Dear customer

ROHM Co., Ltd. ("ROHM"), on the 1st day of April, 2024,
has absorbed into merger with 100%-owned subsidiary of LAPIS Technology Co., Ltd.

Therefore, all references to "LAPIS Technology Co., Ltd.", "LAPIS Technology"
and/or "LAPIS" in this document shall be replaced with "ROHM Co., Ltd."
Furthermore, there are no changes to the documents relating to our products other than
the company name, the company trademark, logo, etc.

Thank you for your understanding.

ROHM Co., Ltd.
April 1, 2024

Dear customer

LAPIS Semiconductor Co., Ltd. ("LAPIS Semiconductor"), on the 1st day of October, 2020, implemented the incorporation-type company split (shinsetsu-bunkatsu) in which LAPIS established a new company, LAPIS Technology Co., Ltd. ("LAPIS Technology") and LAPIS Technology succeeded LAPIS Semiconductor's LSI business.

Therefore, all references to "LAPIS Semiconductor Co., Ltd.", "LAPIS Semiconductor" and/or "LAPIS" in this document shall be replaced with "LAPIS Technology Co., Ltd."

Furthermore, there are no changes to the documents relating to our products other than the company name, the company trademark, logo, etc.

Thank you for your understanding.

<div align="right">

LAPIS Technology Co., Ltd.

October 1, 2020

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ROHM GROUP

ML7416LSI Evaluation Kit
Start Guide

* Read this guide first

ROHM
SEMICONDUCTOR

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LAPIS Semiconductor Co.,Ltd.

Introduction

Thank you for your purchasing our product. Read this "Start Guide" first before using the product to ensure proper use of the product. After reading, keep this guide handy for future reference. This start guide describes the attached articles and connection methods.

The following related manuals are available and should be referenced as needed:

■ ML7416 Data Sheet
■ ML7416LSI Design Manual
■ Wireless PAN Test Tool User's Manual

LAPIS Semiconductor Co.,Ltd.

Contents

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1. Cautions in Handling This Product

- This product is an evaluation kit. It shall be used only for evaluations.
- Use the application software of this product on a personal computer with Windows XP or Windows 7 installed.
- Duplicating all or any part of the software of this product or distributing a copy without the permission of the copyright owner violates the copyright.
- LAPIS assumes no responsibility for retrofitting and illegal using of this product.
- Should this product cause a harmful radio wave interference, immediately change the frequency used or stop the radio wave output and make crosstalk avoidance treatments.

- The evaluation board is set with constants of 200 kbps or lower data rate and 920 MHz band at shipment. If you want to use other conditions for evaluation, refer to the Design Manual to modify the constants.

2. Setup Flow

This flow is from the check on package contents to the assembly.

STEP　1
　　　　　Checking on Package Contents
STEP　2
　　　　　Setting Evaluation Board
STEP　3
　　　　　Setting up Serial Communication Software

STEP1　　Checking on Package Contents

Open the box. First, confirm all of the following articles are available.
Should there is any missing or broken part, contact the source from which you purchased it.

*　　CD-ROM is packaged only when purchased first time.
*　　The mounted parts may look different from the photo depending on the shipment time.
*　　Prepare the stabilized power supply and the serial communication software (TeraTerm) by yourself.

☐　　ML7416 evaluation board (1)

☐　　Antenna (1)

☐　　CD-ROM (1)
　　　　(Only for the first purchase)

☐　　MicroUSB cable (1)

STEP2   Setting Evaluation Board

This chapter describes the evaluation board setting.

*   Always turn off the power when configuring the board setting.

Insert the USB cable into the USB connector on the evaluation board enclosed by a heavy line in the photo below.

*   An attempt to diagonally insert the USB cable may break the connector.
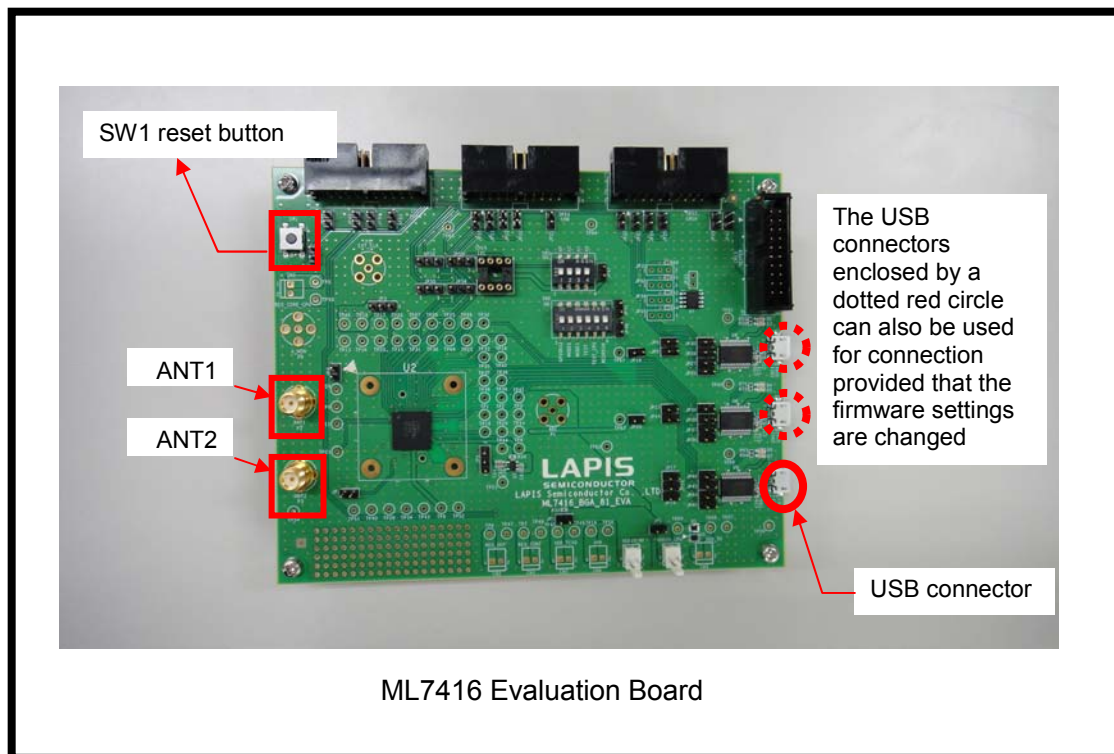

ML7416 Evaluation Board

Figure 1   Connection between the Evaluation Board and USB Cable

This section describes the control board setting. The following table lists the jumper functions and recommended settings of the evaluation board.

Table 1   Table of ML7416BGA Evaluation Board Settings

JP No.	Feature		Recommended settings	HW mode primary	HW mode secondar	HW mode tertiary	Remarks
JP1	VDDIO_CPU VDD_REG_CPU power supply setting	Short: Power supply shared, Open: Power supply separated	Short				
JP2	Loop Filetr voltage monitoring	Short: Monitor output, Open: Normal setting	Open				For tuning at shipment. Always needs to be used in Open setting.
JP3	VDDIO_CPURF power supply setting	1-2: Use VDDIO_CPURF, 2-3: Use external powers	1-2 Short				Always needs to be used in 1-2 Short setting.
JP4	A_MON pin settings	Short: Fixed to GND, Open: A_MON monitor output	Short				When use as a analog monitor circuit set in Open.
JP5	Regulator power supply setting for TCXO	Short: VDDIO_RF, Open: external input	Open				
JP6	Setting for control TCXO	1-2: Fixed to GND, 2-3: Fixed to power supply	1-2 Short				Always needs to be used in 1-2 Short setting.
JP7	RESETN setting	Short: Fixed to VDD, Open: N.C	Short				Always needs to be used set in Short.
JP8	Use VDD_USB1 power supply	Short: Use, Open: Not use	Open				When using power supply for VDD_USB (IC2 regulator), set one of the USB power supply used.
JP13	Use VDD_USB2 power supply	Short: Use, Open: Not use	Short				
JP17	Use VDD_USB3 power supply	Short: Use, Open: Not use	Open				Set this setting only when USB3 connector power supply is used.
JP19	VDD33V setting	Short: Connection, Open: 0Ω resistor connection	Short				Short when R45 is implemented.
JP9	VDD_UART1 VDD33V power	Short: Use, Open: Not use	Open				When using 3.3V power supply for USB-UART conversion LSI, set one of the USB power supply to use.
JP14	VDD_UART2 VDD33V power	Short: Use, Open: Not use	Open				
JP18	VDD_UART3 VDD33V power	Short: Use, Open: Not use	Open				
JP16	VDD_PER setting	Short: Use, Open: 0Ω resistor connection	Open				Short when R42 is implemented.
JP20	VDD_IO1 setting	Short: Connection, Open: 0Ω resistor connection	Open				Short when R46 is implemented.
JP10	SPI MIS0 pin selection	Short: GPIOA2 selected, Open: GPIOA2 not selected	Open			Short	When using CN8 connector
JP11	SPI MOSI pin selection	Short: GPIOA3 selected, Open: GPIOA3 not selected	Open			Short	
JP12	SPI SCK pin selection	Short: GPIOA0 selected, Open: GPIOA0 not selected	Open			Short	
JP15	SPI SSN pin selection	Short: GPIOA1 selected, Open: GPIOA1 not selected	Open			Short	
JP22	SPI MIS0 pin selection	Short: GPIOA10 selected, Open: GPIOA10 not selected	Open			Short	When using CN10 connector
JP23	SPI MOSI pin selection	Short: GPIOA11 selected, Open: GPIOA11 not selected	Open			Short	
JP24	SPI SCK pin selection	Short: GPIOA8 selected, Open: GPIOA8 not selected	Open			Short	
JP25	SPI SSN pin selection	Short: GPIOA9 selected, Open: GPIOA9 not selected	Open			Short	
JP21	CN8 connector SPI/SSIS power supply	Short: Supply, Open: Not supply	Open				
JP29	CN10 connector SPI/SSIS power supply	Short: Supply, Open: Not supply	Open				
JP31	Connection selection for U7 SCLK	1-2: GPIOA9 selected, 2-3: GPIOA0 selected, Open: Not selected	Open				Always needs to be used set in OPEN.
JP32	Connection selection for DOUT for U7	1-2: GPIOA11 selected, 2-3: GPIOA2 selected, Open: Not selected	Open				Always needs to be used set in OPEN.
JP34	Connection selection for DIN for U7	1-2: GPIOA10 selected, 2-3: GPIOA3 selected, Open: Not selected	Open				Always needs to be used set in OPEN.
JP35	Connection selection for U7	1-2: GPIOA8 selected, 2-3: GPIOA1 selected, Open: Not selected	Open				Always needs to be used set in OPEN.
JP33	Power supply for U7	Short: Supply, Open: R63 resistor connection	Open				Always needs to be used set in OPEN.
JP41	MODE_SW power supply	Short: Supply, Open: Not supply	Open				
JP40	Connection between MODE_SW and GPIOA12	Short: Connection, Open: R76 resistor connection	Open				
JP47	I2C power supply	Short: Supply, Open: Not supply	Open				
JP50	I2C_SCL pin selection	1-2: GPIOA4, 2-3: GPIOA0	Open				Set the GPIO pin used as SCL pin.
JP52	I2C_SCL pin selection	1-2: GPIOA0/GPIOA4	Open				Set the GPIO pin used as SCL pin.
JP54	I2C_SDA pin selection	1-2: GPIOA5, 2-3: GPIOA1	Open				Set the GPIO pin used as SDA pin.
JP55	I2C_SDA pin selection	1-2: GPIOA9, 2-3: GPIOA1/GPIOA5	Open				Set the GPIO pin used as SDA pin.
JP4	Power supply for Tester IF	Short: VDD_PER, Open: Not supply	Open				Always needs to be used set in OPEN.
JP46	ICE power supply	Short: Supply, Open: Not supply	Short				J-LINK: Short/ULINK2: Open. Short when R90 is implemented.
JP49	ICE SWD connection setting	Short: SWD connected, Open: Not connected					
JP51	ICE SWCK connection setting	Short: SWCK connected, Open: Not connected					
JP53	ICE RESETN connection setting	Short: RESETN connected, Open: VDD_ICE					

SW No.	Feature		Recommended settings	Remarks
SW3_1	I2C device WP	ON: Enable, OFF: Disable	OFF	
SW3_2	I2C device A2	ON: "1", OFF: "0"	OFF	
SW3_3	I2C device A1	ON: "1", OFF: "0"	OFF	Set the address of I2C device.
SW3_4	I2C device A0	ON: "1", OFF: "0"	OFF	
SW2_3	MODE1	ON: "1", OFF: "0"	OFF	Normally, use set in OFF.
SW2_2	MODE0	ON: "1", OFF: "0"	OFF	Normally, use set in OFF.
SW2_5	TEST_CPU	ON: "1", OFF: "0"	OFF	Normally, use set in OFF.
SW2_4	TEST	ON: "1", OFF: "0"	OFF	Normally, use set in OFF.
SW2_6	REGPDIN	ON: "1", OFF: "0"	OFF	Normally, use set in OFF.
SW2_1	GPIOA12	ON: "1", OFF: "0"	OFF	Normally, use set in OFF.

STEP3   Setting up Serial Communication Software

This step describes how to set up serial communication software used for operating the evaluation kit.

* LAPIS recommends Tera Term (free software) as the serial communication software.
  Macros included in the packaged CD_ROM are written in the macro language for Tera Term.
  Download it before starting this operation.

(1) Install Tera Term on the personal computer used for the evaluation.

(2) Install the Virtual COM Port driver for USB-UART conversion FTDI device on the personal computer used for the evaluation. Download the driver from the following Web page.

http://www.ftdichip.com/FT Drivers.htm

(3) Connect the evaluation board and the microcomputer board.

(4) Use the USB cable to connect the ML7416 evaluation board with the personal computer on which Tera Term is installed.

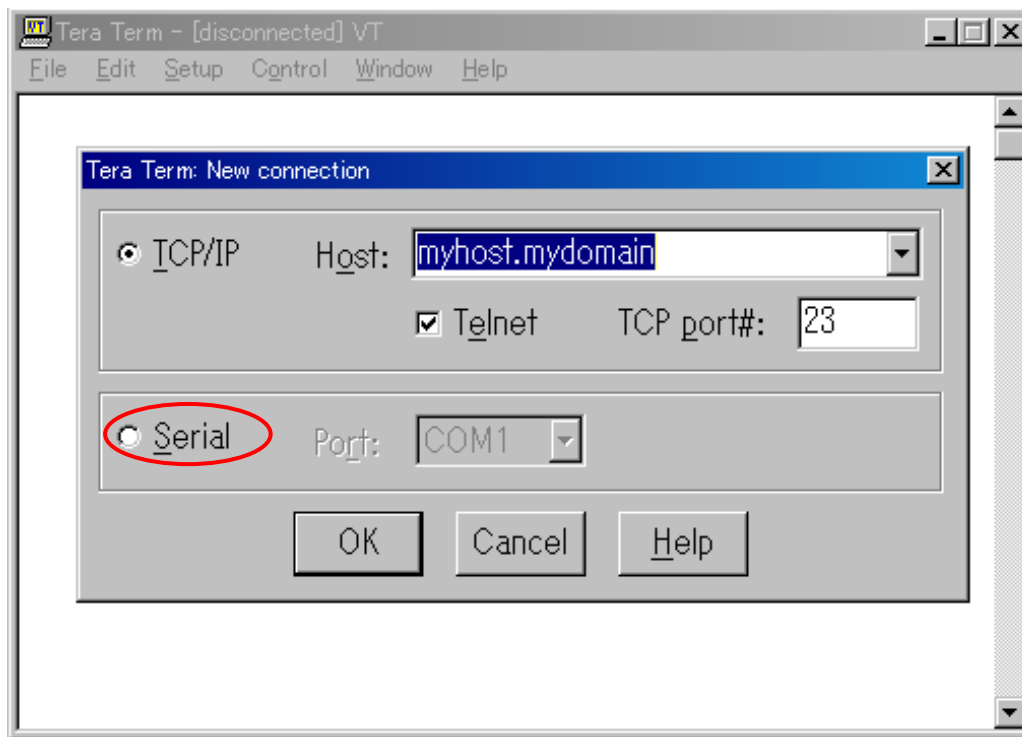(5) Start Tera Term. When it has started, the screen in Figure 3 is displayed.

Figure 3   Tera Term Initial Screen

(6) Select "**Serial**", then in the "**Port:**" combo box, select a COM port to use.

(7) When it has started, from the "**Setup**" menu, select "**Serial port?…**", change the settings by referring to Figure 4, then click the "**OK**" button.

Setting value	Baud Rate:	57600
	Data:	8 bit
	Parity:	none
	Stop:	1 bit
	Flow Control:	hardware

(8) From the "**Setup**" menu, select "**Terminal…**", change the settings by referring to Figure 4, then click the "**OK**" button.

    Setting value   New-line
                           Receive: CR+LF
                           Transmit: CR
                           Local echo: Uncheck
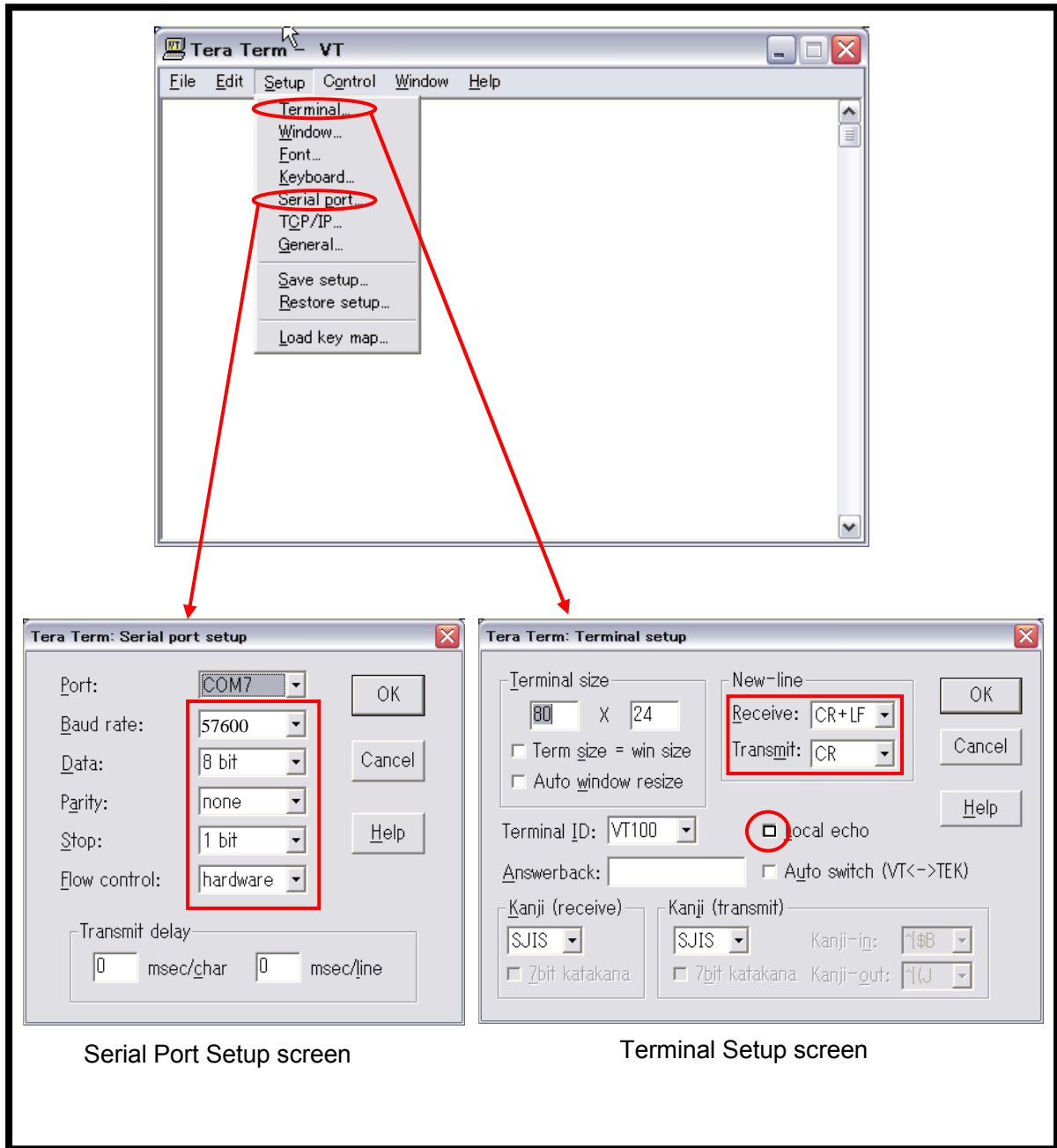
Serial Port Setup screen

Terminal Setup screen

Figure 4　Tera Term Communication Settings

(9) Press the SW1 reset button on the evaluation board.

(10) From the serial communication software, enter "**RREG 6C**".
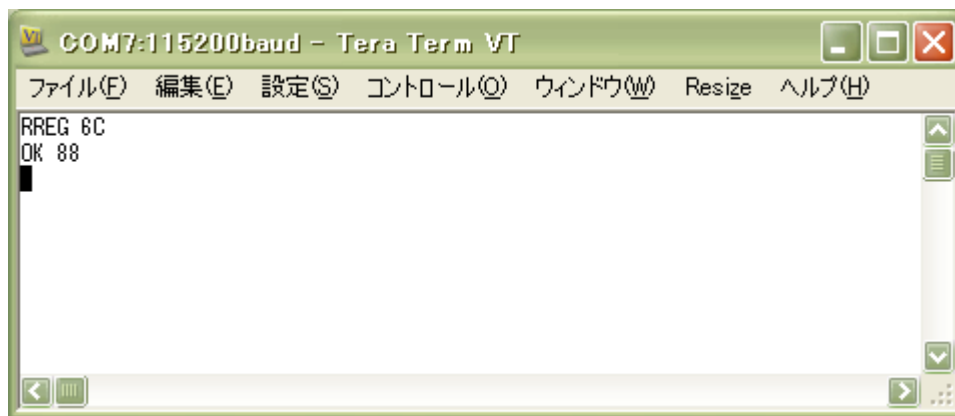It is successful when "**OK 88**" is displayed as shown in Figure 5.

Figure 5　Screen after RREG 6C Command

This concludes the preparation for using this product.

From now on, refer to the attached "Wireless PAN Test Tool User's Manual" and perform communication tests to check the device connection state and proper operations.

Revision History

Document No.	Issue Date	Page		Description
		Previous Edition	New Edition	
FEXL7416EVA_startguide-01	May 7, 2015	–	–	First edition issued