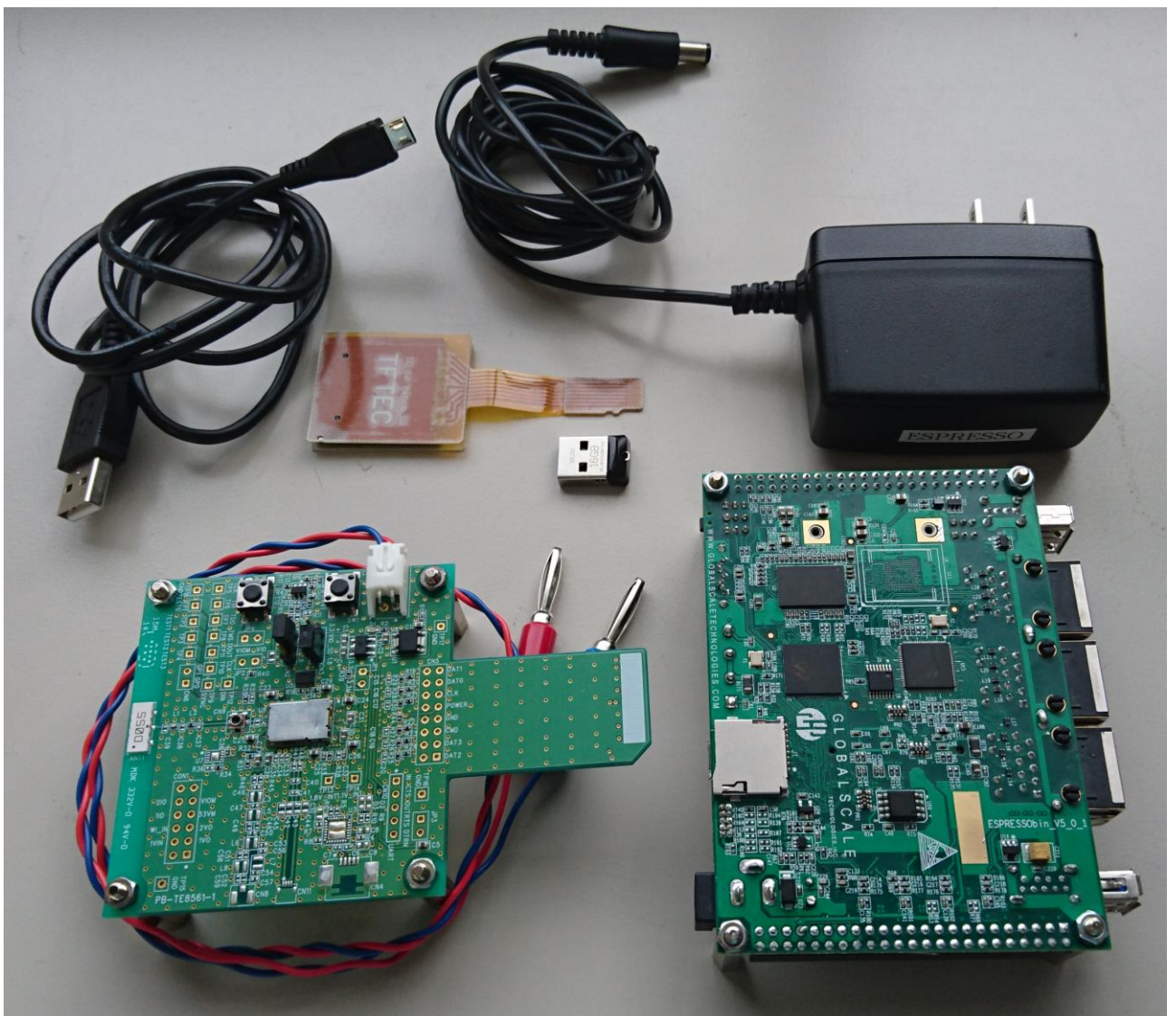


Wireless LAN and Bluetooth® Module Evaluation Kit

WKSBBHVGXG



This evaluation kit is an object for experiment of operation, and does not guarantee quality. Moreover, the conditions of a module of operation are not recommended in the schematic, the parts, the software, etc. currently used for evaluation kit.

WKS BHVGXG

TAIYO YUDEN CO., LTD.

ATTENTION: This module requires device drivers that are under Japan export control. Depending on the customer's country and application (e.g. weapons), TAIYO YUDEN CO., LTD. may not be able to provide these drivers to all customers. Please contact your local TAIYO YUDEN CO., LTD. sales office for additional information.

To contact your local sales office and for additional product information, please visit www.ty-top.com.

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Rev. Records

27-May.2019> Ver.1.0 Release

Introduction

This evaluation kit is developed for communication test of **Wireless LAN** and **Bluetooth®** module which TAIYO YUDEN CO., LTD. develops and sells.

This evaluation kit makes it possible to perform easily the communication test of **Wireless LAN** and **Bluetooth®** module of TAIYO YUDEN CO., LTD..

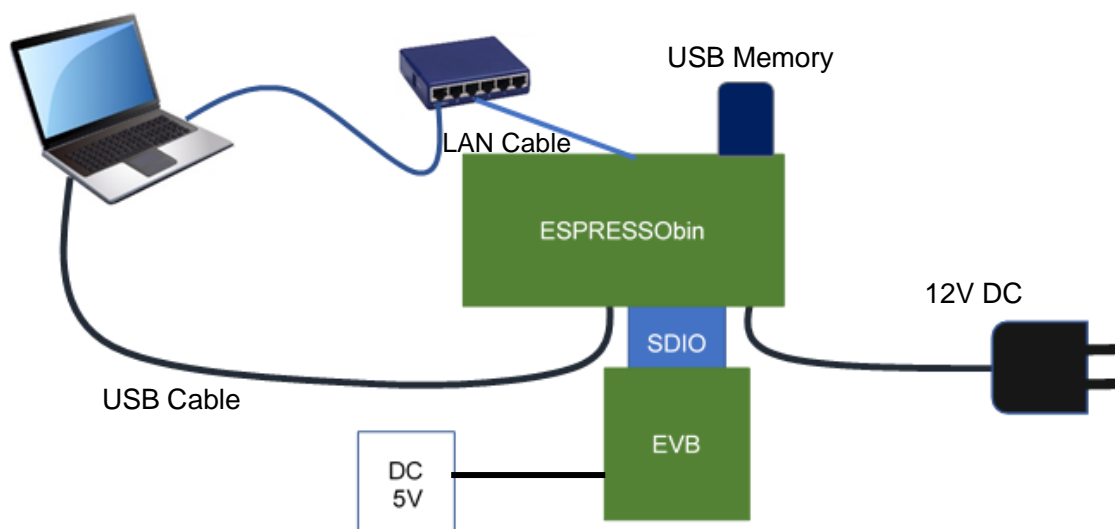
Conformity module

WYSBBHVGXG

Accessories

1	Evaluation Board (WKSBBHVGXG)	1 piece
2	DC Power Cable	1 piece
3	ESPRESSObin	1 piece
4	AC Adapter	1 piece
5	USB Memory	1 piece
6	USB Cable	1 piece
7	SD – Micro SD Conversion Cable	1 piece

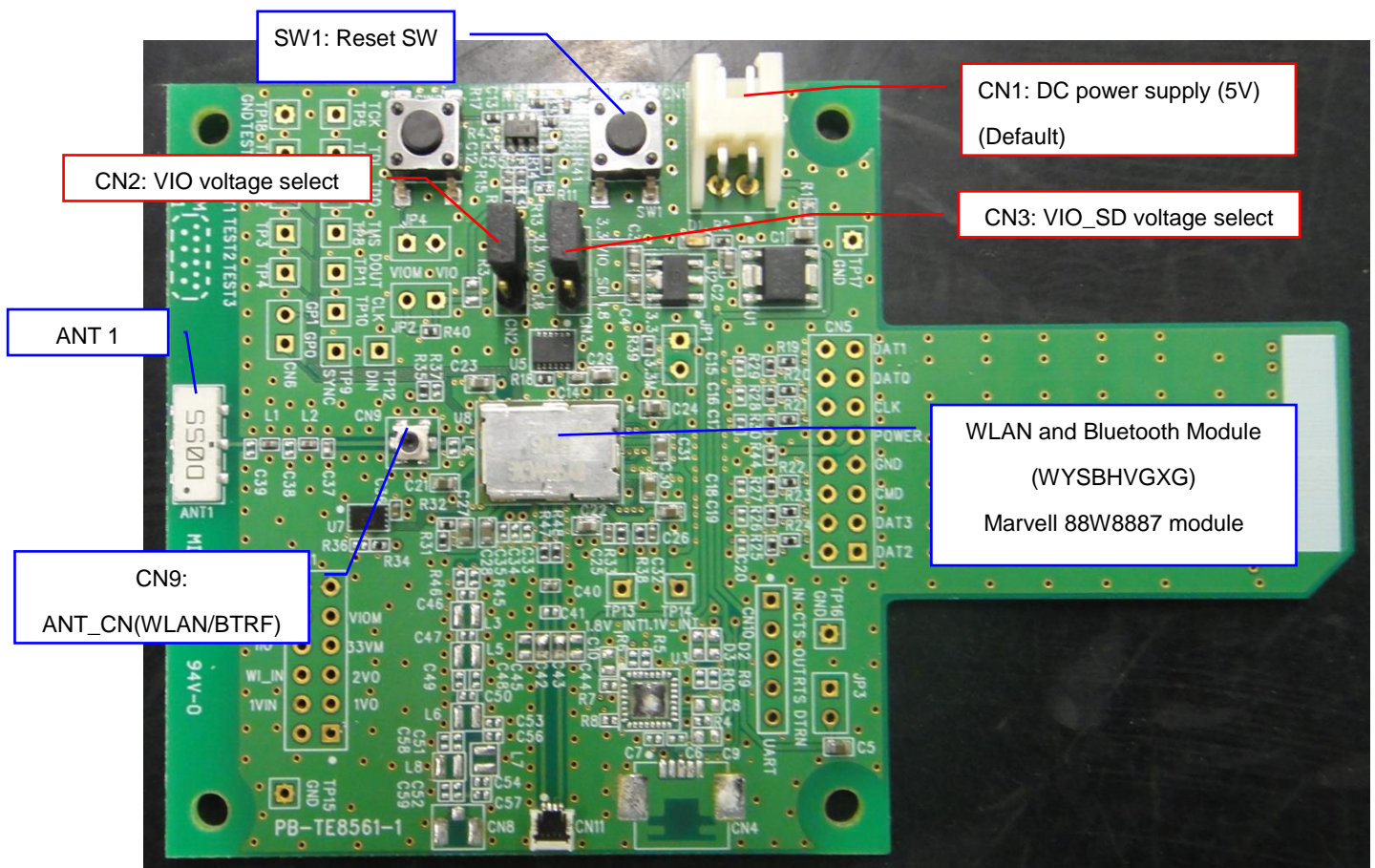
The example of connection



WKSBBHVGXG

TAIYO YUDEN CO., LTD.

Evaluation board layout



Pin description of evaluation board

WBSBBHVGXG

CN1: DC Power Supply

No.	Pin name	Direction	Description
1	5V	Input	5.0V input.
2	GND	GND	Ground

CN2: VIO Voltage Select (Default Setting: 1-2 short.)

No.	Pin name	Direction	Description
1	3.3V	Output	3.3V output.
2	VIO	Input	Input for VIO.
3	1.8V	Output	1.8V output.

CN3: VIO_SD Voltage Select (Default Setting: 2-3 short.)

No.	Pin name	Direction	Description
1	3.3V	Output	3.3V output.
2	VIO	Input	Input for VIO_SD.
3	1.8V	Output	1.8V output.

WKSBBHVGXG

TAIYO YUDEN CO., LTD.

BOM of evaluation board

WBSBBHVGXG

Ref Name	Description	Value	Parts name and standard	Supplier
ANT1	Dual ANTENNA	2.4/5GHz	AH104N2450D1	TAIYO YUDEN CO., LTD.
U1	IC(LDO 3.3V)		S-1172B33-E6T1G	SII or equivalent
U2	IC(LDO1.8V)		S-1170B18UC-OTDTF	SII or equivalent
U3	N.M.			
U4	IC (Reset voltage detector)		TPS3808G01	TI or equivalent
U5	IC(32.768kHz clock)		SG-3030LC	EPSON or equivalent
U7	N.M			
U8	Module		WYSBBHVGXG	TAIYO YUDEN CO., LTD.
SW1	SWITCH		HP03-15AFKP2	Nikkai or equivalent
SW2	SWITCH		HP03-15AFKP2	Nikkai or equivalent
CN1	CONNECTOR		S2B-XH-A	JST or equivalent
CN2	CONNECTOR		PIN_HEADER_S3	
CN3	CONNECTOR		PIN_HEADER_S3	
CN4	N.M.			
CN5	N.M.			
CN6	N.M.			
CN8	N.M.			
CN9	RF CONNECTOR		MM8430-2610	MURATA
CN10	N.M.			
CN11	N.M.			
CON1	N.M.			
JP1	N.M.			
JP2	N.M.			
JP3	N.M.			
JP4	N.M.			
C1	CAPACITOR	4.7uF	LMK107 BJ475KA	TAIYO YUDEN CO., LTD.
C2	CAPACITOR	4.7uF	LMK107 BJ475KA	TAIYO YUDEN CO., LTD.
C3	CAPACITOR	4.7uF	LMK107 BJ475KA	TAIYO YUDEN CO., LTD.
C4	CAPACITOR	4.7uF	LMK107 BJ475KA	TAIYO YUDEN CO., LTD.
C5	CAPACITOR	10uF	JMK107 BJ106MA	TAIYO YUDEN CO., LTD.
C6	N.M.			
C7	N.M.			
C8	N.M.			
C9	N.M.			
C10	N.M.			
C11	CAPACITOR	0.1uF	EMK105 BJ104KV	TAIYO YUDEN CO., LTD.
C12	N.M.	-		
C13	CAPACITOR	0.1uF	EMK105 BJ104KV	TAIYO YUDEN CO., LTD.
C14	RESISTOR	10kohm	MCR01 MZS J 103	ROHM or equivalent
C15	N.M.			
C16	N.M.			
C17	N.M.			
C18	N.M.			
C19	N.M.			
C20	N.M.			
C21	CAPACITOR	10uF	JMK107 BJ106MA	TAIYO YUDEN CO., LTD.
C22	CAPACITOR	10uF	JMK107 BJ106MA	TAIYO YUDEN CO., LTD.
C23	CAPACITOR	10uF	JMK107 BJ106MA	TAIYO YUDEN CO., LTD.

WKS BHVGXG

TAIYO YUDEN CO., LTD.

Ref Name	Description	Value	Parts name and standard	Supplier
C24	CAPACITOR	10uF	JMK107 BJ106MA	TAIYO YUDEN CO., LTD.
C25	CAPACITOR.	10pF	EMK105 CH100J	TAIYO YUDEN CO., LTD.
C26	CAPACITOR	10uF	JMK107 BJ106MA	TAIYO YUDEN CO., LTD.
C27	CAPACITOR	10uF	JMK107 BJ106MA	TAIYO YUDEN CO., LTD.
C28	CAPACITOR	10uF	JMK107 BJ106MA	TAIYO YUDEN CO., LTD.
C29	CAPACITOR	10uF	JMK107 BJ106MA	TAIYO YUDEN CO., LTD.
C30	CAPACITOR	10uF	JMK107 BJ106MA	TAIYO YUDEN CO., LTD.
C31	CAPACITOR	10uF	JMK107 BJ106MA	TAIYO YUDEN CO., LTD.
C32	CAPACITOR.	10pF	EMK105 CH100J	TAIYO YUDEN CO., LTD.
C33	N.M.			
C34	N.M.			
C35	N.M.			
C36	CAPACITOR	0.01uF	EMK105 BJ103KV	TAIYO YUDEN CO., LTD.
C37	INDUCTOR	2.2nH	HK 1005 2N2S	TAIYO YUDEN CO., LTD.
C38-C39	N.M.			
C40	N.M.			
C41	N.M.			
C42	N.M.			
C43	N.M.			
C44-C59	N.M.			
L1	CAPACITOR	0.6pF	EVK105 CH0R6BW	TAIYO YUDEN CO., LTD.
L2	RESISTOR	0ohm	MCR01 MZS J 000	ROHM or equivalent
L3-L8	N.M.			
R1	RESISTOR	0ohm	MCR01 MZS J 000	ROHM or equivalent
R2	RESISTOR	47ohm	MCR01 MZS J 470	ROHM or equivalent
R3	N.M.			
R4	N.M.			
R5	N.M.			
R6	N.M.			
R7	N.M.			
R8	N.M.			
R9	N.M.			
R10	N.M.			
R11	N.M.			
R12	RESISTOR	0ohm	MCR01 MZS J 000	ROHM or equivalent
R13	N.M.			
R14	RESISTOR	300kohm	MCR01 MZS J 304	ROHM or equivalent
R15	RESISTOR	100kohm	MCR01 MZS J 104	ROHM or equivalent
R16	RESISTOR	0ohm	MCR01 MZS J 000	ROHM or equivalent
R17	N.M.			
R18	RESISTOR	0ohm	MCR01 MZS J 000	ROHM or equivalent
R19	RESISTOR.	22ohm	MCR01 MZS J 220	ROHM or equivalent
R20	RESISTOR.	22ohm	MCR01 MZS J 220	ROHM or equivalent
R21	RESISTOR.	22ohm	MCR01 MZS J 220	ROHM or equivalent
R22	RESISTOR.	22ohm	MCR01 MZS J 220	ROHM or equivalent
R23	RESISTOR.	22ohm	MCR01 MZS J 220	ROHM or equivalent
R24	RESISTOR	22ohm	MCR01 MZS J 220	ROHM or equivalent
R25	RESISTOR	47kohm	MCR01 MZS J 473	ROHM or equivalent
R26	RESISTOR	47kohm	MCR01 MZS J 473	ROHM or equivalent
R27	RESISTOR	47kohm	MCR01 MZS J 473	ROHM or equivalent
R28	RESISTOR	47kohm	MCR01 MZS J 473	ROHM or equivalent
R29	RESISTOR	47kohm	MCR01 MZS J 473	ROHM or equivalent
R30	RESISTOR	47kohm	MCR01 MZS J 473	ROHM or equivalent

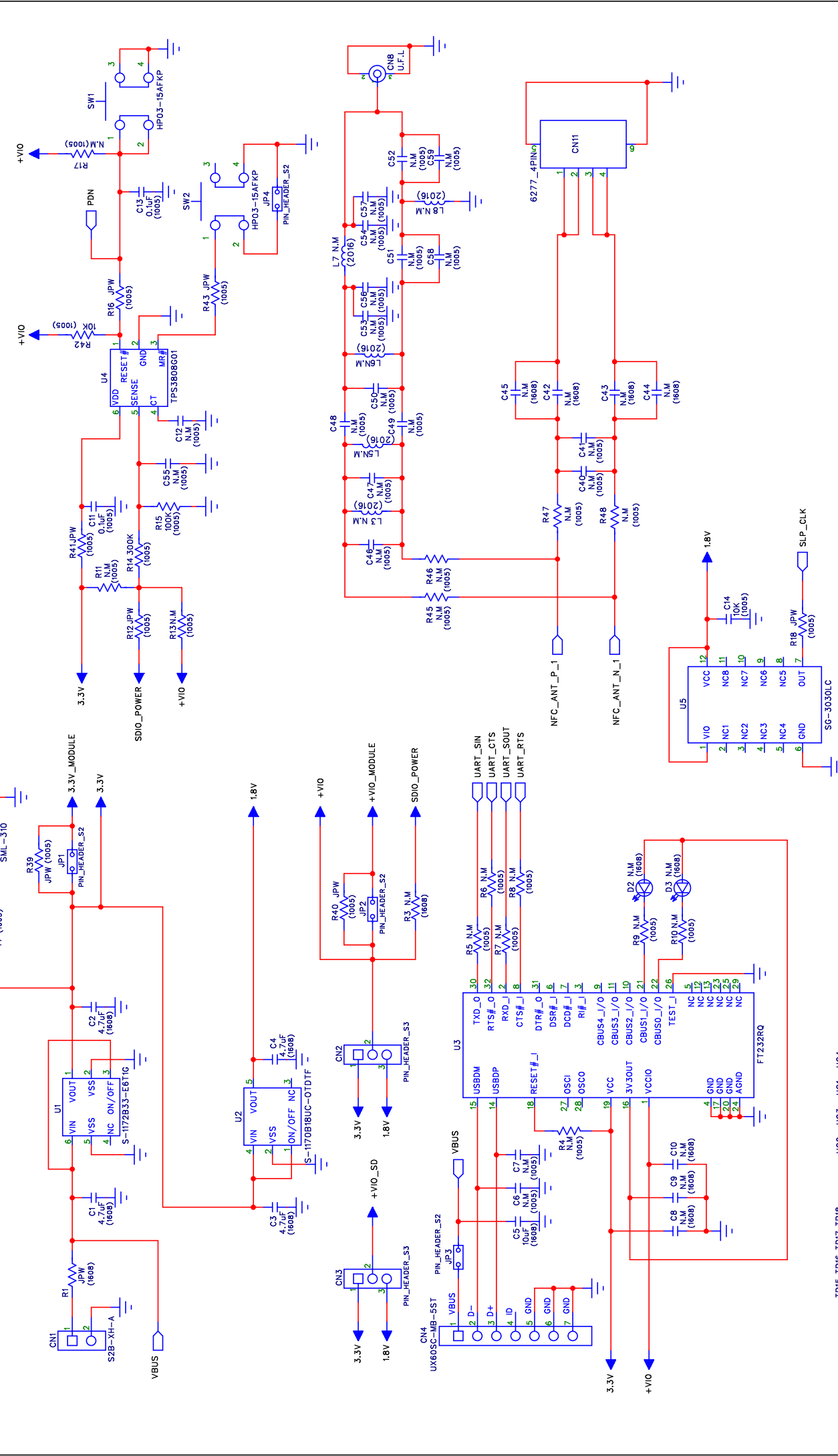
TAIYO YUDEN CO., LTD.

WKS BHVGXG

TAIYO YUDEN CO., LTD.

Ref Name	Description	Value	Parts name and standard	Supplier
R31	RESISTOR	0ohm	MCR01 MZS J 000	ROHM or equivalent
R32	RESISTOR	0ohm	MCR01 MZS J 000	ROHM or equivalent
R33	RESISTOR	0ohm	MCR01 MZS J 000	ROHM or equivalent
R34	RESISTOR	100kohm	MCR01 MZS J 104	ROHM or equivalent
R35	RESISTOR	100kohm	MCR01 MZS J 104	ROHM or equivalent
R36	N.M.			
R37	N.M.			
R38	N.M.			
R39	RESISTOR	0ohm	MCR01 MZS J 000	ROHM or equivalent
R40	RESISTOR	0ohm	MCR01 MZS J 000	ROHM or equivalent
R41	RESISTOR	0ohm	MCR01 MZS J 000	ROHM or equivalent
R42	RESISTOR	100ohm	MCR01 MZS J 104	ROHM or equivalent
R43	RESISTOR	0ohm	MCR01 MZS J 000	ROHM or equivalent
R44	RESISTOR	1kohm	MCR01 MZS J 102	ROHM or equivalent
R45	N.M.			
R46	N.M.			
R47	N.M.			
R48	N.M.			
D1	LED		SML-310	ROHM or equivalent
D2	N.M.			
D3	N.M.			
PCB	PCB		PB-TE8561-1	

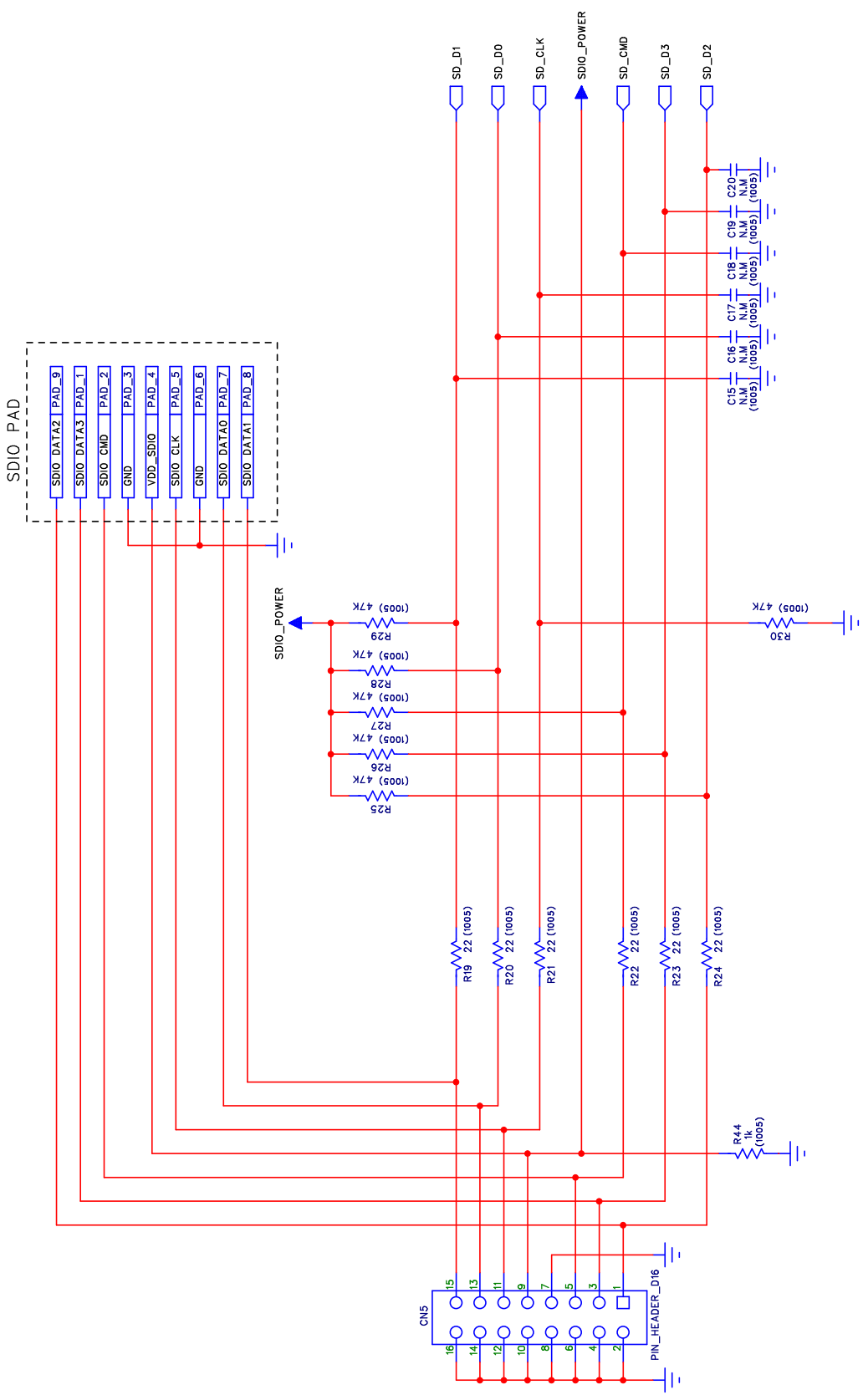
REV	ECO	APPROVED	DESCRIPTION	DATE



APPROVED:	Document No.
CHECKED :	HD-MC-
DRAWN :	BTE8561-1
DESIGNED :	(1/3)

Title	Circuit schematic
TAIYO YUDEN CO.,LTD.	

REV	ECO	APPROVED	DESCRIPTION	DATE



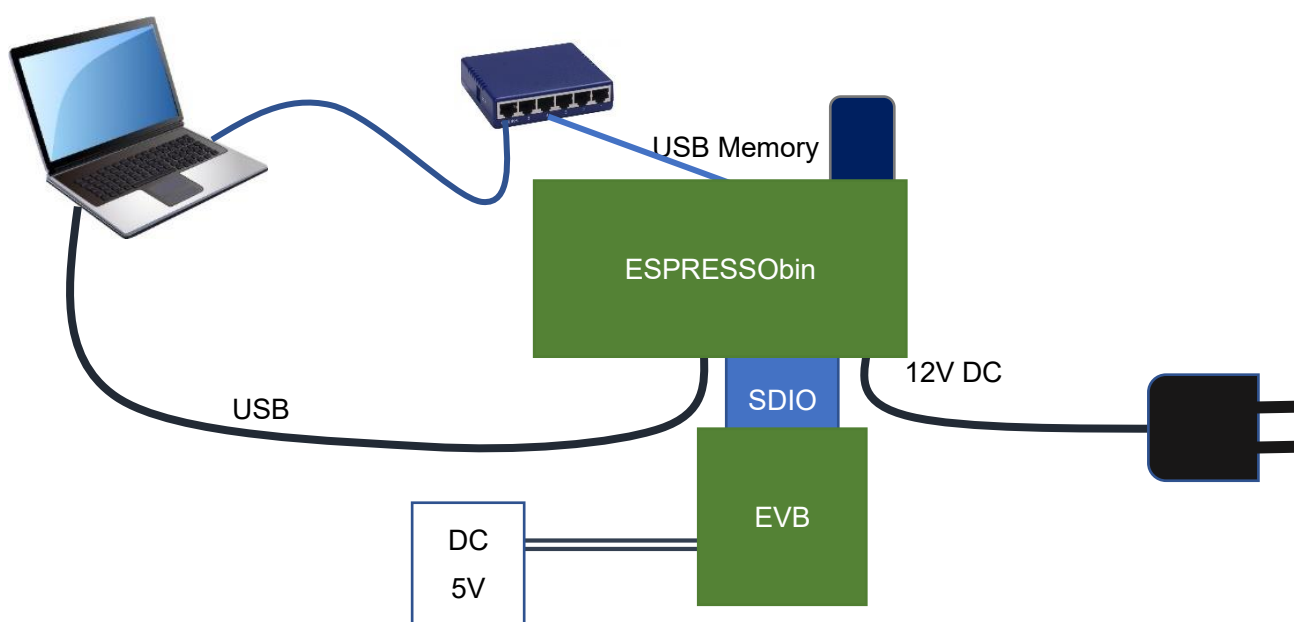
APPROVED:	Title	Document No.
CHECKED :	Circuit schematic	HD-MC-
DRAWN :		BTE8561-1
DESIGNED :		(2/3)

Evaluation guide book of TAIYO YUDEN Wireless Module on the ESPRESSObin (88W8887)

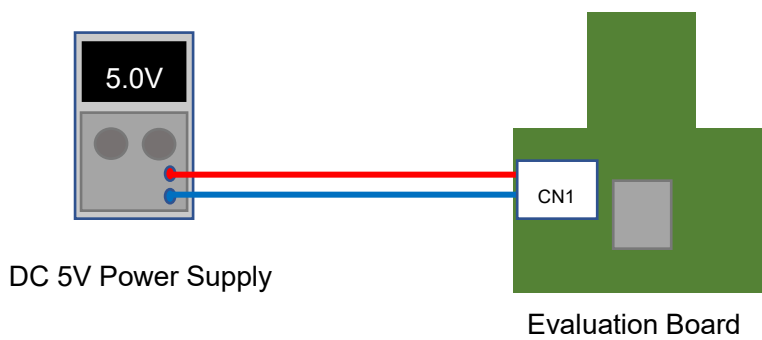
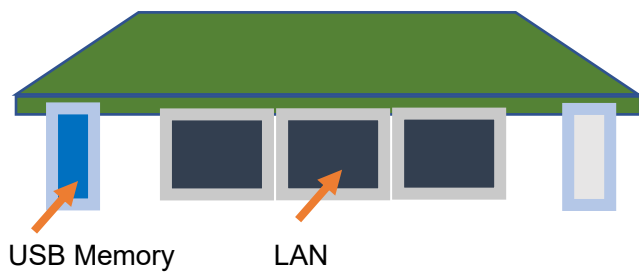
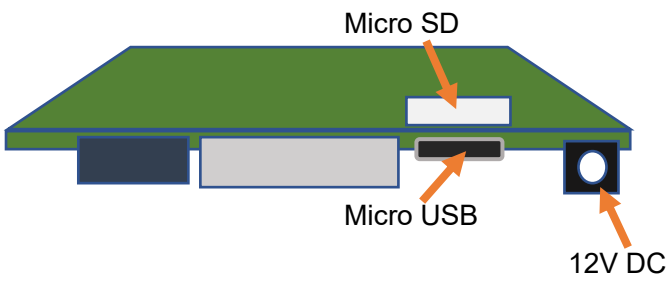
Version 1.1: 24-May-2019

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1. Block Diagram for H/W



Detailed Block Diagram



2. Open serial console on the PC

First connect the ESPRESSObin and the PC with the USB cable.

ESPRESSObin power supply remains OFF.

Open the corresponding port with serial communication software. (terminal software)

Follow the tutorial for your OS to make sure you have everything needed.

Windows:

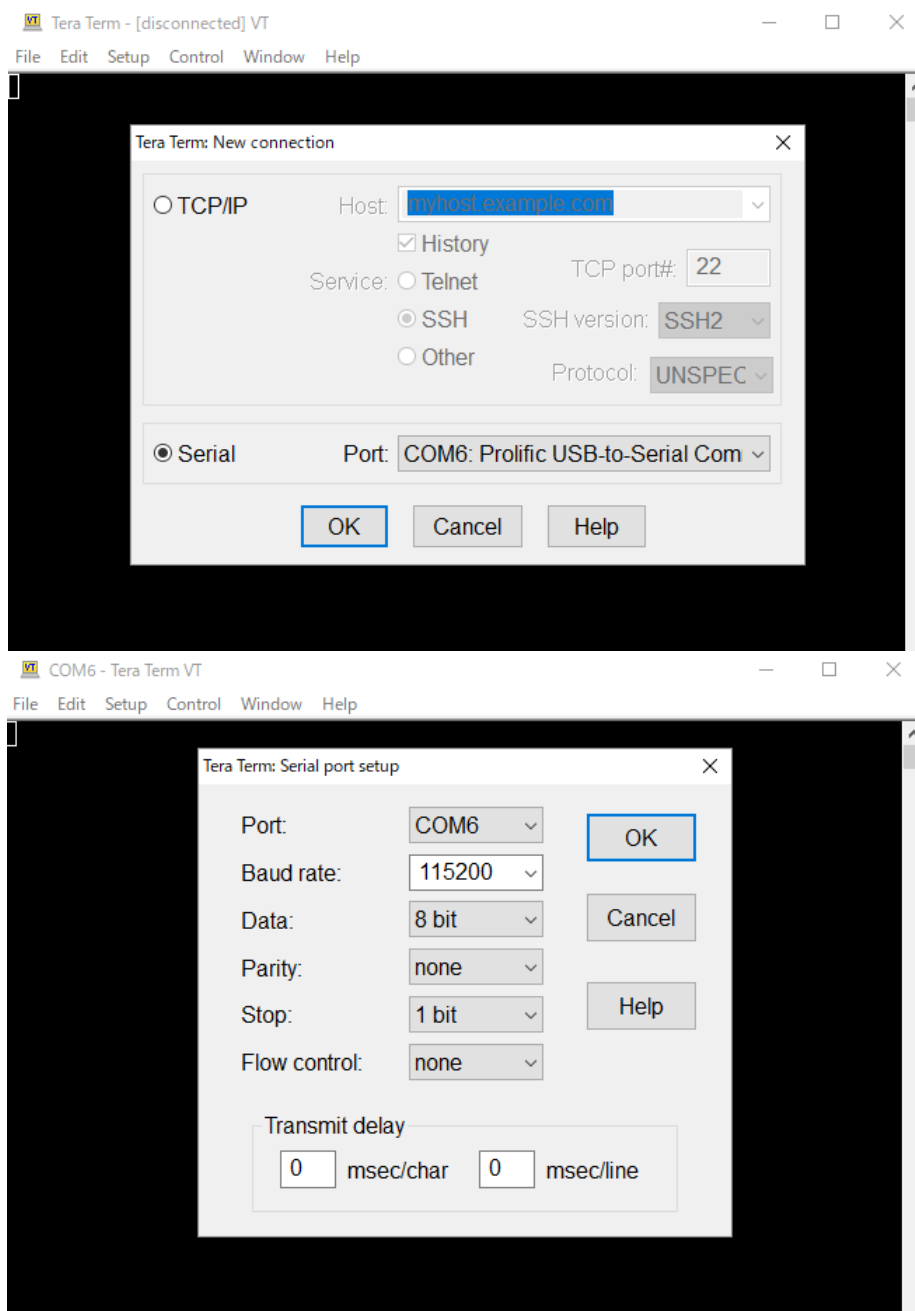
<http://wiki.espressobin.net/tiki-index.php?page=Serial+connection+-+Windows>

Linux

<http://wiki.espressobin.net/tiki-index.php?page=Serial+connection+-+Linux>

For example

Tera Term on the Windows PC



3. Power on the ESPRESSObin

Plug your power adapter to the 12V DC Jack.

When the ESPRESSObin starts to boot, you can check following messages.

```
TIM-1.0
WTMI-armada-17.10.1-b90dbf0
ENTER init_ddrgen
DDR_TOPOLOGY is 4 :    DDR3, 1CS 1G
WTMI_CLOCK=2
    ⏪ (skip)
MMC:   sdhci@d0000: 0, sdhci@d8000: 1
SF: Detected w25q32dw with page size 256 Bytes, erase size 4 KiB, total 4 MiB
Net:   eth0: neta@30000 [PRIME]
Hit any key to stop autoboot:  0
    Please press "ENTER" key when the above message is displayed.
Marvell>>
```

Enter the following in order. (**Blue** letter part)

```
Marvell>> run bootusb
starting USB...
USB0:   Register 2000104 NbrPorts 2
Starting the controller
    ⏪ (skip)
Ubuntu 14.04 LTS localhost.localdomain ttyMV0

localhost login: root (automatic login)

Last login: Thu Jan  1 00:00:20 UTC 1970 on ttyMV0
Welcome to Ubuntu 14.04.5 LTS (GNU/Linux 4.4.8-armada-17.02.2-g8148be9-dirty aarch64)
```

When the ESPRESSObin starts normally, you can check above message.

“bootusb” works with SDIO 3.0. (ultra-high speed)

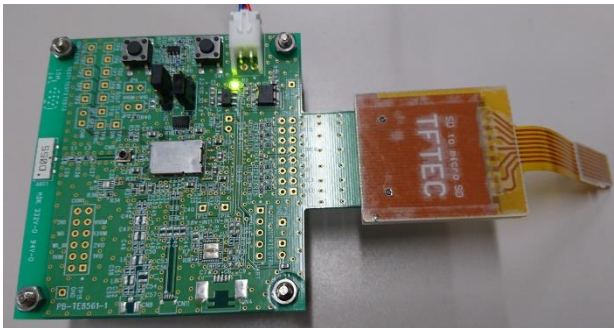
If you want to operate with SDIO 2.0 (high speed), please change to "bootusbH". (**run bootusbH**)

Refer to “6. About SDIO switching” for setting on the evaluation board.

4. Load WLAN and Bluetooth driver

```
root@localhost:~# cd /home/8887/bin_sd8887
root@localhost:/home/8887/bin_sd8887# insmod mlan.ko
root@localhost:/home/8887/bin_sd8887# insmod sd8887.ko cal_data_cfg=none
[ 169.071741] wlan: Loading MWLAN driver
[ 169.076218] wlan: Driver loaded successfully
root@localhost:/home/8887/bin_sd8887# cd ../bin_sd8887_bt/
root@localhost:/home/8887/bin_sd8887_bt# insmod bt8887.ko
[ 178.215970] BT: Loading driver
[ 178.219525] BT: Driver loaded successfully
root@localhost:/home/8887/bin_sd8887_bt#
```

Turn on the power of the 88w8887 evaluation board and insert it into SDIO of ESPRESSObin.



Turn on the power of evaluation board and insert it in SD-Converter.

Insert it in microSD slot of ESPRESSObin.

The evaluation board will be recognized and the following message will be displayed.

```
root@localhost:/home/8887/bin_sd8887_bt# [ 68.499234] vendor=0x02DF device=0x9135 class=0 function=1
[ 68.504945] SDIO: max_segs=128 max_seg_size=65536
[ 68.509804] rx_work=1 cpu_num=2
[ 68.524226] Request firmware: mrvl/sd8887_uapsta_a2.bin
[ 69.651638] WLAN FW is active
[ 74.665275] wlan: version = SD8887-15.68.7.p189-C4X15C605-GPL-(FP68)
[ 74.673418] ahci-mvebu d00e0000.sata: couldn't get PHY in node sata: -517
[ 74.696088] orion-ehci d005e000.usb: init d005e000.usb fail, -517
[ 74.721036] ahci-mvebu d00e0000.sata: couldn't get PHY in node sata: -517
root@localhost:/home/8887/bin_sd8887_bt#
```

When the driver install succeed, you can check “WLAN FW is active” message.

*If “WLAN FW is active” is not displayed, remove the evaluation board from the SD slot, turn the power of the evaluation board on again, and insert it in the SD slot again.

4.1 WLAN operation check

Confirmation of wireless LAN interface

root@localhost:/home/8887/bin_sd8887_bt# iwconfig

```
m1an0 IEEE 802.11-DS ESSID:""  
Mode:Managed Access Point: Not-Associated Bit Rate:1 Mb/s  
Tx-Power=17 dBm  
Retry limit:9 RTS thr=2347 B Fragment thr=2346 B  
Encryption key:off  
Power Management:on  
Link Quality=0/5 Signal level=0 dBm Noise level=0 dBm  
Rx invalid nwid:0 Rx invalid crypt:0 Rx invalid frag:0  
Tx excessive retries:0 Invalid misc:0 Missed beacon:0  
  
wfd0 IEEE 802.11-DS ESSID:""  
Mode:Managed Access Point: Not-Associated Bit Rate:1 Mb/s  
Tx-Power=17 dBm  
Retry limit:9 RTS thr=2347 B Fragment thr=2346 B  
Encryption key:off  
Power Management:on  
Link Quality=0/5 Signal level=0 dBm Noise level=0 dBm  
Rx invalid nwid:0 Rx invalid crypt:0 Rx invalid frag:0  
Tx excessive retries:0 Invalid misc:0 Missed beacon:0  
  
uap0 IEEE 802.11-DS ESSID:""  
Mode:Master Frequency:2.437 GHz Access Point: Not-Associated  
Encryption key:off  
Link Quality:0 Signal level:0 Noise level:0  
Rx invalid nwid:0 Rx invalid crypt:0 Rx invalid frag:0  
Tx excessive retries:0 Invalid misc:0 Missed beacon:0
```

Perform a "scan"

root@localhost:/home/8887/bin_sd8887_bt# iwlist wlan0 scan

wlan0 Scan completed :

Cell 01 - Address: 1C:*.:.:.:.:.:.*

ESSID:"WG1400HP-2G" [4]

Mode:Master

Frequency=2.417 GHz (Channel 2)

Quality:5/5 Signal level:-45 dBm Noise level:-96 dBm

Encryption key:on

Bit Rates:1 Mb/s; 2 Mb/s; 5.5 Mb/s; 11 Mb/s; 6 Mb/s

9 Mb/s; 12 Mb/s; 18 Mb/s; 24 Mb/s; 36 Mb/s

48 Mb/s; 54 Mb/s

Extra:Beacon interval=100

IE: IEEE 802.11i/WPA2 Version 1

Group Cipher : CCMP

Pairwise Ciphers (1) : CCMP

Authentication Suites (1) : PSK

Cell 02 - Address: 1C:*.:.:.:.:.:.*

ESSID:"WG1400HP-5G" [24]

Mode:Master

Frequency=5.18 GHz (Channel 36)

Quality:5/5 Signal level:-42 dBm Noise level:-96 dBm

Encryption key:on

Bit Rates:6 Mb/s; 9 Mb/s; 12 Mb/s; 18 Mb/s; 24 Mb/s

36 Mb/s; 48 Mb/s; 54 Mb/s

Extra:Beacon interval=100

IE: IEEE 802.11i/WPA2 Version 1

Group Cipher : CCMP

Pairwise Ciphers (1) : CCMP

Authentication Suites (1) : PSK

4.2 Bluetooth operation check

Confirmation of wireless Bluetooth interface

```
root@localhost:/home/8887/bin_sd8887_bt# hciconfig
```

```
hci0: Type: BR/EDR Bus: SDIO
```

```
BD Address: AC:3F:A4:84:D1:89 ACL MTU: 1021:7 SCO MTU: 120:6
```

```
UP RUNNING PSCAN
```

```
RX bytes:918 acl:0 sco:0 events:42 errors:0
```

```
TX bytes:1182 acl:0 sco:0 commands:42 errors:0
```

Perform a "inquiry" and "connection"

```
root@localhost:/home/8887/bin_sd8887_bt# hcitool -i hci0 scan
```

```
Scanning ...
```

```
XX:D2:24:BA:9C:02 n/a
```

```
XX:E0:10:E2:48:89 n/a
```

```
XX:CB:57:6A:9A:5C n/a
```

```
E4:A7:A0:4A:C7:42 H00028472-PC
```

```
root@localhost:/home/8887/bin_sd8887_bt# hcitool -i hci0 cc E4:A7:A0:4A:C7:42
```

```
root@localhost:/home/8887/bin_sd8887_bt# hcitool -i hci0 con
```

```
Connections:
```

```
< ACL E4:A7:A0:4A:C7:42 handle 1 state 1 lm SLAVE
```

4.3 wpa_supplicant operation check

```
root@localhost:/home/8887/bin_sd8887_bt# cd /home/wpa_supplicant/
```

```
root@localhost:/home/wpa_supplicant# wpa_supplicant -Dwext -imlan0 -c ./wpa01.conf
```

```
Successfully initialized wpa_supplicant
```

```
rftkill: Cannot open RFKILL control device
```

```
ioctl[SIOCSIWESSID]: Bad address
```

```
mlan0: Trying to associate with 1c:b1:7f:e4:82:22 (SSID='WG1400HP-2G' freq=2417 MHz)
```

```
mlan0: Associated with 1c:b1:7f:e4:82:22
```

```
mlan0: WPA: Key negotiation completed with 1c:b1:7f:e4:82:22 [PTK=CCMP GTK=CCMP]
```

```
mlan0: CTRL-EVENT-CONNECTED - Connection to 1c:b1:7f:e4:82:22 completed [id=0 id_str=]
```

*Please create "conf" file according to your environment and use it.

4.4 hostapd operation check

Confirmation of hostapd is done by loading WLAN driver.

```
root@localhost:~# cd /home/hostapd/bin_sd8887_hostapd/
root@localhost:/home/hostapd/bin_sd8887_hostapd# insmod mlan.ko
root@localhost:/home/hostapd/bin_sd8887_hostapd# insmod sd8887.ko cal_data_cfg=None
[ 48.945206] wlan: Loading MWLAN driver
[ 48.950034] wlan: Driver loaded successfully
root@localhost:/home/hostapd/bin_sd8887_hostapd# [ 67.816250] vendor=0x02DF device=0x9135 class=0
function=1
[ 67.821827] SDIO: max_segs=128 max_seg_size=65536
[ 67.826581] rx_work=1 cpu_num=2
[ 67.833097] Request firmware: mrvl/sd8887_uapsta_a2.bin
[ 68.959540] WLAN FW is active
[ 73.962215] creating custom regulatory domain failed
[ 73.990290] wlan: version = SD8887-15.68.7.p189-C4X15C605-GPL-(FP68)
[ 73.998035] orion-ehci d005e000.usb: init d005e000.usb fail, -517
[ 74.006669] ahci-mvebu d00e0000.sata: couldn't get PHY in node sata: -517
[ 74.049723] orion-ehci d005e000.usb: init d005e000.usb fail, -517
[ 74.057792] ahci-mvebu d00e0000.sata: couldn't get PHY in node sata: -517
```

*Please create "conf" file according to your environment and use it.

```
root@localhost:/home/hostapd/bin_sd8887_hostapd# cd ..
root@localhost:/home/hostapd# hostapd ./test_hostapd.conf
Configuration file: ./test_hostapd.conf
rfkill: Cannot open RFKILL control [ 246.128457] get_channel when AP is not started device
[ 246.137962] get_channel when AP is not started
[ 246.143303] get_channel when AP is not started
uap0: interface state UNINITIALIZED->COUNTRY_UPDATE
Using interface uap0 with hwaddr ac:3f:a4:84:d2:88 and ssid "ESP_AP_test"
[ 246.233170] wlan: Starting AP
[ 246.248426] wlan: AP started
[ 246.253711] Set AC=3, txop=47 cwmin=3, cwmax=7 aifs=1
[ 246.259356] Set AC=2, txop=94 cwmin=7, cwmax=15 aifs=1
[ 246.265744] Set AC=0, txop=0 cwmin=15, cwmax=63 aifs=3
[ 246.271371] Set AC=1, txop=0 cwmin=15, cwmax=1023 aifs=7
uap0: interface state COUNTRY_UPDATE->ENABLED
uap0: AP-ENABLED
uap0: STA e4:a7:a0:4a:c7:3e IEEE 802.11: associated ← Connection from client (station)
uap0: AP-STA-CONNECTED e4:a7:a0:4a:c7:3e
uap0: STA e4:a7:a0:4a:c7:3e RADIUS: starting accounting session 00000041-00000000
uap0: STA e4:a7:a0:4a:c7:3e WPA: pairwise key handshake completed (RSN)
```


5. Manufacturing utility (MFG)

*Please restart ESPRESSObin before MFG operation.

5.1 Wired network settings



Windows PC
192.168.1.100



```
root@localhost:~# ifconfig eth0 up
root@localhost:~# ifconfig lan0 192.168.1.10 up
You can set the IP address arbitrarily.
```

5.2 Load WLAN and Bluetooth driver with MFG firmware

```
root@localhost:~# cd /home/8887/bin_sd8887
root@localhost:/home/8887/bin_sd8887# insmod mlan.ko
root@localhost:/home/8887/bin_sd8887#
insmod sd8887.ko cal_data_cfg=none mfg_mode=1 fw_name=mrvl/sdio8887_sdio_combo.bin
[ 127.544784] wlan: Loading MWLAN driver
[ 127.552974] wlan: Driver loaded successfully
root@localhost:/home/8887/bin_sd8887# cd ../bin_sd8887_bt/
root@localhost:/home/8887/bin_sd8887_bt# insmod bt8887.ko
[ 287.204131] BT: Loading driver
[ 287.207515] BT: Driver loaded successfully
```

Turn on the power of the evaluation board and insert it into SDIO of ESPRESSObin.

```
root@localhost:/home/8887/bin_sd8887_bt#
[ 328.904607] vendor=0x02DF device=0x9135 class=0 function=1
[ 328.912467] SDIO: max_segs=128 max_seg_size=65536
[ 328.917119] rx_work=1 cpu_num=2
[ 328.925621] Request firmware: mrvl/sdio8887_sdio_combo.bin
[ 329.963455] WLAN FW is active
[ 329.985829] IOCTL failed: fffffc038154800 id=0x20000, sub_id=0x20006 action=1, status_code=0x2
[ 329.994793] set mac address failed! status=-1, error_code=0x2
[ 330.011301] wlan: version = SD8887-0.0.0.p0-C4X15C605-GPL-(FP68)
[ 330.021305] ahci-mvebu d00e0000.sata: couldn't get PHY in node sata: -517
[ 330.030038] orion-ehci d005e000.usb: init d005e000.usb fail, -517
[ 330.053699] ahci-mvebu d00e0000.sata: couldn't get PHY in node sata: -517
[ 330.069738] orion-ehci d005e000.usb: init d005e000.usb fail, -517
```

5.3 Run "MFG Bridge" application

```
root@localhost:/home/8887/bin_sd8887_bt# cd ../bin_mfgbridge/  
root@localhost:/home/8887/bin_mfgbridge# ./mfgbridge  
UART: initialize ...  
Can't get port settings: Input/output error  
NET: initialize ...  
NET: socket bind is completed!  
NET: initialization is completed.  
NET: server port: 9930  
NET: client port: 9931
```

Execute "DutApi_w8887_BrdigeEth.exe" on the Windows PC side.
 (Please refer to "8887_MFG_Bridge_User_Guide" for details. It can be download from the following.
<https://www.yuden.co.jp/ut/product/category/module/lineup.html#WLAN>)

```

NET: new connection from 192.168.1.100
Initialize drvwrapper ....
no nfc /dev/mnfcchar0no nfc /dev/mfmchar0Initialize drvwrapper for BT ....
DRV: driver is initialized.
NET: socket FD = 5
NET: receive a packet (bytes = 40
BRDG: process Rx msg ...
NET: WLAN command.
DRV: send host cmd thr ioctl
DRV: host cmd is completed
NET: send a msg.
NET: the msg is sent.
NET: socket FD = 5
NET: receive a packet (bytes = 36
BRDG: process Rx msg ...
NET: WLAN command.
DRV: send host cmd thr ioctl
DRV: host cmd is completed
NET: send a msg.
NET: the msg is sent.
NET: socket FD = 5
NET: receive a packet (bytes = 0
NET: close client socket
De-Initialize drvwrapper for BT...
De-Initialize drvwrapper ....
NET: socket FD = 4
NET: new connection from 192.168.1.100
Initialize drvwrapper ....
no nfc /dev/mnfcchar0no nfc /dev/mfmchar0Initialize drvwrapper for BT ....
DRV: driver is initialized.
NET: socket FD = 5
NET: receive a packet (bytes = 16
BRDG: process Rx msg ...
HCI Command
Rx Event E for 09 10
In Cmd 09 10
NET: send a msg.
NET: the msg is sent.
    
```

```

Name:      Dut labtool
Version:   2.0.0.96
Date:      May 2 2017 (11:53:53)

Note:
1. =====WiFi tool=====
2. =====BT tool=====
3. =====FM tool=====
4. =====NFC tool=====

Enter CMD 99 to Exit
Enter option: 1
    
```

```

Enter option: 1
Name:      DutApiClass
Interface: EtherNet
Version:   2.0.0.96
Date:      May 2 2017 (11:53:34)

Note:
C:\Users\jyt0011083\Downloads\ESPRESSO\bin\MFG-W8887-MF-WIFI-BT-FM-BRG-FC-WIN-X86-2.0.0.96-15.2.7.p123\bin\release
\setup.ini
Dut's IP 192.168.1.10:9930
Host's IP 192.168.1.100:9931
DutIf_UdpIp::delay 0
DutIf_UdpIp::vg_IfSpy 0
TCP connecting...
DutIf_InitConnection: 0

-----
W87xx (802.11a/g/b/n/ac) TEST MENU
-----
Enter option:
    
```

```

-----
W87xx (802.11a/g/b/n/ac) TEST MENU
-----
Enter option: 45
DutIf_GetMACAddress: 0x00000000
DutIf_GetMACAddress: ac.3f.a4.84.d1.88
Enter option:
    
```

```

Enter option: 99
Exiting
DutIf_Disconnection: 0
1. =====WiFi tool=====
2. =====BT tool=====
3. =====FM tool=====
4. =====NFC tool=====

Enter CMD 99 to Exit

Enter option: 2
Name:      DutApiClass
Interface: Version:   2.0.0.96
Date:      May 2 2017 (11:53:36)

Note:
C:\Users\jyt0011083\Downloads\ESPRESSO\bin\MFG-W8887-MF-WIFI-BT-FM-BRG-FC-WIN-X86-2.0.0.
\setup.ini
Dut's IP 192.168.1.10:9930
Host's IP 192.168.1.100:9931
DutIf_UdpIp::delay 0
DutIf_UdpIp::vg_IfSpy 0
TCP connecting...
Dut_Bt_OpenDevice: 0x00000000

-----
W87xx (BT) TEST MENU
-----
Enter option: 45
45
Dut_Bt_GetBDAddress: 0x00000000
BD_ADDRESS: AC-3F-A4-84-D1-89
Enter option:
    
```

6. About SDIO switching

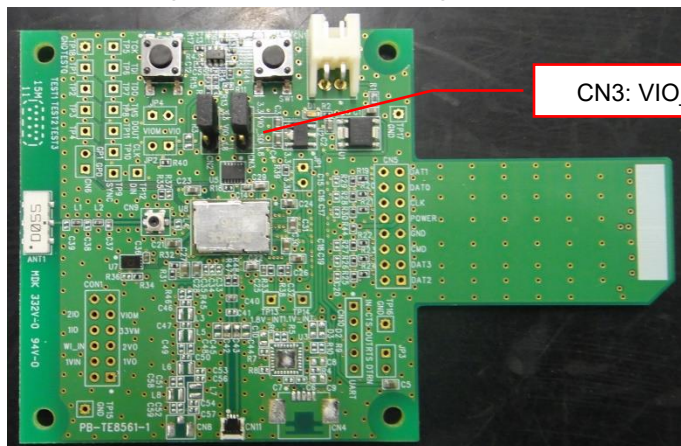
This is the setting of SDIO bus speed switching on each evaluation board.

CN3: VIO_SD Voltage Select

No.	Pin name	Direction	Description
1	3.3V	Output	3.3V output. (high speed)
2	VIO	Input	Input for VIO_SD.
3	1.8V	Output	1.8V output. (ultra-high speed)

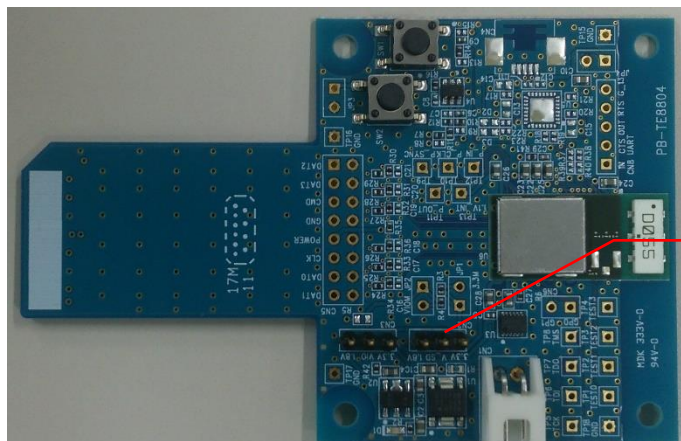
Setting: 1-2 short -> high speed

Setting: 2-3 short -> ultra-high speed



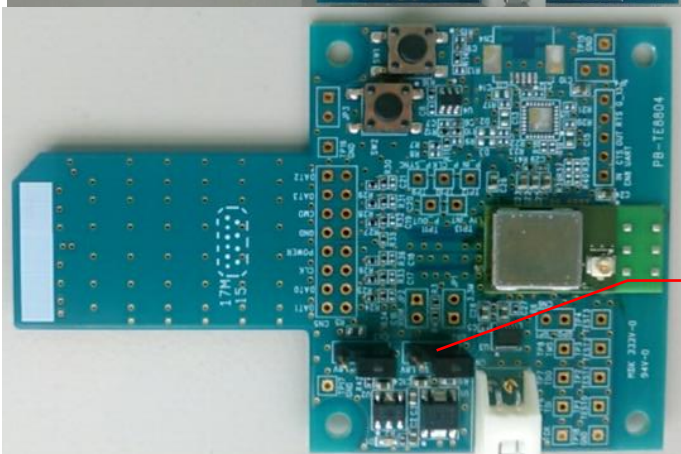
CN3: VIO_SD

WBSBHVXG



CN2: VIO_SD

WBSAGVDXG



CN2: VIO_SD

WBSEGVDXG