

The Alachua County “Arduino WINKEYER”

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Why do CW Field Day ops need a WINKEYER?

- Applications (N3FJP etc) can send “Morse” via serial ports – but code is *JERKY, JUMPY* because Windows **pre-empts timing**
- Radios like ICOM7300 have PADDLE INPUT
- Can send “canned-text”
- **Cannot** insert callsign, from logging N3FJP
- **Cannot** change speed instantly / directly from a physical KNOB (without menu effort)



BIG ADVANTAGE for CW ops


- N3FJP provides almost all CW SENDING with perfect timing through WINKEYER – via canned text usually!
- No errors! No time wasted!
- Touch-typist **fingers remain on keyboard** continuously
- In hours of Field Day, only a small number of paddle-CW actually required, generally when other operator confused.

Commercial Product



K1EL
HAM RADIO KITS

K1EL Systems LLC

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WKUSB CW Keyer Assembled/Tested \$139

REV C is the current shipping version.

Rev C uses a CH340 USB IC. Please refer to the WKUSB User Guide for more information.



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[WKUSB Cable Options](#)

Attention: We are not able to sell directly to EU or UK at

Commercial Product

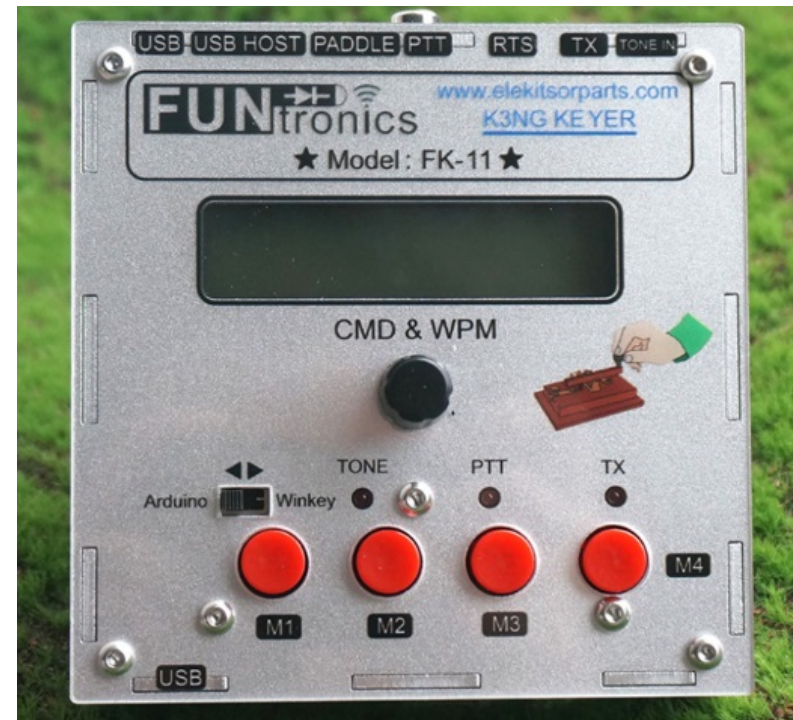


- Steve K1EL's product works WELL and is utilized by many, many operators.
- Accepts 1200 baud USB connections from computers, multiple logging systems (N1MM, N3FJP, others)
- Provides solid-state keying for low-positive-voltage straight-key radio inputs
- Does not provide relay output suitable for older radios with high negative voltage (e.g. many vacuumtube radios using grid-block keying (Heathkit etc)
- **BIGGEST ADVANCE** by Steve might be his **WINKEYER PROTOCOL** which has been adopted by major logging systems.



K3NG's contribution

- <https://blog.radioartisan.com/arduino-cw-keyer/>
- Some years ago, K3NG wrote freely-available code for an Arduino-based keyer using the WINKEYER protocol.
- Multiple commercial products exist using this codebase.



North Florida Amateur Radio Club

NF4RC / NF4AC



- Most of our members don't do Morse Code.
- We DO teach, experiment, and BUILD THINGS in our “LabNLunch” meetings throughout the year – a way of further training our volunteers
- Rather than BUY an off-the-shelf item, we wanted to give our volunteers a LEARNING EXPERIENCE

FCC Part 97.1



§97.1 Basis and purpose

The rules and regulations in this part are designed to provide an amateur radio service having a fundamental purpose as expressed in the following principles:

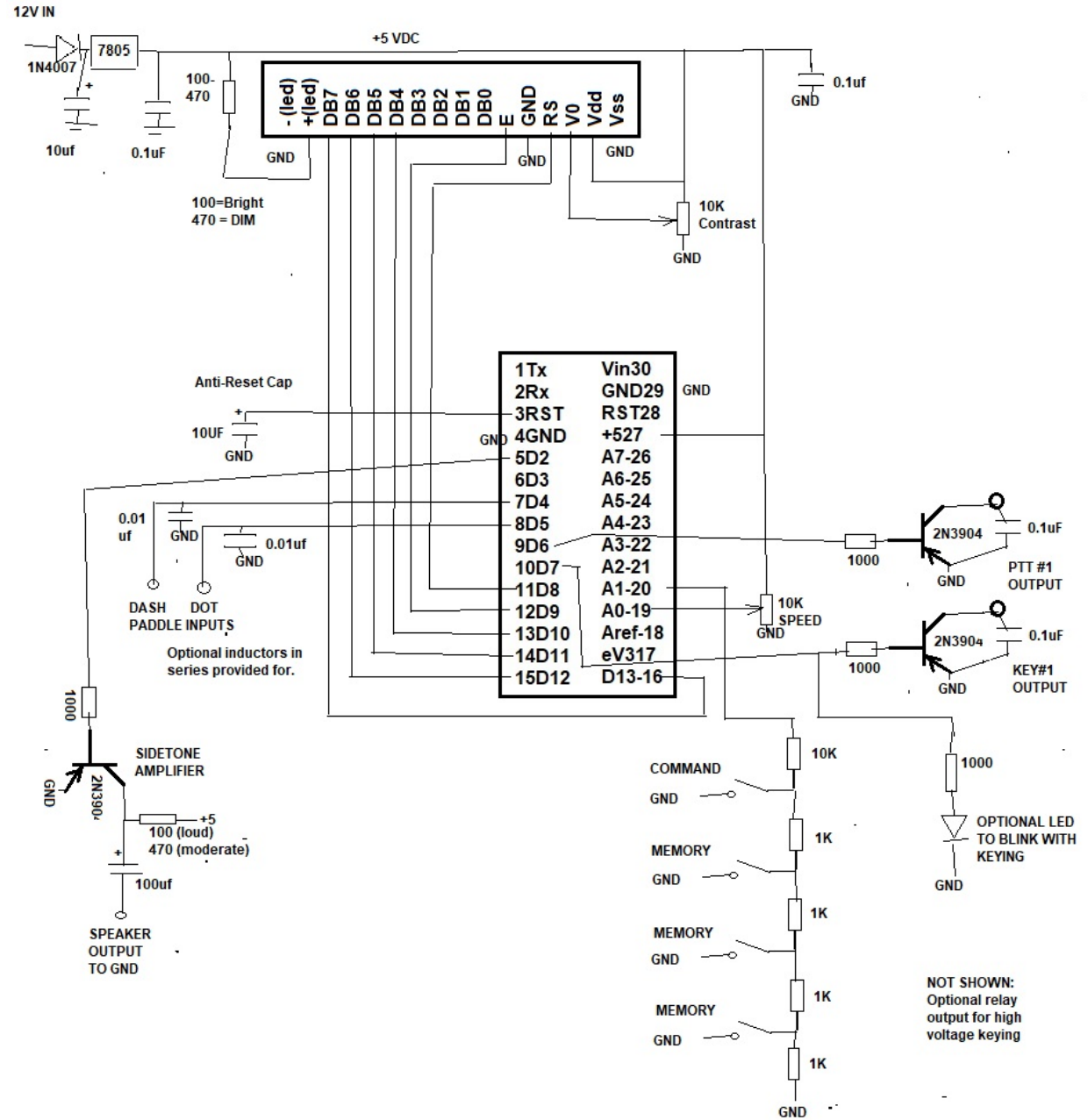
- (a) Recognition and enhancement of the value of the amateur service to the public as a voluntary noncommercial communication service, particularly with respect to providing emergency communications.
- (b) Continuation and extension of the amateur's proven ability to contribute to the advancement of the radio art.
- (c) Encouragement and improvement of the amateur service through rules which provide for **advancing skills in both the communication and technical phases of the art.**
- (d) **Expansion of the existing reservoir within the amateur radio service of trained operators, technicians, and electronics experts.**
- (e) Continuation and extension of the amateur's unique ability to enhance international goodwill.



Perfect Kind of Project for Ham Club

- Printed circuit board greatly reduces time and errors
- No tricky RF wiring
- Not very RF sensitive either!
- 12V or USB powered
- Relatively few components
- Emphasizes connectors / connections

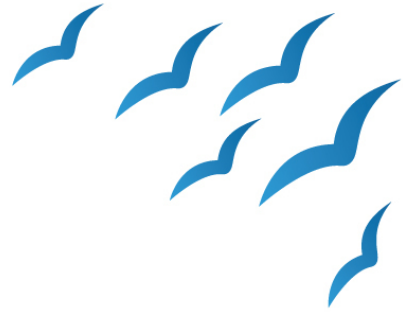
Schematic



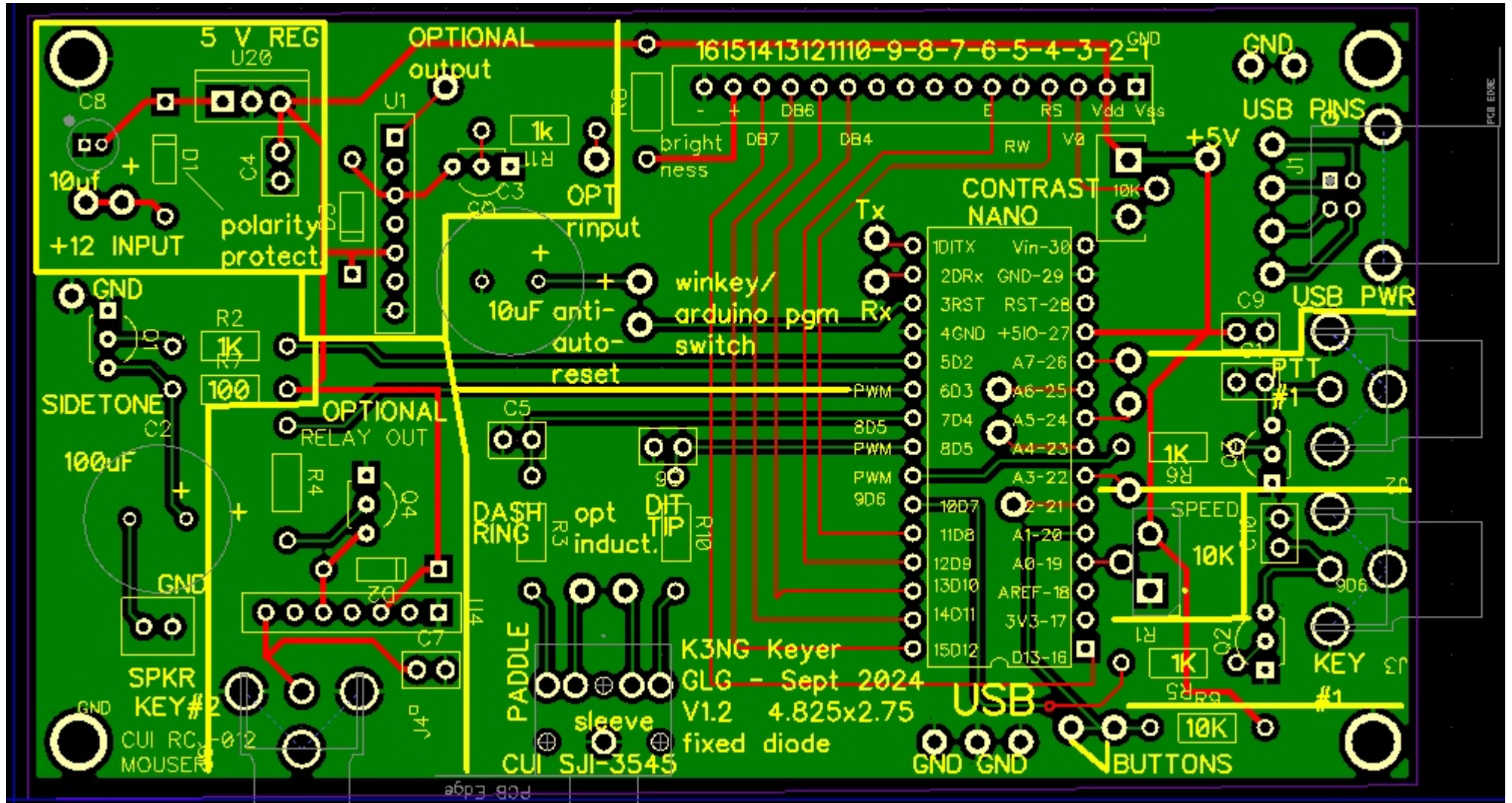


ADDITIONS

- Add 2N3904 control of a reed-relay to handle high voltage / negative voltage radios
- Provide square wave sidetone output
- Power either via USB or 12V input / 3-terminal regulator

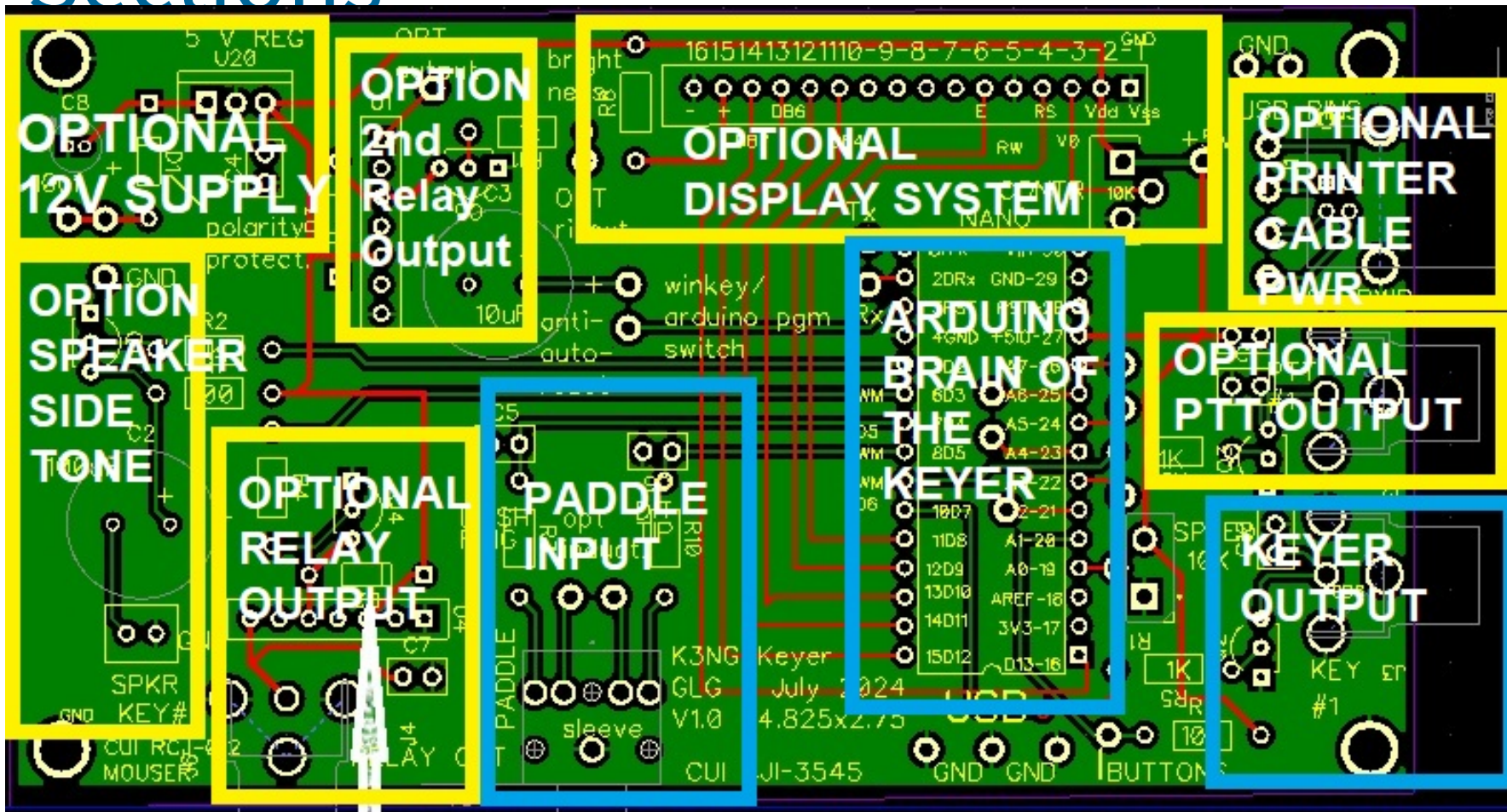


Double-Sided PCB





Sections

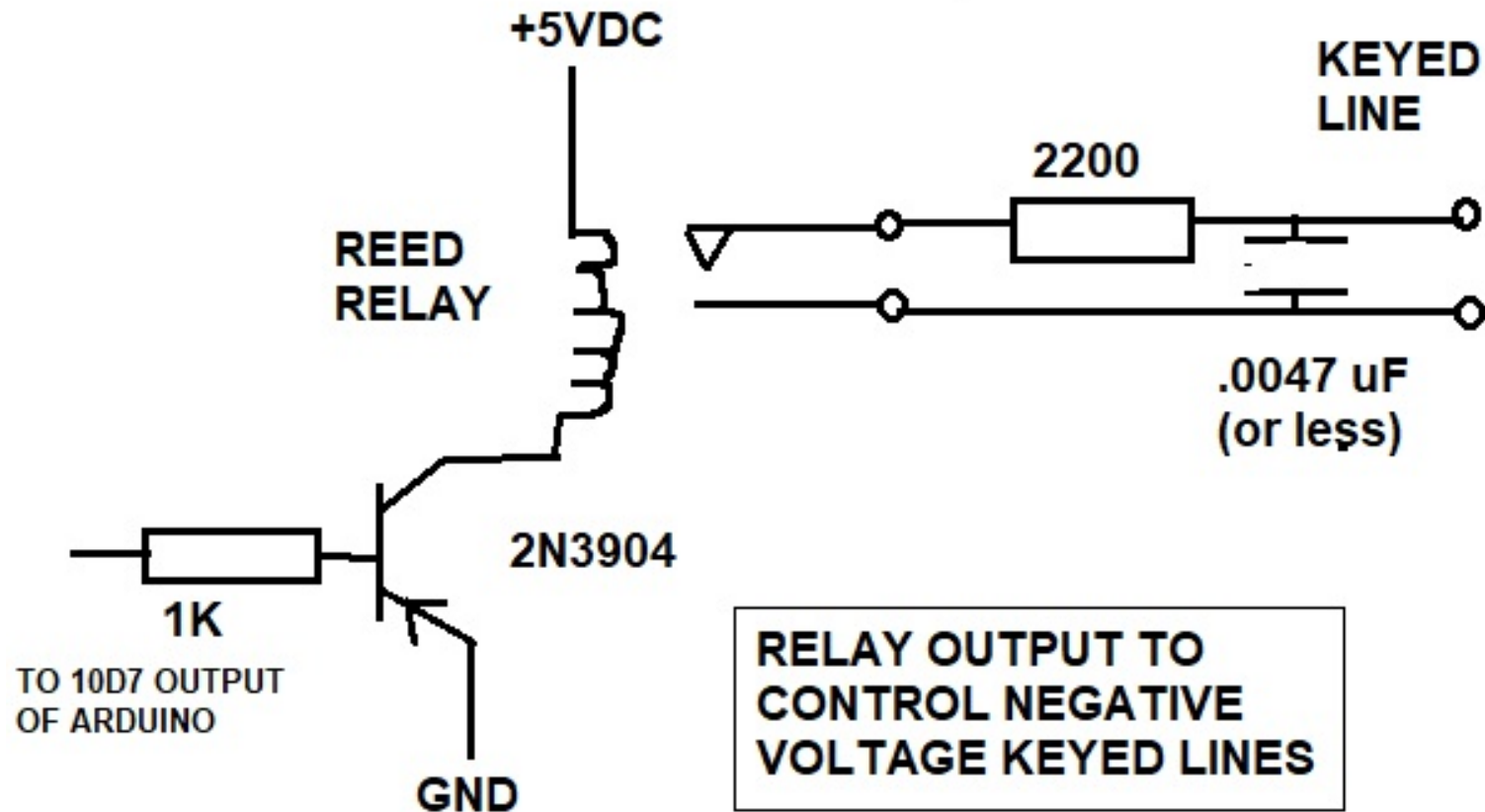


NOTE: D2 on the first batch of PCBs is incorrectly show with the cathode to the LEFT. To the RIGHT is correct as shown here.





Relay Output Correction





Documentation

- Keyer Building & Use Manual

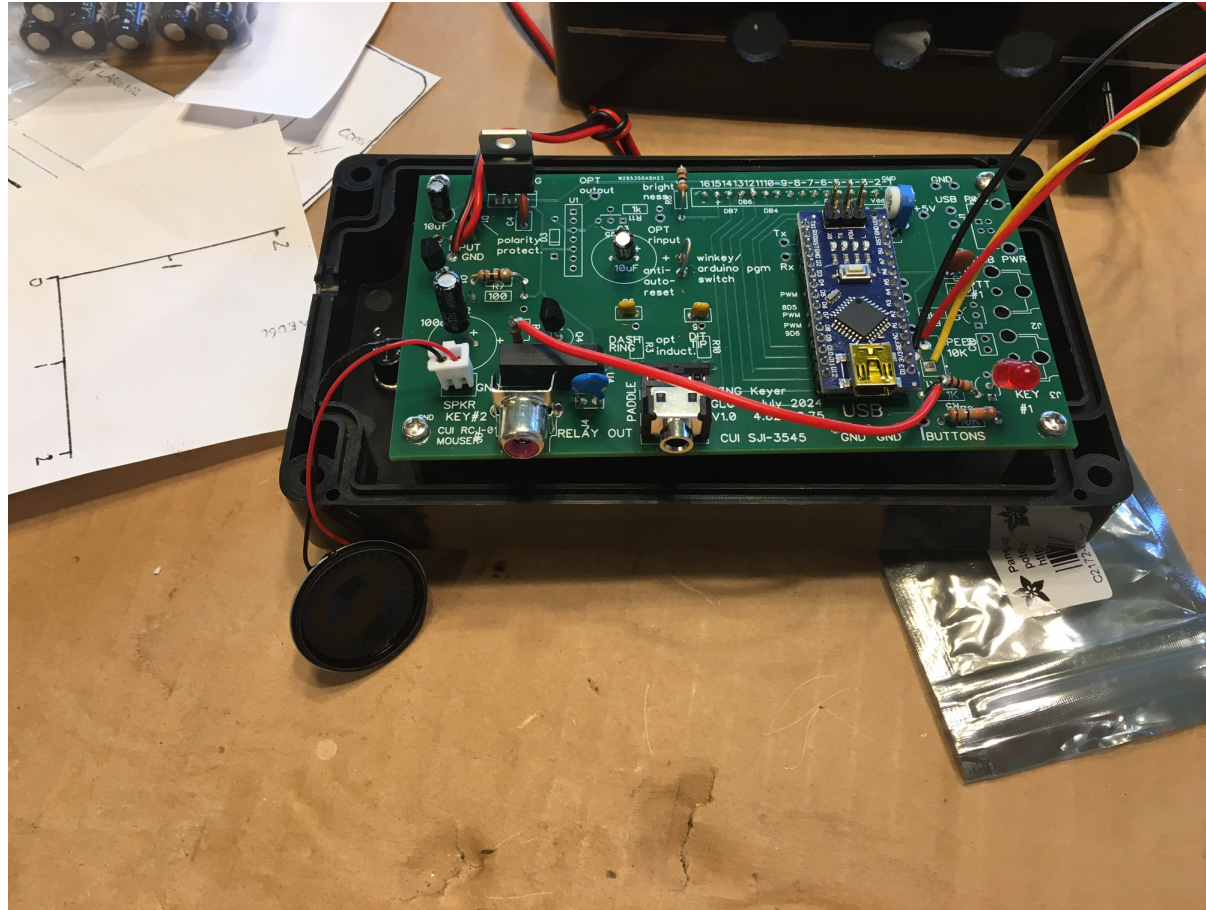
<https://www.nf4rc.club/how-to-docs/arduino-k3ng-winkeyer-emulator-locally-developed-morse-code-keyer-manual/>

- Packaging Manual

<https://www.nf4rc.club/how-to-docs/arduino-winkeyer-packaging-instructions/>



Example Versions







Mechanical Skills Developed

- Use of brass standoffs to mount printed circuit board
- Understanding of common connector types
- Drilling holes at prescribed location
- Dremel rotary cutter to make square openings
- Mounting potentiometer



Mechanical Build





Keyer Operation

- Command Mode versus operating
 - Entering and exit command mode by BRIEF press on command button
- Tailored set of commands to fit Arduino Memory



Commands

Note – when using N3FJP you don't need these memories!

- P1 <send message> Fill Memory #1
- P2 <send message> Fill Memory #2
- P3 <send message> Fill Memory #3
- N Swap dot/dash paddles
- O Cycles the sidetone between none, paddle, all
- Y Sets time delay between memory repeat
- T Very useful TUNE mode (dot dash different)

N3FJP configuration



The image shows two overlapping windows from a software application. The background window is titled "CW Setup Form 1.4 (Ctrl W for this form or Ctrl > Shift W for the CW Mini form)". It has several sections: "Com Port:" with a text box; "Keying Options" with radio buttons for "None", "RTS", "Winkeyer", "DTR", and "N3FJPAPI", and a "Configure Winkeyer" button; "Timing Options" with radio buttons for "Sleep", "Timer", and "Lo"; "WPM" controls with "Faster", "More", "More", "18", "0", "0", "Slower", "Less", "Less" buttons; "Loop Sec" with a value of "2.3"; and "Multi Radio Configuration" with fields for "Rig 1:", "Rig 2:", and "Rig 3:". The foreground window is titled "Winkey Setup 1.1" and contains "Settings" for the Winkeyer. It includes an "Open" button, "Winkeyer Status: Closed", "Winkeyer Version:", and instructions to "Set Speed Pot Lock to adjust WPM by speed pot or use the up and down arrow keys on the main form." It has sections for "Keyer Settings" (Ratio: 50, Weight: 50, Comp: 0, Lead In: 0, 1stExt: 1, Tail: 1, Sample: 50, Farns: 0, Letterspace: 0), "Keyer Setup" (Swap, AutoSpace, CT Spacing, Key on Port 1, Key on Port 2, Enable PTT, Sidetone Enable), "Speed Pot" (Max WPM: 30, Min WPM: 5, Speed Pot Lock checked, Current WPM: 5, Speed Pot: 5), "Paddle Hang" (1.0 Word, Paddle), and "Sidetone" (800 Hz, Paddle Only). There are "Defaults", "Test", "Stop", and "Done" buttons at the bottom.

BE CERTAIN to set the Windows Port Default for that COM PORT to 1200 Baud!



Paddle Prices Prohibitive!



\$179.95

Bencher BY Series Iambic Paddles >

Iambic Paddle, BY Series, Spring, Black Square Base, Chrome Hardware, Clear Paddle, Each

[See More Specifications](#)



Add-On Project: Paddles

- CW keyer PADDLES are another high-priced item, out of reach of many hams
- Turns out – easy to build!
- Solid state inputs like Arduino work FINE with simple screw/metal contact closures
- Simple hardware products provide the spring-action and needed flexibility



Paddle Parts Readily Available

Stainless steel right-angle brackets

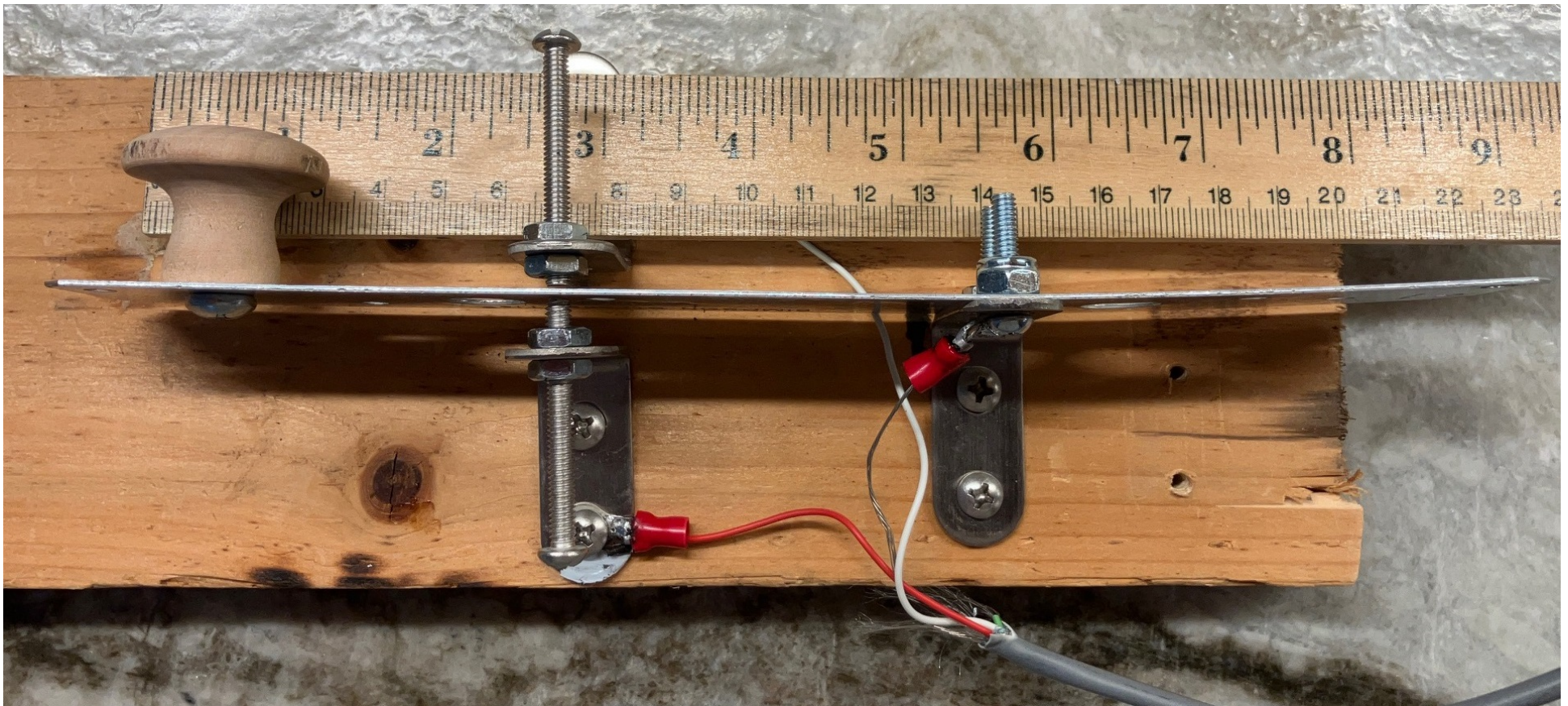
<https://www.amazon.com/gp/product/B08BZPG7ZM?th=1>

Zinc-plated Steel Tie Plate (20-gauge galvanized 1-1/4" x 9" tie \$0.88)

<https://www.homedepot.com/p/Simpson-Strong-Tie-LSTA-1-1-4-in-x-9-in-20-Gauge-Galvanized-Strap-Tie-LSTA9/202255804>

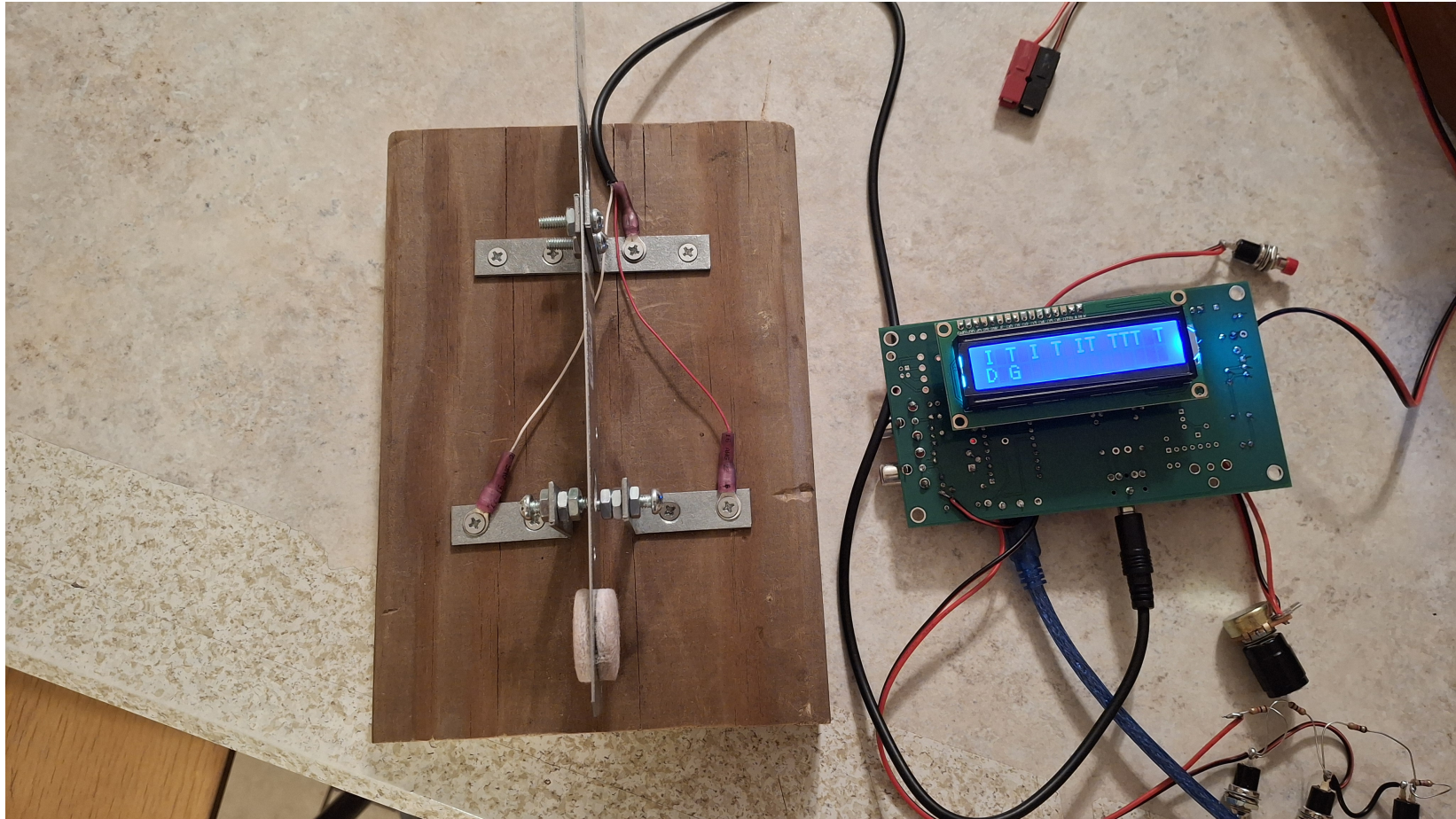


Homebrew \$7 Paddle





Hugh Minnich Paddle





Cheap to add to go-box!



