

Amateur Radio Kit Building

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Homebrew and Kit Building Popularity

- Home brewing was popular for lack of assembled equipment
 - Home brewing was popular for financial reasons
 - Home brewing was educational
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- Kits were available for niche items
 - Kits were popular for financial reasons
 - Kit building was popular for educational reasons.
 - Kit building -- the next best thing to assembled

Amateur Radio History

- **Spark Gap Transmitters**
- **The typical amateur radio operator / licensee was technically inquisitive.**
- **Hams built their own transmitters (CW/AM) and receivers (CW/AM)**
- **Technology Changes (Super-regeneration receivers over to superheterodyne Receivers and now SDR).**
- **Emission types AM/CW only and CW/SSB (~1950) Now, SDR & Digital**
- **Assembled CW/AM/SSB Transceivers became available in 1957.
Transceivers Kits became available during 1965 (Heathkit).**

Early Amateur Radio Products

- Eico
- EF Johnson
- Hallicrafters
- Hammarlund
- Ameco
- Collins
- Drake

Transmitters Only (Kits & assembled Versions)



Receivers Only (assembled versions)



COLLINS RADIO



One of the finest superheterodyne receivers made.



Halcrafters

SSB Transceivers 1957 SR 150 (150W PEP input)



SSB High Power Transceiver 1963 SR 2000 (2KW PEP input)



R L Drake (Miamisburg, OH)



2B Receiver



2C Receiver



R4 Line (TX/RX Transceiver)

Drake equipment was economical and state of the art for the time.

The Drake 2B was considered a poor man's Collins 75-A4.

The first R L Drake Transceiver was the TR-3, named after the Triumph TR3

The Drake 4 Line Twins (Tx & Rx) were considered the poor man's Collins S-Line.

Commercial Kit Building

- **Separates (RX & TX) and Transceivers**
- **EF Johnson (transmitters and antenna matchers)**
- **Heathkit (Separate RX & TX and Transceivers)**
- **Eico (Separate TX and Transceivers)**
- **Ameco (Separate TX Kits and Built Accessories)**
- **World Radio Labs (Kits and Built)**
- **Knight Kit (Separate TX & RX and Accessories)**
- **A majority of hams built kits to learn electronics**

Kits



The SB-101 and SB301/401 looked & operated like the Collins S-Line.

Demise of Kit Building

- Invasion of the Japanese
- Invasion of the Chinese
- Kenwood
- Yaesu
- Icom

Hams found the law of economics. (Hams are always frugal).

The “Big Three” provided the same quality as Heathkit & Drake at the same or lower prices. The Japanese provided more bells & whistles.

Circa 2023, the Chinese copy and make the current equipment cheaper.

Big Three Icom, Kenwood, and Yaesu Transceivers (circa 1970-80s)



Kenwood



Yaesu



ICOM

Demise of *local* parts availability

- Loss of Hughes-Peters (Columbus)
- Loss of Thompson Radio (Columbus)
- Loss of Whitehead (Columbus)
- Loss of Radio Shack (US)
- Today, Hams are on the hunt for parts depots.

1. Digikey (Thief River Falls, MN) <https://www.digikey.com/>

2. Newark (US) <https://www.newark.com/>

3. Adafruit (NYC) <https://www.adafruit.com/>

Revitalization of Home brewing

- Limited radio/transmitter kits (mostly low power SSB & CW)
- Interface kits (Radios to Controllers)
- Remote transmitter interface kits
- CW Keyer Kits, Voice Keyer kits
- Digital interface kits RTTY, FT8, Pactor III, etc ...
- Wire antennas
- Antenna controllers
- CPU Kits (Arduino, Raspberry Pi, etc...) (<https://rpilocator.com>)
- PC interface boards to Kenwood, Icom, Yaesu, Flex, Elecraft

- **N1MM and other logging programs**
- **Chinese kits (HF, VHF, UHF radios, Nano VNA, etc ...)**
- **SDR (Dongles, circuit boards, direct sampling SDR, etc.....)**
- **Elecraft Kits (Through hole kits and “Bolt Together”)**
- **HobbyPC Kits (Hard Rock 50 Amplifier, etc...)**
- **Amateur Television**
- **Amateur Balloon Control**
- **Mesh Networking**
- **DSTAR, DMR, C4FM (Yaesu) Linking and Reflectors**

Tools required for basic Kit building and/or station maintenance

- Soldering iron, solder, solder-wick, solder guns.
- Hand tools (screw drivers, wrench sets (Metric & ANSI), etc...)
- VOM digital and/or analog, Oscilloscope, Spectrum Scopes

Triplitt , Simpson, Fluke, Tektronix, Rigol, Siglent

- VSWR Meter (peak reading if using SSB)
- Coax and Coax jumpers, crimpers
- Dummy Load (Bird, Heathkit (used), MFJ, Palstar, etc ...)
- Ethernet cables, connectors, crimpers
- Ethernet cable continuity checkers (~\$7)

Newer kits From ARRL

From the ARRL: <https://www.arrl.org/etp-kits-projects> ©ARRL

ETP Kits & Projects



This page lists links to instructional Education & Technology Program kits, projects and activities to instruct basic electronics, demonstrate wave forms and modulation, conduct a radio direction finding activity, build a seismometer, control a robot via the ISS!-- to name a few. The list will be updated periodically as new projects are developed and made available.

[Instructional Resources](#)

- [A Transmitter for Fox Hunting-](#)

Radio Direction Finding (RDF) or Fox Hunting is a popular spring and summer activity for many schools. It combines the fun of ham radio and wireless technology with outdoor activity and competition.

- [Fox Hunting Article](#)
- [Fox Hunting Rules & Regulations. Organization - Rules - Changes](#)
- [The Fox Hunt Schematic](#)
- [The circuit diagram for the added operational amplifier](#)

Here are the [files](#) you'll need to construct the boards for the project. Included is the Express PCB file. This is the company used by the author to produce the boards. You can download the company's software from the Web and then display, print, or if desired modify and order the boards from them.

[Learn More](#)

- [Modulation Demonstration Board+](#)
- [Transistor Amplifier and Waveform Exploration Board+](#)
- [Basic Electronics Course +](#)
- [PDA/Handheld Wireless Link Demonstration Project+](#)
- [Seismometer+](#)
- [Seismometer Revisited+](#)
- [No Solder Code Practice Oscillator+](#)
- [No Solder Electronic Organ+](#)
- [L/C/R Board +](#)
- [TV Remote Decoder Board+](#)
- [Soldering 101+](#)
- [Antennas+](#)
- [Explore Space with Radio Astronomy+](#)
- [Digital Signal Processing Fundamentals+](#)
- [MAREA: Control Robots Using Packet Radio+](#)
- [Space/Sea Buoy for Environmental Exploration+](#)

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SDR Bonus

W8KFJ / SK's QRZ web page is still active. He has produced a few videos concerning SDR (Software Defined Radios) and other topics.

<https://www.qrz.com/db/W8KFJ>

Part 1- The Basics <https://youtu.be/ncxyycmSeWU>

Part 2 - The Hardware https://www.youtube.com/watch?v=1JSyaZ_VS6k

Part 3 - Software Puts it all Together <https://youtu.be/D2yyDGbw8H8>

I highly suggest looking at the videos. They are very well produced.

Dave built an early Hermes board kit and an amplifier. He became known as Mr. SDR to the amateur radio community.

One of Dave's videos became a You Tube Video for the Elad FDM DUO



In 2017, he made a YouTube video series titled "How To Get More Out Of Your FDM DUO".

Part 1 - Stand-alone. <https://youtu.be/hoBv5ZYwsZA>

Part 2 - Introducing the SW2 Software. https://youtu.be/nHAb8L_an9Q

Part 3 - Advanced SW2 Software. <https://youtu.be/BjTloJTH0Qg>

On July 5, 2017 he added a YouTube video titled "The Magic FFT", with the intent of advancing understanding of this "magic" idea. It is directed to those with an aversion to math.

Link: https://www.youtube.com/watch?v=40Z7Hr7b_Pg&t=2s