UM Unified Microsystems

SCI-6 Sound Card Interface Kit
Version 1.09
January 2015

The SCI-6 interface was designed to be a low cost, high quality interface between your PC's sound card and radio transceiver. It can be used for PSK-31, RTTY, SSTV, WSJT, EchoLink and a large number of other digital modes.

Unlike other low cost sound card interfaces, the SCI-6 completely isolates your computer and transceiver. It uses transformer isolation on both transmit and receive audio to prevent ground loops and hum. The PTT circuit interfaces to a PC serial port through an opto-isolator to generate automatic transmit/receive control.

Component List

SCI-6 PCB	4N37 opto-isolator
100K resistor (Brown-Black-Yellow)	Right angle phono jack (4)
1K resistor (Brown-Black-Red)	4-40 screw (4)
1N400n (4001, 4002, etc) diode (2)	Plastic case
600-600 ohm transformer (2)	1/8" phono cable (2)
10K trim pot	100uF capacitor
6 pin DIP IC socket	Tie-wraps (2)

Assembly Instructions
1. Insert and solder the 1K (Brown-Black-Red) resistor at location labeled R3.
2. Insert and solder the 100K (Brown-Black-Yellow) resistor at location labeled R2.
3. Insert and solder the 1N400n diodes at locations D1 andD2. Be sure to observe the proper polarity by making sure the white band on the diode matches the white band marking on the circuit board.
4. Insert and solder the 6 pin IC socket at location U1
5. Insert and solder the 100uF capacitor at location C1. Be sure to observe the proper polarity. The negative lead is marked with the minus signs and is shorter than the positive lead. The long lead is inserted into the hole marked with the + sign.
6. Insert and solder the trimmer pot at location R1.
7. Cut off the two metal tabs on each of the transformers.
8. Insert and solder the two transformers at locations T1 and T2. They can be installed either way.
9. Insert and solder the 4 RCA phono jacks at locations J1-J4. Use care that these are installed straight and fully down to the circuit board or they will not line up properly with the case end panels.
10. Insert 4N37 opto isolator IC into the socket at location U1. Be sure to mount it correctly by inserting it so that the dot marking pin 1 on the IC faces the "U1" label on the circuit board. If no dot is visible place it so that the writing can be read normally. Pin 1 will be the lower left pin.
11. Cut the cable with the 1/8" stereo plugs in half.

12. Strip ¾" of the outer layer insulator covering of the free ends of the two 1/8" stereo plug cables. Be careful not to cut the shield wires. Separate the shield wires from the insulated wires. Twist the shield wires together.
13. Strip 1/8" of insulation from the white and red wires of the 1/8" stereo plug cables. Tin the ends and the end of the shield wires.
14. Using an ohm meter, find the wire (red or white) that connects to the end tip of the 1/8" stereo connectors. This wire will solder to the pads marked T in the future steps
15. Place the circuit board into the bottom case part. The bottom has 4 stand-offs that align with the 4 mounting holes on the circuit board. Do not screw the board into the case at this time. Place the rear panel into the slots of the bottom case. The rear panel has one large and two small holes. The RCA connector J3 must protrude through the large hole and the two smaller cable ends will be over the holes marked P1 and P2. The end panel should be oriented so that the small holes are away from the bottom case. If not, remove and rotate the end panel until they are.
16. Take the cables prepared in steps 11-13 and insert them into the holes in the end panel from the outside in. To aid soldering during the next steps you can remove the circuit board and end panel from the bottom case, but keep them together and do not rotate the parts.
17. Solder the cable end nearest the larger hole to location P2. The shield solders to the pad marked "S". The tip wire identified in step 14 goes to the pad marked "T", and the remaining wire goes to the pad marked "C". To avoid possible shorts, keep the shield length short.
18. Solder the remaining cable to location P1 in the same manner described in the last step.
19. Examine your soldering on the whole board to be sure there are no shorts or solder bridges.
20. Slide the rear panel up against the circuit board. Put the panel with the 3 large holes over the other end of the circuit board.
21. Mount the circuit board in the case bottom with the four 4-40 screws. Note that the case is not threaded, but the screws will self thread into the soft plastic if a little pressure is applied while screwing.
22. Push the two black cables into the case so that there are short loops in the cable between the circuit board and end panel. Place a tie-wrap over each wire between the circuit board and end panel as close to the end panel as possible. The tie-wraps act as strain reliefs for the cables.
23. Using a small screw driver, turn the trim pot at R1 fully counter clockwise. Then adjust it ½ turn clockwise.
24. Place the top of the case over the assembly. Be sure the mounting screw bosses align between the top and bottom. Do not screw the case together at this time.
25. Carefully cut out the label. Use the corner markers as a guide. Peel off the adhesive label and orient it so that the side marked – PC – is at the end panel with the one RCA connector and the two 1/8" phono cables.

Cables to the transceiver
The cables to the transceiver are not supplied since there are so many different types of connectors used with different radios. You will have to supply these cables. The SCI-6 uses phono connectors since they are inexpensive and readily available. Make shielded cables to minimize the potential for RFI.

Consult your radio's manual to determine the best way to connect to your radio. Some radios have separate connectors for PC interfacing. If your radio has one, it will generally be best to make your cables for that. Otherwise you might need to use the microphone connector for transmit audio and PTT. The headphone jack may be used for receive audio if there is not a separate data audio connector.

There are 3 jacks on the SCI-6 for connecting to the transceiver. Note that the grounds for these are isolated from each other. It is important not to connect the transmit audio ground to either of the other grounds. Doing so will usually result in ground loops and hum on the transmit audio.

Most radios have a separate ground for the transmit audio. If your radio does not, you will need to connect the PTT ground to the transmit audio ground. Do this as close as possible to the connector that mates to the radio.

The PTT circuit uses control signals from the computer's COM port to for transmit control. The circuit uses an opto-isolator to isolate the computer from the transceiver. This circuit cannot be used with all-tube rigs.

You will need to pick either the RTS or the DTR signals on the COM port to control PTT. RTS is probably the most popular. Some programs allow you select either or both signals at the same time. Refer to the cable schematic for instructions on making a cable to the COM port.

Some users do not use the PTT circuit, but use the transmitter's VOX circuit instead.

Setup and final assembly
1. Install and bring up the program you will be using with the SCI-6. Hook up the SCI-6 to your computer and radio. Table 1 shows the connections.
2. Follow the program instructions for setting the transmit audio drive levels. Adjust R1 for the proper transmit signal level.
3. Place the top cover on the unit and use the supplied screws to secure it.
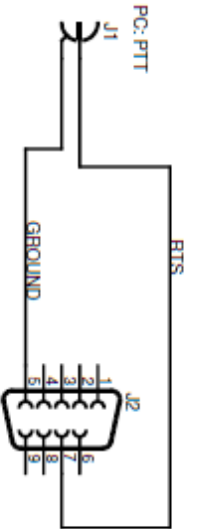
Table 1.

SCI-6 Side	Connects To
PC:RCV	PC Sound Card Microphone Jack
PC:XMIT	PC Sound Card Headphone Jack
PC:PTT	COM Port
Radio: XMIT	Radio Microphone audio
Radio: RCV	Radio Audio out or headphone jack
Radio: PTT	Radio PTT control

Enjoy operating the digital modes with your SCI-6. Digital modes are the new frontier in Amateur Radio. Please report any problems or suggestions to Unified Microsystems.
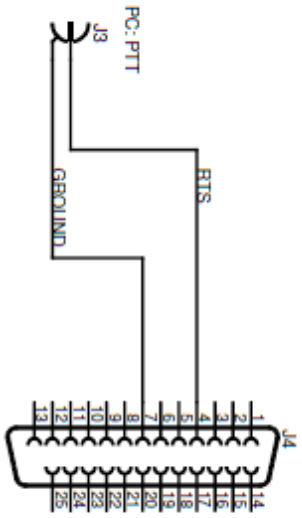
Having trouble getting your SCI-6 up and running? Check out the FAQ in the Downloads and Support page at www.unifiedmicro.com.

If you have questions or need support, the fastest way to get a response is by email. Send it to w9xt@unifiedmicro.com and be sure to include "SCI-6" in the subject line.
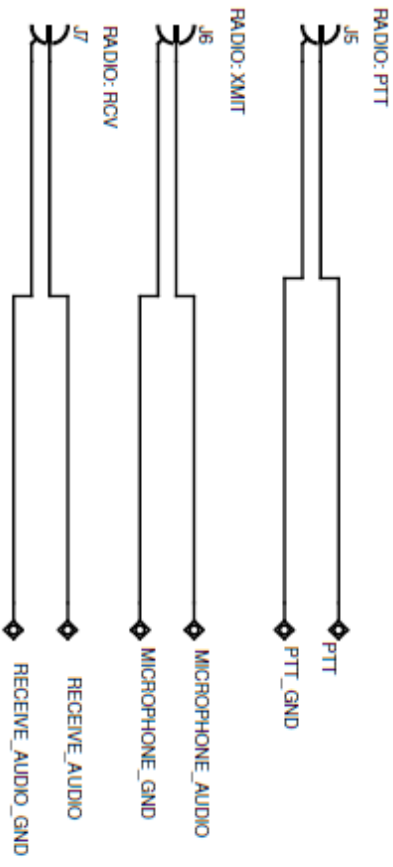
PC: PTT
J1
RTS

COM - SCI-6 PTT CABLE
TO USE DTR CONTROL, CONNECT J1 TO PIN 4

GROUND

J2
1 2 3 4 5
6 7 8 9

PC: PTT
J3
RTS

COM - SCI-6 PTT CABLE USING DB-25
TO USE DTR CONTROL, CONNECT J3 TO PIN 20

GROUND

J4
1 2 3 4 5 6 7 8 9 10 11 12 13
14 15 16 17 18 19 20 21 22 23 24 25

RADIO: PTT
J5
PTT_GND
PTT

RADIO: XMIT
J6
MICROPHONE_GND
MICROPHONE_AUDIO

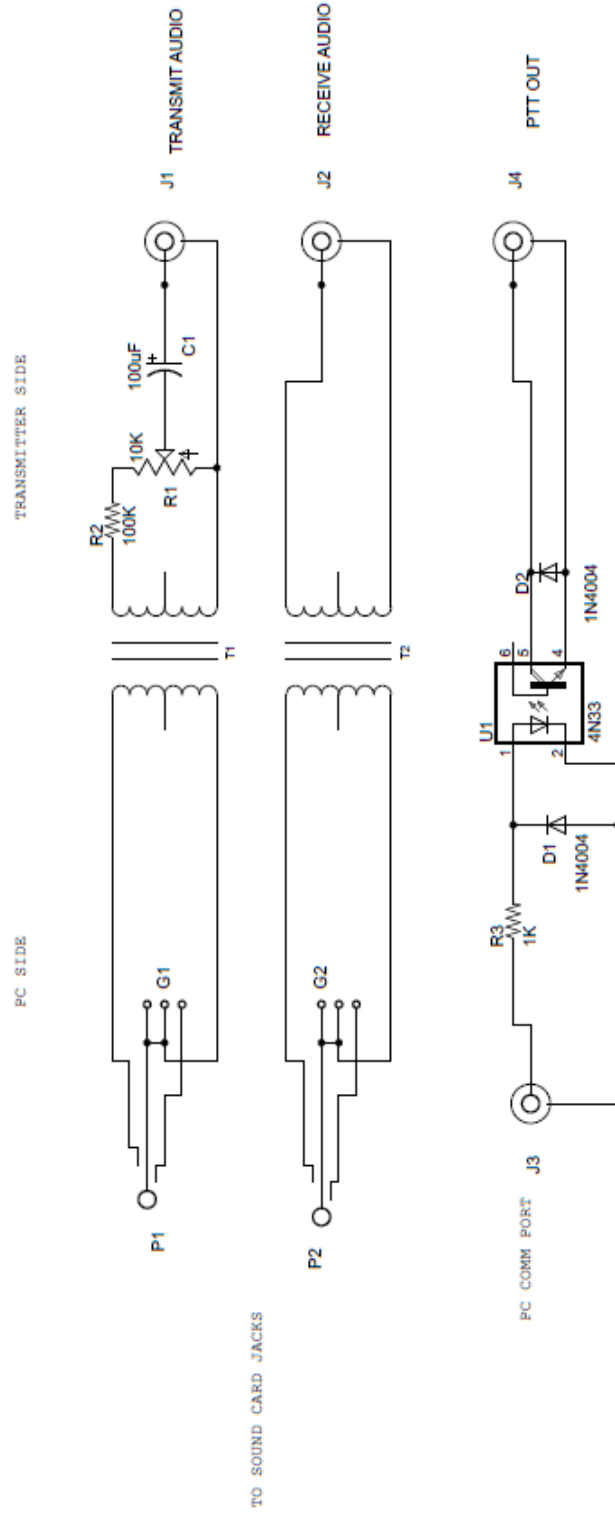RADIO: RCV
J7
RECEIVE_AUDIO_GND
RECEIVE_AUDIO

SCI-6 SIDE
RADIO SIDE

NOTES:

1. USE SHIELDED CABLE

2. DO NOT CONNECT MICROPHONE AUDIO GND TO OTHER GROUNDS

3. PTT AND MICROPHONE AUDIO WILL GO TO THE MIC CONNECTOR OR DATA INPUT CONNECTOR
DEPENDING ON YOUR RADIO TYPE. CONSULT YOUR RADIO'S MANUAL.

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TITLE: SCI-6 CABLE

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NOTES:

1. TRANSFORMERS ARE 600:600 AUDIO

2. KEEP PC SIDE GROUNDS ISOLATED FROM RADIO SIDE GROUNDS

3. KEEP MIC_GND ISOLATED FROM OTHER GROUNDS IF POSSIBLE

TRANSMITTER SIDE

PC SIDE

TO SOUND CARD JACKS

J1 TRANSMIT AUDIO

J2 RECEIVE AUDIO

J4 PTT OUT

100uF
C1

R2
10K
R1

R2
100K

T1

T2

G1

G2

P1

P2

PC COMM PORT
J3

U1
4N33

D2
1N4004

D1
1N4004

R3
1K

TITLE: PSK_IF

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