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Swisson XMT-350 DMX Measurement Tool/Tester

By Richard Cadena

The longer I'm in the entertainment lighting industry, the more I want to travel light. I don't like carrying heavy tools; bulky items, like a wallet or keys; or anything that I have to keep track of on a job site. I don't even like wearing a hat. You may think that it's because I'm getting old, but that's not why; it's because I'm getting smart. The smarter I get, the less I carry. If I thought I could get away with it, I would only carry a roll of gaff tape. You can do almost anything with it, including wearing it.

Realistically, you can't show up at a job with only gaff tape. At the very least, you need a spanner and some gaff tape. But I seldom go anywhere without a DMX tester that has the ability to set up, test, and troubleshoot a DMX system. I like to have quick access to tools that allow me to test data cables, output DMX, and help isolate problems with DMX. And now that just about every new luminaire with a computer chip in it has Remote Device Management (RDM) capabilities, having access to an RDM controller is a bonus. I want these tools to be small, easy to use, and untethered to power or a console.

I used to carry a Swisson XMT-120, and liked it very much. But I took pity on some techs when I traveled to their island nation and they begged me to sell it to them, because the import duty was so high. If I have sympathy for anyone, it's for lighting techs in need of tools. So I made the deal. I did them a favor, but I also did one for myself, because that gave me an excuse to upgrade to the Swisson XMT-350.

The XMT-350 is similar to the XMT-120 except that it adds RDM capabilities. It's a battery-operated, handheld device that fits comfortably in the



The Swisson XMT-350 is smaller and lighter than a roll of gaff tape, and is much better for working with DMX and RDM.

palm of your hand and doesn't weigh you down. It weighs about 1lb (less than .5kg) and measures about 2-3/4" wide x 4-1/2" long x 1-3/4" deep (about 7cm x 11.5cm x 4.5cm). It has a 128 x 64 pixel LCD backlit display, with the ability to turn the backlight on or off to save battery life, and a 12-button membrane control panel. I am normally not a fan of membrane switches, but these are sturdy with a nice, tactile feel to them, and my XMT-120 never experienced any of the problems that other products of this type have, like cracked or broken membranes. The XMT-350 also has a five-pin XLR input and output, plus a micro USB B-type connector to interface with a computer.

I've used both the XMT-120 and the XMT-350 for several purposes, but I probably use it most often to focus lights. It's very quick and easy to do. It

literally takes about two seconds to power up the unit; I can hand it to any stagehand, and, without any instructions, he or she will have it figured out in no time at all. In send mode, you can bring a channel to full by pressing the channel+ button until you land on the channel you want, and then pressing the 100% button. Using it to focus single-channel fixtures, like PAR cans or Lekos, is really quick. If you're focusing three- or four-channel fixtures like LEDs, you can use the group function to skip three or four channels with each button press, speeding the process. Focusing multi-parameter lights, like automated fixtures, takes a bit longer, but it's doable. You can download a fixture library to your computer and load the fixtures you want on the XMT-350 to save memory. Then you can select the channel you want much more easily, because the display

tells you the function of each channel, so there's no math involved. Using this tool to focus lights has the added benefit of freeing up the console so that the programmer can take care of those things that are typically done before a programming session, like getting a Starbucks, checking email, or playing Minecraft.

This is also a great tool for troubleshooting DMX. I've used it a lot just to verify a DMX signal is reaching a particular fixture or location, and if any fixtures are misbehaving, it helps to isolate the problem to a particular component. Without a troubleshooting tool like this, I would simply bypass a fixture by connecting the DMX cable, coming into it directly to the cable coming out of it. But if the problem is a bad cable, this isn't helpful. The next step might be to start swapping cables, but if the problem is with the console, you could spend hours trying to resolve it and get nowhere.

If you connect an incoming DMX signal directly to the XMT-350 and put it in receive mode, then you can tell a lot by the results. If you're getting a good signal, you will be able to see the level of every channel using the channel select buttons. Then you'll know you have a console that is outputting DMX and the cables are working properly. If there is a problem with the signal, the XMT-350 will tell you whether you're receiving a DMX signal but there are some errors, if the DMX signal is so bad that it can't be decoded, or if there is no signal at all.

In any of these cases, you can set the device to timings mode and check the integrity of the signal. It will indicate whether or not the DMX signal is okay and read the refresh rate, the length of the "break" and "mark after break," and the number of DMX channels being received. These are all parts of the DMX packet, and, to a lighting tech, they should mean something. The XMT-350 allows you to check these for compliance with the DMX512 standards.

The refresh rate is the number of

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DMX packets being received every second. If all 512 channels are being received, then the maximum allowable refresh rate is 44 packets per second. Some gear, with older or cheaper processors, has a hard time keeping up with the maximum refresh rate, and fixtures like that will sometimes flicker or exhibit some other sign of trouble. For that reason, certain consoles allow you to go into the settings and slow down the refresh rate to address those problems, although not all consoles do that. If you suspect that one or more fixtures is having trouble keeping up with the refresh rate and your console doesn't have the option to change it, you can put the XMT-350 in send mode and experiment with slower refresh rates of 40, 35, 30, 25, 20, 15, 10, or five packets per second.

The break is the time between DMX512 packets. In both the original DMX and the 1990 version, the break was supposed to be at least 88 microseconds (μsec or millionths of a second), but in the newest version (DMX512-A) it should be at least 92 μsec or longer. The mark after break is another timing signal in the DMX packet, and it should be at least 12 μsec for DMX512-A. Using the XMT-350 to analyze the timing of a DMX packet can reveal information that might help narrow down the source of any DMX problems.

In addition, "flicker finder" mode helps isolate problems to the console or fixtures by capturing a non-changing DMX packet and comparing it to the signal being received at the other end of the data link. If a fixture flickers while the flicker finder is on, then you can check the XMT-350 to find out if the DMX values changed compared to the captured packet.

RDM isn't exactly new to the industry, but only recently has it become ubiquitous in lighting instruments. Consoles are a different story, but with devices like the XMT-350, you don't need a console to use RDM. The 350 has the ability to discover and manage

RDM responders. This could be among the best reasons to have this device. When you find that a fixture's DMX address is set incorrectly on a job site, you can whip out the XMT-350, tap into the data link, discover the fixtures, check the DMX address of each of them, and change those that are set incorrectly. I've been in several situations where this would have saved a lot of time and, more importantly, eliminated the need to climb wire rope ladder and walk a truss to physically access the fixtures and change the DMX address, helping to lessen the risk of accidents. Another situation where this device could save time is in the shop, when you're prepping a show. Rather than hauling a fixture out of a road case to test it, set the DMX address and check the firmware version; all of that can be accomplished by connecting the XMT-350 to an entire rig of fixtures and checking them. RDM has been around since 2006, but it hasn't fully caught on, probably because of the lack of convenient devices like the XMT-350 that make it more convenient to use. This device could help change that.

The XMT-350 does a lot more, including testing cables and running a sequence of cues. You can capture and store up to 32 scenes, arranging them in a sequence with up to 99 steps. You can adjust the speed of playback as well as the fade time, but the default playback speed of one step per second is a bit fast for my taste, and the slowest speed (about eight or nine seconds per step) isn't slow enough. I'm sure it is useful, but I have never had occasion to use it.

The XMT-350 retails for \$720. It comes with a canvas pouch, which has a belt clip, a female three-pin to male five-pin adaptor and a male three-pin to female five-pin adaptor. It won't happen overnight, but I think that, eventually, every lighting tech will have to carry two things—a DMX/RDM test instrument like the XMT-350, and...you guessed it...gaff tape. 📡