EXPERIMENTAL BROADCASTER'S NEWSLETTER

October 1, 1985 Vol. 2, No. 10

If you're of German heritage its time to once again think about an Octoberfest. In the spirit of Octoberfest everyone is welcome. There's a great deal of beer drinking, and toasting, and laughing, and everyone trying to dance the Polka and Hambo. Usually lots of good food too. If you can find an Octoberfest near you...go...and enjoy. Your editor is half French and half English and a native Californian and a "Folk Dancer" for about 20 years.

Kris of WQNR has a modem. He's talking about setting up a computer bulletin board. Of course he suggested that Panaxis do the same. I'm looking into it. I have a slight problem however. Panaxis is located 20 miles from the nearest town. The area is in the Sierra foothills at an elevation of 2000 feet. I can see 75 miles or more everywhere between due south to northwest. The North valley lays at my feet, the Coast range rises on the other side of the valley to the southwest. TV reception is great.....But, I have a 4-party telephone line.

I'm waiting for Pacific Bell to call me back with a price quote. I'll need a touch-tone line, either 2-party or private line. Installation of either entails special "milage" costs. These additional costs can be up to 5 times the normal "base" rate. I'll probably do it, the question is when? Comments from EBN readers would be helpful P.M. Mc...?, Wm De....?, Mr. Blank?, John?, Kris?, any others?

While on the subject of computers...Some broadcast equipment manufacturers are considering using the new Winchester 322 Megabyte type hard disk for digital audio. Machines would feature simultaneous record/playback, 20-20,000 Hz response, etc. Storage capacity equals 50 minutes of mono or 25 minutes of stereo. The price is cute also.....about $28,000 for mono, 30,000 for stereo. If 25 minutes isn't enough you can expand the system with additional disks at only $11,000 apiece.

Smaller machines, equivalent to a cart deck used for ID's and spots, would use a removable hard disk...like a floppy disk except more rugged. A 5 Megabyte disk is good for 26 seconds of stereo, a 10 Mb disk is good for 52 seconds. There goes the traditional 30 and 60 second spots!

It probably won't happen overnight however. Hard disk "carts" might get as low as $40.00 apiece sometime in the future. The machine itself will go for $10,000 starting next year.

Another company has a unique "data compression" system which they say can squeeze 6.6 Megabytes onto a standard 5 1/4" floppy. They say this is equivalent to 10 minutes of mono or 5 minutes of stereo. The 2-channel machine will sell for $34,500. About 50 of their proposed "consumer" design machines were scheduled for a trial run at radio stations this summer.

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WHAT'S NEW FROM THE FCC

A report came in a couple of days ago from one of our readers. He had just received a letter from the FCC. Its an unusual letter however. Its actually more of a "press release". Apparently it is being sent to magazines which carry information about illegal broadcasting, and to "free radio" and "pirate" broadcasters. It reportedly was written by Rebecca Wilman, Public Service Specialist, and distributed by an FCC monitoring station in Nebraska. If you want to find out more you can make an anonymous phone call to 308-382-4296 and speak with her yourself, or you can leave it alone.....

The release simply says that the FCC's close-in Direction Finding equipment will be in the field looking for illegal broadcast and out-of-band stations. Several cities are named. These include: Richmond, Charlotte, Youngstown, Orlando, Miami, Waterbury, Louisville, Minneapolis, Grand Rapids, Lansing, Arkansas City, Fort Smith, San Francisco, and Washington,DC. The unit is supposed to be in California this month (October).

There are several opinions about this approach. One...It is extremely fair of the the FCC to give advance warning of when and where they will be checking. Nicer still to write directly to an individual in time for him to shut down his operation before being "officially" cited. Two...This may be a scare tactic in hopes that unlicensed stations will shut down in fear of being caught. This way is a lot easier and less expensive than trying to track them all down. Three...Maybe the thing to do is shut down for a little while until the FCC passes by, and then start up again. Four....Just ignore the whole thing.

Some other interesting aspects of all this. It was also reported that an FCC inspector can not enter your premises without your permission. Neither can the FCC person take any of your equipment on a first offense. It is usually advisable to cooperate with the FCC if they call on you - the benefit may be a smaller fine or no fine at all. If the inspector is refused entry, or if it is a second offense, then a U.S. Marshal can be brought in for "search and seizure". Under these latter conditions the transmitter can be confiscated.

Generally a first offense fine is less than $1000.00. A second offense might speak of a $10,000 fine, depending on the severity of the situation. Out-of-band, SW pirate operation and the causing of interference are the most severe situations. In every case however the offender has an opportunity to plead for a lesser fine. The originating field office is obliged under the Rules to consider the severity of the offense, and the offender's ability to pay the fine. The originating field office therefore can lower, cancel, or arrange a time payment of fines. Remember, you don't have to be illegal - you can always apply for a licensed station or try your hand at cable FM or Carrier-Current broadcasting.

NICE TO KNOW STUFF

Here is a neat way to make a little extra income for your station. KSEA-FM in Seattle has been doing it since 1984. They get about 100,000 phone calls a month but handle them all automatically.

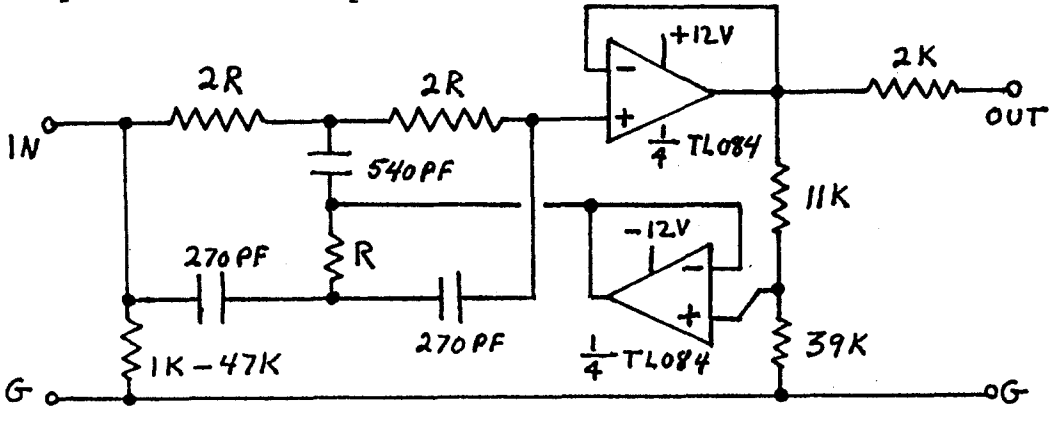
They have a "Weatherphone" service. Listeners that have missed the weather forecast for the day can dial up the station's Weatherphone. It responds with a short commercial message, then the weather report, and then the time.

The short commercial message is paid for by a sponsor, just as if it were being broadcast over the air. The sale price per spot might be less than an "air" spot, but can still be very profitable. If a sponsor reserved one day a week for just $15.00 a day, and you sold all days of the week (7 sponsors), you'd have $450.00 per month.

Digital recorder/announcer machines are available of course. But on a small scale a good grade of phone answering machine might be used for a starter. The only work involved is to update the recording when necessary. A sponsor can be sold a "package" rate to cover specific hours (morning-just before people leave for work) or specific days.

SCHEMATICS SUBMITTED BY WXQX LAST MONTH (19 kHz and 60 Hz notch filter)

The following circuit may be used for either a 19 kHz or a 60 Hz notch filter. The depth of the notch is dependent on the precision of the resistors and capacitors in the parallel "T" network. They should be 1% values if possible. The capacitors selected are 270 pF dipped mica. The 540 pF is simply two 270 pF mica caps in parallel. For the 19 kHz filter R = 15.5K, 2R = 31K. For the 60 Hz notch filter R = 4.9M, 2R = 9.8M. 5% values may be used if you can tolerate some loss in notch depth. As these are non-standard resistance values you'll need to make your own by series or parallel combinations. Two 62K resistors in parallel make 31K, four in parallel make 15.5K. The 4.9M can be made with a 4.7M in series with a 200K. Two of these latter series combinations connected series makes 9.8M. The amplifiers are part of a quad op-amp (TL084 or TL074). The one IC can therefore be used in a stereo circuit as only two amplifiers are needed for each channel filter. The input impedance (resistor) should as small a value as possible for best performance.



STATION OF THE MONTH

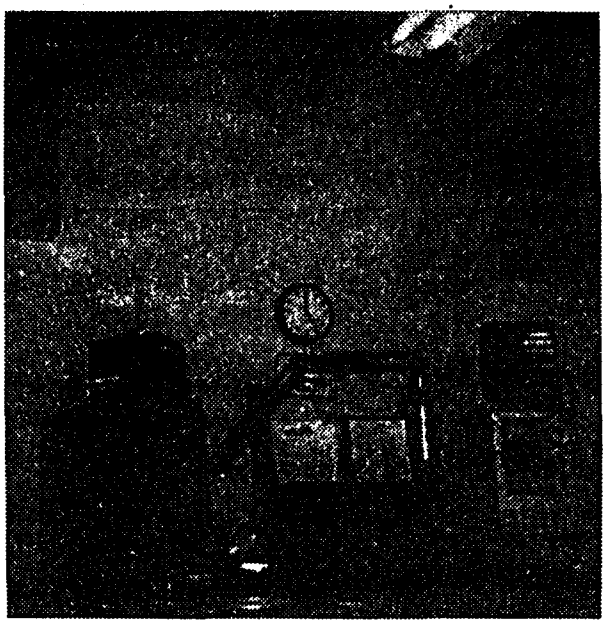
Dear EBN,

Here are some pictures I took a month ago. Here is some history about how I started my station. It began as WASA and used an Archer space control CB unit with a hundred milliwatts of power on channel 14. My studio consisted of nothing more than two old turntables, cassette recorders and a kitchen clock. Later that year I changed call letters to WCVU. In 1975 I constructed my first FM transmitter using a Radio Shack FM wireless mic block module. I used that system til 1980 when I got on the air with a LPB 20 watt transmitter. In 1983 I updated by FM with the FMS 2000 Panaxis transmitter. Using a Radio Shack FM receiving antenna I get close to 10 miles. My Studio equipment consists of:

3 reel to reel decks
2 Gates turntables
2 Spotmaster, 5 decks
1 Radio Shack 5 spot mixer
2 CS2 boss compressor/limiter
1 DX 77 RCA Microphone
1 Gates Studioette six channel console with added amplifiers to convert to studio use.
1 Radio Shack 10 band equalizer

We are currently building a separate studio for our AM. It should be completed in late October. Usually we simulcast AM and FM and operate 3 days a week, M-W-F , 7 to 11 pm. We have three DJ's, J.L. better known as Captain Midnight, my wife and I. When I run into technical problems which I'm not able to handle I call my friend B.H. of WBDS

Take care EBer's. John.



MINI-LESSON (Inexpensive FM transmitting antennas)

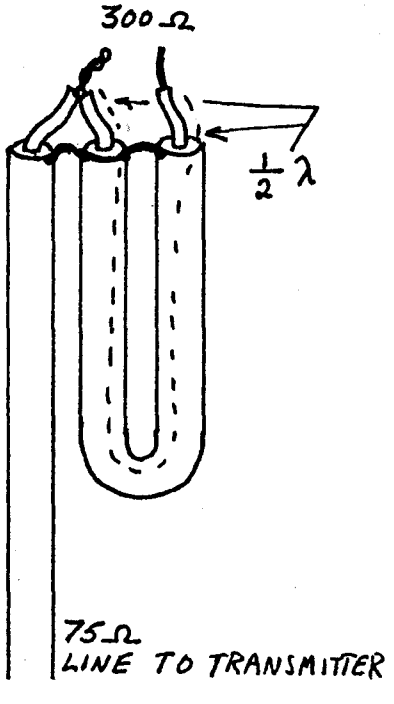
An antenna is an antenna is an antenna. But..there are some important differences to consider. Receiving antennas are designed for reception over a range of frequencies, such as the entire FM band, or the entire TV band. Transmitting antennas however are designed to operate within a narrow frequency range to either side of the center frequency. A transmitting antenna for 100 MHz for example should be much less efficient below 99 MHz and above 100 MHz. The length and diameter of a transmitting antenna is therefore critical. The length should be made adjustable to put it on the exact center frequency.

The SWR (voltage standing wave ratio - vswr) depends on the tuning of the antenna to the desired frequency, and how well the antenna impedance is matched to the transmission line (and transmitter). Any SWR below about 1.5 to 1 is acceptable for broadcasting. The feed impedance of a horizontal dipole is about 75 ohms and is "unbalanced".

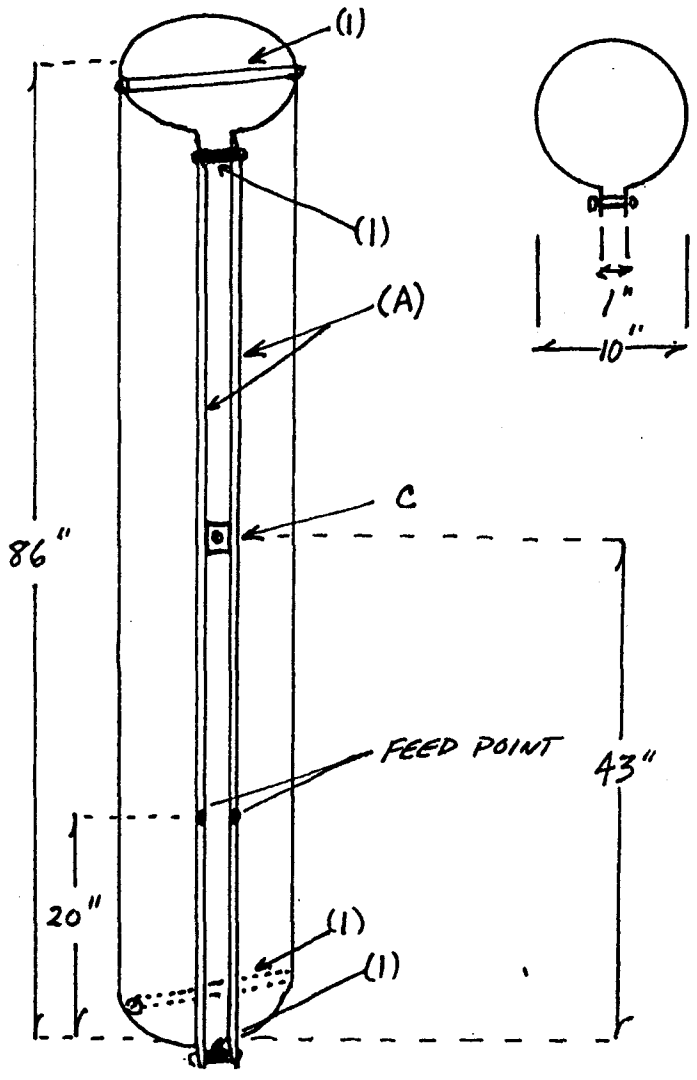
Several EBer's have tried using the inexpensive Radio Shack "turnstile" and "S" type FM receiving antennas for transmitting. Results may be somewhat disappointing due to the characteristics above. In addition these antennas are "folded dipoles", which exhibit a feed impedance of 300 ohms. At low power inputs the little transformers furnished with the antenna might handle it ok, but with higher power they can be cooked. The little transformers are designed for "microwatts" (receiving).

These conditions can be corrected however and a fairly decent and medium power antenna can be made. The first step is to make a 75 ohm to 300 ohm transformer to match the balanced folded dipole to an unbalanced 75 ohm coax cable. Figure 1 below shows a 1/2 wave "balun". It changes an unbalanced 75 ohms to a balanced 300 ohms. Just connect it in place of the little transformer that comes with the Radio Shack antenna. The length of the 1/2 wave section is equal to .66 times 150 divided by the frequency in MHz (if you use regular coax cable - change .66 to .82 if you use foam cable).

Secondly the antenna elements should be adjustable. This means calculating the the length of the elements for your frequency, then cutting the elements to that length. The same amount of tubing is re-removed from both the upper and lower portion of the elements and a smaller tubing is pushed inside to make the whole thing whole again. Small hose-type clamps can be used to firmly hold inner and outer tubes together. The elements can then be slipped in or out to adjust for the proper length (resonance at desired frequency) and lowest SWR.



A Simple "slot radiator" for 88 to 108 MHz



This antenna is quite well suited for indoor use. Its height is less than the standard 8 foot ceiling. It can sit in the corner of a room or in an attic. The centrally located air-variable capacitor tunes the antenna to the desired frequency. It's fed with the 75 ohm to 300 ohm balun shown earlier. SWR can be trimmed by moving the feed point above or below the starting point of 20 inches.

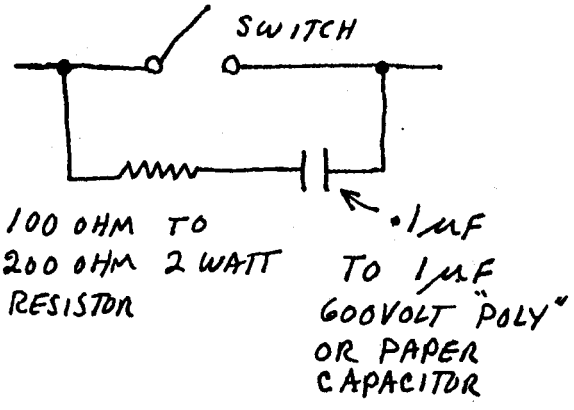
The cylinder can be fabricated by most sheet metal shops in just a few minutes. It's made from a single galvanized metal sheet 33 inches wide by 86 inches long. It's 31 inches in circumference with two 1 inch lips (A). The lips are spaced 1 inch apart with 1/2 inch metal tubing at the top and bottom (1) and held in place with nut and bolt. Plastic spacers may be used at other points along the lip if additional support is needed. Shorting bars at top and bottom diameters (1) are also 1/2 inch tubing, nut, and bolt. The capacitor (C) is variable between 1 and 10 pF and is soldered between the two lips.

Tuning is accomplished by first connecting the feed line (balun) to the feed point shown (20 " from bottom). Alligator clips may be used for these temporary connections. An SWR meter is connected between the transmitter and the coax. Apply power and adjust the variable for the lowest SWR. Switch off the transmitter and move the feed point 1/4" up or down. Again apply power and adjust variable for lowest SWR. Continue in this manner until you have the lowest SWR obtainable. An SWR of 1.2 to 1 should be fairly easy. Your body capacity will mess up the tuning. This means you should move away from the antenna after each adjustment if you want an accurate SWR indication. The balun wires can be fastened with sheet metal screws to the proper feed point once that point is found. The balun should be placed inside of the cylinder, below the feed point, and the coax run out from the bottom. CAUTION: Don't touch the antenna when power is applied....RF voltages can become quite high...they won't shock you but they can burn little holes in your skin.

HELPFUL HINTS DEPARTMENT

Today's silicon diodes have a fairly fast recovery time. This is nice for some digital circuits but is not necessarily helpful in power supply circuits. In fact it can be troublesome at times. If conditions are right the fast recovery can cause "ringing". Ringing is a damped oscillation occurring in a circuit as a result of a fast change in current. The damped oscillation frequency can be many Megahertz, yet occur at the power supply frequency of 60 Hz (120 Hz for full-wave power supplies). The end result is an annoying 60 or 120 Hz buzz in the VHF range. How to correct the problem?.....connect a .01 uF ceramic disc capacitor across each diode in the power supply. The capacitor's voltage rating should be 5 to 10 times the power supply voltage. This procedure may help quiet buzz experienced with some FMS units. Our thanks to Roger Stuart for bringing this to our attention.

Clicks and pops getting into your audio when a switch is activated somewhere is also very annoying. This is a common occurrence with turntable switches, remote start switches, and other ac switches close to your audio source. The problem is caused when the switch is activated (or deactivated) during an ac current peak. If we could operate the switch at exactly the time the ac current is passing through zero we wouldn't have the problem at all. The following simple circuit can eliminate or at least reduce the problem. It is a simple resistor/capacitor combination. The circuit tends to suppress "ringing" caused by operating a switch during an ac current peak.



Not all of us can afford an RF wattmeter which is accurate in the VHF range. But we can borrow some old techniques used to compare one power level to another.

Two identical light bulbs are placed in a box. A solid partition is placed between them. The open end of the box is covered with a piece of frosted glass so the light from both bulbs can be seen. If frosted glass isn't available you can try substituting paper in its place. One light bulb is fed RF power from your transmitter by way of coax. The other bulb is connected to a variable dc voltage source. With the transmitter operating and its bulb glowing, the current to the other bulb is adjusted until both bulbs are the same brightness. The dc voltage and current applied to the comparison bulb are measured. The product of voltage times current equals the power used by that bulb. Since it's the same brightness as the transmitter's bulb, the dc power and RF power are the same ! The bulbs must be identical and capable of handling the transmitter output. The hot resistance should be close to that of the transmitter's output impedance (50 or 75 ohms). For example, a 24 volt/.5 amp bulb looks like about 48 ohms and is good for 10 watts. A 120 volt 10 watt bulb however looks like about 1400 ohms. A 12 volt, 1 amp bulb is good for 12 watts but would present a 12 ohm load.....Volts <u>divided</u> by Amps equals the resistance while Volts <u>times</u> Amps equals the bulbs power rating

BULLETIN BOARD (for messages)

Want to make contact with EBer's in Southern California..Call Reddie Boswell at (213) 672-4416 or write 930 N. Enterprise, Inglewood, CA 90302.

Want to make contact with EBer's, specially those in Virginia. Contact John Hart, 5157 Longston Rd. Virginia Beach, VA

Want to make contact with WXQX. Call Kris at WQNR (516) 736-6448

WANTED, FOR SALE, EXCHANGE, SWAP, BARTER

ANNOUNCING: The first radio network developed specifically for the low power broadcaster, the Low Power Broadcasting Network, LPBN. We have a library of over 50 individual programs at the disposal of our member stations. There are NO FEES for joining...Get the complete details today: John Dutton, LPBN, 514 Vincil, Moberly, MO 65270.

FOR SALE OR TRADE: Blonder-Tongue MCA-B AGC channel processor for cable use. Only $75.00 or equivalent trade. Rod Moyes, PO box 278, Tranquility, CA 93668

WANTED (exchange or trade): IBM compatible, DOS 2.0 or higher programs,BASIC compiler program, Quality dot-matrix printer (15 inch),info on "bulletin board" procedures, names of EBN readers which have computers and modems. Also info, articles from any source, pictures, etc., about "free radio" and "pirate radio" to be used in new book. 9 to 10 foot mesh type satellite dish (just the dish). Write Ernie (Panaxis) at PO box 130, Paradise, CA 95969 or call at (916) 534-0417.

FINAL WORDS

The Eastern seaboard as you know was hit quite hard by hurricane "Gloria". Hundreds of thousands of homes and businesses are without power. The power outage may last up to two weeks. A portable generator can help keep the food cold, the lights burning, and keep the communications channels operating...if you can find one. Everyone has the same idea and there's only so many generators available in an area. What to do?

I just found out that the true spirit of friendship is alive and well. One of our "station of the month" EBer's picked up a generator in Nebraska, and sent it by airline to New York, to another "station of the month" EBer. That home at least has some power, and is back on the air as well. In fact, it may be the only local station available for awhile.