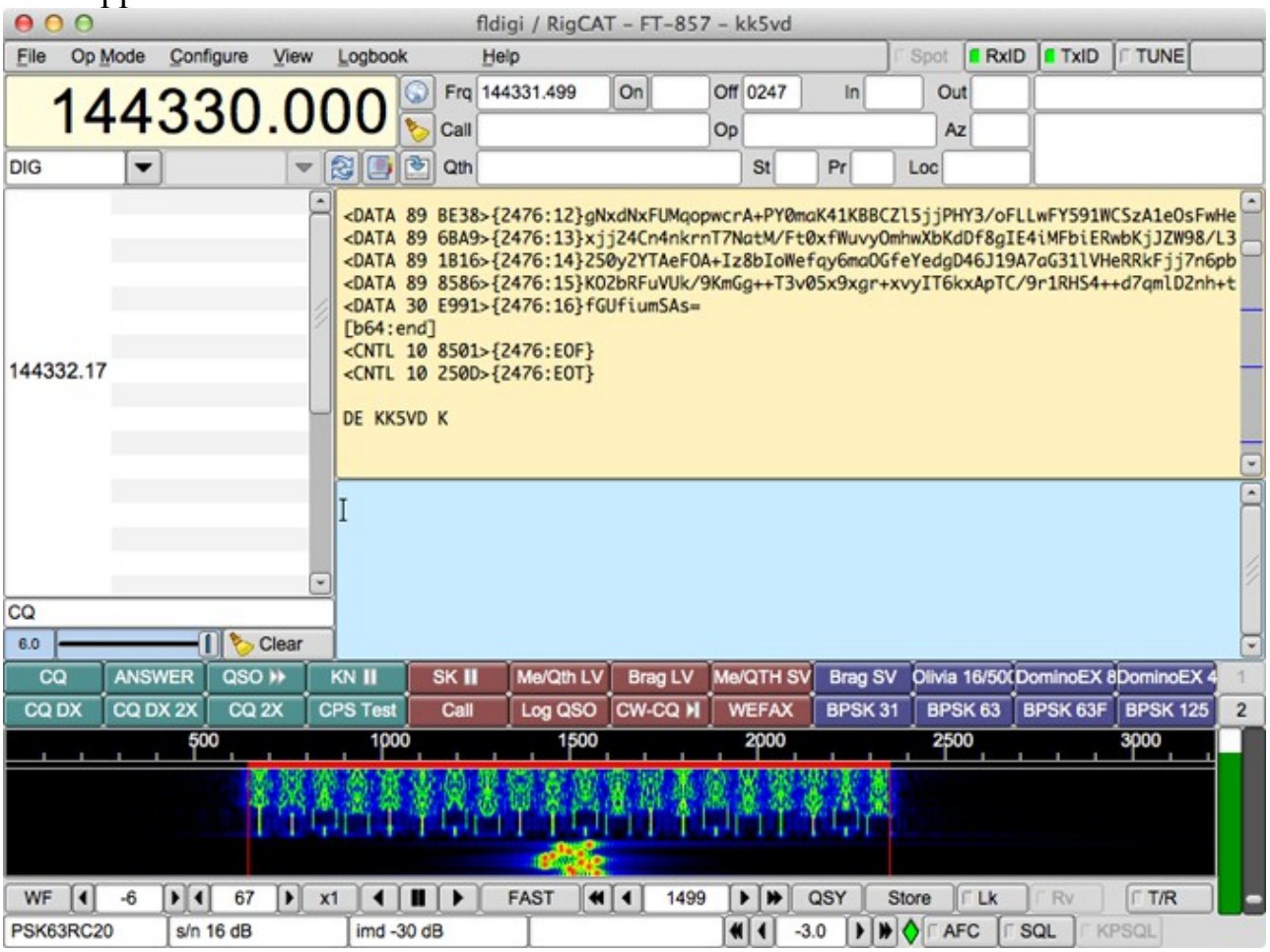
Digital Data Over Amateur Radio

- Digital Data Communication: the transfer of data (text, files, pictures). Mostly found in the HF spectrum but can be performed in any band and mode.
- The data is encoded (transformed) into audio frequencies using a computer. The two primary encoding techniques are Phase Shift Keying and Frequency Shift Keying. Because it is in the audio spectrum, this is referred to as APSK or AFSK.
- Three items are required
  - Computer – performs the translations using an application. Today we are using FLDIGI.
  - Interface hardware – sound card, isolation circuits, keying of transmit. We have two examples today.
    - A simple interface that uses the computer sound card and a circuit that provides isolation and keying. Requires three cable connections. About $20 in parts and requires assembly
    - A more robust unit – Signalink. Contains sound card, signal level adjustments, isolation and keying of the radio. Just over $100, with cable.
  - Amateur Radio – any band. We are using VHF/UHF HT's
- Application – FLDIGI



- One of the best known and most extensive application.
- Each encoding method is called a “modem”. There are 17 modems in this application. Each modem has multiple speeds. The allowed speed is determine by the frequency band used for transmission.
- Screen
  - Upper left – frequencies, radio modulation
  - Upper right – logging information
  - Middle left – Browser: shows active signal text for some modems
  - Middle right, beige – shows all text received and transmitted. Transmitted will appear in red.
  - Middle right, blue – shows text to be transmitted. It will scroll off screen as transmitted.
  - Lower buttons – each button actives a “macro” that you can program.
  - Lower screen, black area – waterfall display. Shows frequencies versus time.
  - Bottom – information and controls for waterfall
- We will demonstrate three Modems
  - PSK31 – one of the oldest modems and most popular, until the last few years. Has been replaced by the WSJT-X modems but is still popular for for conversations and field day. Has not error detection or correction.
  - PSK250R – a variant of PSK that contains some detection and correction. Transmits faster than PSK31 but takes more bandwidth.
  - MFSK8 – An FSK mode. Has both detection and correction.