

Transmitter Site Tips for Techies - Part 3

by Tom Bosscher

These new solid state transmitters are great – built in web browsers, Ethernet connectivity. Yet, when you have a new 20 kW FM transmitter, one would like to have a confidence monitor of what is going on. A staple of a solid FM plant is an external RF wattmeter. Again, there are nice new ones that have Ethernet outputs and isolated analog outputs, but many of us have the older analog power meters that have been in the plant for a while – still in-line to the antenna. These are great for when you are at the transmitter site, but it would be nice to have an output to feed the remote control.

The problem is Ohms Law. Most of the higher power meters are 100 microamp movements, with an internal resistance of around 2500 ohms. That means full scale is only around 250 mV. Connected to most remote controls, that is too low to have enough resolution. We need to bump that level up – cleanly, and accurately.

Enter the Dataq DI-5B series of industrial amplifiers. Take a look at www.dataq.com/.

For our purposes, the DI-5B30-03 will take a 100 mV input and give you 5 VDC out. This module has an input resistance of 50 Meg-ohms, so this will never load down a circuit driving a 2500 Ohm meter. You will need to use some high quality, 1 and 3 Meg-ohm resistors to knock the 250 mV down to less than 100 mV. Then you can feed the 5 VDC amplifier output to your typical remote control.

You can buy a DI-5B04 (two module holder), then add a DI-BEFE unit, and two DI-XSE units. Add a DI-5B-PS 5VDC power supply, and you are good to go. The accessory modules are all less than \$65 each, and the amplifier module is \$150.

Dataq also supplies modules that have true RMS inputs for precise AC voltage measurement. I use the 300 VAC full scale unit (DI-5B33-05) to monitor the primary of filament transformers. I then calibrate the remote control reading to a temporary, handheld true RMS DVM hanging across the actual filament connections – right on the tube socket (the transmitter is *NOT* on the air during this!)



A Dataq module installed in a Harris 3.5K, used to monitor the filament voltage.

Your remote control will now give you a much more accurate reading and tracking than any transmitter front panel meter. The AC modules run about \$240. I also use these to monitor incoming utility and generator AC voltage to the remote control.

If you have a Continental 816, you are aware that the plate current sample is across two terminal points. Since most remote controls are single ended, we all end up just tapping one of those pins. With this transmitter, we now are monitoring both the plate with screen current, and true tracking of the plate current is not possible. If you put in a Dataq Model DI-5B31-02, it can connect to these two pins. The input pins are completely isolated and floating from the output, so this module will give you a true reading to your remote control as to what is across the two driving pins.

You may have heard about having an infrared thermometer as a piece of test gear. Take a look at this picture of the fused disconnect switch at one of my transmitter sites. The bottom blade of the fuse was 60 degrees less than the top one. In this case, the switch was simply defective, and needed to be replaced. When you are using one of these probes, slowly check all the hardware, lug nuts, the wire itself – and all parts of the switch and the fuse holder. The test unit shown is the Raytek RAYMT4U, and the cost is low enough that I carry one in my tool bag in the car.



Brush Off the Lightning

Wish to protect your smaller towers at the studio and your satellite dishes from lightning? You can buy many static drain products from many very good companies, but take a trip to Grainger and pick up a pair of their part #3EDN1 brushes.



Add a few parts from the hardware store, and you can have a dual bleeder as shown.

While these were designed to clean out the inside of pipes, this stainless steel brush has several hundred

sharp points to bleed off the charged air around your tower. These devices do wear out, due to the constant discharging and dulling of the sharp points. You'll need to replace them every few years or so.

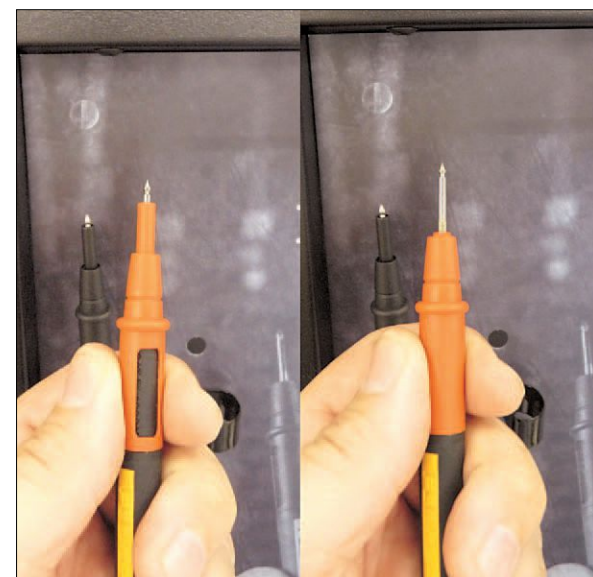
Do you have a security light at your transmitter site? Put an AC relay across the photocell relay contacts, and wire the contacts of this relay in series with the contacts of an additional relay that is in parallel with the lamp. Now, if the lamp is smashed by vandals, you will get an alarm. Many times, thieves will darken a facility to see if anyone notices, and then come back in a few days. This gives you a leg up on them.

Speaking of alarms, what does yours do when it is triggered at the transmitter site? Most alarms properly dial a central monitoring station, the studio – or you. But with a little thinking, you just might scare the thieves away. When the alarm is triggered, have that drive a 30 to 60 second delay.

"Your Time is Up"

That would then trip a fifty dollar voice announce card. No siren sounds, just a calm voice saying: *"Your presence was detected 30 seconds ago, and confirmation has been received from the sheriff's department. Please stay in the building for proper accounting."* I also had a friend that hard wired into the building interior and exterior lights, and flashed them on and off when the alarm was tripped – the wall switch had no affect

Fluke has introduced a clever set of probes, that have a shroud that you can adjust up and down to expose more and less of the probe. This has to help with the slippery finger syndrome at 3:00 AM, when you are trying to measure voltages on adjacent sets of terminals carrying 240 VAC.



Fluke TL175 TwistGuard™ test leads, with adjustable length test tips.

And finally, if you share a transmitter building with anyone, install a simple wired doorbell, with an appropriately loud buzzer. You might wish to embellish this with a passive infrared detector (PIR) that is always active. This way, if someone walks up to your building at night, or your buddy is stopping by, they can ring the doorbell, or be announced by the PIR detector. This is really nice, compared to having someone walk into the building and scaring you while you are measuring voltages on adjacent sets of pins carrying ... 240 VAC!

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