EXPERIMENTAL BROADCASTER'S NEWSLETTER

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It's a beautiful sunny day here in California. 70 degrees outside. Just the day for pruning my wine grapes. A good day for breathing the fresh mountain air as I gaze down at the smoggy valley 2000 feet below. My only thoughts of radio are the sweet refrains emanating from a portable hanging on a fence post. But alas, its time to type up the old EBN, and my visions of a peaceful afternoon flicker away.

Is there hope for the low-power broadcaster? Perhaps. There is a translator near the island village of Klawock which repeats the programming of KRBD-FM in Ketchikan, Alaska. The FCC is permitting the village to use the translator for 2 hours of LOCAL programming. More on FCC matters on page 8.

MINI-LESSON (Doing voice-overs with automatic gain reduction)

Joe Nechanicky has asked about a device that will lower the volume level of music automatically when you speak into the mic. This would be quite helpful for "hands-off-the-controls" voice-overs, walk-ups, etc., either on the air or in the production room. Perhaps it is something that Panaxis could produce. As it turns out it's already, somewhat, in existence.

The Macromod compressor uses a dual audio control chip for stereo operation. Each channel's audio is internally rectified and the resultant dc level is used to control gain. In a stereo situation the two rectifier outputs must be tied together so the left and right channel gains will "track". In other words each channel's rectifier as well as the other channel's rectifier controls the gain of both channels.

If we consider the unit not as stereo, but as a dual compressor we come up with something interesting. Music can be put through channel 1 and a mic through channel 2. When you speak into the mic, channel 2's rectifier lowers the gain of channel 1. The greater the volume level from the mic the greater the gain reduction of the music. Channel 1 and 2 are mixed at the outputs for one composite audio (mono).

The system will also work for stereo music (using channels 1 and 2) if a separate mic preamp is used. The output from the mic would be fed to a long time constant rectifier (simple circuit). The output from the mic rectifier is then fed to the rectifier filter of the Macromod compressor. The increase in rectifier bias level reduces gain of both channels. A portion of the mic's output is fed to both compressor inputs to mix the voice with the music. Cost of the system is a diode or two, a filter capacitor, and extra RCA jack and a mic preamp. If anyone is interested in the circuit diagram and how to hook it up let me know by March 15th so we can get it into the next EBN. If you would like to see Panaxis develop a separate unit just for this application, let me know that also....Ernie

Published By Panaxis Productions, PO Box 130, Paradise, CA 95969

LETTERS TO EBN (Union City Radio - Shortwave Broadcasts)

Union City Radio signed on the air December 8th, 1984 at 0316 GMT on 7430 KHz. We broadcast irregularly in the 41 meterband (7400 - 7450 KHz) and we may use the 19 meterband (15010 - 15070 KHz) during the summer months.

Our programming consists generally of 70"s and 80"s rock music, progressive rock and some blue grass. Along with uncensored comedy, political satire, commentaries and our personal views on pressing concerns of the day. Union City Radio is funded by its operators.

To date we have been heard in 21 US states, 4 Canadian provinces and in Europe (via Climax Relay Service).

Station Equipment: Transmitter(s):Johnson Viking Ranger with audio modifications and 2 back up transmitters, a Johnson's Ranger and Challenger. Yaesu watt meter. Modulation Compressor/Limiter: Custom Panaxis MMC with meter. Antennas: a 1/2 wave dipole and an inverted V; SWR meter: Radio Shack.

Studio Equipment: Stereo Receiver: Sansui R-70; Stereo Amp: Radio Shack SA-10. Mixer: Radio Shack;Mics: Shure SM58, RS 33-1071; Spectrum 10 band EQ. Tape Decks: Panasonic RS-621US, Pioneer CT-40 and Radio Shack CTR-70 Turntables: Technics SLQ200, Sansui B200, Fisher MT 6130, w/Grado pu's.

UCR verifies all correct reception reports currently with a QSL letter. Listeners requiring a reply in North America are asked to send 3 First- Class US stamps or 2 IRC's. Listeners outside of North America are asked to send 3 IRC's. Soviet block countries require no return postage. Address letters to to Union City Radio, PO Box 5074, Hilo, HI 96720

Union City Radio offers Free relay service for fellow pirates. The relays of these stations have been very successful. In the future we hope to relay Euro pirates via our transmitter. U.C.R.

Editor's Note: Excerpt from "Radio World"; The FCC shut down an FM pirate in St. Paul last November. They have also published a short list of other suspected pirate station locations as follows: Newark, DE; Hollywood, FL; Green Bay, WI; Pierce, AL; Lake City, SC; Cincinnati, OH; Waterbury, CT; Long Beach and San Francisco, CA; Ponca City, OK; Waynesboro, VA; Gorham, ME; and Minneapolis/St.Paul, MN. They say that pirate operators can be fined $10,000 and get one year in jail. The highest fine I have heard about was $1000, with the most common being $750. They also accept monthly payments on the fine. Transmitting equipment is not always confiscated.

(WMTK - FM99, 2 Watts Stereo)

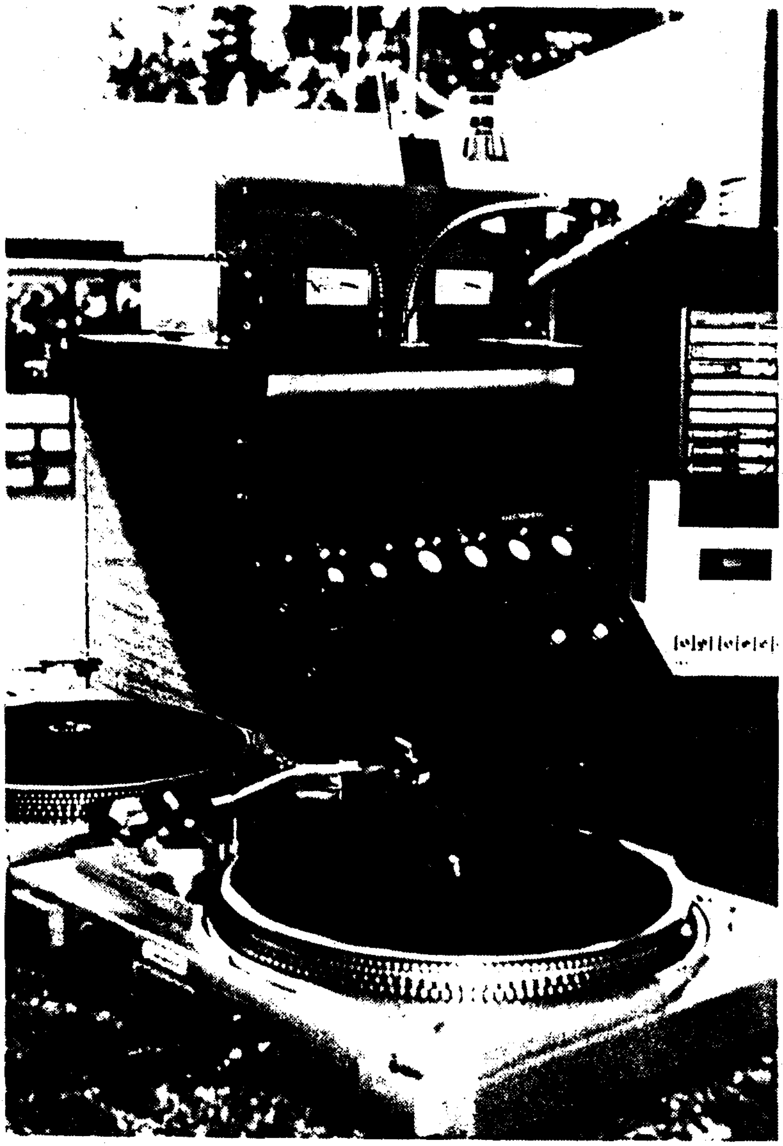
Dear EBN, Here are some pictures of my station. I have been on the air since the first of 1984. With the FMA2000 and a 50' tower I get an approximate 6 mile range. A half wave phased colinear antenna is used, mounted in a vertical position.

My equipment consists of:

FMA2000 transmitter. Macromod compressor. 5 channel sound workshop mixer. ADC 24 band equalizer. Sansui SR 333 Turntables. SMC 592 Stereo R/P cartmachine. Marantz SR 4000 amp & receiver. Yamaha 4115 studio monitors. AKG mic's and headphones. AKAI GXC-570d cassette deck.

Our format is pop and top 40. These pictures were shot at a live outside remote. The FMA 2000 was used to transmit programming to over 50 portable radios at an annual picnic.

Sincerely, Allen Roberts



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Dear EBN, My radio career began in 1979 when I was in the eighth grade. My literature teacher had a third class radio-telephone license. For a class project, she had the class do a mock radio broadcast. At the time my hobby was weather forecasting, so, I did a weather report. When the class project was finished, I still had an interest in radio. At home one evening I took two record players and a cassette recorder and made my own deejay show. Soon after that, I was on the air on channel 14 on the CB band. I wanted the campers in my parent's campground to hear me however so CB just didn't work.

I went to Radio Shack and bought an AM broadcaster kit. By itself it was pretty much useless for my purposes. Instead of a 9 volt battery I used a 9 volt power adapter. The way it was designed it coupled directly into the AC power wiring and everybody who was plugged into it could hear it on their radios.

With that problem taken care of I had another one that demanded thought. The campers didn't know when the broadcasts would be on. The best way to do it would be to be on 24 hours a day, but I had no automation equipment. Bingo! and idea! Was there any reason I couldn't connect an inexpensive weather broadcast receiver to my little transmitter? Certainly not. I did it an began 24 hour operation. I would cut in with a deejay show or two but for the most part the broadcasts were weather related. I learned a lot when I started working at a local AM and TV station.I modelled my station after them and even built a mixing board.

Eventually I bought some new equipment including a cassette deck, a combination mixer/amplifier, two BSR turntables (which I bought wholesale for $25.00 each),and a 5 band equalizer. Next I bought a Panaxis FM transmitter kit to increase my range. I messed up the stereo generator part when I was building it, but after it was fixed it broadcast stereo real well. The antenna I used and I continue to use is an omni- directional folded dipole receiving antenna on top of a 40 foot tower. Since my power output was only 2 milliwatts it handled it nicely. I have expanded even more with a new 20 milliwatt FM transmitter and a 5 watt AM transmitter, both from Panaxis kits.

In May of 1984 I moved my station set-up out of my bedroom to an upstairs apartment that my parents had available. This gave me a lot more room to expand and it gave me a place to store my ever expanding collection of records and tapes. I kept my transmitter over at the house and ran my audio from the apartment to the house via 16 gauge two-conductor shielded cable. It really works nice and eliminates any RF problems. The run is about 300 feet.

When I expanded operations I also acquired some new equipment. This included a 5 channel console that a broadcast engineer had made, 2 new CM Labs LAD-200 turntables with Stanton 500 cartridges and styli, and auto- reverse cassette deck to do some experimenting with automation programming, and and auto-reverse open-reel deck to automate my station for up to six hours.

In the fall of 1984 I attended a local junior college to get my degree in radio broadcasting. While I was going to school I started up a low-power AM station in the dorms. The dorm mother kept asking me if it was legal and I kept telling her it was. At first there was a lot of enthusiasm towards it, but after a month I turned it off because I was the one doing all the work. Good experience though!

KOAG automated station KEGG-AM, C-C station at school

This past summer KOAG was completely automated with weather, music, and Westwood One programming. A Compact Laser Disc was also added to the audio chain. I plan to run it again this summer when I return to full-time work at the home town radio and TV station. Currently I'm finishing up school and will graduate with an associate degree in radio broadcasting. Roy......

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Editor's note: KKTO, a Southern California low-power station was been shut down by the FCC in February. Two FCC inspectors asked to see the station and then issued a verbal warning to cease operation. Apparently they told the operator that no fine would be levied. They did not confiscate the equipment. Pictures and comments from KKTO have been published in past issues of the EBN. They had been on the air for several years, were doing well, and had a good audience including local commercial broadcasters.

It's been reported that: (1) KKTO received some hassle from another low-power broadcaster in the area. (2) KKTO's car had been vandalized on at least one occasion. (3) Someone apparently asked the post office for the KKTO mail...and got it without any questions! (4) KKTO's transmitter had been stolen from his home. (5) A new transmitter was built and put into service only weeks before the FCC showed up. (6) The other low-power broadcaster was also shut down, and the missing transmitter was found and is now in the hands of the FCC. (7) KKTO believes the other low-power broadcaster may have turned him in and it back-fired. (8) The recently built transmitter has already been sold. (9) The owner of KKTO is now considering applying for a licensed station or a cable operation.

MINI-LESSON (Possible areas of interference from FM band harmonics)
The electrical characteristics of RF amplifiers tend to produce additional frequencies which are multiples of the desired frequency. The desired frequency is called the fundamental, the multiples are called harmonics. The 2nd harmonic is twice the fundamental, the 3rd is three times, etc.

RF oscillators and amplifiers normally operate in a mode called "class C". There are also "single-ended" (one transistor or tube) and push-pull (two transistors or tubes) amplifier configurations. Class C circuits tend to produce odd-order harmonics (3,5,7, etc). Class B is sometimes used in amplifiers but tends to produce even-order harmonics (2,4,8, etc). A push-pull amplifier (each tube or transistor operates during a portion of a half-cycle of the RF signal) tends to cancel even-order harmonics. Harmonic levels decrease as the number goes up, 3rd is less than 2nd, etc.

Other circuit characteristics, mostly caused by resonant components or circuit pathes, may generate other frequencies not related to the fundamental. These are called spurious frequencies or "spurs". It's quite possible for a 100 MHz amplifier produce spurs at 102, 110, 325, 78, or anything else within reason, at the same time! Fortunately tuned circuits discriminate against all but the ones closest to the desired frequency. Still, sometimes, unwanted frequencies can get through.

The following shows what radio services might be affected by an FM band transmitter (88 - 108 MHz). Interference to some may not seem too important. Interference to the "Public Safety Radio Service" (Navigation, survival beacons, emergency channels) ould kill someone.

Fundamental (88 - 108 MHz): Aero navigation 108.0 to 117.975 MHz may be affected by "spurs" when operating near 108 MHz. TV channel 6 (82 - 88 MHz) may be affected by "spurs" when operating at the low end of the band.

Second Harmonic (176 - 216 MHz): TV Broadcast ch 7 - 13 each with a 6 MHz bandwidth. Example: 88.1 MHz 2nd harmonic=176.2 which is within the band width of tv channel 7 (174 - 180 MHz).

Third Harmonic (264 - 324 MHz): Space telemetry, survival craft beacons (267 - 273 MHz), radio astronomy (328.6)

Fourth Harmonic (352 - 432 MHz): Mobile (335.4-399.9),radio navigation satellite (399.9-400.05), standard frequency and time (400.1), Earth exploration satellite/meteorlogical aids (400.15 - 410), Amateur radio band (420 - 450).

Fifth Harmonic (440 - 540 MHz):Amateur band (420-450), aux broadcast RPU's(450-451,455-456), domestic mobile (454-455, 459-460), private mobile(451-454, 460-462.5375)

MINI-LESSON (Short transmitting antennas for indoor use)

Several short wave broadcasters have asked for ways to install an indoor transmitting antenna. On 41 Meters a 1/4 wave vertical antenna would be 67 feet tall, too tall for a bedroom or even a garage. If the length is reduced to 8 feet then a loading coil (to make the antenna resonant) would be needed. The remaining length (8 feet) of the antenna would be very inefficient.

There has been some success with the helical wound antenna however. This is where you begin with 1/2 wavelength of wire and wind it on a long PVC pipe (in this case 8 feet long) to form a very long "coil". For 41 Meters this is about 134 feet of wire. The turns are spaced apart at the ends but are closer together at the middle of the pipe. This tends to distribute the RF currents differently along the length of the resultant coil. The diameter of the pipe will affect the number of turns and also the overall inductance and capacitance of the antenna. For example:

1" pipe, 134 feet = 2035 turns
2" pipe, 134 feet = 512 turns
3" pipe, 134 feet = 228 turns
4" pipe, 134 feet = 127 turns

As the effective inductance and capacitance changes due to closeness of spacing, the square of the number of turns, the coefficient of coupling (length of coil), and diameter, so will affect the amount of wire required. In practice you start with 1/2 wavelength and check it out with an SWR meter. You then remove some of the wire, re-space the turns, and check it again. You continue doing this until you have reached a minimum SWR. The end result usually comes out with you removing about 10% of the wire.

The bottom of the antenna is insulated from "ground" and is fed by connecting the center conductor of your coax at the bottom. The "ground" in this case are a number of long wires spread out on the floor and going in all directions from the antenna like spokes on a wheel. The shield of the coax connects at the center of the "spokes". The antenna can be further matched to the transmitter by moving the coax center conductor up the antenna one turn at a time until the lowest SWR is found. If a large circular piece of screen wire (a disc) is centered on the top of the antenna (called a "top hat") it will act with the "ground" as a "capacitor". This capacitive "loading" at the top of the antenna increases the current flow through it. It is the current flow which produces the electromagnetic field which is to be radiated. The greater the current the greater is the output (efficiency) of the antenna.

WHAT'S NEW WITH THE FCC

The FCC is still trying to shut down pirate broadcasters. Several communications type magazines and newspapers carry the FCC's warning of possible big fines and jail. To go to jail, or even pay the maximum of a $10,000 fine, must take something pretty drastic. Even pirates that have been shut down 3 and 4 times have only been fined about $1000. *In commercial* radio the FCC is considering abolishing the "program duplication" rules for co-owned AM and FM stations. For years all AM/FM stations with populations of 25,000 or more could not simulcast more than 25% of their programming. With previously "free" satellite channels being scrambled, some TVRO owners are upset. Some may have transmitted signals from their dishes to the birds deliberately causing interference. The FCC may stiffen the penalty for this, but admit it's tough to track down the culprits. Anyone going "pirate" on 4 GHz? Wow, what a range!!!

FOR SALE, EXCHANGE, TRADE, BARTER, & BULLETIN BOARD

I want to make contact with Carrier-current and Cable FM stations. Please write to Bill DeFelice, 621 Bishop Ave., Bridgeport, CT 06610

For Sale: Parts for Pioneer CTF cassette deck> These parts are unused Head Block assembly E/RP part NO. RXA910, $30.00 Tape guides for same machine, have seven, part No. RNK870 $5.00 for the lot. Pinch roller assembly for the CTF1000, have two, $5.00 each. J. Nechanicky (below)

Wanted: Service/schemo on H.H. Scott Stereo Master 380 AM/FM receiver. Also "the fifties" and "the sixties" jingles for an oldie show or any "solid gold rock and roll" insert type promos, and "107" or "107.3" jingles. J. Nechanicky, University of Minnesota, Technical College, Waseca, Library, A/V Dept KUMW cable radio, Waseca, MN 56093

For Sale or Trade: FMS 2000, 4 months old, tip-top shape. $120.00 or will trade for AM 5000. Ron Badger, 1616 Slate Run Rd. New Albany, IN 47150.

Wanted: Air checks, yours for mine. Also want to make contact with anyone using CD players. Paul Kriegler, 423 N 47th St. Omaha, NE 68132 (402) 551- 2124 evenings.

Wanted: Members for Low Power Broadcasting Network, LPBN. Extensive library of tapes for free exchange among members. Contact John Dutton, 514 Vincel, Moberly, MO 65270.

Wanted: Catel stereo cable modulator. KREG, Steve O'Brien (415) 595-5297.

EBN Editor wants to beg, borrow, trade (anything short of stealing or buying) communications (radio, tv, electronics) software for IBM. "Ernie"