

Radio World®

ENGINEERING EXTRA

REPRINTED FROM AUGUST 22, 2007

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PROJECT PROFILE

WOR Builds New Studios in Manhattan

Opting for Classier Digs Than the Basement at 1440, WOR Kicks Off a New Era at 111 Broadway

by Thomas R. Ray, III

In the spring of 2004, WOR(AM) was starting the renewal process of the lease of our space on the 23rd and part of the 22nd floor of 1440 Broadway in New York City.

The building's new management had made many upgrades, including a completely renovated lobby and updated elevators. But the new owners thought they had built the Taj Mahal. Their offer to WOR would have increased our rent immediately by 2.8 times.

The building owners would not bend from their demands unless WOR agreed to move to the basement to keep the rent the same.

Psychologically, this did not sit well with Buckley Broadcasting President Richard Buckley, taking a legendary radio station and relegating it to the basement of the building. Second, the N/R/W subway lines run under Broadway, as close as 50 feet under the building foundation. Putting radio studios in the basement would be far too noisy; and they would be prohibitively expensive to noise-proof.

THE SEARCH BEGINS

In a city like New York, one does not go out on their own and rent office space. You need a real estate broker.



Fig. 1: WOR's New Home: 111 Broadway, New York City.

First, we needed to establish our criteria:

- The rent range we were willing to accept.
- The space, at least 23,000 square feet of space on one floor.
- Adequate power for the studio area.
- Roof rights to install antennas for reception and STL.
- The ability to tie in to the building's emergency generator, if it had one, or the right to install one.
- Our own air conditioning system for the studio area.
- Proper telephone facilities, in particular access to fiber.
- Easy access 24/7.

Several buildings were located. Rick Buckley, VP/General Manager Bob Bruno, VP/CFO Joe Bilotta and I went on hours of tours. We vetoed numerous buildings immediately for various reasons: They would not allow the installation of a generator; or the required that visitors pass through metal detectors and X-ray machines, which would not sit well with our high-profile guests.

We finally settled on three buildings. The overall deciding factors for our final choice at 111 Broadway were that the building was willing to work with us to make our move happen, whatever it takes; the building is two blocks north of Wall Street in a good and accessible area of New York; the rent agreement was very good; and the building is a restored turn-of-the-century building that is absolutely beautiful, with gold-trimmed ceiling ornamentation in the lobby and stained-glass windows in most of our offices. It has the class that is WOR.

An agreement was reached and planning began.

BUILDOUT PLANS

Things began to move rapidly in the fall of 2004.

We decided to keep a good portion of the offices and the lobby as they were on the south side of the floor. We'd have to pretty much gut the west end, where producers and talent were to be located; the east end, where sales would be; and the north side, home of the studios and Master Control Room.

We decided to put the technical area, studios and Master on a 6-inch raised computer



Fig. 2: The entry hallway into WOR's new location.



Fig. 3: This area would become the new master control room.

floor. This would facilitate wire runs and keep them out of the ceiling, which would be packed with air conditioning ducts.

That presented another problem: 111 Broadway is a landmark building, one of the original high-rises in Manhattan. There are strict conditions on what you can and cannot do to landmark buildings. The floor we would be on had louvers in place, which could be used for the studio air conditioning, but this space was limited and the air conditioning units barely fit.

For construction of the studios, we literally took a page out of the Lucasfilm THX

manual and designed the studios to its specifications. They are constructed of two layers of 5/8-inch sheetrock attached to the studs, fiberglass insulation blankets, another set of studs (not connected to the first set of studs), two more layers of 5/8-inch sheetrock and Armstrong Soundsoak.

The sheetrock goes deck to deck and is sealed to the decks with sound-rated caulk. The ceilings are 2-inch thick fiberglass tile. The space above the ceiling is lined with "duct liner," a thick fabric normally used for lining air conditioning ducts to reduce noise transmission. The entire space is lined.

The air conditioning returns cascade through the studio ceilings. There is a duct in the shape of an "S" between each room. The "S" points down in one room, and points up toward the lining material in the next. All air conditioning ducts are lined. This has effectively kept noise transmission between rooms to almost zero.

One advantage the studios at 111 Broadway have over the studios at 1440 Broadway is that they have windows. Granted, they look out onto Thames Street, a very narrow street that runs between 111 Broadway and its sister building at 115 Broadway, but there are windows nonetheless.

The building replaced every window on the floor when we started construction. I distinctly remember the conversation with Rick Buckley about having to soundproof the windows.

I was not pleased with the street noise I



Fig. 4: This inside plate glass window reduced outside noise by over 60 dB.

was hearing through the windows. He responded, "This is New York. People are used to hearing noise in New York. It's not that bad." As luck would have it, the high school on Church Street let out just then and we could clearly hear every "F" word shouted. That would have played really well given the FCC's crackdown on obscenity.

We decided to leave about an inch or so of air space to the building's windows, and placed a 1/2-inch-thick piece of plate glass over the window in a frame. This effectively took the outside noise down a good 70 dB. It was fortuitous we did this. We were building in winter; as it turned out, in summer the restaurant downstairs hires local rock bands to play on Thames Street. That would have made the studios unusable.

We decided to go with Studio Technology furniture. Being in the Philly area, the company is local and can do the installation.

The company's Vince Fiola came in one afternoon to do a final measurement on the rooms to make sure our furniture would fit. This was before the computer floor was in; a mockup of the studio windows was in place. There was only one problem: the mockup looked too high in the wall between the control room and studio. Vince measured. It was a foot too high even when the computer floor was taken into account.

We called the architect and told him the window needed to come down a foot. He said he put it at that height so "if anyone puts stuff on the counter, it won't be seen in the other room." So I asked him what I was going to do about our five-foot-tall producer who wouldn't be able to see above the bottom window frame and therefore couldn't com-

municate with the host visually.

Even though he had sat in on our studio operations at 1440, it didn't strike him that the personnel in the control room and the talent in the studio relied on seeing each other. I'm glad we caught this while it was only roughed in.

MOVIN' OUT

WOR wanted out of 1440 Broadway as soon as possible.

But because of construction schedules and the fact that Engineering is responsible for not only the studio area but all phone systems and computer systems — and because moving 100 people itself would be a major undertaking — we didn't want to attempt to get the studios online at the same time as the office move. It was decided to move the offices first.

We met with the local phone company, Verizon, and our reps from AT&T. The PBX is fed from four T1 circuits through AT&T.

Though the architect had sat in on our studio operations at 1440, it didn't strike him that the personnel in the control room and the talent in the studio relied on seeing each other.

We needed two T1 circuits to ABC Radio Networks at 125 West End Avenue uptown for uplink of The WOR Radio Networks.

We needed two T1 circuits, taking completely different paths out of the city, to the transmitter site(s), one in Lyndhurst, N.J., and the one which was being constructed in Rutherford, N.J. We needed three other T1 circuits for the various POTS lines from AT&T. We needed about 18 POTS lines from Verizon. And we needed 30 ISDN circuits, as we use Telos TWOx12 phone systems and feed them with ISDN. Verizon got busy installing fiber and a multiplexer on the third floor.

While all the above was going on, it was time to figure out how to outfit the studios. I went to visit or talked with several major vendors, including in-depth conversations with Kirk Harnack, Frank Foti, Mike Dosch and Steve Church of Telos/Axia/Omnia.

I decided to take a chance on being the first large-scale integration of the Axia sys-

tem. There were several things I liked about the system, among them having no single point of failure, being able basically to design the amount of redundancy I wanted into the layout, and having to only run one cable to each studio. This would be a major plus, as we were short on time and didn't need to run and punch down cumbersome multi-pair cables.

Plus, the Axia system interfaced directly with the Radio Systems StudioHub system, simplifying and speeding up installation as readily available off-the-shelf CAT-6 patch cords could be used to connect studio equipment along with Radio Systems XLR-to-RJ-45 dongles.

We also would need a systems integrator because of all the work that needed to be done with the office side, plus laying out of the studio side, plus having to constantly check on what was happening at the transmitter site, all on top of our busy remote schedule.

I chose Andrew Rosenberg from Creative Studio Solutions of Wheat Ridge, Colo., to perform the integration. I had worked with Andrew and knew that we could work well together, as I had specific ways I wanted certain things done.

In making this move we said goodbye to vintage models such as Pacific Recorders & Engineering System 1 consoles (very early serial numbers, like 1 to 5), a PR&E router/studio switcher and a 1A2 telephone system, etc. These items were installed in 1978.

Right after Christmas 2004, while the studios were still being put together construction-wise, we started integration.

BACK TO THE OFFICE

Because the studios would be remaining at 1440 Broadway to start, certain personnel would be left up there, among them the program director, the producers and talent, the operations director, the news department and the technical shop. The PBX would be



Fig. 5: The new lobby entrance.



Fig. 6: The author in a soon-to-be completed Studio 4.

moving to 111 Broadway with the offices, so we needed a plan where people would still have telephones. The studio call-in lines would not be a problem, as they were separate from the PBX.

We ordered in 35 Centrex lines from Verizon with voice mail attached. When the PBX moved, we would cut over these lines to the remaining phones, then “sling-shot” the normal phone numbers for the persons left at 1440 through the PBX. In this way, there would be no number change for anyone dialing those left behind.

All phones and computer network connections in the office areas were pre-wired before anyone moved, including several WiFi access points. We mapped out the PBX and made sure that the wiring to the punch blocks matched up with the correct extension numbers.

Meanwhile, construction on the office area was nearly complete, and we were ready to move the offices. On Friday, Feb. 25, 2005, everyone who was making the initial move was told to pack up; at 5 p.m. the PBX was disconnected.

The trucks were being filled all day. It still took two hours from the time the PBX was disconnected until it rolled out of the freight elevator at 111 Broadway (keep in mind the new location is only 3.6 miles from the old location). The PBX was connected, the T1s lit up and a call to AT&T showed that all was well.

The following day, Saturday, we spent plugging in phones, correcting any errant wiring and getting computers up and running, while the staff set themselves up. First

day of business at 111 Broadway was Feb. 28, 2005.

Meanwhile Creative Studio Solutions was making progress on cable runs and putting things together in the studios. I tackled Master Control and started populating racks. Axia was on site briefly to get us going with the system, but we were far from ready to program things and make them work.

We determined early on that we would not be able to see the transmitter site from our new location. We rented space on 4 Times Square for an STL repeater and planned to shoot through a narrow window up to Midtown, then over to Jersey. I found what could be the last available STL frequency in the city for the link to 4 Times Square.

The T1s to the transmitter sites were installed. We brought the backup Intraplex unit over to 111 Broadway and were soon “talking” to Jersey. All of our satellite equipment is at the transmitter, so “Y” adaptors were added to feed both Intraplex units. We now had external audio coming into the studios! We could play and start programming the Axia system.

STILL MUCH TO DO

They say the devil is in the details, and that is exactly what needed attention.

Arrangements were made to put the STL antennas on the roof of 111 Broadway and 4 Times Square, and get the link from 111 Broadway aimed. However, we wouldn’t be able to aim the link from 4 Times Square to Jersey until last minute. All this was done by

the first week of April, and the link to Jersey was aligned the Friday morning of the studio move at the end of April.

We were using Axia Pathfinder as a studio switcher, and right after NAB, John Makely, Mike Dosch and crew arrived for the final touches. We spent countless late hours designing paths, testing studios, testing switching, deciding what sources each studio needed access to and creating those sources in the system.

WOR has unique uses for Pathfinder. This is a talk station; we don’t believe in dumping delay unless someone says something really bad. We’ll bleep out the word or the offending call letters of our competition.

At 1440 Broadway, we had an analog switcher in the delay line in each studio. If something needed to be bleeped, the operator would monitor the outgoing audio; press the bleep button, which would put an oscillator on the air; and release the bleep button when it was safe to do so, putting program audio back on line.

Having everything in the digital domain would not allow for analog switching. The Axia crew designed a method for Pathfinder to intercept the button press for a bleep, determine if this studio were on the air or feeding one of the WOR Radio Networks, and route a bleep tone to the appropriate output buss. When the operator releases the button, Pathfinder remembers which studio was on what buss and puts the studio audio back online.

We also use Pathfinder to create various intercom paths such as giving the producer direct access to a talent’s headphones. This

is possible through the GPIO nodes in each room.

We have Pathfinder route the cues for The WOR Radio Networks from the studio or ENCO system to the cueing encoders, which feed to ABC and then to the local station's StarGuide receiver. This was a big change from 1440 Broadway, where we generated sub-audible tones in each studio, which were decoded in Master, then pulsed the cueing encoders to ABC. Because we operate a live show in profanity delay, the cue buttons in each room are routed through the AirTools delay units, which will delay contact closures by the delay amount.

This solved another problem we had at 1440: We couldn't go to break on either network if we dumped delay and were ramping back in. The delay units would pitch shift the sub-audible tones just enough that they would not decode in Master. By being able to send straight contact closures and have them delayed correctly, life has been made much easier.

DIDN'T MISS A SECOND

WOR uses an ENCO Digital Audio Delivery system, which was not replaced for the move.

On the Thursday before the move, we brought the backup server to 111 Broadway. Operators were busily making backup CDs of the entire log for Friday night, Saturday, Sunday and Monday, just in case. We also planned on operating with entirely recorded programming after the morning show on Saturday, and again on Sunday, so we wouldn't have talent tripping over us and vice versa. Only the newscasts would be live.

On Friday morning of the move, after the morning show signed off the air, we disabled several studios at 1440 and brought the ENCO workstations, which were freed up to 111 Broadway.

After the ENCO workstations were connected and levels verified, we had the operators come in and touch the consoles, the first time they had been able to do that. Talent came in and got used to the sight lines and the sound of the new facility. What could be packed up at 1440 in the studio area, was. The producer's desks and other areas were not a problem to pack.

On Saturday, April 30, 2005, I called ABC Satellite Services at 10 a.m., and they cut WOR Radio Network One over to 111

Broadway. The first program aired on WOR Radio Network One at 10:06:40.

At 11 a.m. I called ABC again, and we cut over Network Two. At 11:06:40, both WOR Radio Networks were operating out of 111 Broadway.

I called Master at 1440 for the last time at noon. Near the end of the live newscast, I told the operator to position the mouse over the correct button on the transmitter remote control screen, as with the HD delay, I wouldn't know when to hit the button to switch locations.

Bob Gibson had the final words from 1440, announcing that he was doing the

It was amazing to see the bundles of wire in the racks. God knows how any equipment ever fit in there. There had been a tremendous amount of history for WOR at 1440 Broadway.

IF THESE WALLS COULD TALK

WOR had been located at 1440 Broadway since the building was new: 1926. Over the years, we had been on various floors, had an associated FM — WOR(FM), now WRKS, Hot 97, and owned by Emmis — and a TV station — WOR(TV), now WWOR(TV) Channel 9 and owned by Fox. WOR had been on the



Fig. 7: The STL antenna, AM loop and DirecTV antenna mounted on the roof. The Mark grid dish is painted the same color as the building penthouse.

final newscast from those studios, ending with, "And you're listening to WOR, New York." The operator hit the button on the remote control, the audio switcher at the transmitter site switched to the Intraplex from 111 Broadway and the new facility was completely on the air at 12:06:40. We missed zero airtime.

And then there was sadness. I visited the 1440 location near the end of the first week of May to make sure everything that needed to be saved was out of the racks and my old office, which I hadn't seen since January. It was sad looking at the original, 25-year-old Pacific Recorders consoles that would be sent to the dumpster.

23rd floor since 1978.

WOR was one of the founding stations of the Mutual Radio Network; "The Cisco Kid" was originated at the WOR studios, along with many other programs during the Golden Age of Radio. Incidentally, WOR originated the first broadcast of the Columbia Broadcasting System from the WOR studios in the late 1920s, with a temporary control room set up in the men's room (seriously).

I think of John B., John A. and John R. Gambling (father, son and grandson); Vincent Price; Frank Sinatra; Arlene Francis; Bernard Meltzer; Barry Gray; Larry King; Bob Grant; Joan Hamburg (who is still

here); Dr. Joy Browne (also still here); The Fitzgeralds; and Bob & Ray.

When we pulled apart Talent Studio 2, we found a strange thing across the mic circuit. I was told it was Bob & Ray's telephone filter, to make one of them sound like they were on the phone when they were doing bits.

Other people who had spent time at WOR: Leonard Nimoy; Hillary Clinton; Gene Simmons; Joan Rivers; Neil Sedaka; Diana Degarmo of American Idol; Joe Franklin (a name you may have heard on the Simpsons; Krusty the Clown is usually interviewing Joe when Bart is channel surf-

ferent era of talk. The rooms were oversized for their use and for a time when you had a bunch of people working on one show. The talent who had passed through those rooms over the years is mind-boggling, as is the fact that a facility built in 1978 was still on the air —sounding good — and the equipment still worked when it was common to have all studios doing something practically 24/7.

Among the news stories that were covered at 1440 was the opening of the George Washington Bridge in 1931; the stock market crash of 1929; World War II (the bombing of Pearl Harbor was announced during a

WOR studios, and experimentation with stereo transmission, with one channel on WOR, the other on WOR(TV).

GENERATOR GYMNASTICS

I wanted to install a 50 kW generator on the roof of the building but there was a problem.

There are subway lines running under Church Street in the rear and Broadway at the front of the building. The Trinity Church graveyard is on the south side, and Thames Street is too narrow for a crane. Because of the subway lines, a crane is not allowed on Church Street or Broadway. Any generator would need to be disassembled and brought up the freight elevator. And a 50 kW unit wouldn't fit. A 35 kW unit would.

So we installed a 35 kW unit with a 125 gallon diesel tank under it. There are no natural gas pipes going to the roof of the building, and the city only will allow 125 gallons of diesel. Propane is a no-no.

It was quite the sight, seeing this genny dismantled, crammed into the elevator, removed on the 21st floor, then hoisted with a block and tackle one flight to the roof.

Incidentally, we have used it twice, as the building had to replace two 5,000 amp switches for the electric utility in the basement — switches that had been in service since 1919! We discovered that 125 gallons will last in excess of 45 hours under full load.

To refuel, we need to bring the diesel up the freight elevator in 5 gallon cans. We can bring it as far as the 21st floor, then carry it up one flight to the roof.

We found a few quirks along the way, the funniest of which was the newsroom.

Originally, we were considering doing newscasts in the center of the newsroom, but it is too noisy. So rather than build an edit booth in News, we chose to use it as the air studio.

No one noticed that on the other side of the wall in this booth is a bathroom. You can imagine the look on everyone's face in Master Control the first time someone in the bathroom flushed the ol' commode and we heard it on the air.

Needless to say, there is now a modified on-the-air light in the bathroom that says "Don't Flush" when the newscaster's mic is on.

Another quirk is that with the AM loop antenna on the roof pointed in the direction of the transmitter site, we have absolutely no signal. The antenna is 45 degrees off-axis



Fig. 8: Lynn White and Ellis Henican of 'Henican and White' in the new Studio 4.

ing); just about every star on Broadway; Henny Youngman; and Dee Snyder of Twisted Sister. To name a few.

Paul Stewart was chief engineer when the facility was built. Other engineers have included John Lyons, Herb Squire, Art Marko, Mario Sfogliano (still here) and many others in New York.

In the movie "Ghostbusters," Larry King is seen on the air in a radio studio talking about the ghost infestation. The studio you see is the former Talent Studio 3 at WOR at 1440 Broadway.

A baby elephant even visited the WOR studios. It was arranged as a joke for John A. Gambling by the staff when Ringling Brothers was in town. They brought it up in the freight elevator and it stunk up the place.

So there was a sense in the move that it was the end of an era.

The studios had been designed for a dif-

ferent era of talk. The rooms were oversized for their use and for a time when you had a bunch of people working on one show. The talent who had passed through those rooms over the years is mind-boggling, as is the fact that a facility built in 1978 was still on the air —sounding good — and the equipment still worked when it was common to have all studios doing something practically 24/7.

Also covered: the World Trade Center bombing in 1993; the attack on the World Trade Center on Sept. 11, 2001, when we watched the towers collapse from our newsroom windows 3.4 miles away; and every Macy's Thanksgiving Day parade that passed by the 1440 Broadway studios from when Macys started them. (Macy's may have started them before 1926, but when WOR was located to 1440, they would have been covered.)

Engineering "firsts" at 1440 include the development of the digital profanity delay, which was tried and perfected using the

where the signal peaks. All I can figure is that it is some phenomenon with the way the signal propagates around the buildings.

SUMMER IN THE CITY

Summer of 2005 arrived with a very hot spell — and it got very hot in the studios and Master Control room. Something was obviously wrong. And what was wrong was that the air conditioning engineering firm screwed up.

When we were planning, I repeatedly told them I wanted 20 tons of air conditioning for the studios and Master. They repeatedly asked for heat load on all pieces of equipment — impossible for something like a CD player or computer. The manufacturers just don't provide that information.

So I added up the total power consumption of everything in the room and presented them with a number in kilowatts for just the equipment, as a piece of equipment can't generate any more heat than the number of watts it is consuming. This did not include a calculation for people or the sizes of the rooms.

The HVAC engineers had only put 10 tons of air conditioning in. They had no clue as to what was really required.

I did the calculations and determined that the 10 tons that were installed were perfect — for the studios only. Add Master Control and the newsroom to the equation, and we were 5 tons short.

We decided to tap into the building's cooling water supply and use a water-cooled air conditioner to feed the Master Control Room and News. The existing units were rerouted to feed only the studios.

We also found that we needed to install filters between the outside air and the air conditioning units. The air in Manhattan is so dirty that the condenser coils were



Fig. 9: The generator sits in the southwest corner of the roof, hidden by the façade.

becoming clogged and severely reducing efficiency monthly.

IT-BASED OBSERVATIONS

The overall experience using an IP-based system has been very positive. The flexibility is wonderful. This became obvious when “The Dr. Joy Browne Show” started simulcasting with Discovery Health television. The TV crew wanted all the mics, the telephone mix and certain other items in the studio broken out: seven items in all. I simply handed them an Axia audio node, programmed seven outputs and made them very happy. No multi-pair, no rewiring.

It also is easy to reconfigure the system in any way with a standard Web browser. We can check system parameters on the audio engines this way, add or subtract what the operators can see for sources and change monitoring assignments. Each operator can

set up his console the way he likes it for his particular show, then simply load his or her own profile when they set up a studio. It has proven to be a good choice.

From concept to on-air, we built an entire facility in six months. The facility is working out well and gives WOR the flexibility for whatever may come down the road.

There was a lot of history that happened at 1440 Broadway. It is indeed the start of a new era. Building this facility, we needed to keep the historic and proud past of WOR in mind, but I did not feel I had a ghost looking over my shoulder, as I would have if we had rebuilt the studios at 1440.

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This article was adapted from a paper presented at the NAB2007 Broadcast Engineering Conference. ■