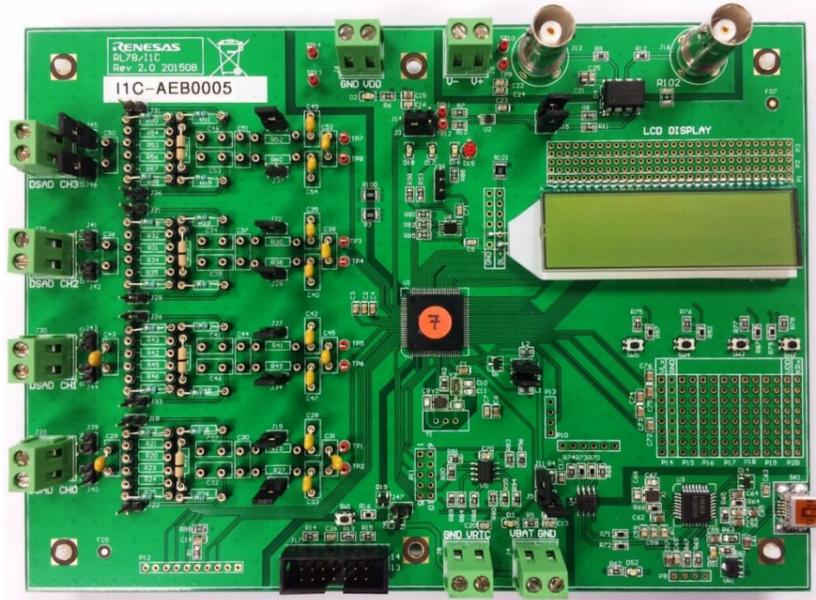


# RL78/I1C Evaluation Board

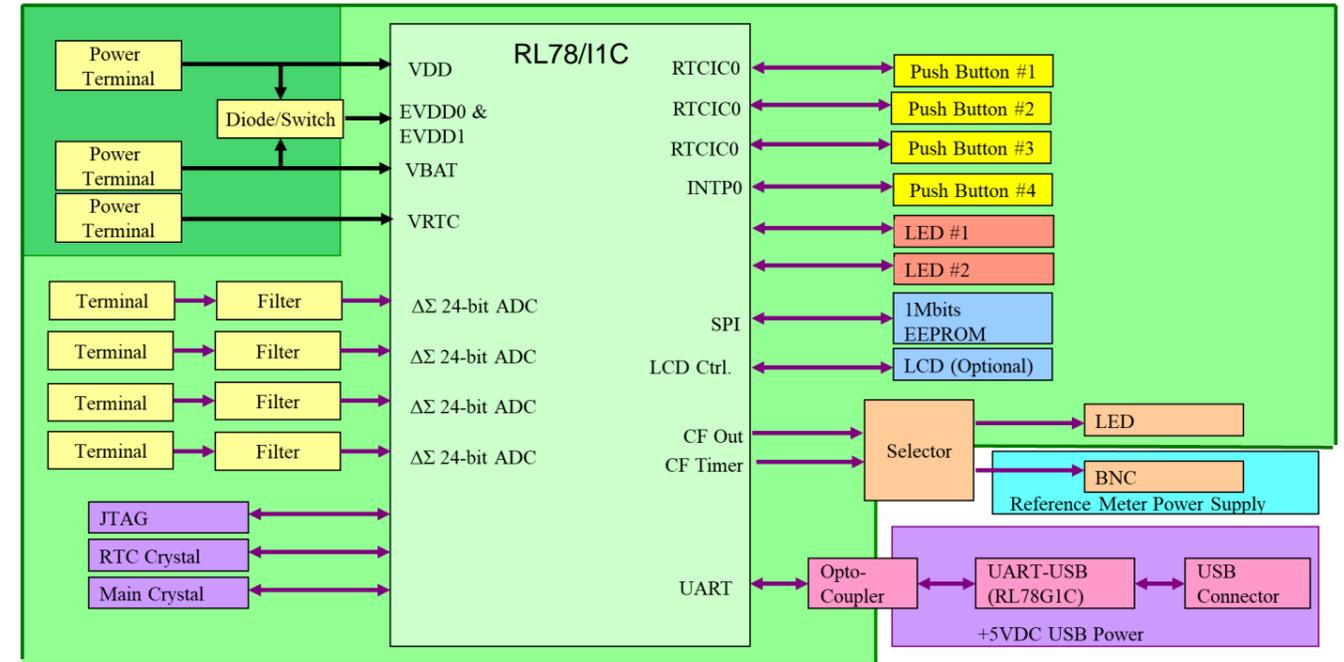
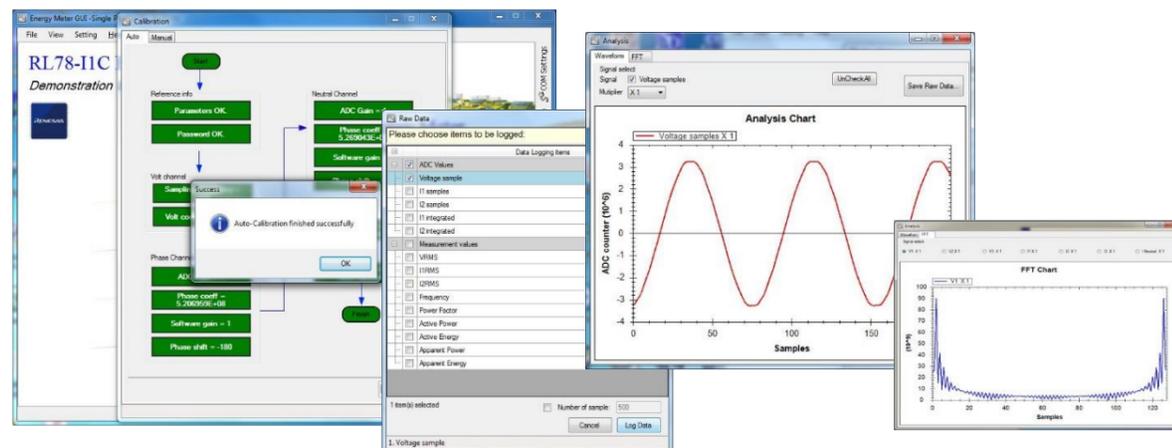
For single phase or three phase electricity meter

## Overview

The Evaluation Board RL78/I1C is designed to evaluate the solution performance using RL78/I1C 100-pin MCU chip on board. The board also provides a useful platform for evaluating the Renesas suite of development tools such as. for coding and debugging, CubeSuite+ and for programming, Renesas Flash Programmer (RFP) via E1 emulator. This Evaluation Board RL78/ I1C designed with the low current consumption, a lot of feature and high performance solution for any applications. The RL78/I1B Evaluation Board is a good design with low current consumption and high performance solution for many applications. The product is built on



Renesas RL78 Group MCUs that is fully integrated with 16 bit RL78 CPU core, ultra-low power technology with high speed on chip oscillator correction function, 24-bit  $\Delta\Sigma$  A/D Converter, Even Link Controller (ELC) signals, battery backup function, data transfer controller (DTC), Low Voltage Detector (LVD), optional connection for SAR and multiple communication interfaces. In addition, the board is designed for user to evaluate the capabilities of the device and its peripherals in a matter of a few minutes after opening box. The evaluation board RL78/I1B can also be connected to the Energy Meter GUI interface via USB.



## 24-bit $\Delta\Sigma$ A/D Converter

The 24-bit A/D converter has a 24-bit resolution when converting an analog input signal to digital values. S/N+D ratio 80 dB min (when pre-amplifier gain of  $\times 1$  is selected). Sampling frequency 3906.25 Hz (4kHz sampling mode) /1953.126Hz (2 kHz sampling mode). HPF cut off frequency 0.607Hz, 1.214Hz, 2.429Hz, or 4.857 Hz can be selected. Either High-speed system clock ( $f_{MX}$ ) (only 12 MHz crystal resonator can be used) or High-speed on-chip oscillator ( $f_{IH}$ ) must be used.

## 16 Bit RL78 CPU Core

This MCU delivers 33 DMIPS at maximum operating frequency of 24 MHz. By enabling the PLL operation, the operating frequency can be up to 32 MHz. 86% of instructions can be executed in 1 to 2 clock cycles due to the CISC architecture (Harvard) with 3-stage pipeline. In addition, it is able to multiply signed & unsigned is 16 x 16 to 32-bit result in 1 clock cycle. While MAC is 16 x16 to 32-bit result in 2 clock cycles. 16-bit barrel shifter for shift & rotate in 1 clock cycle. The MCU has 1-wire on-chip debug function which optimize the pin usage

## HOCO

Using the subsystem clock  $f_{SUB}$  (32.768 kHz) as a reference, the frequency of high-speed on-chip oscillator is measured, thus the accuracy of the high-speed on-chip oscillator clock ( $f_{IH}$ ) frequency can be corrected in real time.

## DTC and ELC Feature

The data transfer controller (DTC) is a function that transfers data between memories without using the CPU. The DTC is activated by a peripheral function interrupt to perform data transfers. DTC & CPU use the same bus. The DTC takes priority over the CPU when using the bus. The event link controller (ELC) mutually connects (links) event output from each peripheral function. By linking events, it becomes possible to coordinate operation between peripheral functions directly without going through the CPU.