Field Guide

by Chris Tarr, CBRE, CBNT

Nautel's V10 A Versatile Performer

I remember the email from our Corporate Engineer like it was yesterday: "Hang on – Here we go!"

A TALE OF TWO SITES

This was a bit over two years ago, and Clay Freinwald was writing me about the launch of HD transmissions at our Milwaukee stations. I started working on becoming an "expert" on HD immediately.

I looked at the layout of my plants. WMYX was going to be easy – there was plenty of room in the transmitter building. High-level combining would be a no-brainer there.

WXSS was an entirely different matter, however.

THE "FUN" SITE

WXSS is located at a shared antenna site. At the time we were running a BE FM 30T as the main transmitter and a Harris FM20H3 as a backup. Those two monsters took up pretty much all of our available space. So Clay and I started our planning sessions.

A tightly packed transmitter room.

We had a few options. For instance, the dual-input antenna had just been released. We could put one of those up and hang a transmitter from the ceiling. That posed some challenges, mainly the cost involved with a structural analysis, an increase in lease fees, an additional run of coax, and then, of course, a transmitter hanging from the ceiling!

The second option was split-level combing. That would require replacing the relatively new BE transmitter, plus since split-level was in its infancy at the time there were a lot more questions than answers.

In the end, we opted to go with a high-level combining system – with a slight twist.

COVERING TWO NEEDS

Initially, I was concerned that to make room for a transmitter capable of producing the 2.1 kW of pre-injector RF we needed, we would have to take out the Harris rig.

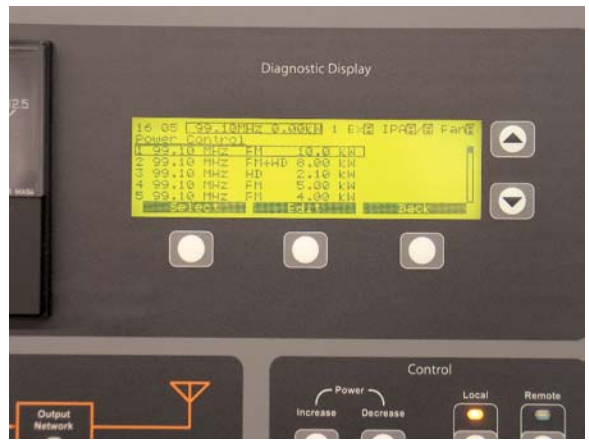
Sure, most people would be happy about losing a transmitter of that vintage. But I had just gone through it and it was an excellent backup rig. While we do have an auxiliary transmitter at a separate location, I still was not excited about the prospect of losing a good, full-power backup transmitter.

Our solution was to try and find a transmitter that would serve as both an HD transmitter and an emergency analog backup. When Clay and I drew up the specifics for this install, one important piece of the puzzle was a transmitter that could effortlessly change modes, preferably by just a remote control closure.

A SOLUTION APPEARS

Clay's mission at NAB that year was to find a transmitter that met our requirements. Right after the convention, I got a call from an excited Clay.

"I was talking to Gary Manteuffel at Nautel about their new V10," Clay said. "I told him what we wanted, and he said the V10 can deliver. I asked him to show me and sure enough it worked!"



The V10 can be programmed to switch instantly to Analog, HD, or both.

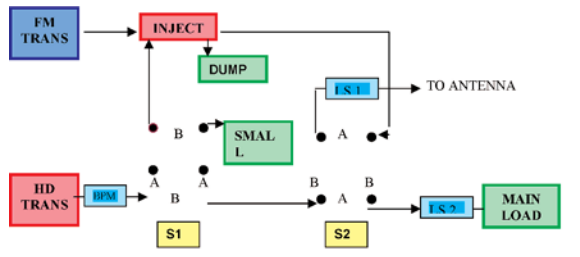
I did some further investigating and Clay and I teamed up against The Powers That Be – we wanted the V10! It was a happy day when I signed the purchase order for two V10s.

DOUBLE DUTY

One of the greatest (and most underrated) features of the V10 is the ability to change mode, power, or even frequency on the fly. You simply set the parameters in the exciter and transmitter as presets.

These presets also can be called by remote control, so I can have one preset for 2,100 watts of HD and another preset for 10,000 watts of analog FM – or a combination of both. All the biasing and drive settings are computed on the fly, so there is no user intervention involved.

A custom controller provides flexible switching.



SWITCH MODE	CONNECTIONS	NOTES
S1-A & S2-A	FM TO ANTENNA VIA INJECTOR HD TO ANTENNA VIA INJECTOR	NORMAL MODE
S1-B & S2-A	FM TO ANTENNA VIA INJECTOR HD TO MAIN LOAD	HD TX TEST MODE
S1-A & S2-B	FM TO LOAD VIA INJECTOR HD TO LOAD VIA INJECTOR	OVERALL SYSTEM TEST
S1-B & S2-B	FM TO LOAD VIA INJECTOR HD TO ANTENNA	FM TX TEST MODE HD HYBRID MODE ON AIR

The only other thing we needed was a way to have the V10 bypass the injector while in "FM Backup" mode. We used two coax switches and a custom designed switch control built by Steve Tunwall at Tunwall Radio.

There are four buttons, which select the modes, The "Normal" mode routes the FM 30T and V10 into the injector and on to the antenna. The "Hybrid" mode routes the V10 around the injector and into the antenna. Two additional test modes place either transmitter into a dummy load.

With the help of Mike McCarthy from MRE, we built a frame out of strut that allowed us to hang the two switches and the injector from the ceiling, saving us precious real estate. Mike and I pre-built the frame at my shop at the studio site (where we had plenty of room) plumbed it and then took it up to the site where it was hung.

It was a whole lot easier setting it up on the ground than trying to assemble it while it was hanging from the ceiling.

HOW DO I LOVE "V"? LET ME COUNT THE WAYS

Using the remote control, I can shut down all the transmitters, switch the V10 into the antenna, change its mode and power from 2,100 watts HD to 10 kilowatts analog, and turn it back on.

Even better, using the Burk Auto-Pilot scripting, I can run the entire process with one click of the mouse. It takes a little hack, but it works well: I have an empty channel on the Burk wired to trigger a latching relay connected to that channel's status light.

Clicking "lower" on that channel, which is labeled "Backup" (or pressing lower on the Burk R/C) turns on the status light, which triggers the script. The script is essentially a few raise and lower commands, along with a few status checks as a fail-safe.

Raising the channel, which is labeled "Normal" turns off the status light and runs the script that reverses the process. There may be a more elegant way to accomplish this – be sure to let me know if you have found one.

GETTING THE JOB DONE

Using the same footprint that I started with, I now have not only HD, but quite a bit of redundancy as well, built into a very nice solid-state analog backup rig. I simply love my V10.

Nautel V10

The transmitter is built like a tank. The M50 exciter sounds great – in my opinion the V10 would also be a very capable FM-only or FM+HD transmitter. And, of course, Nautel's customer support is second to none. We had a few minor issues during the setup, but all of our questions and concerns were handled quickly.

Looking back, I think the only thing I would change in the design of the transmitter is the wiring for the mode switching. Since the mode of both the exciter and the transmitter need to change together to switch modes, we ended up tying the contacts for the two together to accomplish the "one closure" criteria.

It would be nice to have the option of linking the two preset lists together, though I can see the benefit of having them separated for flexibility.

One of the good things about the rise in HD rollouts is that it puts us all in a position to think outside of the box and come up with new and creative ways to solve the challenges that invariably crop up. I now look forward to each HD project that comes my way – it really keeps my creative juices flowing.

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