Interfacing Radios and Computers

W5 KQJ

Lilburn Smith

What Mode Do You Want To Run?

- **Joe Taylor Modes – FT8, JT4, JT9, JT65, QRA 64, ISCAT, MSK144 WSPR and Echo**
- **Slow Scan TV – SSTV**
- **Radio Teletype – RTTY**
- **CW**
- **Packet**
- **NOAA APT and GOES**
- **APRS Decode**

Computer Requirements

- 1.5 GHz or faster CPU
- 200 MB of available Memory
- At least one Serial Port or USB converter
- Sound Card or on board sound
- Mouse
- Keyboard
- Monitor with 1024 x 780 resolution or better
- Suitable operating system
  - Windows XT or Newer
  - Linux
  - OSx
- Internet Connection

Radio Requirements

- **The obvious- covers band, mode and frequency you desire to operate**
- **Nice to have-**
  - **Access to a constant audio level independent of gain control**
  - **Access to a separate data input**
  - **A data mode which shuts off the microphone**

Control Of Band, Mode and Frequency

- **Control Of These Items Requires Separate Interfaces Which Are Not Covered In This Talk**
- **Use The Radio Front Panel For Those Tasks**
- **The Icom IC746PRO requires a level converter (CT-17) for computer commands**

Available Software

- **Joe Taylor Modes –WSJT-X, Version 2.00. Older versions will not work.**
  https://physics.princeton.edu/pulsar/k1jt/wsjtx.html

- **SSTV –**
  - **JV-Com32- http://www.jvcomm.de/index_e.html**
  - **MMSSTV- https://hamsoft.ca/pages/mmsstv.php**

- **RTTY- Mmtty https://hamsoft.ca/pages/mmtty.php**

- **CW- Cwdecoder http://www.polar-electric.com/Morse/MRP40-EN/**

- **NOAA APT- Wxtolmg https://wxtoimgrestored.xyz/**

- **APRS – QTMM AFSK1200 decoder**
  https://sourceforge.net/projects/qtmm/

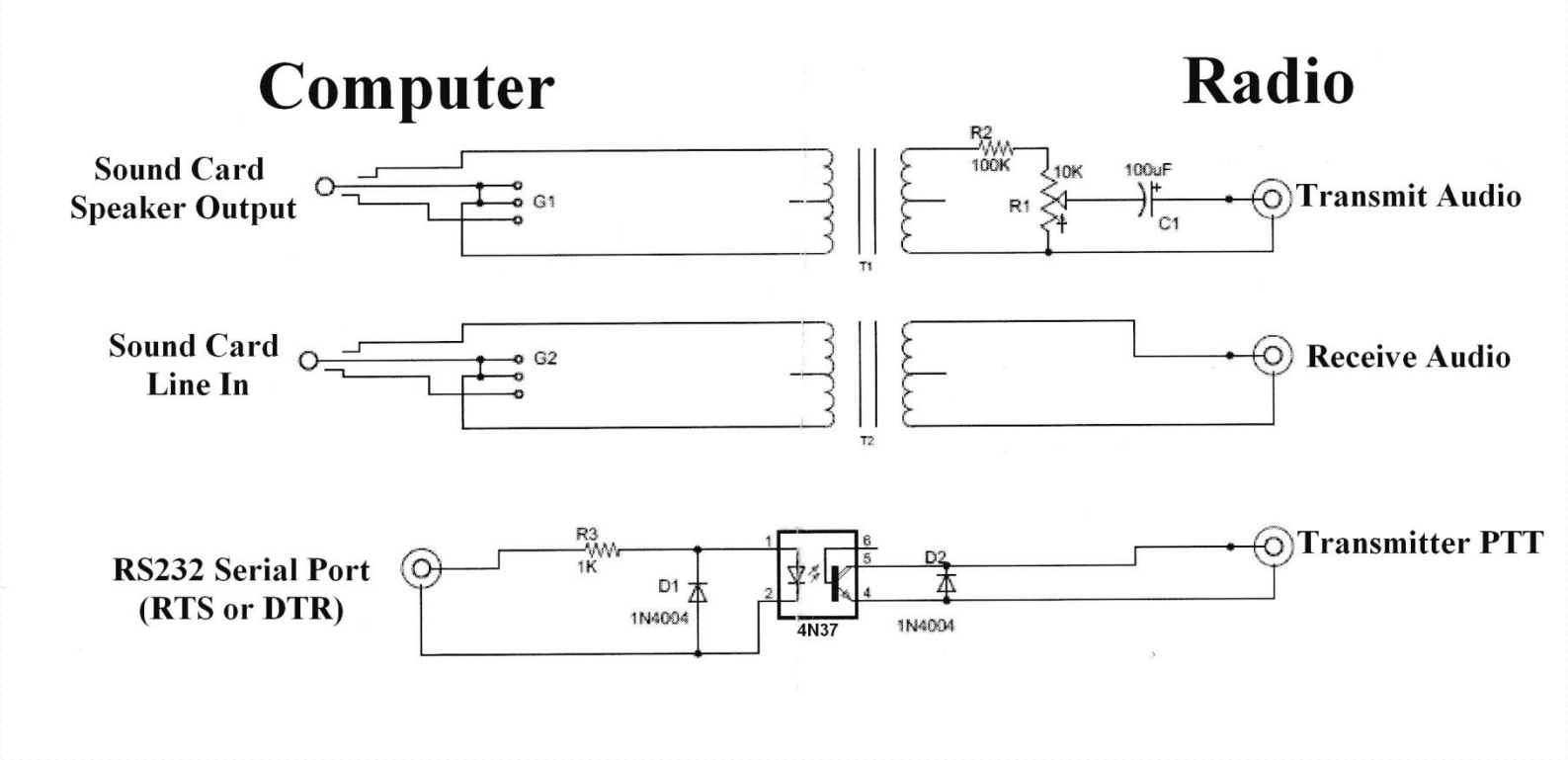
The Most Basic Interface

- Connect the computer sound card output to the radio microphone input through a shielded wire
- Connect the computer sound card input to the radio speaker or headphone jack
- Use VOX for transmit

Unsatisfactory

- Sure to hum
- Limited control
- Ties up microphone connector
- No independent volume control for speaker

A Better Way



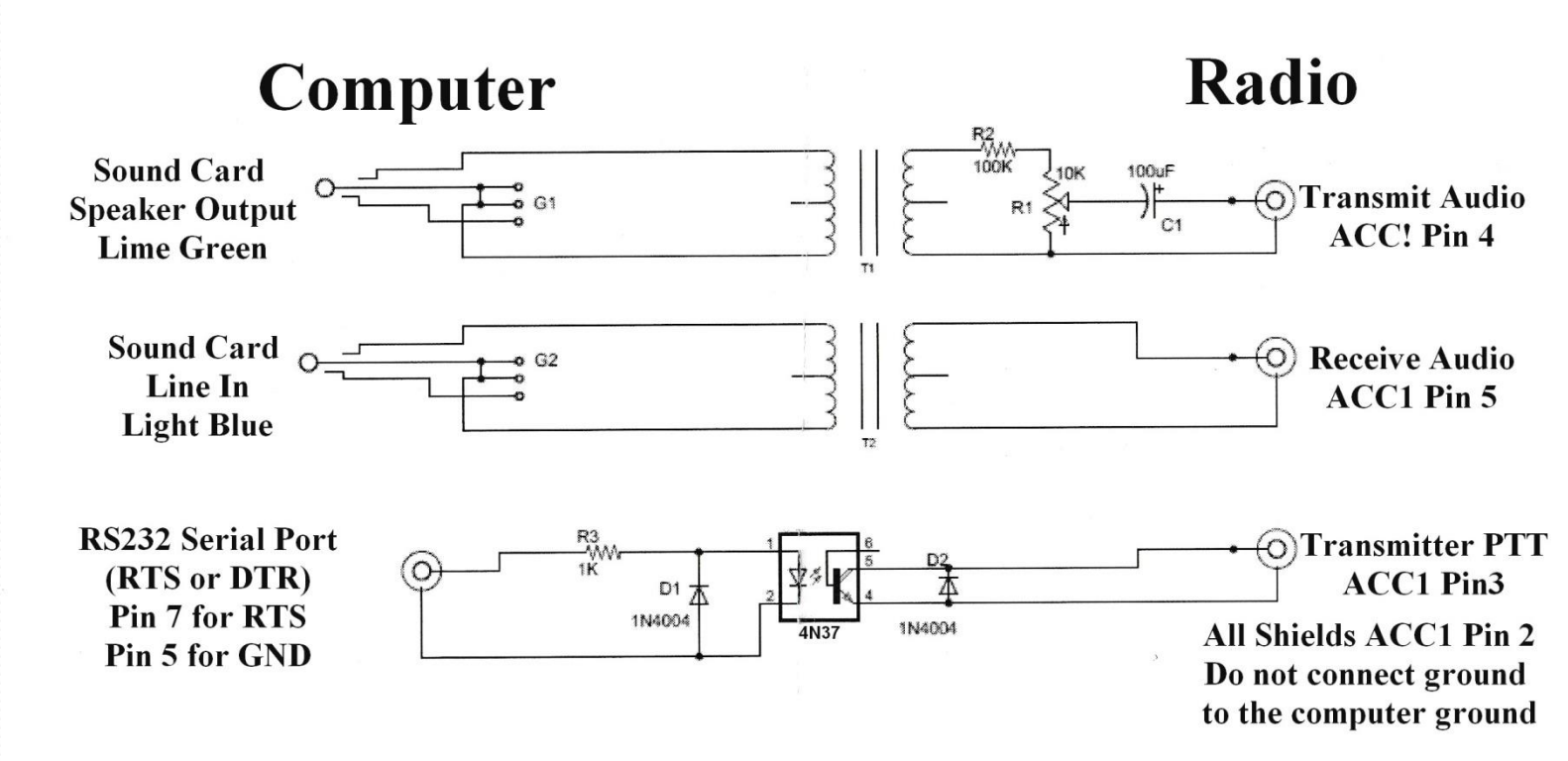
Credit: W9XT Unified Microsystems

Features

- Isolates computer and transceiver
  - Transformer isolation for audio
  - No ground loops
  - Isolated PTT interface
- Available as a kit from Unified Microsystems
- Part number SCI-6
- www.unifiedmicro.com

Example: The Icom IC746PRO

- This schematic is all you need for most modes on the HF bands and 6 meters.
- Exceptions: RTTY and 2 meters



RTTY for the Icom IC746PRO

•Icom provides for transmission of RTTY on their older radios. When the IC746PRO was introduced about the only digital modes available to amateurs were Packet and RTTY. Joe Taylor had yet to release his landmark programs.

•RTTY is transmitted in two ways: AFSK and FSK. In AFSK a 2125 Hz tone is shifted upward 170 Hz and transmitted by LSB. In FSK a carrier is shifted upward in frequency 170 Hz. To the receiver there is no difference. The recovered audio is sent to a decoder called a TNC which outputs the text.

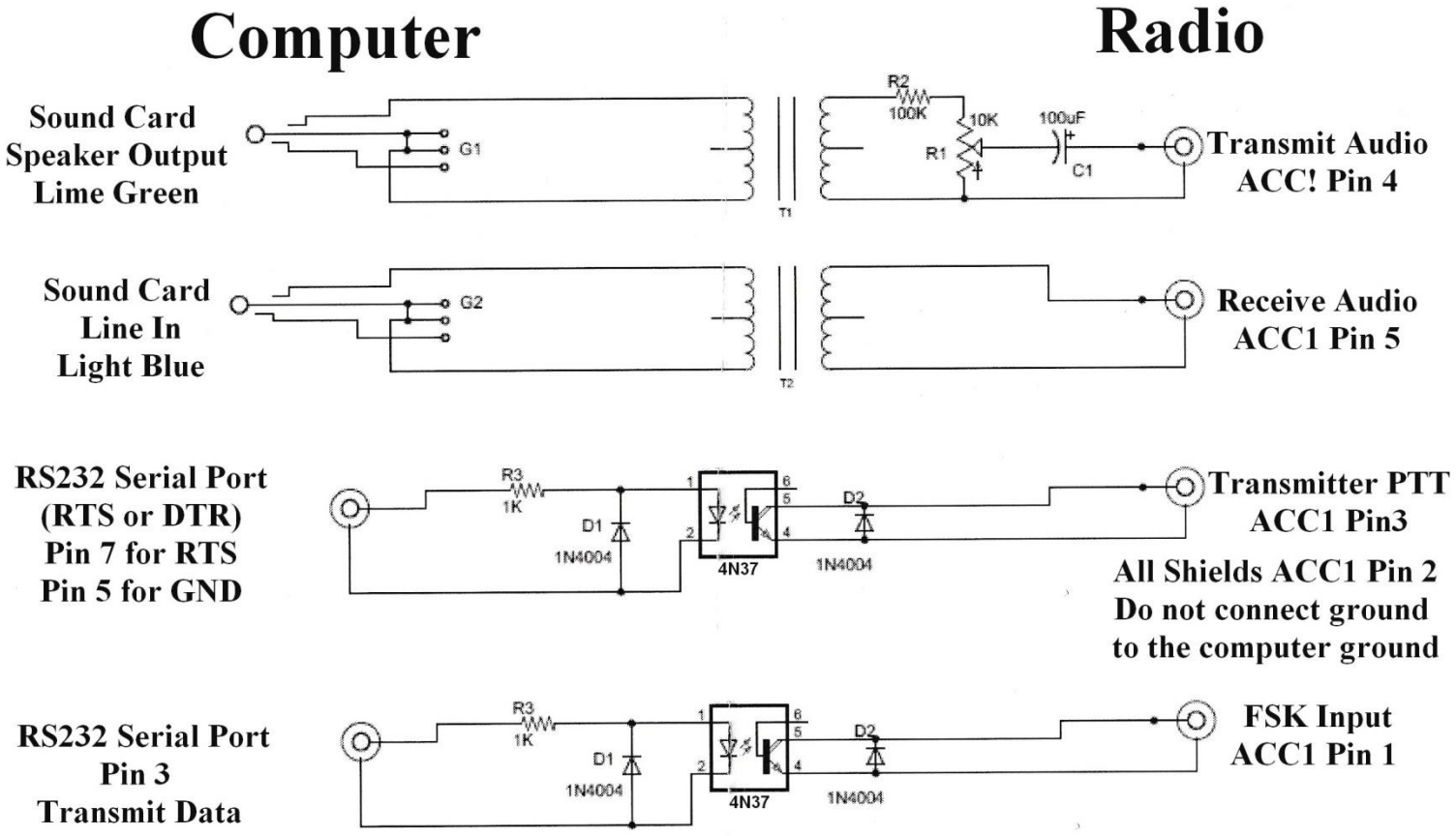
Icom RTTY Continued

•Icom implemented some nifty features for RTTY, including a really good filter and a built in decoder, eliminating the need for a TNC on receive.

•On the Icom schematic of the interface connections pin 1 is shown as the audio input of the ACC1 Plug in the computer interface. The audio input pin is pin 4. Pin 1 is the logic level FSK input.

• The hitch: in order to use the RTTY features only the FSK mode is available.
The modulation input (pin 4) from the sound card TNC emulator is turned off. An additional interface is required for FSK using the serial port.

RTTY Interface



Notice that for AFSK transmit the *sound card out* path is used. For FSK transmit only the bottom circuit is active. To receive either the *sound card in* is used.

2 Meter Operation

For some reason known only to God and Icom, 2 meter operation requires a separate PTT interface. The 2 meter PTT is brought out on ACC2, pin 6. I could not find an elegant way to switch between the 2 meter PTT and the lower band PTT so I just unplug one and plug in the other. A switch could have been used but I had no convenient place to mount one.

Other Radios

Kenwood

All the needed functions are brought out on the accessory connectors, and it is only necessary to build an interface cable going to the proper signals. Some older radios had a Phone Patch interface which could be used directly. Newer radios have an RS-232 interface connector.

Yaseu

The same basic interface will work. Again, newer radios have an RS-232 input directly.