DRIFTER GPC SETUP PROCEDURE

This procedure outlines a protocol for configuring the FOX D27 GPC on the Drifter platform for normal use.

https://www.acmesystems.it/doc_foxd27

1. Copy the image from a working image.
    a. sudo dd if=/dev/sdb of=/home/eric/Desktop/fox_card.img bs=4M status=progress
    b. sudo dd if=/home/eric/Desktop/fox_card.img of=/dev/sdb bs=4M status=progress
2. Plug in TTL UART into serial console port header. 115200, 8,N,1
3. Set shutdown switch to 5V and plug in USB port to power board.
4. Login is user: acme/Password: acmesystems
5. repartition to fill card
    a. sudo fdisk -l
    b. sudo fdisk -l /dev/mmcblk0
    c. sudo apt update
    d. sudo apt install parted
    e. sudo parted /dev/mmcblk0
        i. (parted) resizepart 2
            1. 100%
        ii. ‘q’ to quit
    f. resize the filesystem
        i. sudo resize2fs /dev/mmcblk0p2
    g. sudo reboot
6. Install python
    a. sudo apt update
    b. sudo apt install python3-libgpiod
7. Set a fixed IP address
    a. edit /etc/network/interfaces.d/eth0 with “sudo nano /etc/network/interfaces.d/eth0
    b. Comment out the code that’s there with ‘#’ on the first four lines.
    c. Add the following code:

```
auto eth0
iface eth0 inet static
  address 192.168.9.1
  netmask 255.255.255.0
  gateway 192.168.9.90
```

    d. reboot by running ‘sudo halt’ and pulling power once shut down followed by repowering.
    e. verify ip address is 192.168.9.1 with ‘sudo ifconfig’
        i. Note sometimes I set to 192.168.8.207 (default gateway 192.168.8.1) to get on internet and be on the same subnet as the computer.
8. Set up an ssr account
    a. sudo adduser ssr
    b. sudu passwd ssr (set to Jameswebb18-)

c. sudo usermod -a -G sudo,users ssr
d. sudo halt and log back in as ssr

9. Install Samba
    a. mkdir Share
    b. sudo apt update
    c. sudo apt upgrade
    d. sudo apt install samba
    e. whereis samba (check if successful) should output samba: /usr/sbin/samba
        i. Create a directory that samba will point to eg. sudo mkdir /home/ssr/Share
    f. edit configuration file in /etc/samba/smb.conf with “sudo nano /etc/samba/smb.conf”
    g. Add the following at the beginning of the file after [global]

[global]
oplocks = no
level2 oplocks = no

```
[sambashare]
    comment = Samba on Ubuntu
    path = /home/username/sambashare
    read only = no
    browsable = yes
```

[sambashare]
comment = Samba on Ubuntu
path = /home/ssr/Share
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    h. restart samba for configuration to take effect “sudo service smbd restart”
    i. UPdate firewall rules to allow samba traffic “sudo ufw allow samba” (probably don’t need this’
    j. give read write access to all users for the mapped directory using chmod 777 eg. “sudo chmod 777 /home/ssr/Share”
    k. set the samba username and password to the system account “sudo smbpasswd -a ssr”
    l. reboot with ‘sudo halt’ and pull power and restart
    m. Test Samba
        i. With an ethernet cable connect a laptop
        ii. Disable WiFi
        iii. On Laptop Configure ethernet settings IPV4

1. Use Following
    a. IP Address 192.168.9.9
    b. Subnet Mask: 255.255.255.0
    c. Default Gateway: 192.168.9.90

iv. In Putty connect to 192.168.9.1 (Default Drifter IP address) or in linux ssh ssr@192.168.9.1

v. Map Network Drive \\192.168.9.1\sambashare

10. Install libgpiod
    a. "`sudo apt update`"
    b. "`sudo apt install python3-libgpiod`"
11. Install minicom
    a. sudo apt update
    b. sudo apt install -y minicom
    c. sudo minicom -s
12. Reconfigure the Device Tree
13. Install the Arm Crossplatform Toolchain ON A PC with UBUNTU or in VirtualBox
    a. sudo apt update
    b. sudo apt install libc6-armel-cross libc6-dev-armel-cross binutils-arm-linux-gnueabi libncurses5-dev build-essential bison flex libssl-dev bc
    c. sudo apt install gcc-arm-linux-gnueabihf g++-arm-linux-gnueabihf
    d. Install SSH client to allow copying files to board
        i. sudo apt update
        ii. sudo apt install openssh-client
        iii. Test connection with sudo ssh ssr@192.168.8.217
        iv. 'exit' to close ssh
            1. to copy files to the linux device via ssh use
                a. scp hello ssr@[your_board_ip]:/home/ssr/hello
    e. Install the kernel resources
        i. wget https://www.kernel.org/pub/linux/kernel/v4.x/linux-4.19.134.tar.xz
        ii. tar xvfJ linux-4.19.134.tar.xz
        iii. cd linux-4.19.134
    f. Install git
        i. sudo apt update
        ii. sudo apt install git
    g. Install a local git repository for acme files
        i. git init; git add .; git commit -m "Linux vanilla"; git branch acme; git checkout acme
        ii. If git credentials not set up set them up (eg. eberkenpas…)
        iii. wget https://raw.githubusercontent.com/AcmeSystems/acmepatches/master/linux-4.19.x.patch
        iv. patch -p1 < linux-4.19.x.patch
    h. make ARCH=arm CROSS_COMPILE=arm-linux-gnueabihf- acme-roadrunner-10uart.dtb

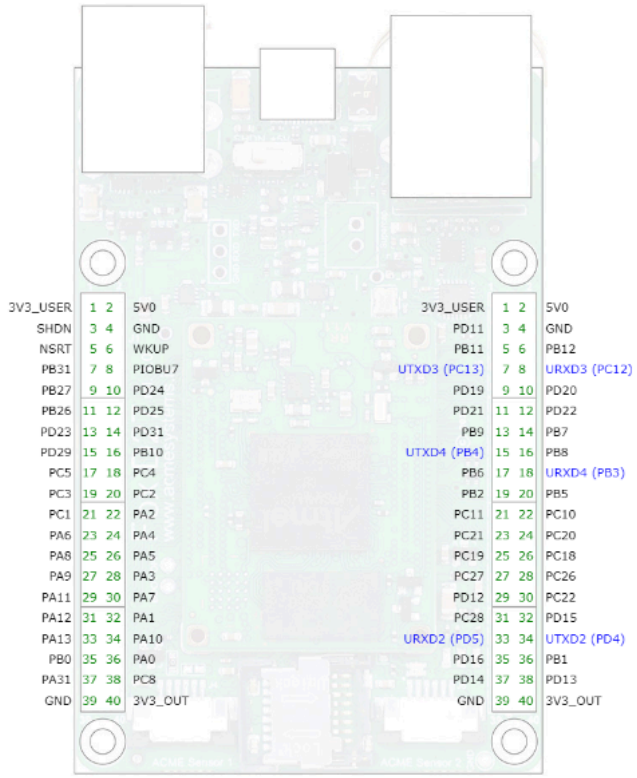
i. copy acme-roadrunner-10uart.dtb to /boot/ directory on the FOX D27
    i. scp acme-roadrunner-10uart.dtb:/boot/acme-roadrunner-10uart.dtb
j. backup acme-roadrunner.dtb on the Roadrunner platform
    i. ssh ssr@192.168.8.217
    ii. cd /boot
    iii. sudo cp acme-roadrunner.dtb acme-roadrunner-original.dtb
k. overwrite acme-roadrunner.dtb with the new one
    i. sudo cp acme-roadrunner-10uart.dtb acme-roadrunner.dtb
l. reboot platform
    i. sudo reboot
m. log back into platform

14. Check comms with drifter controller
    a. sudo minicom -o -b 57600 -D /dev/ttyS2
15. Install serial python libraries
    a. Download pyserial
        i. curl -O https://files.pythonhosted.org/packages/1e/7d/ae3f0a63f41e4d2f6cb66a5b57197850f919f59e558159a4dd3a818f5082/pyserial-3.5.tar.gz
        ii. tar -xzf pyserial-3.5.tar.gz
        iii. cd pyserial-3.5
        iv. sudo python3 setup.py install
        v. Check version python3
            1. import serial
            2. serial.VERSION
        vi. install GPIOD library for GPIOS
            1. sudo apt update
            2. sudo apt install python3-libgpiod
    b. Add current user to dialout to give serial permission
        i. sudo usermod -a -G dialout $USER
        ii. reboot for new settings to take effect
            1. sudo reboot
16. Make ssr a root user that doesn't need to enter a password for a sudo call
    a. sudo visudo
    b. Add the following to the last line:
        i. ssr ALL=(ALL) NOPASSWD: ALL
    c. Check if settings are good by using:
        i. sudo -u ssr sudo whoami
17. Configure GPCstart.py to run on boot.
    a. copy the 'gpc_start.service' file to the /etc/systemd/system/ folder
        i. go to the driftersystem folder
        ii. sudo cp gpc_start.service /etc/systemd/system/gpc_start.service
    b. Enable and Start the service
        i. Reload the systemd manager to recognize the new service
            1. sudo systemctl daemon-reload

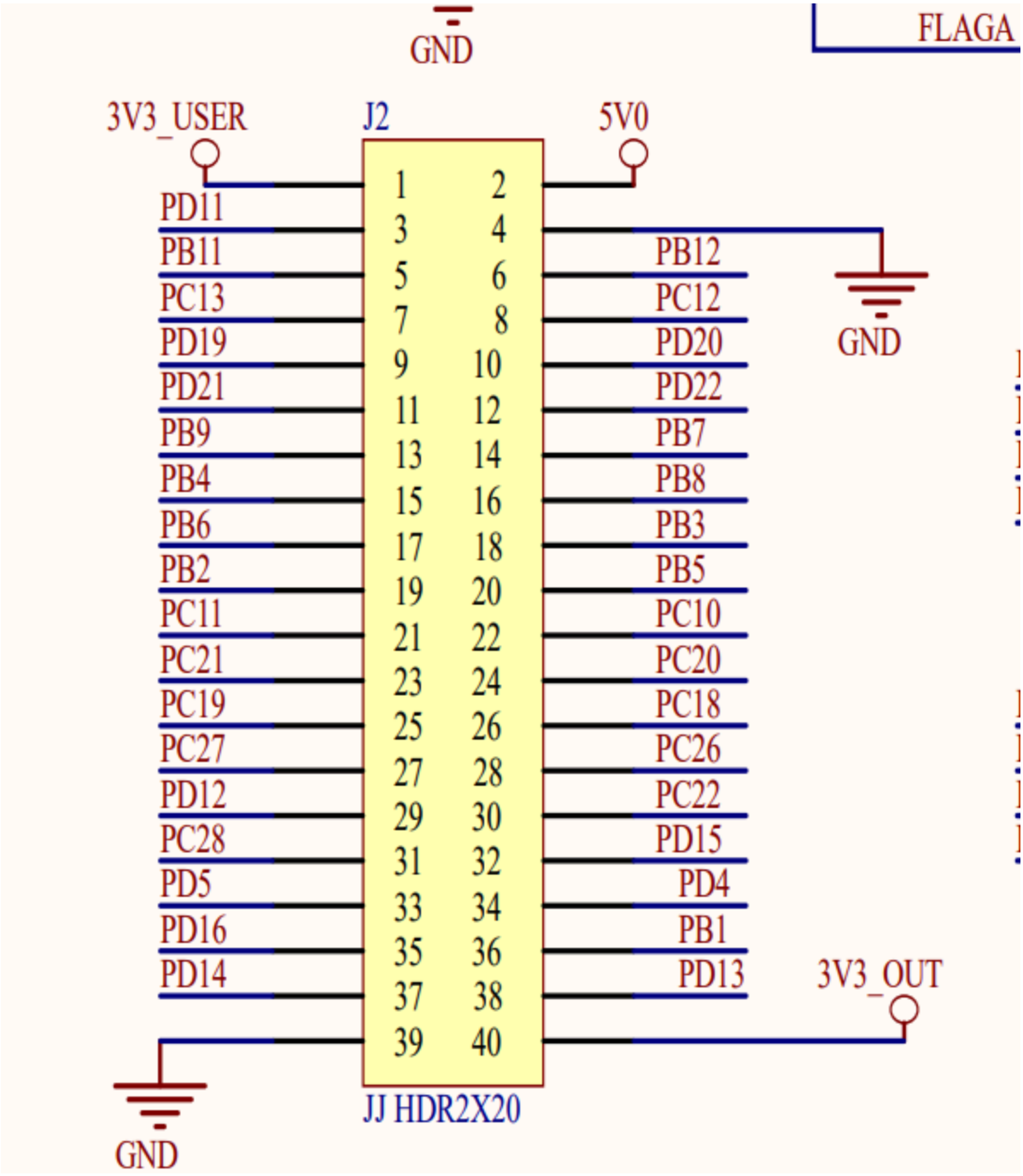
ii. Enable the service so that it starts on boot
    1. sudo systemctl enable gpc_start.service
    2. sudo systemctl disable gpc_start.service (to disable)
iii. Start the service to immediately test it
    1. sudo systemctl start gpc_start.service
    2. sudo systemctl stop gpc_start.service
iv. Check the status of your service to verify it is actively running
    1. sudo systemctl status gpc_start.service

18. Create the “Data” folder to save all data files.
    a. cd /home/ssr/Share
    b. sudo mkdir Data
    c. sudo chmod -R 777 /home/ssr/Share/Data
19. Configure “drifterterm” for execution (allows user to enter terminal mode on the drifter controller.
    a. Go to driftersystem directory
        i. cd /home/ssr/Share/driftersystem
    b. Make the drifterterm file executable
        i. sudo chmod +x drifterterm
    c. Copy this file to /usr/local/bin
20. Configure downloadDataScript bash file be executable and copy to the same folder.

Pinout FOX Board D27



- [ ] UART0 IOSet1
- [ ] UART1 IOSet1 (Debug port)
- [x] UART2 IOSet1 - [ ] IOSet2 - [ ] IOSet3
- [x] UART3 IOSet1 | [ ] UART3 IOSet2 | [ ] UART3 IOSet3
- [x] UART4 IOSet1
- [ ] FLEXCOM0 IOSet1
- [ ] FLEXCOM1 IOSet1
- [ ] FLEXCOM2 IOSet1
- [ ] FLEXCOM3 IOSet1
- [ ] FLEXCOM4 IOSet1
- [ ] TWI0 (PD21,PD22)
- [ ] TWI0 (PB31,PC0)
- [ ] TWI0 (PC27,PC28)
- [ ] TWI0 FLEXCOM0 (PC29,PC30)
- [ ] TWI1 (PD4,PD5)
- [ ] TWI1 (PD19,PD20)
- [ ] TWI1 (PC6,PC7)
- [ ] SPI0 (PA15,PA16,PA14,PA17,PA18,PA19,PA20)
- [ ] SPI0 (PB0,PA31,PB1,PA30,PA29,PA27,PA28)


GND
FLAGA
3V3_USER
J2
5V0
1
2
PD11
3
4
PB11
5
6
PB12
PC13
7
8
PC12
GND
PD19
9
10
PD20
PD21
11
12
PD22
PB9
13
14
PB7
PB4
15
16
PB8
PB6
17
18
PB3
PB2
19
20
PB5
PC11
21
22
PC10
PC21
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PC20
PC19
25
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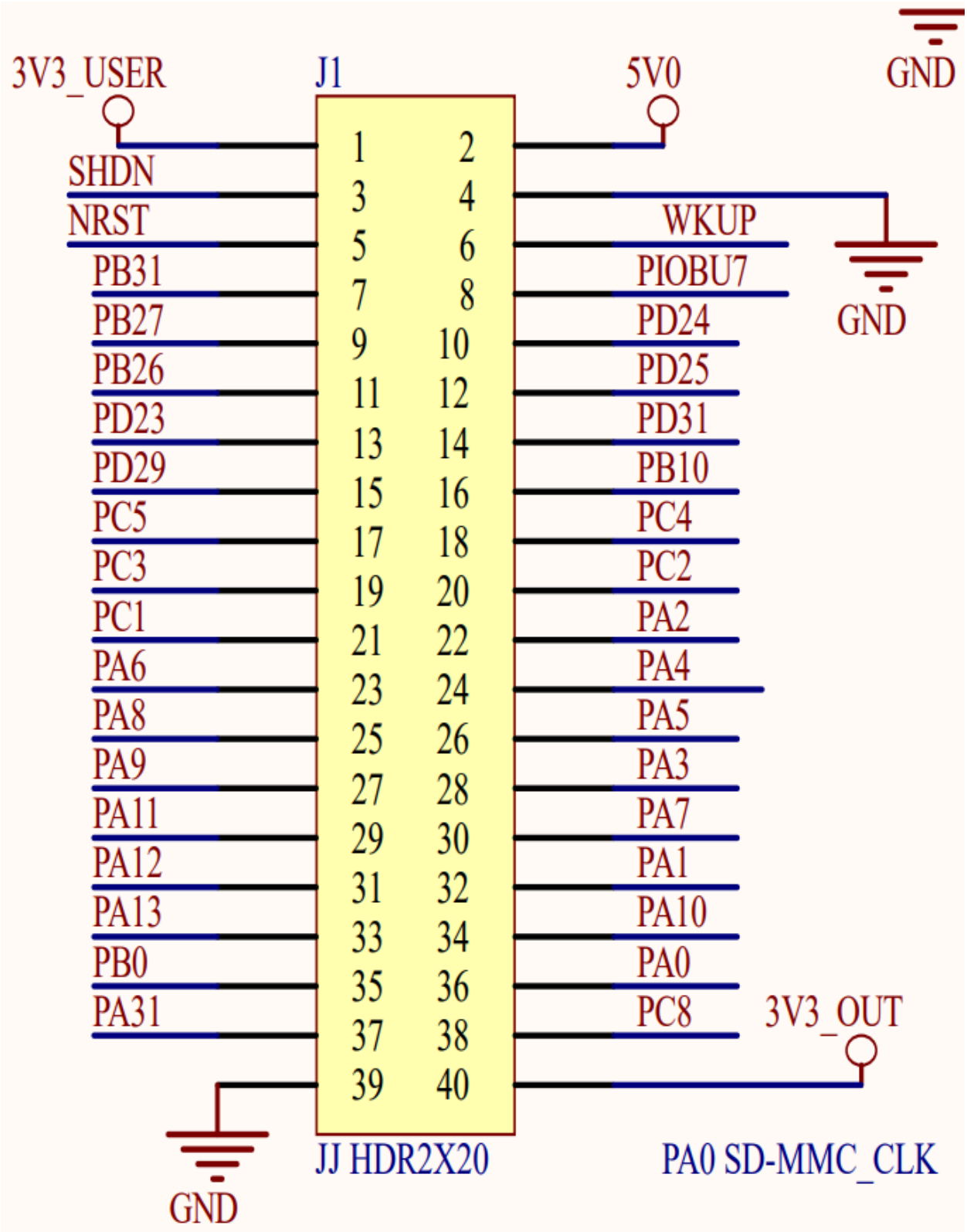
PC18
PC27
27
28
PC26
PD12
29
30
PC22
PC28
31
32
PD15
PD5
33
34
PD4
PD16
35
36
PB1
PD14
37
38
PD13
3V3_OUT
39
40
GND
JJ HDR2X20


3V3_USER
J1
5V0
GND
1
2
SHDN
3
4
NRST
5
6
WKUP
PB31
7
8
PIOBU7
GND
PB27
9
10
PD24
PB26
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PD25
PD23
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PD31
PD29
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PB10
PC5
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PC4
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PC1
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PA2
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PA4
PA8
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PA5
PA9
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PA3
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PA7
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PA1
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PA10
PB0
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PA0
PA31
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PC8
3V3_OUT
39
40
GND
JJ HDR2X20
PA0 SD-MMC_CLK