EXPERIMENTAL BROADCASTER'S NEWSLETTER

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.*.*.*.*.*.*.*.*.*.*.*.*.*.*.*.*.* HAPPY NEW YEAR *.*.*.*.*.*.*.*.*.*.*.*.*.*.*.*.*.

Getting pictures for the EBN is something like the story of the Catsup Bottle....first comes a little, then a lottle. This issue features pictures of THREE stations. To conserve some space, portions of the text accompanying those pictures was shortened - hopefully leaving the basic information intact.

A question on clarification of FCC Rules was asked by one of our reader's in a recent post-card. I thought it might be advisable to refresh all the EBN subscribers as well:

Interpretation of FCC Rules regarding low power broadcasting

(Frequencies from 510 kHz to 1600 kHz.....Phono Oscillators)

Field strength in microvolts/Meter must not exceed 2400/F(kHz) at 30 Meters

-or-

Power input to the final radio stage must not exceed 100 mW AND the length of the antenna, including transmission line and ground wire, must not exceed 3 Meters (10 feet).

Emissions below 510 kHz or above 1600 kHz must be suppressed 20 dB below the unmodulated carrier.

(Frequencies from 88 MHz to 108 MHz.....Wireless Microphones)

Emission from the device must be contained within 200 kHz centered on the operating frequency.

Field strength must not exceed 50 microvolts/Meter at a distance of 15 Meters from the device.

Emission of any frequency outside of the 200 kHz bandwidth must not exceed 40 microvolts/M at a distance of 3 Meters from the device.

The antenna must be an integral part of the device. No additional antenna may be used.

(All of the above devices)

Must not cause interference to licensed radio services.
Must have a "certification" label stating unit complies with FCC Rules

Of course the Rules are much more involved than the few lines shown here. For a full coverage you should consult Parts 15, 2, 73, and those dealing with international agreements and treaties. There is further discussion on page 8.

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STATION(s) OF THE MONTH.....#1 - KREG-FM CABLE/AM CARRIER-CURRENT

Hi, this is Paul with KREG. We've made a lot of changes this past year. To get an idea of just how much you might look at some of our pictures in the back issues of the EBN.

With the help of Kris and some quick fingering of the telephone after reading an ad in Radio World, I managed to snag a McMartin B-502 console. It's in excellent condition but required some minor work on the input bus switches. All together it cost us $220.00 plus $150.00 for the repair work. The sound quality is fantastic. I am impressed by how a console that has seen 10 years of duty on the front line of a radio station (i.e...abuse) can still sound this clean.

The biggest improvement made this last year is definitely my brand new baby....an FME-250. I'd been told about its superior sound quality and frequency stability but held off because of the price. After 9 months I finally decided to get it. I can truly say it is worth the price. My station with it's new console, equalizer and transmitter simply blows the other stations right off the dial.

With all the new improvements come new listeners. With a solid listener base, which is getting bigger all the time, its time to think about the next step.....increasing the sale of air time. Then going 24 hours, hiring more DJ's, adding more equipment (we need a couple more cart machines).

Our station plays Progressive New Rock Music interspersed with traditional AOR fare. We get all of our records strictly from distributors which service broadcasters. We run the Doctor Demento show, Rock Week, and Rock Chronicles from Westwood One for example.

I would really like to get in touch with other stations out there such as WXQX, KKTO, etc., and trade air checks with you. Just send a 60 minute cassette (el cheapo is o.k.) with 30 minutes of your station as it sounds on the air. In return I'll record 30 minutes of my station and send it to you. My address is 423 N. 47th St., Omaha, NE 68132.

Before I go I want everyone to know what a great friend Kris Holtegaard, with WQNR, has been. We have constantly been in touch this past year sharing our problems, and together contributing to each other's successes. When Kris was without electrical power (that big storm that hit the East coast) we were able to send him a generator. In turn he helped us monetarily with getting our new console. No one could have a better friend. I hope our association will continue far into the future....Kris, Thank You.

Keep up the good work Ernie (Panaxis). Without your help over the last couple of years, my station would still be going through an archaic Radio Shack "ten dollar special" AM transmitter.

Paul.

(Editor's comment): You're welcome.... (Watch out NBC!!!!)

KREG CAFM-CCAM

95.3 MHz CAFM
860 KHz 5W CC
8 A.M. - 9 P.M.
Potential audi-
ence: 100,000

Sanyo RDS-22
Cassette Deck;
Tapecaster 600
RP Cart Deck;
Denon 12
CassetteChanger;
Technics SL-220
Turntables;
McMartin B-502
Console;
JVC 7 band
Equalizer;

STATION(s) OF THE MONTH.....#2 WTMS - FM 96 10 WATTS

Dear EBN,

Here are some pictures of our station. We've been on the air since early 1985 with a 10 watt FM unit. We have a 6 mile coverage radius using a horizontal dipole mounted on a metal tower. Our format is Pop and Hard Rock and 12 inch remix. Operating hours are between 7 A.M. and 12 Midnight. Our equipment consists of: NIKKO NR-500 receiver for monitoring; TENNAPHASE PR-3700 Mixer; AUDIO CONTROL 520B 5-band Equalizer; TEAC CX-400, SANYO RD5030, and SHARP RT310 Cassette decks; EPI Monitor speakers; Two TECHNICS SL-B2 turntables.

Sincerely, Rabon

STATION(s) OF THE MONTH.....#3 KNPR-AM, KHOG-AM, KHOG-FM, KCUF-FM
(Confessions of a former "Pirate")

Dear EBN,

I got my start in 1978 when I was a sophomore in high school.

My first transmitter was a 4 transistor job that had about a 100 Ft range.

It wasn't much but it got me hooked quick. I soon built a second AM transmitter using 3 tubes, a 12AX7 and 2-50C5's. Its range was about a mile.

Equipment shown: PIONEER and AR turntables; SONY D-5 CD player; HOMEMADE Mixer; REALISTIC Mic mixer; DNR Noise Reduction; Monitor speakers, etc.

I was fortunate to get practical experience also at our school station, KBPS (1450 kHz), which also complemented my electronics training.

In 1980 I began attending our State College. Like most freshman I lived in a dormitory. It didn't take long to realize that the floor I lived on (known as "Hog City" or the "Hog Empire") was really wild 'n crazy. Seemed like a good place for a radio station. On went the transmitter. We decided to call the station KHOG for obvious reasons. It was an instant success.

We got this really funny guy down the hall to be a DJ. He'd never done anything like it before, but he was a natural. We set up a request line and the phone was ringing off the hook. And, for some reason, the pretty coeds started hanging around "station headquarters"!! We signed-off at Midnight with by playing the **Imperial Death March** from "The Empire Strikes Back" sound track. Our T-shirts emphasized the theme with the following logo:

We went through three transmitters that year. Our second transmitter, built by a friend and I, used a 6DQ6 tube with a crystal. It was modulated by an audio amplifier through a 70 volt line transformer connected in series with the tube's plate voltage supply. Later my friend needed his 1 MHz crystal back (belonged to his computer)so we went back to 840 kHz after finding a new crystal. Our last transmitter was a hybrid containing IC's, transistors, and tubes (tubes reign supreme).

The following year wasn't as successful because most of the good people were kicked out of the dorm for being too rowdy. Fall of 1981 marked a turning point however as we moved to FM stereo. My transmitter was a Stellatron FX-20, with an output of 20 mW it got out about 1/3 mile. I tried all kinds of schemes to boost the output power but none of them worked. It would be a few years before I knew enough about RF design to design my own VHF amplifiers.

In addition to the low output power I also had frequency drift. One day I read a construction article in RADIO-ELECTRONICS about a "Frequency Synthesized RF Signal Generator". A light bulb went on in my head "why can't I do this for my FM transmitter?". It took most of 1982 to work out the bugs but I did it. What an improvement! Crystal controlled accuracy and .1 MHz resolution using BCD thumbwheel switches. This was living!

The next major improvement was in early 1983 with the addition of a power amplifier. I used a MOTOROLA MHW-592 module to get a 2 watt output. This increased the station's range to a 5 mile radius (coverage of the whole town). Later I changed to a Panaxis FMA-2000 (lots of adjustments, but it seemed to give me a bit more power - in part because I increased the supply voltage to 15 volts instead of 12). The addition of a Panaxis RFI filter prior to my 1/4 wave ground-plane antenna improved matching and increased range further. I was in an apartment now with no place for an antenna. A friend next door put it on top of his house (100 feet of buried cable). We painted it black so it would be hard to see. The FCC would never know!

In the summer of 1983 I started building a mixer with TL074 op-amps. It has 17 stereo inputs, six pots, and three stereo mixing buses (audition, pgm, cue). It wasn't finished until the end of that year.

On December 9, 1983 KHOG helped out with a dance at my old dorm. Everyone brought records to my apartment. We broadcast to the dance two blocks away. The phone was tied up all evening with requests. The people would tell our "DJ" at the dance what they wanted, he would relay it to us on the phone. The dancers couldn't tell their music was being broadcast to them from a remote location!

After Christmas break and on the air again for about 10 days, I received a visit from the FCC. I was in the shower so my roommates answered the door. By the time I got there they had already hidden the transmitter but forgot the amplifier, which I hid immediately. I went to greet my visitor in the next room. He was wearing a trench coat..(give me a break!). He asked to see the transmitter, so I showed him the 20 mW unit. He didn't believe that was all there was to it and wanted to know where the antenna was. If he didn't see the antenna, how did he know where to find me? Someone must have turned me in. In any case, he let me off with a warning and didn't take the equipment. After he left I realized the date....January 13th, 1984..FRIDAY the 13TH.

We came to the conclusion that we were "identified" by our telephone ring. Just as we were signing-off that night the phone rang...and was picked-up by the microphone. Instant confirmation that the station was located at the same place as the phone!

So there I was, not supposed to go on the air, and several years of work put into it. I decided no one was getting the last laugh on me....I turned my transmitter into a senior project and got 8 hours of college credit (straight "A"'s no less). The station was off the air for 8 months until August, 1984, when a friend of mine offered to start it up again. We agreed in writing that it would be HIS responsibility, and would be located at his house. The station was renamed KCUF by the new owner but the equipment was being rented from me. When I moved from the area I took the transmitter with me. KCUF has since obtained another transmitter and is still on the air at 90.3 MHz.

In June, 1985, I graduated with a BS in electrical engineering. I am now working for Tektronix designing test and measurement equipment for TV stations (still hooked on broadcasting!).

Two friends and I have formed TBA productions for the purpose of starting a cable FM station. Our initial problems were lack of space on the cable for stereo,and then our proposal to use their text-only bulletin board channel brought a polite refusal a week later.

A major problem is the cost of phone lines...$120.00/month for one 8 kHz line; $350.00/month for a pair of 15 kHz lines

This picture shows KCUF as it appeared in May, 1983. Equipment included:

AKAI 2-Ch. Open Reel
AKAI 4-Ch. Open Reel
TEAC and TECHNICS Cassette Decks
11 Band Equalizer
Stereo Receiver
Communications Receiver
Police Scanner
2 KVA Isolation Transformer
Stellatron FX-20 (modified)
Panaxis FMA 2000 2 watt amplifier
Stellatron CX-5 Limiter
2 Cassette Decks
3 CD Players

My "Pirate" days are over so you can sign me: Sincerely,
Bill McFadden

NICE TO KNOW STUFF (Input From Our Readers)

From Mark P.: Extract from article in "The Press", August, 1982.....

Pirate radio in Paris, France apparently is going great! The Socialist government elected in 1981 promised to legalize "FREE RADIO". While it considers who should have specific wavelengths in each locality, it seems to be ignoring present activity. No standards have been set and no authority is given to shut-down the new stations. The young broadcasters range in age from 9 to 17 years

According to the article "Opening the airwaves to all, including commercial interests,is like opening Pandora's box. Italy already has entered the next phase, when entrepreneurs with heavier equipment and paid staffs have begun to crowd the amateurs out, in TV as well as radio. Throughout Western Europe, thousands of local civic groups, churches and the like now have their own antennae. But their collective audience is small, and hungry professionals are pushing in with their big kilowatts."

Editor's Note: An EB'er just returning from a visit to Sweden (his homeland) spoke to me on the phone the other day. He said that FREE RADIO is alive and doing extremely well in Sweden. Until recently transmitters could be purchased easily across the counter. It is now illegal to sell them, but apparently not to use them!

From Bill McFadden (off of AT&T UserNET):

CHICAGO - A pirate broadcaster has been treating Chicago area radio listeners to some unscheduled programming by transmitting on the microwave studio-to-transmitter links of area AM radio stations. The last incident, on November 21, involved the "tapping" of WMAQ-AM facilities. Listeners were assailed with a barrage of cursing, and were treated to an old Bob Dylan tune "Don't Think Twice". WMAQ-AM is the third Chicago station to report an intrusion.

From John A. at Pandora Music Communications:

Carrier-current operators may want to get in touch with WKVU, Villanova University, a station that has been in operation for many years. They use phone lines to feed multiple transmitters in dorms. Their business number is (215) 645-7200. Doctor Richard Welch, the station's advisor, can also be of help. His number is (215) 645-4500, ext. 4785.

From Brian H.:

Preliminary design for a C-Quam stereo AM exciter. Looks very promising. Your editor will be working with the design in the near future. Between Brian and I we should have a PC board worked up and a kit available later this year. Brian's "breadboard" model is functioning extremely well. We'll keep you up to date on our progress.

Continued from page 1

At the present time there are no provisions for low-power, over-the-air broadcasting. The Part 15 Rules are for "limited radiation devices" - devices for short range music, voice, or telemetry (garage door openers). This includes "phono oscillators" and "wireless microphones". Distances are limited to a few hundred feet at best.

Carrier-Current operation is allowed (AM broadcasting 535 kHz-1600 kHz) using the power line as a transmission line PROVIDING the field strength at the specified distance from the power line is not exceeded. In a properly set-up Carrier-current station these conditions can be met even with a transmitter up to 50 watts. Coverage may extend many miles as it follows the power lines.

The FM band equivalent to Carrier-Current is Cable FM broadcasting. Cable FM is a closed system, which theoretically doesn't radiate(not over-the air). A cable FM modulator needs to supply **less than 100 microwatts** to the cable. The repeater amplifiers on the cable system extend the range of the signal.

The above appear to meet the criteria specified in the Rules, and therefore may be used for broadcasting without a license. Stations of greater field strengths and/or power require a license to broadcast. However, there are no provisions for licensed broadcast stations under 100 watts (except for some Class D - Educational stations).

Thousands of small broadcasters, all over the World, operate with powers from a few milliwatts to a kilowatt. Some countries have no Restrictions, other countries have no control. These broadcasters go by various titles such as "Pirates", "Free Radio", "Alternative Radio","Experimental Broadcasters", etc. Most of them cause very little harm or interference to "legal" radio stations and radio services. It's not always the "closet DJ or radio enthusiast" that has a station either. Some churches operate "illegal" stations on Sunday, broadcasting to nearby communities, or to the hard-of-hearing within the Church building itself. Schools, at all levels, are notorious for starting "campus limited" stations (which often get out a mile or more). Then there are Ski Resorts, Drive-In Movies, Shopping Centers, Real Estate Agents, and on and on, that exceed the defined field strengths. Technically, they're all illegal in their operation.

The FCC has recently renewed its effort to shut down unlicensed stations. From the reports we get however, we come to these conclusions: (1) The FCC is understaffed, (2) They tend to ignore unlicensed AM and FM stations, (3) They respond to complaints about interference, (4) They are more aggressive toward unlicensed **shortwave** broadcasters, (5) Monetary forfeitures (fines) range from 0 to $1000. (6) Sometimes they will confiscate equipment, (7) Sometimes they give a verbal warning with no other penalty, (8) If you play "ignorant of the law" (Gee...I didn't know I was doing wrong), they may go easier on you.

For those interested in applying for a commercial FM station license, the 80-90 Docket channels 221,225,245,and 251 application window will open shortly. Check with the FCC to see if one of these openings is near you.

Ooops! Ran out of room for mini-lessons and classified's. See you next issue.