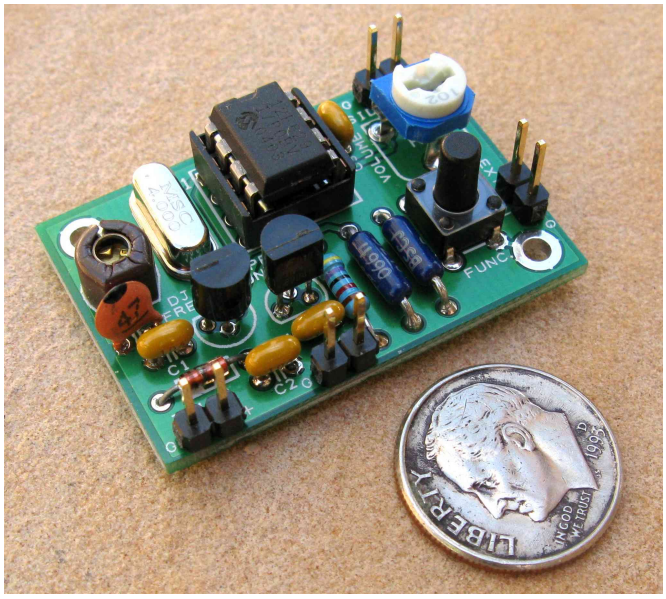
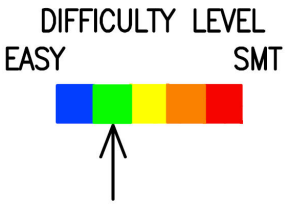
DJ3KK SPRAT CW Announced Frequency Counter





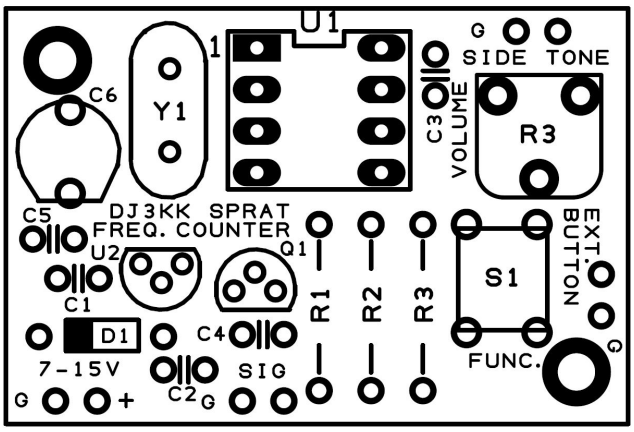
First, familiarize yourself with the parts and check for all the components. If a part is missing, please contact us and we will send one. You must use ***qrpguys.parts@gmail.com*** to request a part.

Please read all the instructions before starting the assembly.

Parts List

1 – DJ3KK counter pcb
1 – U1, PIC12F629A or PIC12F675 DIP IC
1 – U2, 78L05 regulator
1 – Q1, 2N3904 transistor
1 - Y1, 4.000 MHz crystal
1 - D1, 1N4148 diode, small glass with black band on one end
1 - S1, push button switch, pcb mount
1 - R1, 47K resistor, (yellow-violet-orange-gold)
2 - R2,3, 510 ohm resistor, (green-brown-brown-gold)
1 - R3, 1K trim pot, 6mm
4 - C1,2,3,4, .1uF mono capacitor, marked 104
1 - C5, 47pF capacitor, marked 47
1 – C6, 60pF trimmer capacitor
1 – 8 pin dip socket
4 – 2 pin header

Refer to the graphic below and the PCB silk screening for the placement of the components.



You will start with the smallest components first and progress to the larger ones.

[ ] Install C1,2,3,4, .1uF mono capacitor (marked 104)

[ ] Install C5, 47pF capacitor, marked 47

[ ] Install D1, 1N4148 diode, small glass with black band on one end, *match the silkscreen outline*

[ ] Install R1, 47K resistor, (yellow-violet-orange-gold)

[ ] Install R2,3, 510 ohm resistor, (green-brown-brown-gold)

[ ] Install the 8 pin dip socket for U1

[ ] Install Y1, 4.000 MHz crystal

[ ] Install Q1, 2N3904 transistor, *match the silkscreen outline*

[ ] Install U2, 78L05 regulator, *match the silkscreen outline*

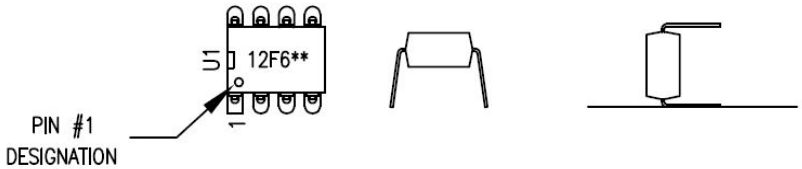
[ ] Install the four 2 pin headers

[ ] Install R3, 1K trim pot

[ ] Install C6, 60pF trimmer capacitor, *match the silkscreen outline*

[ ] Install S1, pushbutton switch

[ ] Install U1, 8 pin PIC chip into the dip socket, observe the orientation of pin 1



When inserting the IC, the pins are flared so that they can be retained by auto insertion tools. Gently rock them on a flat surface so the pins are parallel and they will insert into the sockets more easily.

This completes the assembly.

Usage:

The SPRAT counter uses a menu system accessed with the "function" push button. All menu parameters are stored in non-volatile memory. *To access the menu and set your parameters, you must hold the function switch on, and power up the counter.* To go through the menu items you use a short press of the "function" button. A longer press of the button stores the item in memory and sends "OK". When you are finished remove the power to the counter. Turn back on the counter and it will respond "F?" indicating that it is ready to read and respond with your frequency according to your parameters with a push of the function button.

The menu items are in the following order:

SP? – This is the speed of the sent cw to the audio output.
RESET? – This clears all the parameters you may have set.
IF? – This is for parameter for the vfo frequency, for receivers/transceivers with a vfo.
AD? – This is to tell the counted if the vfo frequency is to be added to the sensed frequency.
SU? – This is to tell the counter if the vfo frequency is to be subtracted from the sensed frequency.
R1? – If selected, the resolution is xx.xxx MHz, leading zero suppressed
R2? – If selected, the resolution is xx.xxx.x MHz
R3? – If selected, the resolution is xxx.x KHz
R4? - If selected the resolution is xxx KHz
R5? - If selected the resolution is xx KHz
R6? - If selected the resolution is xx.x KHz
R7? – If selected the resolution is xx.xx KHz
R8? - If selected the resolution is xx.xxx.xx MHZ, full readout

Resolution example for a frequency of 7.035284 MHz

R1 → 7 035
R2 → 7 035 2
R3 → 035 2
R4 → 035
R5 → 35
R6 → 35 2
R7 → 35 28
R8 → 07 035 28

There is a tiny pause between the groups of numbers when the CW announcement is sent.

Setting the parameters

Typical set up for direct conversion:

- Connect a small speaker or earbuds to the audio output. Hold the function switch down and power the pcb with 7-15vdc. You will hear the first item in the menu, SP?
- Either use the default speed of 13-15wpm or press and hold the "function" button until the dits reach a speed you are comfortable with. Release the button, then press longer and hear "OK" to store.
- If you are using this on a direct conversion receiver/transceiver, no IF offset is required
- Press the "function" switch momentarily until you reach the "R" parameter you want for resolution.
- Press the "function" switch longer and hear "OK" to store the parameters.
- When you are finished remove the power to the counter. Turn back on the counter and it will respond "F?" indicating that it is ready to read and respond with your frequency according to your parameters with a push of the function button.

Typical set up with a vfo offset:

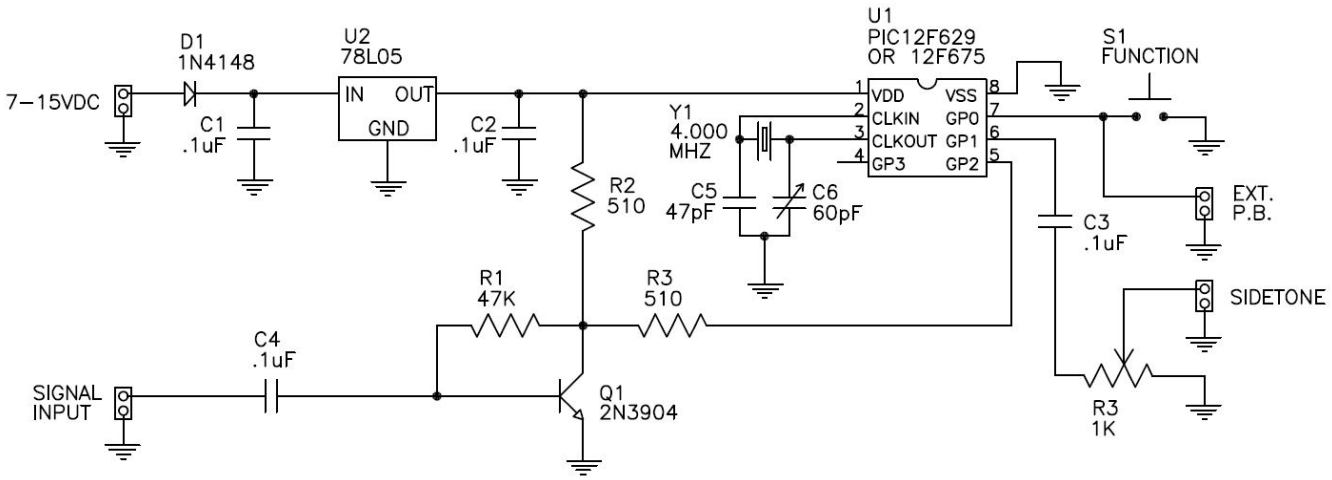
- Connect a small speaker or earbuds to the audio output. Hold the function switch down and power the pcb with 7-15vdc. You will hear the first item in the menu, SP?
- Either use the default speed of 13-15wpm or press and hold the “function” button until the dits reach a speed you are comfortable with. Release the button, then press longer and hear “OK” to store.
- Feed the IF frequency from your receiver or a signal generator to the counter input at a level of 2-4Vpp.
- With the IF frequency fed from the VFO or signal generator, press “function” switch momentarily until you select the “IF?” menu item.
- Press the “function” switch longer and hear “OK” to store the offset frequency.
- Press “function” switch momentarily until “AD?” or “SU?” is heard, and depending on your receiver select additive or subtractive.
- Press the “function” switch longer and hear “OK” to store.
- Press “function” switch momentarily until you reach the “R*” parameter you want for resolution.
- Press the “function” switch longer and hear “OK” to store the parameters.
- When you are finished remove the power to the counter. Turn back on the counter and it will respond “F?” indicating that it is ready to read and respond with your frequency according to your parameters with a push of the function button.

You can reset and start over as often as you like. All your parameters are stored or can be cleared from the non-volatile memory.

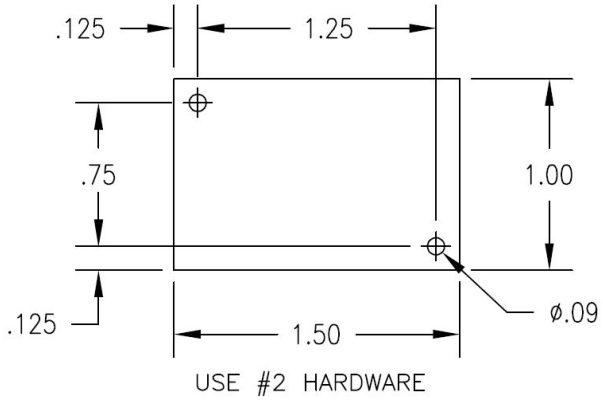
After you have set the parameters, couple the signal input between the counter and your circuit according to your manufacturers recommendations. Keep your signal input connection wires as short as possible. Usually a small coupling capacitor is used between the counter and the circuit you are measuring. The cw output audio can be fed into your audio chain. There is a trimmer pot on the pcb to adjust the sidetone audio level. There are connections on the pcb for using an external pushbutton switch.

The C6 trimmer capacitor is for adjustment, if you want to calibrate the counter to a known frequency source.

Schematic:



Mounting dimensions:



Notes: