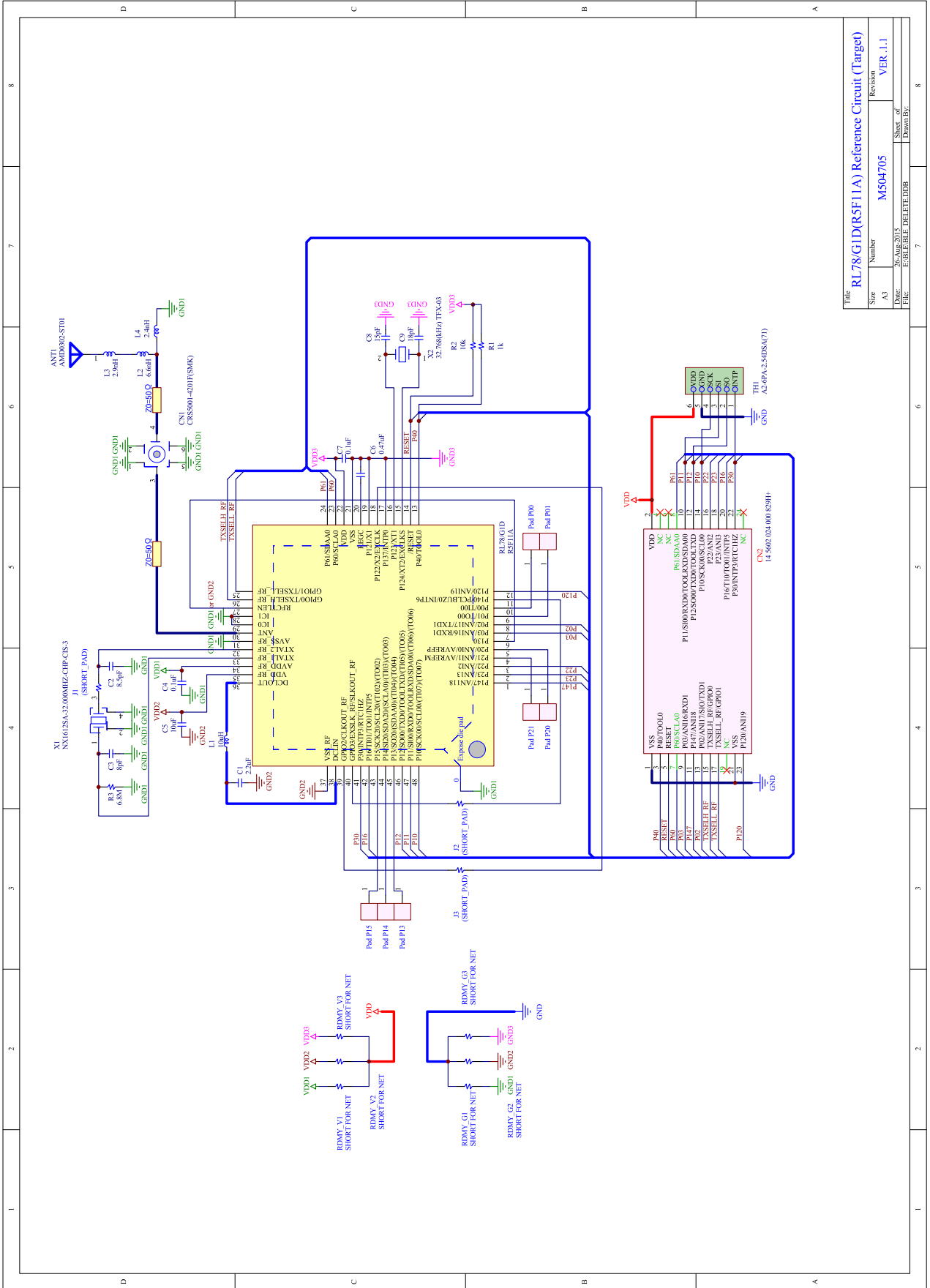
8.2   Circuit Diagrams of Extension Board for Bluetooth Low Energy Evaluation

Circuit diagrams of the extension board for Bluetooth Low Energy evaluation (R0K3ZBBBDBN00BR) are shown on the following pages.

Drawing Name

R0K3ZBBBDBN00BR
POWER & Main Block

Drawing Number
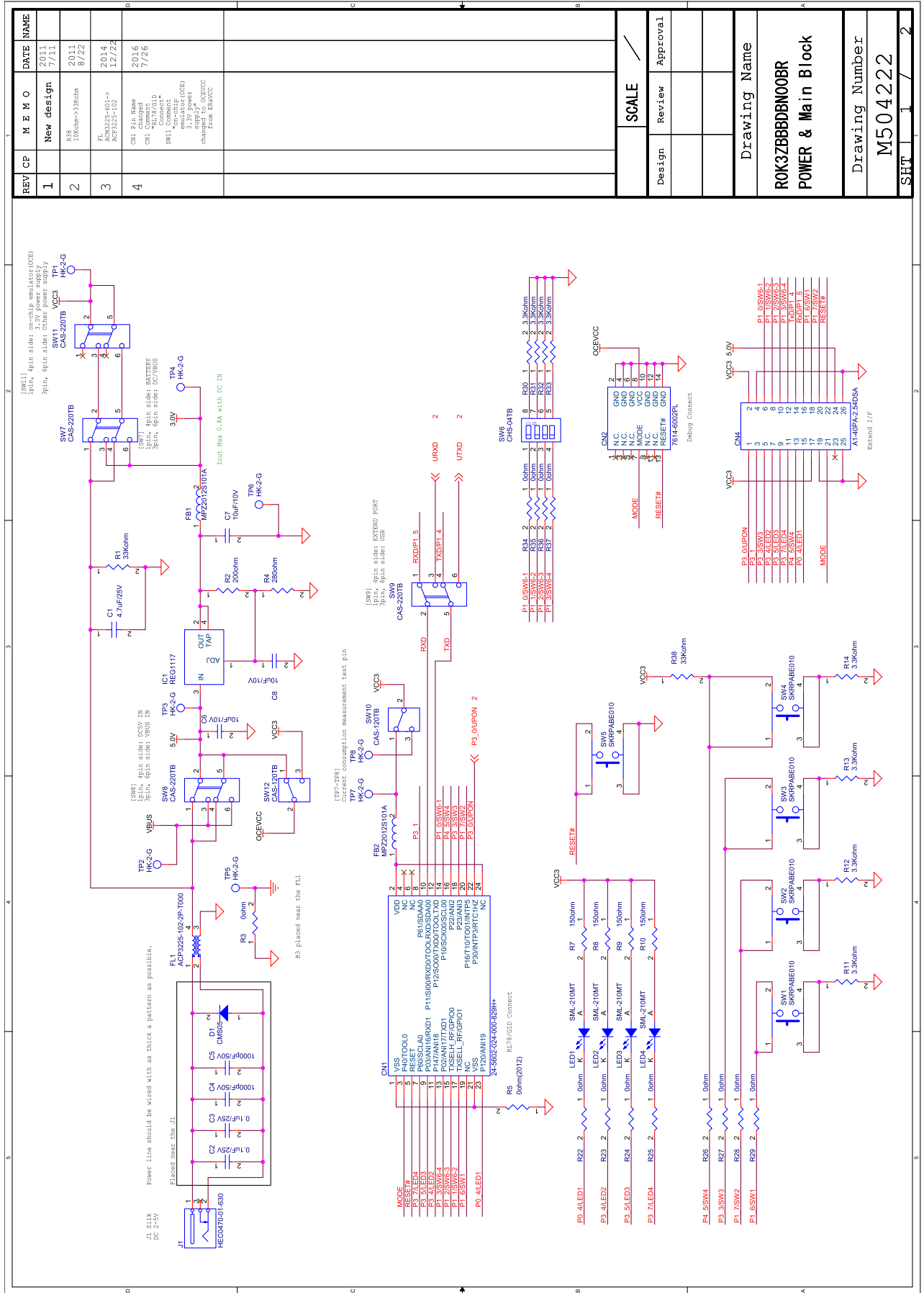
M504222

REV	CP	M E M O	DATE	NAME
1		New design	2011 7/11	
2		R38 10Kohm->33Kohm	2011 8/22	
3		FL1 ACM3225-601-> ACP3225-102	2014 12/22	
4		CN1 Pin Name changed CN1 Comment "RL78/G1D Connect" SW11 Comment "on-chip emulator(OCE) 3.3V power supply" changed to OCEVCC from EBaVCC	2016 7/26	

SCALE

Design | Review | Approval

SHT 1 / 2
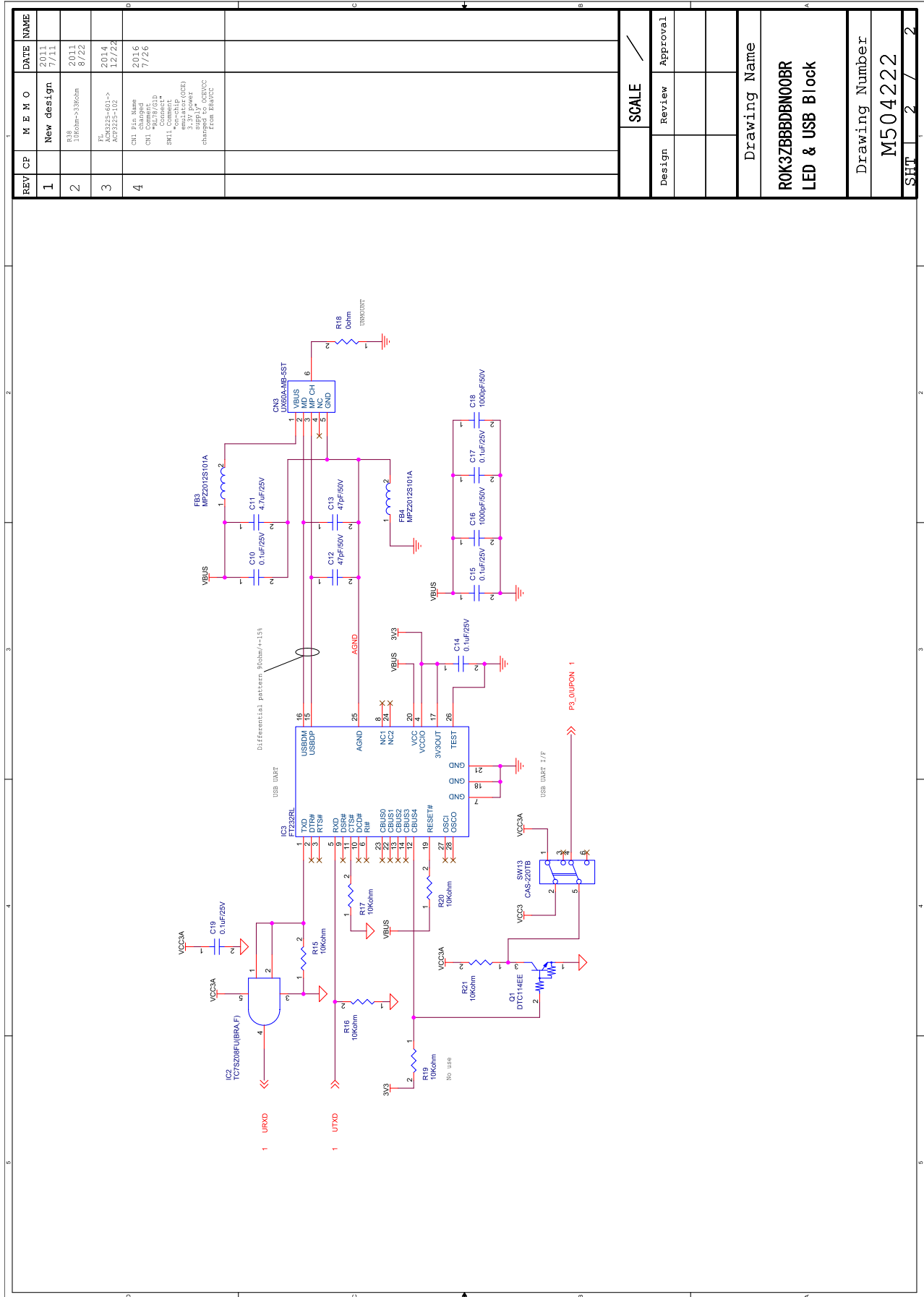
[SW11]
1pin, 4pin side: on-chip emulator(OCE) 3.3V power supply
3pin, 6pin side: Other power supply

TP1 HK-2-G
SW11 CAS-220TB
VCC3

SW7 CAS-220TB
[SW7]
1pin, 4pin side: BATTERY
3pin, 6pin side: DC/VBUS
TP4 HK-2-G
3.0V

Iout Max 0.8A with DC IN

FB1 MPZ2012S101A
C7 10uF/10V
TP6 HK-2-G

R1 33Kohm
R2 200ohm
R4 280ohm
C1 4.7uF/25V

IC1 REG1117
OUT TAP ADJ IN
C6 10uF/10V
C8 10uF/10V

TP3 HK-2-G
[SW8] 1pin, 4pin side: DC5V IN 3pin, 6pin side: VBUS IN
SW8 CAS-220TB
5.0V VCC3
SW12 CAS-120TB
OCEVCC
VBUS
TP2 HK-2-G
TP5 HK-2-G
R3 0ohm

FL1 ACP3225-102-2P-T000

J1 Silk DC 2-5V
HEC0470-01-630
J1

D1 CMS05
C5 1000pF/50V
C4 1000pF/50V
C3 0.1uF/25V
C2 0.1uF/25V

Power line should be wired with as thick a pattern as possible.
R3 placed near the FL1
Placed near the J1

[SW9] 1pin, 4pin side: EXTEND PORT 3pin, 6pin side: USB
SW9 CAS-220TB
RXD/P1_5
TXD/P1_4
URXD
UTXD
RXD
TXD

SW10 CAS-120TB
VCC3

TP7 HK-2-G
TP8 HK-2-G
FB2 MPZ2012S101A
P3_1
[TP7-TP8] Current consumption measurement test pin

CN1
VSS P40/TOOL0 RESET P60/SCLA0 P03/ANI16/RXD1 P147/ANI18 P02/ANI17/TXD1 TXSELH_RF/GPIO0 TXSELL_RF/GPIO1 NC VSS P120/ANI19
VDD NC NC P61/SDAA0 P04/ANI14/RXD0/TOOLRXD/SDA00 P12/SO00/TXD0/TOOLTXD P10/SCK00/SCL00 P22/ANI2 P23/ANI3 P16/TI00/TO00/INTP5 P30/INTP3/RTC1HZ NC
24-5602-024-000-829H+ RL78/G1D Connect
24.5602-024-000-829H+(2012)

R5 0ohm

TP9, TP10, TP11 HK-2-G

P3_1

P1_0/SW6-1
P4_5/SW4
P3_3/SW3
P1_7/SW2
P3_0/UPON

LED1 SML-210MT
LED2 SML-210MT
LED3 SML-210MT
LED4 SML-210MT

R7 150ohm
R8 150ohm
R9 150ohm
R10 150ohm
R22 0ohm
R23 0ohm
R24 0ohm
R25 0ohm
R26 0ohm
R27 0ohm
R28 0ohm
R29 0ohm

P0_4/LED1
P3_4/LED2
P3_5/LED3
P3_7/LED4
P4_5/SW4
P3_3/SW3
P1_7/SW2
P1_6/SW1

MODE
RESET#
P3_7/LED4
P3_5/LED3
P3_4/LED2
P3_3/SW6-3
P1_2/SW6-2
P1_1/SW6-3
P1_6/SW1
P0_4/LED1

R30 3.3Kohm
R31 3.3Kohm
R32 3.3Kohm
R33 3.3Kohm
R34 10ohm
R35 10ohm
R36 10ohm
R37 10ohm

P1_0/SW6-1
P1_1/SW6-2
P1_2/SW6-3
P1_3/SW6-4

SW6 CHS-04TB

OCEVCC
CN2 7614-6002PL
N.C. N.C. N.C. MODE N.C. RESET#
GND GND GND VCC GND GND
MODE
RESET#
Debug Connect

VCC3 5.0V
CN4 A1-40PA2.54DSA
Extend I/F

P1_0/SW6-1
P1_1/SW6-2
P1_2/SW6-3
P1_3/SW6-4
TxD/P1_4
RxD/P1_5
P1_6/SW1
P1_7/SW2
RESET#

P3_0/UPON
P3_3/SW3
P3_4/LED2
P3_5/LED3
P3_7/LED4
P4_5/SW4
P0_4/LED1
MODE

VCC3
R38 33Kohm
R14 3.3Kohm
R13 3.3Kohm
R12 3.3Kohm
R11 3.3Kohm

SW4 SKRPABE010
SW3 SKRPABE010
SW2 SKRPABE010
SW1 SKRPABE010
SW5 SKRPABE010

RESET#
VCC3

Appendix A. The UART- USB Conversion Device Driver

To communicate with an external device via the USB interface by using UART0 of the RL78/G1D, a UART-USB conversion device (FT232RL) driver must be installed in the computer.

Before connecting the evaluation board to the computer, download the UART-USB conversion IC (FT232RL) driver from the website of FTDI (Future Technology Devices international Ltd.) and install it on your computer.

Appendix B. Conformity Assessment

RL78/G1D evaluation board (RTK0EN0001D01001BZ) conforms to the laws and regulations that are described in the following.

FCC/IC Regulatory

Since this module is not sold to general end users directly, there is no user manual of module.
For the details about this module, please refer to the specification sheet of module.
This module should be installed in the host device according to the interface specification (installation procedure).
The following information must be indicated on the host device of this module;

Contains FCC ID: 2AEMX-G1DEVA
This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Contains IC: 20194-G1DEVA
The following statements must be described on the user manual of the host device of this module;

[for FCC]
FCC CAUTION
Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This transmitter must not be co-located or operated in conjunction with any other antenna or transmitter.
This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment and meets the FCC radio frequency (RF) Exposure Guidelines. This equipment has very low levels of RF energy that it deemed to comply without maximum permissive exposure evaluation (MPE). But it is desirable that it should be installed and operated keeping the radiator at least 20cm or more away from person's body.

[for IC]
This device complies with Industry Canada's licence-exempt RSSs. Operation is subject to the following two conditions: (1) This device may not cause interference; and (2) This device must accept any interference, including interference that may cause undesired operation of the device.
Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : 1) l'appareil ne doit pas produire de brouillage; 2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

This equipment complies with IC radiation exposure limits set forth for an uncontrolled environment and meets RSS-102 of the IC radio frequency (RF) Exposure rules. This equipment has very low levels of RF energy that it deemed to comply without maximum permissive exposure evaluation (MPE). But it is desirable that it should be installed and operated keeping the radiator at least 20cm or more away from person's body.
Cet équipement est conforme aux limites d'exposition aux rayonnements énoncées pour un environnement non contrôlé et respecte les règles d'exposition aux fréquences radioélectriques (RF) CNR-102 de l'IC. Cet équipement émet une énergie RF très faible qui est considérée conforme sans évaluation de l'exposition maximale autorisée. Cependant, il est souhaitable qu'il devrait être installé et utilisé en gardant une distance de 20 cm ou plus entre le radiateur et le corps humain.

Korea Radio Regulations

MSIP-CRM-R5E-G1DEVA
해당 무선설비는 전파혼신 가능성이 있으므로 인명안전과 관련된 서비스는 할 수 없습니다.

China SRRC

1.
- 使用频率：2.4 – 2.4835 GHz
- 等效全向辐射功率(EIRP)：
  天线增益<10dBi 时：≤100 mW 或≤20 dBm
- 最大功率谱密度：
  天线增益<10dBi 时：≤20 dBm / MHz(EIRP)
- 载频容限：20 ppm
- 带外发射功率(在 2.4-2.4835GHz 频段以外)
  　　　　　　 ≤-80 dBm / Hz (EIRP)
- 杂散发射(辐射)功率(对应载波±2.5 倍信道带宽以外)：
  ≤-36 dBm / 100 kHz (30 – 1000 MHz)
  ≤-33 dBm / 100 kHz (2.4 – 2.4835 GHz)
  ≤-40 dBm / 1 MHz (3.4 – 3.53 GHz)
  ≤-40 dBm / 1 MHz (5.725 – 5.85 GHz)
  ≤-30 dBm / 1 MHz (其它 1 – 12.75 GHz)

2.不得擅自更改发射频率、加大发射功率(包括额外加装射频功率放大器)，不得擅自外接天线或改用其它发射天线；

3.使用时不得对各种合法的无线电通信业务产生有害干扰；一旦发现有干扰现象时，应立即停止使用，并采取措施消除干扰后方可继续使用；

4.使用微功率无线电设备，必须忍受各种无线电业务的干扰或工业、科学及医疗应用设备的辐射干扰；

5.不得在飞机和机场附近使用。

RE Directive

Hereby, Renesas Electronics Corporation declares that the radio equipment type RTK0EN0001D01001BZ is in compliance with Directive 2014/53/EU.
The full text of the EU declaration of conformity and the conformity risk assessment report are shown from the next page.

RENESAS

Renesas Electronics Corporation
3-2-24, Toyosu, Koto-ku, Tokyo, 135-0061, Japan

EU DECLARATION of CONFORMITY (DoC)

This declaration of conformity is issued under the sole responsibility of the manufacturer:

Name: Renesas Electronics Corporation
Address: 3-2-24 Toyosu Koto-ku Tokyo 135-0061 Japan

We declare that the DoC is issued under our sole responsibility and belongs to the following product.

Object of the declaration:

Product Name	RL78/G1D Evaluation Board
Model Name	RTK0EN0001D01001BZ
Batch	N/A
Serial Number	N/A
Software Name	Bluetooth low energy protocol stack, Beacon stack
Software Ver.	Bluetooth low energy protocol stack is V1.10, V1.11, V1.20, and V1.21. Beacon stack is V1.00, V2.00, and V.2.10.
Accessories	N/A

The object of the declaration described above is in conformity with the relevant Union harmonization legislation:

Radio Equipment (RE) Directive (2014/53/EU)

RENESAS

The following harmonized standards and technical specifications have been applied:

Health & Safety   EN 62368-1:2014(Second Edition)
(Article 3.1(a)):   EN 62479: 2010
                                EN 62311: 2008

EMC   EN 301 489-1 V2.1.1
(Article 3.1(b)):   EN 301 489-17 V3.1.1

Radio Spectrum   EN 300 328 V2.2.2
(Article 3.2):

Signed for and on behalf of:

Japan	April 9, 2021	*Awanish*
Place of Issue:	Date of Issue:	Awanish Mishra
		Director
		IoT Platform Business Division
		IoT and Infrastructure Business Unit
		Renesas Electronics Corporation

Revision History			RL78/G1D Evaluation Board User's Manual	

Rev.	Date	Description		
		Page	Summary	
1.00	Mar. 27, 2015	—	First Edition issued	
1.10	June. 1, 2015	13	Append a CAUTION about static electricity accumulation avoidance.	
		20	Appendix B. Conformity Assessment Described.	
1.20	Sep. 1, 2015	15	Circuit diagram update (resistor R3 append)	
1.30	Dec. 1, 2015	8	Figure 4-1: Changed the RL78/G1D module image data.	
		21	China SRRC compliance notation added.	
1.40	Sep. 1, 2016	17	Revised the circuit diagram of the extension board to RL78/G1D version.	
		22	Replaced the DoC of the R&TTE Directive. (Article 3.2 Spectrum: EN 300 328 V1.8.1 → V1.9.1)	
1.50	Jun. 8, 2017	Contents	Correction of specification name of "Usage Notes of Evaluation Board".	
		22	Replaced the DoC of R&TTE directive with the DoC of RE directive. Added the conformity risk assessment report.	
1.60	Feb. 1, 2019	5	Table 3-1: Corrected mistake of evaluation board type name of table title. R0K3ZBTM9D000BR → RTK0EN0001D01001BZ	
1.70	May.28.21	22	Replaced the DoC of the RE Directive. (Article 3.2 Spectrum: EN 300 328 V2.1.1 → V2.2.2) Deleted the conformity risk assessment report.	

RL78/G1D Group

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