

Terra-Berry DAC2

Serial port communication setting manual
at volumio2 & Raspberry Pi3

Notes

This procedure contains volumio modifications. Please be aware that whatever problem happens as a result of following this procedure manual, all responsibility will be attributed to the user who did this.

This procedure manual is based on volumio 2.296. Please also note that it is not always applicable in future versions.

1. Preparation

1-1 Prepare a SD card with the volumio image file written.

Reference information:

SD Card Formatter : SDFormatter (https://www.sdcard.org/downloads/formatter_4/)

SD Image Wrighter : Etcher (<https://etcher.io>)

1-2 Mount SD card on PC

Search for a SD card named “boot” .

1-3 Find and make copies of “config.txt” and “cmdline.txt” , and rename the copy files to “config_org.txt” and “cmdline_org.txt” respectively.

It is a procedure to make it possible to restore them to their original state immediately. If it is unnecessary, you do not have to do it.

1-4 Open config.txt with a text editor and add the following comment to the last line.

```
dtoverlay=pi3-miniuart-bt
```

“dtoverlay=pi3-miniuart-bt” switches the Raspberry Pi 3 Bluetooth function to use the mini UART (ttySo), and restores UART0/ttyAMA0 to GPIOs 14 and 15.

1-5 Open “cmdline.txt” with a text editor and delete the following contents

```
console=serial0,115200 kgdboc=serial0,115200
```

ex.

Contents of the file “cmdline.txt” before deleting

```
splash quiet plymouth.ignore-serial-consoles dwc_otg.lpm_enable=0  
dwc_otg.fiq_enable=1 dwc_otg.fiq_fsm_enable=1 dwc_otg.fiq_fsm_mask=0x3  
console=serial0,115200 kgdboc=serial0,115200 console=tty1  
imgpart=/dev/mmcblk0p2 imgfile=/volumio_current.sqsh elevator=noop rootwait  
smc95xx.turbo_mode=N bootdelay=5 logo.nologo vt.global_cursor_default=0  
loglevel=0
```

After deleting

```
splash quiet plymouth.ignore-serial-consoles dwc_otg.lpm_enable=0  
dwc_otg.fiq_enable=1 dwc_otg.fiq_fsm_enable=1 dwc_otg.fiq_fsm_mask=0x3  
console=tty1  
imgpart=/dev/mmcblk0p2 imgfile=/volumio_current.sqsh elevator=noop rootwait  
smsc95xx.turbo_mode=N bootdelay=5 logo.nologo vt.global_cursor_default=0  
loglevel=0
```

In volumio, the primary UART (serial0) is assigned to the Linux console. To stop this default behaviour, the serial console setting needs to be removed from command line as shown above. These procedures allow the user to use the serial port to communicate with the Terra-Berry DAC2.

Make sure the rest of the line remains the same, as errors in this configuration can stop the Raspberry Pi from booting.

Note : For further information about modifications in “config.txt” and “cmdline.txt” , please refer to a official document “THE RASPBERRY PI UARTS” on Raspberry Pi Foundation website.

(<https://www.raspberrypi.org/documentation/configuration/uart.md>)

2 Enable SSH login

2-1 Boot up Raspberry Pi 3 with Terra-Berry DAC 2 installed.

2-2 Access “ http://volumio.local/dev/ ” by a web browser.

2-3 Find “SSH” and click “enable” .

This procedure enables the remote login by SSH.



3 Remote login by SSH

3-1 Prepare an application to perform SSH login.

ex.

Tera Term (<https://tssh2.osdn.jp/index.html.en>) for Windows PC
Terminal (Available in "Utility" folder as default) for Mac

3-2 Login by ssh

ex. A case of Mac.

Enter "ssh volumio@volumio.local" , and press "enter" key.

Enter "volumio" as password.

After logging in, it is strongly recommended to change password for security reasons. It can be changed by entering a command "passwd" . Please note that you will have to redo from writing to the SD card if password change fails.

It is shown as below if password is changed correctly.

```
volumio@volumio:~$ passwd
Changing password for volumio.
(current) UNIX password:
Enter new UNIX password:
Retype new UNIX password:
passwd: password updated successfully
```

4 Install the terminal application for serial communication

(picocom is recommended)

4-1 Preparation for installation

Execute the following command to update the index of APT library. This may take time.

```
sudo apt-get update
```

Note : When executing the sudo command, you may be prompted for a password as shown below. If you have not changed your password, please enter "volumio", if you changed, please enter the newly registered password.

We trust you have received the usual lecture from the local System Administrator. It usually boils down to these three things:

- #1) Respect the privacy of others.
- #2) Think before you type.
- #3) With great power comes great responsibility.

```
[sudo] password for volumio:
```

4-2 Install picocom

Then execute the following command.

```
sudo apt-get install picocom
```

Note : You can also use minicom instead of picocom. In that case, run "sudo apt - get install minicom" to install minicom and then run "sudo usermod - a - G dialout volumio".

4-3 Reboot and log in again

Then execute the following command.

```
sudo reboot
```

After Raspberry Pi 3 rebooting, please login by SSH again.

5 Operation of picocom

5-1 Confirm that picocom works

Enter the following phrase and press the enter key.

```
picocom -r -l -b9600 /dev/ttyAMA0
```

The following contents should be displayed.

```
volumio@volumio:~$ picocom -r -l -b9600 /dev/ttyAMA0
picocom v1.7

port is      : /dev/ttyAMA0
flowcontrol  : none
baudrate is  : 9600
parity is    : none
databits are : 8
escape is    : C-a
local echo is : no
noinit is    : no
noreset is   : yes
nolock is    : yes
send_cmd is  : sz -vv
receive_cmd is : rz -vv
imap is      :
omap is      :
emap is      : crCrLf,delbs,
```

Terminal ready

5-3 Initialize picocom

Press the Enter key after pressing the period key three times.

...

Nothing is displayed because of echo back is turned off as default. In order to enable echo back, Please enter ". echo" and press the enter key.

5-4 Confirm firmware version of Terra-Berry DAC2 through the serial port

Press the enter key after entering “.hello” .
It should be displayed as below.

```
.hello
:TerraBerryDAC II V01L00(20170516)
```

5-5 Quit picocom

Hold down the control key and enter "ax".

When it is displayed as follows, picocom is quited.

```
Thanks for using picocom
volumio@volumio:~$
```

Note : To quite minicom, please input "azx" while holding down the control key.

=====

The setup and installation instructions are above.

For further infomation about the operation, please refer to "DAC Serial Port Command List" published by Terra Technos Corporation.

http://www.terratechnos.com/products/terraberriyac/dac_command_list.txt

Note : This manual explains installation of Picocom or Minicom. However, please note that it is installed for testing communication with Terra-Berry DAC2 via serial port. Terra Technos Corporation recommends using JavaScript or Python to create a function to communicate with the Terra-Berry DAC2 and implement it in the music player.

Note : This is a manual produced based on experience of one user. It is never an official manual.