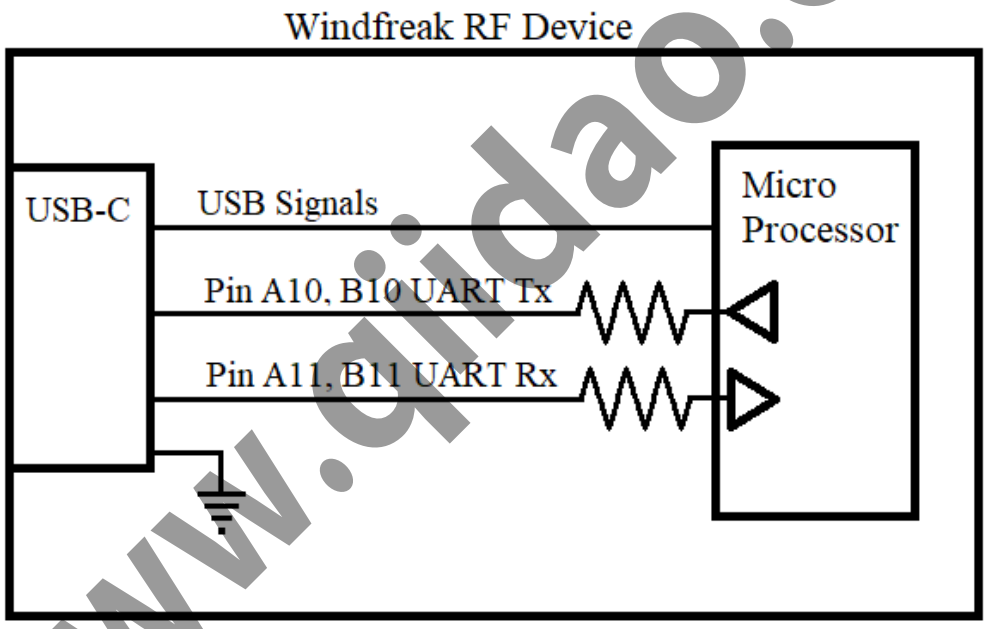
Windfreak RF Devices that have USB-C as the USB communications plug can also send and receive UART communications through two of the pins in the USB-C connector. Devices such as the SynthNV Pro, SynthHD (v2) and SynthHD Pro (v2) have this ability. This document describes how to hook into the UART signals from Arduino and Raspberry Pi devices.

Please note: This is an industry non-standard way of doing things, so these types of devices from Windfreak ship with a USB2 cable. When using these devices with USB only, it is important to use the USB2 cable shipped with the device. This protects the PC from any issue that might be caused by the UART signals coming through a USB3 cable to a PC USB port. Internally, there are 500 ohm resistors on the Tx and Rx lines, which should protect hardware from damage.



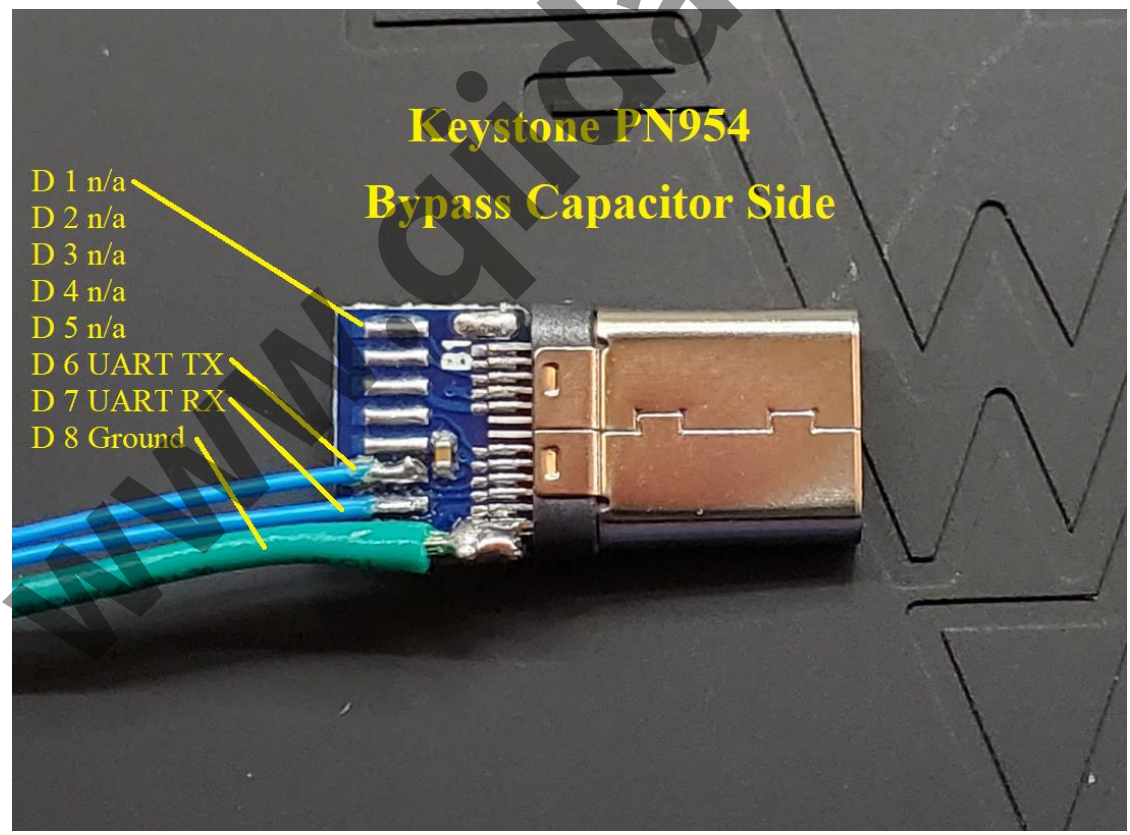
Windfreak Communication Block

One way to connect to the Windfreak device is to cut and strip back a USB-C 3 cable and tap into the bare wires. This takes knowledge of the cable, or some other way of knowing what the wires are. It's probably not a good idea to trust in wire colors unless getting them directly from the manufacturer of the cable.

A better solution is to purchase the below connector and solder your own wires.

The part is Keystone Electronics part number 954. At Digikey the part number is 36-954-ND and possibly can be found quickly via this link: https://www.digikey.com/product-detail/en/keystone-electronics/954/36-954-ND/5638367

It is important to be very careful with your soldering as shorting any pads together could harm the Windfreak device. The Windfreak device uses a 3.3V processor, but its pins are 5V tolerant.



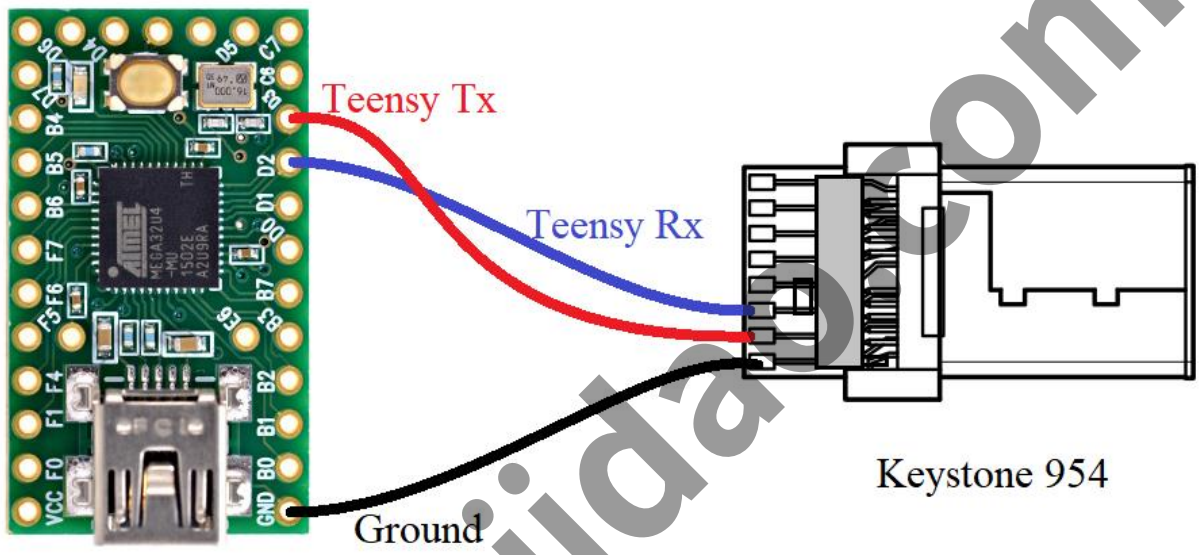
Keystone PN954 Wiring

When hooking your UART device to the Windfreak device, Tx should hook to Rx and Rx

should hook to Tx. In other words, your transmitter should transmit to the Windfreak UART receiver at Keystone Pin D7 and your receiver should receive from the Windfreak UART transmitter at Keystone Pin D6.

Teensy 2 Arduino Control

One example of a controller would be to use a Teensy 2 from PJRC:
https://www.pjrc.com/store/teensy.html



The Teensy will get its power from your USB control connection, and the Windfreak device should be plugged into a 5V power source through its barrel connector. If you are using a SynthNV Pro, we don't typically ship with a power adapter since it can power through USB, so please contact us for one.

For the Teensy Arduino application, you can use code like this:

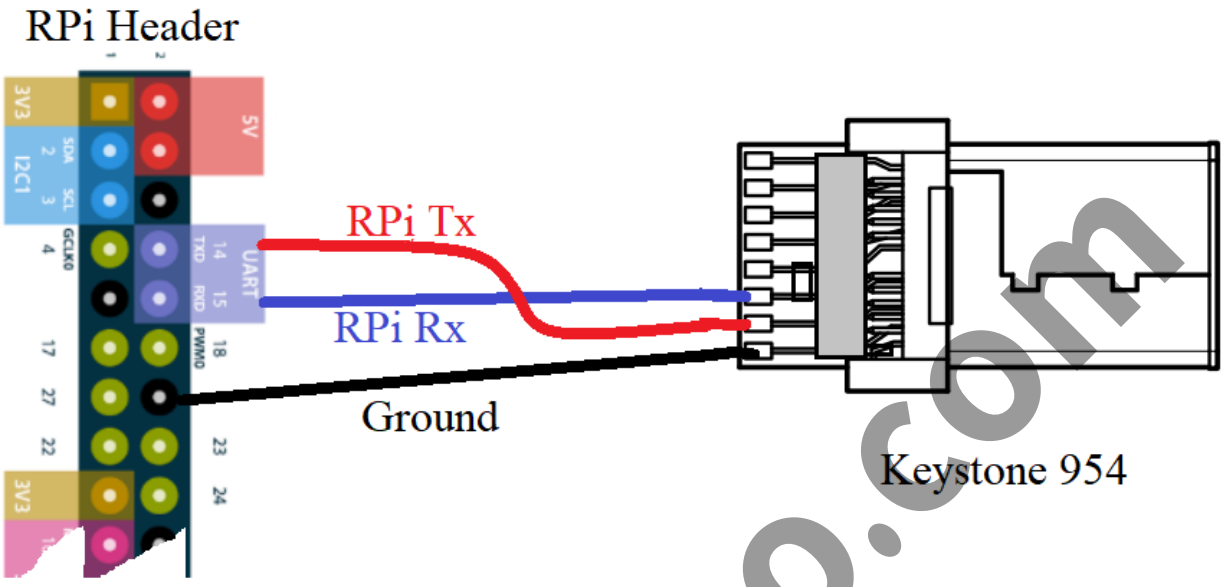
```
void setup() {
  Serial.begin(9600); // USB baud don't care
  Serial1.begin(115200); // UART baud required for Windfreak
}

void loop() {
  if (Serial.available() > 0) Serial1.write(Serial.read()); // write to UART from USB
  if (Serial1.available() > 0)  Serial.write(char(Serial1.read())); //write to USB from UART
}
```

Using the Arduino Terminal, send a ? command through USB to the Teensy and you should see a response of all Windfreak variables. Here is an example from a SynthHD:

Raspberry Pi4 Control

Another example of a controller would be to use a Raspberry Pi:
https://www.raspberrypi.org/products/raspberry-pi-4-model-b/



To get the RPi going you need to enable the hardware pins:

1) In terminal run: sudo raspi-config
2) Select Interfacing Options
3) Select Serial
4) Select NO for login shell access
5) Select YES to enable the serial hardware pins
6) Reboot
7) Install Cutecom

Open Cutecom. If this is the first time to run Cutecom you need to change the device to /dev/ttyS0. Also change the termination characters to “None” to the right of the input box. Click Open and send a ? command and you should get a response similar to below:

For UART enabled USB-C Windfreak RF Devices

Troubleshooting

If you don't see /dev/ttyS0 then repeat steps 1-6 above. Windfreak devices don't like to see termination characters, so be sure and use a terminal program that allows you to turn them off. You can easily use a USB connection from the RPi since Raspbian comes with the proper hardware drivers. Finally, the UART port is slower than USB so using the Windfreak GUI based on Labview wont work properly through UART because of delay issues.

Sincerely,
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