

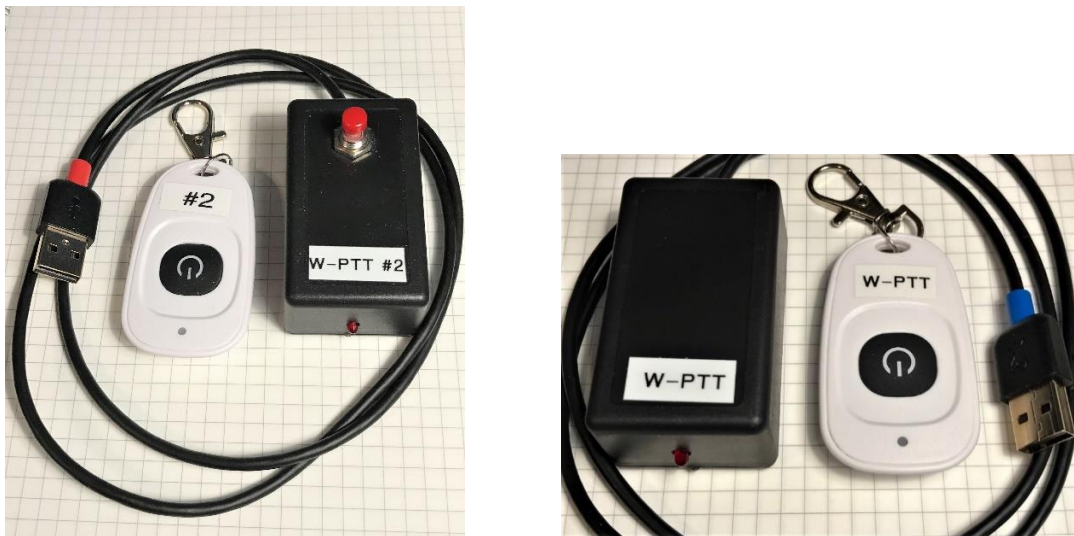
RCForb Client Wireless External PTT/LED Interface *External Wireless PTT with Push Button FOB and LED Indicator*

by Gene Hinkle, K5PA

Introduction

Ham operators like using RemoteHams *RCForb Client* application (<http://download.remotehams.com/>) to connect to remote radio servers world-wide. I use the **v0.9.xxx Public Alpha** releases to provide the functionality shown in this document (the current release is ***RCForbClientSetup_v0.9.250.exe***). However, using the Client's radio GUI leaves something to be desired when controlling the push-to-talk soft button. The space bar can also be used if the PTT is highlight by the mouse. However, what is missing is a standard PTT interface using a switch closure from a finger operated push-button. In prior projects, I have used several tiny wireless RF switches or relays that make interfacing a snap. This wireless switch married to a USB adapter makes an easy way to provide a wireless PTT for the shack giving freedom of movement.

Luckily, the RCForb Client software already has a built-in interface using a serial port on your computer! All that is needed is an inexpensive USB to TTL converter that exposes the serial control signals (e.g., CTS, DTS, etc.). This technical note explains how to easily assembly one from parts obtainable from on-line sources such as Amazon. The completed assemblies are shown in Figure 1 with and without an optional physical PTT switch mounted on the box.



***Figure 1. Author's Wireless PTT Unit Using a USB to TTL Interface Board and FOB
(Shown with and without manual switch on box)***

The schematic is shown in figure 2. This circuit board requires connecting cable from the **Mini-B USB** socket to the computer's USB port. The other side of the circuit board has a two-wire connection for the PTT switch closure to connect the control signal **CTS** to Ground (**GND**). These **CTS** and **GND** signals are switched with the wireless switch module. Once the software has been setup to receive this signal, connecting these two lines together using the wireless switch sends the signal for PTT to the **RCForb Client** software. A physical switch can also be used, and a small, red LED is included to indicate the assertion of PTT. This is a special low current (2 mA) LED, thus the 1600 ohm resistor in series with it.

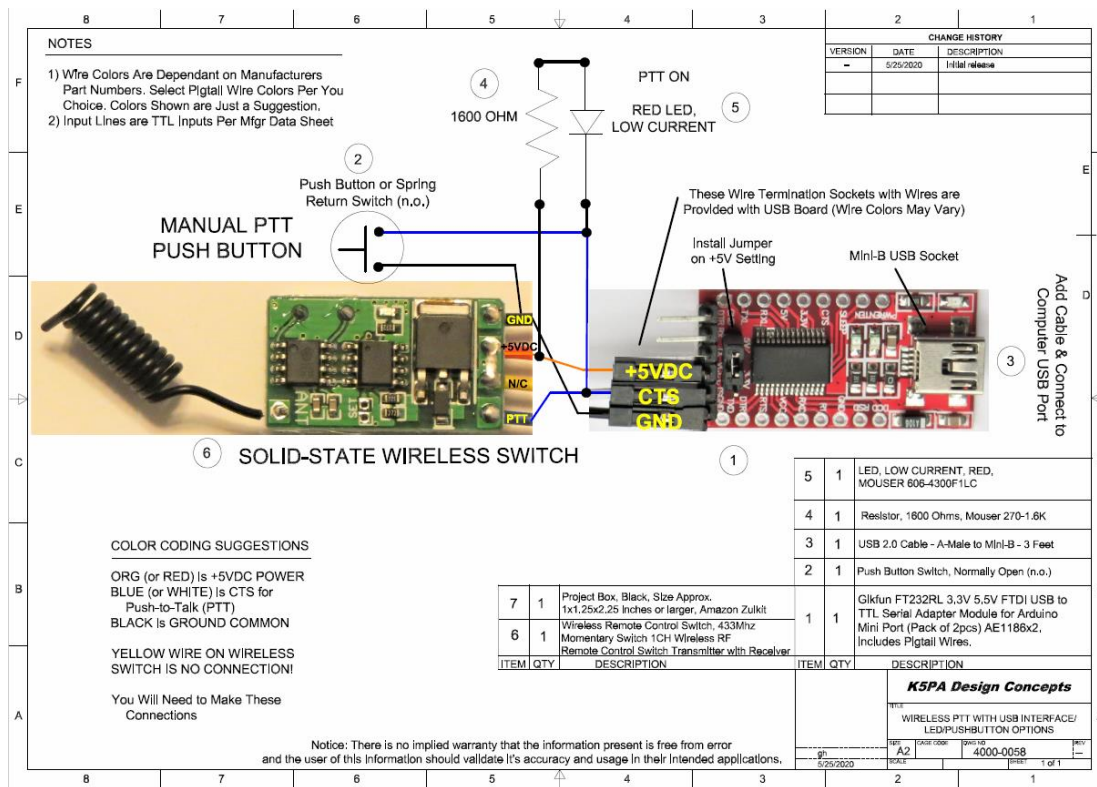


Figure 2. Author's Wireless PTT Schematic for Connections Between the Circuit Boards

Client Software Setup

The **RCForb Client** software has setting under the **Control Devices** tab at the top of the main GUI, shown in Figure 3. Initially the **External PTT** tab is **OFF**. It cannot be turned **ON** until the **CONFIG COM #** assignment and **PTT Pin CTS** is defined.

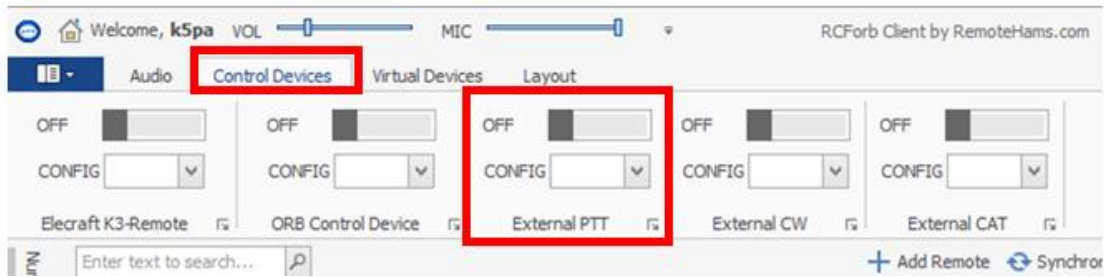


Figure 3. Control Devices Tab, External PTT in OFF State

When the USB to TTL interface is plugged into the computer’s USB port, the connection creates a **COM #** port, where # is the number assignment. This **COM #** port number will be displayed in the **CONFIG** drop down menu as shown below. Selecting the **COM #** port number and the **CTS** line for the PTT function will allow the Client to use this port for PTT.

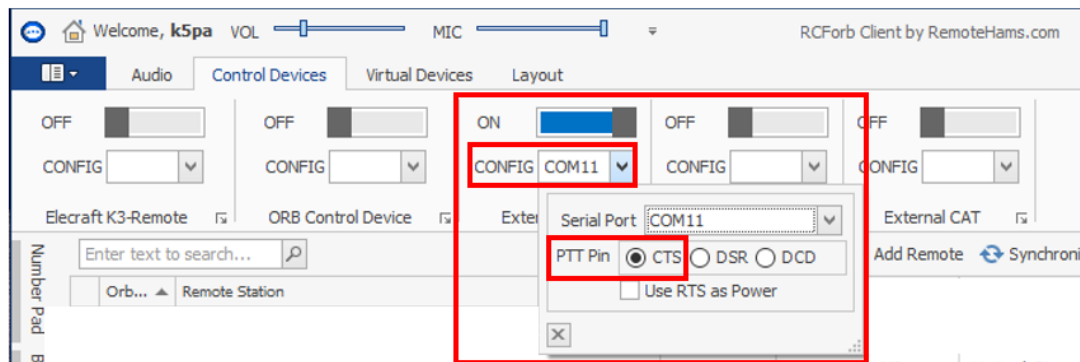


Figure 4. External PTT Selection for COM Port, PTT Pin Assignment CTS

When the **External PTT** settings have been finalized the software slide switch can be change from **OFF** to **ON** that is already shown **ON** in Figure 4. It is now able to respond to a hardware PTT using the small interface board.

Hardware Schematic and Bill of Materials

The schematic diagram is included in the **Appendix** as well as the **Bill of Materials** (Bom). The BoM includes suggestions for part numbers and vendors to purchase any components. Feel free to make substitutions based

on the BoM given. Also provided are links that can be clicked to take your browser to the vendor. Photographs of a completed prototype is also included in the Appendix.

There are two in-line pin header blocks, one for input/output connections and the other for 3.3 or 5 VDC operation on the board. These pin headers are clipped off to reduce the head-room requirements. The input/output pin headers are clipped with EXCEPTION of the GND and VCC connection. There are bent upward to allow the wireless switch board to be soldered to these pins. The 5 volt selection is soldered across on the pin header at the bottom of the board.

I have designed the circuit to include an extremely low current (2 mA), LED to indicate when the PTT is asserted. This is important if the latching type logic is selected in the wireless switch, so you always know the state of the PTT, on or off. I also included an option to add a physical PTT switch for times when I am at the computer and within reach of the wireless switch box. In that case, I can just press on the push button to assert PTT. The push button can be left out if you do not need it.

I might mention there are several alternative configurations for USB to TTL circuit boards on the market. Some already have the USB male connector mounted on the board. This could be substituted but I chose not to select a board that might put a strain on my laptop's USB connector. If you select an alternate circuit board configuration or a different source, beware of using boards that do not have the **genuine FTDI chipset** and driver availability. There are also **counterfeit FTDI chipsets** on the market, so buyer beware. The part number I provided has been used successfully in many applications by the author. Otherwise, *your mileage may vary* as the saying goes!

73 Gene K5PA

APPENDIX

- SCHEMATIC, P/N 4000-0058 rev-0
- BILL OF MATERIALS
 - (WITH CLICKABLE URL VENDOR LINKS)
- FINISHED UNIT VIEWS

NOTES

- 1) Wire Colors Are Dependant on Manufacturers Part Numbers. Select Pigtail Wire Colors Per Your Choice. Colors Shown are Just a Suggestion.
- 2) Input Lines are TTL Inputs Per Mfgr Data Sheet

CHANGE HISTORY

VERSION	DATE	DESCRIPTION
-	5/25/2020	Initial release

**MANUAL PTT
PUSH BUTTON**

Push Button or Spring Return Switch (n.o.)

1600 OHM

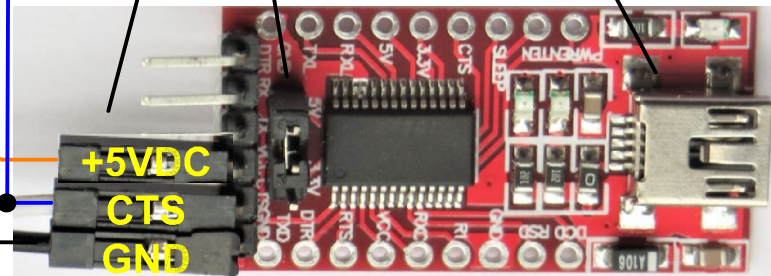
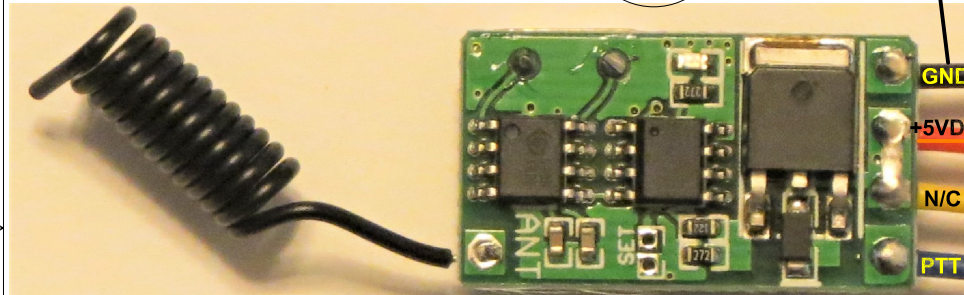
PTT ON
RED LED,
LOW CURRENT

These Wire Termination Sockets with Wires are Provided with USB Board (Wire Colors May Vary)

Install Jumper on +5V Setting

Mini-B USB Socket

Add Cable & Connect to Computer USB Port



6 SOLID-STATE WIRELESS SWITCH

1

COLOR CODING SUGGESTIONS

ORG (or RED) is +5VDC POWER
BLUE (or WHITE) is CTS for Push-to-Talk (PTT)
BLACK is GROUND COMMON

YELLOW WIRE ON WIRELESS SWITCH IS NO CONNECTION!

You Will Need to Make These Connections

ITEM	QTY	DESCRIPTION
7	1	Project Box, Black, Size Approx. 1x1.25x2.25 inches or larger, Amazon Zulkit
6	1	Wireless Remote Control Switch, 433Mhz Momentary Switch 1CH Wireless RF Remote Control Switch Transmitter with Receiver

5	1	LED, LOW CURRENT, RED, MOUSER 606-4300F1LC
4	1	Resistor, 1600 Ohms, Mouser 270-1.6K
3	1	USB 2.0 Cable - A-Male to Mini-B - 3 Feet
2	1	Push Button Switch, Normally Open (n.o.)
1	1	Gikfun FT232RL 3.3V 5.5V FTDI USB to TTL Serial Adapter Module for Arduino Mini Port (Pack of 2pcs) AE1186x2. Includes Pigtail Wires.

Notice: There is no implied warranty that the information present is free from error and the user of this information should validate it's accuracy and usage in their intended applications.

K5PA Design Concepts

TITLE
WIRELESS PTT WITH USB INTERFACE/
LED/PUSHBUTTON OPTIONS

SIZE A2 CAGE CODE DWG NO 4000-0058 REV --

gh 5/25/2020

SCALE SHEET 1 of 1

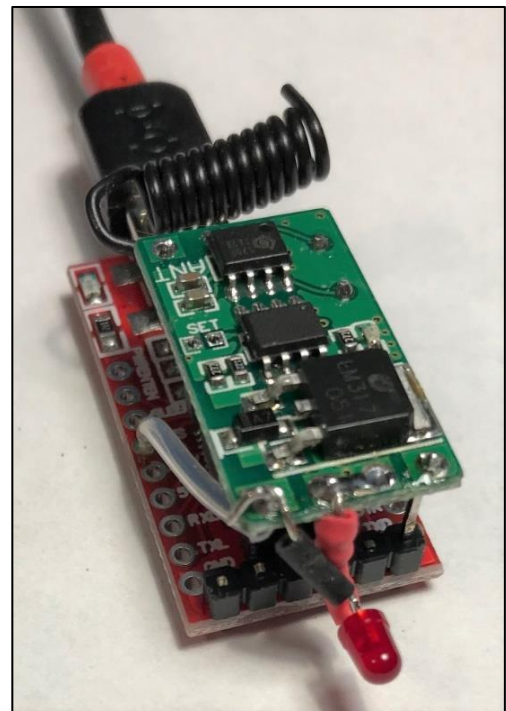
Date: 5/25/2020

Bill of Materials Drawing 4000-0058 Rev-0

PTT Wireless Switch Interface Using an Inexpensive USB-TTL Adapter

Item	Part No.	Part Description	Mfgr	Part No.	Vendor	URL of Vendor P/N	Qty	Item Cost
1	4000-0058	Gikfun FT232RL 3.3V 5.5V FTDI Mini USB to TTL Serial Converter Adapter Module DIY Kit for Arduino Mini Port (Pack of 2pcs) AE1186x2_1 (Includes Pin/Socket Cable)	Esooho	ASIN: B07FCGS8TN	Amazon	FT232RL 3.3V 5.5V FTDI Mini USB to TTL	1	\$ 9.36
2	4000-0058	Push Button, Normally Open (n.o.)		ASIN: B07G6HBQQM Model: BEST9439	Amazon		1	
3	4000-0058	AmazonBasics USB 2.0 Cable - A-Male to Mini-B - 3 Feet (0.9 Meters)	Amazon Basics	Model: AFIR	Amazon Basics	USB A-Male to Mini-B	1	\$ 4.80
4	4000-0058	Metal Film Resistor, 1.6K ohms, 1%	Xicon	1.6K-RC	Mouser	Go to www.mouser.com and enter the part number: 270-1.6K-RC	1	\$ 0.22
5	4000-0058	Red Diffused LED, Low Current, 2 mA	VCC	4300F1LC	Mouser	Go to www.mouser.com and enter the part number: 606-4300F1LC	1	\$ 0.73
5	4000-0058	PICK ONE --Wireless Switch (non-Relay version), DC 6V-36V (Momentary Switch)	BWSS	ASIN: B07H4VK882	Amazon	6V-36V Wireless Switch (Momentary)	1	\$ 11.99
6	4000-0058	PICK ONE --Wireless Switch (non-Relay version), DC 6V-36V (Latching Switch)	BWSS	ASIN: B07H7CF8HL	Amazon	6V-36V Wireless Switch (Latching)	0	\$ 11.99
7	4000-0058	Zulkit 5Pcs Project Boxes ABS Plastic Electrical Project Case Power Junction Box Black 2.40 x 1.41 x 0.98 inch (61 x 36 x 25 mm)	Zulkit	Black ABS Plastic	Amazon	Project Box	1	\$ 8.99

- **Finished Unit Views** (Without the PTT Manual Switch Installed)



- When the wireless relay enclosure includes the physical PTT push button, it is mounted directly under the mini-USB cable plastic connector and connected to the circuit points shown in the schematic. The pushbutton switch selection must be small enough to fit between this mini-USB cable and the top of the plastic box.
- The red LED is mounted so it slips into the little 1/8" hold in the box that is selected to be at the correct height. It supports the board from moving in the final assembled unit.

