Recovering Piksi

Recovering Piksi after flashing an unbootable firmware image

Overview

Due to the open nature of Swift devices, it is possible in the course of development to lose communication with Piksi® due to issues with settings or problems with custom firmware images. This guide is intended to help developers recover their Piksi. Piksi's on-board bootloader has the capability to boot into a failsafe mode that either allows a user to have access to a primitive bootloader or to reverts to the second most recent firmware that existed on the board. This is achieved through configuring a series of jumpers on the board during boot. In most cases, users can boot into the second most recent firmware image that existed on the board and then perform a firmware upgrade to a known good firmware as opposed to a development version in order to recover their piksi module. The steps to achieve that recover are below.

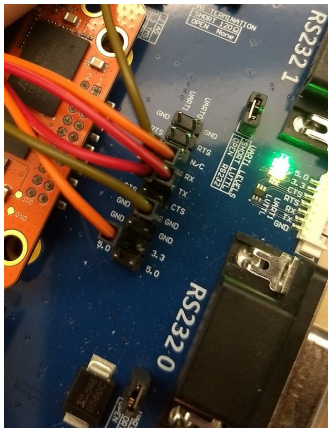
Prerequisites

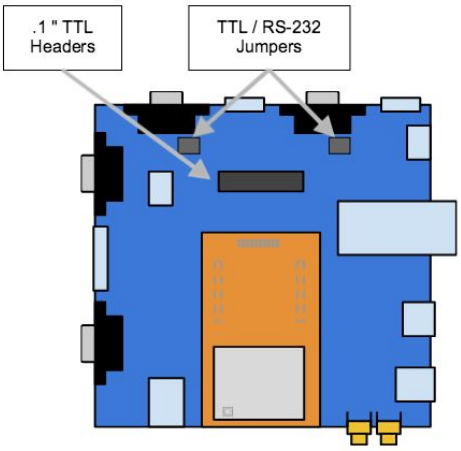
Please make sure to attempt to reset Piksi to the default settings (see the "reset to Default Settings" article) prior to attempting any of these recover steps.

- 3 .1 inch jumper cables. These cables will be used in the ttl level uart headers on the piksi multi evaluation board
- A USB flashdrive with empty contents except a known good firmware from Swift Navigation.
    - Please obtain the firmware from our piksi firmware downloads support page
        - NOTE: only firmware images prior to and including v2.0.2 can be used to recover the device

Procedure:

- With power off, mate both TTL level jumpers for RS232 1 and RS232 0 on your board. These jumpers change the UART signaling on the evaluation board from RS-232 levels to TTL levels.





- Configure the jumpers wires on the TTL level header as indicated in the image above and the table below

	UART1 header row	UART0 header row	Image wire color	Logic state
Jumper 1	TX	TX	Red	
Jumper 2	RX	GND	Brown	UART 1 RX Pulled Down

Jumper 3	3.3V	RX	Orange	UART 0 RX Pulled Up (pulled up internally)

- Reset your Piksi
    - Your Piksi should boot into the second most recent firmware that was on the board
- Connect to your Piksi over the micro-usb interface and note the firmware version via the swift console “firmware update” tab
- Close your swift console
- Prepare a usb flash drive with the latest released firmware and mate with the evaluation board
- Press the reset button your evaluation board
- Re-open the swift console over the micro-usb interface
- When you see the messages in the Swift console indicating that the firmware update has completed
    - Remove the usb flash drive.
    - Remove all of the 0.1” jumpers
    - Reset your piksi
- Your piksi should boot into the firmware from the usb flash drive

Failsafe mode More info

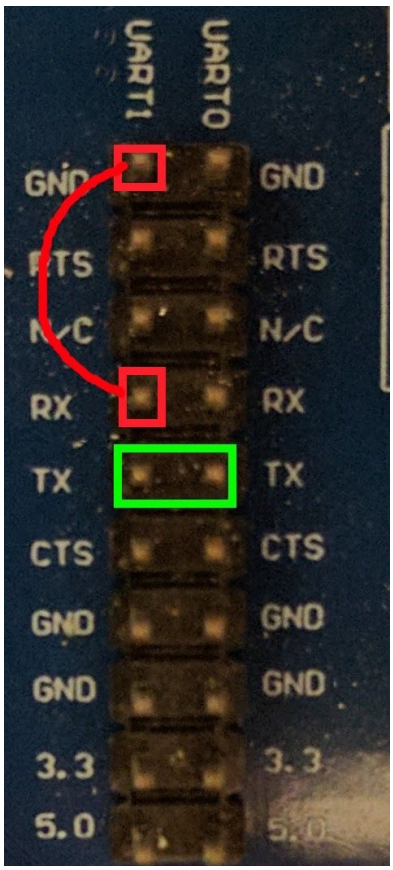
For some more background information, the Red wire above that connects UART1 tx to UART0 tx indicates to the low-level bootloader on Piksi that it should boot into an unconventional mode. This unconventional mode reads the state of the RX lines on both UARTS as a truth table to decide in what configuration to continue booting. The truth table is listed below.

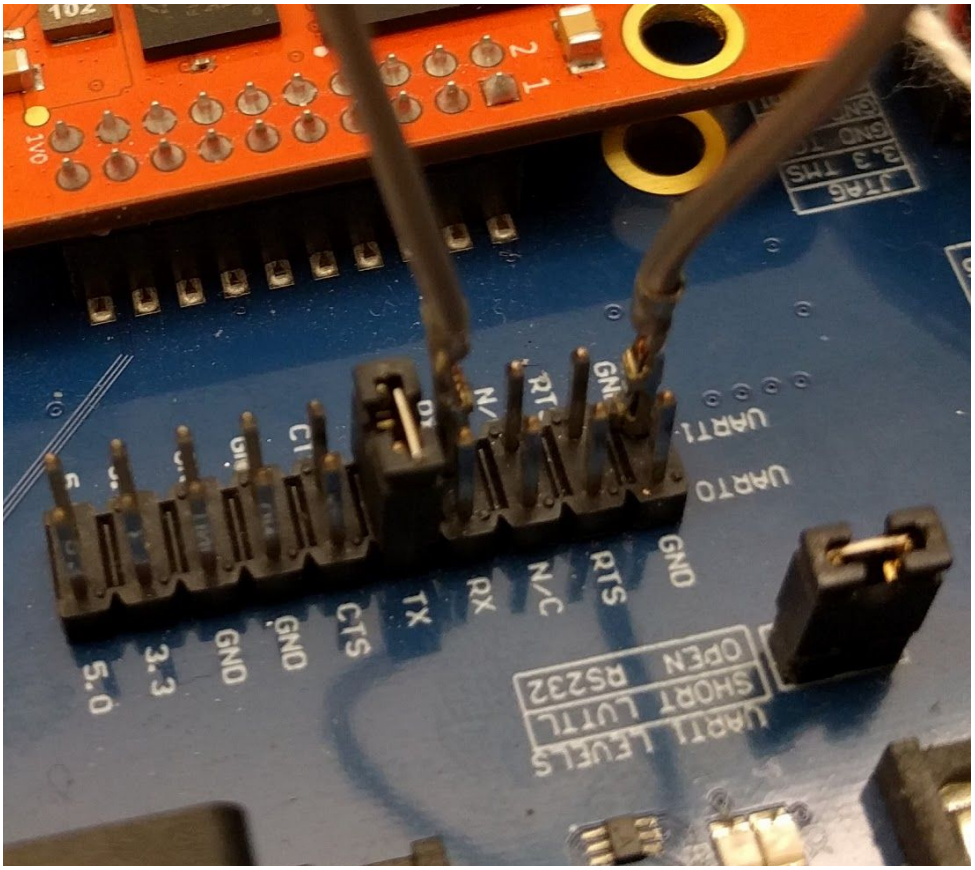
Boot Mode	UART0 RX	UART1 RX	Notes
Failsafe image B	Pulled Down	Pulled Down	
Failsafe image A	Pulled Down	Pulled Up	U-boot
Second most recent firmware image	Pulled Up	Pulled Down	
Most recent firmware image	Pulled Up	Pulled Up	

Simplified Wiring

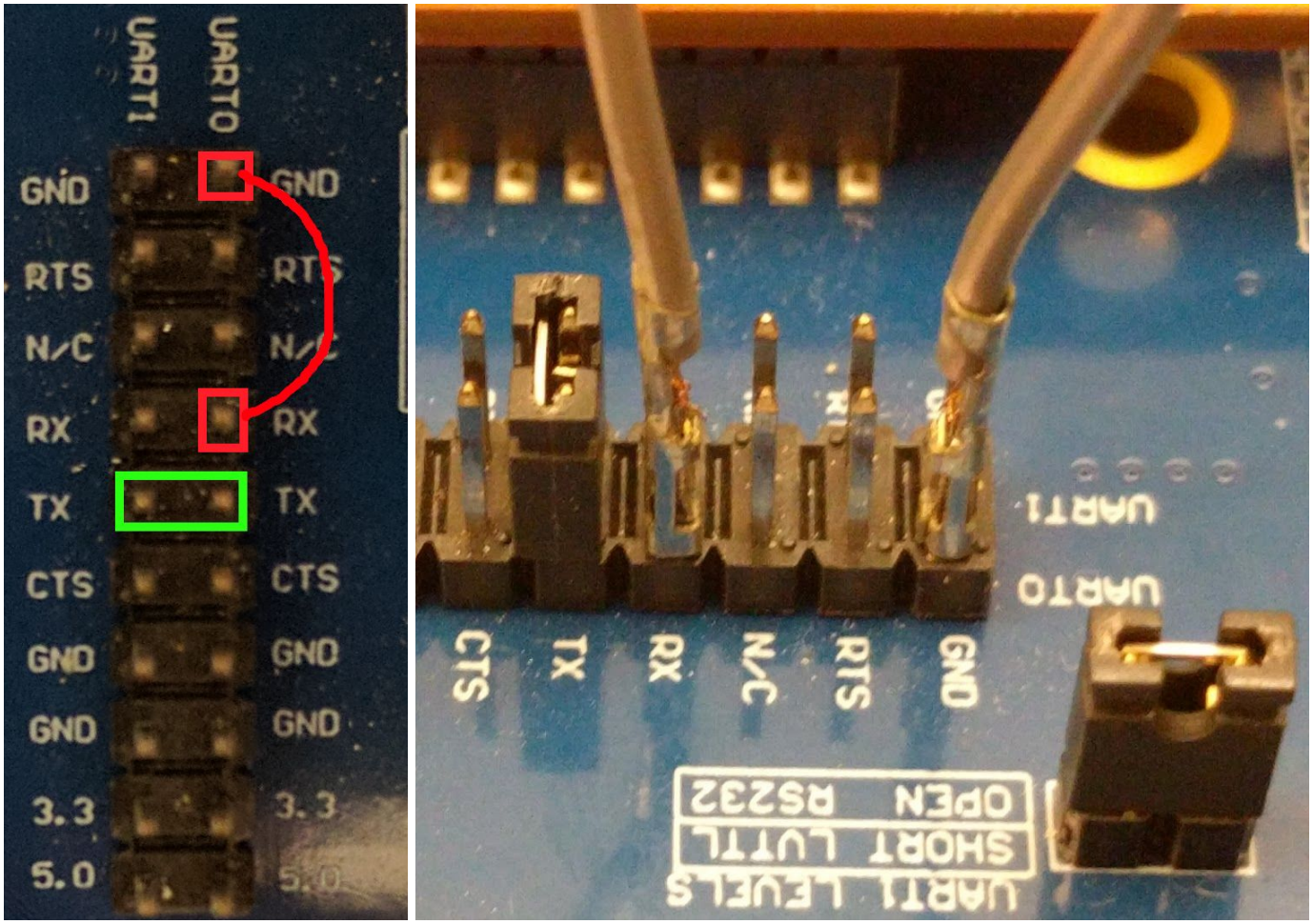
Currently the pins are pulled up by default. This allows for the previous image or bootloader to be run with a single jumper wire and an extra 100mil jumper, in addition to the two 100mil jumpers on the UART level selects.

Previous Firmware





Failsafe Bootloader



Reflashing from Failsafe Bootloader

1. Insert a USB drive with the image file to flash
    a. REMINDER: only firmware images prior to and including v2.0.2 can be used to recover the device
2. Boot into the failsafe as show above
3. After 30 seconds disconnect the jumpers and connect a serial terminal to UART1 on the board. Sending '?' followed by a new line should print out the available commands.
4. Send the following commands

```
usb start
fatls usb 0
fatload usb 0 0x02000000 YOUR_IMAGE_FILE_NAME
sf probe
sf erase 0x0180000 0x0040000
sf erase 0x0280000 0x0040000
sf erase 0x0300000 0x1c00000
```

```
image_set write 0x02000000 0x0180000 0x0280000 0x0300000
image_set check 0x0180000 0x02000000
```

5. Restart and the flashed image should boot