

Radio History

by Frank Absher

KMOX – 80 Years Old and Moving Ahead

Nothing really rattles Paul Grundhauser, the chief engineer at Infinity's KMOX in St. Louis. Having worked for the late Robert Hyland, whose high standards and demands imposed on his staff are legendary, Grundhauser thrives on the unexpected.

About 15 months ago he was told KMOX was on the short list to get a new transmitter by the end of 2004. The station began filling out the ever-necessary paperwork, but then they were told the new equipment would not arrive until sometime in 2005.

On December 1st, another note came just as the Grundhauser family was getting ready to go on vacation. This time he was told the new transmitter would ship in the next three weeks. Thus began the transformation of one of the nation's blowtorches from analog to HD/digital transmissions.



KMOX Letterhead c. 1925

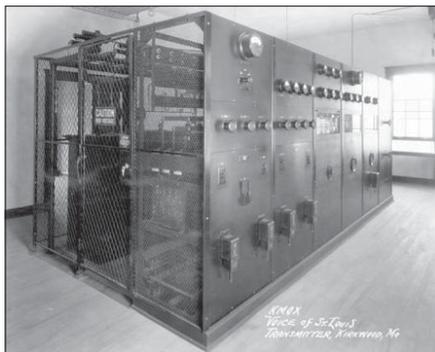
A LONG HISTORY

It was 80 years ago this month that KMOX first went on the air.

St. Louis had several radio stations by then, but this one was to be the city's biggest and best yet. A consortium of major business owners organized as "The Voice of St. Louis, Incorporated," and pooled their money to build what was then called a "super station."

The station's studios would be in the downtown district, housed on the mezzanine level of the Mayfair Hotel, but a distant, rural site was chosen for the towers some 16 air miles away in far suburban Kirkwood.

It was there that the new Western Electric 104-A transmitter was installed.



KMOX' first transmitter, a WE 104-A.

The WE 104-A was an upgrade from the earlier design and included water-cooled finals, improved fidelity, reduced harmonic distortion and crystal-determined frequency, according to renowned transmitter historian Stanley Adams.

A LOCAL POWERHOUSE

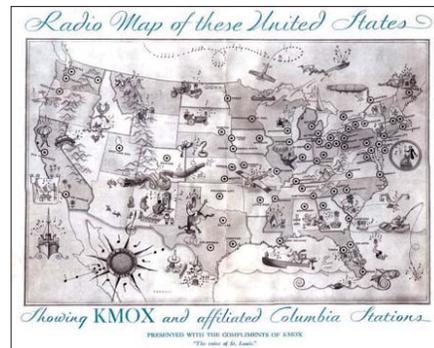
Most transmitters built in this era were 500 watts or less, Adams says, with those stations "owned by the privileged few operating groups" getting the 1,000 and 5,000 watt systems. The 5,000 watt unit at KMOX placed the new station among the nation's elite.

As was always the case in those early days, Western Electric sent a team of engineers from their New York City manufacturing plant to the St. Louis site to do ground surveys prior to the transmitter's manufacture. W.A. Butler from Western Electric was quoted in a 1925 article in *Radio Age* as saying the 5,000 watt transmitter would have, "an effective range throughout the entire nation."

Listener response bore out his prediction. The *St. Louis Globe-Democrat* printed a letter from George Munro of University College in Auckland, New Zealand in which he said he had heard KMOX during nighttime transmitter tests on December 16.

EVEN MORE POWERFUL

Within four years of signing on, KMOX was given permission to experiment with 25,000 watts and soon a WE 107-A transmitter was in place. Power was again increased in 1931, putting KMOX into the true super-station category with 50,000 watts.



KMOX Radio Map

In 1947, the station moved its transmitter site to its present location in rural Stallings, Ill., to the northeast of the station's downtown St. Louis studios. (The original building and towers were sold to Thomas Convey's KWK radio.) The "new" tower was a hand-me-down from sister station WBBM in Chicago.



The new KMOX transmitter site from a 1949 drawing.

During construction of the new transmitter site, a new Westinghouse 50-HG-1 was installed. As a backup,

a Continental 316B, 10kW auxiliary transmitter was also added.



Westinghouse 50HG-1

Over time, a Gates MW-50 was installed (in 1976), followed by a Harris DX-50 in 1993, and the new 3DX-50 this year.

The transmitter building, surrounded by corn fields, is a two-story bunker with 5,400 square feet of floor area. Built immediately following World War II, the structure has required very little modification over the years. The first floor housed a fallout shelter, complete with a fully functioning broadcast studio, two-way communications with Civil Defense Headquarters and enough survival supplies to support five men for two weeks.

MOVING TO DIGITAL

Paul Grundhauser was aware that parent company Infinity had cut a deal with Harris to buy a certain number of the new digital transmitters by a certain date. At that point, no one in the trenches knew anything about delivery dates. So he was not really surprised when he learned the date for the new KMOX transmitter delivery was fluid. He says corporate had an agreement to "take delivery on a certain number of transmitters by the end of 2004; we evidently jumped onto the list, got pushed off, and then got pushed back on."

The installation process for the Harris 3DX-50 was leisurely. Market chief engineer Joe Geerling was involved, as was contract engineer Bruce Cavins. Grundhauser says, "Our consulting engineer, Jack Sellmeyer, [was] crucial to the implementation of the HD side of the install, and we contracted out the electric install for the transmitter. That was done by the Debber Company."

MOVING THE "FURNITURE"

Obviously, there was some "housecleaning" that had to be done during installation. Grundhauser took advantage of the opportunity to move out a couple of the old back-up units: the 10 kW Continental and the Gates MW50.



Paul Grundhauser holding the last piece left from the Continental 316B 10 kW transmitter.

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The new transmitter was then hooked up to the Continental's old RF connections. "We got the power, RF and analog audio connections done in June," says Grundhauser, "and Harris came down and ran through their test sequence on the transmitter. It worked fine, except for a little more reflected power than we would have liked." A little bit of post-installation tweaking is expected to resolve that issue.

The building's massive air-handling equipment could also go, since the new transmitter recirculates indoor air instead of relying on the big fans bringing in outside air for pressurization to cool the old units.

80 YEARS OLD AND UP-TO-DATE

If things go according to plan, digital transmissions of the 50,000 watt KMOX signal will be a reality by year's end.

Consulting engineer Sellmeyer designed a new main tower Antenna Tuning Unit as well as phase rotation networks for installation in the building. The 476-foot Utility Tower, erected five years ago by the Jessie Craig Company, has a 3 foot face and an impedance of 68 ohms.



The KMOX tower reaches up and out.



KMOX' new Harris Destiny during installation.

The Harris 3DX50 is set up for a 50 ohm transmission, necessitating the installation of capacitors and coils to minimize noise in analog receivers.

WAVE OF THE FUTURE

Infinity's director of engineering for the St. Louis cluster, Joe Geerling, is optimistic about the big picture, and he believes digital represents AM radio's future. "We are in a pioneering time – taking the process from the lab and into the marketplace. For AM stations there is an-

credible audio quality increase when receiving the digital broadcast," he says.

Geerling notes the process of going digital has involved much more than the transmitter. "The process to go digital at KMOX includes sweeping changes in the way we create, edit and move the audio. Going digital also includes using the latest technology to analyze and improve the transmission system – and some very expensive replacements of the station's ground system and adjustments to the tower. We also installed a new transmitter and supporting equipment."

The ultimate result, according to Geerling is that all this activity "places KMOX in the forefront of AM broadcasting, allowing us to better serve our listeners, just as we did so many years ago when we were among a select few to get licensed at 50 kW."

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The fourth generation of Nautel's 50 kW AM transmitter provides proven reliability at an affordable price, and supports both HD Radio™ and DRM. The XR50 is over-engineered to provide many years of trouble-free service, even under harsh operating conditions.

Power modules are hot-pluggable and can be removed and replaced without any interruption in service. For even greater redundancy, the XR50 includes a complete standby DDS exciter and modulation encoder that automatically takes over when it detects a problem.

The 240 x 60 LCD graphical user interface, advanced alarm system, 128-event log and on-board real-time clock make operation,

troubleshooting and system monitoring easy. The XR50 is also designed to allow extended periods of unattended operation, making it a good choice for remote or unmanned sites.

The XR50's fault tolerant design even accommodates problems that occur in the antenna system. It requires no manual tuning or adjustment, even with an antenna mismatch of up to 1.5:1 VSWR at 50 kW with 100% modulation.

With over 84% efficiency and low maintenance costs, the XR50 is extremely cost effective to own and operate. And its compact rack (53" W x 72.5" H x 41" D) is ideal for sites with limited space.

Contact Nautel for details.

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