RangeMaster Transmitters   Suggestions for reaching the community

1.0 Reception range with low power

Reception range can be affected by many things.
-Grounding
-Noise in the area
-Height of the transmitter
-Audio level

It is critical to pay attention the good grounding, not only for good range but for proper lightening protection. First any mounting should be properly grounded according to NEC and local codes, then the transmitter is grounded to the mounting. The idea is to achieve the lowest possible resistance to the "Earth" possible, methods to do this can be the subject of an entire paper. See http://www.am1000rangemaster.com/amradiogrounding.pdf for a complete discussion.

Noise in the area will affect the ability of the listeners radio to pick you up. An industrial area with factories, lots of electric motors starting and stopping, can be a more difficult area to cover, because the noise floor is higher. This can be seen on a radio field strength meter. But a rural neighborhood, or suburbs, is usually quieter. Watch out for unusual noise sources, a Doppler radar can blank out AM band radio reception in the area, strong microwave radiation of any kind will affect AM reception. Listen to a sensitive radio, if you hear a quiet hiss then you are likely fine, if you hear nasty hum sparking sounding noises then reception may be difficult.

The height of the transmitter is important, it only needs to be above other man made structures in the area that may block its signal. Higher then that may help some, but not dramatically.

Getting proper audio level to the transmitter is important, you need to have enough level to fully modulate the transmitter. You should sound as loud as other stations in the area.

It is important to realize that you are working with a low power signal, not a 10KW transmitter. It is more of an "art" to get good reception with lower power levels. Listeners will need to have good quality radios, such as a car radio. A radio that is not sensitive, such as a $4 clock radio for example, will not be sensitive. On the other hand there are some advantages to being Part 15, you do not have the same bandwidth restrictions as the big radio stations. You can broadcast a wider bandwidth resulting in near FM quality sound. You can actually sound "better" then some local stations.

1.1 Suggestions for improving range

If you are not quite getting the range you need with one transmitter you may be able to get the range you need by adding audio processing.

A word about audio processing in general first. It is a good idea to add a compressor limiter to your audio chain. The behringer MDX 1600 is a popular choice. Also some like to EQ the sound (adjust the high, low, midrange levels) It seems to work well with AM to boost the high and low ranges while maintaining the midrange the same.

In the 1970 a radio trick came into use called asymmetrical modulation. It simply allows the transmitter to be modulated with a non-symmetrical waveform, which is not possible with standard audio processor equipment. It takes a special audio processor designed to be used with a AM transmitter to do this. The result can be a louder signal (important with AM) and a 15-20% increase in range, since you can drive the power peaks higher without distortion. The innovonics 222 is a good example of this type of processor.

http://www.am1000rangemaster.com/amprocessing.html   article on AM processing

If you are working with one site and you need just a bit more range, adding such a processor may be the way to go.

If you are trying to cover a much larger area then multiple transmitters is the way to go. Most do not use asymmetrical modulators such as the 222 with multiple transmitters because you need a 222 with each transmitter site.

2.0 Using Multiple transmitters

Multiple transmitters can cover the area you need if one transmitter won't do the job. The most common method people are using to cover a larger area with multiple transmitters is place RangeMaster transmitters around the area and link them by Internet. When using this method there are some important things to know. First you need to keep your audio in sync, even a few tenths of a second delay of audio between the transmitters will cause a noticeable echo as a person drives between transmitter zones. Second, the RF carrier is not in phase sync using this method, the transmitters will not heterodyne (you must use the crystal controlled model) but the PHASES of the carriers will not be synced. Normally you will have a short zone of "flutter" as you drive between zones, not too noticeable, like driving under a power line. However if you don't do a good job of planning transmitter locations and get the transmitters to close together then the flutter will become worse.

The way to design a system would be to generally plan a coverage are, put up the first unit and determine your coverage area. If you are getting 1.5 miles range then the next transmitter would need to go approximately 3 miles away. All the cells would be planned depending on the range attainable by the other cells and of course available locations. The idea is not to get the transmitters to close together and not to far apart. To close together and you have to much overlap, phase flutter and wasted coverage. To far apart and you have hole in you coverage. This is the Zerobeat method. With our system your coverage areas CAN overlap.

2.1 Proper site spacing
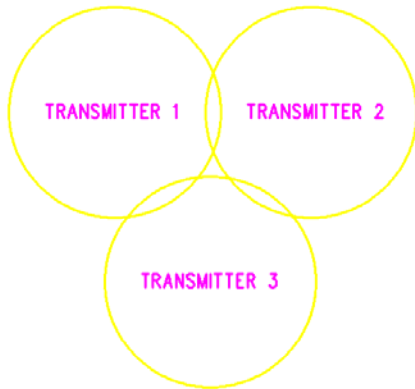
You should try to place the transmitters so the coverage areas do not strongly overlap (see diagram). The signal from one transmitter should start to drop as the other starts to pick up. The signals can overlap, but it is better if they do not strongly overlap. If they strongly overlap you may get a zone of noticeable phase flutter directly in-between.

Exstreamer 100   *Instreamer 100*

2.2 The audio link

The most common way to link the audio is the Barix product. The Instreamer can link to up to eight Exstreamer devices. You need high speed internet at all the locations.

Other audio links are possible. In some areas the telephone company can provide a link, it would be a special wide bandwidth link for audio use. It can be possible to use a radio link though in metro areas the radio spectrum may be to crowded. Microwave links are possible.

3.0 Summation

Using good technicians that know what they are doing will achieve the best results. Keep a copy of the FCC certification handy in case the FCC stops by. It is a good idea to broadcast a regular statement "We broadcast using a FCC certified transmitter, give the FCC ID number and your contact information." That way if the FCC is listening they will know you are not a pirate.