# AFSK Feld Hell to OOK Circuit for CW Transmitters

At the end of my last *All Things Digital* column *(TCA, June-July, 2012)*, I mentioned that you could easily modify a CW transceiver to transmit (and receive) standard Feld Hell. I was going to introduce this circuit in my next column but it's such a nifty add-on circuit that it couldn't wait! Below is the schematic for an **A**udio **F**requency **S**hift **K**eying (AFSK) to **O**n/**O**ff **K**eying (OOK) circuit that you can use with digital modes software such as Fldigi, Hellschreiber, MultiPSK, etc.; in this case you don't need a soundcard interface to radio interface! Purists may balk at the idea of not isolating the soundcard, so I built the circuit using and not using a standard (and easy to get) audio isolation 1:1 transformer (600:600 ohms). There were no problems (battery operation) with RFI or ground loops by leaving it out and feeding the audio directly into the circuit; the audio in (to the soundcard) was straight from the receiver audio out never isolated. However, not all situations are the same and I recommend using an isolation transformer on the soundcard audio out (transmit) line if you are at all unsure. The circuit is simple, inexpensive, with explanatory notes; it's not my original design as you'll see it used in many similar keying circuits. However, this application may be the first for Feld Hell, in a long while. *Note: CW means **C**ontinuous **W**ave and **NOT** Morse code (exclusively) as there are other CW modes such as Feld Hell!*
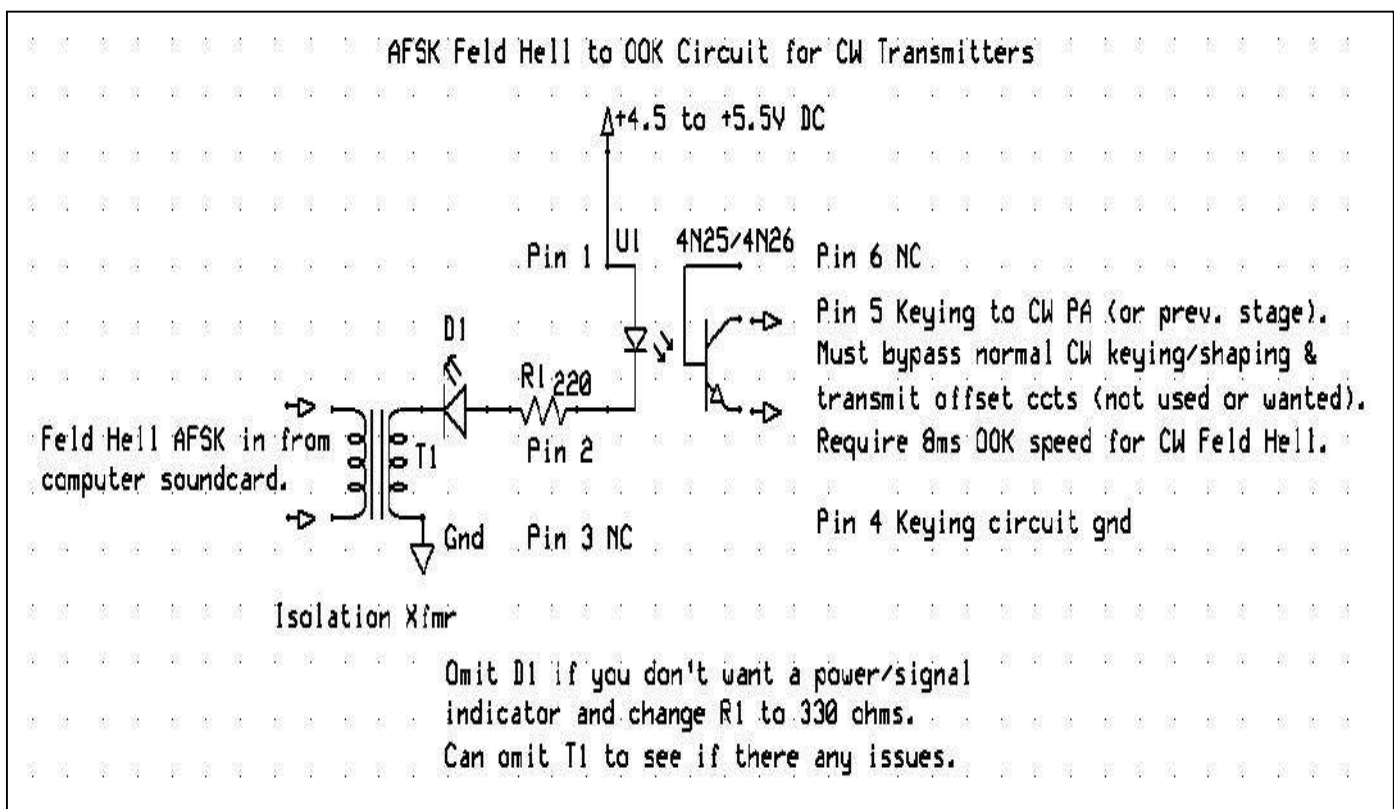
To receive Feld Hell audio, just connect a mono (or stereo) audio cable from your receiver's AF output jack to your computer soundcard's MIC or LINE input (usually MIC for laptops). As standard Feld Hell needs 8ms keying speed, you want to bypass CW keying and shaping circuits and any transmit shift offset (both stations must transmit and receive on the same carrier frequency). So, you just need to key the PA (power amplifier) directly or the previous buffer stage. This may mean drilling another keying jack in the case and running your Feld Hell transmit and ground wires accordingly. In my experiments, I found that the simple and open style 2 or 3 transistor QRP transmitters/transceivers were easier to use (Tuna Tin, PIXIE, Lil Squall, et al). The fast keying can produce "hard" keying but the transmitter's low pass filter should be able to block any harmonics.

Soundcard Feld Hell uses USB regardless of the band; most "action" is on 20m USB (14.063 MHz), just above the QRP calling frequency. To use the circuit for AFSK Morse code keying, you can use the same Feld Hell keying method and see if it works with your specific rig, or experiment with keying from the key jack (with or without a transmit offset). As both Feld Hell stations must use computers to send and receive with the same carrier frequency, there's no issue of chasing each other up the waterfall; standard Feld Hell uses a single frequency tone to key the transmitter at 8ms per character dot element (400ms per character). See https://sites.google.com/site/feldhellclub www.nonstopsystems.com/radio/frank_radio_hell.htm.
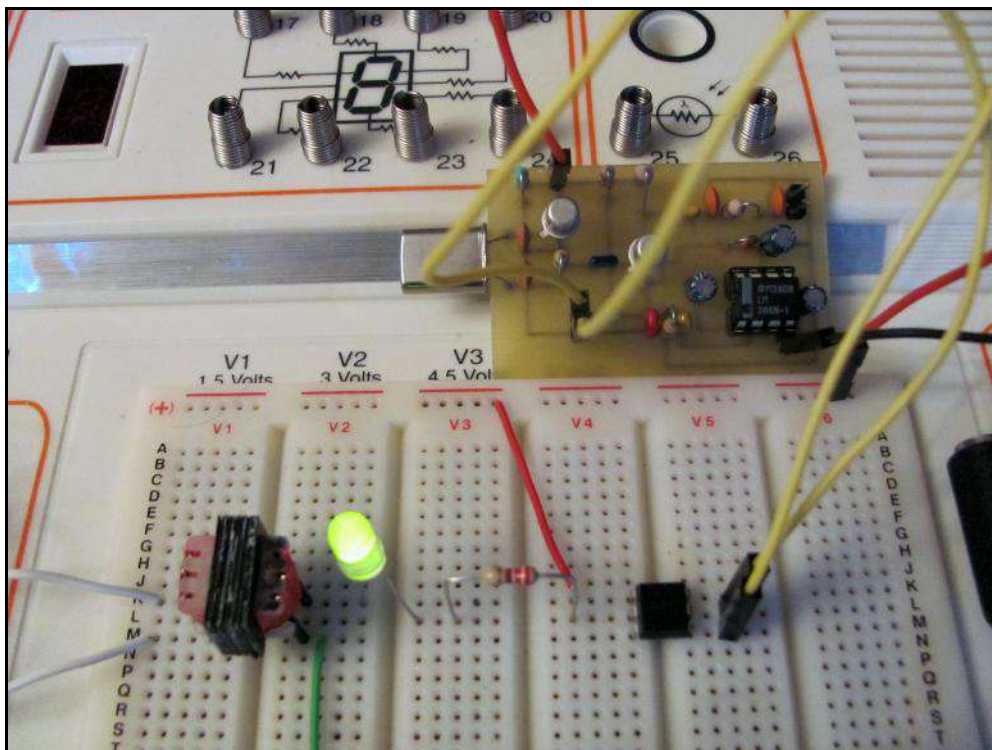
Here's the prototype AFSK-OOK keying circuit keying an unmodified PIXIE II transceiver (yellow wires). You may have to figure out how to tap about 5V to power the circuit—perhaps using a 78L05 voltage regulator (easy enough to do). I've also designed PICAXE MCU circuits to transmit Morse code and Feld Hell propagation beacons; this removes the keying circuit, computer and software from the equation! Feld Hell is a very interesting and educational mode that's still used by Hams!

Standard Feld Hell Operation
Using Fldigi (as an example), select Op Mode > Hell > Feld Hell and select an AFSK frequency to use in the water fall for calling CQ, or click on a Hell signal in the waterfall to "read the mail" and contact a station. All transmitting and receiving is done with software using your CW transceiver (or separates) as a simple conduit to go back and forth. You may be wondering (or not) why the various Windows digital modes software don't support serial or parallel port standard Feld Hell keying as they do for Morse code? I asked Patrick, F6CTE, the author of MultiPSK that very question. After some testing, Patrick discovered that Windows is a very inefficient multitasking system; the fastest that he could key the serial or parallel port was around 12ms—way the Hell too slow (pardon the pun). Those old DOS box computers easily could as they only ran one program at a time; all the processing speed was directed towards one task and not umpteen others.

73,
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