

Ham 46C – ASL Radio: Repeater Connections

Dr. Marc © 221214

1. Connection between the Raspberry Pi running AllStar software and the radio world is via a USB interface. A cable is the only hardware required.
 - a. Separate articles describe the Pi & AllStar configuration.
 - b. Since AllStar is a telephone system, it only has audio out (Tx) and audio in (Rx). It uses DTMF for control.
 - c. The program code expects the C-Media CM119A Digital Signal Processor (DSP) audio controller on the USB.
 - d. In addition to audio the card must provide PTT to the radio and COS from the radio.

2. For a REPEATER node, sound cards / radio adapters are available, such as RA-42 from Kevin Custer's www.MastersCommunications.com.



- a. His build site is www.repeater-builder.com.
 - b. Add a very short USB-A male from the Pi to the USB-B male on the adapter. It starts working with green LED heartbeat flashing and blue comm ok.
3. Five connections are between the adapter and radio through a DB9 connector.
 - a. Receive audio in (Rx) - from the radio speaker jack. Level controlled by pot R9 /12.
 - b. Transmit audio out (Tx) - to the radio mic jack.
 - c. Ground.
 - d. Carrier Operated Switch - COS DC-level switched by receiver when hearing a signal.
 - e. Push-To-Talk - PTT is pulled to ground by switch to transmit.

4. The adapter DB9 connector has these connections.
 - 9-1. Right (Aux or Tone) Output – level controlled by pot R14
 - 9-2. Left (Main or Voice) Output – level controlled by pot R16 (Tx)
 - 9-3. COS Logic Input - (pull near ground required for valid input)
 - 9-4. CTCSS Logic Input - (pull near ground required for valid input)
 - 9-5. PTT Output pulled to gnd
 - 9-6. Discriminator /Detector or Receiver Audio Input - level controlled by pot R9 (Rx)
 - 9-8. Ground - all
 - 9-x. MIC +5VDC is a larger pad/hole near the DB9 connector for power to a DTMF microphone.



DB-25 female solder



DB-9 male solder

5. Set-up audio levels to / from the radio. Set software first, then hardware. Use a second radio.
 - a. PuTTY to Pi > Login > sudo /usr/sbin/asl-menu.
 - > 4) SimpleUsb Tune Menu.
 - > 6) ASL Configuration Edit > I) Edit simpleusb.conf
 - b. The Rx audio level adjusts with pot R12. Transmit audio adjusts with pot R16.
 - c. See the firmware articles, Ham 45 D for more details.



RA-42 adapter

DB25	BCR-50V repeater with DB-25	DB9	Radio
1	13.8 Volts out (1A max)		
5	BASE STATION AUDIO OUT – Level adjusted with Volume Control		
7	Gated Discriminator Audio Out (Deemphasized) or		
8	RX Discriminator Out – Demodulated received audio	9-6	3-a
9	RX MODULE - General Purpose Input		
10	RSSI – Received Signal Strength Indicator		
12	Dedicated COS - Active HI		
13	+5 Volts Out		
14	TX MODULE – Relay OUT		
15	TX MODULE – Relay IN		
17	Programmable COS Output – OPEN DRAIN - Active LO Asserted based on CARRIER OR VALID SIGNAL	9-3	3-d
19	TX Audio Input	9-2	3-b
20	External PTT Input	9-5	
21	TX Subaudible Data or BROADBAND/Composite Input	9-1	
22	REPEATER/BASE Mode OUT		
23	Fan2/Fan1 Control Output		
24	CTCSS / DCS Encode Disable Input – Active LO		
25	GND	9-8	3-c

