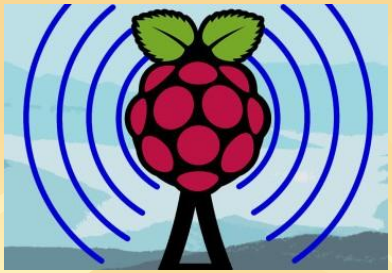


Internet Telegraph

Outfitting the first digital mode with 21st Century Technology

Scotty Cowling, WA2DFI

2017 TAPR/ARRL Digital Communications Conference

September 2017, Earth City, MO

CW vs ‘Phone

Typical Fffone Op’s Installation

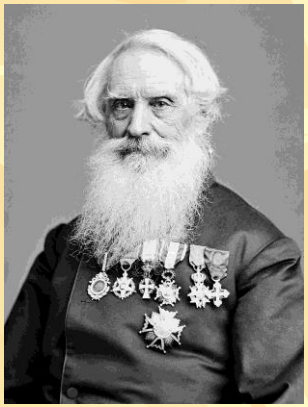
CW vs ‘Phone

Typical CW Op’s Installation

Some History

American Morse Code, 1837

Morse Telegraph Club
www.morsetelegraphclub.com



Samuel F B Morse

International Morse Code, 1848

makezine.com/projects/use-raspberry-pi-modern-day-telegraph/

Friedrich Clemens Gerke

Wait, not *that* much history

14 Feb 1991 – Technician code test eliminated
15 Apr 2000 – General and Extra code tests dropped to 5 wpm
11 July 2003 – ITU drops international code dropped requirement
23 Feb 2007 – FCC drops amateur code requirement
24 Feb 2007 – Bruce does happy dance

Even though the horse is dead, the beatings continue

So what can we do about it?

#1 –***Spark*** interest (pun intended)

Sometimes this isn't necessary to get someone interested, but interest leads to passion, and *passion* is what makes a CW operator.

One method is to combine modern techniques (computers) with old ones (Morse) to capture the modern amateur's interest.

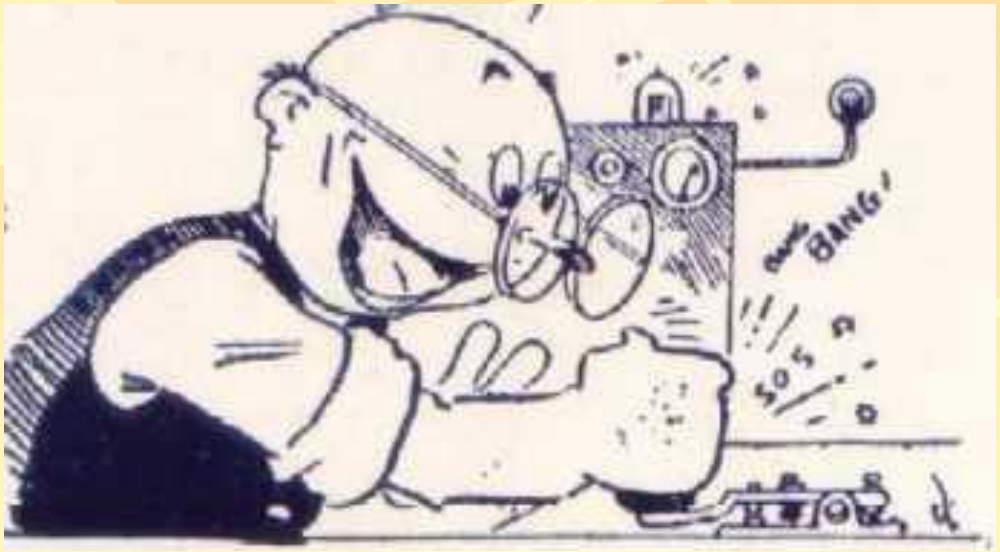
So what can we do about it?

#2 –***Teach*** good techniques on quality equipment

Don't use junky or inadequate keys just because they are cheap.

Do use PCs, Farnsworth, VHF nets, code tutors, Rufz, etc

Do use tried and true methods.



So what can we do about it?

#3 –***Practice***

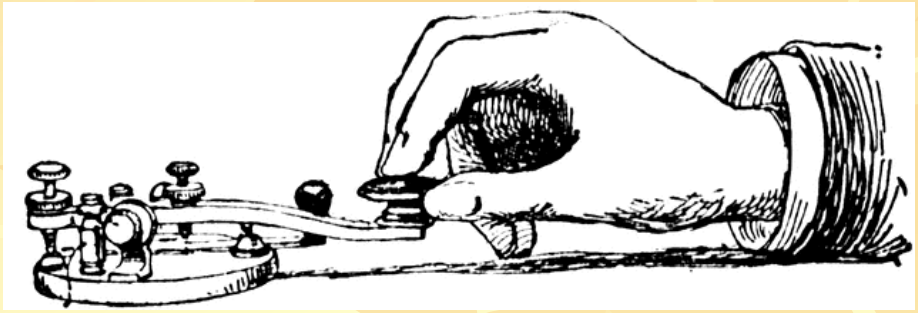
Participate with your students in practice sessions.

Make it fun.

Schedule your practice sessions

Knowing when each practice session is held will increase participation

So what can we do about it?



#4 – ***Bridge the code Chasm***

Between 5 and 20 wpm lies the often times fatal code CHASM. *Why?*

Solo practice sessions become boring after a while

Difficulty in finding partners (QSOs) for interactive practice

Beginners usually have minimal radio equipment and/or antennas

However, most everyone has a PC and an internet connection

Morse is dead, Long live Morse

How to get over 100 kids to stand in line for 6 hours

The Explorer Post 599 "Free CPO" Project

For the 2005 Scout-O-Rama we wanted something:

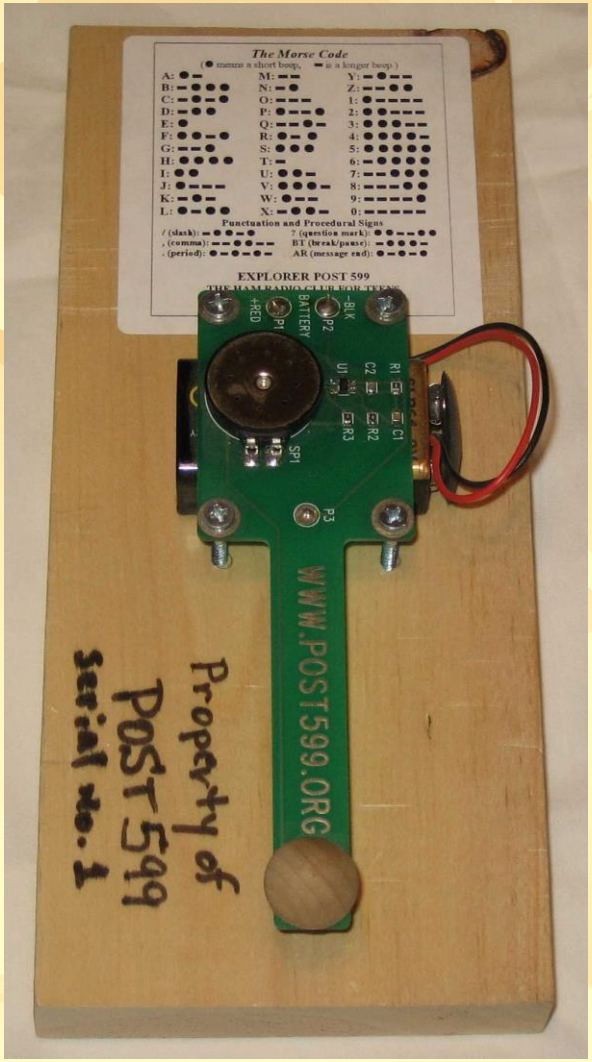
- Cheap enough so we can give away 100 of them
- Easy enough to build so that a 10 year old can do it in 10 minutes
- Quiet enough so that Mom would allow it in the house
- Fun to play with so that 8 to 14 year olds will *want* one
- Preferably have something to do with Ham Radio…

Post 599 Free CPO Project

The Explorer Post 599
“Free CPO”

Cost to build:
about $1.50 each

Number built: 100
Number given away: 98
Number of happy kids: 98



Post 599 Free CPO Project

Explorers soldered all SMT parts and tested each CPO

No Explorer scouts were harmed during this event (not much anyway)

Post 599 Free CPO Project

Recipient scout solders battery and contact wires and does all mechanical assembly

Post 599 Free CPO Project

The CPO project was well received by the scouts

Post 599 Free CPO Project

Testing out his new CPO!

Note the advanced keying technique

Post 599 Free CPO Project

The Post 599 booth was a bit popular!

Many scouts (and parents) waited over an hour in line to build a CPO

Learning the Code

On the air practice with your HT

Explorer Post 599

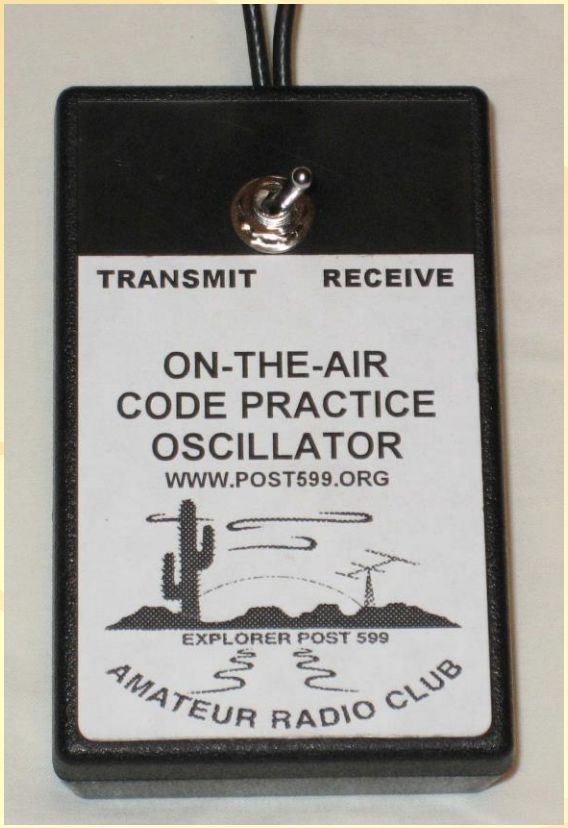
“HTCW”

Mark II

2008

Learning the Code

On the air practice with your HT



Explorer Post 599

“HTCW”

Mark III

2008

Learning the Code

On the air practice with your HT

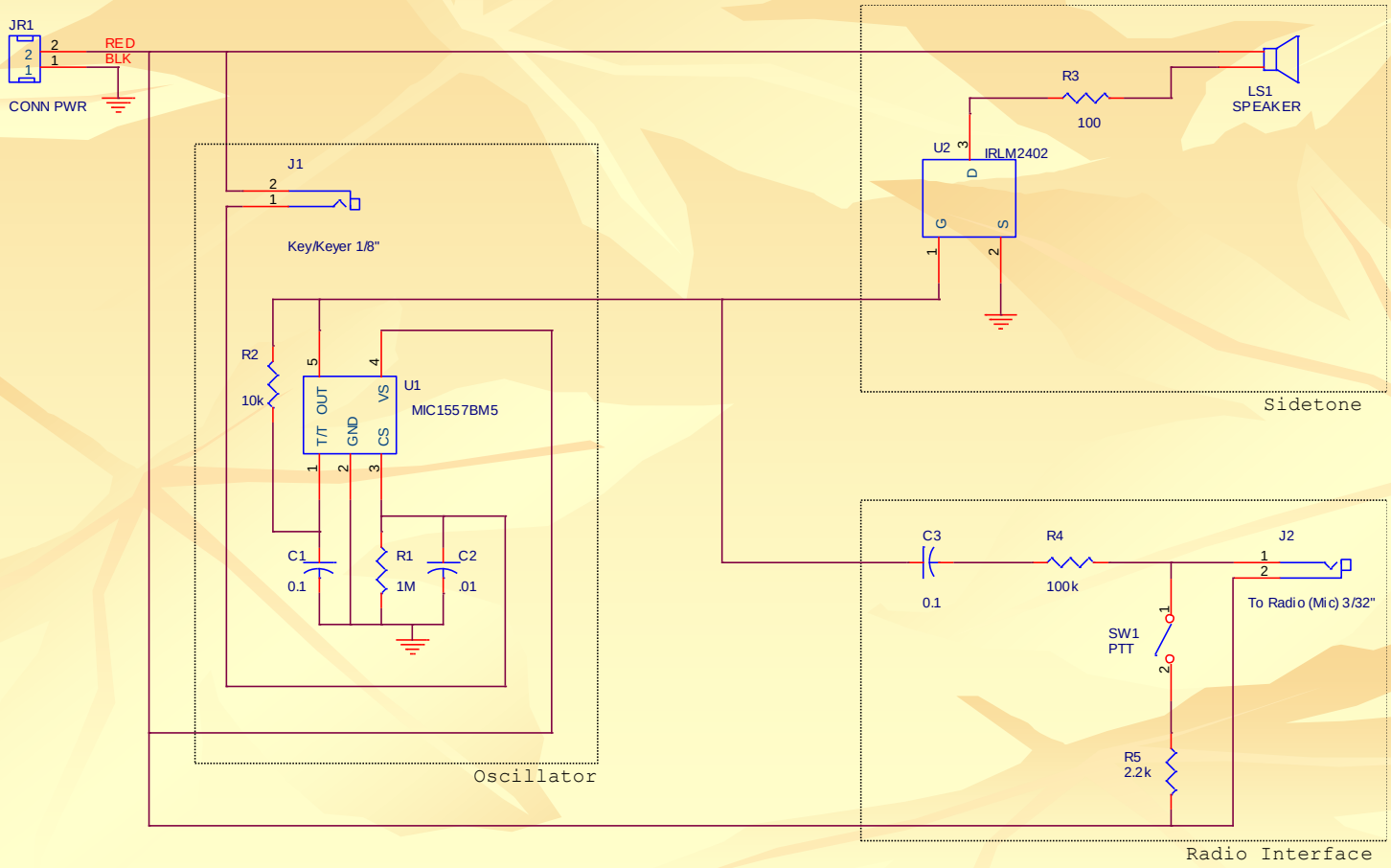
Explorer Post 599

“HTCW”

QRV for 2M

Learning the Code

On the air practice with your HT



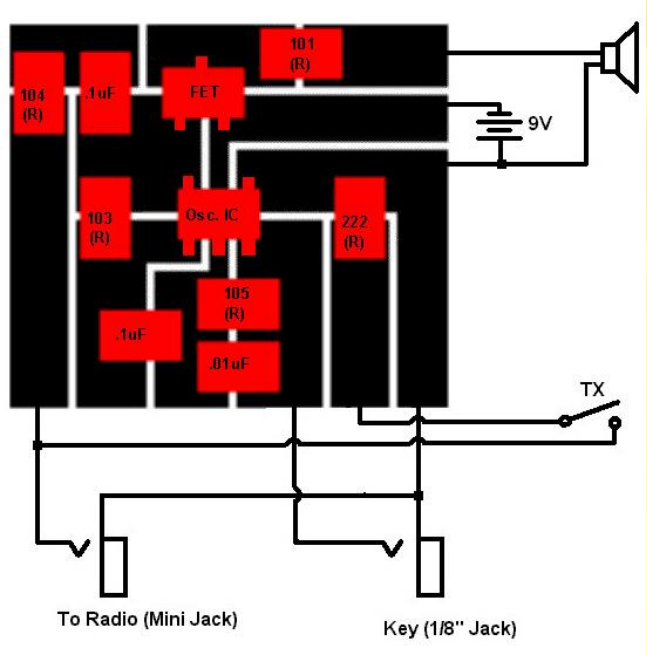
"HTCW"

schematic

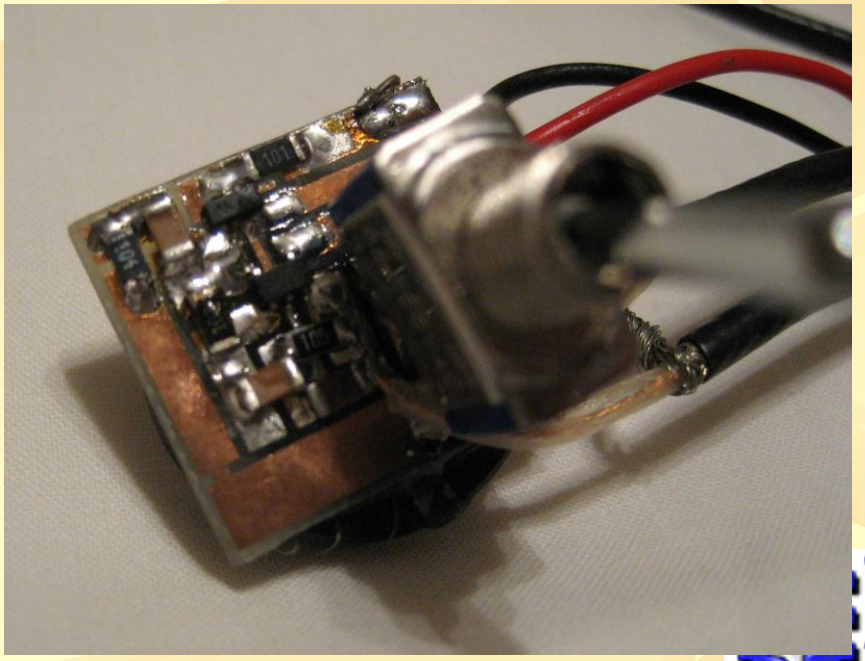
Learning the Code

On the air practice

Layout of “HTCW” PCB



Picture of “HTCW” PCB



Tackling the Hard Ones

The Internet Telegraph

- Combine modern techniques (computers) with old ones (Morse) (to ***spark*** interest)
- Provides a group practice virtual room (for ***practice***)
- Is inexpensive (under $40 even if your junkbox is bare)
- Requires some assembly (also ***sparks*** interest)

Oh, and it is FUN,too!

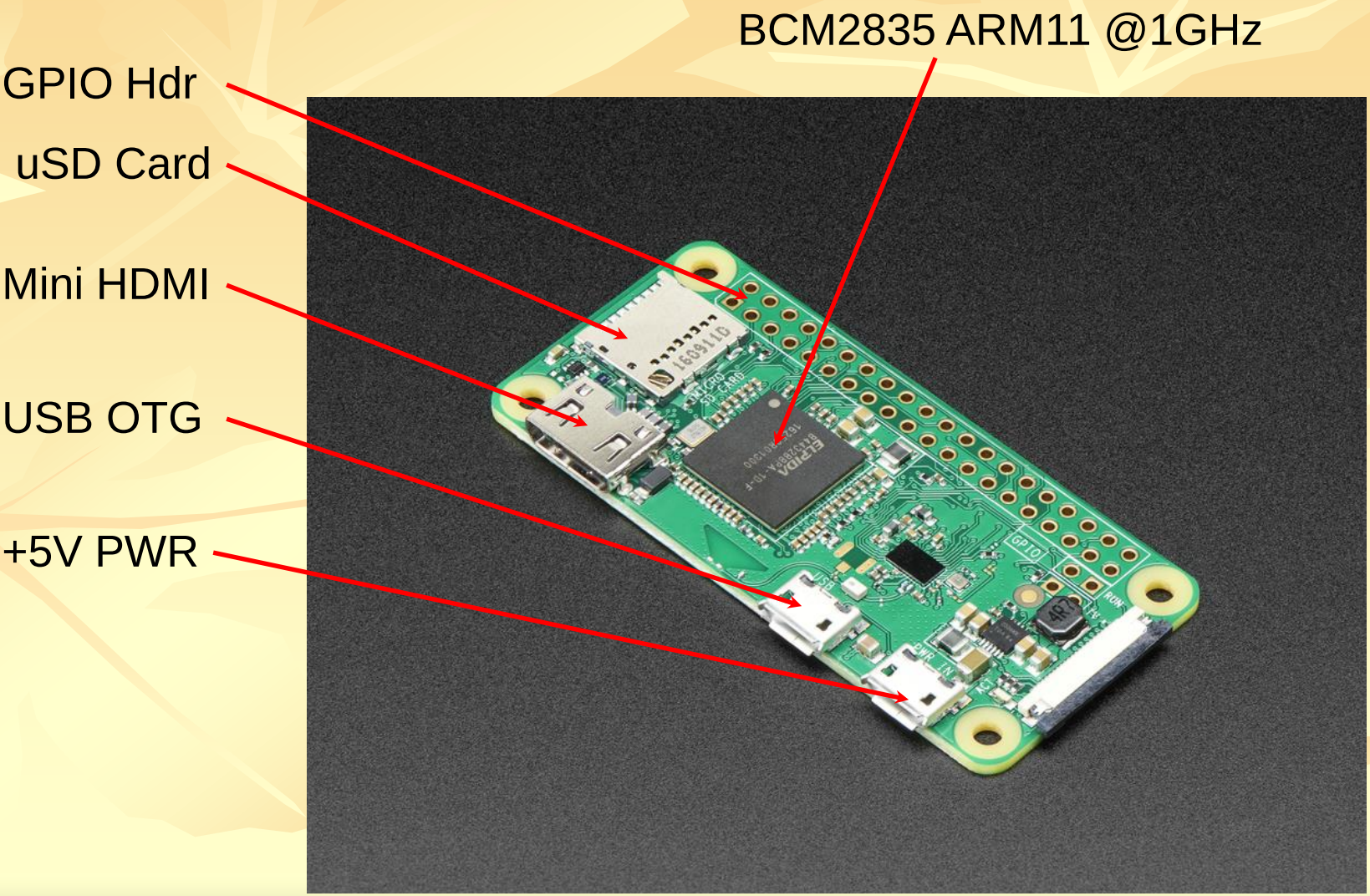
Internet Telegaph

- Uses Raspberry Pi Zero-W ($10)
- Add buzzer ($1) and key (<$20 at most swap meets)
- Connects to most any wireless AP
- Can run headless (no HDMI monitor, mouse or keyboard)
- Connects to one of unlimited number of Morse “chat rooms”
- Full duplex
- User configurable via text editor
- Local code practice mode (coming next release)

Internet Telegraph

Original Article in Makezine
By Adam, Isa and Emmanuel McKenty

Internet Telegraph Hardware

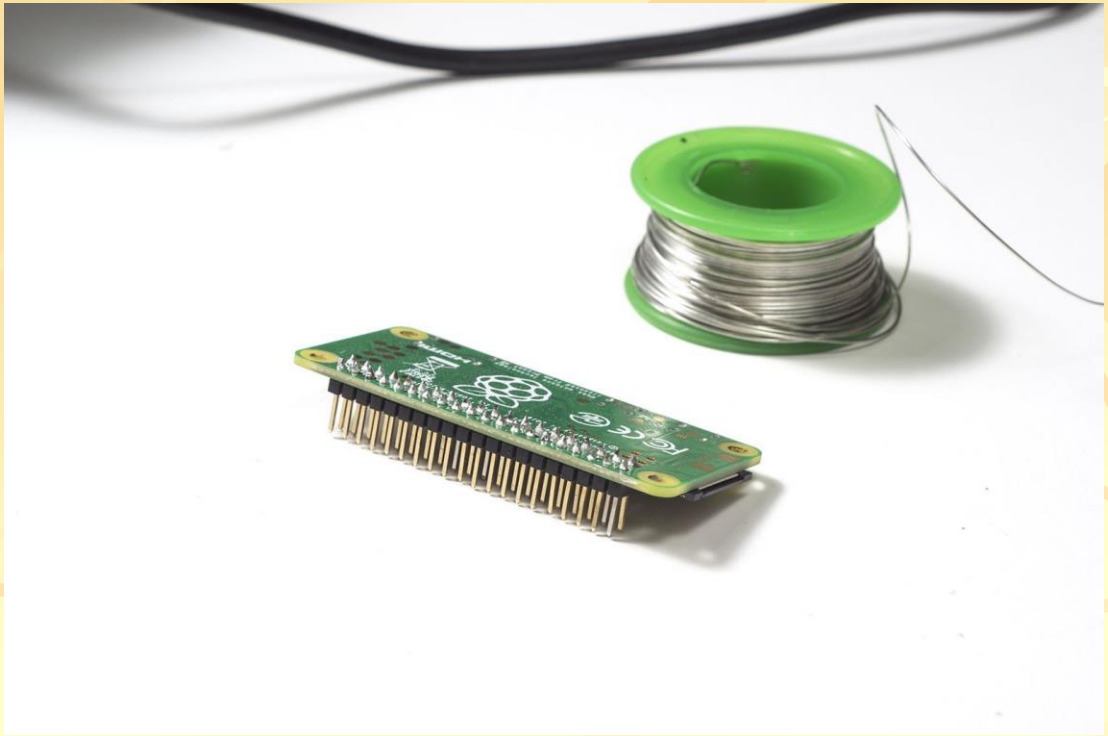


Internet Telegaph

Assembly

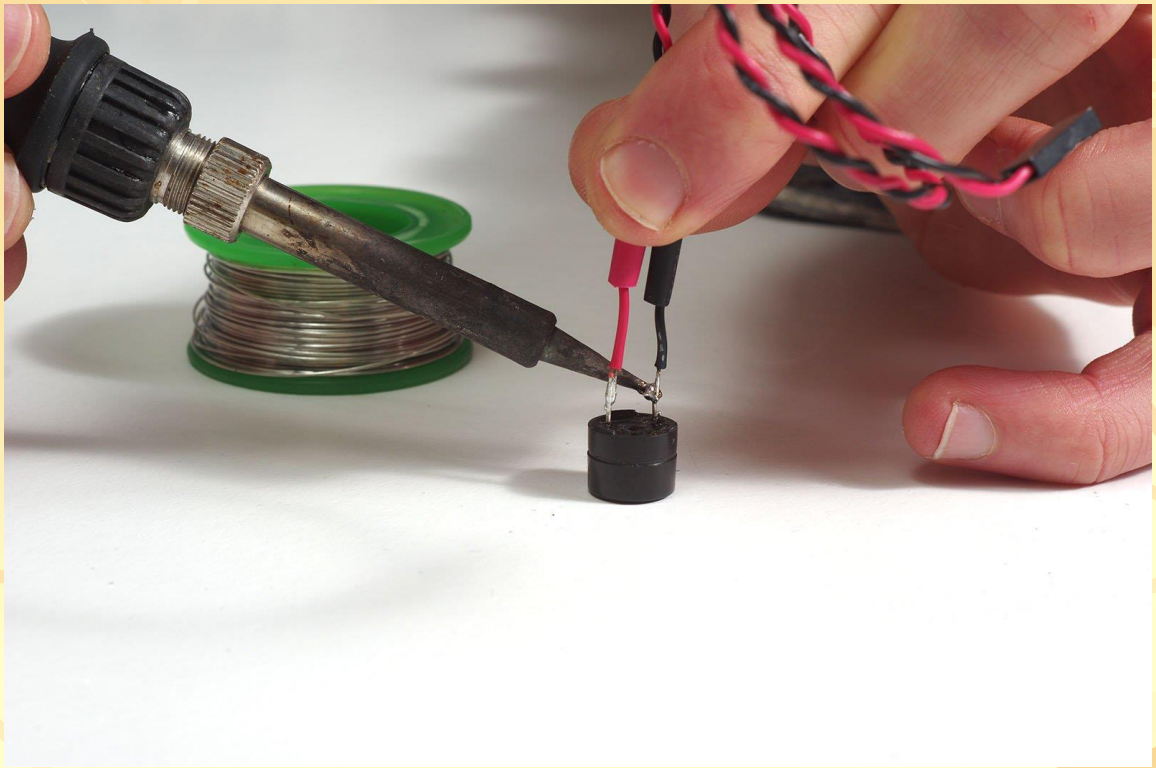
- Solder 40-pin header onto Pi Zero W
- Make key pigtail
- Make buzzer pigtail
- Clean up and mount telegraph key to board
- Program uSD card image
- Assemble into case
- Update AP parameters: SSID, PWD, Encryption type
- Update local configuration: server name, chatroom name, DHCP

Internet Telegraph Hardware



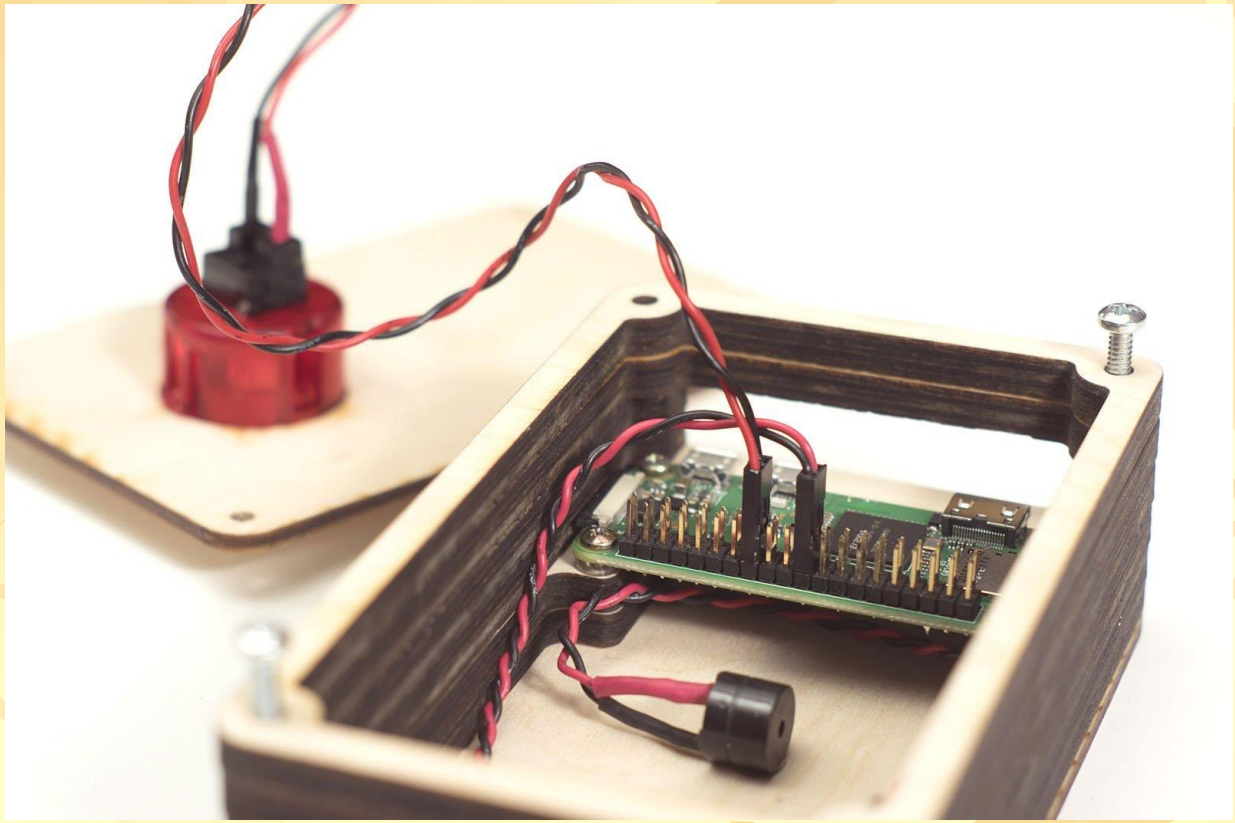
Solder on the GPIO header

Internet Telegraph Hardware



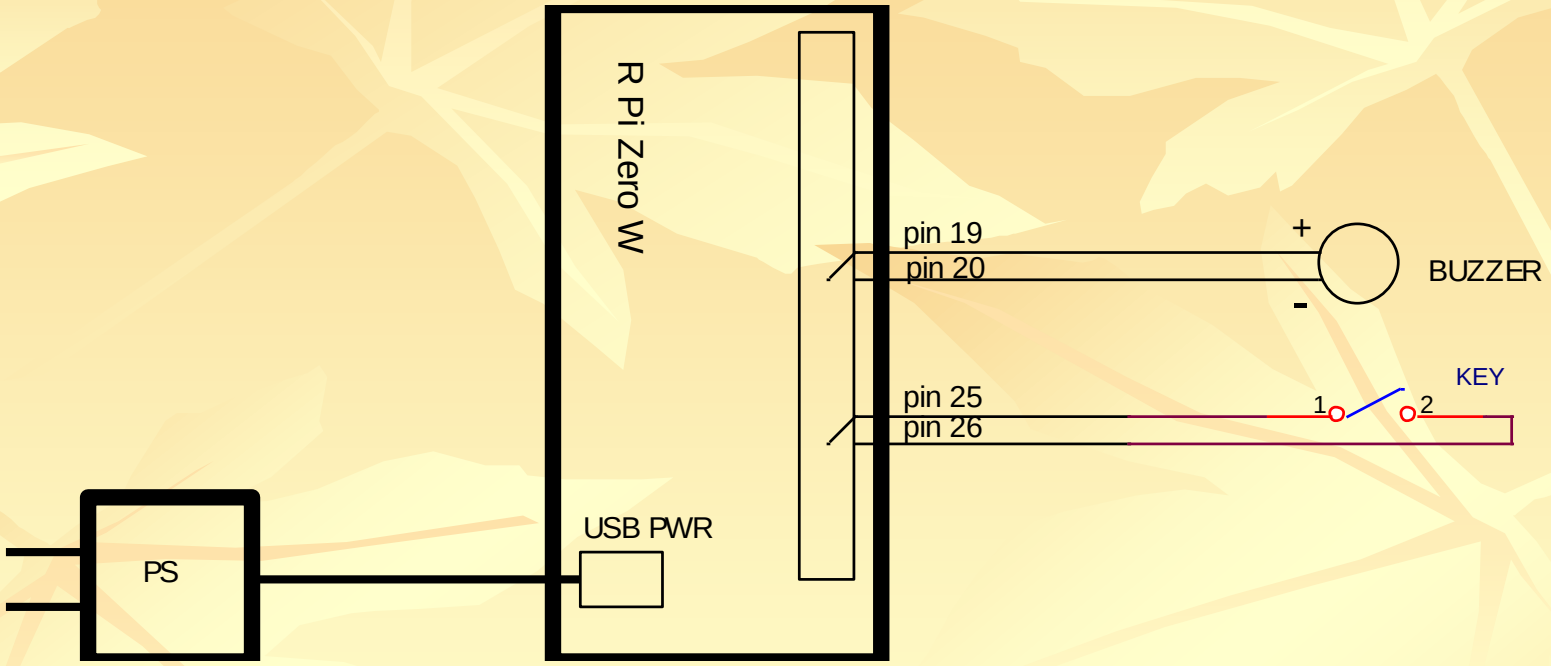
Solder buzzer onto the pigtail

Internet Telegraph Hardware



Final Assembly

Internet Telegraph Hardware



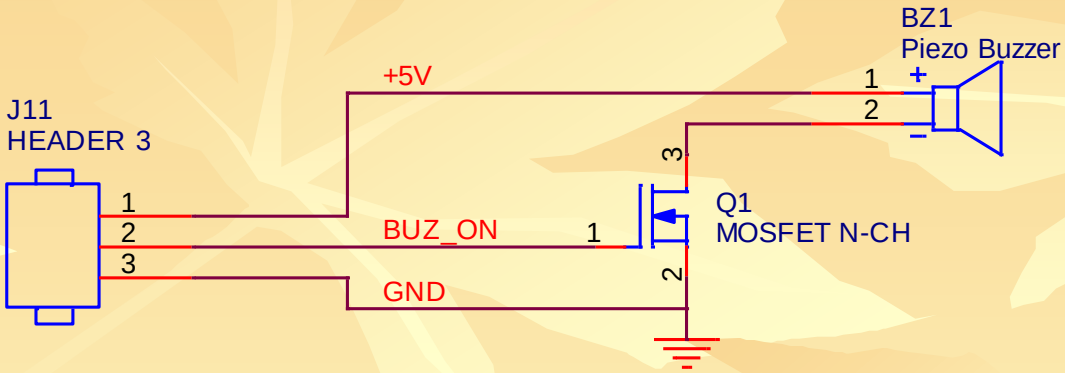
Internet Telegraph Wiring (Original)

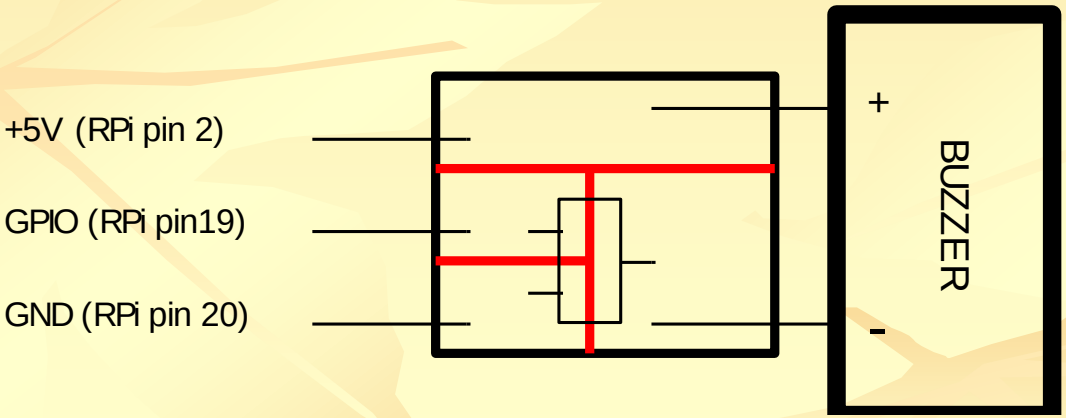
Internet Telegaph

Improvements over original article

- Hardware: Use telegraph key instead of “Big Red Button”
- Hardware: Use MOSFET to drive 5V buzzer from 3.3V I/O pin
- Software: Local loopback to decrease latency
- Software: CPO mode when no AP or server found

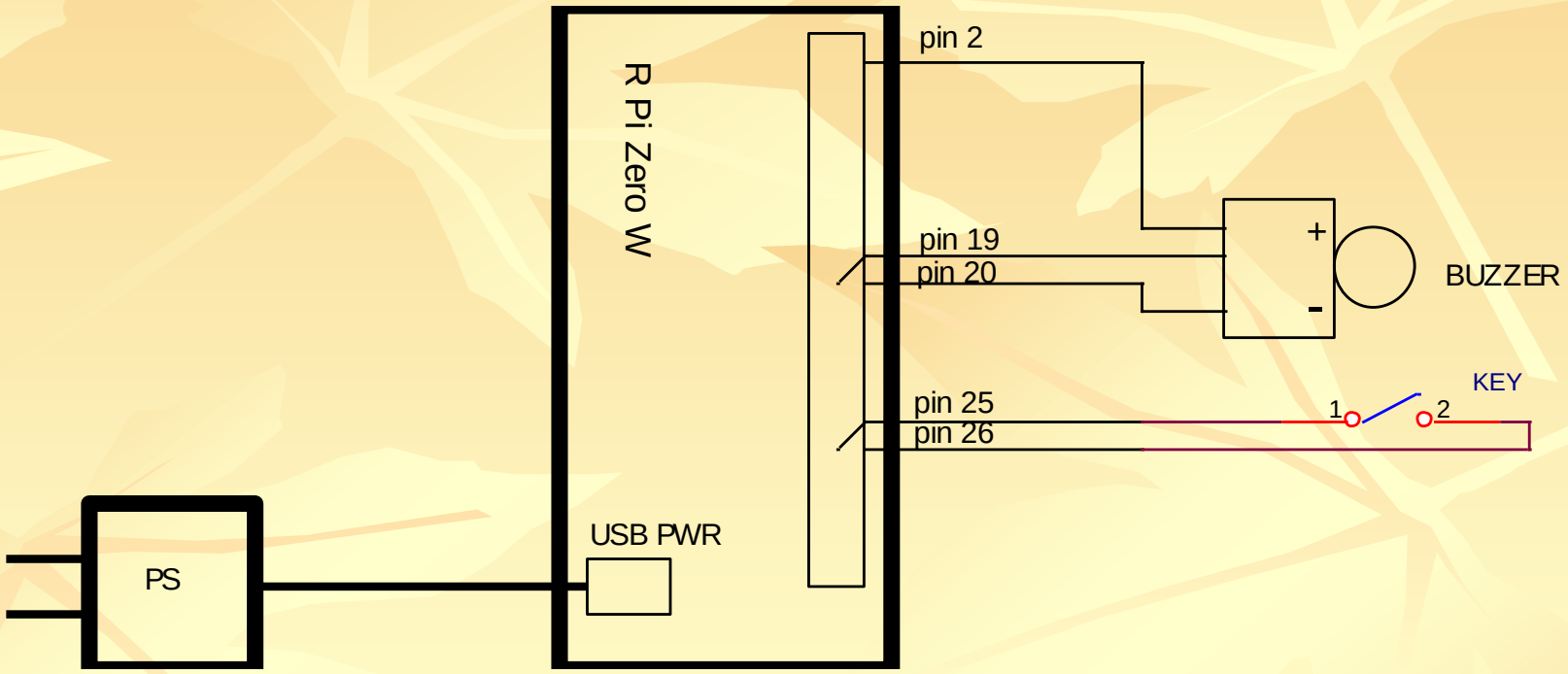
Internet Telegraph Hardware





MOSFET Buzzer Driver

Internet Telegraph Hardware



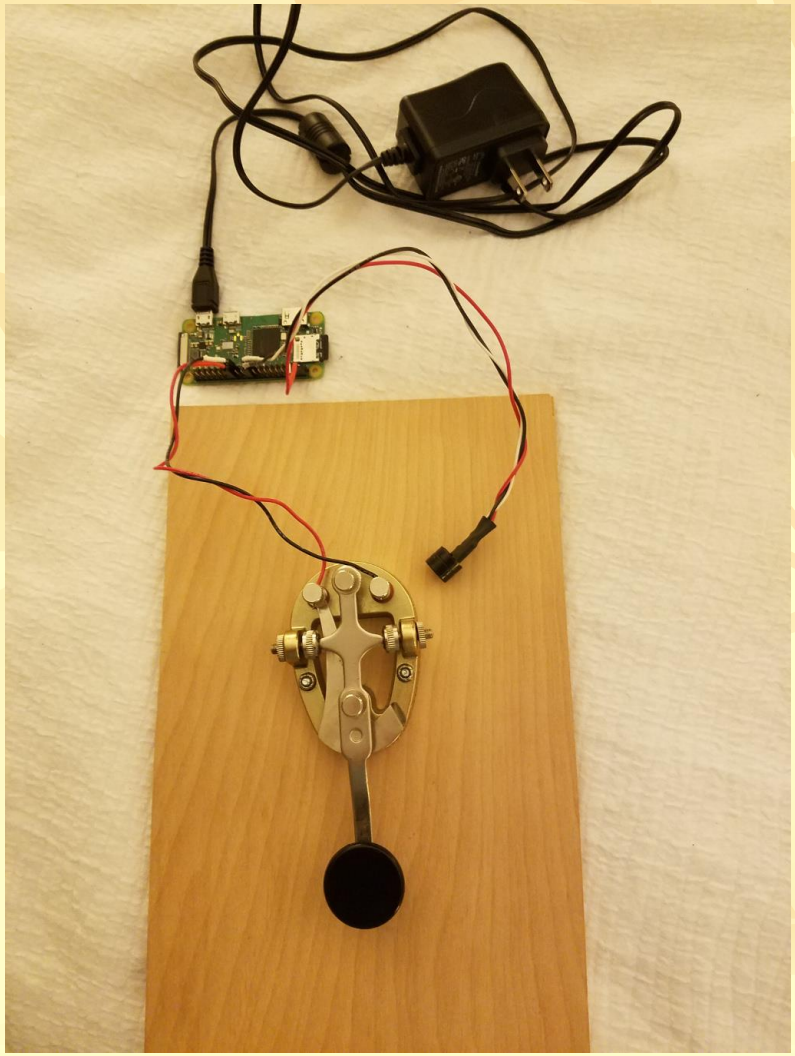
Internet Telegraph Wiring (Modified)

Internet Telegraph Hardware

Internet Telegraph

Completed Unit

2017



Internet Telegaph

WiFi Configuration

Edit file **/etc/wpa_supplicant/wpa_supplicant.conf**

```
network={
    ssid="YOUR_NETWORK_NAME"
    psk="YOUR_NETWORK_PASSWORD"
    key_mgmt=WPA-PSK
    }
```

Internet Telegaph

Telegraph Channel and Server

Edit file **/config.json**

```
{
  "channel": "lobby",
  "server": "morse.autodidacts.io",
  "port": "8000"
}
```

Internet Telegaph

Configure your Router

Set your router to pass port 8000 traffic

Internet Telegaph

HAVE FUN!!!

Thank you!

Internet Telegraph Project information at:

Makezine page: makezine.com/projects/use-raspberry-pi-modern-day-telegraph/

R Pi Zero W Boards available at:

Adafruit: adafruit.com

MCM Electronics: mcmelectronics.com

eBay: search for R Pi Zero W

See One in Operation in the Demonstration Room