Yet Another Code Practice Oscillator

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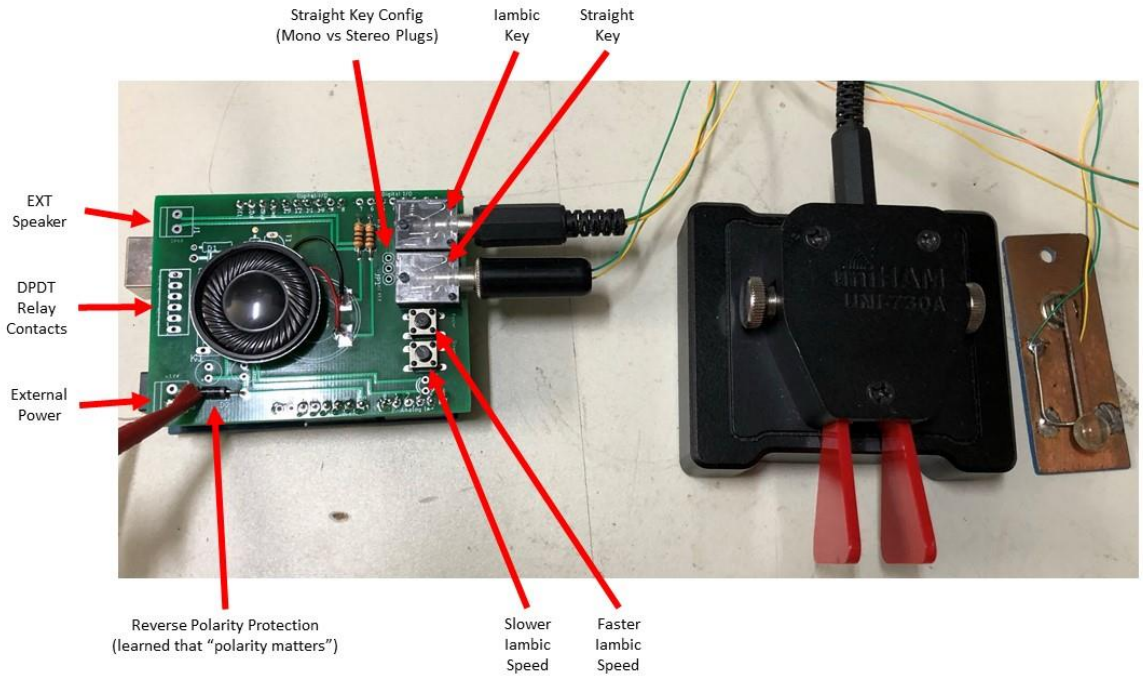
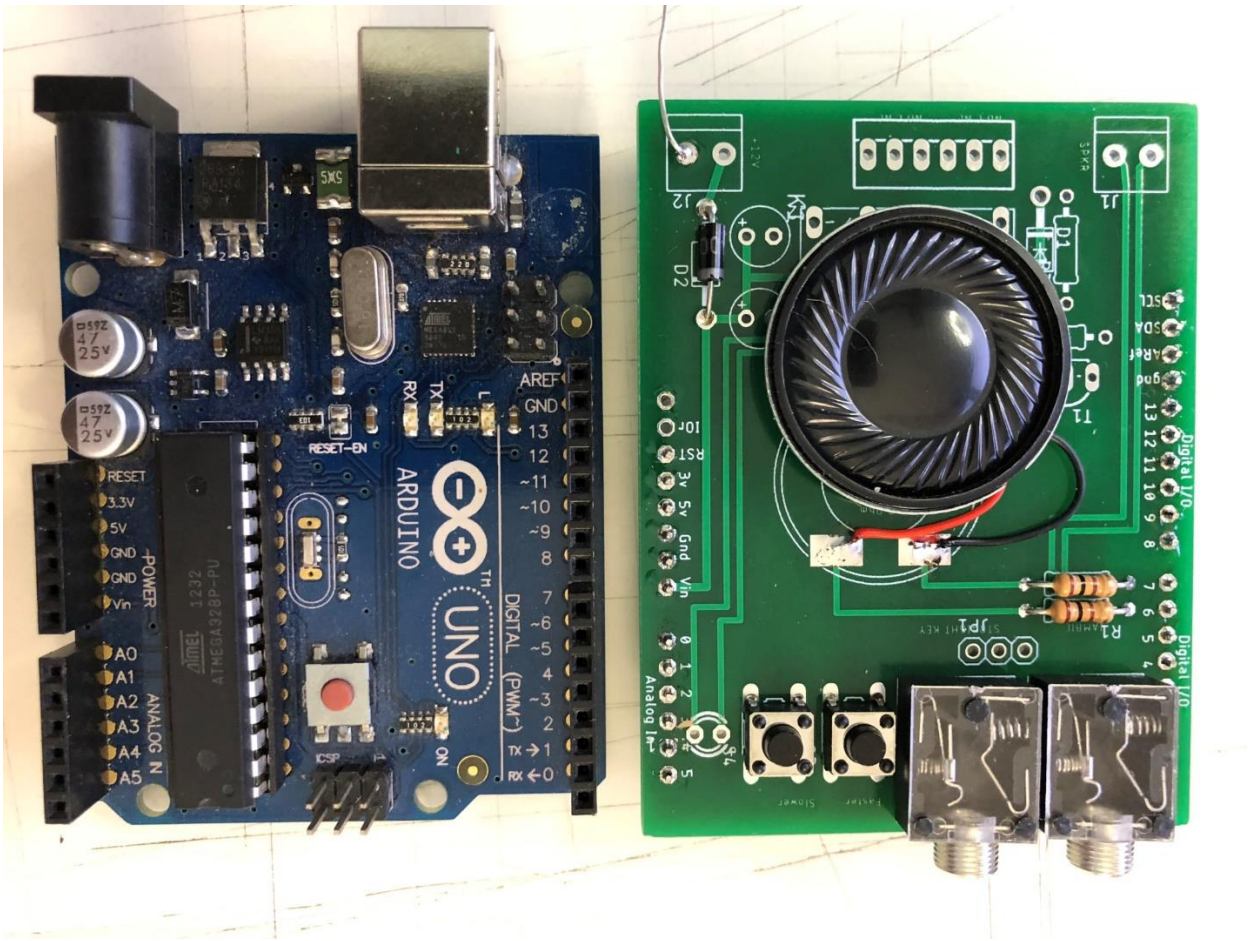
While most HF rigs can be configured to act as a code practice oscillator for new hams an IC 7300, FT 991, or other comparable transceiver may not be readily available. While CPO (code practice oscillators) circuits are everywhere this CPO design (leveraged from implementations created by others and placed into the public domain) attempts to:

1. Build on low cost Arduino Uno (now available for as little as $3-$5/board) as a shield
2. Power flexibility (5V to 30V DC) – I am using a 9V Battery
3. Supports straight and Iambic keyers driving a low cost speaker
4. May be used to key other transmitters/transceivers and or TR switches using the optional circuity provided via a DPDT relay
5. Enough remaining memory and spare DIO pins to add your own features (e.g. button to auto send CW messages like “CW CW CW QRP de KI6RT K”)



Overview

The CPO is designed as an Arduino Uno shield using standard 2.54 spacing headers. DPDT relay used to key a transmitter is not populated due to potential interference with the Arduino USB connector.



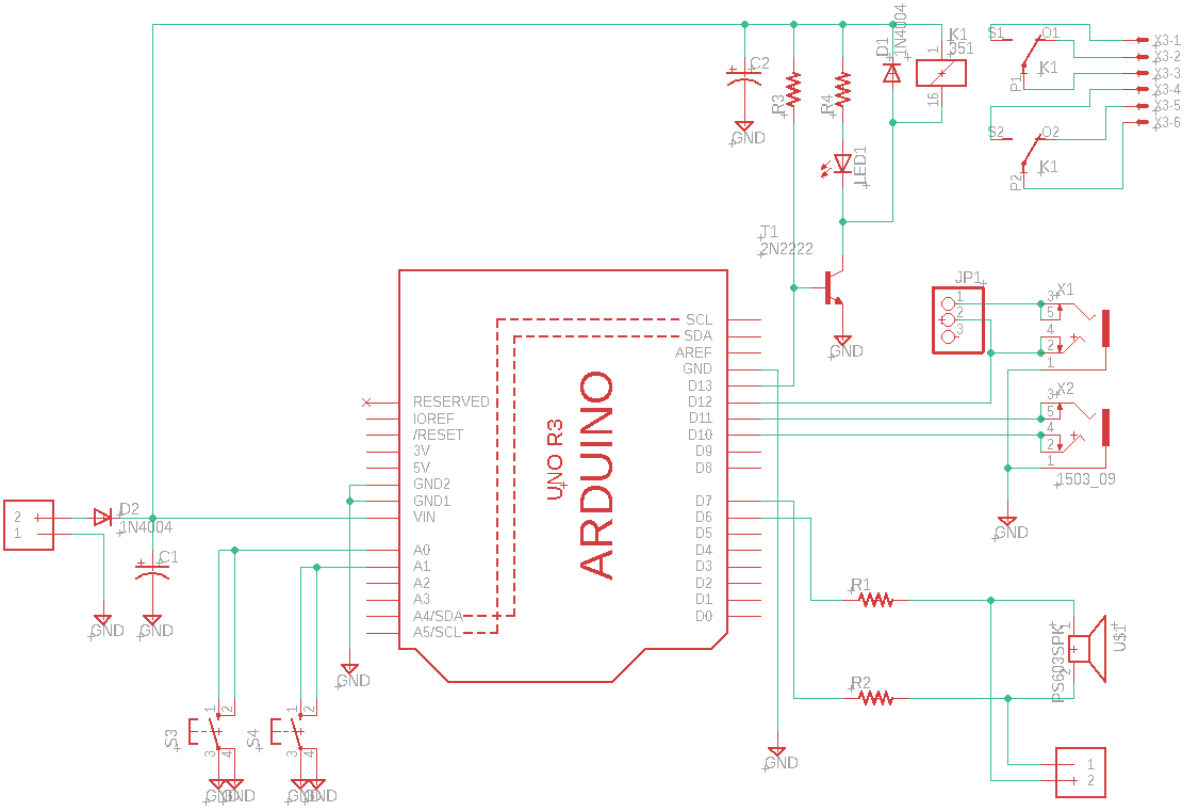
Notes

1. Miniature speaker is glued on using silicon calking or double stick tape
2. Jumper JP1 is not populated but is provided in case a mono phone jack is used
3. J1 is provided to solder an optional external speaker

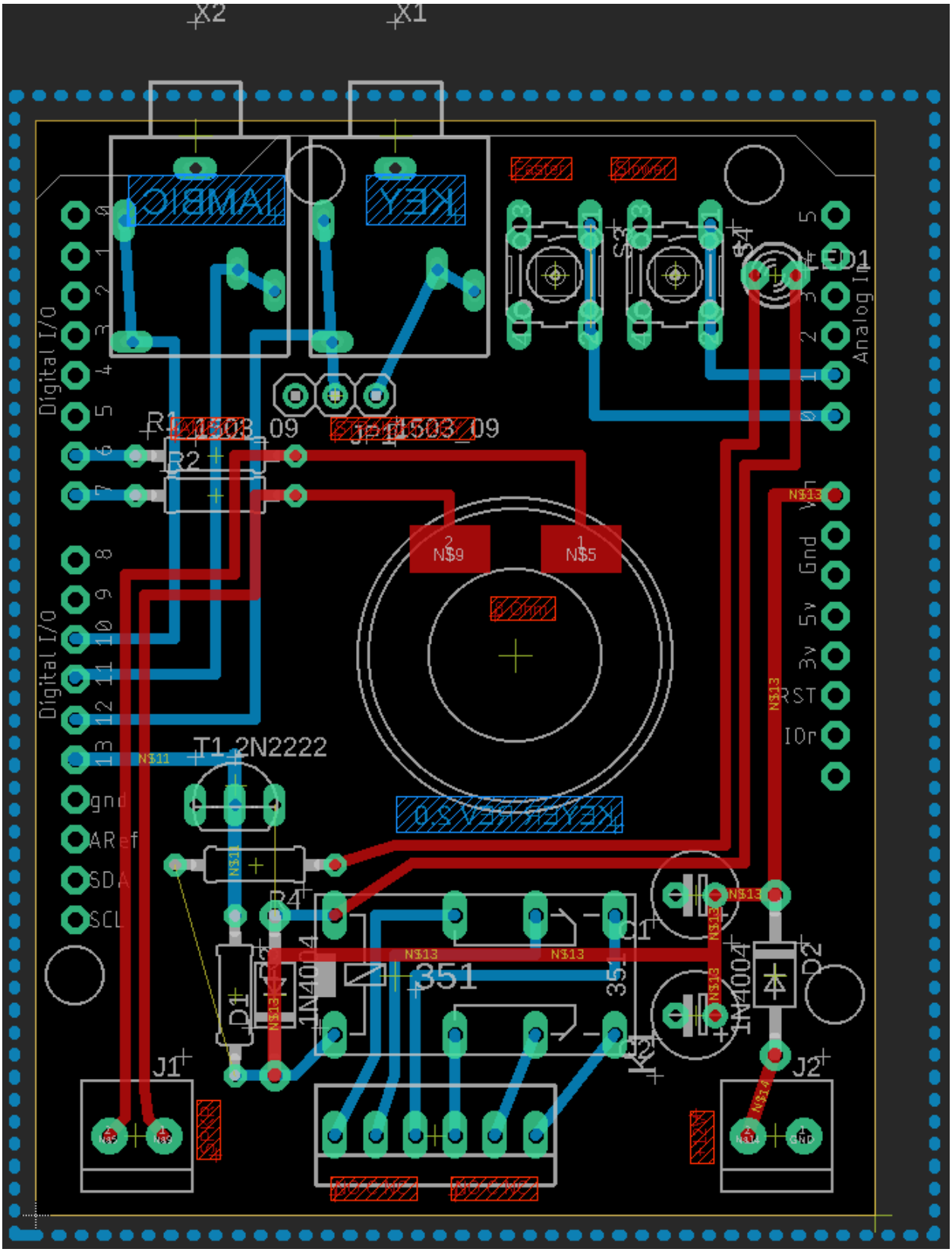
Bill Of Materials

ITEM	REF DESIG	DESCRIPTION	MANUFACTURER	ORDER INFO
optional	C1, C2	47uF 25V electrolytic capacitor	generic	
1	R1, R2	100 ohm ¼ watt resistor	generic	Tadya Electronics A-2051
optional	R3	4.7K ¼ watt resistor	generic	
optional	R4	1K ¼ watt resistor	generic	
2	D1, D2	1N4001A silicon diode	generic	Tadya Electronics A-162
optional	T1	2N2222 NPN transistor	generic	
optional	LED1	5mm LED, color of users choice	generic	
3	S2, S3	Tactile momentary switch	C&K PTS645SK43JSMTR92 LFS	Mouser 611-SM43JSMTR92LFS
4	X1, X2	3.5 mm headphone jack	Switchcraft 35RAPC2BH3	Mouser 502-35RAPC2BH3
user supplied	SPK1	8 ohm miniature speaker	Visaton K23 – 8 ohm	Mouser 243-K23-8OHM
optional	K1	12V DPDT Relay	generic	
user supplied	na	40 pin 2.54mm header strip	generic	Tadya Electronics A-197
user supplied	Na	Arduino Uno (any generation or clone will work)	generic	Sparkfun $22.95 Amazon $20.16 eBay $3.99

Schematic


ARDUINO
UNO R3
RESERVED
IOREF
/RESET
3V
5V
GND2
GND1
VIN
A0
A1
A2
A3
A4/SDA
A5/SCL
SCL
SDA
AREF
GND
D13
D12
D11
D10
D9
D8
D7
D6
D5
D4
D3
D2
D1
D0
C1
C2
D1
D2
1N4004
K1
R1
R2
R3
R4
LED1
T1
2N2222
JP1
X1
X2
1503_09
S1
S2
S3
S4
P1
P2
O1
O2
X3-1
X3-2
X3-3
X3-4
X3-5
X3-6
U$1
PS03SPK
GND

PCB Layout


X2
X1
JAMBIC
KEY
Digital I/O
Analog In
LED1
R1
R2
T1 2N2222
N$9
N$5
N$11
N$13
N$14
gnd
AREf
SDA
SCL
3v
5v
Gnd
RST
IOr
D1
1N4004
D2
J1
J2
351

Build Instructions

1. Trim & solder header strips
2. Install X1 & X2 (depending on supplier may need to trim leads to insert into PCB)
3. Install S2 & S3
4. Install R1 & R2
5. Install SPK1 and glue to PCB
6. Install D2 polarity protection diode
7. Program the Arduino Uno (email me for the latest source that I will upload to groups.io once fully debugged)

Operation

1. Plug shield onto programmed Arduino, connect key and power.
2. In Iambic mode use the momentary contact switch to increase/decrease CW rate.