Experimental Broadcaster's Newsletter

Volume 5, Number 4
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Did you know that AM stereo was first transmitted by WPAY, New Haven, CT, way back in 1925? They used two transmitters, each operating on a different frequency. Two receivers were needed for reception of course, but it was a start.

In the 1950's a few stations experimented with simulcasting on AM and FM. Stations were not necessarily owned by the same company either. Two different station owners, one with AM the other with FM, would broadcast Left and Right channels at the same time. Again two receivers were required. Some receiver manufacturers went so far as to make AM/FM stereo receivers. These were kind of cute as you could tune both AM and FM on separate dials and hear both at the same time. When not listening to experimental stereo you could listen to "Rock" and "Bach" at the same time.

Early proposals for AM stereo included systems by Belar Laboratories, Harris Corp., Magnavox, Kahn and Motorola. Leonard Kahn had submitted his petition for adoption as far back as 1959. Receiver manufacturers Pioneer and Sansui recommnded the FCC adopt the Harris system because it would be the easiest to impliment.

Popular Electronics magazine (no longer published) announced in their August 1980 issue that the Magnavox system had been adopted as the U.S. Standard. The article went on to say that Motorola's C-Quam system had been rejected by the FCC. The Magnavox system had been approved by a 5 to 2 vote of FCC Commissioners and the Broadcast Bureau Report and Order was published in the Federal Register. Sounds pretty final, hmmm? The author of the article also stated that rival stereo developers were challenging the decision and asking the FCC to reconsider.

Here we are almost 30 years after the various systems were presented to the FCC and still no official "standard". Its been over 7 years since the FCC "approved" the Magnavox system and rescinded that ruling. Is this the "American Way". Will AM stereo every become a reality or will it remain a novelty?

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What's New At The FCC

It appears Docket 87-389 (proposed amendments to Part 15 Rules) will separate restricted radiation devices into categories. (1) Devices which are designed to radiate such as hand-held wireless mics, cordless telephones, garage door openers, etc. (2) devices which aren't supposed to radiate (but do) such as receivers, computers, VCR's, etc. (3) devices which remain under present rules but would include " it such equipment causes interference, it is the operator's responsibility to eliminate it." Radiation limits would range from 30 uV per Meter at 1.7 MHz to 500 uV per Meter at 960 MHz.

This doesn't appear to increase levels of radiation for devices operating on the AM or FM broadcast bands. It's still a little early to tell however as the proposal can be changed considerably before it becomes an actual amendment.

We'll keep in touch. .....

Becoming an amateur radio operator has always required three things from applicants (1) a knowledge of the FCC rules (2) a knowledge of radio theory, and (3) the ability to send and receive code.

Over the years many otherwise qualified individuals would have become "HAM"s if it weren't for the code requirement. The old timers say that if you are REALLY interested you'll learn the code. Others say that in this day and age voice communication is foremost, code is only necessary for special applications.

Proposals have been tendered to the FCC in the past - to no avail. This may change however as pressure is felt from our northern neighbor. The DOC (Department of Communications) of Canada may have a no-code entry-level amateur license sometime in 1989. This beginner's license would allow full operating privileges from 30 MHz and up.

Most of us know that the FCC's budget is a little tight these days. Field offices may be under-staffed. Perhaps for this reason field agents tend to ignore "peanut whistle" broadcaster's unless they receive a specific complaint. "Bust" priority might be

(1) Deliberate interference with licensed stations

(2) Unintentional interference to Public Safety Radio Services (Police, Fire, Ambulance), aircraft, marine, or military radio)

(3) Local interference to consumer equipment such as TV receivers, VCR's, AM & FM radio, PA systems, etc.

Where it comes to *Deliberate* interference, especially where that interference could result in someone being hurt, the FCC doesn't kid around. A recent bust is evidence of this. It seems tug-boat and barge workers in New York harbor have been on strike. Someone deliberately jammed VHF marine channel 13 - a channel used by tugboat operators while pushing large freighter around the harbor. While the frequency has suffered some abuse during the strike the one individual that was caught was not a member of the union!

The man had also used obscenities during the jamming sessions which he transmitted from his Chevy van. Using mobile direction finders the FCC tracked him to his home on Staten Island. The fine was $2000 but it could have been as high as $100,000 plus 1 year in jail.

Please don't forget to check the expiration date shown on your address label. Also please notify us of a change of address so we can avoid delays in getting your EBN to you on time. If your subscription has expired you can still renew now without missing an issue. Renewals are $18.00 per year. NEW subscription rates are $20.00 per year.

What's Happening In Radio Land

Earlier this year FM station WLIE in Mt Pisgah, Michigan received an astonishing letter. It was a QSL report from La Plata, Mexico saying how much the listener had enjoyed the programming. The station manager, "Loo" Flirpa, took it to be some kind of joke. After all the distance from Mt Pisgah to La Plata is about 3500 miles!

The letter included a phone number which prompted Flirpa to call this person's bluff. He called and spoke with the man's daughter who spoke a little English. She assured him that they listened to the station frequently. In fact they had the radio on at that time. She brought the phone next to the radio and Flirpa heard his station loud an clear!

Convinced there was trickery involved Flirpa grabbed a flight to Mexico to see for himself. The trip was more than rewarding as Flirpa received the hospitality of the Hernandez family. Senor Hernandez played his guitar, Senorita Hernandez sang, and Senora Hernandez prepared a meal unsurpassed. Later they listened to WLIE on the Hernandez's Grundig FM table radio. Further inquiry revealed they had listened to WLIE for months - they thought it was some kind of United States SUPER STATION. It was their turn to be amazed when Flirpa told them that WLIE only broadcast with 3000 watts!

Back at WLIE a group of consulting engineers were called to explain the phenomenon. Examination of the station disclosed the top bay of their 4-bay antenna system had twisted in a wind storm. It was pointing upward at about a 10 degree angle. One of the engineers recalled some amateur radio experiments with "Transequatorial" (TE-mode) propagation. Radio amateurs had found they could communicate great distances on 2 Meters (144 MHz) across the equator. TE depends on "ionospheric tilt" which occurs above the geomagnetic equator. An effective "lens/mirror" is created which intensifies and reflects radio signals in the 25 MHz to 150. MHz range. This effect, plus some of the station's power being beamed slightly upward, resulted in the 3500 mile "hop".

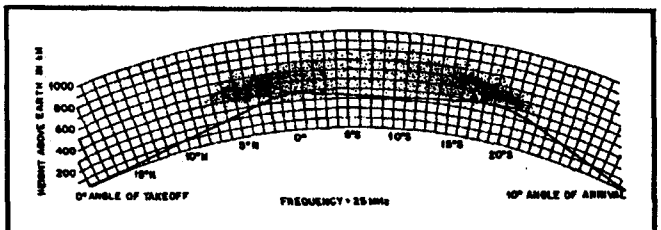
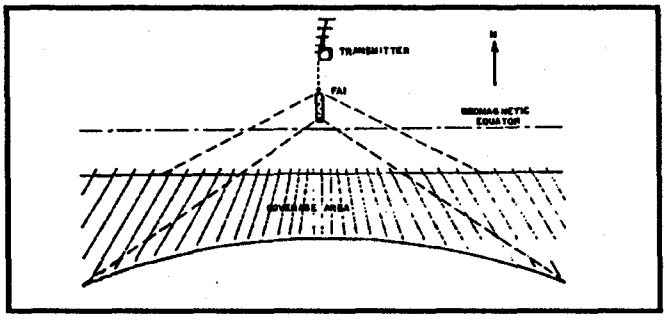


Fig. 2 — Cross section of a transequatorial ray path, showing the effect of ionospheric tilt on a 25-MHz signal. This drawing shows a typical example of TE propagation. (From Davies, "Ionospheric Radio Propagation," U.S. Government Printing Office, Washington, DC, 1965.)

The received signal was so loud and clear that Flirpa wondered if a return transmission were possible with lower power. The Hernandez family was outfitted with a Panaxis FME500 exciter set for 1/2 watt at 94.3 MHz. An FM Yagi antenna was installed on a Palm tree and pointed north and upward at about 10 degrees. Flirpa hurried back to WLIE and set up his receiver, also with an FM Yagi pointing south and upward about 10 degrees. Success, the Hernandez family was heard faint but clearly.



The ionospheric tilt acts as a virtual repeater- transmitter to both ends of the transmission path.

The next day made radio history. Flirpa himself took over WLIE's microphone. In a bold clear voice he announced his TRANSEQUATORIAL REMOTE BROADCAST. He then introduced the Hernandez family who promptly responded with magnificent music. The special program lasted over an hour, phones calls kept the switchboard lit up. MORE, MORE their listeners shouted.

Unfortunately the signal began to fade due to atmospheric changes. The antarctic ozone hole had moved north over the equator. Engineers and geo-physicists predict another Transequatorial Remote broadcast won't be possible until the first of the fourth month in the year of1999.

Be sure to listen!

Letters

Dear EBN,

I was sorry to hear that "E.T." was busted, he was the most professional sounding station I've heard. He really seemed to have a regular audience and to be serving a purpose. But with his very high power and large coverage area, I guess it had to happen sometime.

I have a few thoughts on this. First, the day he was busted, I was on the air and so were the other guys at 104.7. Neither of us had any trouble. This points out that the enforcement is based on specific complaints as you've stated. According to "ET", a specific complaint was received by the FCC about his operation. This may have come from one of two commercial stations here which broadcast to many different ethnic groups including the one which he was serving. "Pirates" take note - - - keep your power and range down as much as possible, don't use regular hours, and avoid doing anything to bring a complaint. This would not only include sloppy programming or material in extremely bad taste, but even more too professional programming which might tend to make commercial broadcasters feel threatened by the operation should they hear of it.

Finally, if the operation of a "Pirate" station is in a large metropolitan area with only one or two spots available for such operation, it would only be a matter of courtesy to limit range to allow others to have a chance on the air. Using several hundred watts would render an open channel useless to a low power broadcaster for as much as a 50 mile radius or more with a good transmitter site and antenna system. This together with the fact that such operations will bring the FCC to the area in very short order, will spoil the fun and enjoyment for many other low power operations in the area.

For now, all experimental operations in this area are on "hold" for awhile, and I've cut my range to about 100 feet and don't get on at all like I used to. Hopefully this won't happen again anytime soon, but maybe some operators with overly big ambitions will learn something from this so something like this will not be repeated. That's it for now.

73's, Roger

Dear EBN

I have a few questions whose answers may be of interest to other EBN subscribers

Question: (1) In reference to your MMC compressor/limiter unit. Would it be possible to employ this device as a noise reduction system for open reel and cassette tape recorders? For example: If used with a 3-head tape deck (separate record/playback heads and electronics) so you could monitor the results of the entire record/playback cycle, could you wire one complete stereo unit for compression to be used during the recording process while a second complete stereo unit, wired for expansion, is used for playback?

Question: (2) For tape decks equipped with only a single record/playback head, would it be feasible to wire a single stereo MMC with a switching arrangement so as to allow one unit to be used for both record and playback?

Question: (3) Can these units be adjusted so as to be compatible with the dbx (2:1 compansion) type noise reduction system.

Comments: Of course one stereo MMC could be wired as two MONO circuits, one for compression (record) and one for expansion (playback) for mono tape machines. Considering the high cost of "add-on" noise reduction units this might be a low- cost alternative. I'm sure there are still many fine older open reel decks out there that could benefit from an "outboard" unit! Please answer directly or in the EBN so others can share this information. Thanks, Howard

Answer: (1) Yes. Remember however that the MMC requires at least a -20 dBm input and supplies up to +20 dBm output. Any connection to the tape equipment would have to be level and impedance matched to the machine. It would be mandatory that the tape machine have its own record and playback amplifiers.

Answer: (2) Yes. Answer (1) applies here also. Switching would have to be "clickless" and probably shielded. Quick changes between record and playback operation would be slowed by having to stop and switch the switch.

Answer: (3) No. The dbx system uses pre-emphasis and de-emphasis during record and playback. Both dbx and the MMC chips use a 2:1 compression/expansion slope, the big difference is in the selected frequency processing. This can't be added to the MMC as the frequency control is part of the dbx chip. The dbx chips are not available to hobbiests, only to original equipment manufacturers - possibly requireing some sort of licensing agreement as well.

Black Rose Returns to Radio

Bishop Walter Dunn aka The Black Rose

Two years ago this month Soul-oriented Seaside FM station KSOS was shut down by the FCC in Seaside, California. Head of the operation was The Black Rose also known as Bishop Walter Dunn.

Walter Dunn and associates had also operated a station in Fresno, California shortly before the Seaside venture. The Fresno operation received FCC citations and letters via mail. Dunn claims a "free-person status". As such he says he is bound only by the constitution not by "contractual joint maritime ventures". The latter would put him under control by the "government". By not signing an application for a driver's license, social security card, or any other governmental document, Dunn feels he has not consented to governmental control. This holds true as well for FCC applications and replies to letters, etc.

The FCC apparently received word from Washington to do something about the station. FCC citations and letters were ignored - including any fines mentioned in those documents not being paid. The station was silenced for awhile however and that seemed to satisfy the FCC for the moment. When the station started up again in Fresno, on 108.1 MHz (near aircraft bands) the FCC agents obtained a warrant.

With warrant in hand and a Federal Marshal to enforce it the FCC searched for and seized the stations transmission equipment. Seized equipment may be used as evidence in Federal Court during prosecution. The station was again off the air - perhaps all the FCC was after - the case apparently never went to court.

The U.S. Attorney's Office in Sacramento sought a meeting with Walter Dunn. The object of the meeting would be to settle the matter out of court. Dunn did not show up for the meeting. According to Dunn he hasn't been contacted by the agents of the government in months.

The Black Rose had returned to the air with "Zoom Black Magic" radio - KSFR.

According to Dunn he is filling a need of the black community. Many low-power broadcasters have felt that commercial radio is not flexible. That radio is stuck in a rut of "same music", "same inane commercials", and very little initiative to try something new or daring. Dunn, as The Black Rose, is trying to do something about that by giving the black community what they want. He's doing it, he feels, in the only way open to him. A licensed broadcast station might take years in the making, mountains of documents, hearings and appeals, and a barrel of money.

Questions to consider:

Why have federal authorities not pursued court action against The Black Rose? Are they afraid he could win on the grounds of his consitutional rights?

Would Dunn's thrust change if a low-power (and low-cost) license were available for "local" non-commercial or commercial radio?

How many "broadcast pirates" would convert to a "legal" station if the opportunity was presented?

Are licensed broadcast facilities *really* within reach of the general public?

International Marconi Day

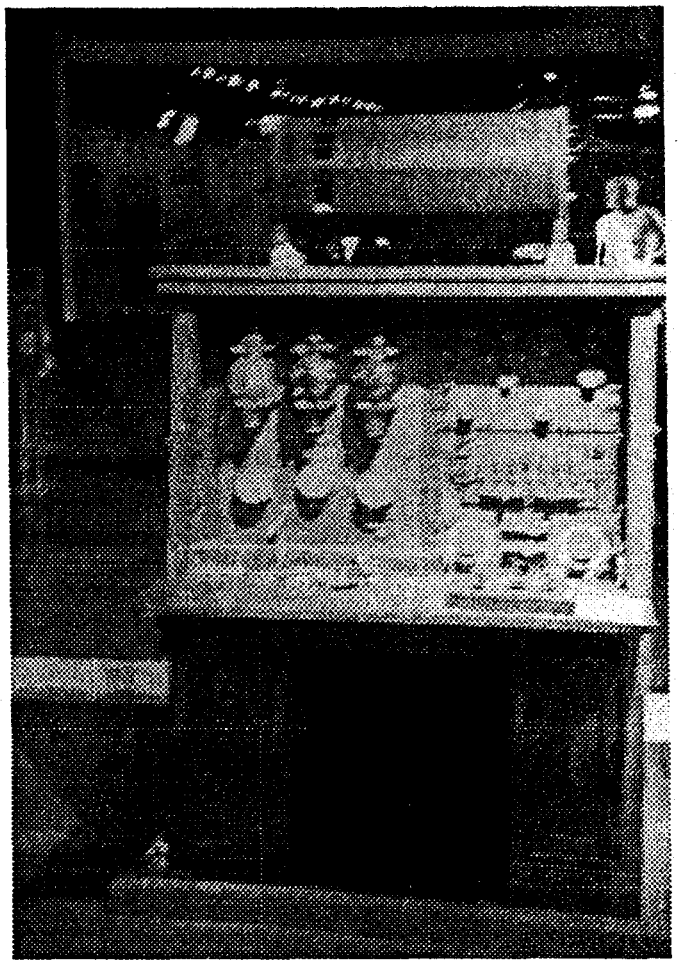
Many people have contributed both directly and indirectly to the development of radio communications. Many of the names are well known, others known mostly by radio enthusiasts, and still others known mostly to physicists, teachers, and historians.

One of the well known men is being honored this month by Italy, Canada, Newfoundland, Ireland, England, and the United States - Guglielmo Marconi.

Saturday April 23rd was selected as International Marconi Day as it is the day closest to his birthday.

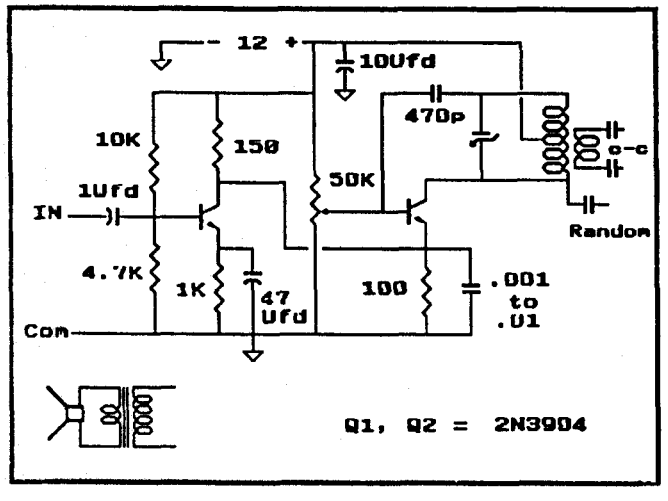
The Society of Newfoundland Radio Amateurs will operate station VO1IMD St Johns' Signal Hill. It will be from the exact spot where Marconi heard transatlantic signals December 12, 1901. The Amateur Radio Club of Nova Scotia will be operating from the Marconi Museum at Glace Bay. This was the site of the first east-west transatlantic transmission. Another station will be operating from Bologna, Italy, birthplace of Guglielmo Marconi.

These amateur stations will be operating on 3.770-3.780, 7.070-7.080, 14.270- 14.280, 21.250-21.260 and 28.530-28.540 (all SSB). Awards will be given to amateur radio operators that work any 5 of the 6 stations. Award claims should be sent to Cornish Amateur Radio Club, PO Box 100, Truro, Cornwall, United Kingdom TR1-1XP.



Marconi's Original Transmitter

Experimenter's "Part 15" 100 mW AM Transmitter



Here is a simple "Part 15" (legal) AM transmitter. When constructed with the parts shown if should produce a carrier of just under 100 mW.

The circuit is about as simple as you can get. The second transistor is connected as a collector-coupled Colpitts oscillator. Positive feedback to sustain oscillations is coupled from the tank circuit (coil and variable capacitor) through a 470 pF capacitor to the transistor's base. Operating bias is adjusted for best output and fidelity by means of the 50K potentiometer.

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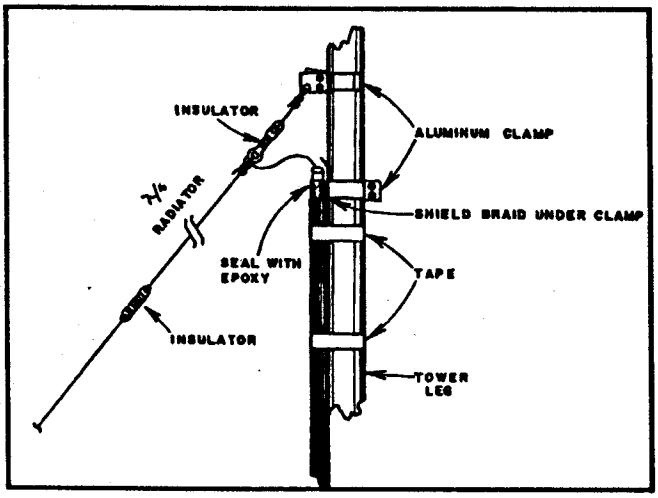
"Hidden " Half-Sloper is Pirate's Favorite



The half-sloper antenna's name comes from two of its features. (1) It's essentially one-half of a dipole antenna. And (2) The wire antenna is not vertical nor horizontal but "slopes" at an angle. Two such antennas connected opposite each other at the top of a tower form an antenna which looks like, and is called, an "Inverted V".

Design Considerations::

The tower can be an aluminum or steel TV mast.

It can be whatever height is allowed for TV antennas in your neighborhood.

The length of the radiator is 1/4 of a wavelength.

The radiator is made from ordinary TV mast guy wire.

Both horizontal and vertical polarization components are present in the radiated field.

It is directional in the direction AWAY from the mast because the mast casts a shadow to the rear.

If a wooden support is used the antenna is less directional but still radiates mostly in the direction of the slope

Effective power gain can be realized by making the radiator and odd number (1x, 3x, 5x) of 1/4 wavelengths long.

A quarter- wavelength is calculated by: L(feet) = 234/f(MHz).

Coax feed is 50 Ohms.

If weather is a problem (ice, snow, rain, etc.) then the end of the coax should be sealed with silicone caulking.

Easily "hidden" because it looks like, and can be used as, a regular TV antenna installation.

Experimenter's "Part 15" Transmitter

The coil should be in the order of 100 to 300 microhenries. About 80 turns of wire, tapped at 40 turns, and wound on a 1/2" form should work OK. for the broadcast band. The tuning capacitor is a compression trimmer type of 100 to 300 pF.

The collector tap is suitable for a random length antenna wire of up to 10 feet long (FCC limit). Coupling to a power line for carrier-current operation requires the separate low-impedance winding, series capacitors, and fuses. The Carrier-current output winding should consist of 10 turns wound directly over the main coil with taps every two turns. All output coupling capacitors are .1 Ufd. Capacitors for coupling to the power lines should have a 600 volt rating. One-Ampere fuses should be placed in series between the 600 volt coupling capacitors and the power line.

The first transistor is an audio amplifier/modulator. The supply voltage is divided roughly in half between the 150 Ohm collector resistor and the oscillator's 100 Ohm emitter resistor. This puts about 6 volts at the oscillator's emitter and 6 volts across the transistor itself. Audio variations across the 150 Ohm resistor cause the oscillator's emitter voltage to swing between almost 12 volts and almost 0 volts. This process produces amplitude modulation. The oscillator's emitter capacitor should be selected for best fidelity.

Audio sensitivity is quite good so you may need a volume control if your source is a tape recorder, mixer, or whatever. "Good" microphones probably won't have quite enough output to connect them directly. Modulation would most likely be less than 100%. A simple dynamic microphone with adequate output (not great fidelity however) can be made from a small speaker and transformer. The transformer should have an impedance of 8 Ohms (speaker side) to 2000 Ohms (output side).

If you're a radio amateur you might want to try this circuit on one of the lower ham bands. Decreasing the value of tuning capacitor or the number of turns on the coil increases the frequency. If you intend to try it on the ham bands remember ... this is a modulated oscillator AND there is no crystal to keep it on frequency.

Unclassified, Barter, Trade, Bulletins

WANTED: DEAD OR ALIVE!! Any PANAXIS sub-assemblies fro transmitters, such as the SG, FME, FMA-5K, MMC, etc. Working or not as long as the PC board is ok. Need for parts, spares, etc. Call "Guy P." (818) 797-5581

FOR SALE: AM100 transmitter with PS700 power supply and AM5000 amplifier. All in same enclosure. $50.00 (needs some work). Write to Harvest Productions, PO Box 463, Kadoka, SD 57543

FOR SALE: Versa Count 10 W FM exciter/transmitter with stereo generator. $1500.00 contact C. Haynes, WJMI, PO Box 31235, Jackson, MS 39206 phone (601) 948-1515

FOR SALE: Katel FMX 2100 FM modulator. Best Offer. R Sweatte, KZZU, South 5505 Regal St. Spokane, WA 99223 Phone (509) 448-5555

FOR SALE: Wilkinson SG1E exciter. E Kazmark, KAZZ PO Box 1369 Deer Park WA 99006 Phone (509) 276-8816

FOR SALE: SWR 6681 field strength meter $20.00. J Klauck, Phone (203) 726-9083

POSITION WANTED: I have designed, built & maintained many radio stations, including Radio New York International, what can I do for you? A Weiner, Engr, 178 Lawrence Park Terr, Bronxville, NY 10708. Phone (914) 337-4554

POSITION WANTED: CE Radio NOW! Former CE, Boston, Houston, Miami, Ft Lauderdale, FCC Genrl, ASEE, non-drinker, ham, M Gottesman, 3377 Solano Ave #312, Napa CA 94558. Phone (415) 221-2000

FOR SALE: Computer, AT clone, 6/10 MHz zero wait state, 40 MB hard drive, 1.2 MB floppy, 3 1/2" floppy, extra memory, etc. Call and we'll talk about it. Ernie, (916) 534-0417

FOR SALE: 3 items.....(a) Cart machine, Tapecaster (mono), 700-RP, Excellent condition. W/extra motor $325.00 or best offer. (b) SWR-Field Strength meter (Selfix) Model 6681. $20.00 or best offer. (c) Stereo Mixing Console, Atus- AM500 (brand new - never used). * stereo inputs, 2 mic inputs, EQ and much more. Only $225.00 (retail $370.00) Perfect for experimental broadcasting. Contact: Jim Klauck (203) 726-9083

FOR SALE: 1 watt F.M. transmitter, incredible sensitivity, adjustable from 70 - 230 MHz. Includes instruction manual, $50.00. Write Paul D., PO Box 14204, Phoenix, AZ 85063

FOR SALE: ICOM 45A, 450 MHz amateur band mobile transceiver. Used once - original box and manuals. Make reasonable offer. Also have TrippLite 450 watt power inverter (12 VDC to 117VAC), Best offer. Ernie (916) 534-0417

FOR SALE: Panasonic Technics SP-10 MK II in factory base w/Autdio Technica tone arm; SL-100A & SL-1200 MK II TTs; Stanton 310 TT preamps, new (2). Best Offer. B Royster, KQM, 1019 Cordova St, San Diego CA 92107. Phone (619) 223-3413