PicoLnCnv, PicoLnCnv-WL Manual

table of contents

1 Please read

***When using PicoLnCnv or PicoLnCnv-WL, be sure to check the terms of use on the Shiomachi Software website.**

<Terms of Use URL>
https://sites.google.com/view/shiomachisoft/english-home/terms-of-use

Furthermore, Shiomachi Software (the creator of PicoLnCnv/PicoLnCnv-WL) assumes no responsibility whatsoever for any trouble, loss, or damage arising from the use of PicoLnCnv/PicoLnCnv-WL or from the contents of this document.

2 Overview

This is the manual for PicoLnCnv and PicoLnCnv-WL.
An overview of PicoLnCnv and PicoLnCnv-WL is as follows.

2.1 Overview of PicoLnCnv-WL

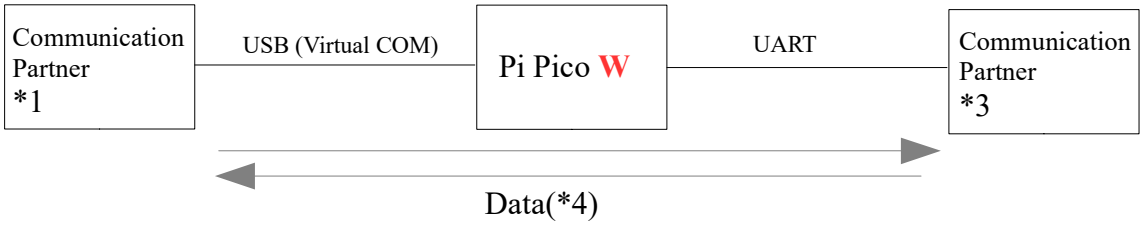
We will use a Raspberry Pi Pico W.
PicoLnCnv-WL is firmware that performs the following line conversions (a) and (b).
(a) USB (virtual COM) <==> UART
(b) Wi-Fi (TCP socket communication) <==> UART

-When using Wi-Fi, Pi Pico W becomes a TCP server.
-To use Wi-Fi, you will need a wireless LAN router that supports the 2.4 GHz Wi-Fi standard "IEEE 802.11b/g/n."
-The source code is not released.

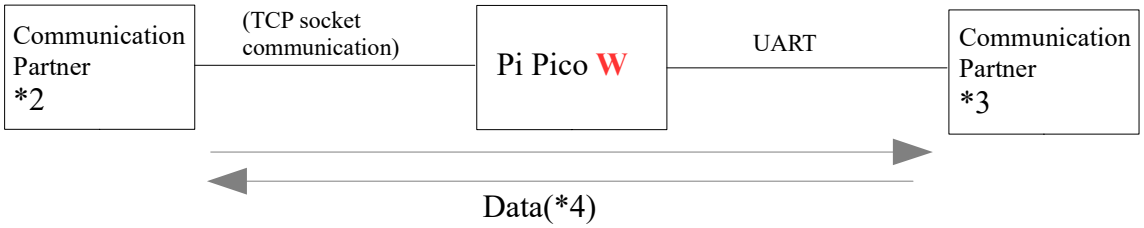
<System configuration >

-Line Conversion Mode

(1) USB<==>UART



(2) Wi-Fi<==>UART



*1: As an example, a PC with Tera Term installed.
*2: A client for TCP socket communication.
*3: A microcontroller board that can use UART.
*4: PicoLnCnv handles data in binary, so it does not care whether the data is in character code or not.

-Setting Mode

Configure the UART and wireless LAN of Pi Pico W.

*5: We use a PC app called PicoJigApp.

2.2 *Overview of PicoLnCnv*

-We will use a Raspberry Pi Pico.
-PicoLnCnv does not support Wi-Fi, unlike PicoLnCnv-WL.

3 Contents

3.1 Firmware (FW)

(1) PicoLnCnv_*XXXXXXXX*.uf2

*XXXXXXXX is the version date.

This is the firmware for PicoLnCnv and will be written to Pi Pico.

(2) PicoLnCnv_WL_*XXXXXXXX*.uf2

*XXXXXXXX is the version date.

This is the firmware for PicoLnCnv-WL and will be written to Pi Pico W.

3.2 PC App

(1) PicoJigApp_*XXXXX*フォルダ

* XXXX is the version.

This folder contains the binaries for PicoJigApp (an app that runs on a Windows PC).

PicoJigApp is compatible with both PicoLnCnv and PicoLnCnv-WL, and is used for UART settings and wireless LAN settings.

Copy the PicoJigApp_XXXXX folder to a suitable location on your PC (such as the desktop).

For Windows, .NET Framework 4.x.x must be enabled, with .NET Framework 4.6.2 or higher.

Not compatible with .NET 5 and higher.

Enabling the .NET Framework is at your own risk.

4 Setup

4.1 Write FW to Pi Pico or Pi Pico W

Below are the steps to write the firmware to Pi Pico or Pi Pico W.

<Note>
*For PicoLnCnv, write PicoLnCnv_XXXXXXXX.uf2 to Pi Pico.
*For PicoLnCnv-WL, write PicoLnCnv_WL_XXXXXXXX.uf2 to Pi Pico W.

(1) While pressing the white button on the Pi Pico (Pi Pico W), connect the Pi Pico (Pi Pico W) to your PC with a USB cable. The RPI-RP2 drive will then be recognized.

(2) RPI-RP2 の中に PicoLnCnv_*XXXXXXXX*.uf2(PicoLnCnv_WL_*XXXXXXXX*.uf2)をドラッグします。

This completes the firmware writing process.
The firmware will start up when the Pi Pico (Pi Pico W) is turned on.

4.2 PC setup

(1) Copy the PicoJigApp_XXXXX folder to a suitable location on your PC (such as the desktop). PicoJigApp is compatible with both PicoLnCnv and PicoLnCnv-WL, and is used for UART settings and wireless LAN settings

For Windows, .NET Framework 4.x.x must be enabled, with .NET Framework 4.6.2 or higher.
Not compatible with .NET 5 and higher.
Enabling the .NET Framework is at your own risk.

5 LED

5.1 PicoLnCnv(Pi Pico) LED lighting

-If the FW has not detected an error, the LED will flash at 500 ms intervals.
-If the FW has detected an error, the LED will flash at 100 ms intervals.

5.2 PicoLnCnv-WL(Pi Pico W) LED lighting

-If the FW has not detected an error and has not been connected to the wireless LAN router, the LED will flash at 500 ms intervals.
-If the FW has not detected an error and has been connected to the wireless LAN router, the LED will remain lit.
-If the FW has detected an error, the LED will flash at 100 ms intervals.

Examples of errors that the FW recognizes are as follows.
<Examples>
-The microcontroller was reset due to a WDT timeout.
-UART: Framing error
-UART: Parity error
-UART: Break error
-UART: Overrun error
-Requested data was discarded because there was no free space in the buffer (USB transmission)
-Requested data was discarded because there was no free space in the buffer (UART transmission)
-Requested data was discarded because there was no free space in the buffer (UART reception)

6 Pins Used

6.1 Pins used by UART

The pins on the Pi Pico used for UART are as follows:
-UART0 TX = GP0 = pin 1
-UART0 RX = GP1 = pin 2

6.2 Pins used to switch between setting mode and line conversion mode

The following pins on the Pico are used to switch between setting mode and line conversion mode.

-GP2 = Pin 4 (GPIO input...pull-up)

-GP3 = Pin 5 (GPIO output...LOW output)

7 Switching between setting mode and line conversion mode

7.1 Switch to Setting Mode

When you connect the GP2(pin 4) and GP3(pin 5) of the Pi Pico with a lead wire and turn the power on, the Pi Pico will enter setting mode.

(Boot with GP2=Low)

7.2 Switch to line conversion mode

If you turn on the power to Pi Pico without connecting anything to GP2(pin 4), it will enter line conversion mode.

(Boot with GP2=High)

8 Configure UART and wireless LAN settings in setting mode

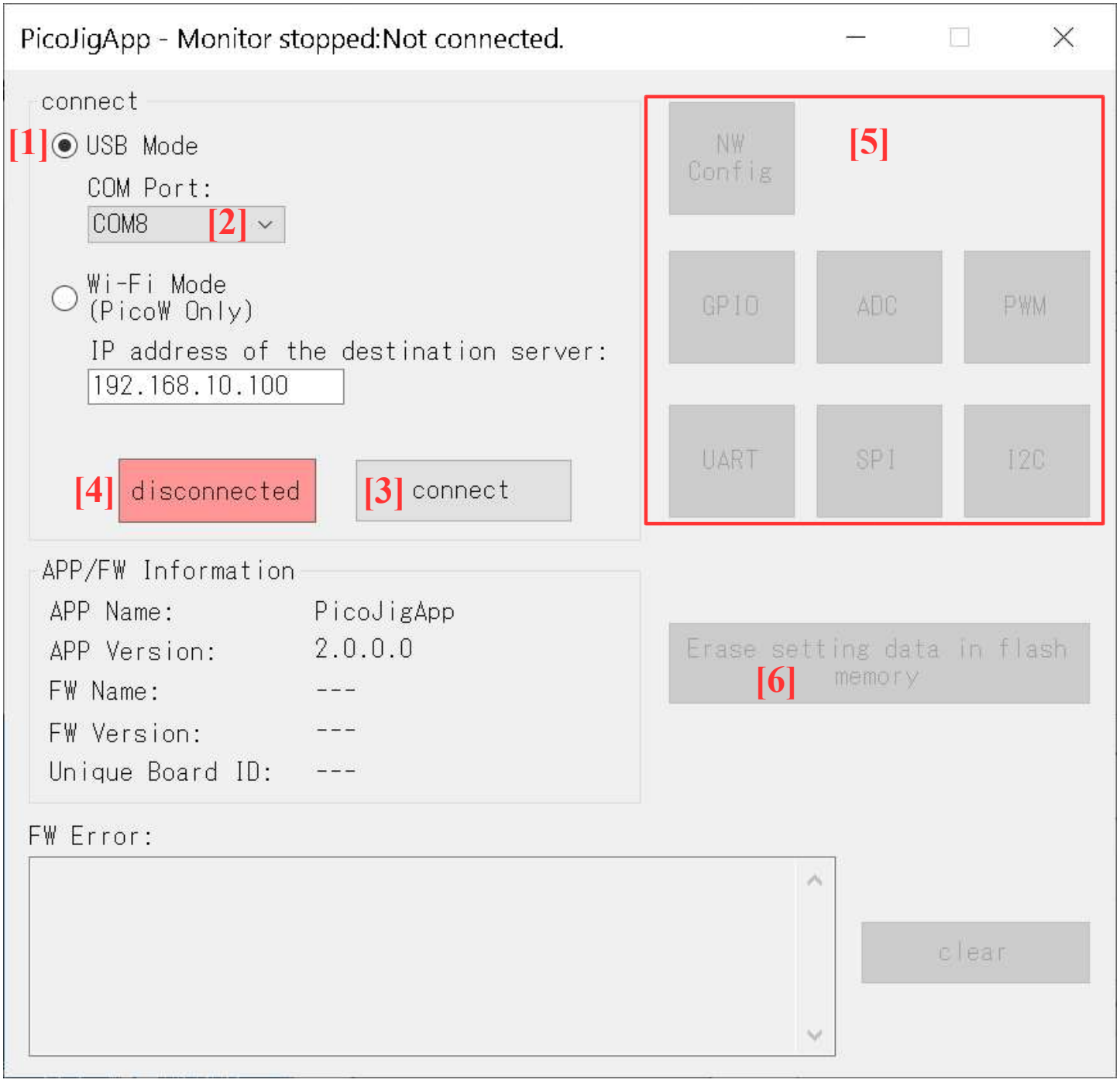
8.1 Put your Pi Pico in setting mode

Put your Pico into setting mode.

(With GP2(pin 4) and GP3(pin 5) of the Pi Pico connected with a lead wire, turn the Pi Pico power on.)

8.2 Starting PicoJigApp

8.2.1 Main Screen



8.2.2 Start and Connection

(1) After connecting Pi Pico with the USB cable, wait about 10 seconds and then double-click PicoJigApp.exe in the PicoJigApp_XXXXX folder. *The reason for waiting about 10 seconds is because it takes time for Windows to recognize Pi Pico's virtual COM. Double-clicking PicoJigApp.exe will display the main screen from the <Main Screen> chapter.

(2) Leave [1] on the <Main screen> ON.

(3) After selecting the Pi Pico COM number in [2] on the <Main screen>, press the [3] button.

If [4] on the <Main screen> changes to "connected", the connection to Pi Pico has been established.

If an error message box appears, try the following.
-If there are multiple COM numbers in the list in [2], change the COM number selection in [2] and then press [3].
-Check the connection of the Pi Pico USB cable, wait 10 seconds, and then restart PicoJigApp.exe.

When [4] on the <Main screen> changes to "connected", the buttons in [5] (*1) and [6] on the <Main screen> will become enabled.

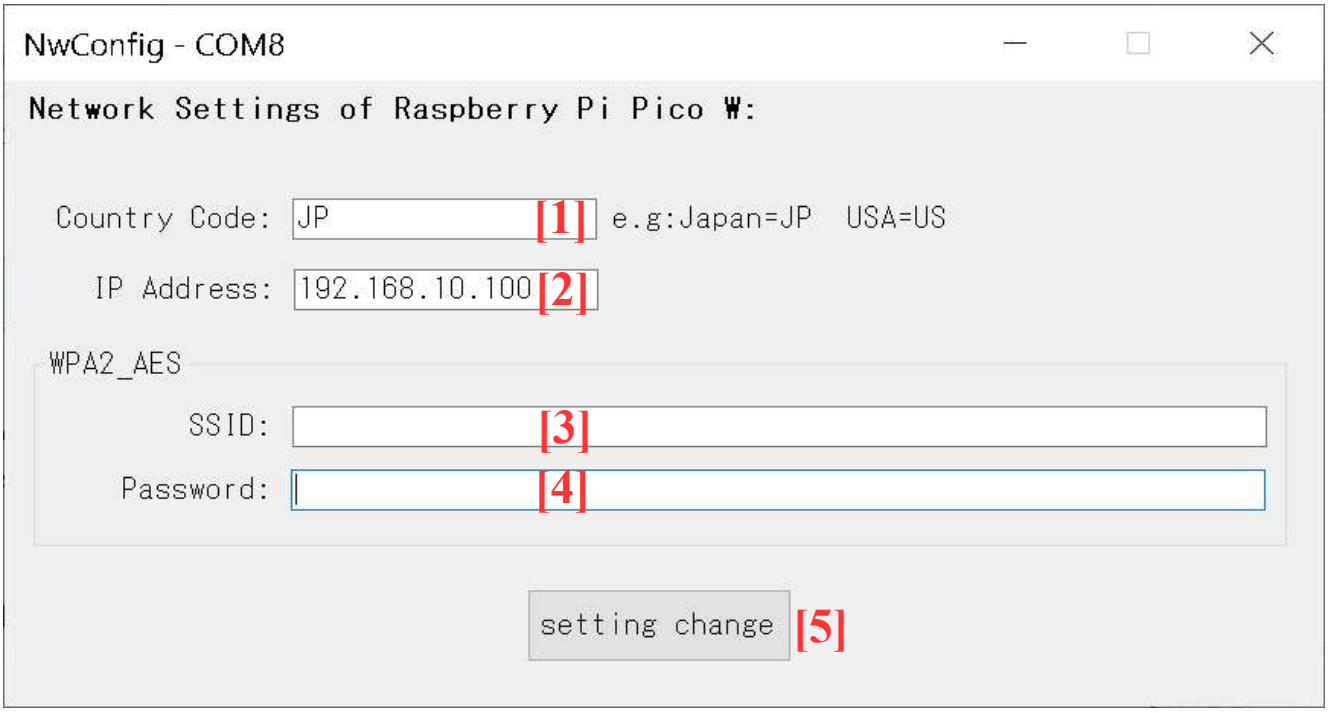
*1:
<For PicoLnCnv-WL>
The UART button and NW Config button will become enabled.

<For PicoLnCnv>
The UART button will become enabled.

8.3 Wireless LAN settings

8.3.1 Wireless LAN setting screen

The wireless LAN setting screen is displayed when you press the [NW Config] button in [5] on the <Main screen>.



(1) Enter the country code in the box [1].
<Example>
-Japan: JP
-United States: US

(2) Enter the IP address you want for your Pi Pico W in the box [2].
<Example>
If you want your Pi Pico W IP address to be 192.168.10.100:
192.168.10.100

*The socket port number is fixed at 7777.

(3) Enter the SSID of your wireless LAN router in the box [3].
*Conditions for the SSID of a wireless LAN router that can be specified:
-It must be compatible with the Wi-Fi standard "IEEE 802.11b/g/n" that uses the 2.4 GHz band. Be careful not to accidentally specify an SSID that uses the 5 GHz frequency band.
-The encryption method must be WPA2 (AES).

(4) Enter the password for your wireless LAN router in the box [4].

(5) Press the button [5] to configure the wireless LAN settings.

(6) After configuring the wireless LAN, check that the LED on Pi Pico W is lit and not flashing.

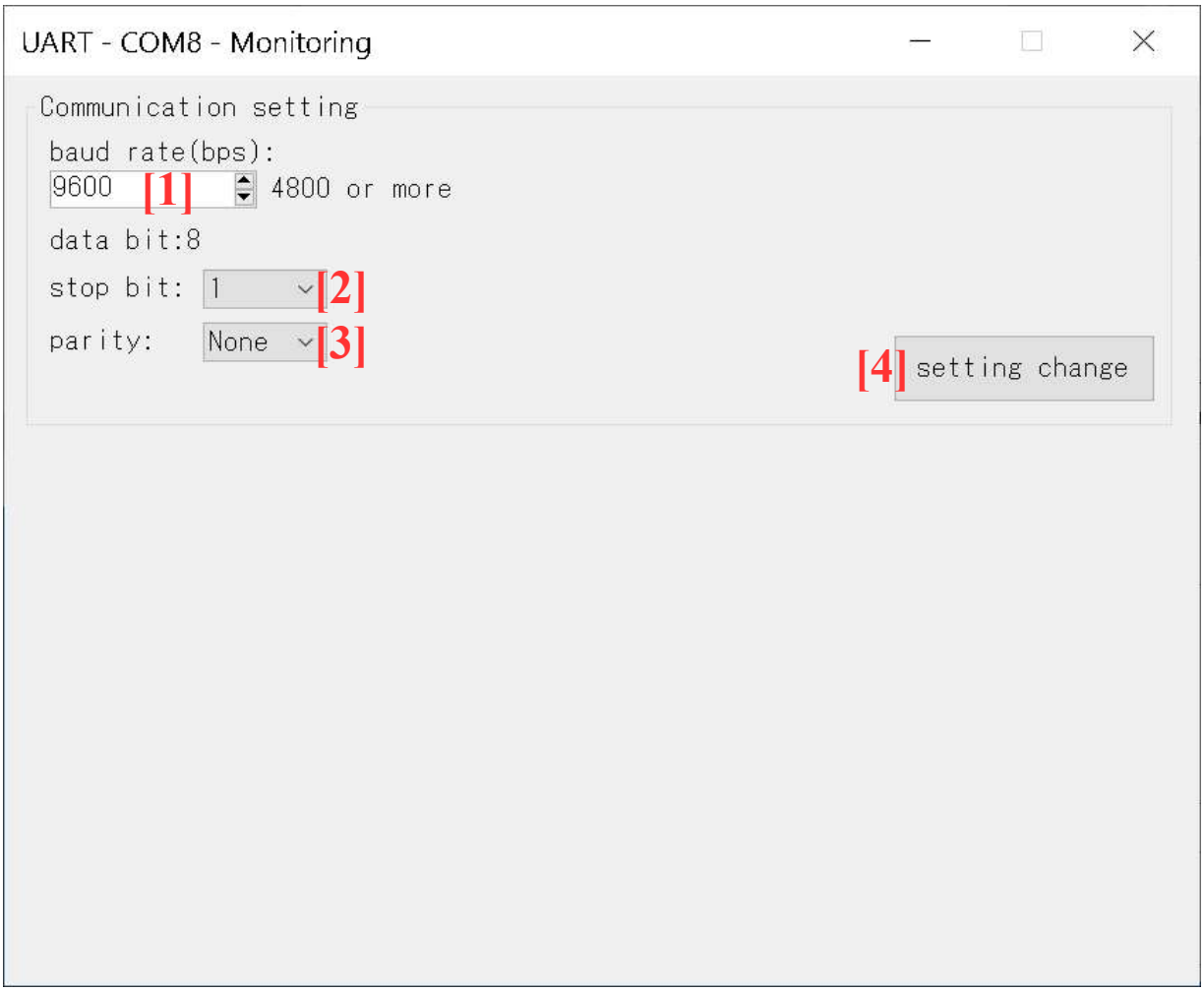
(This checks that Pi Pico W is connected to the wireless LAN router.)

Once the Wireless LAN settings have been completed, Pi Pico W will try to connect to the Wireless LAN router.
If it's successful in connecting to the Wireless LAN router, the LED will stop flashing and stay lit.
*If the LED continues to flash and does not light up, please do the following.
- Check that there are no devices near Pi Pico W that may cause radio interference.
- Check that the Wireless LAN settings are correct.

8.4 UART Settings

8.4.1 UART screen

The UART screen is displayed when you press the [UART] button in [5] on the <Main screen>.



You can change the UART settings using the following procedure.
(1) Select the baud rate in [1].

(2) Select the stop bit in [2].

(3) Select the parity in [3].

*The data bit is fixed at 8.

(4) Press the [4] button.

Pressing the [4] button will configure the UART settings.

The default UART settings are as follows:
-9600bps, data bit length = 8bit (fixed), stop bit length = 1, parity = none

8.4.2 Erasing the configuration data in the Flash memory

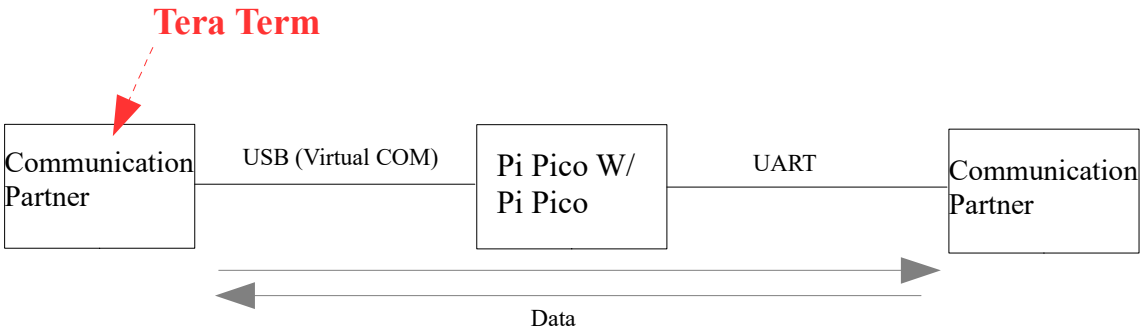
The following setting data is saved in the end of the Pi Pico's Flash memory.
-Wireless LAN settings
-UART settings
*If you are no longer using PicoLnCnv (PicoLnCnv-WL), we recommend that you erase the setting data saved in the end of the Flash memory using the [6] button on the <Main screen>.

9 Virtual COM port settings

The virtual COM port settings are fixed as follows:
- 115200bps, data bit = 8bit, stop bit = 1, parity = none

10 When using Tera Term as the communication partner in line conversion mode

10.1 USB<==>UART



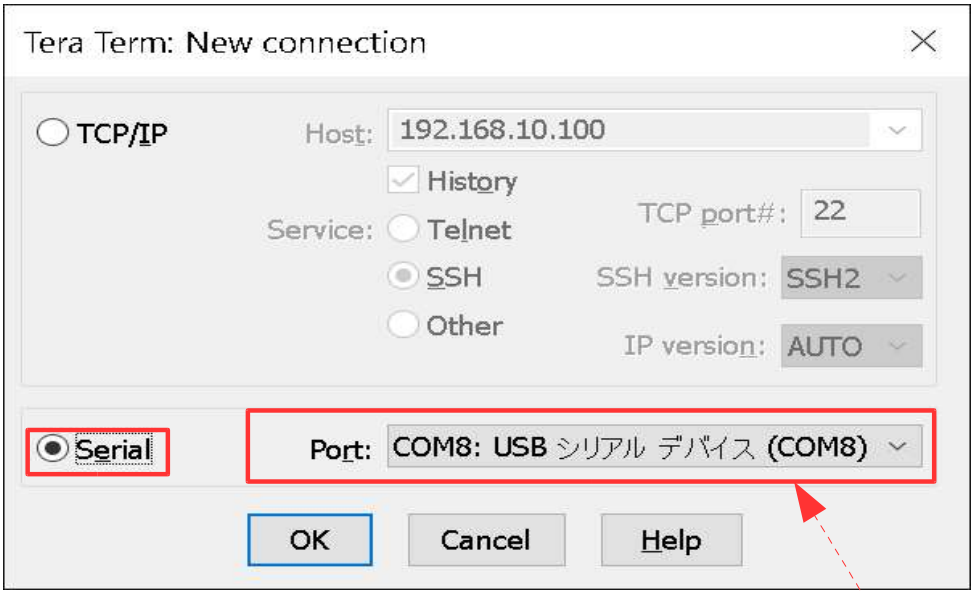
***Preparation**

(1) Please complete the UART settings in setting mode.

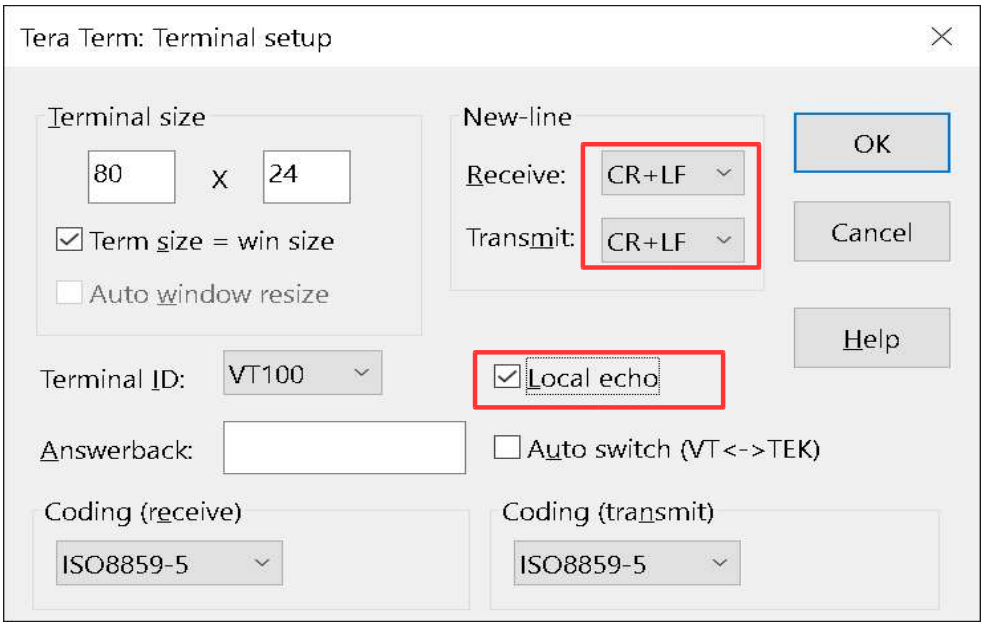
(2) Set Pi Pico to line conversion mode.

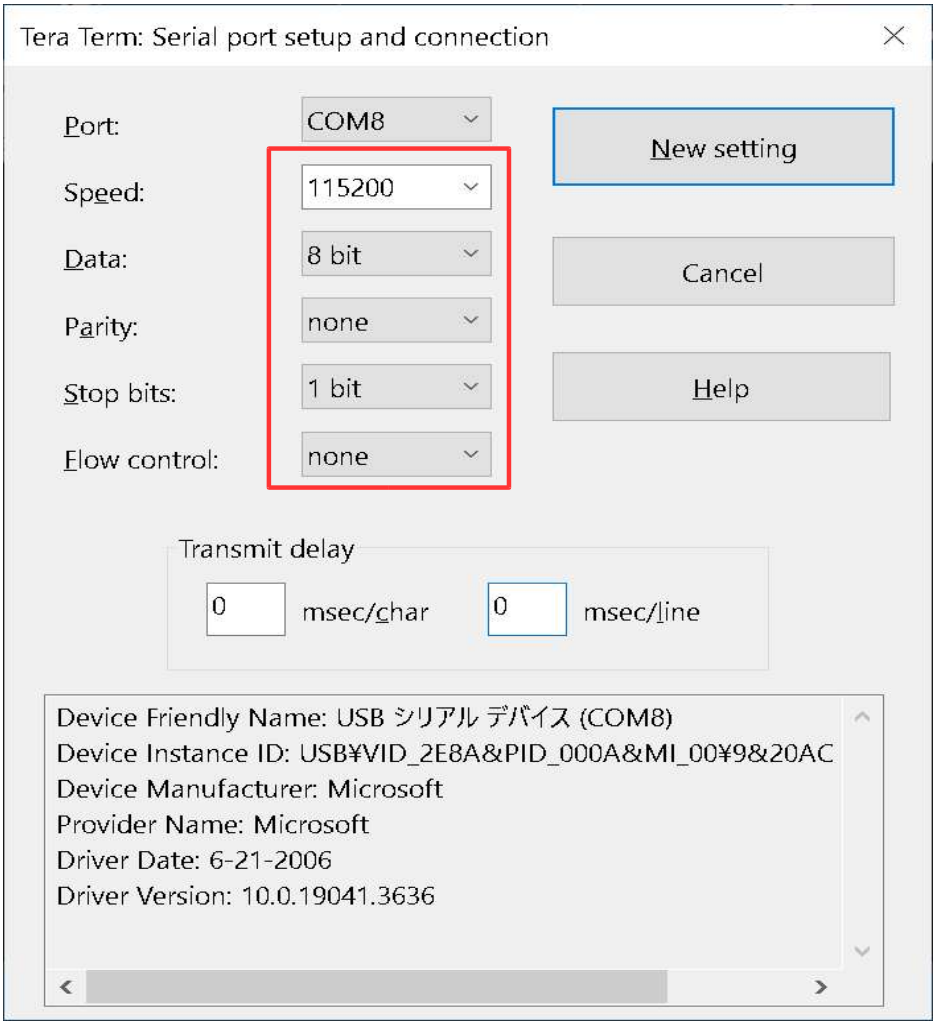
(Turn on the power to Pi Pico without connecting anything to GP2 (pin 4).)

*Tera Term Settings



Select the COM number of Pi Pico.
The COM number will vary depending on your environment.



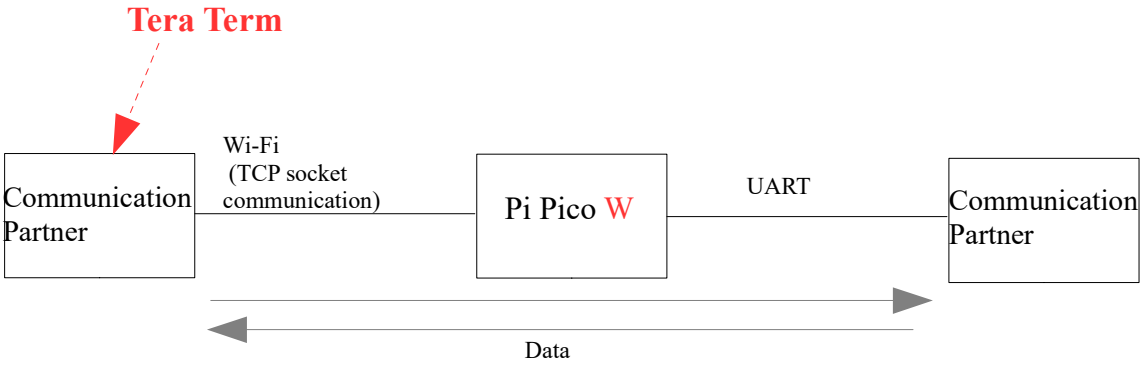


-Supplementary Information

(1) PicoLnCnv handles data in binary, so it does not care whether the data is in character code or not.

(2) The communication partner does not have to be Tera Term.

10.2 Wi-Fi<==>UART



***Preparation**

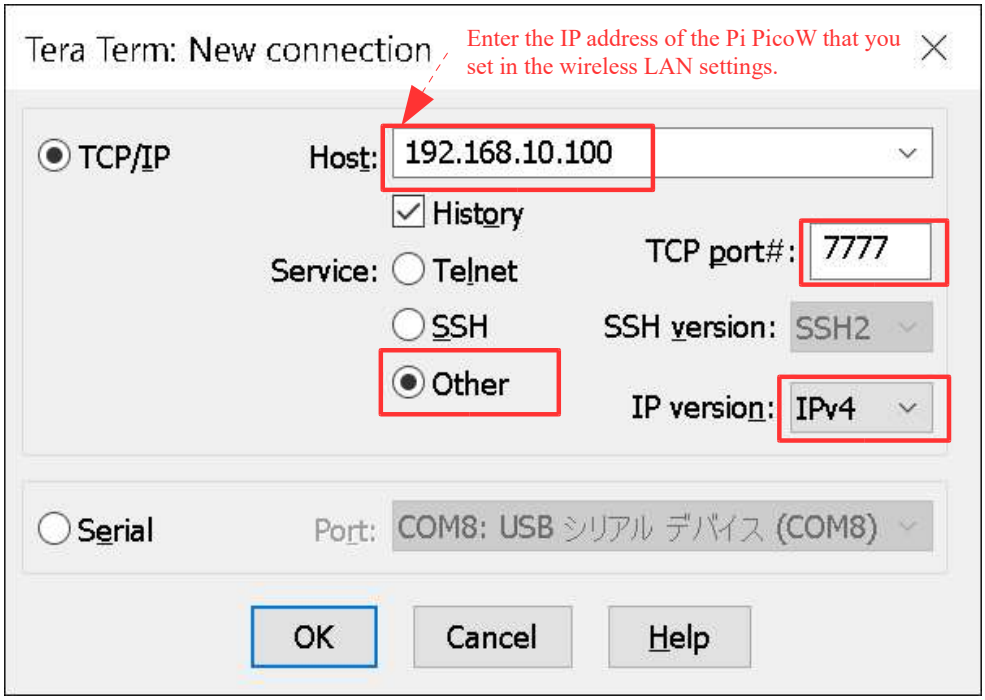
(1) Please complete the Wireless LAN settings in setting mode.

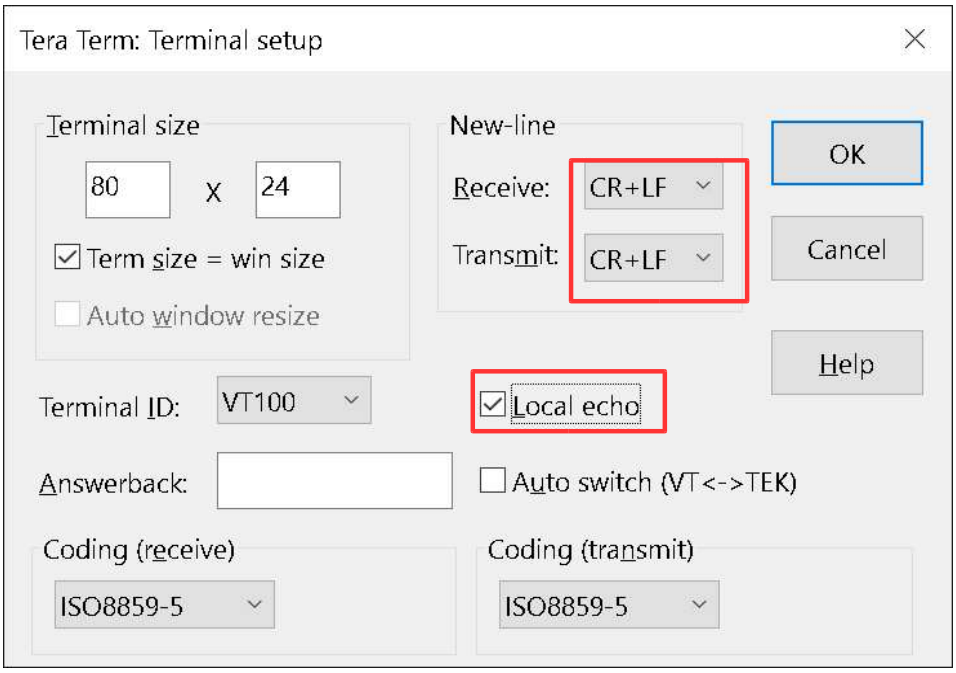
(2) Set Pi Pico to line conversion mode.

(Turn on the power to Pi Pico without connecting anything to GP2 (pin 4).)

(3) Please make sure that the LED on Pi Pico W is lit and not flashing.
(Please make sure that Pi Pico W is connected to the wireless LAN router.)

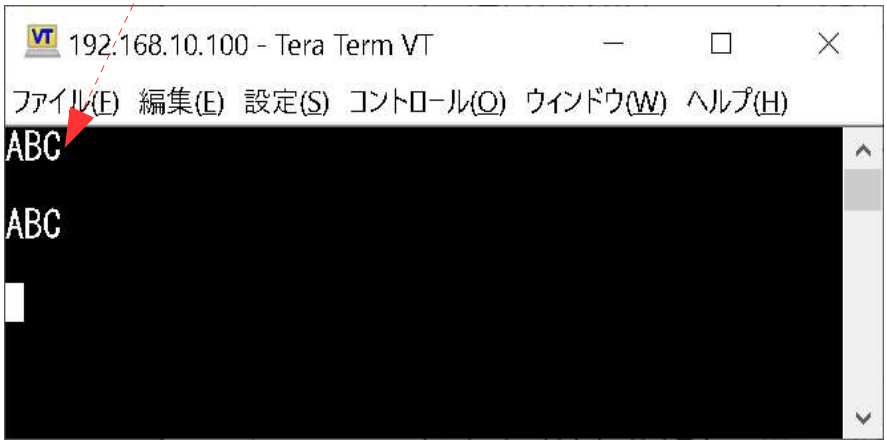
***Tera Term Settings**





-Note

Only in the case of TCP, it seems that you need to press the Enter key when sending from Tera Term. (This is about the behavior on the Tera Term side.)



-Supplementary Information

(1) PicoLnCnv handles data in binary, so it does not care whether the data is in character code or not.

(2) The communication partner does not have to be Tera Term.

11 Other Notes

COM connections take priority over TCP connections.

(Even if a TCP connection is used, if a COM connection is also used, USB<==>UART conversion takes priority.)