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Clear Channel Radio, Tucson

## Continental Electronics' New 816HD Debuts at Tucson's KRQQ

With 2005 coming to an end – and along with it the aggressive timeline Clear Channel placed on the IBOC rollout initiative at KRQQ in Tucson, Arizona – we solicited the help of Continental Electronics to develop a quick all-inclusive HD solution.

### FITTING THE SPACE

Our transmitter site, atop Tucson Mountain just west of downtown Tucson, would prove to be a challenge, not only for equipment delivery but because of the limited amount of floor space available to us as well.



Tucson Mountain

As with many stations using mountain top facilities, enlarging the room just was not an option. Inside the transmitter room was a 20 kilowatt Continental 816R-3 serving as the main transmitter. Next to that was a Collins 830F that was limping along as our backup transmitter; the new unit would need to fit on the same floor space.

Continental's answer was the new 816HD-series transmitter with low-level combining. This transmitter amplifies both the analog and digital signals using common amplification and does so while with the same footprint as our existing analog transmitter.

### ENHANCING A PROVEN TRANSMITTER

The 816HD is the latest version of the FM transmitters first delivered by Collins Radio in the 1970s (as the 831 series) and which has developed an amazing reputation for reliability over the years.

Continental took over the line when they bought the Rockwell-Collins broadcast operation in 1980, renumbering the series and improving it. The 816R3 at our sister station is still going strong 24/7, over 21 years after it was installed in 1984; others have been going even longer.

The big challenge for the 816HD was for Continental to adapt the transmitter for digital operation by making the tube power amplifier section linear enough for the purpose and yet still maintain the Transmitter Power Output (TPO) necessary for analog operation. A discussion about this was in the July 2005 *Radio Guide*.

Briefly put, using a new IPA section and a 4CX20,000E tetrode PA tube allowed the necessary modifications to the transmitter so that it meets the NRSC recommendations on spectral emissions. Although not necessary for all power levels, the Continental 816HD uses pre-correction to comply with, and significantly exceed, the NRSC mask while generating analog power levels up to 21 kW.

### GETTING READY FOR DELIVERY

In preparing for the new 816HD transmitter, we decided to start by completely moving everything from the room with the exception of what was absolutely

necessary to remain on the air. Consolidation and ownership changes over the years had left us with virtually no documentation on this facility or its interconnection to one of Clear Channel's other stations in a separate room at the same site.



Continental Electronics 816HD Transmitter

We removed all intra- and interconnecting cabling, RPU and monitoring equipment, backup transmitter, dummy load – we even replaced the old tile floor that was creating a dust nightmare.

Next we installed an entirely new audio processing chain along with new cabling complete with proper labeling and documentation. As the work in the transmitter room was nearing completion, we coordinated with Mike Troje at Continental Electronics. He was able to have the new 816HD transmitter on site in less than 48 hours.

### A CAREFUL TRIP UP THE HILL

The trek up Tucson Mountain is not an easy one – as with many mountain sites, the grade gets pretty steep. That trip, along with the complications of actually getting the transmitter through all the doors and hallways into the room, took the better part of a day. Fortunately, the company that moved the transmitter had experience with this site and was well prepared for the challenges.

Once the transmitter was in the room and in place, all the panels were removed and a thorough inspection for loose hardware or connections revealed that everything was in order. Because the 816HD requires no special plumbing or combiners, we simply connected the transmission line to the directional coupler and made all the electrical and control connections.

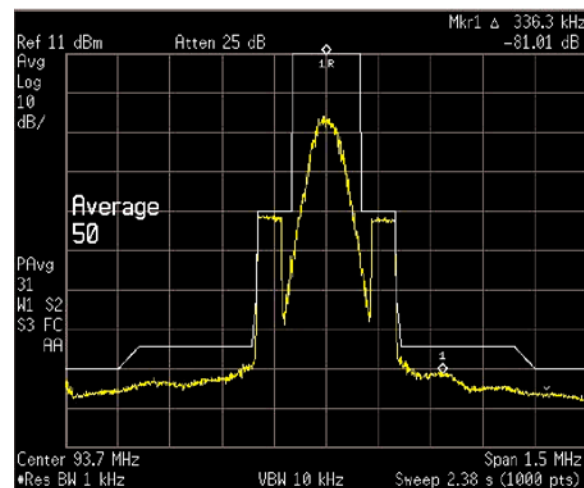
I was pleasantly surprised at the ease of installation; with the exception of the IBOC generator, it was no different than any other 816-series installation and by the end of the day we felt like we were ready to go.

### THE ACID TEST

Continental dispatched a team of experts – Dan Dickey, Richard Garret, Alan White, and Mike Troje – for the initial turn-on of the transmitter, their very first 816HD in the field. Clear Channel's regional vice president of engineering, Gil Garcia, also joined us.

As midnight approached, the main transmitter was powered down and the 816HD was brought up into the antenna at low power and walked up to its full analog TPO of 20 kW. All readings matched the factory test data.

One of Clear Channel's key stipulations for equipment acceptance was that the 816HD meets the NRSC spectral mask with full modulation applied. The spectral images we measured showed that the 816HD was well within the mask, regardless of power or modulation level.



816HD Spectral Plot with 100% Modulation

Even though we had prepared to work through the night, by 2:00 AM it was clear the transmitter was operating without a hitch and we had accumulated all the data and readings we needed for acceptance. As we left the site we felt confident selecting the 816HD was a good choice for KRQQ.

### RUNNING WELL

Since that night in late November, the transmitter has been operating flawlessly at full TPO, even through several of the electrical anomalies that frequent southern Arizona.

We have intentionally run the transmitter up and down while observing the signal to make sure there would be no problems, even if we had to operate at a "non-standard" power level during work on any of the co-located towers on Tucson Mountain.

Thus far the spectral and operating parameters have continued to look just as they did on Day One.



KRQQ's 816HD transmitter  
alongside the 816R-3 (now the Backup).

Having had an excellent relationship with Continental Electronics over the past 21 years, it was really great to see Continental back in a leadership position with a product the industry most definitely needs.

We passed a small window of opportunity for this project on to the Continental folks and they were willing to meet our timelines and work within the constraints of the project. We stayed in close contact with each other and, simply put, Continental delivered and I could not have asked for more.

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