

## Audio Switch Unit (ASU) for the KX3 Radio

*Keeping it simple to change between external speakers and a headset to match your operating style*

by Gene Hinkle, K5PA

### Introduction

I enjoy operating my transceiver using speakers for general listening to QSO's but also like to be able to put on a headset with boom microphone to work DX. I was getting weary of having to unplug the speaker output of the transceiver going to external speakers and connecting my headset. Additionally, configuring my microphone was clumsy. The idea of a very simple Audio Switch Unit (ASU) was borne out of the necessity to make it easy to operate in my casual and demanding modes.

There are a proliferation of inexpensive, quality audio headsets used in computer gaming applications. Examples of these are the , Yapster or Yapster Plus (TM-YB100P). The Yapster is shown in Figure 1.

**Figure 1. Example Headset (Yapster)**



These headsets have the computer standard 1/8 inch line cord plug for the headphone and for the microphone element. This means 2 plugs must be interface to the radio communications equipment that typically would have an 8-pin Foster socket, RJ45 socket, or 1/8 inch plug. Additionally, a means must be provided to provide a push-to-talk (PTT) switch closure for putting the radio in the transmit mode. The Audio Switch Unit (ASU) solves the problem of routing of audio transmit and receive signals and push-to-talk transmit control from inexpensive gamer headphones to the radio equipment.

The design requirements set for the ASU was

- 1) Small size for palm use,
- 2) Push button for PTT transmit control but still support VOX,
- 3) Speaker-headphone toggle switch to allow monitoring in the shack when not using headset, and
- 4) Two 1/8" jacks for interfacing to the gaming headset.

My finished prototype of the ASU is shown in Figure 2. It meets all of my requirements and is a pleasure to use.

**Figure 2. Prototype ASU Connected to KX3 Transceiver Audio Output and Microphone Input**



### **Electrical Schematic Diagram**

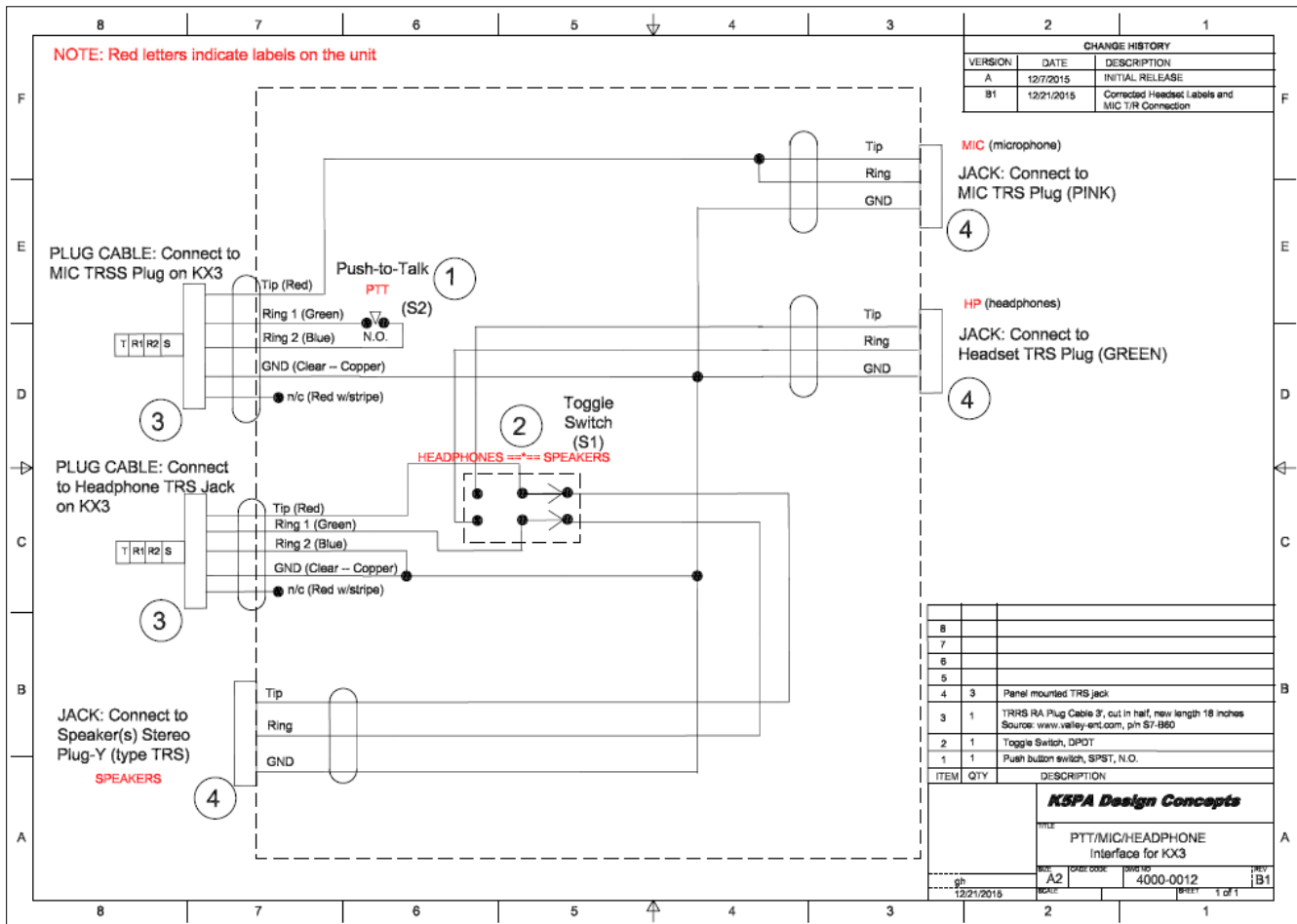
The electrical schematic is shown in Figure 3. A larger version of the schematic is included at the end of this technical note.

Since I was interfacing to the Elecraft KX3 transceiver, I was interested in having the MIC and Headphone connectors being part of the ASU. This was accomplished by purchasing a TRRS plug-to-plug cable (*Valley Enterprises, p/n S7-B60, www.valley-ent.com*) and cutting it in half, making it the interface to the radio. The wire colors within the cable is noted on the schematic and will be determined by the actual cable used. Also, if other radios are being interfaced, the cable hardware would be changed accordingly.

Toggle switch (S1) is a DPDT switch that connects the stereo audio from the radio to either the speakers or the headphones. I chose to disable the headphone sounds when the speakers are selected. But, the wires could be connected so the headphones are always connected to the radio audio and only have the speaker disconnected. I am using stereo connections because the KX3 provides independent audio (right/left ears) for dual watch receiver functions used during split operations.

Push button (S2) is a momentary, normally open (N.O.), switch used as the push-to-talk (PTT) on the radio. Again, the KX3 is wired so the 2 rings (R1 and R2) on the microphone connector to create the PTT action when connected together. Depending on the radio being interfaced other pins should be connected to push button (S2) based on the radio connections. Although a PTT switch is included, you do not have to use it if you prefer Voice Operated Transmit (VOX) operation and your transmitter supports it.

**Figure 3. Schematic Diagram for the Audio Switch Unit**



**Prototype Construction**

The prototype unit is shown in Figure 4. A small (2 x 3 x 1 inch) plastic container is used to mount the switches, jacks and cables. The container is small enough that it could be held in the palm of your hands or left on the desk top. Note in the figure on the right, you can see the two 1/8" male connectors that connect to the radio for transmit and receive audio. Since I used the same male to male cable cut in half, each connector set is the same type (Tip, Ring1, Ring 2, Sleeve or TRRS). The length and orientation of the plugs are also tailored for the KX3 so these can be adjusted based on your specific requirements.

**Figure 4. Construction of Audio Switch Unit Box Prototype**



*Caption: Plastic enclosure, 2" x 3" x 1"*

**Summary**

A small audio switcher unit (ASU) was designed and implemented as a prototype unit to permit inexpensive headsets to be used with commercial/amateur radio equipment. The ASU met the goals set for the unit by making it small, hand held, push button PTT control or VOX, and speaker/headphone switching.

A schematic of the unit as designed for use with the KX3 transceiver was given.

