

# SHoW DMX Multiverse: Poised to Change the Industry

By: Richard Cadena

Wireless DMX is changing the live event production industry, and City Theatrical is out to change wireless DMX. It's a small change, literally, but it could have big implications.

City Theatrical's SHoW DMX wireless DMX system is not new. In fact, it's been around since 2008. Like other wireless systems, it spreads the transmission frequency across a range of selected channels in order to avoid interference from other wireless systems in the vicinity. But unlike other systems, the frequency hops are synchronized with the transmission of packets of DMX so they aren't broken up, interrupted, or dropped. This is why it was dubbed "Synchronized Hopping of Wireless DMX" or SHoW DMX for short. City Theatrical's R&D team designed the radio with enough speed to broadcast a second, redundant DMX packet on a different channel than the first for added reliability and to minimize the chance of interference from another source.

Since its introduction, SHoW DMX has been proven reliable on many shows. Now the manufacturer wants to make the system ubiquitous in the industry. In October 2016, Gary Fails, president and founder of City Theatrical, held a press conference on his booth at LDI to announce the launch of SHoW DMX Multiverse, the next generation of the technology with some impressive features.

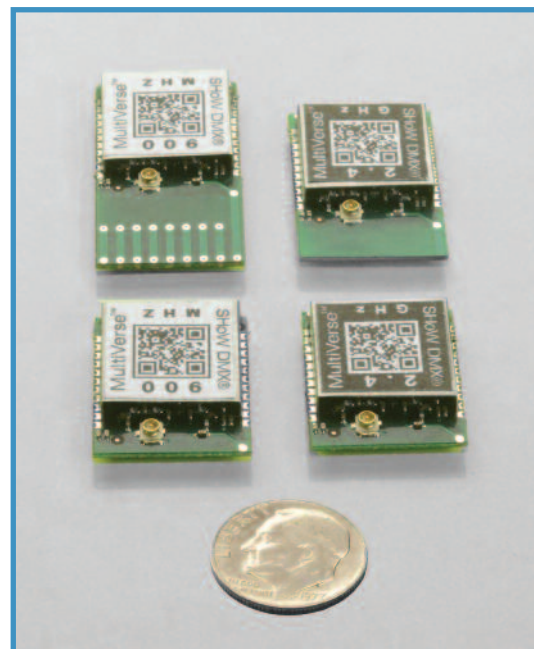
First, the company managed to package it in a tiny module about the size of a dime (approximately 1.5cm, or 0.59" square). The module consists of an integrated circuit chip mounted on a PC board. To be fair, City

Theatrical was not the first to package its DMX radio transceiver in an IC chip, but the company believes that the combination of the OEM price and feature set will allow manufacturers to make it available "in every device." It's an ambitious goal, and the feature set it offers gives them a good chance for it to happen.

Among the features is, as its name implies, the ability to transmit multiple universes of DMX. It can send five universes, to be exact, at 2.4GHz or four

## SHoW DMX Features:

- **Adjustable Power Output:** User-adjustable power from 5 — 100mW CE ETSI. (The manufacturer recommends using the minimum power needed for the application.)
- **Adjustable Hopping Patterns:** User-selectable frequency hopping; full bandwidth or three partial bandwidth options to avoid other Wi-Fi signals in the area.
- **Limited DMX Burst Output:** You can broadcast fewer than 2,562 channels at a time if you choose, in order to minimize interference with other radios.
- **Simple Default Plug-and-Play Mode:** Factory default mode is plug-and-play.
- **RDM:** SHoW DMX can be used with any RDM controller to monitor any RDM device.
- **OEM Transceiver:** A tiny module is available for manufacturers who want to add wireless DMX/RDM to their products.



This tiny wireless DMX radio module could have big implications in the entertainment lighting industry.

at 900MHz. (Note: 900MHz transmission is only allowed in the Americas.) This alone will help make its implementation less costly by reducing the number of transmitters needed to broadcast more than 512 slots of DMX. A single transmitter will be able to broadcast up to 2,560 DMX slots at 2.4GHz or 2,048 DMX slots at 900MHz. It will also reduce the need for data splitters, since a single chip can transmit multiple universes to multiple fixtures without going through a data splitter, which could save thousands of dollars for the end user while simplifying and speeding up installation and setup.

Since the arrival of wireless DMX in the industry, there has always been the option to add a receiver to a luminaire and use it wirelessly, but at the cost of several hundred dollars. Packaging wireless DMX in an IC chip and building an OEM module greatly reduces the cost, and City Theatrical aims to

offer its solution at “the lowest cost yet seen in our industry for professional quality wireless DMX.” City Theatrical also claims that integration into luminaires will be simple because of the availability of reels of chips ready for surface-mounting. Based on the numbers being batted around and the ease of integration, it’s likely that wireless DMX will no longer be an option in many luminaires but will come as a standard feature that can be turned on or off in the menu settings. You will be able to enable it for those shows

where you’re comfortable with wireless and disable it for shows where you feel more comfortable using copper. My guess is that, once you’ve used it enough, you’ll probably be comfortable using it in any environment under any circumstances.

Another feature is the ability to broadcast RDM commands concurrently with DMX. RDM over a wired DMX network is a half-duplex scheme, meaning that it can’t transmit and receive at the same time. Because it uses the same pair of wires for DMX

as it does for RDM, a normal DMX system has to stop sending DMX packets before it can send or receive an RDM command. But since the bandwidth of SHoW DMX Multiverse is so much wider than that of DMX, it allows both DMX and RDM traffic at the same time. So it also allows you to use RDM with an RDM-enabled lighting console, or, in the absence of such a console, you can tap into the network at a location other than the console using an RDM tool like City Theatrical’s DMXcat multi-function test tool and add RDM functionality. That’s important, because it gives the electricians crew the ability to configure, test, and monitor all of the devices on the network with little or no interruption for the programmer, who needs to be busy programming the show.

Technically, wired DMX, which is based on RS-485, can be run up to 1,000m, or about 3,280’. But in real life, a single run of DMX cable has lots of interconnections, and every connection weakens the signal. So you can run it up to about 300m, or 1,000’ without any problems. But I’ve long said that, if you have to run 1,000’ of DMX cable, perhaps you should consider wireless DMX. In the 2.4GHz range, wireless DMX with an ordinary antenna will perform reliably up to about 300’, if there is a clean line of sight between the transmitter and receiver. But you can use directional antennas that will extend the range well over 1,000’. And today’s technology is reliable, thanks to techniques like redundancy and adaptive frequency hopping.

At the LDI press conference, Fails predicted that SHoW DMX Multiverse was going to change the industry. As business guru Peter Drucker once said, “The best way to predict the future is to create it.” City Theatrical may have just done that. 📶

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