RZ/G2L Evaluation Kit - Carrier Board

Board Specification Overview

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 Carrier Board from the perspective of a hardware system.

The features of this Carrier Board are shown below.

- The FFC/FPC connector is mounted as standard for connection to high-speed serial interface for camera module.
- The Micro-HDMI connector via DSI/HDMI conversion module is mounted as standard for connection to high-speed serial interface for digital video module.
- The series Micro-AB receptacle (ch0: USB2.0 OTG) and A receptacle (ch1: USB2.0 Host) are respectively mounted as standard for connection to USB interface.
- The RJ45 connector is mounted as standard for software development and evaluation using Ethernet.
- The audio codec is mounted as standard for advance development of audio system. The audio jack is implemented for connection to audio interface.
- The CAN connector is implemented for connection to CAN-Bus interface.
- The series Micro-AB receptacles is implemented for connection to asynchronous serial port interface.
- The microSD card slot and two sockets for PMOD are implemented as an interface for RZ/G2L peripheral functions.
- For power supply, it is mounted a USB Type-C receptacle that supports the USB PD standard.

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](image-url)
## 1.2 Functionality

Table 1.2-1 shows functionality for the Carrier Board

<table>
<thead>
<tr>
<th>BOARD FUNCTION</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>SD Card Interface</td>
<td>microSD card socket: 1pc card socket microSD from Molex</td>
</tr>
<tr>
<td>USB2.0 Interface</td>
<td>Ch0 USB2.0 Host, Function, or On-The-Go USB connector(Type-MicroAB receptacle): 1pc 629105150921 from We-online Ch1 USB2.0 Host USB connector(Type-A receptacle): 1pc KUSB-SMT-AS1N-B from Kycon Common TVS diode array: 2pcs RCLAMP0582N from Semtech Corporation Dual USB port power supply controller: 1pc ISL61852 from Renesas Electronics</td>
</tr>
<tr>
<td>Audio Interface</td>
<td>Audio codec: 1pc WM8978CGEFL/V from WolfsonCirrusLogic Audio jack: 1pc SJ-3523-SMT-TR from CUI</td>
</tr>
<tr>
<td>Display Interface (MIPI-DSI)</td>
<td>HDMI connector: 1pc Micro_HDMI_TYPE_D from Molex MIPI/DSI receiver: 1pc ADV7533BCBZ-RL from Analog Devices HDMI ESD protector: 1pc TPD12S016PWR from Texas Instruments</td>
</tr>
<tr>
<td>PMOD Interface</td>
<td>Pmod0 Type2A(SPI) Connector: 1pc socket 12way Pmod_if from Samtec Pmod1 Type3A(UART) &amp; Type6A(I2C) Connector: 1pc socket 12way Pmod_if from Samtec</td>
</tr>
<tr>
<td>UART Interface (Serial Debug)</td>
<td>USB to UART bridge: 1pc FT230XO from FTDI USB connector(Type-MicroAB receptacle): 1pc 629105150921 from We-online</td>
</tr>
<tr>
<td>Camera Interface (MIPI-CSI)</td>
<td>FPC/FFC connector: 1pc 5051102491-SD from Molex</td>
</tr>
<tr>
<td>CAN-FD Interface</td>
<td>CAN transceiver: 2pcs TCAN1046V-Q1 from Texas Instruments Connector: 2pcs SM03B-SRSS-TB from JST</td>
</tr>
<tr>
<td>Mode Setting Interface</td>
<td>DIP switch: 1pc DIP-Switch-4pol-SMD from Tyco Electronics</td>
</tr>
<tr>
<td>Ethernet Interface</td>
<td>RJ45 connector: 2pcs J0G-0001NL from Pulse Electronics</td>
</tr>
</tbody>
</table>
1.3 Block Diagram

Figure 1.3-1 shows a block diagram of the Carrier Board.
1.4 Layout

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

![Figure 1.4-1 Layout of Carrier Board]
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, extraneous 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 $V_{\text{IL}}$ (Max.) and $V_{\text{IH}}$ (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 $V_{\text{IL}}$ (Max.) and $V_{\text{IH}}$ (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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