

# RZ/G2L Evaluation Kit -Module Board

## Board Specification Overview

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### Introduction

This document describes the specification of Evaluation Kit for performing functional evaluation and application software development/evaluation of microprocessor RZ/G2L produced by Renesas Electronics.

This Evaluation Kit complies with the SMARC 2.1 edge connector and consists of the Module Board and Carrier Board.

This document describes in detail the overall design and usage of the Module Board from the perspective of a hardware system.

The features of this Module Board are shown below.

- It is mounted with the following external memories.
- DDR4 SDRAM: 1GB × 2pcs
- QSPI flash memory: 512Mb × 1pc
- eMMC memory: 64GB × 1pc
- The microSD card slot is implemented and used as an eSD for boot.
- It is implemented a 5-output clock oscillator "5P35023".
- It is implemented a discrete power supply circuit.
- The EtherPHY is implemented as standard and can send/receive data at 10/100/1000Mbps.
- Terminals not used on this Board are connected to the 314-pin 0.5pin 0.5-mm pitch connector, which can be used in conjunction with the Carrier Board. It also allows for the development of the Carrier Board that meet the needs of development.
- The Cortex Debug 10-pin connector is implemented for connection to user debug interface.
- The 10-pin pin header is implemented for connection to ADC interface.

### Target Device

RZ/G2L

## 1. Overview

### 1.1 Overview

Figure 1.1-1 shows a block diagram of the Evaluation Kit for RZ/G2L. The following section describes the Carrier Board in detail

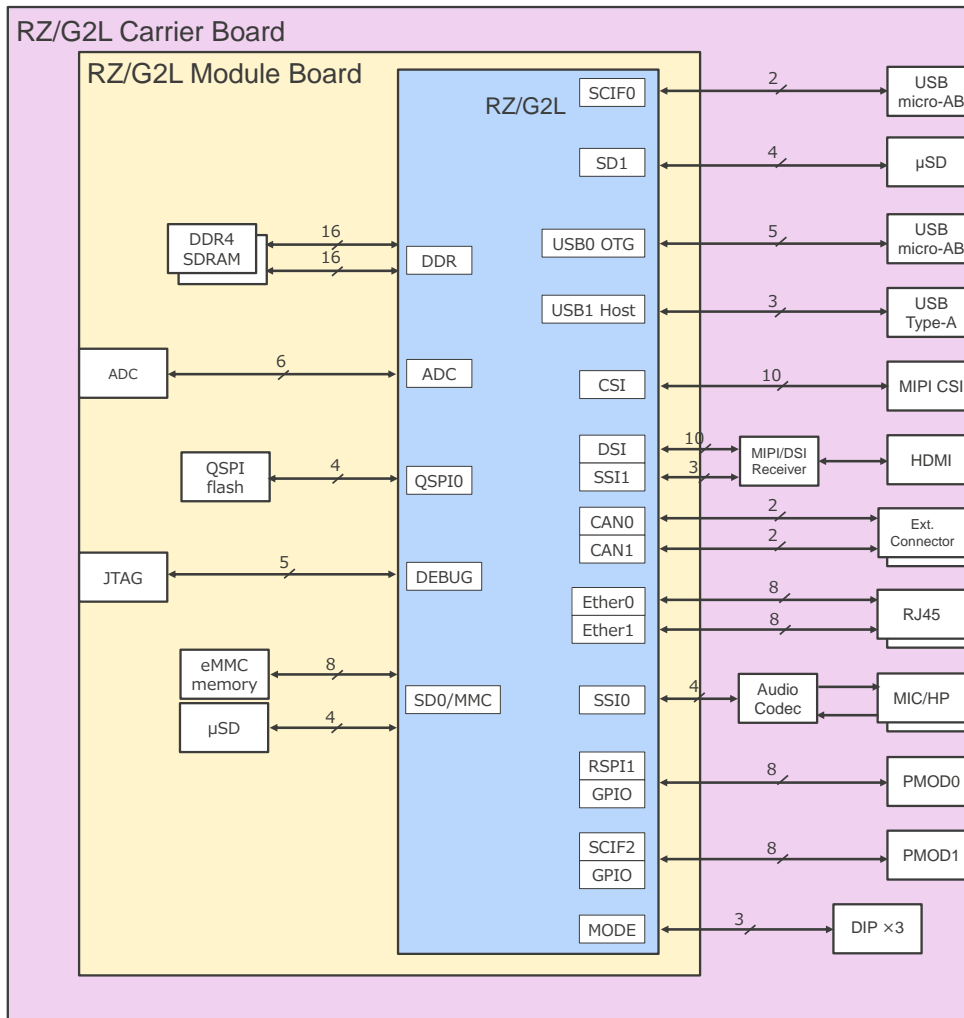


Figure 1.1-1 Block Diagram of Evaluation Kit

## 1.2 Functionality

Table 1.2-1 shows functionality for the Module Board

**Table 1.2-1 Specification Overview of the Module Board**

BOARD FUNCTION	DESCRIPTION
Clock	Quartz oscillator: 1pc CX1612DB24000D0PPSCC from Kyocera Clock generator:1pc 5P35023 from Renesas Electronics
SDRAM Interface	DDR4-1600 1GByte 16bit: 2pcs MT40A1G16RC-062E:B from Micron
MMC memory Interface	eMMC 64GByte: 1pc MTFC64GAKAEYF-4MIT from Micron
Flash Memory Interface	QSPI 512Mbit: 1pc MT25QU512ABB8E 12-0SIT from Micron
AD converter Interface	Connector: 1pc FTSH-105-01-F-DV-K from Samtec
JTAG Interface	Connector: 1pc FTSH-105-01-F-DV-K form Samtec
Ethernet Interface	Gigabit Ethernet transceiver: 2pcs KSZ9131RNX from Microchip

### 1.3 Block Diagram

Figure 1.3-1 shows a block diagram of the Module Board.

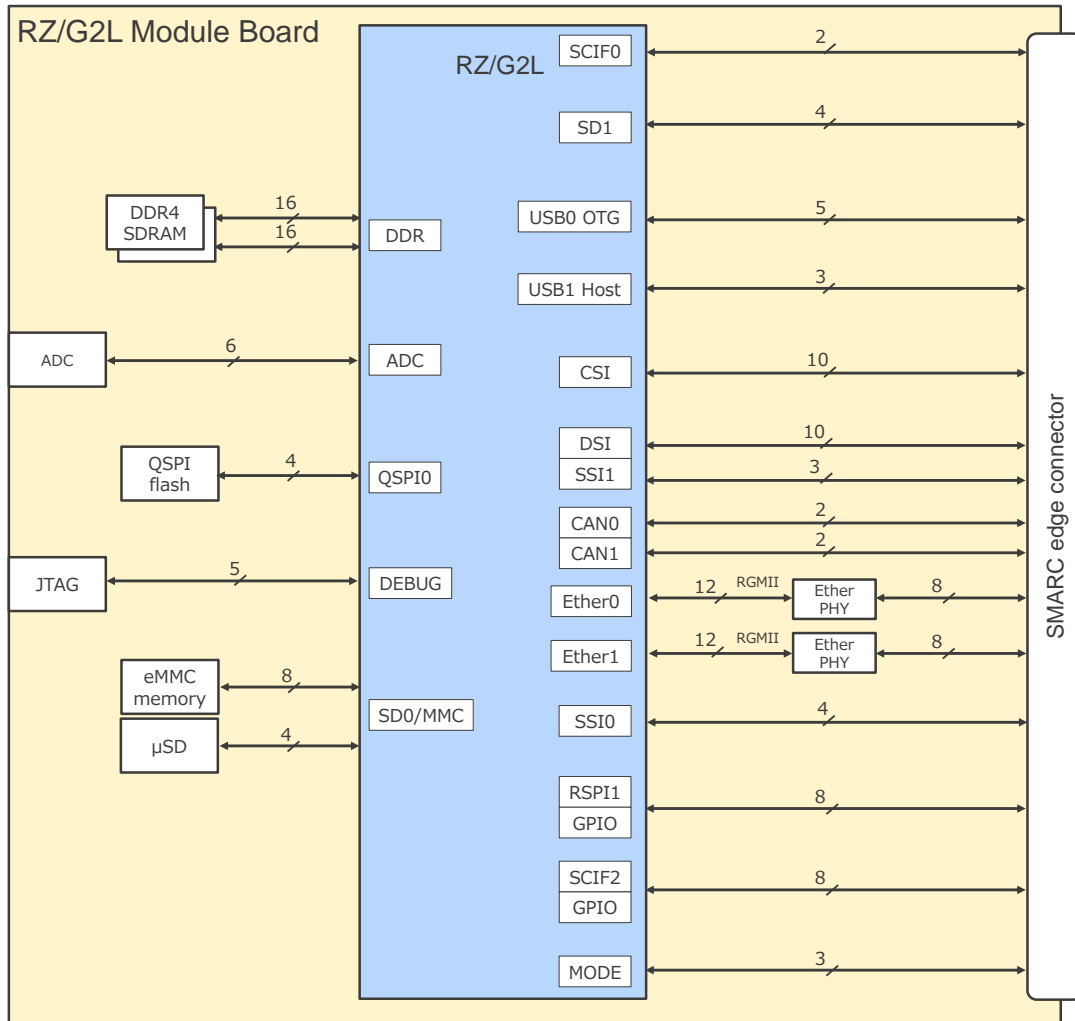


Figure 1.3-1 Block Diagram of Module Board

### 1.4 Layout

Figure 1.4-1 shows a layout of the Module Board.

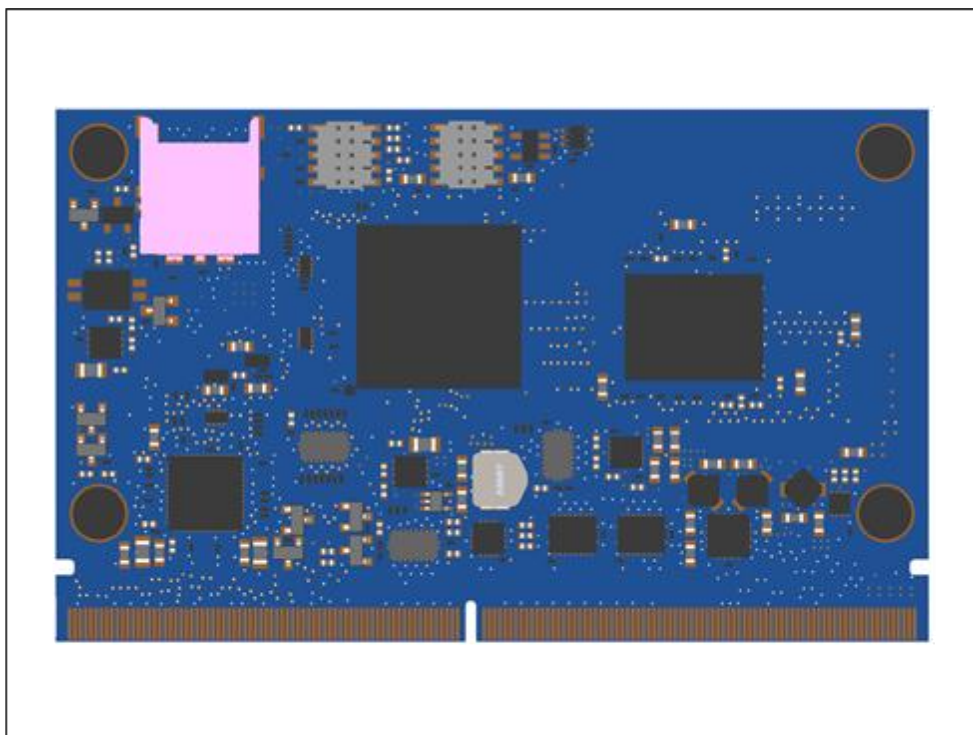


Figure 1.4-1 Layout of Module Board (Top)

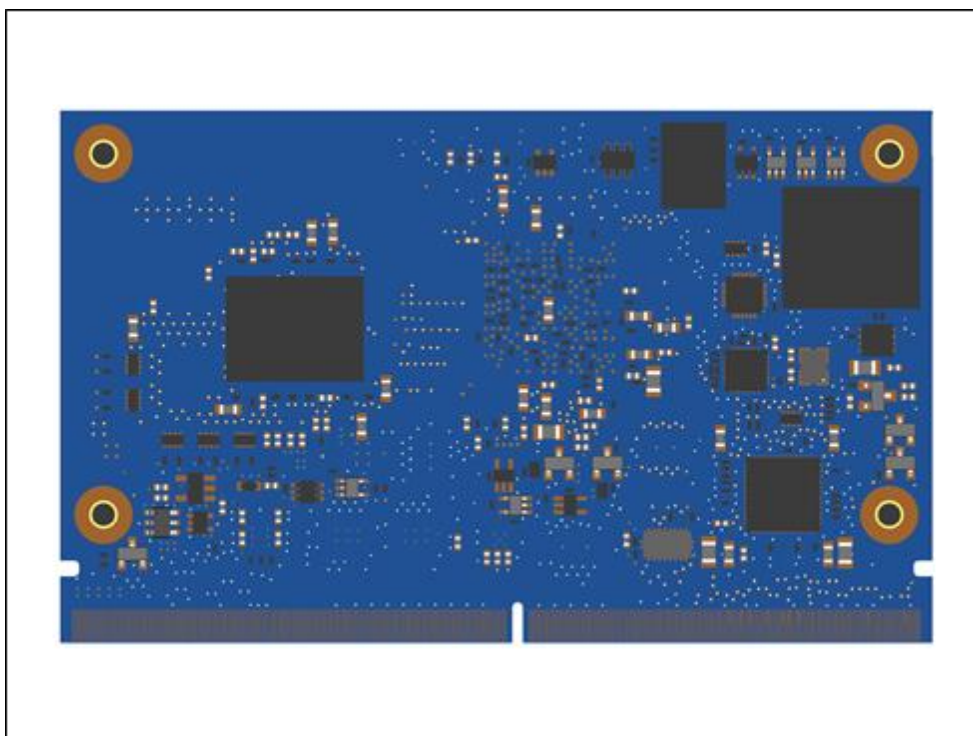


Figure 1.4-2 Layout of Module Board (Bottom)

## General Precautions in the Handling of Microprocessing Unit and Microcontroller Unit Products

The following usage notes are applicable to all Microprocessing unit and Microcontroller unit products from Renesas. For detailed usage notes on the products covered by this document, refer to the relevant sections of the document as well as any technical updates that have been issued for the products.

### 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.).

### 7. Prohibition of access to reserved addresses

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.

### 8. Differences between products

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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