

Advanced Repeater Systems USB AllStar Adapter Installation and Operation Instructions

Overview

The Advanced Repeater Systems USB AllStar Adapter provides a self powered, computer to radio interface required to create an AllStar node or link. The Adapter utilizes a high-performance, full-duplex, 7.1 CH USB CM108 chipset soundcard for high-fidelity audio and compatibility with the AllStar software. Transmit and receive levels are adjustable via potentiometers. The Portable and Mobile Radio Adapter have a carrier detect, COS generator circuit (no need for an external COS signal), with a fixed 1.5 second delay to minimize drop-out. Universal Versions have an active high COS input. The Adapter has 3 status LEDs; Green to indicate computer communication, Blue for modulation and Red for Tx Key.

The Portable and Mobile radio versions have a microphone and speaker cable and plug(s) with preset audio levels, and operate half duplex. The Universal Version has an interface cable for direct solder connection to most radios and repeaters, and can operate full duplex.

The Adapter has been tested and is compliant with the USB 2.0 Full-Speed (12 Mbps) Specification, USB Audio Device Class Specification 1.0 and USB HID Class Specification 1.1.

Ground Loop Hum, Isolation and Single Point Ground Systems

The ARS USB AllStar Radio Interface Adapter utilizes a common ground design for use in a Single Point Ground System (SPGS). These are the safest, most effective ground and equipment protection method for radio and repeater systems. A SPGS requires all equipment grounds to be tied to a single common point. Some computer to radio interface devices avoid ground-loop audio hum by isolating grounds with transformers and optic isolators which is unnecessary with a properly designed and installed SPGS.

If you are experiencing audio hum, you likely have a ground-loop. Reverse the computer and/or radio power plug polarity or use a 3 to 2 prong adapter to open the ground loop between the equipment. Multiple equipment ground returns, through audio cables, data lines, power supplies and even antenna systems, are often the cause of ground-loop related audio hum and lightning related equipment damage.

Universal Version Interconnect Wiring

The Universal Version is provided with a 5 conductor wire suitable for solder installation with virtually any radio or repeater. The Tx Key is an open collector 2N2222 capable of 500 mA current sink. Tx Audio is sufficient to drive most microphone inputs and has about 5 K ohms output impedance. It may be necessary to install between a 10K to 100K series resistor with the microphone input to prevent overdrive and hum. Receive audio should be deemphasized and gated speaker audio.

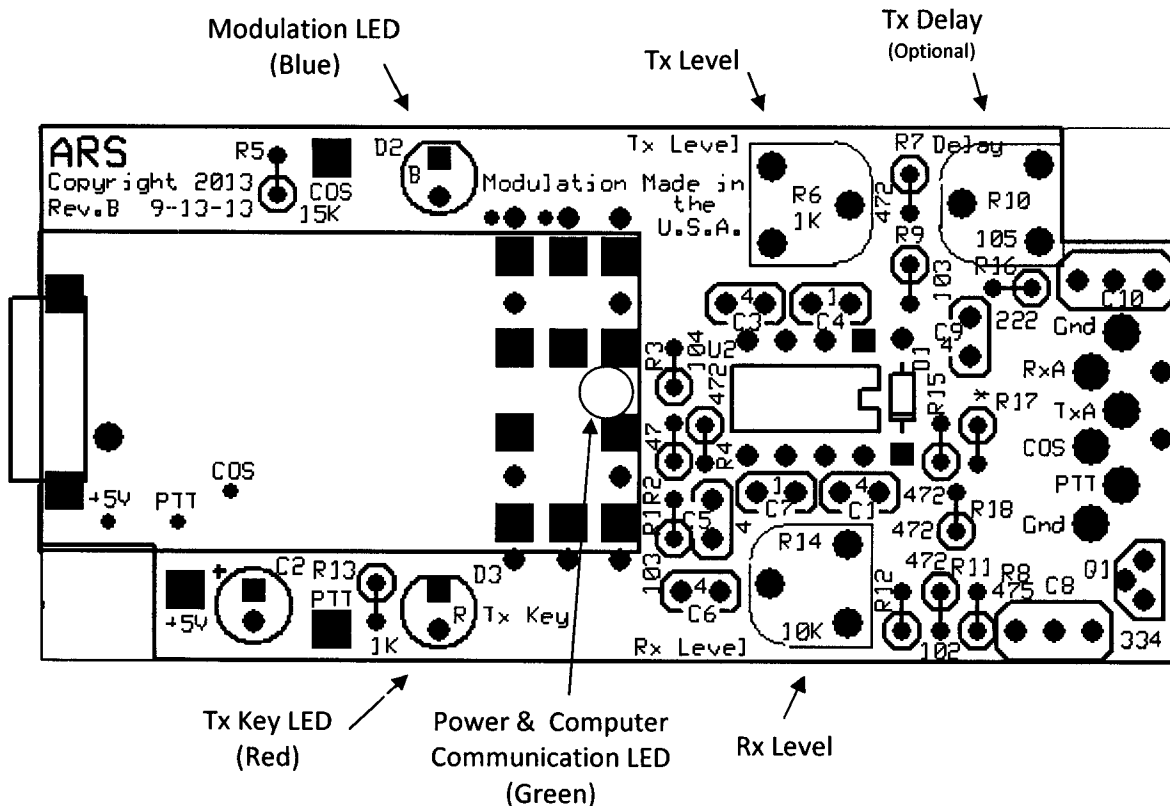
The following is the interface cable color code.

| <u>Signal</u> | <u>Wire Color</u> |
|---------------|------------------------------|
| Rx Audio | Red |
| COS | Orange (set for active high) |
| Tx Key | Black |
| Tx Audio | Yellow |
| Ground | Green |

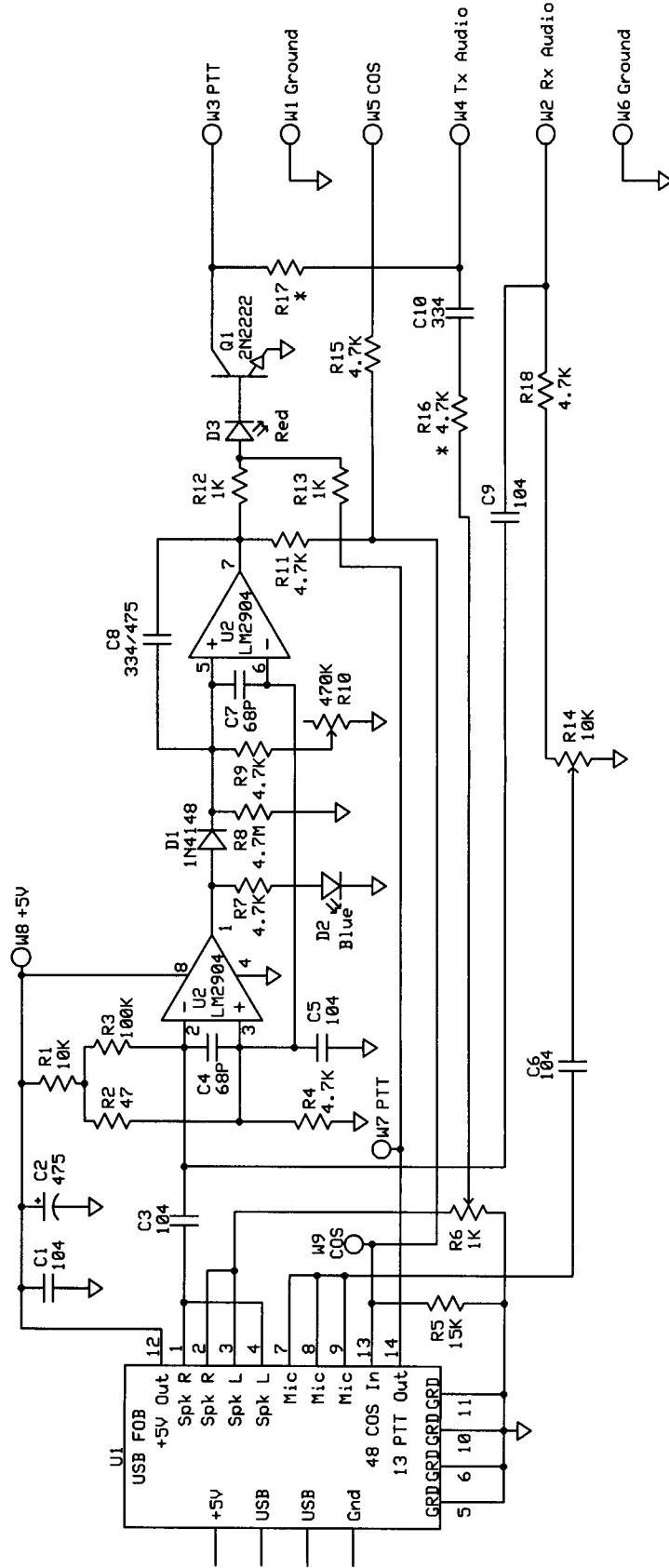
AllStar Portable Radio Set-up

1. Plug the Adapter into one of your Linux computer's USB ports, the Green LED should begin to flash indicating communication with the AllStar software.
2. If your Adapter is half duplex (such as the portable radio version), you must configure the AllStar software for half duplex operation. Set duplex=0 in both usbradio.conf and rpt.conf. If you do not do this, as soon the Adapter receives a signal from the radio, it will immediately key, which will block the incoming signal, causing a ping-pong effect.
3. Set carrierfrom=usb for input signal detection.
4. Connect the Adapter to the radio. Unsquenced receive audio should light the Blue LED. The Red LED indicated transmitter key.
5. Verify correct audio levels, if necessary, adjust the audio level pots. Portable and Mobile radios should require no more than ½ receive volume.
6. Reference the AllStar website for instructions on configuring and operating your node.

USB AllStar Radio Interface Adapter Circuit Board Layout



USB Radio Interface Adapter



Mobile Radio RJ Connectors

| Icom | Kenwood | Yaesu |
|--------|---------|-------|
| R16 | 10K | 100K |
| Mic Hi | 6 | 2 |
| Mic Lo | 5 | 3 |
| PTT | 4 | 5 |
| PTT Lo | 7 | 6 |

Portable Radio Connectors

| Icom, Alinco, RS | Yaesu (VX) | Yaesu (Waterproof) | Kenwood, Baofeng |
|-----------------------|-----------------------|-----------------------|-------------------|
| R17 4.7K, RS-2.2K | R17 2.2K | R17 2.2K | R17 NU |
| 1 Ground- Black/Blue | 1 Ground- Green | 1 Ground- Black/Blue | 1 Ground- Black |
| 2 Rx Audio- Red | 2 Rx Audio- Red | 2 Rx Audio- Red | 2 Rx Audio- Red |
| 3 N/C | 3 N/C- Black | 3 N/C | 3 PTT- Blue |
| 4 Tx Audio/PTT- White | 4 Tx Audio/PTT- White | 4 Tx Audio/PTT- White | 4 Tx Audio- Green |

Configurations

Fixed Hangtime: C8- 334, R9 & R10 NU (Not Used)

Variable Hangtime: C8- 475 NP, R8 NU

EchoLink & Winlink: R5, R11, R13, R15, C9 NU

AllStar Portable Radios: C3, R5, R12, R15 NU

AllStar Radio Interface: R9, R11, R12, D1, C7, C8, C9 NU

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