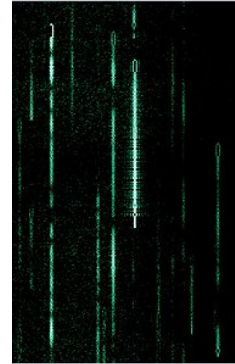


How do I?

An occasional series

This week: PSK31/BPSK31/QPSK31



A look at the original computer soundcard mode for HF.

See <https://www.radioclub-carc.com/resources/> for more articles on computers, radio and digital modes.

When many amateur radio operators think of modes, they usually are thinking of Phone, CW and Data (digital).

CW (Morse code) was the original digital mode. The 0s are the dots and the 1s are the dashes. The character length is variable. All the way from • for an **E** to — — •• for a **Z**. Numbers and punctuation typically use a greater number of dits and dahs.

Morse code, later in a modified version as International Morse, was the world leader in rapid communication from the 1840s into the early 1900s. In 1895 Guglielmo Marconi was able to transmit radio waves for a few miles. By 1901 he was trying to get radio signals across the Atlantic Ocean. Commercial radio developed from there. In 1909, Jack “CQD” Binns was the hero radio operator in the *RMS Republic/SS Florida* collision. Wireless telegraphy had a fairly tough barrier to entry: prospective operators had to be very proficient with Morse code; some had to know both American and International Morse; and they had to be willing to go to sea. In the early days, there were not many land station job openings.

Radio Teletype was being tested in 1922 and was in commercial service by 1934 in the US. RTTY, as it is known for short, used the Baudot Code. In Baudot, every symbol is fixed-length at 5 characters. Baudot is faster than Morse as a result. The operator types the message on a keyboard. The message goes onto tape, which the machine sends at higher speeds than human operators can generally maintain for a long time. On the receiving end, the message is printed on tape, and then transcribed by humans.

By 1906 experimentation with Phone, or radio telephony had reached the point where a voice could be transmitted by radio. AM two-way communication came into use in the 1920s and by the 1946 had reached the point where Dick Tracy was using his “wrist radio” in the comic strip of the same name. He was only about 60 years ahead of the smartphone and about 70 years ahead of the Apple Watch.

Amateurs began using cast off commercial teletype machines in 1946. Amateur radio use grew in popularity into the 1970s, but never had a large number of users as the machines

were rare, hard to find, and you had to maintain them yourself for the most part. The printers were about the size of a dishwasher.

The personal computer was released in the 1970s. Almost immediately hams began trying to figure out what they could do with them. By 1978 Canadian hams were experimenting with packet and in 1980 the FCC authorized transmitting ASCII codes via amateur radio. Users needed a radio, computer monitor and keyboard and a terminal node controller or TNC. This worked, but the improvements kept coming.

By 1991 PACTOR was introduced and by 1998 computers had reached the point where computer soundcards could be used relatively conveniently for amateur radio use. The very first soundcard mode, PSK31 (Phase Shift Keying -31 baud) was a keyboard to keyboard real time mode using computer soundcards linked to transceivers.

By 2004* the software suite *Fast Light Digital Modem*, or FLDIGI was released. This let amateurs without as many computer skills use computers and radios to send and receive messages. Over time, additional modes such as THOR, Olivia, MFSK, and more were added to FLDIGI. FLDIGI is free and still maintained today. In 2001 the first version of the WSJT software suite was released by Dr. Joe Taylor, K1JT. WSJT is still around today, but has been largely supplanted by its offspring - WSJT-X - where users will find JT65, FT8 and FT4 modes among others.

Why PSK31? Before PSK31, amateur radio was mostly Phone, CW and if you wanted Data, it was either RTTY (via hardware or software) and packet (with a hardware TNC or a software TNC). PSK31 enabled low power (30 watt), long distance, and conversational communication under poor conditions.

PSK31 will outperform RTTY, but FT8 will remain decodable when PSK31 is lost in the noise. JT65 will outperform both in extremely bad conditions.

What's that you say? Enough with the history, I just want to play radio? Ok. You need a computer. FLDIGI is extremely platform agnostic. There are other programs, including Ham Radio Deluxe and PSK Express that can send and receive PSK31 signals. In this article we are using FLDIGI and a Windows 10 or 11 computer.

Begin by downloading the FLDIGI software. Your sources are [W1HKJ Software](#) or [fldigi download | SourceForge.net](#)

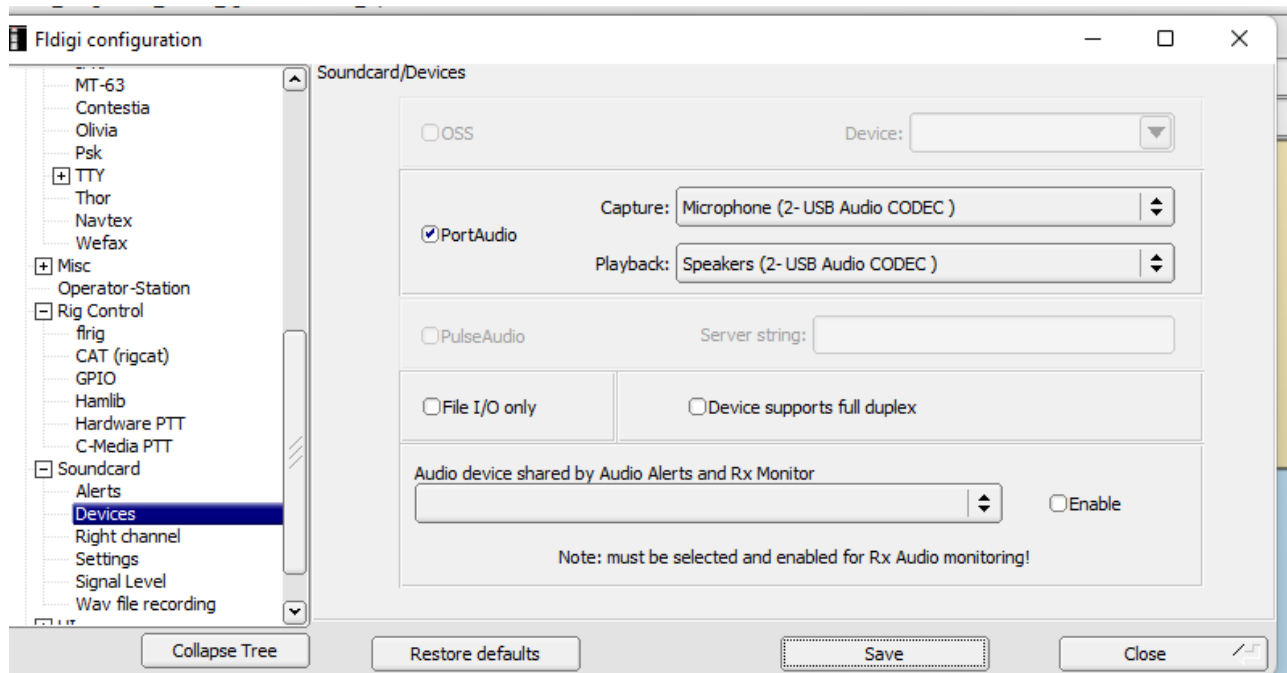
As I write this article, fewer than 500 people worldwide have downloaded this software in the last week. So your antivirus/internet security software probably will not be happy. With AVG or Windows Defender, just keep clicking OK until the software installs. Some security software may need bypassed, but that is why I stick with AVG.

Install the files.

When you open FLDIGI for the first time, it should lead you to a set up screen. Enter your call sign, name, Maidenhead grid square, etc.

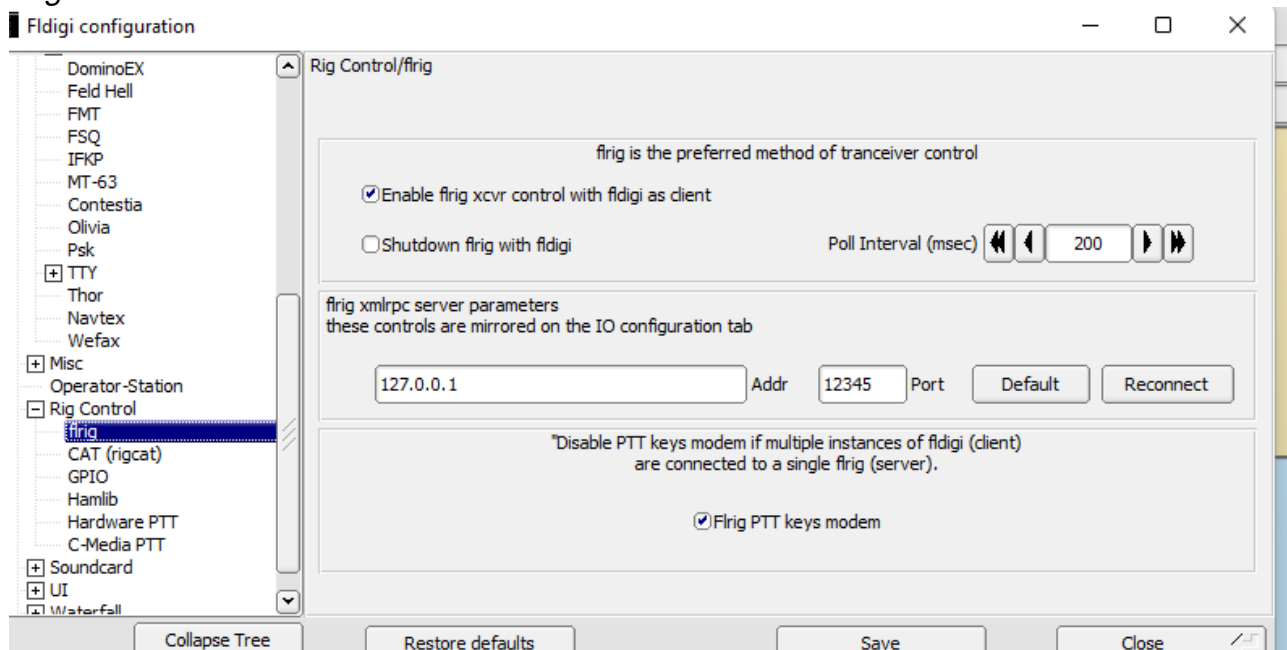
*Some places on the internet say 2007, but from other sources it was clearly past the beta stage by 2005.

Next set up your sound card. In this example we are using the USB Audio Codec, such as found in the Signalink external soundcards, the Yaesu SCU-17 and the built in cards in some Kenwood and Yaesu transceivers.

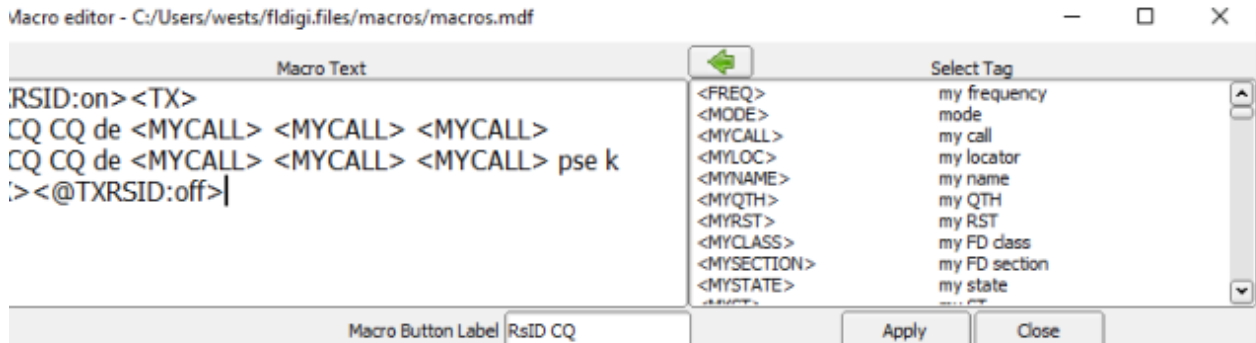


At this point check and make sure you can actually get data from the radio to the computer and vice versa.

Next set up CAT control. This is optional, but well worth the effort. FLDIGI uses FLRIG as its interface, and FLRIG can be used with other software such as *WSJT-X* and the *N3FJP Call Log*.



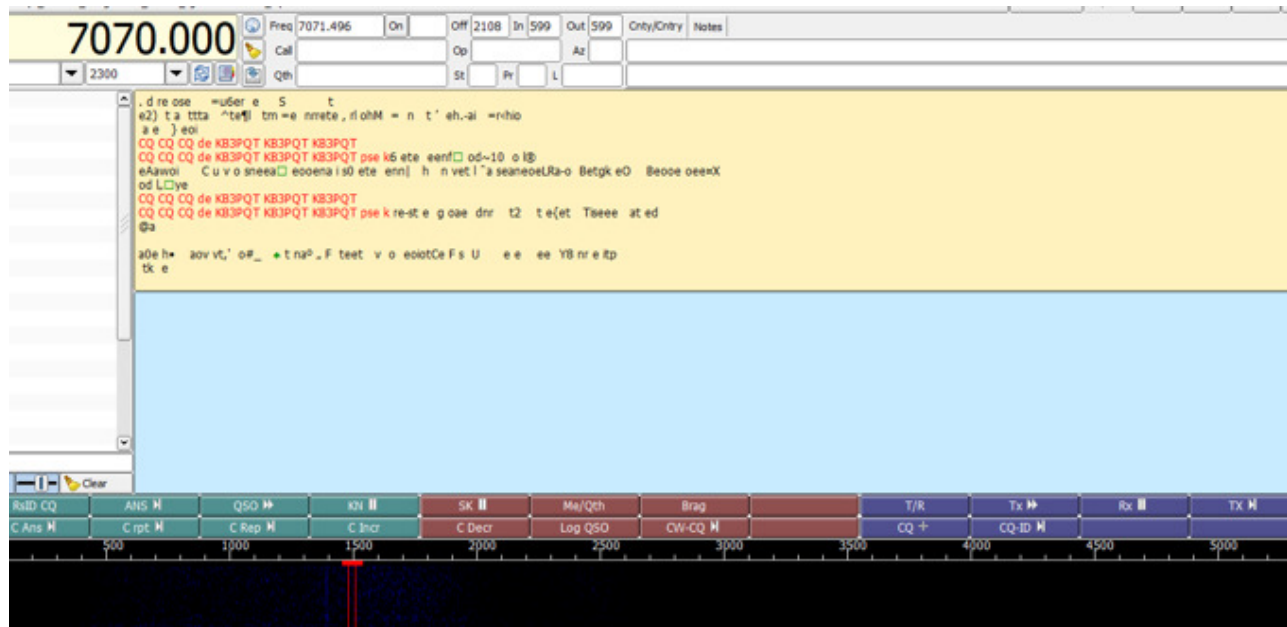
Next configure your macros. One of the complaints about PSK31 was that unlike CW or Phone, it was “macro driven”.



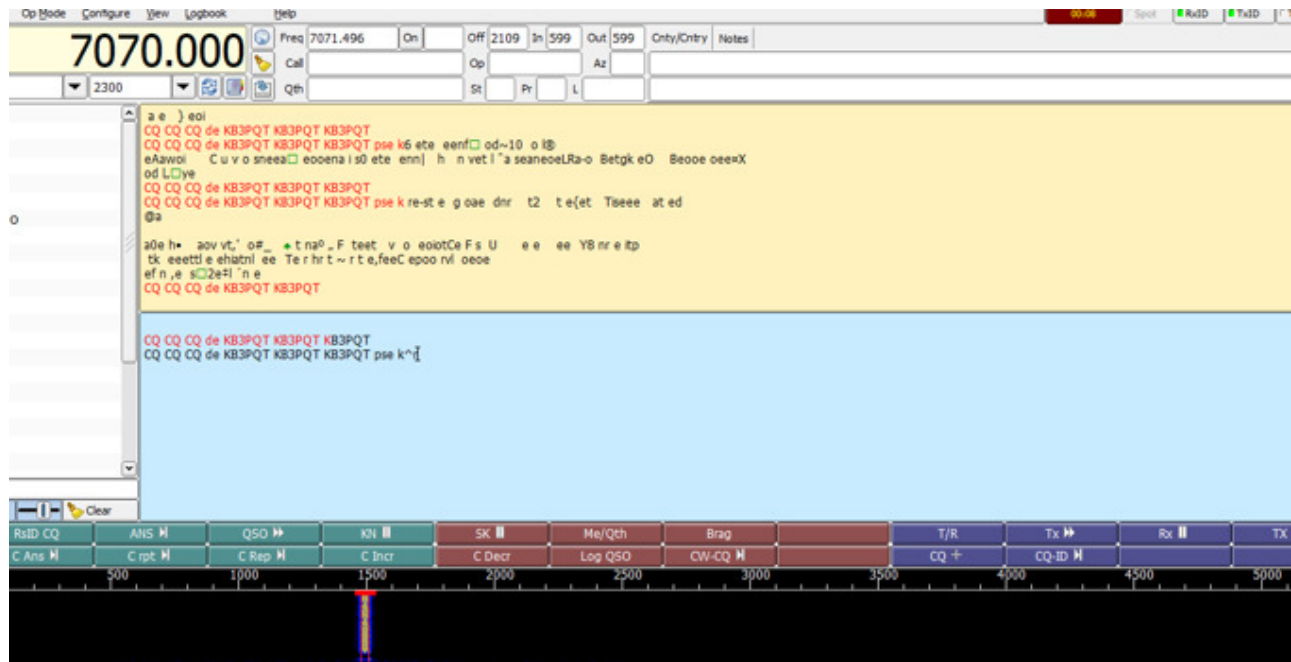
You have room for at least 48 macros. The basic ones are CQ, ANSWER QSO, KN, and SK
A typical QSO sequence is something like this:

- You transmit a CQ with your call sign.
- Someone hears your CQ and ANSWERS
- You begin the QSO conversation
- Stations alternate using KN
- Finish the QSO with SK

You can also free form messages.
Here is an example of a CQ



The RXID and TXID are very useful. They transmit a separate RSS signal (the same technology that tells your car stereo what commercial station you are tuned to and what song is playing) so that the receiving station knows what mode you are using.



If I wanted to respond to a CQ, all I need to do is enter the call sign in the CALL box to the right of the frequency. I can enter other data if I know it, or I can use a popular call book such as QRZ to look it up. Click ANSWER and my macro will transmit, with the other call automatically filled in.

When done, tap the SAVE button right below the broom and the QSO will be logged. To view the LOG file click on logbook on the top ribbon.

Logbook - logbook.adi

On	Time On	Call	Name	In	Recs
30625	22:01:00	AF3I	Andrew	599	43

Off	Time Off	Freq.	Mode	Pwr	Out	Loc
30625	22:20:18	146.491500	DOMINO	51	599	FN10k

St	Pr	Country
PA		USA

Other | Notes | My Station | Contest | CW SS | JOTA

Call Search

Retrieve

C:/Users/wests/fldigi.files/logs/logbook.adi

Date	Time	Callsign	Name	Frequency	Mode
30326	22:34	AF3I	Andrew	146.491500	DOMINO
30416	22:31	AF3I	Andrew	146.491500	DOMINO
30416	22:32	AF3I	Andrew	146.491500	DOMINO
30423	22:20	AF3I	Andrew	146.491490	DOMINO
30423	23:01	AF3I	Andrew	146.491490	DOMINO
30430	22:35	AF3I	Andrew	146491.490	DOMINO
30507	22:37	AF3I	Andrew	146.491.490	DOMINO
30521	22:19	AF3I	Andrew	146.492700	DOMINO
30604	22:24	AF3I	Andrew	146.491.490	DOMINO
30618	22:56	AF3I	Andy	146.491500	DOMINO
30625	22:20	AF3I	Andrew	146.491500	DOMINO

Want to use another log, such as Ham Radio Deluxe or N1MM? You can export the log file as an .adi file and import that file into other loggers. I used to do this with the N3FJP Amateur Call Log, but then found an easier way.

Fldigi configuration

Logging/N3FJP logs

Address: 127.0.0.1 Port: 1100 Connect Connected

TCP/IP Data Stream

SEND: <CMD><PROGRAM></CMD>
 RCVD: <CMD><PROGRAMRESPONSE><PGM>N3FJP's Amateur Contact Log</PGM><VER>7.0.8</VER><APIVER>2.1</APIVER></CMD>

SEND: <CMD><NEXTSERIALNUMBER></CMD>
 SEND: <CMD><VISIBLEFIELDS></CMD>
 RCVD: //

Enable Data Stream
 PTT via <RIGTX> and <RIGRX>
 Center DXspot freq at sweet spot Report actual modem RF frequency

Clear text

Yep. Just go to the logging tab and click on N3FJP Logs. Check the CONNECT and Enable Data Stream radio buttons and you are all set.

Participating in a contest such as the RTTY Roundup or the CQDX Digital? You can configure the contest log so that FLDIGI logs directly to it! The FLDIGI logging is not bad, just rudimentary.

Start by launching the FLRIG software. Once the radio is connected, start N3FJP Amateur Call Log. Then open FLDIGI. FLDIGI will say connected to N3FJP. When you type a call sign in the Call box in FLDIGI, it will open a log screen in N3FJP. When done, you can save in FLDIGI. I generally click save on both. And that sometimes puts two entries in N3FJP. I just delete the newer one, unless it has more data than the other.

Hopefully you now have a better understanding of FLDIGI, FLRIG and PSK31 and learned some new stuff to make playing radio even more fun!

Catch 'ya on the air!