

The sound card interface was tested with both a Kenwood TS-570S and Kenwood TS-2000 at the ACC2 port of both transceivers. During the design and testing process I found that a value of 2.2k ohms for R3 provided sufficient drive to the input diode of the 4N35 optoisolator to drive the output transistor of the 4N35 into saturation levels sufficient to activate the PTT of both transceivers. I recently purchased an Icom IC-7000 transceiver and discovered that when using the interface it would not activate the PTT at the ACC port of the IC-7000. A detailed examination of the data sheet for the 4N35 and measured voltages at the RTS line of the COM port on several computers revealed the following information:

- V_{RTS} measured at the COM port on four computers ranged from 5.4 volts minimum to 6.1 volts maximum
- V_F of input diode of 4N35 is 1.2 volts typical, 1.5 volts maximum
- I_F of input diode of 4N35 is 10 mA typical, 60 mA absolute maximum, no minimum specified
- Full saturation of the output transistor of the 4N35 was obtained with $I_F = 5$ mA as tested using 10 devices, resulting in $V_{CE(SAT)}$ of 4N35 is .3 volts @ $I_F = 5$ mA
- V_F of D1 1N4148 is .7 volts typical
- EIA RS232C specification 10mA maximum current sink

The value of R1 necessary to provide 5 mA of current to the input diode of 4N35 with a V_{RTS} voltage of 5.4 volts from the COM port is calculated as follows:

$$R = E_R / I_F \text{ where}$$

- $E_R = V_{RTS} - V_{F(D1)} - V_{F(Q1)} = 5.4 - .7 - 1.2 = 3.5$ volts
- $I_F = 5$ mA

Using the above values results in a calculated value of R3 of 700 ohms. A value of 560 ohms was chosen to provide adequate current without overloading the RTS portwhile providing full

saturation of the output transistor of the 4N35 and reliable keying of the IC-7000 transceiver.

