SOUND CARDS & TNCs

BUT FIRST,

A DEFINITION:

expert \’ek-,spərt\ *n*

- Someone that has a briefcase
- Also has slides
- Is more than 50 miles from home

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Therefore I’m not an expert

TERMINAL NODE CONTROLLER

What is a TNC?

- CPU with protocols implemented in firmware with a modem (modulator/demodulator). The firmware adds information to the data specific to the protocol being used.

  - Modulator: Converts digital signals from the software into audio signals for transmission. The audio signal consists of two or more audio frequencies.

  - Demodulator: Converts the received audio tones into digital signals which the computer decodes to obtain the information in the signal.

TERMINAL NODE CONTROLLER

TNC advantages:

- Can be used with any computer.

- Initialization settings are internal to the TNC, but can be reset as needed.

- Can offer features independent of a computer: Digipeater, BBS, APRS beacon, plus others.

- Includes some mechanism to provide Push to Talk (PTT).

- Firmware supports only one protocol.

TERMINAL NODE CONTROLLER

- Some VHF/UHF radios include a TNC internal to the radio, but they may be limited to use for APRS only, others may also be used for packet (ax.25) radio.

-Dedicated TNCs are available to operate different protocols, Packet being an example protocol.

TERMINAL NODE CONTROLLER

Examples of TNCs (not a complete list of available devices):

- MFJ-1270X ($180)

- Kantronics: Several different models available ($240+)

MULTI-PROTOCOL CONTROLLER

- A TNC, but offers the capability to operate several modes such as RTTY, CW, AMTOR, PACTOR I, G-TOR, SSTV as well as Packet

- Cost: $200 - $600 depending on make, model and features

SOUND CARD

What is a sound card?

- A sound card converts the digital code into audio tones that can be transmitted by a radio. It also converts the received audio into a digital code that the software converts into information that can be displayed on a screen.

- Usually includes means to perform the PTT function.

SOUND CARD

- The digital modes use a software modem (may or may not be obvious) and a sound card, the sound card includes means to provide the PTT function.

    - Example digital modes that use a sound card:

        Winlink
        FLDIGI
        WSJT-X
        JS8CALL

SOUND CARD

- Sound cards and a software modem may be used in place of a TNC for ax.25 packet.

    - Software modems are cheaper (as in free) and provide better frame decoding than a TNC according to those that provide the software.

        - Examples of software modems:

            Soundmodem (Windows)
            Direwolf (Linux, Mac OS or Windows)

SOUND CARD

- Computer sound cards are not recommended for digital amateur radio uses. They lack the PTT function.

- A TNC cannot be used in place of a sound card. The TNC protocol is fixed by firmware and cannot be altered according to the needs of different digital modes.

- Sound cards are not specific to a fixed digital mode, the software includes code that perform the function of the modem.

SOUND CARD

Example of sound cards:

- Signalink:

  Popular, highly rated

  Early models do not have as large an audio frequency bandwidth due to the isolation transformers used

  Plug-and-play

  Jumper arrangement to match cable connections to the Signalink internal wiring.

  Have a relay for PTT

  Price: $140, includes one radio cable

SOUND CARD

Example of sound cards:

- Digirig:

  Small size

  Open source, circuit drawings available

  Includes built-in serial CAT interface

  Price: $50, radio cables additional $20 to $30 depending on radio

SOUND CARD

Example of sound cards:

Master Communications:

Kits, but also available assembled.

Several different models, differ mainly by radio connector and internal amplifiers for received and transmitted signals.

PTT can be a little difficult to set-up on the software being used.

Price: $35 - $55, as a kit, $30 additional if assembled, 3D printed case $15. Cables available from other sources.

SOUND CARD

- Sound cards can also be home brewed

- USB sound card dongles are readily available from Amazon or Ebay and similar sources. Quality varies.

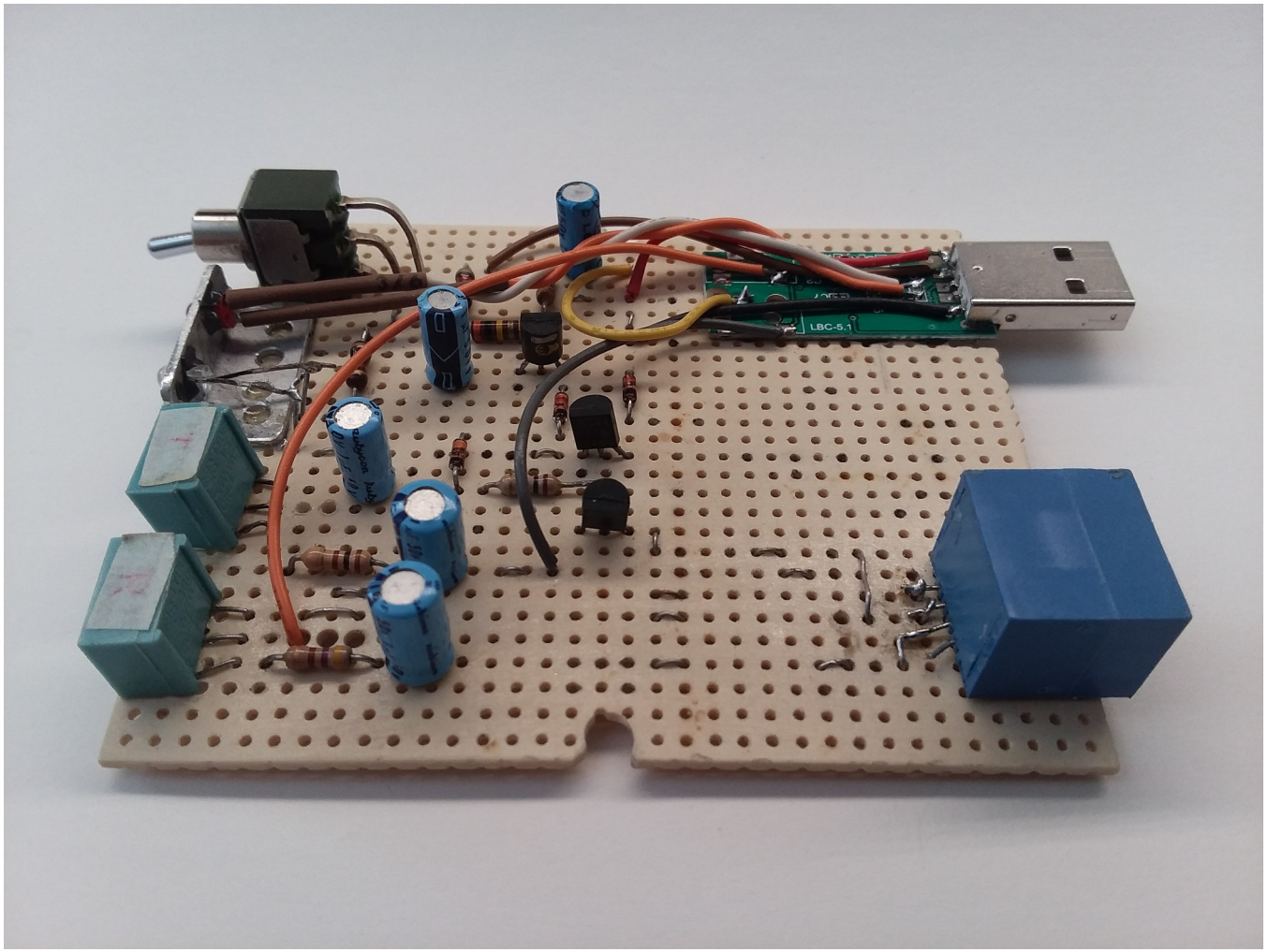
- A PTT circuit is easily made to provide that function.

- Example circuit source:

https://www.g4lib.com/usblink.html

SOUND CARD

My homebrew soundcard



SOUND CARD

- Some of these sound cards do not have transformers providing DC isolation between the radio and computer. May or may not be a problem. Their need remains to be an item for discussion.

- Proper cables are required to interface the sound card to the radio. Radio manufactures have standardize the connections for a 6-pin mini-DIN connector. Fortunately, this appears to be a common connector on many radios but older radios (and some newer ones) do not use these connectors.

- Some radios have a sound card built-in and only require a USB cable to connect the radio to the computer. (Yeasu FT-991A and Icom IC-7300 and IC-9300 for example).

1200/9600 FOR VHF/UHF

Some VHF/UHF radios have data connections labeled for 1200 and 9600 baud signals.

- 1200 and 9600 are misnomers. Baud implies that a digital signal is involved but the signal is an audio signal.

- Wide and Narrow, for example, would be a better name.

  - 1200 signals are 300 to 3000 Hz wide.

  - 9600 signals are near 0 Hz to whatever is allowed by the radio or the band used (FCC rules for VHF/UHF) and is controlled by the software.

1200/9600 FOR VHF/UHF

- 1200: Transmit and receive signals pass through the microphone/speaker circuitry in the radio, audio is emphasized during transmission, de-emphasized during reception.

- 9600: Transmit and receive signals do not pass through the microphone/speaker circuitry in the radio, audio is not emphasized during transmission, de-emphasized during reception.

- The audio signal level from radio is different for 1200 and 9600, this may or may not be a problem. Use 9600 if it works for you.

ANY QUESTIONS ?

THANK YOU

73

DE KN4FM