

City Theatrical Multiverse

By: Richard Cadena

In 2016, Gary Fails, founder and CEO of City Theatrical, held a press conference on the show floor of LDI to announce the launch of a new wireless DMX product called Multiverse. At its heart was a tiny integrated circuit chip mounted on a very small circuit board. It looked very promising, but we would all have to wait to get our hands on it. A few years later, the full product line is finally here.

The range includes the Multiverse 5910 Transmitter, Multiverse Node, Multiverse Gateway, and Multiverse Module. I was finally able to get my grubby hands on them and test them out and, in short, they are easy to set up and use, and they work really well. The longer version is that the system is well-thought-out and has lots of features.

The Multiverse 5910 Transmitter can wirelessly transmits up to nine universes of DMX/RDM: five in the 2.4GHz band and four in the 900MHz band. Someone asked me why this is a big deal, and I can think of at least two reasons: First, it replaces nine transmitters with one, saving space and setup time; second, it automatically coordinates the frequencies so that it minimizes interference, using something called SHoW Key Security to ensure that other City Theatrical SHoW wireless DMX systems do not interfere. The Ethernet input port allows it to receive sACN or Art-Net, obviating the need for multiple DMX inputs. It even has power over Ethernet (POE), so you can avoid having to use the power cable, powering it through the Ethernet cable if it's fed from an Ethernet switch that has a POE power supply.

Even though it outputs nine times more universes than other wireless DMX systems, it uses some clever compression techniques to reduce the amount of radio energy that it outputs.



The Multiverse Transmitter can transmit nine universes of DMX, five in the 2.4GHz range, and four in the 900MHz range. It uses several techniques that help make it work well even in the most challenging of conditions, like a trade show environment, as illustrated by the screen capture of a Wi-Fi scan.



One of my favorite features is the configuration screens in RDM. It shows you easily legible configuration settings in a simple layout format.

Fails talked about this feature two years ago during a presentation at LDI. It can be set up so that it only transmits changes in DMX values instead of repeating the same, unchanged DMX values over and over again. Ordinarily,

a console repeats the DMX data up to 44 times per second, regardless of whether any of the values have changed. With a wired system, this has no ill consequences but when you're trying to share the wireless



At a distance of approximately 500' or more, I had good signal strength using the 2.4GHz band in a crowded space.

spectrum with other wireless systems—like audio, Wi-Fi, wireless monitoring, etc.—it's not a very effective use of bandwidth.

But how well does it actually work? That's the question I set out to answer when I received the demo package.

As with all wireless systems, one of the biggest potential problems is interference. Trade shows are the worst. Fortunately, I happened to be in the Boston Convention and Exhibition Center during a medium-sized trade show, so I could test the system in a fairly harsh environment. I scanned the 2.4GHz and 5GHz bands and found that they were both very crowded. (See illustration.) Perfect.

Setting up the Multiverse

Transmitter and the Multiverse Node as a receiver was very easy. I already had the DMXcat app on my iPhone, and since the transmitter has a built-in DMXcat, I was able to connect it to my phone via Bluetooth and discover it using RDM. It was so intuitive that I never had to break out the user manual, with one small exception. When I accidentally connected a device to the input of the node instead of the output, it automatically went into transmit mode. I didn't realize my mistake until I read the manual. As soon as I disconnected it, it went back into receive mode.

Then I walked it away from the transmitter to see if I could get a signal in the middle of the trade show. At a distance of about 175', transmitting through dry wall and two sets of glass walls, the handy signal strength icon on the backlit LCD screen on the face of the node was showing three out of four bars, which means 50% or better. I thought I was using 900MHz but when I later looked at the pictures I took, I realized it was actually the 2.4GHz band. I would likely have gotten much better results with 900MHz, because the lower frequencies travel farther and penetrate obstacles better than 2.4GHz. There is also a lot less interference in the 900MHz band.

Next, I walked the node all the way down the hallway, as far as I could go, which I estimate was about 500' or more. It was easy to do because the node is only about 4" tall by about 2-1/4" wide and weighs about 6oz. I did have to find an AC outlet to power it.

In a perfect scenario, I would have elevated the transmitter and receiver about 8' above the floor, because that's the best location for the strongest signal. The transmitter and node both come with an attachment plate that makes it easy to mount on a grip stand, truss, pipe, or some other structure. In this instance, I just set the transmitter on the floor and the receiver still showed three out of four bars of reception.

Again, I thought I was using

900MHz, but it was actually 2.4GHz, and I was using the omnidirectional antennas that came with the units. If you need greater transmission distances, you can always use directional antennas.

The reception was strong and steady, despite the crowded frequency band. There are a few reasons for this. First, I was using the highest power setting. You can dial it down if you don't need to transmit over extremely long distances and this will lessen the likelihood of interfering with other wireless. This is an important feature in today's production environments, where other crews are working hard to get their own wireless (audio, monitoring, lens focus, etc.) to work. Second, Multiverse also has user-selectable adaptive spread spectrum frequency hopping, which changes the transmission frequency several hundreds of times every second, and it monitors the spectrum to avoid frequencies that have a lot of interference. Third, it uses forward error correction.

There are many more features in the system; one of my favorites is the built-in Wi-Fi that allows you to connect to it to a tablet and use Luminair or any other tablet-based app to control your lighting system. One thing that makes its configuration easy is that it has RDM. It gives you quick access to a number of settings and options so you can, for example, turn DHCP on or off, change the IP address and subnet mask, assign DMX universes, label the settings, and more.

Another component of the Multiverse family of products that I think is really interesting is the Multiverse Module, which is an integrated circuit chip that manufacturers mount on a tiny circuit board to integrate wireless DMX into their fixtures. It's inexpensive enough that it's likely to become ubiquitous. The wireless revolution will not be televised, but it will be broadcast, and it's now under way. Stay tuned. 📶