WIRELESS DISTRIBUTION

Eliminating the cable in feeding delays with the AiRocks Pro system. ***by Keith Clark***

I'VE SPOKEN WITH DOZENS of live sound techs and engineers over the years who have expressed (often longingly) their wish for a way to reliably distribute full-bandwidth audio signal wirelessly to loudspeakers in remote locations, such as delay towers that extend coverage at larger events. The decades-long practice of running cable for this application has been, and remains, somewhat expensive as well as a hassle, i.e., preventing cable damage or accidental unplugging with thousands of people tromping around.

Attempts to utilize conventional entertainment wireless systems have proven to work marginally well, particularly when the equipment is of premium quality, but they're not designed for this purpose, limited in both overall capability and by a point-to-point distribution approach. And then there's the ongoing RF situation, with entertainment wireless losing the 700 MHz spectrum a few years ago and further changes still unclear.

All of this is why I was intrigued to come across AiRocks Pro, offered by Atlanta-based AirNetix, while attending the InfoComm 2015 show in Orlando. AiRocks Pro is a multi-hop repeater system designed to transmit wireless audio to remote powered loudspeakers and amplifier racks, operating in the license-free 900 MHz band that penetrates walls, trees, people and other obstructions that can limit higher frequency devices that work at 2.4 GHz or 5 GHz.

AirNetix founder Mike Hooper with an AiRocks Pro ARX-900 unit.

As a result, it's well-suited for delay stack applications at concerts, festivals, golf tournaments, parades, air shows, auto races, and other events requiring full-bandwidth, pro-quality audio signal distribution over a large area. An AiRocks Pro system also provides 158 mW of effective transmitting power for range of more than 1,000 feet, as well as built-in variable delay (up to 500 ms), XLR line-level audio input and output, and network control. The system provides 2-channel stereo operation as well as single-channel mono mode, and the hardware is housed in weather-resistant aluminum enclosures designed for outdoor use.

IDENTIFYING A NEED

Founded by Mike Hooper, AirNetix is focused on designing and developing digital wireless products for the pro audio market. A self-described "long-time serial entrepreneur," Hooper has more than 40 years of experience with satellite and optical communications, data networking, wireless semiconductor development, WiMAX, WiFi, power amplifiers and front-end modules (FEMs) for mobile devices.

Over that time, he's worn a lot of hats, developing both hardware and software as well as serving in various management positions. For example, as CEO of RF Solutions, an Atlanta-based startup, the company developed highly efficient 2.4 GHz and 5 GHz semiconductor power amplifiers for the early WiFi market. He's now bringing that hard-earned expertise to the pro audio market via AirNetix.

AiRocks Pro deployed by West Moon Studios for the Arts Alive Festival in Mission Viejo.

Hooper saw a traditional wireless audio equipment landscape primarily made up of systems with a single transmitter and a receiver sending audio from point A to point B. And while some newer wireless audio systems have the ability to send signal from a single transmitter to multiple receivers. ("point-to-multipoint"), because the FCC restricts the amount of power that each transmitter can radiate, the effective range is limited. Finally, there weren't any devices with the ability to be configured as a transmitter and a receiver simultaneously, again limiting range.

REPEAT THAT PLEASE

Hooper's response with AiRocks Pro is a network system approach consisting of a

single master unit and one or more relay units, each able to be configured to operate either as the master or a relay. Two types of units are available: the ARX-900 for mobile applications and the ARX-910 for installed applications. The only differences between the two are that the ARX-910 doesn't include front panel controls (saving cost) and is fully weather proofed for long-term outdoor use.

Within an AiRocks Pro network, each unit receives an audio transmission from a single "upstream" unit and then re-transmits that same signal to one or more "downstream" units. Each unit creates its own point-to-multipoint sub-network. The input to each sub-network is the signal received by the single uplink AiRocks Pro unit.

As a result, a network is a group of one or more sub networks, all of which emanate from a single network master. Networks can be as simple as one master unit and one relay unit in a point-to-point configuration or as complex as 100 units with multiple branches and sub-networks.

If there's a failure of one of the upstream units, the downstream units automatically scan for other AiRocks Pro transmission within range. If an acceptable signal is found, it then becomes the input signal for that sub-network or any newly created sub-networks. This automatic switchover is accomplished without the need for manual intervention.

TOOLBOX OF FUNCTIONS

It's all set up and controlled via the Network Management System (NMS), built into every unit and providing a toolbox of real-time monitor and control functions. A remote spectrum analyzer function scans the local RF environment of any remote unit and plots the results of the scan on a spectrum analyzer graph in the NMS relay monitor window, allowing the operator to keep track of any potential interference at any remote relay location.

Other critical functions that can be monitored and controlled include receive signal strength indicator (RSSI or receive signal level), packet error rate (PER), remote spectrum analysis (RSA), audio level, and delay. Another feature called Automatic Link Optimization (ALO) continuously monitors the quality of the link between units and automatically selects a new transmission channel if the interference level is too high.

Even if interference appears after the initial installation has taken place, the links continue to self-optimize to avoid any new or transient local interference. The ALO scan and optimization takes 2 seconds, during which the audio output from the unit is muted.

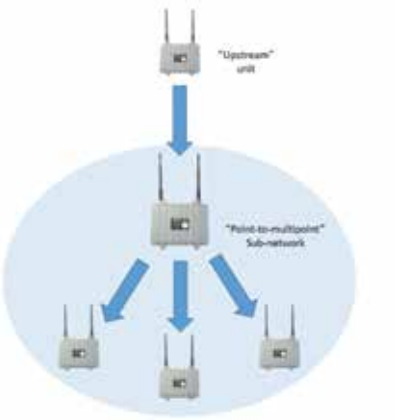
As noted, AiRocks Pro transmits at 158 mW of output power, which can cover distances of more than 1,000 feet with standard antennas. Utilizing an optional directional 6 dBi Yagi antenna boosts effective output power to 398 mW, and for extreme cases, the AiRocks Pro has been authorized to use a 14 dBi Yagi directional antenna, which means an effective transmit power of 2500 mW.

IN THE REAL WORLD

Finally, AiRocks Pro operates in the unlicensed, uncrowded 900 MHz radio band, offering the flexibility to utilize the system virtually anywhere in the U.S. and Canada without dealing with licensing while also lessening the need for frequency coordination and eliminating intermodulation issues. It was subject to a lengthy beta-test process that concluded this past April, with several noted sound companies in the U.S. providing Hooper with a range of useful input that was incorporated into the system.

Single Unit – A closer look at an ARX-900.

One of those beta-testers, Alex Moran, owner of Spider Ranch Productions (South San Francisco), notes, "We've used an AiRocks Pro system in several of our more challenging venues and it performed flawlessly. The transmit range is well beyond any other product that we have tested, and the rugged aluminum enclosure makes it perfect for the hard knocks on the road. And since any radio can be configured as a transmitter or receiver, we are able to quickly reconfigure our RF link to and from the stage during a live event."



A simplified overview of the AiRocks Pro repeater process.

Another user, Danny Gray of West Moon Studios (Capistrano Beach, CA), deployed AiRocks Pro for the Arts Alive Festival in Mission Viejo this past May. "I put two of the units 15 feet into the air and the third on a regular tripod speaker stand," he explains. "Everything worked as planned. The master node was placed at the front of house mixing position, with the others at 240 feet and 460 feet from the stage.

"The software seems pretty complete, although I will need to spend a little more time with it. I especially like the 500 ms delay, which worked really well," he concludes. "My client was happy, and even happier that they didn't have to bury 460 feet of cable." ■

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