

# WRFU-LP Station Signal Flowchart

Left Studio Monitor

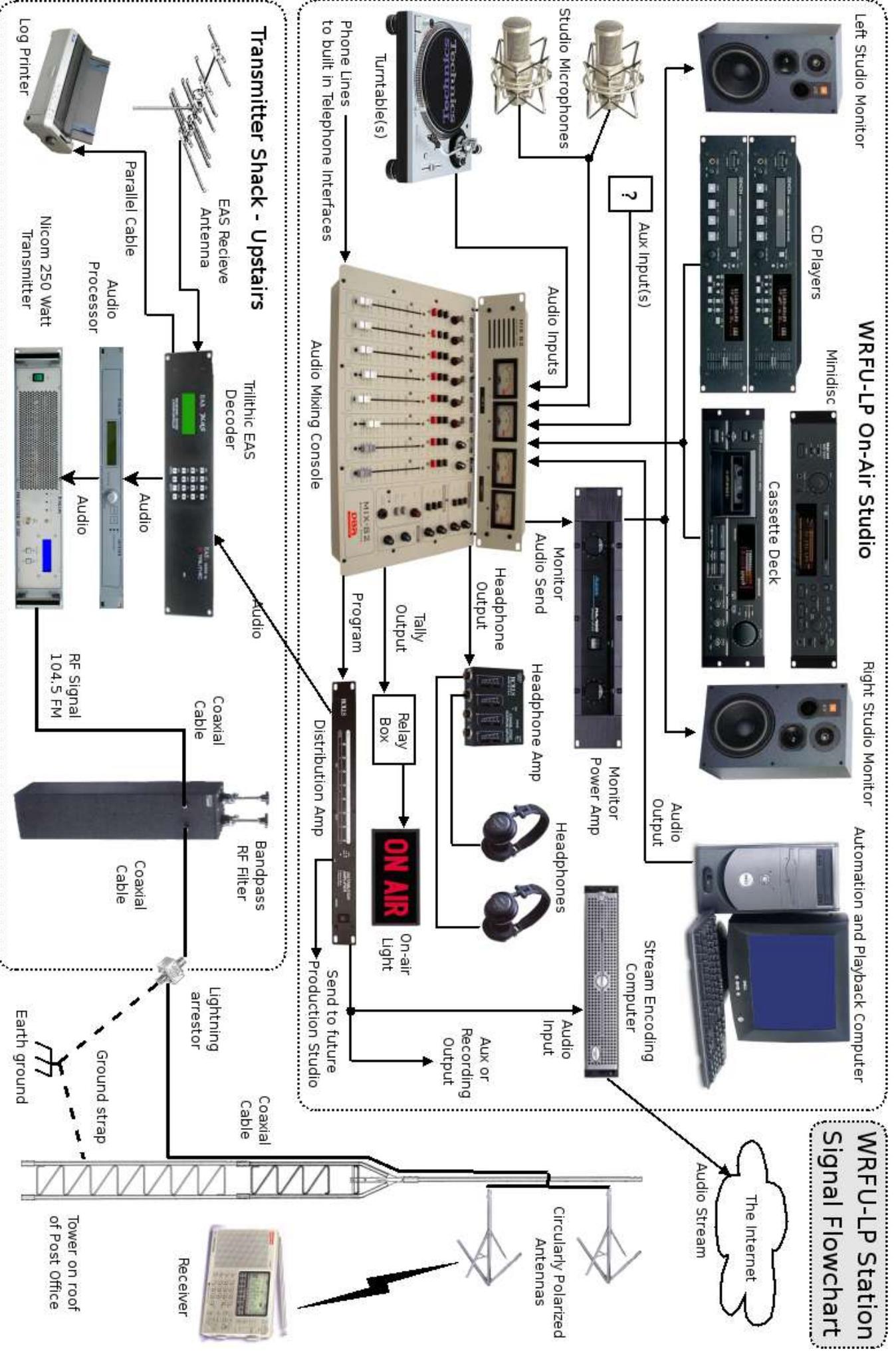
WRFU-LP On-Air Studio

Right Studio Monitor

Automation and Playback Computer

The Internet

Audio Stream



## And the Knee Bone's Connected to the...

*(How the Radio Free Urbana station will work)*

The first and most important part of every station (which is unfortunately not pictured in the diagram) is the DJ! Everything relies on a person in the On-Air studio to bring radios in people's homes to life. The DJ talks into a Microphone, hits play on the CD player or Tape Deck, puts a record on the Turntable, or plays back an MP3 on the computer - this generates the sound that then gets fed into the Console. There is a Telephone interface (hybrid) built into the console that allows the DJ to put callers on the air. There may be extra inputs on the console to plug in extra devices - a Laptop or Minidisc player - so the DJ can bring in whatever material they may have recorded themselves.

A console is just a fancy mixer for the rest of us: it adjusts the levels and mixes the sounds together under the DJ's control. The output of the console can go many places: back to a tape deck for recording, to Headphones, and to the Monitor Amplifier. The monitor amplifier powers the 'Monitors', or speakers. The program signal from the console is split using a Distribution Amplifier, which allows for adjustment of the audio level going to the various output points. There is usually a Radio Receiver somewhere in the studio as well, with a switch that flips the audio the DJ hears in the headphones between the output of the console and the over the air signal. This is sometimes called a 'confidence check', and lets the DJ know that everything is A-Okay at the transmitter, and replicates what listeners out in Radioland hear.

There are often a few computers in On-Air studios today, and they can serve many functions. One computer is usually used for office functions, where the DJ can get written and audio material off of the Internet to read back or play on the air. They can also use this machine for live instant messaging to take in requests or comments in real time. Another computer in the On-Air studio can also have special 'Automation' software installed on it, to assist the DJ in playing back audio files from the computer, or even fill in for a DJ on the late night shifts, or if someone calls in sick. The software can play various programmed lists of material, stream syndicated content from another source, and fill in station identifications at set times – such as the top of the hour, or ever 15 minutes. There can be a third computer – a Streaming Encoder, which converts the program audio output of the console into a digital audio stream. This digital stream is sent out over the Internet to a Streaming Server, which hosts the live content so people all over the world can listen to the station.

A Production studio is planned for the future, this will be similar to the On-Air studio. The two studios will be connected with audio cables: from the output of the On-Air studio to the input of the Production studio, and from the output of the Production studio to the input of the On-Air studio. This allows for more flexibility in what can be put on air, such as a person reading the news in the production studio, or adding capacity if there is a large group for live performances. The Production studio will have one feature the On-Air studio doesn't have: a fast computer with audio recording and editing software on it. It can be used to edit together documentary or news pieces, station identifications, or whole shows for later playback.

The audio output of the On-Air studio will run through the wall up to the second floor of the Post Office, where the transmitter will be located. This audio signal is then passed through the Emergency Alert System (EAS) unit. The EAS unit is a special piece of hardware that relays signals from Federal, State and Local government officials in times of emergency. It can also be used to relay severe weather warnings and alerts. If there were such an alert, the EAS would cut off the audio from the studios, play back a message, and then resume the audio coming from the studios. The EAS messages come from other radio stations – special signals are broadcast over the air, and these are picked up with a normal radio antenna, and fed into the unit. The EAS then repeats those signals and plays back the message on the air.

Once the audio passes through the EAS, it is sent to an audio processor. This processor is a bit different from a standard audio compressor or effects unit that may be in a recording studio, for instance. It protects the transmitter from high audio levels that may still be present in the signal. This keeps the transmitter from over-modulating on these high audio levels - preventing the transmitter from generating signals outside of the station's allocated bandwidth (space) on the FM band. The processed audio is fed into the Transmitter, which changes the audio signal into radio frequency energy. This RF energy is then sent out over a heavy coaxial cable to the Circularly Polarized antennas on the large tower. These antennas radiate the radio frequency energy out into the air, sending the radio signal through space and time to the listener's receiver. The receiver changes the FM audio back into sound waves that the listener can hear!