RL78/G1D Group

RL78/G1D Solution Kit – Target Board Hardware Manual

R01AN2958EU0100
Rev.1.00
July 31, 2016

Introduction

This document represents RL78/G1D Solution Kit's Target Board. The document describes hardware platform information such as RL78/G1D-SK Bluetooth® module interface and its Bluetooth® connectivity, programming, debugging, and schematics.

Target Device

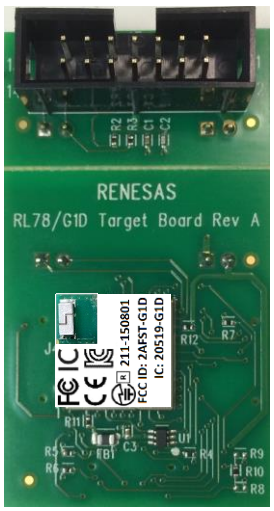
RL78/G1D Group (R5F11AGJ)

This Solution Kit's Target Board includes RL78/G1D-SK Bluetooth® module and three interface connectors to Activity Module, which contains power supply, user interface like vibrator, LED, LCD and buttons, accelerometer, light sensor, temperature sensor. The RL78/G1D-SK has Renesas' Intelligent Bluetooth® low energy technology device with part number starting with R5F11A (256 KB program flash memory, 20 KB RAM and 8 KB data flash memory) [1].

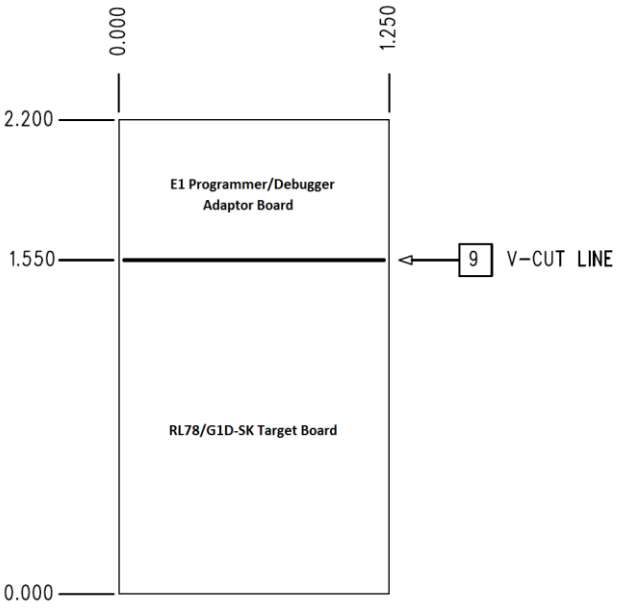
Contents

1. Overview

RL78/G1D-SK Target Board has two sections: Bluetooth® module (RL78/G1D-SK) [2] with three standard board-to-board interface connectors and Adaptor board for E1 program/debug connector. These sections are divided by breakaway groove at bottom side. Before using with Activity Module, you have to break into two pieces and use Adaptor Board for programming or debugging to RL78/G1D-SK Target Board. Refer detail about Activity Module in the document, Solution Kit Activity Module Hardware Manual, R01AN2960EU0100_RL78G1D [3]. Figure 1 shows top view of the RL78/G1D-SK Target Board and its dimension.



RL78/G1D-SK
Target Board



Dimension

Figure 1 RL78/G1D-SK Target Board

1.1 Specification Outline

The specification of RL78/G1D-SK Target board is described as below Table 1.

Table 1 RL78/G1D-SK Target Board Specification

Item	Content
Dimension	22.00 mm x 12.50 mm
Operation Power Supply Voltage	3.0 V
Maximum Power Supply Voltage	3.6 V
Average Operation Current	10 µA Note1
Maximum Total Output Current	150 mA Note2
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 1: One-second interval with keeping Bluetooth® connection
Note 2: Refer Electrical Specifications of RL78/G1D User's Manual: Hardware, R01UH0515EJ0110 [1]

2. RL78/G1D-SK Target Board interface

For interface connection, the RL78/G1D-SK Target Board has three board-to-board 0.5 mm pitch SMT female 30-pin header connector at the bottom of the board. In addition, two right angle connector (J8 and J9) with 0.1-inch pitch for programming/debugging interface. The J8 connector has control interface such as TOOL0 and Reset, and J9 connector provides supply voltage from E1. Using the connectors J8 and J9, you can program or debug to RL78/G1D-SK Bluetooth® module. After braking, the RL78/G1D-SK Target Board, the connector pin number and pin orientation are shown in Figure 2. The Table 2 shows its pin configuration.

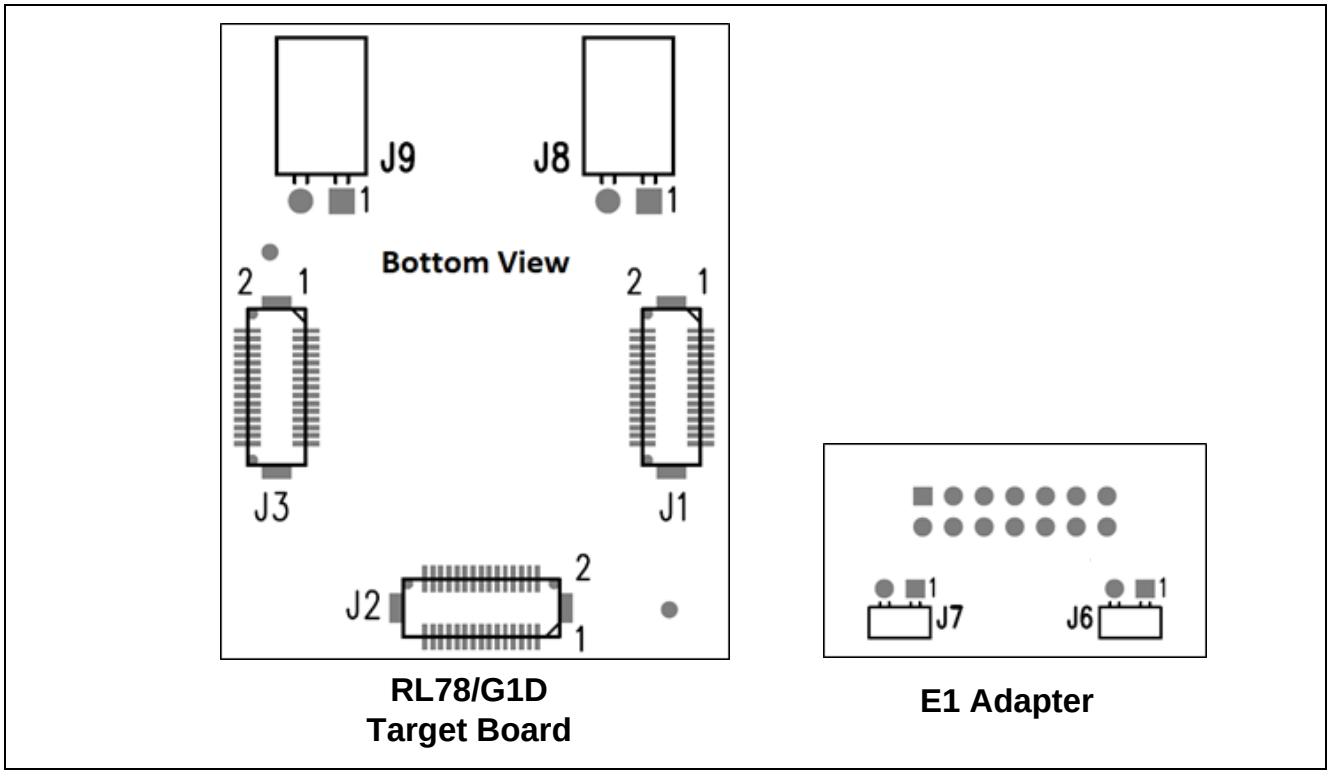


Figure 2 Connector pin assignment for RL78/G1D-SK Target Board

Table 2 Interface between RL78/G1D-SK Target Board and Activity Module

Connector	Pin Number	RL78/G1D-SK Target Board	Description	Remark
J1	3	VBR_PWM	PWM output for Vibrator	
J1	4	SENSOR_SDA	I^2C Data for Sensor	
J1	5	SENSOR_SCL	I^2C Clock for Sensor	
J1	13	GND	Ground	
J1	14	BUTTON_2	Button 2 input	
J1	15	GND	Ground	
J2	1	PWR_SCL	I^2C Clock for Fuel Gauge	
J2	2	PWR_SDAL	I^2C Data for Fuel Gauge	
J2	3	MAG_DRDY	Accelerometer control	

Connector	Pin Number	RL78/G1D-SK Target Board	Description	Remark
J2	4	CURRENT_LIMIT	Current limit	
J2	5	SUSPEND_TERM	Accelerometer control	
J2	9	GND	Ground	
J2	10	VCC_3.3V	Power Supply	
J2	11	BUTTON_1	Button 1 input	Interrupt
J2	12	GND	Ground	
J2	15	SENSOR_SCL	CSI Clock for Sensor	
J2	16	SENSOR_MOSI	CSI Master output for Sensor	
J2	17	SENSOR_MISO	CSI Master input for Sensor	
J2	18	GYRO_INT	Accelerometer control	
J2	19	ACCEL_INT	Accelerometer control	
J2	22	USB_DM	USB D minus	Not in use
J2	23	USB_DP	USB plus	Not in use
J2	30	BATT_LOW	Battery low signal	
J3	1	GND	Ground	
J3	6	MAGNET_CS	Accelerometer control	
J3	7	TOOL0/LED_1	Programming / LED	
J3	9	MAG_INT	Accelerometer control	
J3	10	ACCEL_CS	Accelerometer control	
J3	11	GYRO_CS	Accelerometer control	
J3	12	CHARGE_EN	Enable Battery charger	
J3	16	PMOD_MOSI	Bluetooth UART Tx	
J3	17	PMOD_MISO	Bluetooth UART Rx	
J3	23	GND	Ground	

3. Operating RL78/G1D-SK Target Board

After breaking Adaptor Board of the RL78/G1D Target Board, you get mountable target board with Bluetooth® to activity module. The RL78/G1D Target Board has RL78/G1D-SK Bluetooth® module and you can mount the target board to Activity Module using three board-to-board connectors (J1, J2, and J3). Then, you get solution development platform. Using Adaptor Board, program or debug function can be performed to the development platform (Activity Module) if needed.

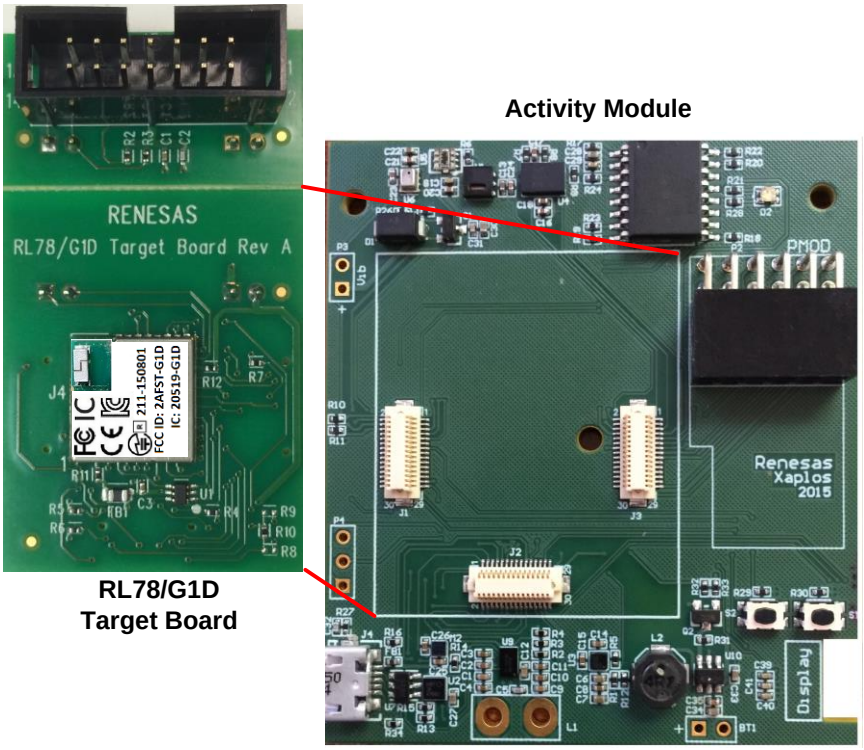
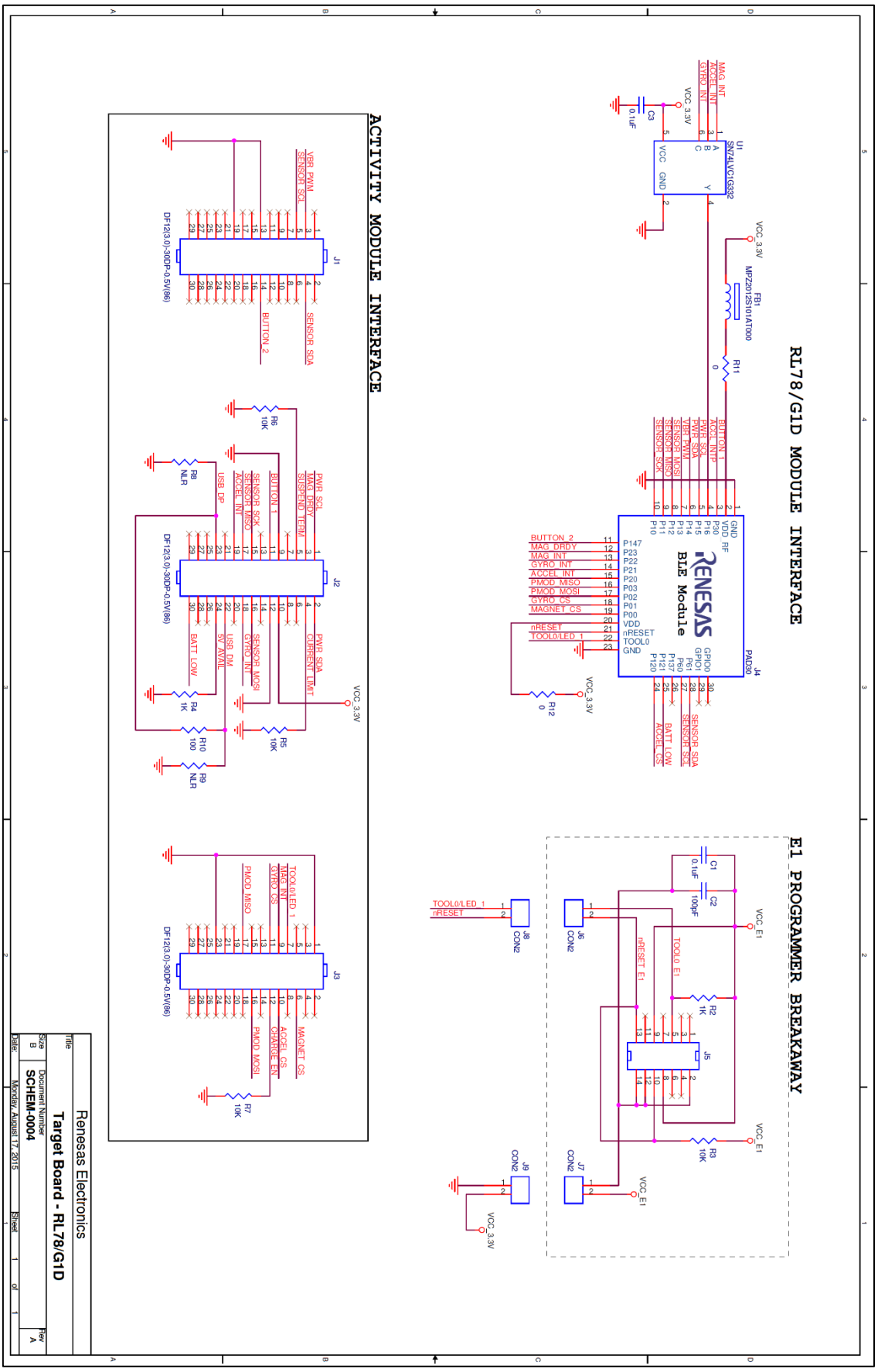


Figure 3 RL78/G1D-SK Target Board with Activity Module

4. Circuit Diagrams



Appendix A - References

[1] RL78/G1D User's Manual: Hardware, R01UH0515EJ0110 Rev.1.10, Sep 25, 2015

[2] RL78/G1D Solution Kit-PMOD Module Hardware Manual, R01AN2919EU0100_RL78G1D Rev.1.00, July 31, 2016

[3] RL78/G1D Solution Kit-Activity Module Hardware Manual, R01AN2960EU0100_RL78G1D Rev.1.00, July 31, 2016

Appendix B - Conformity Assessment

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: 2AFST-G1D

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: 20519-G1D

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.

R&TTE Directive

We hereby declare that this product is in compliance with the essential requirements and other EC relevant provisions of
Directive 1999/5/EC.

Declaration of Conformity (DoC) can be available upon request. Contact to local Renesas Sale office.

Korea Radio Regulations

MSIP-CRM-R5E-G1D
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Japan Radio Law

Contains MIC ID: R1507226
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Revision History

		Description	
Rev.	**Date**	**Page**	**Summary**
1.00	July 31, 2016	—	First edition issued

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. 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 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. Unused pins should be handled as described under Handling of Unused Pins in the manual.

2. Processing at Power-on

   The state of the product is undefined at the moment 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 moment 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 moment 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 moment when power is supplied until the power reaches the level at which resetting has been specified.

3. Prohibition of Access to Reserved Addresses

   Access to reserved addresses is prohibited.

   — The reserved addresses are provided for the possible future expansion of functions. Do not access these addresses; the correct operation of LSI is not guaranteed if they are accessed.

4. Clock Signals

   After applying a reset, only release the reset line after the operating clock signal has become stable. When switching the clock signal during program execution, wait until the target clock signal has 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. Moreover, 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.

5. Differences between Products

   Before changing from one product to another, i.e. to a product with a different part number, confirm that the change will not lead to problems.

   — The characteristics of Microprocessing unit or Microcontroller unit products in the same group but having a different part number may differ in terms of the 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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