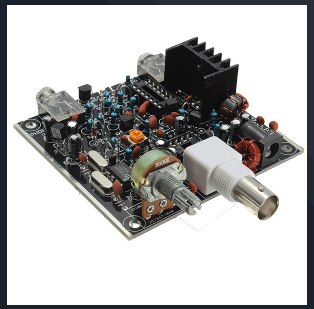
Recent adventures in ham radio kit building



A relative newcomers introduction to the world of ham radio kit building - the good, the bad, and the ugly

What we are talking about tonight

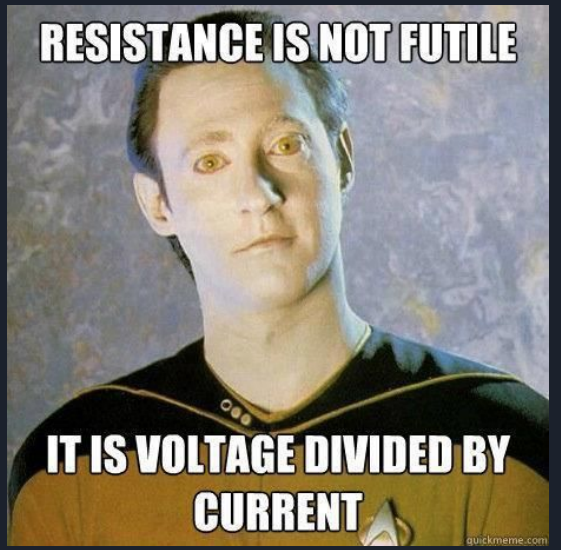
The fascinating and intriguing world of amateur radio and related kits

Very brief history

Experiences

Pros and Cons

Examples



My personal experience

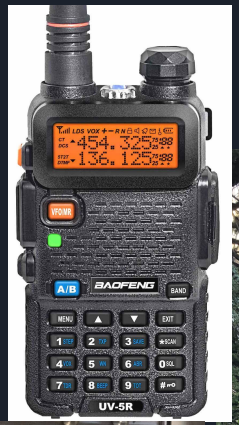
QRA? Erick Dahan, VE2LRZ

Got my ticket in 2017 - Basic with Honours

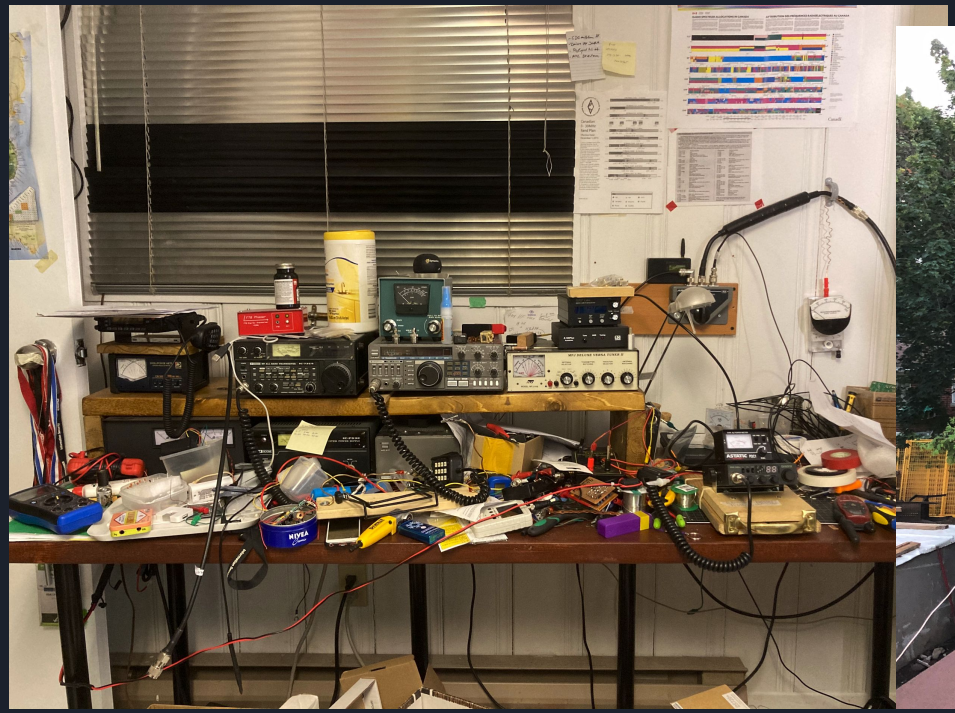
Homebrew spirit - origin of “amateur”

Pandemic

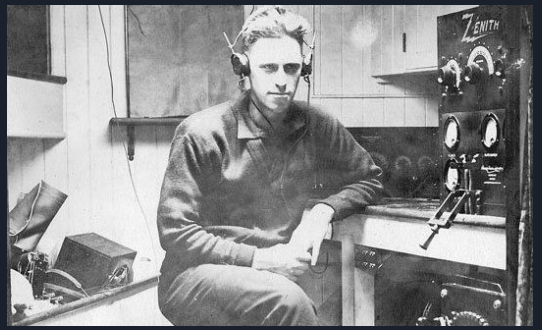
How it Started



How it’s going



Quick recap - Homebrewing



Amateurs…

Building equipment because none existed

Homebrewing, and publications sharing tricks and designs started.

Heathkit

Electronics kits

Affordable personal computers

More info:

https://www.iaru.org/amateur-radio/amateur-radio-through-the-decades/

Heathkit SB630 Control Console

Mort Waters W2JDL
82 Boston Avenue
Massapequa, Long Island
New York 11758

The old saying about good things coming in small packages could have been written with Heathkit's SB630 console in mind. There are four operating conveniences in this one compact unit—SWR bridge, hybrid phone patch, 24-hour digital clock and an entirely independent 10-minute timer which reminds you when it's time to identify. This last provides you with a choice of a brightly lit *identify* on the panel, or the internal buzzer may be switched on so that light and sound both remind you that it's time for a station break.

Styled to match the rest of the ever-growing Heathkit SB-family, the SB630 can, of course, be used with any gear. Panel height is identical with the other Heath units, but a variety of feet come with the kit to let you change it to whatever suits you best.

SWR bridge

The hardware and circuitry of the built-in bridge appear to be identical to the HM-15 SWR meter. Two sets of resistors are supplied with the kit, allowing use with either 50-52 ohm or 70-75 ohm transmission lines. It's a good idea to keep the unused resistors handy; you can tape them to the chassis in case you decide to change feedlines.

For full scale forward deflection on 75 meters, 70 watts of output are required but as frequency rises, less power is needed. At 6 meters only 2 or 3 watts pin the needle when the sensitivity pot is wide open. Despite these requirements, the bridge can be used at lower power levels too, with some slight loss of accuracy. If for example, the forward reading is only 50% of full scale, the indication of reflected power is proportional.

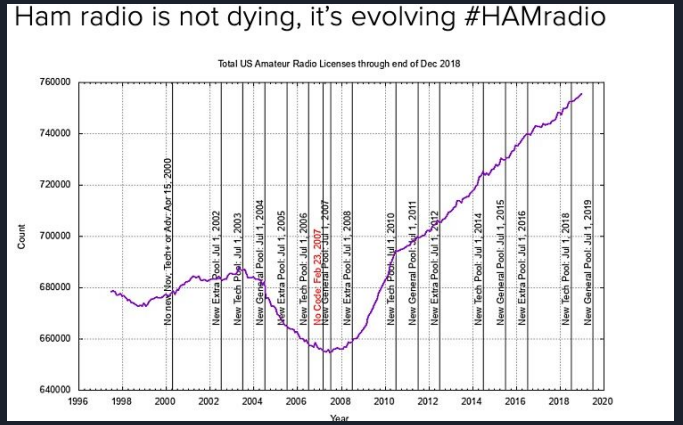
Perhaps even more important than any discussion of the bridge's characteristics is the manual's lucid and concise explanation of SWR and line losses, and what they mean to the amateur.

Phone patch

The SB630's meter has two functions—SWR, as already mentioned, and the indication of phone line listening level. When the mode switch is turned to **phone patch**, the meter reads accordingly.

In addition, there's a two-position slide switch on the rear apron. At the **monitor** position, which is where you'll normally use it, the meter indicates signal level on the phone line, so you can set the gain to avoid

Radio and Radio related Kits today - What's going on?



Resurgence in interest

Changes in licensing

DIY and Maker community

3D printing

Low cost Single-Board computers and microcontrollers

Extensive information readily available online

Newcomers to hobby from diverse backgrounds

Innovation, discovery, and ready access to affordable and accessible technology

foulab
montreal hackerspace

MAKER LAB

Let’s talk about Kits!

Not just transceivers, transmitters, or receivers

Antenna and related: Antenna tuners or “transmatches”, antennas, traps, coils, SWR indicators, etc

BalUns, UnUns, Transformers

CW keyers

Amplifiers

RF shaping: BPFs, HPFs, LPFs, RF attenuators, etc

Power management

Displays, VFOs, Audit kits

Troubleshooting and testing equipment

Building your own kit - Pros

Satisfaction of operating and using something you built

Cost/Value

Learning - the theory of operation

Lower complexity

It’s fun!

Can be group activity to get people interested

Building your own kit - Cons

You are not likely going to build a highly sophisticated and advanced tcvr

    You are not going to get $2000 tcvr experience with a $100 DSB radio kit

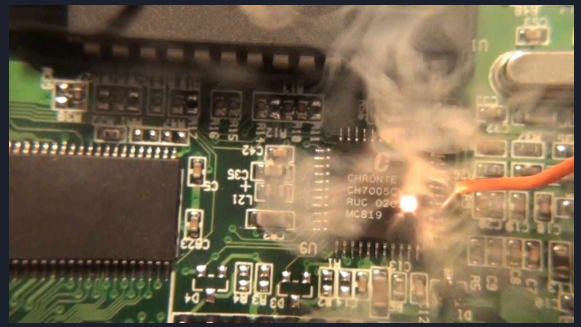
There are no guarantees: on power output, quality, or working at all!

Troubleshooting - sometimes things don't work the way they should, or expected

    Usually assembler error, but sometimes who knows

Alignment and adjusting

After all that hard work, results not what you expected



Typical kits

Supporting components/tools: test equipment, power related

Antenna kits and related: antennas, tuners, traps, transformers

CW: Keys, keyers, practice kits

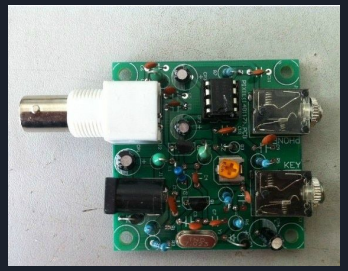
Transceivers:

- Mostly QRP levels due to their simplicity and cost
- Plethora of CW and Digital modes kits
- Phone: mostly Double Side Band tcvrs, a few SSB, even fewer AM.

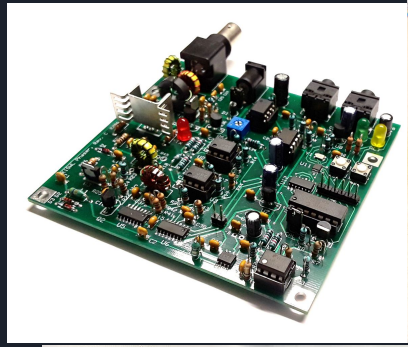
Some are mostly assembly and no/virtually no soldering (HF Signals uBitx)

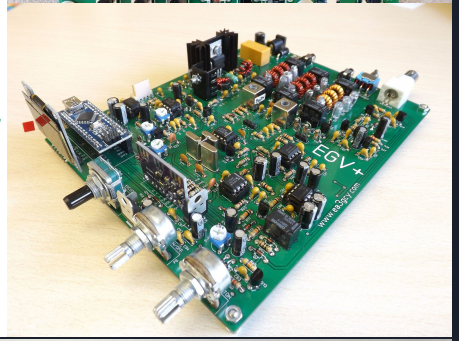
KITS!


ELECRAFT K2 TRANSCEIVER




QRPGUYS.COM
Si5351 VFO




EGV+

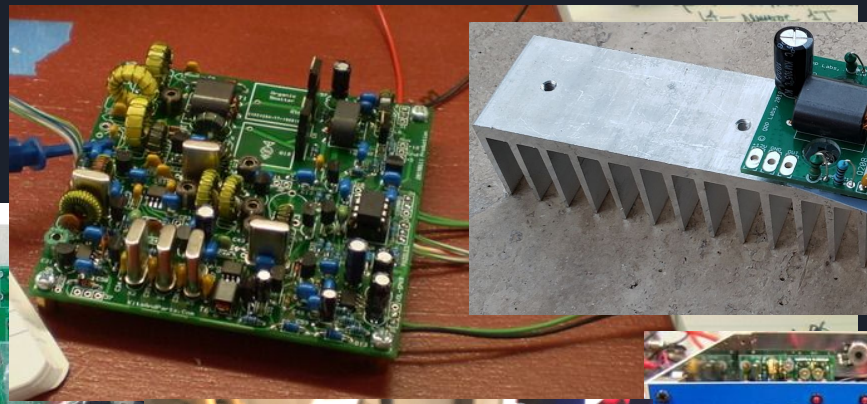

QRPGuys No Tune End Fed Half Wave Antenna

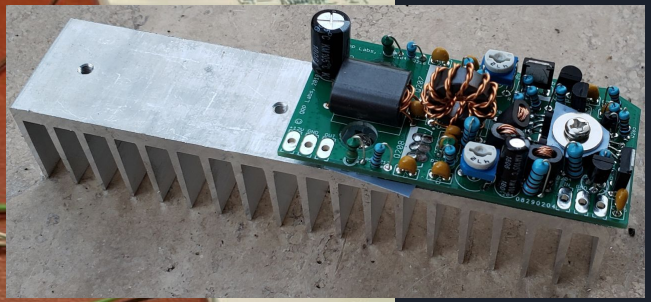

A 7.020.00
QRP Labs QCX-mini CW Transceiver

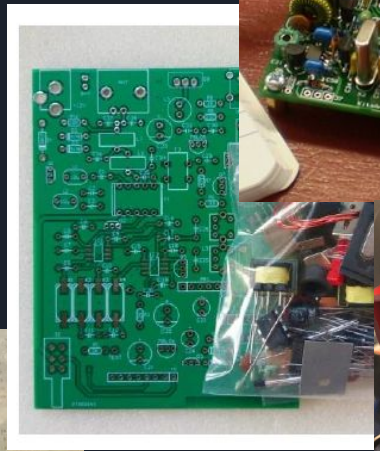

HARDROCK-50 HF POWER AMP
HARDROCK-50 AMP
VERSION 3 FW:1.2
KEY MODE
BAND SELECT
POWER/ TX

MORE KITS!


75M SSB/CW TRANSCEIVER
KD1JV SURVIVOR
WWW.QRPKITS.COM
OFF








QRPproject SPEAKY


FT8 Phaser
FT8 Digital transceiver
KI5WL
FT8
Alt


Hilltopper 40
GAIN
SPEED
FUNCTION
TUNING


TRX "KLOPIK"
PTT
MIC
VFO
A=B
A/B
PHONES
RIT
MODE
BAND
MENU
IF WIDHT
CW / SSB
TUNING
RIT
AF gain


ON/OFF
12V
ANT
TUNE
DCT
DSB/CW
QRP TRANSCEIVER
MENU
KEY
EAR
MIC
SPK
AF GAIN
MIC GAIN
CW
www.ozQRP.com

Radio Kits - what to look for

- Popularity
- Active and sizeable user (and therefore support) community
- Mailing list (“reflectors”)
- Well written documentation for assembly, operation, troubleshooting, and schematics.
- Multi-use
- Matches your building skill level (# of components, SMD, toroid windings, eyesight friendly, board size, etc)
- Responsive vendor/kitters - many do this as a hobby or side business, and it shows.
- Avoid early adoption

Kit Building vs Building it yourself/Homebrewing

In many cases schematics and build manuals can be reverse engineered/copied

The bill of materials is not always cheaper to get yourself, and you likely won't want to buy limited numbers of the quality components often included in these kits (not all junk boxes are created equal). I did this for some low pass filters; sourcing the toroids, getting the right amount and value of NP0 capacitors, often more trouble than it's worth. (Of course that hasn't stopped me).

Sometimes the well designed PCB is worth the price of admission - sure you can put it on your own or use a copper clad board, but is it worth it?

Supporting the kit vendors

Where to source parts (Local and Shipped)

Digikey, Mouser, Newark (CA): most components, type 43 toroids. Most can upload your BOM as CSV file

KitsandParts (W8DIZ) (USA): esoteric parts, every toroid imaginable

Specialized: mikeselectronicparts for poly variable caps

Nettyelectronics (CA): Earl VE3AB - email him!

Abra

Addisons: I've found older HC49 sized crystals, weird ferrite cores

Amazon/AliExpress: "Cheap, Quick delivery, avg quality - pick one"

Dumpster diving: old junked electronics/radios and some desoldering. Mostly for toroids, weird polyester/mica capacitors, poly variable capacitors, extendible antennas… why not? Recycling at it's finest. YMMV

How about we set up a local "parts exchange" on a mailing list?

Kits - just some of the vendors out there

Big list:
http://www.qrparci.org/links/qrp-kits-bits-and-supplies
https://qrpkits.com/ 👍
http://k4icy.com/cw_qrp_sw40.html
https://qrpguys.com/👍
http://ozqrp.com/👍
https://qrp-labs.com/👍
https://qrpbuilder.com/
http://www.4sqrp.com/kitIndex.php👍
https://kitsandparts.com/5watters.php👍
http://www.qrvtronics.com/ USA representative of
http://crkits.com/
https://www.sdr-kits.net/
http://shop.kit-projects.com/👍
https://amateurradiokits.in/

https://www.vakits.com/catalog/ham-radio-kits
http://www.jumaradio.com/juma/
https://youkits.com/products/youkits-digital-40-qrp-transceiver-kit
http://dzkit.com/
https://elecraft.com/products/k2-the-classic-hf-transceiver-full-kit
https://steadynet.com/emtech/
https://hamtronics.uk/
https://www.hamshop.cz/
https://www.sotabeams.co.uk/
http://fivedash.com/
http://www.nitehawk.com/blissradio/
http://www.qrpme.com/
https://Box73.com
https://www.qrphamradiokits.com/