

# A NEW APPROACH TO WIRELESS IN-EAR

## Evaluating the world's first 5GHz Wifi/Bluetooth wireless in-ear prompting system.

by Fred Speckeen of Edisonian Partners Limited



[Digitear will be shown at NAB 2018 at Overline Systems Booth C1336](#)

### INTRODUCTION

Search the internet and you'll quickly find a litany of complaints from broadcast engineers reporting the problems they have with current wireless in-ear systems:

- poor coverage range over even small distances;
- complete drop-outs requiring rebooting and/or laborious hit-and-miss reprogramming of systems to try to find open frequencies;
- poor intelligibility due to lack of audio bandwidth;
- less than adequate volume levels and lack of isolation in earpiece design; and
- degraded and uneven quality of service due to RF interference.

*Today, our patience is shorter than ever when something is not easy to use or reliable*

The promise of workflow improvement and convenience of a wireless in-ear system is often thwarted by such shortcomings as well as our own rising performance expectations set by

the consumer electronic devices we use. Today, production time pressure is greater and our patience is shorter, so when something is not easy to use or reliable it no longer meets our requirements.

Intercom veterans of over 30 years, *Overline Systems* of France has set out to redesign wireless in-ear system solution from the ground-up to meet today's needs. It's called Digitear and will be shown for the first time in North America at NAB 2018 (Booth C1336).

## EVALUATION

### Design for User Experience

Digitear is targeted specifically as a solution for on-air presenters - a next generation wireless in-ear prompter with talkback. According to Overline, the physical design and features of each Digitear component reflect a deep understanding of the needs of presenters and engineers, and also the design, ease-of-use and reliability expectations associated with consumer electronics products.

### The Presenter's System

The presenter receives a complete system contained in a high-impact, lidded gift box that houses the belt pack, 2 in-ear monitors and an extra belt pack battery. On the rear of the box, a mini-USB connector allows charging of all nested components including the extra battery when they are not in use.

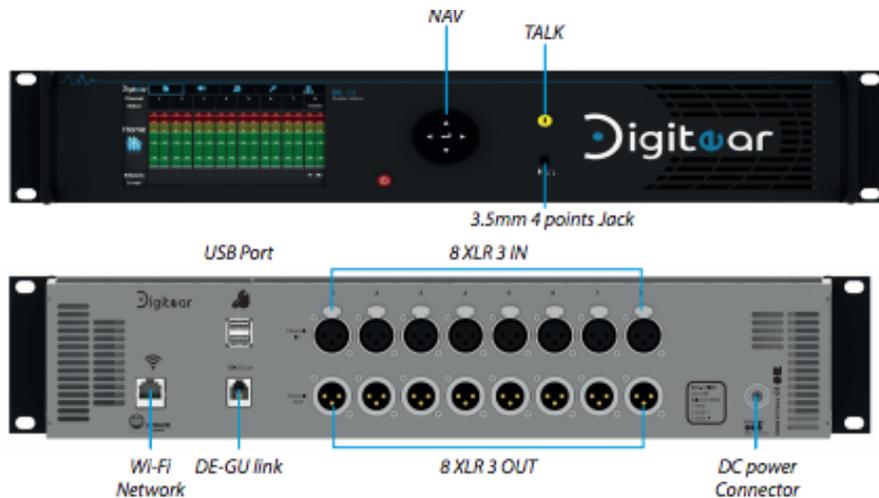


Digitear: a next-generation wireless in-ear prompter with talkback

Pairing of the belt pack and earpieces with each other and the larger system is automatic. In prompting applications, a single charge for the belt pack and an earpiece typically provides 6 hours of operation, and users are warned audibly when battery time falls to less than 30 minutes. A simple push-to-talk button on the belt pack allows talkback (simplex) using the belt pack's built-in condenser mic (more details on simplex and duplex operation are found later in this review).

### Control Room Integration

Each TX box supports 8 belt pack/earpiece sets, with each set having its own independent channel. Multiple TX boxes can be interconnected to support more channels. The TX box integrates easily with existing consoles via XLR analogue cables, and configuration of cross-channel communication is accomplished using the studio's existing console/matrix. The TX box connects to a dedicated Wifi antenna or an existing Wifi network via ethernet cable. All settings can be adjusted via the front panel or via remote control software should the TX box be placed in the machine room or a remote location.

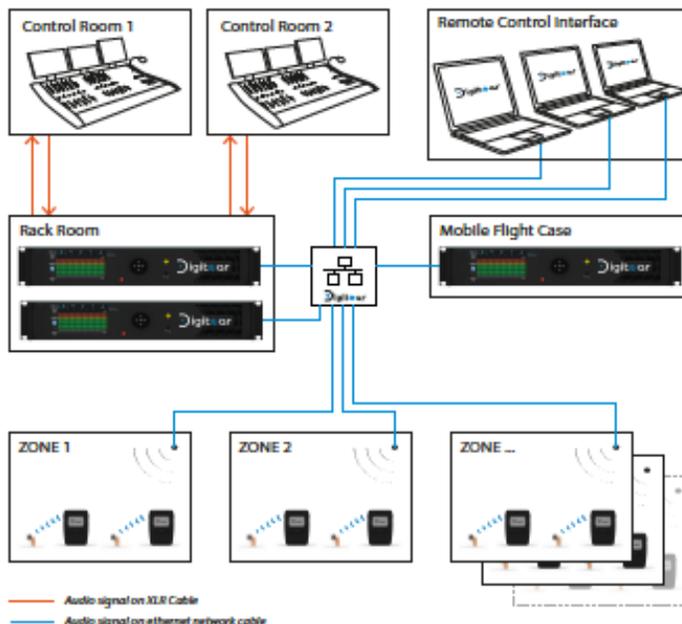


The backbone for communication between control room and talent utilizes a combination of 5GHz Wifi and Dual-streaming Bluetooth

Status of each belt pack and earpiece pair's signal level and battery level are visible on the front panel screen and on the remote control software. Re-pairing of belt packs/earpieces is automatic in as little as 3 seconds if presenters move between coverage zones.

### Digitear Signal Routing

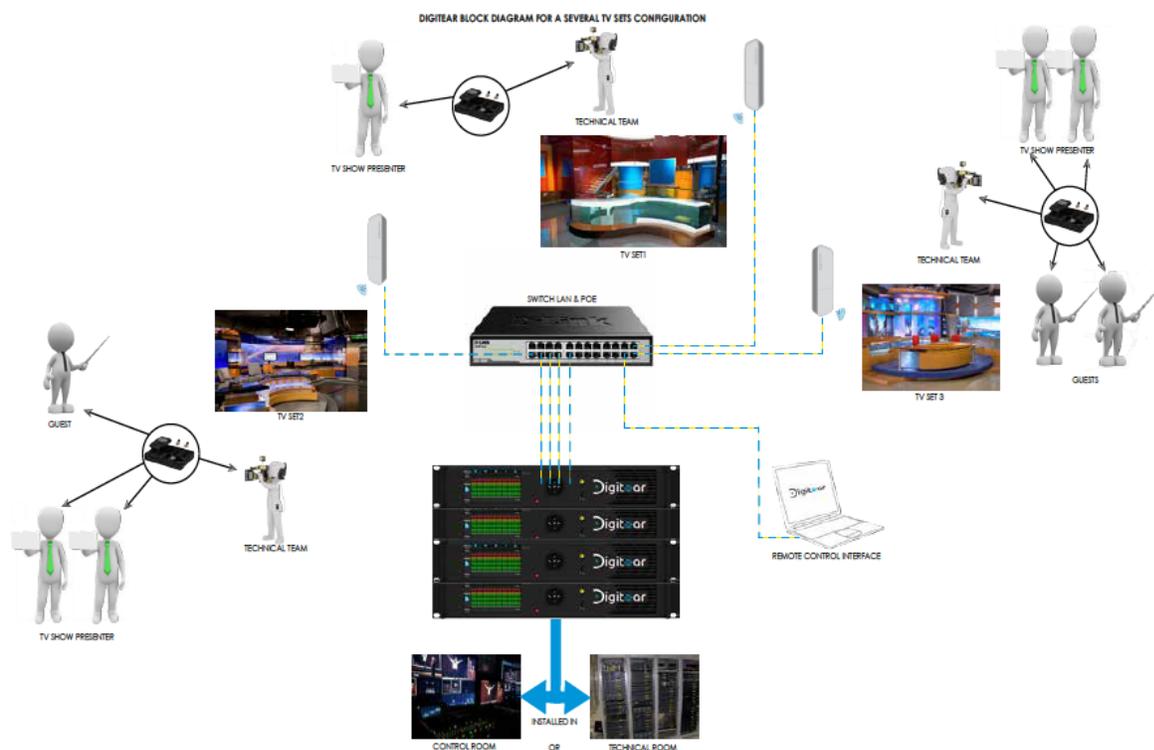
Rather than develop a proprietary communication protocol, Overline has leveraged existing protocols and systems for all digital wireless communication. The backbone for communication between control room and talent is a combination of 5GHz Wifi and Dual-streaming Bluetooth. 5GHz Wifi moves audio packets back between the wifi antenna and each presenter's belt pack. The belt pack then translates those packets into Bluetooth for the last



few feet between that belt pack and the paired in-ear monitors. The belt pack PTT switch that activates talkback via the built-in mic (mentioned earlier) can alternatively be used to remotely control routing of an existing mic via GPO. The Belt-pack can also be connected to a bluetooth mic/headset or a plug-in electret condenser mic. Further, each belt pack system can also be configured for full-time, latched, full-two-way (duplex) communication.

### Long Range and Multiple Zones

Engineers have the choice of either utilizing dedicated Wifi antennas to cover multiple zones or, instead, integrating Digitear into existing Wifi Networks. In the latter case, system administrators merely assign Digitear priority to guarantee quality of service. Each Wifi access point antenna covers a range 150' (50 meters).



### Conclusion

Digitear clearly represents a 21st Century approach to wireless in-ear, taking advantage of new technologies and customer-experience informed design approaches to overcome the problems in existing solutions. The technical specifications provided by Overline reflect substantial improvements across the board compared to existing 20th Century legacy designs. The overall ease of use and simplicity of operation put a smile on my face - Digitear components and user interfaces reflect Overline’s thoughtful approach to considering the needs and expectations both of presenters and broadcast engineers.

## Technical Highlights (\*Information and manuals can be found at [www.digitear.info](http://www.digitear.info))

### Range

- 150' (50M) from Access-point to Belt pack
- 15' (5M) from Belt pack to Earpiece
- Add multiple Access-points for greater coverage

### Audio

- 15kHz frequency response
- Earpiece design provides 60dB of isolation and  $\leq 110$ dB sound level
- Latency Range 60ms -150ms\*

### TX Box

- Rack-mountable base station with control screen display
- 8 separate audio channels per unit and up to 200 channels via interconnect

### Belt Pack and Earpieces

- Direct access audio level and talk-back/GPO control
- Auto-pairing with TX Box and Earpieces after initial configuration
- Rechargeable with full charge typical operating time of 6 hours
- Earpieces use interchangeable silicon earbuds that adapt to ear shape

\*It may surprise many that despite the mixed format communication chain, Digitear's overall communication latency is about the same as that of typical mobile phone communication and less than typical VOIP. While very low (seemingly sub 140ms as measured by the author), this is *not* a system for live music in-ear monitoring, though in fairness that is not the use-case it was designed for. For intercommunication between control rooms, technical teams and presenters in the Broadcast studio, Digitear offers a significant step forward to fulfilling the original promise of wireless in-ear prompters.

### Learn More

Digitear info and downloads [www.digitear.info](http://www.digitear.info)

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### The Author



Fred Speckeen is co-founder of Edisonian Partners Limited. An audio industry veteran of over 30 years, he has held executive positions with companies including TC Electronic, Dynaudio Professional and Tannoy Professional. A radio amateur (VA3AWO) since age 14, he developed an early and continuing obsession with things related to audio and communications.