

Wireless Room Measurements



One of the biggest problems in measuring a large space is getting the measurement microphone connected back into the analyzer. Wireless technology, at first glance, seems perfectly suited for this, but the use of companding circuits in most models violates the prerequisite for linearity in the system-under-test. Some will remember the HME PAL (Precision Audio Link) that allowed wireless measurements in the early 1990's. The PAL has been long discontinued, and now over a decade later we finally have another wireless link between the mic and the analyzer.

The Lectrosonics UH400TM/R400 wireless system is a digital wireless transmitter/receiver that is well-suited for measurement work. The small transmitter is powered by a 9V battery and can be plugged directly onto the measurement microphone. Phantom power (48V) is provided. The small diversity receiver is placed near the analyzer. It allows signal levels from -30dBu to 0dBu. A high-pass filter is provided, which is invaluable for measuring in noisy spaces.

A few concerns worthy of mention: Because this is a

digital device there is latency in the conversion from analog to digital and back again. This latency is best viewed in the impulse response measurement of the system as shown in Figure 1. You can see, there, some three milliseconds of latency in the measured arrival time. This is a small amount of time, roughly equal to three feet of offset, but it should be considered in any measurement procedure.

The body of the transmitter, when plugged onto the measurement microphone can be a factor at high frequencies; the dimensions suggest that anything above about 8kHz could be affected by the transmitter body. It's all in the wavelength folks. For high frequency measurements that may be affected by the physical presence of the transmitter, a cable can be used to add some distance between it and the mic.

Lastly, the frequency response is down at the extremes, as would be expected from most any wireless system. The bandwidth and processing required to rebuild the digital signal in the analog domain is still prohibitive in all but the most expensive wireless systems and not necessary for typi-

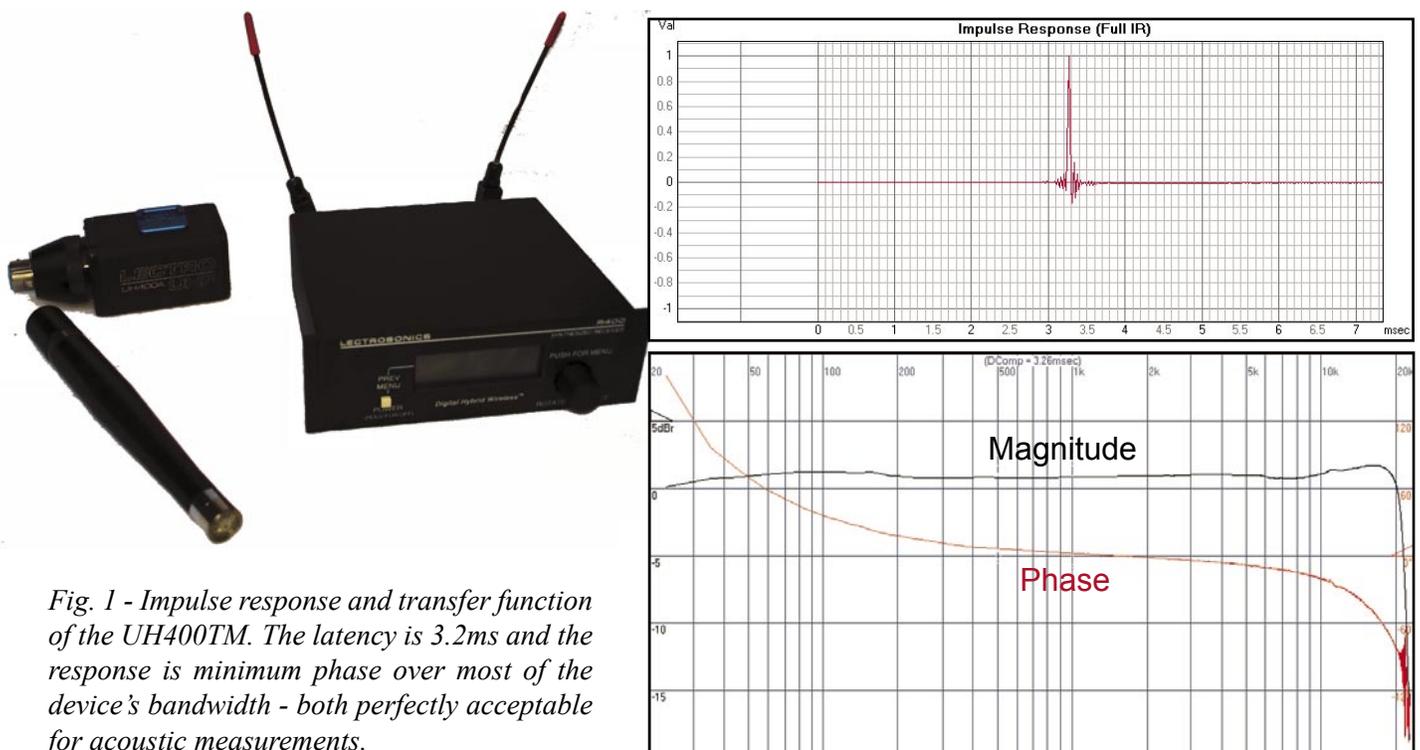


Fig. 1 - Impulse response and transfer function of the UH400TM. The latency is 3.2ms and the response is minimum phase over most of the device's bandwidth - both perfectly acceptable for acoustic measurements.

cal audio measurement tasks. Figure 1 shows the transfer function of the looped back system. Some details:

- The phantom power is switchable between 48V (limited to 5ma), 15V (capable of 15mA) and 5V (capable of 15mA). This allows use with the widest possible range of microphones.
- The transmitter and receiver, although lightweight, are constructed metal.
- The system is frequency agile and allows selection between 256 frequencies.

Field testing of the unit proved quite pleasurable. It is small and light, and even the DC supply for the receiver is a featherweight. The transmitter locks firmly to the measurement mic (not included) and balances nicely for stand mounting. The height of the transmitter supplies the correct angle for boundary placement of the mic (and keeps it from rolling!), so in many cases the user simply needs to lay the mic on the floor of the venue for ground plane measurements. The output level of the receiver is adjustable by a front panel control, allowing easy gain settings for interfacing to sound cards. We did not test the battery life, but an alkaline 9v endured several hours of measurements, and still indicates a nearly full charge on the receiver.

A wireless measurement mic system offers the benefits of quick setup and ease of use in measuring acoustics and tuning sound systems in large rooms; there is no hassle with long mic cables, but the trade-offs must be factored into the decision to use any wireless system. *pb jj*

From Syn-Aud-Con Newsletter
Vol. 32 No. 4
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Top - Boundary placement of microphone.
Bottom - Transmitter controls.