

Wi-SUN module for B-Route, Enhanced HAN

# BP35C0-J11 Start up manual

Version 1.0.2

## Introduction

This manual describes the operation confirmation procedure using the serial communication software (Tera Term) for the Wi-SUN module BP35C0-J11.



BP35C0-J11-T01



BP35C1-J11-T01



BP35C2-J11-T01

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## 2. About downloading related documents and software

The documents associated with this manual are listed at the beginning of each chapter. Please read it according to your needs.

Hardware documentation is available for download on the ROHM's Wi-SUN support page.

ROHM Wi-SUN Support page: <https://www.rohm.com/products/wireless-communication/specified-low-power-radio-modules/bp35c0-j11-product/documents>

You can also download the software documentation on the support page of ISB Co., Ltd.

Wi-SUN Enhanced HAN + B-route support page: <https://wisun.isb.co.jp/enhan/wer0/>

Use Tera Term of terminal software for operation confirmation.

You can download it from the following URL:

Tera term Download: <https://ja.osdn.net/projects/ttssh2/>

The evaluation board uses FTDI's USB-UART conversion chip. It is not automatically recognized by Windows and you may need to install the driver, so please download the FTDI driver from the following URL if necessary.

FTDI driver Download: <https://www.ftdichip.com/FTDrivers.htm>

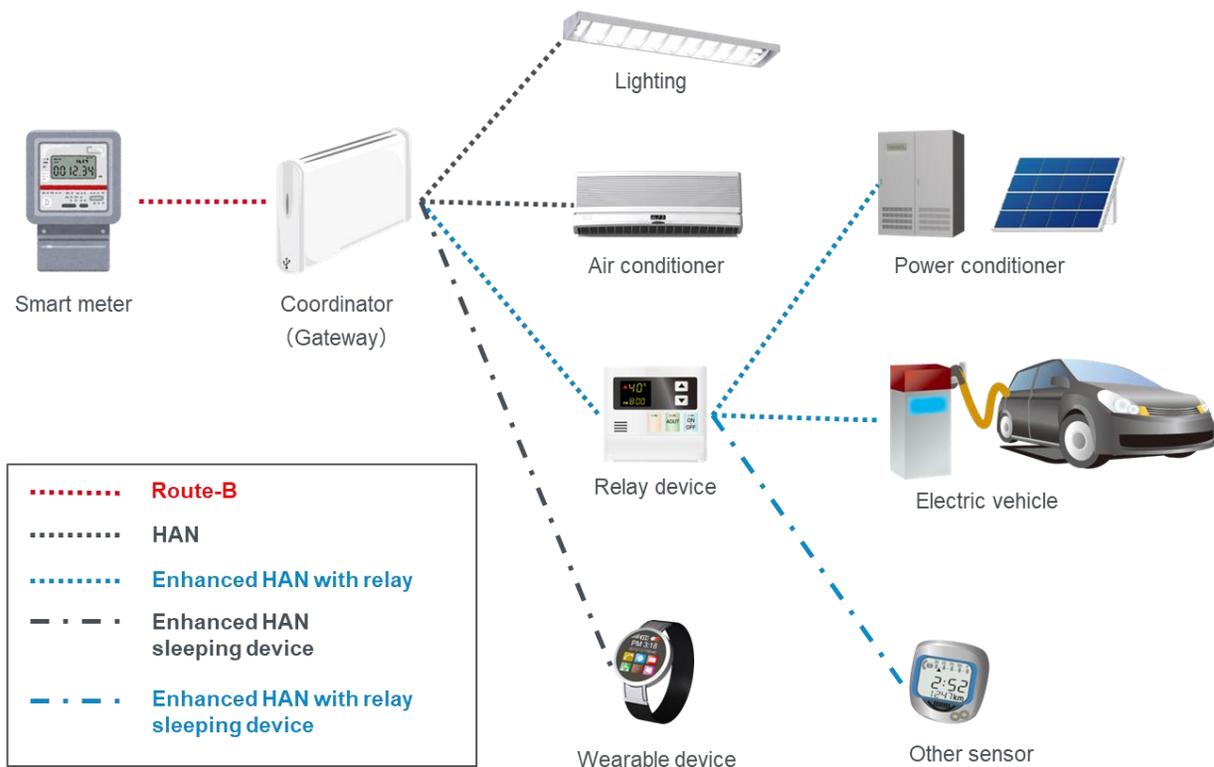
### 3. What you can do with BP35C0-J11

The following communication and functions can be realized in the module BP35C0-J11.

Each function can be operated concurrently in the same network.

Name	Features
Wi-SUN B-route Communication	Ideal for communication with smart meters. Enables one-to-one communication in authentication and encryption conditions
Wi-SUN HAN Communication	Ideal for communication in the near-medium range (about 100 to 500m) in a good location. It is possible to communicate with multiple-devices in the authentication and encryption state.
Wi-SUN Enhanced HAN Communication	Suitable for the operation of the communication, battery driven, etc., where the wall is sandwiched. Enables communication including authentication/encryption status and low-power consumption operation

•Network Configuration Example



## 4. Setup the evaluation environment

This chapter describes the Setup of the Evaluation environment for BP35C0-J11 operation.

The setup flow for the following evaluation environments is described in detail.

[STEP 1] Hardware setup

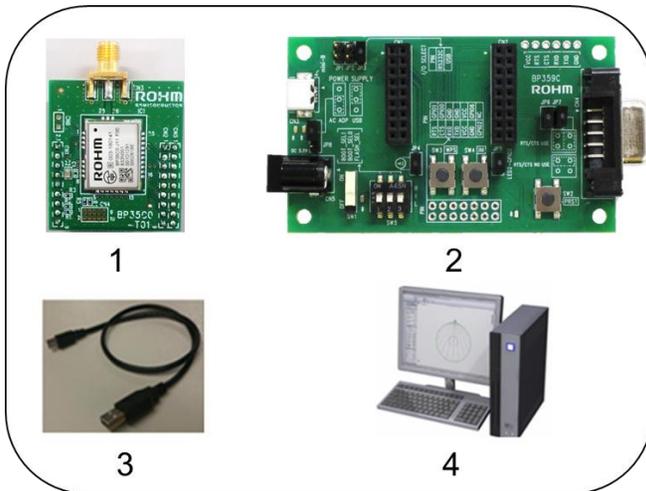
[STEP 2] Software setup

[STEP 3] Running test macros

### 4.1. [STEP1] Hardware setup

[In case of using BP35C0-J11-T01]

The evaluation environment uses the following hardware:



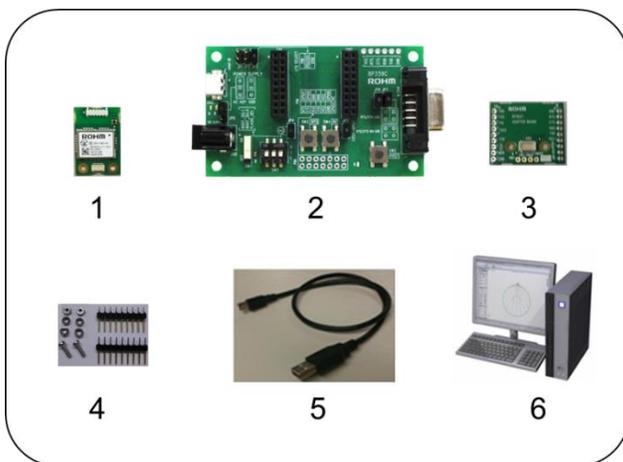
No.	Type
1	BP35C0-J11-T01
2	BP359C
3	USB cable (Mini-B)
4	Windows PC

- No.1 and 2 are available through ROHM and distributors and online sales.

- No.3 and 4 are to be prepared by customer.

[In case of using BP35C1-J11-T01]

The evaluation environment uses the following hardware:



No.	Type
1	BP35C1-J11-T01
2	BP359C
3	BP35A7A
4	BP35A7accessories
5	USB cable (Mini-B)
6	Windows PC

- No.1, 2, 3 and 4 are available through ROHM and distributors and online sales.

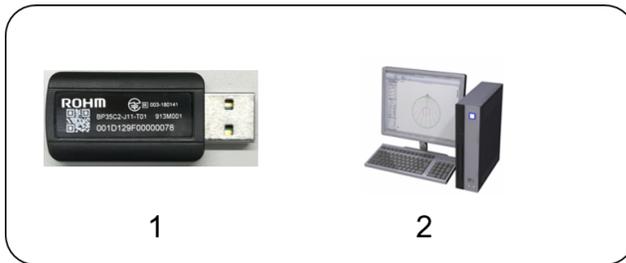
- No.5 and 6 are to be prepared by customer.

\* Reference information: The following cable has been used as a USB cable in ROHM.

- "U2C-M05BK (mini-B type)" made by ELECOM

[In case of using BP35C2-J11-T01]

The evaluation environment uses the following hardware:



No.	Type
1	BP35C2-J11-T01
2	Windows PC

- No.1 is available through ROHM and distributors and online sales.
- No.2 is to be prepared by customer.

The relevant documentation for the hardware is listed below. Please refer it according to your needs.

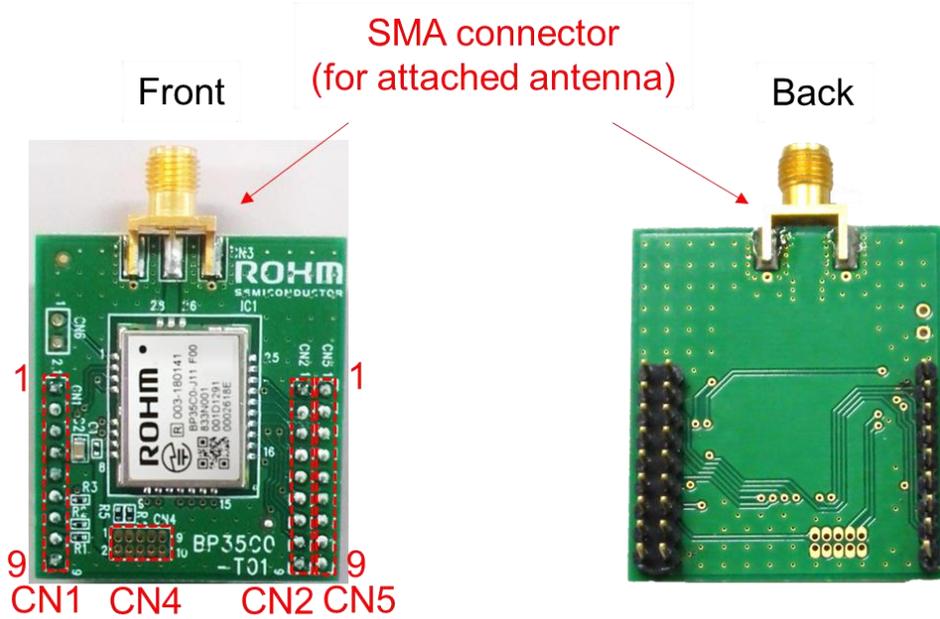
Download URL: <https://www.rohm.com/products/wireless-communication/specified-low-power-radio-modules/bp35c0-j11-product/documents>

Name (filename)	Contents
BP35C0-J11 Datasheet (bp35c0-j11_datasheet_v***e.pdf)	Describes the hardware specifications of the BP35C0-J11.
BP35C1-J11-T01 Evaluation Board (bp35c1-j11-t01_evaluationboard_v***e.pdf)	Describes the hardware specifications of the BP35C1-J11-T01.
BP35C2-J11-T01 Evaluation Board (bp35c2-j11-t01_evaluationboard_v***e.pdf)	Describes the hardware specifications of the BP35C2-J11-T01.
BP35A7A Evaluation Board (bp35a7a_evaluationboard_v***e.pdf)	Describes the hardware specifications of the BP35A7A.
BP359C Evaluation Board (bp359c_evaluationboard_v***e.pdf)	Describes the hardware specifications of the UART Interface Evaluation Board (BP359C).
External antenna list (bp35c0-j11_antennalist_v***j.pdf)	List of external antennas that can be used as certified antennas for the BP35C0-J11 under the Japan Radio Law.

\*\*\* indicates the version information.

4.1.1. Adapter Board BP35C0-J11-T01

In this document, BP35C0-J11 module is used in the evaluation board (BP359C), with the BP35C0-J11 Mounted Adapter Board (Use BP35C0-J11-T01). This board is evaluation board that can be connected to the BP359C with BP35C0-J11.



BP35C0-J11-T01 pin outs are as follows:

CN1	
No.	Symbol
1	GND
2	ADC1
3	ADC2
4	VCC
5	VCC
6	GPIO7
7	MODE2
8	MODE0
9	GND

CN2	
No.	Symbol
1	GND
2	RTS
3	CTS
4	RXD
5	TXD
6	SCL
7	RESET
8	SDA
9	GND

CN5	
No.	Symbol
1	N.C.
2	SPI_SCK
3	DCLK/SPI_SSN
4	DIO/SPI_MISO
5	DMON/SPI_MOSI
6	FTM
7	N.C.
8	N.C.
9	N.C.

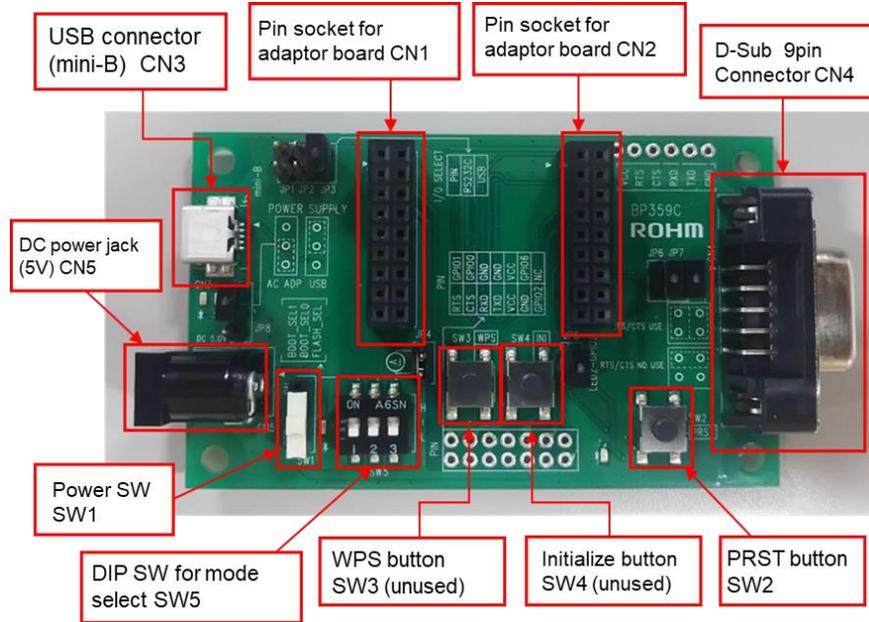
CN4	
No.	Symbol
1	SWD
2	VCC
3	SWCLK
4	GND
5	N.C.
6	GND
7	N.C.
8	N.C.
9	RESET
10	GND

For each terminal information of BP35C0-J11, please refer to “BP35C0-J11 Datasheet”

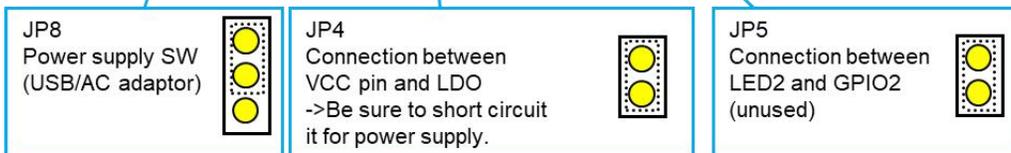
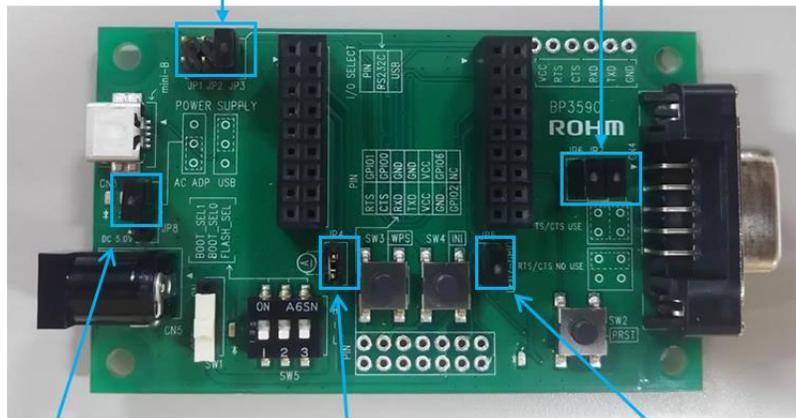
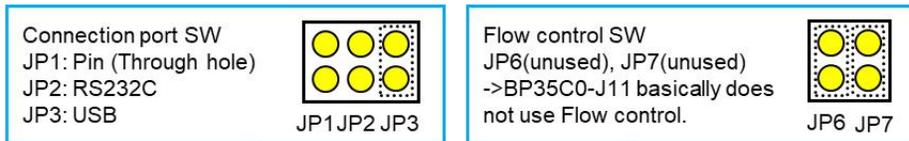
4.1.2. Evaluation Board BP359C

The evaluation board BP359C is designed to evaluate various types of wireless modules.

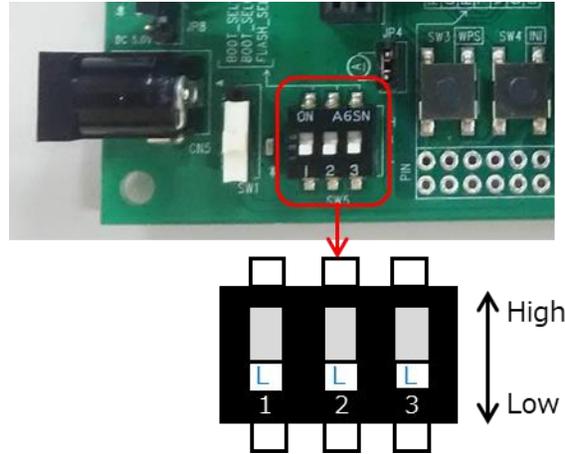
For internal schematics and pin layout, please refer to “BP359C Evaluation Board”. The terminal connector names of each part are listed below.



The role of each jumper pin and the settings when using the USB connector (CN3) are described below. The settings for using the “D-Sub connector” are described in Appendix 6.16.1). In this document JP5, JP6, and JP7 are not used.

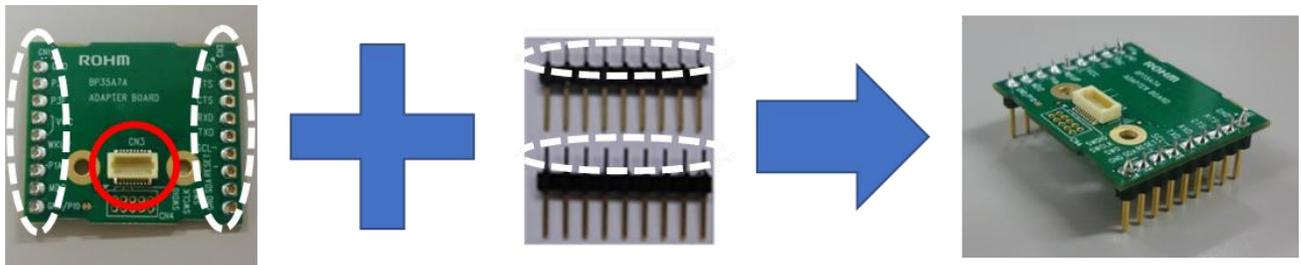


When the DIP switch (SW5) is normal operation check, set it all to low as below:



4.1.3. Adapter Board BP35A7A

Solder the pin header to the through-hole of both ends of BP35A7A as follows:



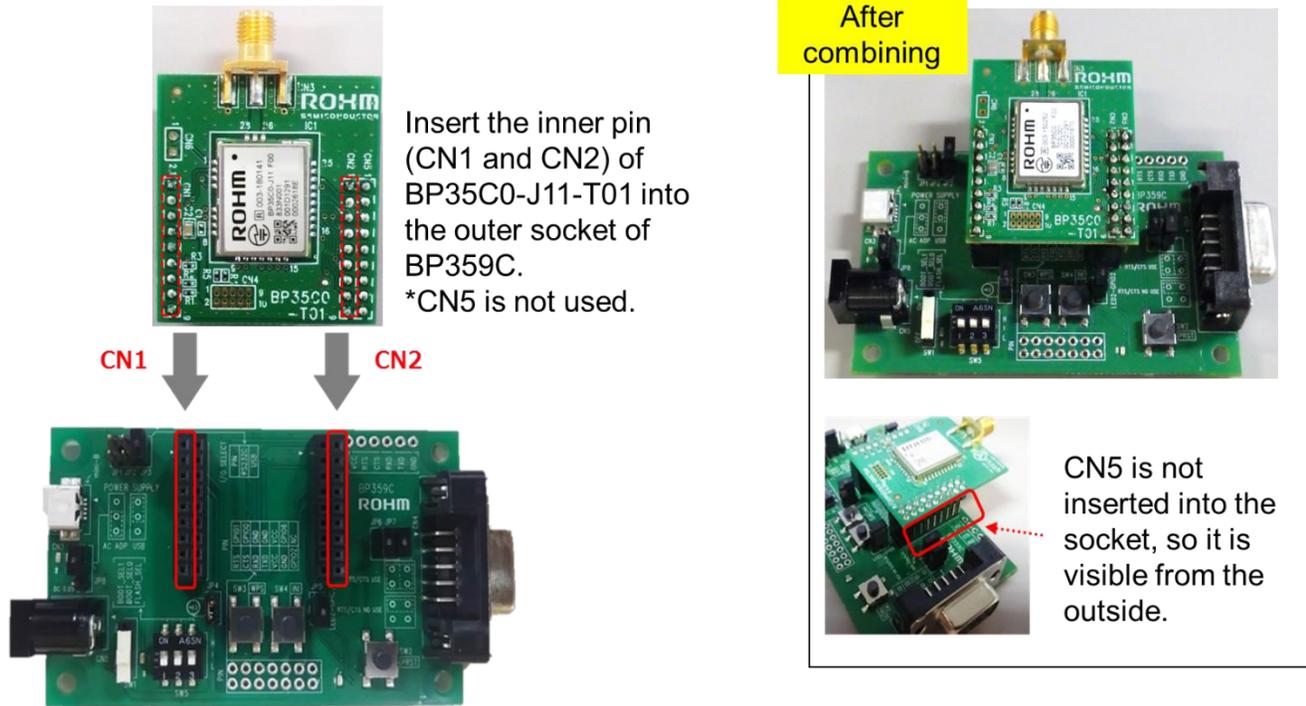
The side with CN3 is the front side.

Please be careful not to implement a pin header by mistaking the front and back of BP35A7A when you implement a pin header.

4.1.4. Connecting to boards and PCs

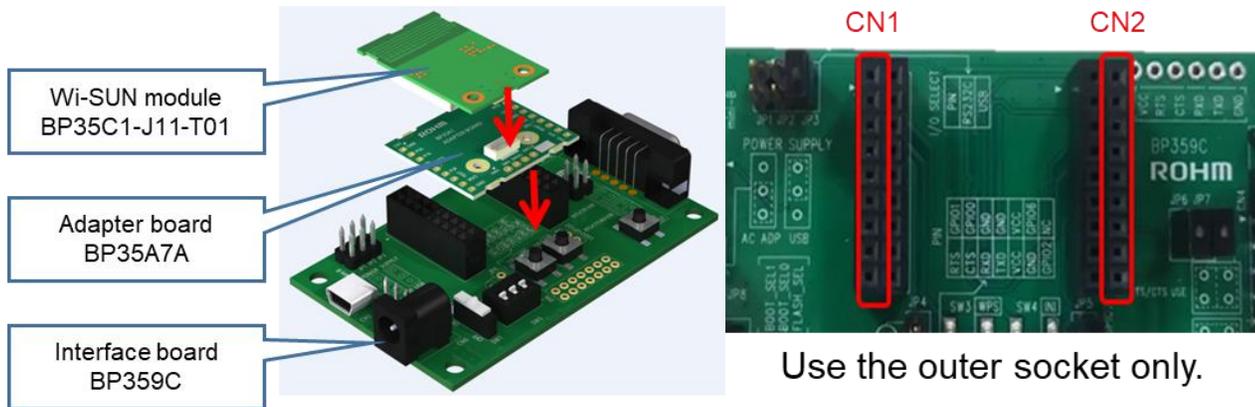
[In case of using BP35C0-J11-T01]

Insert BP35C0-J11-T01 into BP359C from the top as shown in the figure below.

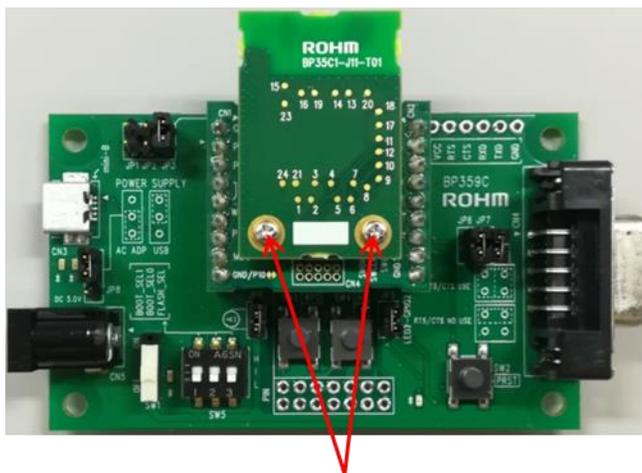


[In case of using BP35C1-J11-T01]

Insert BP35C1-J11-T01 and BP35A7A into BP359C from the top as shown in the figure below.



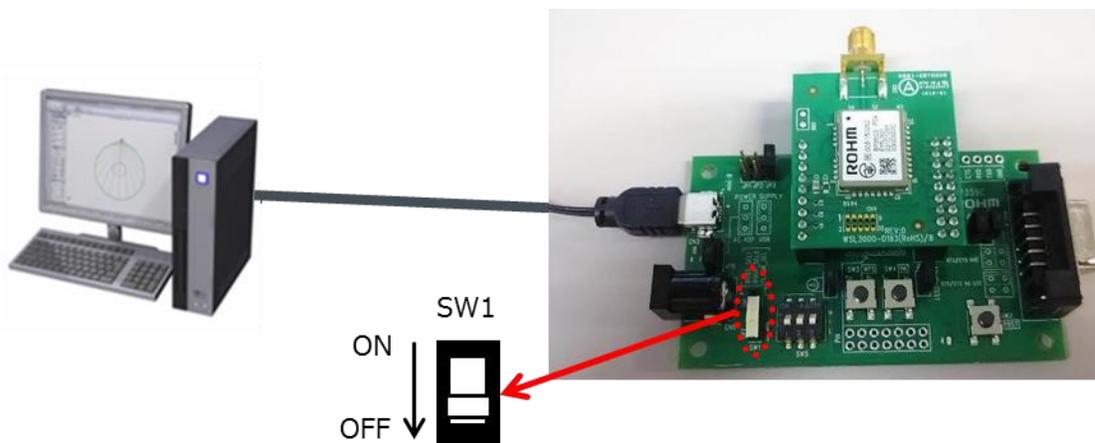
To fix BP35C1-J11-T01 to BP35A7A, use the screws, spacers and nuts in the BP35A7 accessories.



Use screws, spacers and nuts.

[In case of using BP35C0-J11-T01 or BP35C1-J11-T01]

Connect to PC after fixing adapter board to BP359C. The Power switch (SW1) on the top should be in the OFF state when connecting to a PC. After connection, the Evaluation Board will be automatically recognized by Windows.

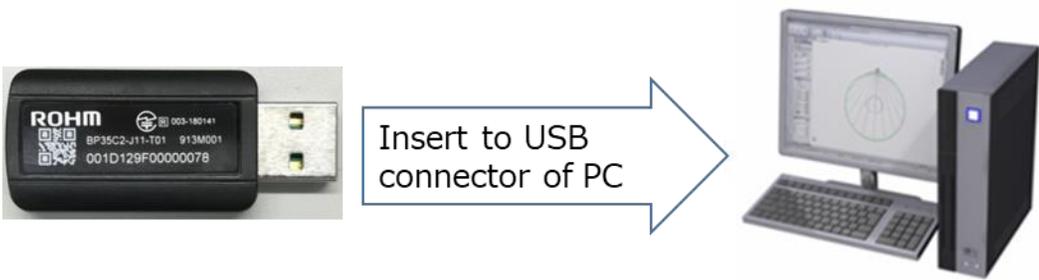


\* In the figure, BP35C0-J11-T01 is used, but the process is the same when using BP35C1-J11-T01.

\* BP359C uses FTDI to convert USB to UART. Depending on the environment of the PC, you may need to install the driver, download the driver if necessary (2See 2).

[In case of using BP35C2-J11-T01]

Insert the BP35C2-J11-T01 into the USB connector of your PC.



## 4.2. [STEP2] Software setup

This chapter uses the following software:

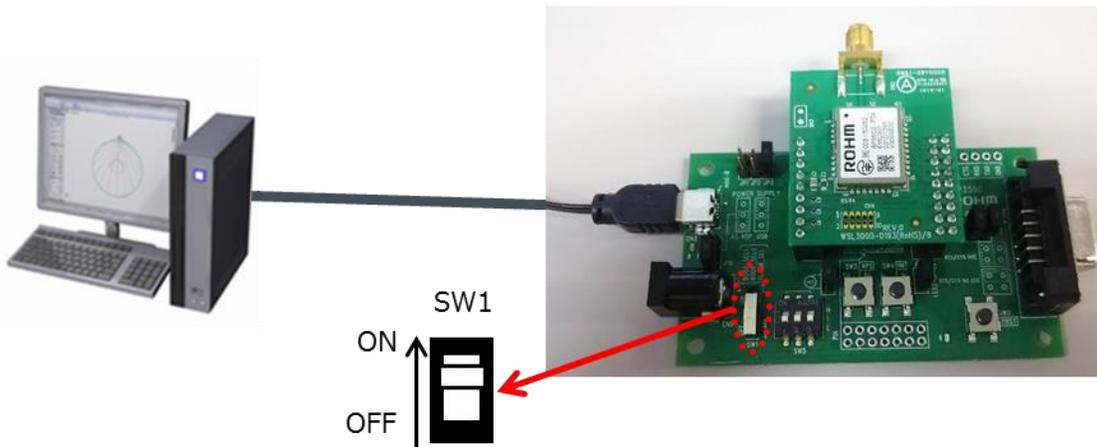
Name (filename)	Contents
Terminal Software (Tera Term)	It is a free software that can transmit serial communication and binary file on Windows.

### 4.2.1. Serial Communication Software setup

For serial communication, this board uses the Tera Term of Windows free software.

[In case of using BP35C0-J11-T01 or BP35C1-J11-T01]

Turn-On the power supply of BP359C power switch (SW1) after Tera Term installation is complete. When the power switch is ON, the LED near SW1 lights-up green.

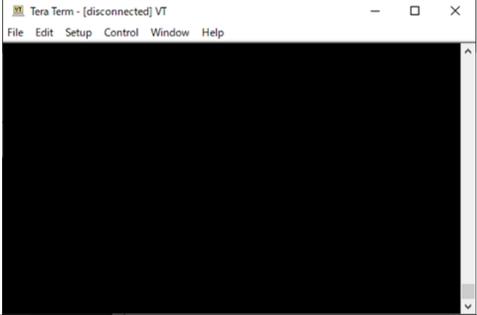
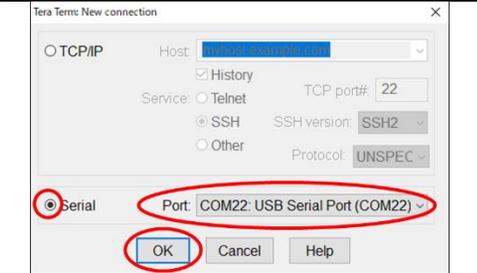
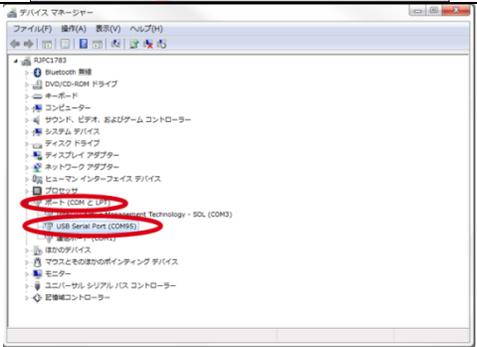
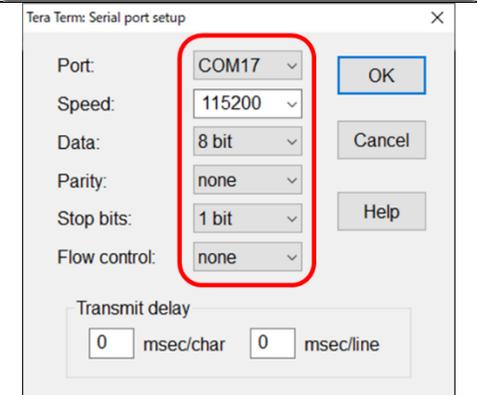
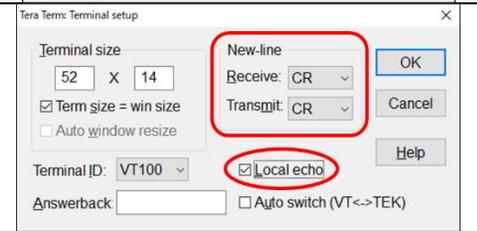


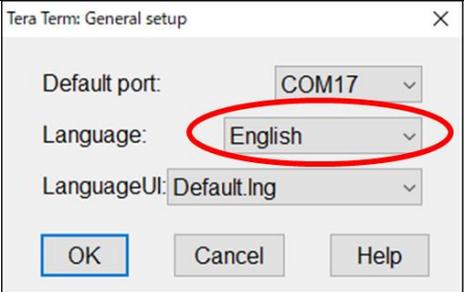
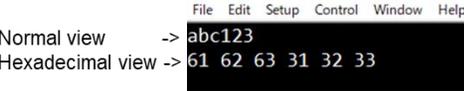
After powering ON, activate Tera Term and follow the below procedure.

\* In the figure, BP35C0-J11-T01 is used, but the process is the same when using BP35C1-J11-T01.

[In case of using BP35C2-J11-T01]

After inserting the BP35C2-J11-T01 into the USB connector, activate Tera Term and follow the below procedure.

No.	Screen	Operation Details
1		<p>Tera Term starts up</p>
2		<p>Select "File" -&gt; "New Connection". Check the "Serial" in the window, select COM port (USB Serial port) you want to use, and click OK.</p> <p>The COM port is the number assigned when the USB is inserted into the PC. If you are not sure, check the following steps:</p>
3		<p>(If the COM port is not known) Open the left screen in Device Manager (search in the Windows Start menu). Refer to the COM port that is displayed in the port (COM and LPT) items.</p>
4		<p>Select "Setup" -&gt; "Serial port". Pick up "115200" from the "speed" pull-down in the window. "Data" should be set to "8 bit", "none" for "Parity", "1 bit" for "Stop bits", and "none" for "Flow control". Click OK after selection.</p>
5		<p>Select "Setup" -&gt; "Terminal". Get up and send the newline code in the window, both "CR" and check the local echo. Click OK after selection.</p>

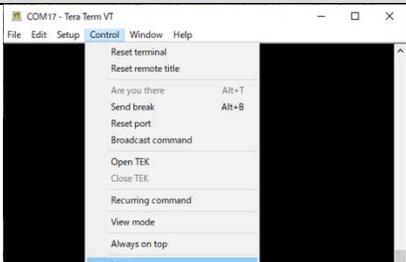
6		<p>Select "Setup" -&gt; "General".                  Select "English" for the language item in the window.                  Click OK after Selection.  <b>Important: If you do not perform this operation, the binary data will not be able to communicate properly.</b></p>
7	<p>TERATERM.ini</p> <pre> ; Display all characters (debug mode) Debug=on ; Debug mode type which can be selected by user. ; on all = All types ; off none = Disabled debug mode ; normal = usual teraterm debug mode ; hex = hex output ; noout = disable output completely DebugModes=all                 </pre>  <p>* If the display is not switch, run Tera Term as an administrator</p>	<p>If you want to display binary data on Tera Term, edit the configuration file (TERATERM.ini) and Debug=on. After Restarting Tera Term, Shift+Esc you can switch the display mode to:                  Normal view -&gt; debug mode                  -&gt; Hexadecimal debug mode -&gt; Hide                  You can put binary data into hexadecimal view by using hexadecimal debug mode.                  For more information, see the Tera Term Help.</p>
	<p>You are now ready for Tera term.</p>	

4.3. [STEP3] Running test macros

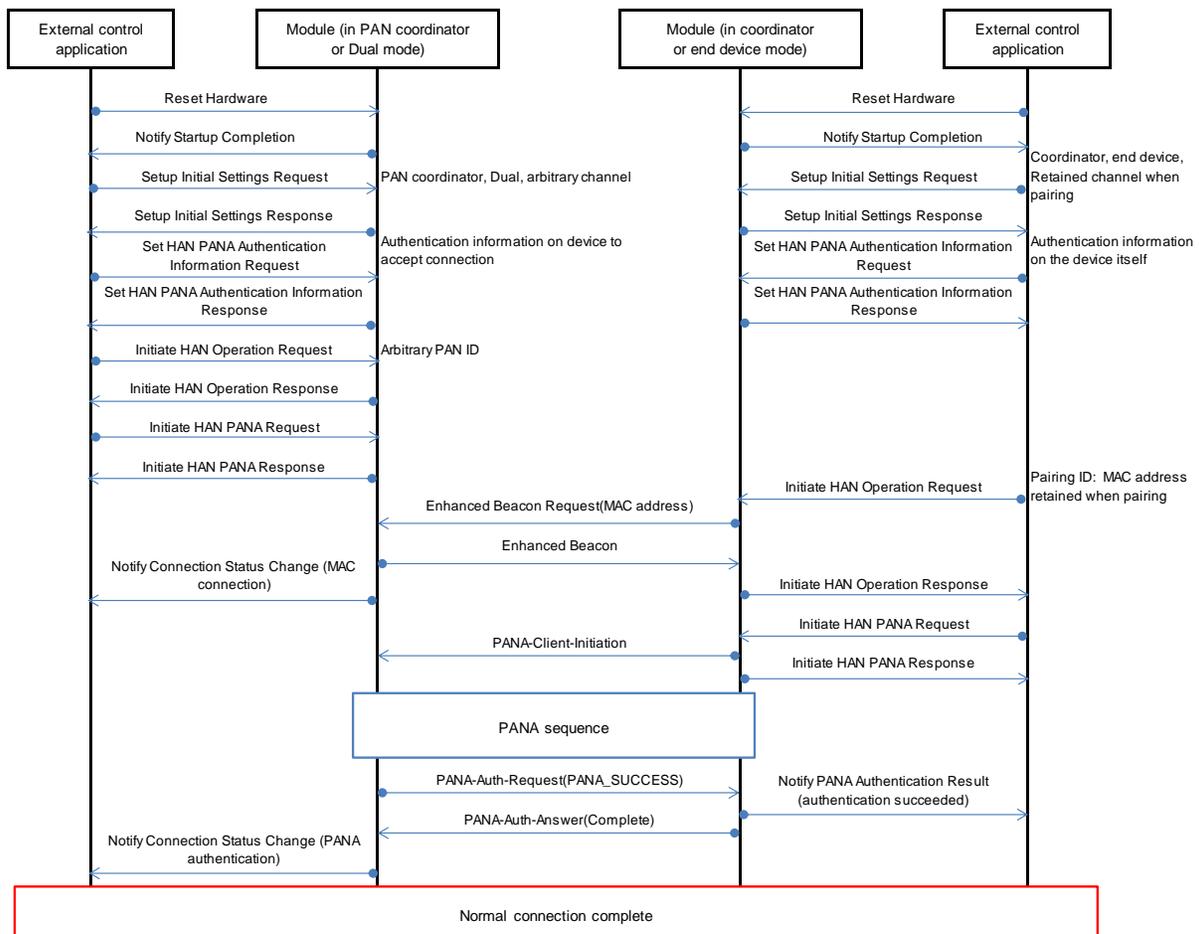
In order to confirm the operation, you can try to test sample macros. If you need it, please contact ROHM sales or distributor.

Name (filename)	Contents
Sample macro (TeraTerm macro.zip)	It is a macro to realize the communication of Wi-SUN Enhanced HAN on Tera Term.

How to run a macro:

No.	Screen	Operation Details
1		Select "Control" -> "Macros" and select the macro you want to run. Please refer to README of the sample macro for the macro operation method.

You can confirm the communication like the following the sequence between PAN coordinator and End device with the macro.



If you want to use your own macro, make the following statement first in the macro, if necessary:

Tera Term Macro command	Contents
Set echo 1	Enable local echo.
Set debug 2	Displays the display mode in hexadecimal. When the hexadecimal display is displayed, it is possible to wait for the hexadecimal character by the wait command etc.

When sending binary data with the Send command or similar, append \$ to hex.

Example: Sending "ABC": "send \$41 \$42 \$43"

For more information, refer to the "TTL Command Reference" in the help of Tera Term.

It is also possible to create binary data and send data from "file" to "file".

If you do not use Tera Term and want to communicate directly with the MCU etc6.2., refer to Appendix 6.2.

## 5. FW Update

This chapter is provided on the Wi-SUN enhanced HAN+B-route support page of ISB Co., Ltd. Use the following documentation and software:

Wi-SUN Enhanced HAN+B-route Support page: <https://wisun.isb.co.jp/enhan/wer0/>

Name (filename)	Contents
FW for OTA (BP35C0_J11_0400*****_OTA_Bank*.zip)	This is the FW to use in the OTA update. Please note that Bank0 and BANK1 will change depending on the order in which they are written.
OTA Update function Manual (J11_ota Update function Manual _ part*.pdf)	This document describes the commands and sequences used in the OTA update.
OTA Update sample macro/operation manual (OTA Update _ Sample script.zip)	This document describes the OTA Update sample program described in Python and how to use it.

\* Indicates version information and bank number.

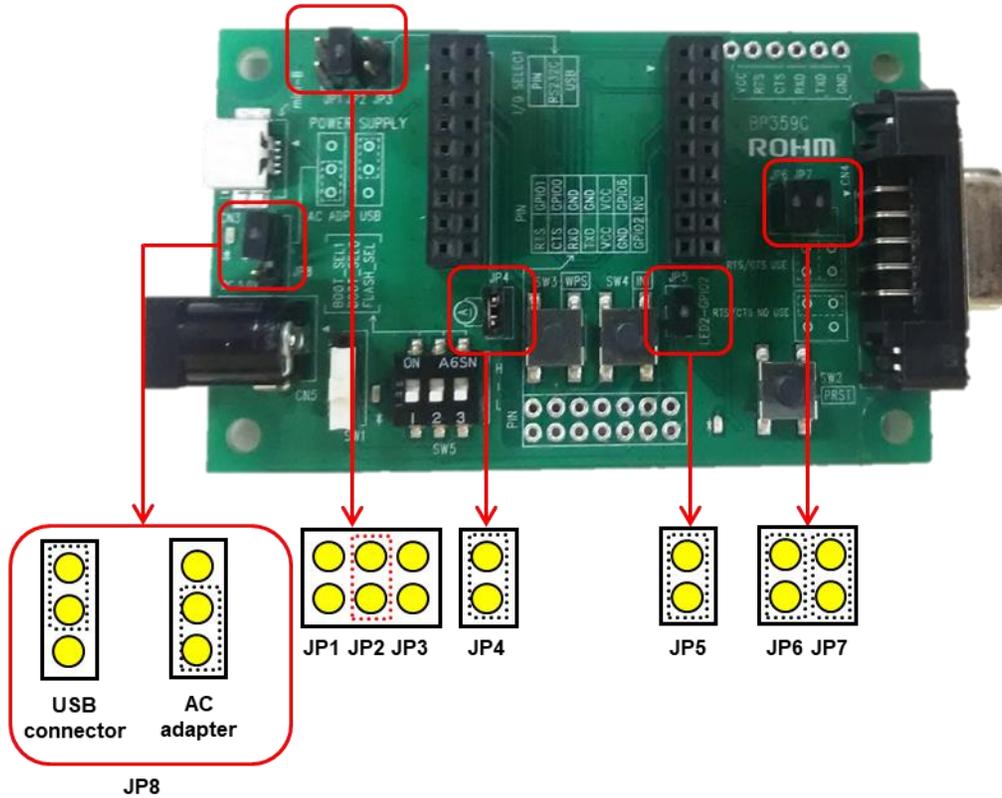
BP35C0-J11 is compatible with OTA (Over-The-Air: Via radio) update. We have released the FW (firmware) for the OTA update, so please perform an OTA UPDATE if there is a FW update. The version of FW that is being written can be checked by getting version information (Command code: 0x006B).

OTA update samples (Python) are available for OTA update implementation. Please use it as a reference when you check the function and implement it to the MCU. Refer to the OTA update function manual and the OTA Update sample macro operation manual for more information on how to use it.

## 6. Appendix

### 6.1. Connecting via D-Sub connector

Set the jumper pin as follows. Depending on the power supply method (via USB connector or via AC adapter), switch the JP8.



The actual connection between the D-Sub connector and the AC adapter is as follows.

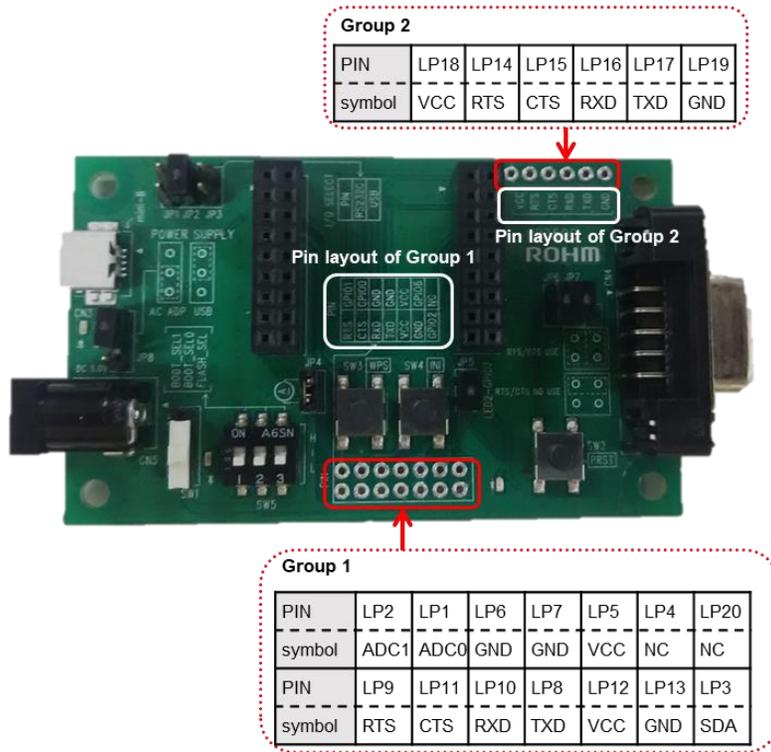


\* In the figure, BP35C0-J11-T01 is used, but the process is the same when using BP35C1-J11-T01.

\* Please use a plug with an external diameter of 5.5 mm, internal through  $\Phi$  2.1 mm, and a length of 9.5 mm. Also, please use the output voltage of 5V products.

6.2. Connect UART directly from through Hole

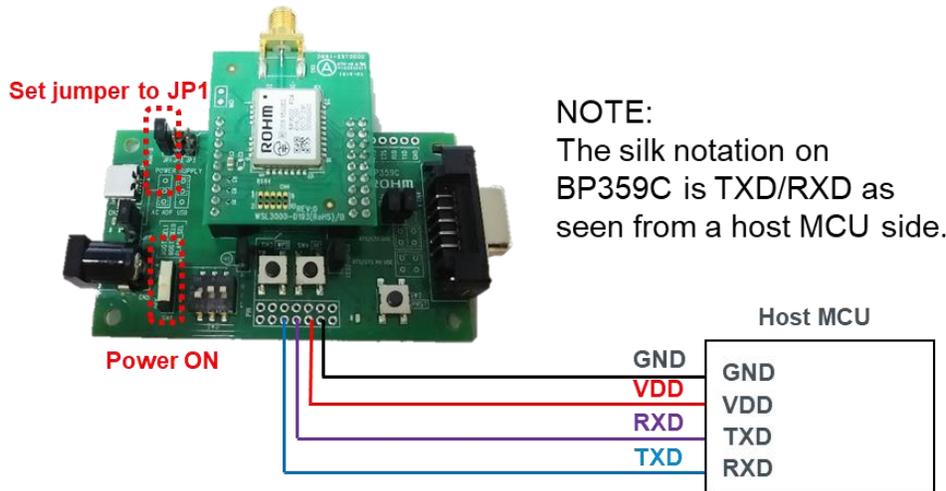
BP359C has a through-hole as follows.



The terminals (TXD, RXD, etc.) required for BP35C0-J11 UART can be extracted from the through-hole group 1 and through-hole group 2 as described in on the BP359C board.

Please note that when using the UART terminal of through-hole group1, it is necessary to connect the JP1 and enable the terminal. Through-hole 2, it is possible to take out the UART terminal from BP35C0-J11 without switching the JP1.

It is also possible to connect the BP35C0-J11 to the host MCU and the through-hole by the wiring as follows. Please try to evaluate using the MCU without using Tera Term etc.,



\* In the figure, BP35C0-J11-T01 is used, but the process is the same when using BP35C1-J11-T01.

## 7. Revision history

Ver.	Date	Contents	Revised by
1.0.0	2019/03/01	Created new	ROHM
1.0.1 (Rev.001)	2020/05/22	Modify format	ROHM
1.0.2 (Rev.002)	2020/06/01	Change the URL of ROHM Wi-SUN support page	ROHM

## Notes

- 1) The information contained herein is subject to change without notice.
- 2) Before you use our Products, please contact our sales representative and verify the latest specifications :
- 3) Although ROHM is continuously working to improve product reliability and quality, semiconductors can break down and malfunction due to various factors.  
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- 4) Examples of application circuits, circuit constants and any other information contained herein are provided only to illustrate the standard usage and operations of the Products. The peripheral conditions must be taken into account when designing circuits for mass production.
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- 7) For use of our Products in applications requiring a high degree of reliability (as exemplified below), please contact and consult with a ROHM representative : transportation equipment (i.e. cars, ships, trains), primary communication equipment, traffic lights, fire/crime prevention, safety equipment, medical systems, servers, solar cells, and power transmission systems.
- 8) Do not use our Products in applications requiring extremely high reliability, such as aerospace equipment, nuclear power control systems, and submarine repeaters.
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