

## A Radio System for Relaying the Patient Monitor Audio Output to the Anesthesiologist during Pediatric Sedation

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**Introduction:** The anesthesiology motto of “vigilance” reflects the need to be aware of a problem in order to correct it timely. The need for vigilance is particularly acute in the care of children in dental facilities where staff may have no experience with sedation. Pediatric dental facilities usually have distractions not seen in the typical sedation location such as crying children in neighboring operatories, questions from worried parents observing the procedure on their child, the whine of the 500,000 RPM dental drill, helicopter landings, running water, cell phone calls, and the need to leave the area for numerous x-rays to name a few.

In order to make sure that I never lose touch with my monitor’s audio output, I built a transmitter into the monitor stand and a receiver into my stethoscope. The system has worked well and comfortably for over 3,500 cases with only rare instances of radio interference.

**Methods, Results, and Discussion:** The monitor is a 900 MHz Wireless Camcorder Transmitter/Receiver (1). The transmitter requires a 1.5V input from an AA battery and has a 150 foot range. The transmitter is integrated into the monitor stand, so I installed a 1.5V DC transformer and ran the wires into the battery case of the transmitter and attached each lead to a screw inserted in the appropriate end of a dowel cut to the proper size to act as a “dummy” AA battery. In this manner, I never need to replace the battery. Both the transmitter and receiver are 2.0”x2.5”x0.5” in size and weigh 1.5 ounces without the battery.



The transmitter has a long wire attached to its microphone, and, after locating the speaker on my monitor, I permanently mounted the microphone on the stand such that it is as close as possible to the speaker. I adjust the monitor volume to control the intensity of the sound I hear with my earpiece. It turns out that a very low monitor volume setting works fine which has the advantage that the beeping and alarms are inaudible to the dental staff and thus do not distract them. This system should work with any monitor.

The receiver is powered by a single AA battery and can be set to one of three channels (which need to match the switch setting of the transmitter). To hear the sounds, I use a custom molded earpiece with a tiny powered microphone built into it (2). This connects to the audio out 1/8” mono jack of the receiver. If I do not want to wear the earpiece, I use a tiny AAA battery powered speaker (designed for an iPod Nano) (3) that plugs into the audio jack. To manufacture the earpiece, an audiologist needs to make an ear impression (EmTech will want you to send them the 1/8” mono jack and some cable. This can be cut from the bottom of the receiver since it is provided to interface with recording equipment which will never be used in this application). The earpiece needs to have a handle built into it to prevent the power wires from being used as a handle and eventually failing.



The receiver sits in a BBC brand “belt pager pouch” with a Velcro closure that is attached to my stethoscope.

Refs: (1) Sony Model WCS-999 Camera Mountable 900 MHz Lavalier Microphone System, \$99.99  
(2) EmTech Laboratories, Inc., 7745 Garland Circle, Roanoke, VA 24019, \$70.00  
(3) Merk Mini Nano Speakers, Merkury Innovations, 2006 Model: MI-SPNN, \$19.99