LogiCoA™ Power Solutions

Boundary Conduction Mode PFC and Quasi-Resonant Flyback Converter with Analog-Digital Hybrid Control Evaluation Board LogiCoA003-EVK-001

(24V, 4A Output)

Introduction

LogiCoA™ is a power solution that implements analog-digital hybrid control for a switching power supply. This quick start guide describes the necessary procedures for operating and evaluating the LogiCoA™ power solutions Boundary Conduction Mode PFC (BCM-PFC) and Quasi-Resonant (QR) Flyback Converter evaluation board, LogiCoA003-EVK-001. The details are described in the Evaluation Board LogiCoA003-EVK-001 User's Guide [1].

1. EVK Appearance

Figures 1-1 and 1-2 show the appearance of this EVK.

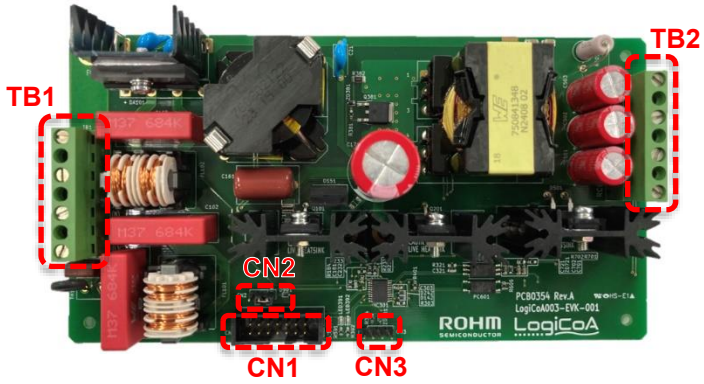

Figure 1-1. LogiCoA003-EVK-001 (Top View)

Figure 1-2. LogiCoA003-EVK-001 (Bottom View)

2. Operation Procedure

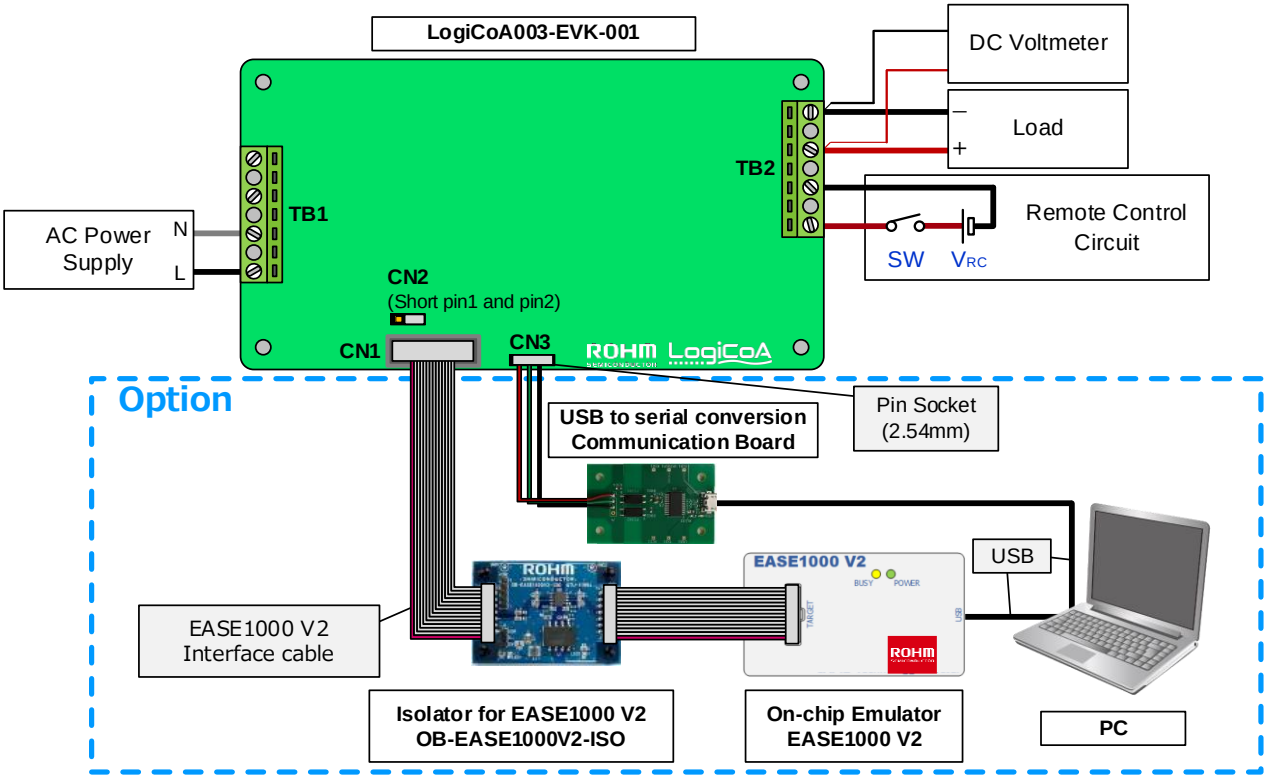

Figure 2. LogiCoA003-EVK-001 Connection Diagram

1. Required Equipment
   (1) AC power supply ($85V_{AC}$ to $264V_{AC}$, 120W or more)
   (2) Load (up to 4A)
   (3) DC voltmeter
   (4) Remote control circuit (external power supply V_{RC} 4.5V to 12.5V and switch)
   (5) Communication board equipped with serial conversion IC *(Note 1)*
   (6) On-chip emulator EASE1000 V2 *(Note 2)*
   (7) Isolator for EASE1000 V2 *(Note 2)*
   (8) Windows PC *(Note 1) (Note 2)*

2. Equipment Connections
   (1) Preset the AC power supply to $85V_{AC}$ to $264V_{AC}$ and turn off the power output.
   (2) Set the load to 4A or less and disable the load.
   (3) Preset the external power supply for the remote control circuit to 4.5V to 12.5V and turn off both the power output and the switch. *(Note 3)*
   (4) Connect the EVK, AC power supply, load, DC voltmeter, and remote control circuit as shown in Figure 2.
   (5) For communication control, connect the EVK, communication board and PC. *(Note 1)*
   (6) For debugging, connect the EVK, EASE1000 V2, EASE1000 V2 isolator and PC. *(Note 2)*
   (7) Turn on the output of the AC power supply.
   (8) Turn on the external power supply output and switch for the remote control circuit. *(Note 3)*
   (9) Make sure that the DC voltmeter display shows the output voltage of 24V. *(Note 3)*
   (10) Activates the load.

(Note 1) This is required when performing communication control for optional functions. It is not necessary if communication control is not performed.
(Note 2) This is required when performing debugging work on optional features. It is not necessary if you are not performing debugging work.
(Note 3) This is the initial setting. The output logic settings of the remote control and the output voltage can be changed by modifying the firmware or by using the communication GUI provided in Microsoft Excel.

3. Serial Communication

In this EVK, by preparing a communication board that converts USB to serial communication, it is possible to connect to an external PC and perform UART serial communication, allowing for changes to power control parameters, calibration and to obtain log data. For information on the communication board, please refer to the Evaluation Board LogiCoA003-EVK-001 User's Guide [1].

For details on serial communication and communication commands, please refer to Serial Communication of RMOS and GUI Developing Manual [2].

4. Program Development and Debugging Work

This EVK is pre-installed with the firmware and can be evaluated independently. In addition, the following environment can be used to develop and to debug switching power supply control programs using RMOS.

① Integrated Development Environment LEXIDE-Ω
② RMOS project file (file to be read into LEXIDE-Ω and used)
③ Windows PC (Windows 10 64-bit version or Windows 11 64-bit version)
④ On-chip emulator EASE1000 V2
⑤ Isolator for EASE1000 V2 (OB-EASE1000V2-ISO)
⑥ Microsoft Excel 64-bit version (This is used to check the communication function and requires permission to use the macro function. Operation is confirmed on Office 365 MSO 32-bit, Microsoft 365 MSO 64-bit, and Office 365 MSO 64-bit)
⑦ Communication board equipped with serial conversion IC

Integrated Development Environment LEXIDE-Ω is a developed software based on Eclipse, an open-source integrated development environment. Please refer to the documentation included with the on-chip emulator EASE1000 V2 for details.

The "RMOS Project File" (LogiCoA™ Solutions BCMPFC+QR flyback Converter Reference Program) for this EVK can be downloaded from our website[3] with a program for power control.

The "EASE1000 V2 on-chip emulator" can be purchased from electronic components distributors.

To protect the equipment when a PC is connected for debugging, it is recommended to use the isolator for EASE1000 V2 (OB-EASE1000V2-ISO) between this EVK and the on-chip emulator EASE1000 V2. If this EVK accidentally fails during debugging, high voltage from this EVK may be directly applied to the USB port of the PC connected to EASE1000 V2, potentially damaging the PC and other equipment. By connecting the isolator for EASE1000 V2, which has an isolation circuit configuration, even if this EVK fails during debugging, high voltage will not be directly applied to the PC and other equipment, preventing damage. For more details on the isolator for EASE1000 V2, please refer to OB-EASE1000V2-ISO User's Manual [4].

For information on how to develop and update the program, please refer to Operating System for Switching Power Control MCU "RMOS" [5].

5. References

[1] 67UG062E, Evaluation Board LogiCoA003-EVK-001 User's Guide
[2] 67AN103E, Serial Communication of RMOS and GUI Developing Manual
[3] LogiCoA™ Solution BCMPFC+QR flyback Converter Reference Program
[4] FEBLEASE1000V2ISO-01, OB-EASE1000-V2-ISO User's Manual
[5] 67AN099E, Operating System for Switching Power Control MCU "RMOS"

Revision history

Date	Revision Number	Description
31.Mar.2025	001	New Release

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