E B N e w s l e t t e r . . . . . .

November - December, 1987 Vol. 4, No. 11/12

End-of-Year Issue

"Free Radio" is active in many parts of the world. Reasons and rational for their existence ranges from Anarchism to Zealot - including: (1) fighting the establishment (2)to bring "new" or "different" programming to the air (3)impossible to get a license for the area (4)Country has no rules governing radio stations (5)bring communications to a community too small or too remote for a "large" station....etc.

Europe of course has been alive with **FREE RADIO-PIRATE-UNDERGROUND,** or whatever they choose to be called, stations. We're beginning to receive information from some of these stations and/or their listeners in England, Sweden, Norway, France and Africa.

The greatest input in the smallest space comes from newspaper clippings. We have some to share with you in this issue. We'll also share some of the contents of a "Pirate Handbook" recently submitted. We've also received air-check audio cassettes but we can't fit them into a newsletter - we MAY however find someone to dub and distribute them. One video tape of a BBC TV broadcast special about "Pirates" promised to be great. The following is the text of its promotional copy:

> The Black & White Pirate Show
>
> Pirate radio has been a feature of British broadcasting since 1963. This programme explores the history of pirate radio from the Sixties to the Eighties through acrhive and contemporary coverage,interviews and music. Ex-Radio Caroline DJs Tony Blackburn and Johnny Walker and former owner Rowan O'Rahilly talks about the response the stations generatred among young people and their impact on the BBC; and founders of the Dread Broadcasting Company Iepke and Rankin' Miss P explain why black music stations were established in the Seventies and Eighties. The programme includes film of a government raid on a station, and Tony Blackburn and music writer Paul Gilroy debate the issues raised by pirate radio in the Eighties.

Imagine...In the U.S. - an FCC bust of a pirate station, with TV crew at the scene.....

.....**FILM AT 11 !**

Unfortunately the English and American VHS recordings are not compatible. We were only able to pick out a few words and couldn't get a picture at all. If anyone has a suggestion of how to play or dub these tapes perhaps some others would like to a copy. We should compensate P.G. in England however for his time, materials and postage if he agrees to providing the recording for dubbing. We appreciate your efforts P.G. - Thanks.

Panaxis Production's PC's Perilous Plight Prompts Procrastination - Ernie's Euphoria Ended

The EBN and I would like to thank all of you that sent your regards for our poor computer. As one reader put it " I hope it didn't Byte the dust". No, a new mother board and controller and she works better than ever - in fact, she's a bit faster. I guess we have to call it a "she", I spend more time with it than my wife.

Not all is back together however. The scanner card developed some problems also. The result is that pictures for this issue had to be "pasted-up" instead of electronically inserted. The quality suffers somewhat.

We aplogize for the lateness of the EBN's-November issue and sincerely hope you'll enjoy this End-of-Year Double Issue.

Published by PANAXIS PRODUCTIONS, PO Box 130, Paradise, CA 95967-0130

"**Radio is my Bomb - A DIY Manual for Pirates**" was generously submitted to the EBN by one of our good friends in England. Designed and published especially for the "Free Radio" and "Pirate" broadcaster it contains many articles, circuit diagrams, and parts-equipment/informational sources.

It's published by the Hooligan Press, c/o BM Hurricane, London WC1N3XX, or Radio Support Group, c/o Box 010, 37 Stokes Croft, Bristol BS1 3PY, or Free The Airwaves BCM Box 1502, London WC1N3XX. The price is about 2.4 pounds. A letter of inquiry to them should bring a response as to the U.S. dollar amount required including postage.

The inside cover has the following:

Printed on Earth. Copyright 1987 (Except to anti-commercial pirates).

As several "Pirates" read the EBN we didn't think the publishers would mind if we passed-along some of their material.

The title "Radio Is My Bomb" is a quote from something Chantal Paternostre, a Belgian anarchist, said when interrogated on charges of arson and bombings. She was arrested on August 15th, 1985 while working for Radio Libre, a Brussels pirate. She was released after more than a year in prison apparently innocent of arson and bombings - her rebellion she claimed was via the airwaves.

Most of us are only exposed to our own (U.S.) newspaper, magazine, and radio/television form of news, information and philosophies. It is no wonder that most of us then are caught in a condition of "ethrocentrism" - a limiting of one's perception to one's own ethnic group. What we perceive in our everyday living is quite normal for us and often taken for granted. It's often interesting to experience how the rest of the world perceives us (the United States).

Many of the articles are "political" in the sense that the writers feel that "Free Radio" is a "right" and not a privilege. Pirating in Europe seems to be much more "hard-core" and tenacious than in the U.S. or Canada. While mention is made of the "sameness" of radio station programming, and the need for diversity, more emphasis seems to be placed on "freedom of the airwaves".

The following pages contain some excerpts from this booklet - presented for your information and interest. We can understand the various writer's views but don't necessarily agree with some of the action taken. To retain the "flavor" of these excerpts we have refrained from altering spelling, punctuation, grammar or content as much as possible.

From "Radio is my Bomb"

THE ITALIAN EXPLOSION

It all happened in Italy after 1975, when hundred of FM political pirates (left wing) took to the air. "The idealism of that first hour, when we thought we had found THE medium of communication..by and for the masses". Round the clock discussions were the order of the day, and literally everyone seemed to be on the airwaves! There were 'autonomists', housewives, anarchists, squatters, workers, women's groups, intellectuals, Marxists, etc., all clamouring to get their views across. Everyone spoke and sang and put out an incredible range of programmes. It was revolution on the air waves. "We did it for contra-information, against the media and the monopoly of the RAI.. What went wrong in the end? Or was it just the 'live fast die young syndrome' at work?".

In 1975 there were suddenly hundred of such station in Italy. But by 1980 there were only 10's, and by 1985 probably not one.

The first repression of 76 to 77 was quite severe, but the pirates just kept coming back on air and had plenty of support. Then in 1977 a new tactic by the state..the law was suddenly changed on our favour, or so it seemed, as the RAI (State media body) was declared to be 'without authority'.

But this soon proved to be a curse in disguise, as swarms of commercial pirates began taking to the air. A long losing battle took place, as their money and high powered transmitters literally blotted us off the airwaves, one by one. A prime example of "free" capitalism destroyed the creativity and collectivity of the people. By the end of 1977, as their numbers increased above 2000, commercial and party bosses began putting stations of up to 40 w on the air.

The big commercials brought back uniformity of programming and less and less spoken word. To raise their advertising profits they formed into chains, buying each other out and standardising their reactionary 'formula' programming.

As all this was happening the political pirates were themselves being divided, reflecting and reproducing the arguments then tearing apart the Movimiento (Movement) itself, before stupid and elitist acts of Marxist terrorist resistance gave the State excuse for ever heavier police repression, practically finishing us off altogether.

Some alternative radios turned commercial, just to survive. Others just closed down. Other found that the idea of total community participation wasn't as easy or as successful as they had hoped.

Radio Polare (Milano), is one of the few to survive since 1976, and to weather both the commercial assault and the collapse of the Autonomist Movement. Its now and alternative information station, financed by membership, workers, benefits and...commercials.

The demand now is that part of the FM band (104 to 108 mhz) should be made free for non commercial pirates, with no regulations (other than that) from the State.

Editor's comments:

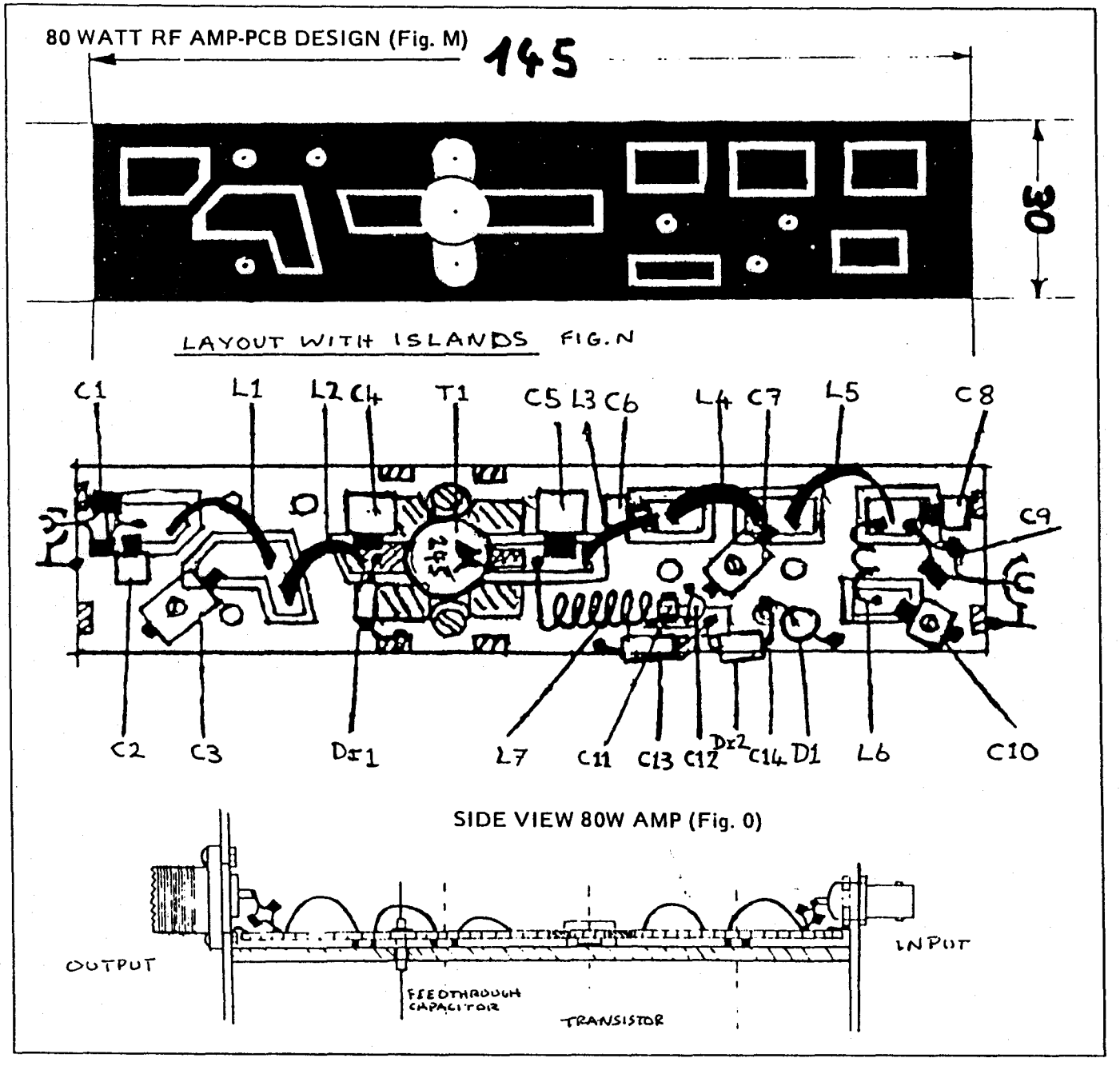
The latter proposal mentioned by this author has also been suggested in the U.S. by Bruce Quinn. The ex-"Jolly Roger Radio" (shut down in 1980) is waging battle at this very moment to establish licensing of low-power non-commercial stations. His proposal would permit thousands of small community stations to develop. Stations with the potential to reach people at a "grass-roots" level with minority programming, training, ethnic music and news, etc.

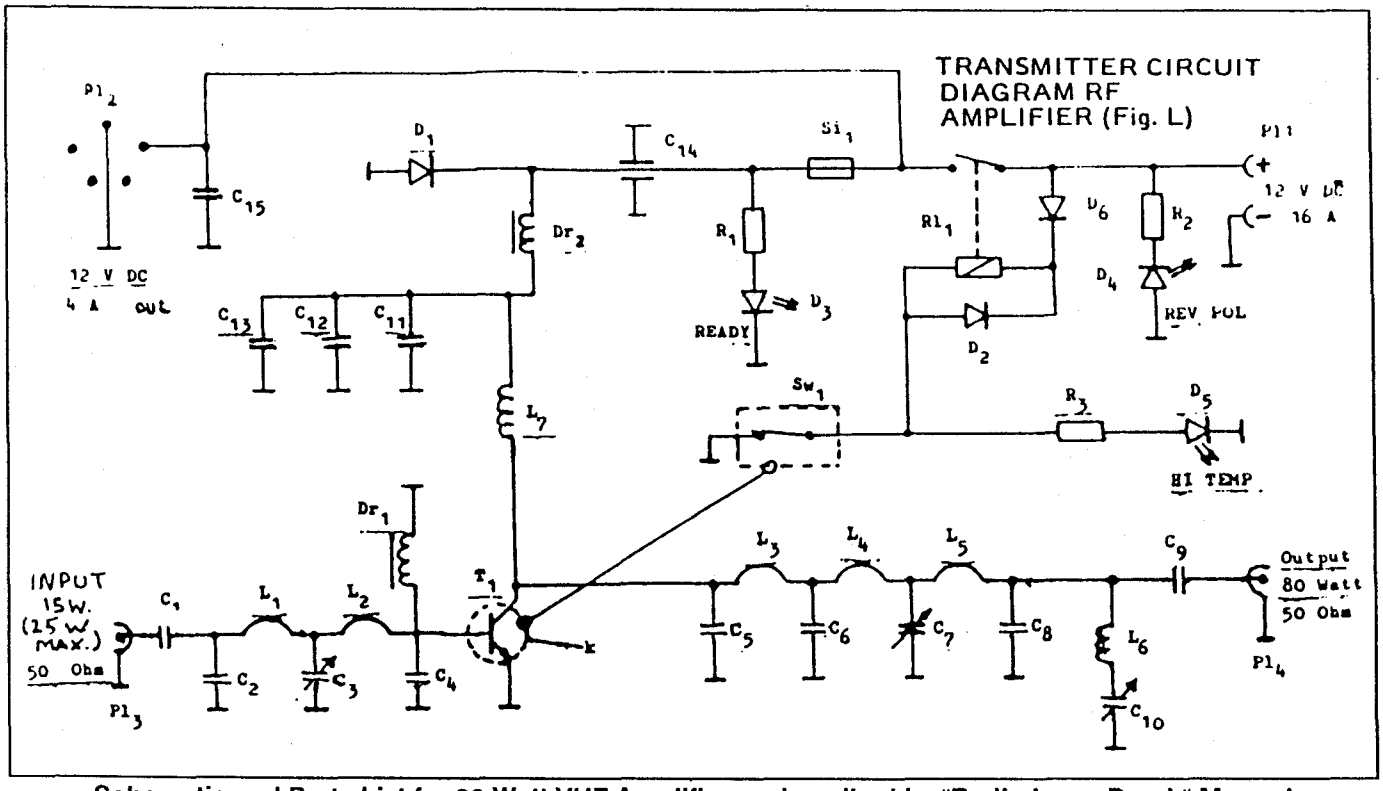
80 WATT VHF AMPLIFIER

Although the following is taken from "Radio is my Bomb" it bears a resemblance to something from the "Motorola RF Devices Handbook"

It requires about 15 watts input for the full output of 80 watts. It draws a healthy 14 Amps from a 12.5 volt DC supply. The relative high capacity of its compression tuning caps permits small high "Q" coils to be simply short pieces of brass strip.

The circuit also includes protection from reverse polarity and overheating. If the heat sink exceeds 90 degrees Centigrade the unit shuts down. All dimensions are in Millimeters.





Schematic and Parts List for 80 Watt VHF Amplifier as described by "Radio is my Bomb" Manual

T1	MRF245 or MRF247
D1	1N5402
D2,D6	1N4002
D3	Red LED
D4	Green LED
D5	Yellow LED
SC1	16A fuse and holder
PL1	DIN socket 5 pin 240 degree or whatever
PL2	two 4mm sockets, one red, one black
PL3	BNC socket of UHF SO239 with gnd lug
PL4	SO239 UHF socket with ground lug
SW1	90 degree C thermal switch (not a fuse)
R1,2,3	1K resistor
RL1	Relay 12v, 150 ohm, 16A contacts
C1,9	500 pF dipped mica cap
C2	10 or 15 pF hiQ ceramic
C3,7	Compression trimmer 10-80 pF
C4,5	500 pF hiQ ceramic
C6	100 pF hiQ ceramic
C8	22 pF hiQ ceramic
C10	5-15 pF air trimmer
C11	3.3 nF ceramic, preferably chip ceramic
C12	100 nF ceramic
C13	10 uF 35v Tantalum
C14	4.7nF feedthough capacitor
C15	3.3nF ceramic
L1	3x35x0.1 mm brass strip
L2	3x25x0.1 mm brass strip
L3	3x15x0.1 mm brass strip
L4	3x25x0.1 mm brass strip
L5	3x35x0.1 mm brass strip
L6	3 1/2 turns #18 silver coated wire on 6mm form
L7	6 turns # 14 silver coated wire on 7 mm form
DR1,2	windeband ferrite choke (F5111 beads)

Printed Circuit board
Heatsink, thermal resistance less than 0.5 degrees C/W

The following is a view of the United States broadcasting industry as seen from a country where the "state" owns the radio stations. Some of the comments are not unlike those we've heard from some EBN readers in the past however. What do YOU think?

Taken from "Radio is my Bomb"

"THE USA"

In the US everything is free if you have the money. Radio and the media at large seem to be in private commercial hands, though much of it is controlled by huge corporations enmeshed in the State and the 'military industrial complex'.

So, its free to go on the airwaves, but: 1) It takes years to go through the license procedures of the controlling body, the FCC. 2) It costs many 1000's of dollars. 3) To get such a licence you need to be a 'respectable hierarchically organised group'. With Boards of Directors, etc. 4) What they give, they can take away, if you did by some miracle get a non-commercial licence they would stop it at the first wrong move.

"Public" radio in the US began to be licensed in the '50s (in the US context 'public' means non-profit and NOT run by the state directly). By now one in eight stations are 'public'. One in five of these 'public' stations are in the Community Federation and thus claim to 'have no institutional affiliation', in fact they see themselves as some kind of social workers. The community radio movement (now 60 stations) was begun by the anarchists and pacifists of the KPFA station Berkeley, SF, in 1949, and anarchist principles were incorporated into the charter. KPFA still exists today, and is the mainstay of the Pacifica Foundation (5 stations, one in New York) which has come under increasing attack (despite all being "free") in the Reagan years. A right wing group called "accuracy in the Media' accused Pacifica of broadcasting 'filth, racism and communism'. Back in '81 a National Enquirer expose screamed 'Your Tax Dollars Support Red Broadcasters' but the licences have not yet been revoked.

While commercialism, rather than the State directly is the controlling force in the US, with most stations flooded by inane advertising and playing the same few top records, there is nevertheless such a big range of stations that you can find alternatives. For instance in New York you can tune in to over 60 channels on the FM band, including lots of ethnic language or 'minority' music stations if you look for them. In Britain by contrast you can find just 4 or 5 official channels on FM in most parts of the country The argument that there is no room to legalise pirates in Britain is demonstrably ridiculous.

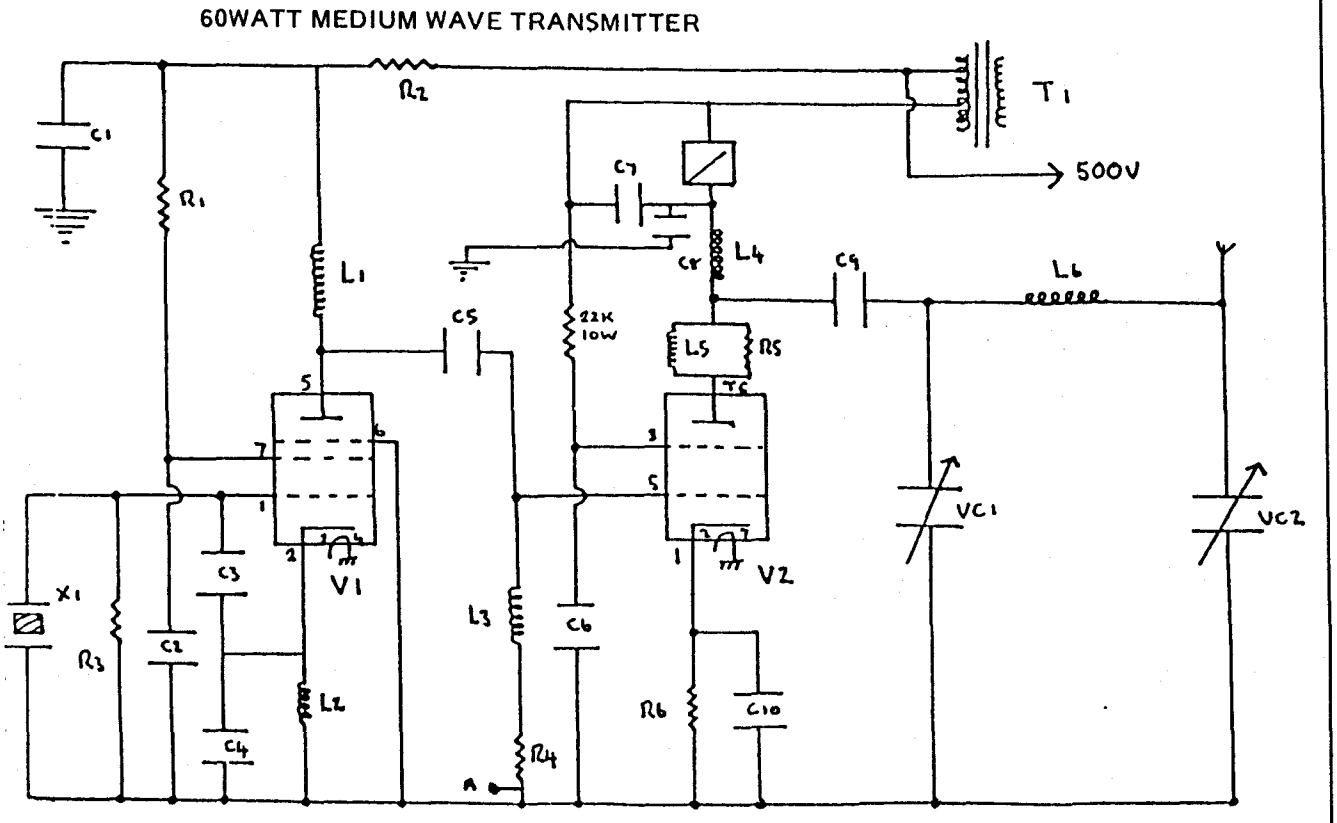
Editor's comment:

Everything is relative to something else isn't it? The story of "inane advertising" and "playing the same few top records" is familiar to most of us. But this author's point of view, coming from a country where the "state" runs the stations, is that New York is well off with over 60 FM channels. He sees no problem in finding alternative programming.

On the other hand RNI (Radio New York International) felt quite differently when they broadcast from their pirate ship "Sarah". Their stance was that there were too many stations in New York and one couldn't find decent alternatives or programming..

TWO-TUBE 60 WATT MEDIUM WAVE AM TRANSMITTER SCHEMATIC

Taken from Page 50 of "Radio is my Bomb - A DIY Manual for Pirates"



60 Watt medium wave transmitter

RESISTORS - all ½ watt unless stated

R 1 4.7K 2W
R 2 27K 3W
R 3 22K
R 4 22K
R 5 33
R 6 220 3W
R 7 (between C7 & C6) 47K 3W

COILS

L 1 2.5 mH RF Choke
L 2 2.5 mH RF Choke
L 3 2.5 mH RF Choke
L 4 2.5 mH RF Choke 200 mA
L 5 6 turns 22 swg en. cu. wire round resistor
L 6 70 turns 22 swg en. cu. wire round 1¾" former. Tapped at 5 40 turns and then every 5 turns.

CAPACITORS

C 1 0.005 mfd 500v
C 2 0.005 mfd 500v
C 3 30 pf 50v
C 4 200 pf 50v
C 5 100 pf 500v
C 6 0.005 mfd 500v
C 7 0.01 mfd 1Kv
C 8 0.005 mfd 1Kv
C 9 0.005 mfd 1Kv MICA
C 10 0.005 mfd 50v
VC 1 500 pf (wide spa
VC 2 1000 pf

VALVES

V 1 EF 91 or 6AM6
V 2 6146 or QV06-20

MISCELLANEOUS

M 1 150 mA meter
X 1 medium wave crystal (1MHz - 1.5 MHz)
T 1 modulation transformer (Woden UM 1 or similar)
A Metering point. Disconnect R4 from earth. 6146 grid current should be set to 3.4 mA by changing the value of EF 91 screen grid resistor if necessary.)

ERROR There should be a link between the cathode of V1 and the junction of C 3 & C 4.

50.

The following is a clipping from the "Daily Telegraph" England.

MINORITY RADIO SILENCED (August 12, 1987)

By Clare Hargreaves in Paris

FRENCH minority radio stations, whose causes range from homosexual rights to the crusade against Communism, have lost their voice after the reregulation of the Paris airwaves by the French authorities.

The French National Commission for Communications and Liberties cleand up Paris's clogged airwaves by cutting the 300 or so stations vying for a voice on the FM dial in greater Paris to 96.

Among the casualties are Radio Marmalade, Radio Beetroot, FM, Gypsy Crossroads, Radio Mandarin, Radio Sunshine, Tropical FM and the far left Radio Rosta which advocates armed revolution.

But they also include better-known stations like the homosexualrights station, Future Generation, which claims to have one of the biggest audiences in Paris, and the most influential station of the sizeable African community in Paris, which calls itself "Radio Black Frequents Sorcier".

HUNGER STRIKE

Many of the banned stations have vowed to continue as pirate outfits. But the Director of the North African Immigrant station in the Goutte d'Or district of Paris, called Radio Soleil Goutte d'Or, this week began an indefinite hanger strike in protest.

At one established pirate station, Radio-Show, a furious young disc jockey said "It's an assault on the freedom of expression and on the right of young people to work.

The FM airwaves were opened up to all in Paris by the previous Socialist Government but stations started opening up in front rooms of private homes to promote causes from homosexual rights to armed Marxist inspired revolution.

Many of the silensed stations say the commission's selection is politically biased towards rich commercial radio stations, many of them reportedly run by business friends of M. Chirac, the Right-wing Prime Minister, and that it condemns less privileged groups such as immigrant communities.

From "Radio is my Bomb"

In Paris there are now about 80 stations on the FM band as opposed to a mere half dozen in most parts of Britain. Of course many of the french stations are pirates, including a host of rock stations and minority stations, often sharing frequencies, for a dozen different international tastes. Stil going strong at the end of 1986 were Radio Libertaire (89.4 MHz), Radio Mouvance (106 MHz), Frequence Gaie, anti-commercial gay station (97.2 MHz), Radio Ici at Maintenant, Ca Bouge dans ma Tete (93.8 MHz) and many more.

The CIA station, Voice of America, has a pirate repeater on 94.8 MHz, and there seems to be one right wing pirate, Radio Solidarite, on 99.3 MHz.

The Other Direction Has Problems Also !

JAPAN, MINI TX BOOM

From Relay Magazine

An intriguing loophole has created the possibility of legal piracy in Japan. Technical ingenuity has created wireless microphones, remote garage doors and model planes all of which use small transmitters. To ensure they are legal, all transmitters which generate less than 15 microvolts per metre 100 metres from the source are excluded from the regulations requiring broadcasters to be licensed!

A tiny FM transmitter, broadcasting in the 76-90 MHz band, and within legal limits , can reach a radius of 0.3 of a mile, an exciting prospect in a crowded city. Manufactured primarily for CB enthusiasts, and costing L20, the technology was easily available, and with 9 months of the the first tentative experiment 100 stations were broadcasting. Soon the media had picked up on the phenomenon and there was an explosion. By August '83, just three months later, there were 700 mini stations!

Once again the fantastic demand for access all over the world was evident. And, as always there were very different interest involved. The first stations included two which illustrate the differences - Radio Polybucket, started by free radio enthusiast from Washo University; and the media wise Radio KIDS wanting an audience for their home-produced music cassettes.

KIDS was backed by advertisers wanting a liberalisation in Japanese broadcasting law, and when publicised widely ensured most pirates were what one Japanese, in his first encounter with a style which seems all too familiar to us, described incredulously as "childish monologues with American pop music!"

In Tokyo there are severe restrictions on street life because of the riots in the late 60s and after. Even stopping on the street without police permission is illegal. But the freedom of the airwaves enabled Radio Contemporain to create a completely new kind of event. Broadcasting from vans they put out a mix of rock music and political protest against the visit of the US nuclear carrier Enterprise. As youngsters walked the streets listening on their Walkmen, the radio station drove amongst them. A mobile station and mobile audience managed to have a demonstration, a public meeting and benefit all at the same time!

The Japanese Government is worried, and have proposed ways of closing the loophole. But every day that passes brings new stations. How can the confiscate so many tiny transmitters, especially because they are so cheap to replace? And the draconian powers, not to mention the resources, needed to fully extinguish the movement would be out of all proportion to the harm they do.

Reflecting

Perhaps our own pirates are too eager to mimic normal radio, not just in content but in service area as well. Wanting to broadcast to a large population makes for relatively expensive equipment, and for fewer stations. If London were a maze of hundreds of small pirates enforcement would cease! And perhaps, as in Japan, the small scale would stimulate some real community radio.

Editor's comment: In our last issue of the EBN we presented a copy of an FCC "Information Bulletin" aimed at "... All Young People Interested In Radio". It warned that even small home stations might cause interference to licensed stations and was therefore to be avoided. They went on to say "A boy or girl can further an aptitude for practical radio experience by qualifying in the Amateur Radio Service." These "KIDS", children, youngsters, or whatever apparently aren't interested in amateur radio - they want to BROADCAST...NOW. Should someone send a copy of the FCC's "Information Bulletin" to Japan's FCC equivalent?

Great Britain

From the "Independent" - England

PIRATE RADIO CHECKS HIT BY REDUCTION IN STAFFING (July 29, 1987)

By Mark Rosselli

THE GOVERNMENT has been accused of deliberately running down the Radio Investigation Service (RIS), which combats pirate radio stations. Staff numbers are said to have been halved.

Yesterday, John Butcher, the junior industry minister, appealed for the public to help protect RIS engineers from attach by pirate radio operators.

Mr. Butcher listed a catalogue of beatings, harassment and intimidation against investigating engineers, and called for people to come forward with evidence that would enable the Department of Trade and Industry to crack down on the pirates.

However, the Institution of Professional Civil Servants, which represents the RIS engineers, yesterday accused the Government of cutting their numbers by more than 50 percent in three years, and of planning further reductions in staff.

The RIS, which also advises householders and businesses on radio and television interference problems and regulates Citizen Band radios, was transferred to the DTI from British Telecom in 1984 at the time of privatisation.

Tony Cooper, the institution's assistant general secretary, said that at the time of transfer the RIS workload required 300 engineers.

British Telecom confirmed that just before transfer, about 280 engineers were employed. But at the moment the RIS employs only 125 engineers to carry out the same tasks, and Mr Cooper said it was proposed to allow engineering numbers to dwindle by another 30.

Alternative TV for the Masses

Excerpted From "New Society" - England

Pirates of south London

'Low power television' Is a cheaper alternative for the future than cable or satellite. But the freedom it offers could easily be abused.

Sustaining Network 21, Britain's first pirate TV station, is an exercise in perseverance that frequency descends into farce. Marshall and McLuhan, the necessarily pseudonymous organisers of Network 21, recently went to a friend's flat in a south London tower block with the intention of broadcasting from the roof. When they got there they found the only way onto the roof was up a ladder perched on the balcony of his top floor flat. In pitch darkness with a 500 foot drop should they have lost their footing, not forgetting a small but heavy transmitter, they decided suicide was too high a price to pay for subverting the British broadcasting system. "Roofs," McLuhan mutters, "the bane of very media subversive's existence."

Network 21 is a collective, consisting of about 50 independent film makers, activists and musicians. At midnight Friday 4 April, Britain's first unlicensed TV station went on the air. It provoked surprisingly little attention. The MAIL ON SUNDAY flirted with the idea of doing a feature but balked at the L1000 fee Marshall and McLuhan demanded. The BBC's media-watch programme,

(continued next page)

Pirates of South London - continued

DID YOU SEE?, found Network 21 a cause for amusement rather than concern. The authorities too, have turned a blind eye; inspectors fro the Department of Trade and Industry, who could impose L2000 fines or imprisonment on the culprits, have, so far, been conspicuous by their apparent absence of interest.

... Marshall and McLuhan are revolutionaries who know they can't afford to be too revolutionary. They are playing for higher stakes than being this year's media scam. Their aim is to force the government to deregulate British television and allow the country to be networked with low power local television stations like their own."The longer we stay on the air, hopefully, the better ournce....of winning a committed audience."

... As Marshall explains, "It is important that Network 21 stays on the air long enough to establish the practice of local low power television. The longer we stay on the air, hopefully, the better our chance of winning a committed audience and of encouraging other people around the country to follow our example. Our transmitter is available for hire to any group that wants to use it."

The notion of pirate TV first gained public attention in the summer of 1984. An engineer called Jim Young, representing a group known as Channel 36, had developed a transmitter the size of a briefcase with a range of 25 miles (similar in fact to the one now used by Network 21, though their range is limited to ten miles).

Discussion - 60 Watt Tube-Type Medium Wave AM Transmitter

The schematic on page 7 is almost as basic as you can get with an AM transmitter. It's called a MOPA (master osciliator-power amplifier) circuit. V1 is a standard Colpitts-type crystal oscillator. The output of V1 is coupled to V2's grid (input) via the circuit of L1, C5, and L3. R4 is used to establish an operating bias. The amplifier is operated class"C" which requires monitoring of the voltage across R4 to assure proper biasing. Point "A" is supposed to be that point but was drawn at the wrong end of R4, it should be at the top.

A meter in V2's plate circuit monitors plate current and aids in tuning of the output stage. L5/R5 is a parasitic (VHF) suppressor. VC1 is called the plate tuning capacitor, VC2 is the output loading capacitor. These two variable capacitors and L6 form a "Pi" output filter, named for the shape of the Greek letter "Pi". Plate current required from the 500 volt power supply would be about 200 milliamperes (.2 amps).

Audio modulation is fed to the output stage through T1. The impedance of the winding connected to the plate circuit is in the neighborhood of 1000 to 2000 ohms. The input windings impedance must match the source of the audio amplifier's output. Audio power required is 35 to 50 watts. If driven from a home Hi-Fi amplifier, as most pirates using this circuit would do, then the input impedance of T1 should be about 8 ohms. The transformer must be rated for at least 50 watts.

The circuit is so basic that it's not limited to operating on the broadcast band. In fact it was probably designed for one of the amateur bands and adapted to the AM broadcast band later on. By simply changing the crystal and the number of turns on L6, for example, it should work nicely on the 160, 80, and 40 meter bands. A change of crystal, smaller L6, and reduction in the values of VC1 and VC2 would make it operable through the 20, 10, and 6 meter bands. Similar circuits can be found in the ARRL Amateur Radio Handbook.

Such a circuit could be used for AM carrier-current provided however that the FCC's Part 15 Rules are observed (there'is a limit as to the maximum signal strength which may be radiated from the power lines). Operation with an antenna, of course, is illegal.

What's wrong with saying "nipple" on the air?

Dear Sirs,

I have successfully built a 10 watt FM stereo rig and am currently looking for more power. We are using the rig at the University ... and love the way it sounds. We want to serve two other colleges that are 10 miles away from us in two directions.

I am a ham operator and have successfully built most of my gear. Would you look at the enclosed schematic and let me know what you think about it as an amp to follow the unit we currently have. This entire amplifier is written up in the 1988 American Radio Relay League Handbook (pages 31/39-31/45). They go into great detail on specifics but this should be enough info for you to get the gist of our ideas. Maybe there is something solid state you know of that will get us around the 100-200 watt range.

We are looking for about 350 watts, that's all. We don't have a schedule - we just turn it on and go. We pride ourselves on the quality of our station and have never even said "nipple" on the air!! (although I've always wanted to....)

I realize there is some major risk involved here but having worked in ... professional radio for four years I know, and have the support of, most of the chiefs in the area. They find us amusing. We even had the chief of a local TV station give us a written report off a QEI mod monitor!!

Thanks for your time, B.G.

Response to B.G.'s letter:

Yes, there is a major risk involved. The greater your power - the greater your exposure - and the greater the chances of interference to other radio communications. Although the FCC may not have the man-power to actively look for unlicensed broadcasters, **an interference complaint gets attention!**

The same amplifier appears in my 1987 edition of the ARRL Handbook. It's an ambitious endeavor, calling for air blowers, special sockets, lots of metal working, and including construction of a hefty power supply. It's rated at 300 watts at 144 MHz (2 Meter amateur band). Legally it can only be built and operated by an amateur radio licensed to operate on the 2 meter band at this power level.

The circuit shows the use of a "strip line" output tuner. The over all construction appears very similar to a commercial FM transmitter (ITA 250) in use in the 1960's. They originally appeared using a 4-250 (glass tube) but were later modified by the factory to a 4CX250B (ceramic tube). It's rating was based on continuous FM service - 250 watts, while the ARRL circuit is based on intermittent amateur service - 300 to 350 watts.

Chapter 2 of the ARRL manual discusses inductance. Some research into the theory discussed elsewhere in the manual will show that:

operation of this amplifier at 100 MHz would require some inductance and/or capacitance changes. Inductance is related to the number of turns, the diameter, and the length of a coil of wire. At these frequencies a "coil" may be 1 turn or less - or even a straight piece of wire - or a "strip-line". The inductances of the ARRL circuit are calculated for 144 MHz. For 100 MHz more inductance would be required at the ratio of 144/100 or 1.44 more. The number of turns required for the "coil" is the "square-root" of the ratio of the inductance change. In this case it would be 1.2 - in other words the number of turns required of each tuning inductor would have to be increased 1.2 times. The "strip-line" might have to be longer as well as the input coils having more turns or a larger diameter.

The above is a "general" condition. To maintain the proper bandwidth, "Q", efficiency, and while keeping harmonic content under control, may also require a change of some capacitive values.

As I said earlier, this would be an AMBITIOUS endeavor. The question you may want to ask yourself is "is it worth the time, expense, and additional risk?"

To answer the question "What's wrong with saying "nipple" on the air?" I don't know, most everyone has them and arn't ashamed to admit it. In any case it got your attention, didn't it? Ed.

The following is a list of European contacts which deal in FREE RADIO (pirating) books, information, and equipment.

D.R COMMUNICATION C/O Stokes Croft, Bristol (England)	Technical air, development, research group for radical pirates. Membership fee required.
FREE THE AIRWAVES BCM Box 1502 London WC1N3XX	A clearing house for pirate info. Produces RADIO CRIMES. Design simple transmitters. Membership fee required.
LEE 71 Ave de Fountainbleau B.P. 38 77310 Pringy-Ponthierry, France	Transmitters built to order. Expensive. Send internatial postal reply coupon.
ANORAKS UK PO Box 539, Blackpool, Lancashire FY14RE (England)	Distribute all kinds of pirate stuff including transmitters. Catalog available.
TX BCM Box 225, London WC1N3XX	London's alternative radio magazine. Has run down on current pirates.
LONDON SQUATTERS PIRATES c/o BCM 1502 London WC13XX	North, South and East London pirate group.
JBC 126A Roundwood Rd, London MW10	Black music pirates that keep on the move. Also do Irish and Asian programs.
FREETEC same address as Free Radio Waves	Ready made gear includes 5 watt and 35 watt FM transmitters.
FREE RADIO WAVES West Heath Lane, Sevenoaks Kent TN131TA (England)	Pirate buffs, have good info to read.
RADIO LIBERTARIA San Martin 5 1a, Valencia, Spain	Spanish anarchist pirate
NUOVA ELECTRONICA Via Cracovia 19, Bologna, Italy	Sells complete transmitters including PLL exciters. Reads only Italian. Return letters and instructions also in Italian.
ELECTRONIKA Papaverhoek 22 Amsterdam Noord, Holland	Sells transmitter kits. Speaks English. Phone: Amsterdam 327514
HOOLIGAN PRESS c/o Free the Airwaves BCM Box 1502 London WC1N3XX"	Publishers of several books including "Radio is my Bomb" Books mainly about strike, strife, politcal movements, sub-culture, squatting (I assume same as "Hippies" in U.S.)

CONCLUSIONS ?

THE REST OF THE WORLD

(from "Radio is my Bomb")

Once you move outside Europe you're talking about very different cultures and political situations, and the experience of such pirates is not so relevant.

Radio is a part of the international battleground, the medium, for instance was used effectively both by Hitler's fascists, who excelled at mass propaganda, and the French and other resistance partisans. After the 2nd world war almost every conceivable guerrilla and national liberation movement had its own 'pirate' stations .. the Irgun, the IRA, Basque separatists, Kurdish rebels, Spanish or anti-communist exiles, etc., etc. During the Cuban revolution, for instance, there were at least 9 stations battling it out, 3 revolutionary and 6 run by the CIA and the Right. These included the famous 'Radio Rebelde' set up by Che Guevara in the Sierra Maestra in 1958, which set the tone for later resistance and 'people's' radio.

For the purpose of examining overseas pirates we can divide them roughly into five groupings: Commercial / Sub cultural, alternative / subversive, anti-state / Community, participatory / and Revolutionary, nationalist.

In fact the lable 'pirate' itself becomes quite meaningless, for instance in civil war struggles. And are not the superpowers, BBC World, Voice of America and their Soviet and Chinese equivalents, guilty of much worse than piracy in flooding wavelengths in every corner of the world with their more or less subtle power propaganda.

Editor's Comments:

Although pirate radio and TV are illegal in most countries it doesn't seem to stop them from being created. In fact, it appears that many pirates gain a strong support from their communities, artists, engineers, and even legitimate broadcasters. And, there is an indication that government authorities may look the other way at times.

The goal of "free radio", to establish community oriented low-power stations without large masses of paper-work or money, is certainly creditable. The problem seems to be that there is no expedient or inexpensive or legal way to establish them. Power and range doesn't have to be great either. One to 20 watts would suffice in many cases.

We also hear of smaller coverage stations such as Churches which broadcast to the hearing impaired seated some distance from the podium. There are drive-in theaters which accompany their movies with the film's stereo sound track - beamed to the cars via FM-stereo. There are the real estate offices that place small transmitters within houses for sale - prospective buyers just drive by and tune in the message. And what about the schools, colleges, and universities that only need "dorm" or partial campus coverage. All are legally limited to some form of carrier-current transmission. Instead they choose the least expensive, most effective, and more noise-free FM. But technically they are outside of the "rules" and are also "pirates".

It appears people will have their way, Government control will attempt to stop them, and on and on it goes. Wouldn't it be nice if the World governments could get together to set aside a band of frequencies for "Free Radio" - lowpower community radio - everybody's radio. Of course there would be those that wouldn't want to be tied-down to a single band. It would get crowded after all, and each little station would attempt more power, change frequency, move around, etc.

In fact that's what happened in the United States in the very early days of radio. It got so bad that the Government finally stepped in and formed the Federal Radio Commission, today's Federal Communications Commission.

MINI-LESSON (Loading Coils) Continued from last issue

In the October issue we began a discussion of loading coils. An antenna shorter than about 1/4 wavelength appears electrically "capacitive". If the proper amount of inductance is added in series with the short antenna it can be made to resonate just as if it were 1/4 wavelength long. The trick is knowing just how capacitive the short antenna appears to be.

Our example used a 50 foot TV mast with a 1.25" average diameter and an operating frequency of 175 kHz. The capacitance was found by a fairly complex formula to be about 146 picoFarads. Readers were invited to solve for the required inductance of a loading coil.

THE ANSWER: 5700 microHenrys (5.7 milliHenrys)

Now comes the REAL fun part - calculating the number of turns required for the loading coil.

Two methods could be used. (1) an air-wound coil (2) a toroid-wound coil

(1) An air-wound coil could be made by wrapping several turns of wire around a large cardboard or plastic tube. Optimum dimensions for an air-wound coil is where the length is about 2 times its diameter. To allow some margin in the design the we should provide for at least 10% more inductance than calculated. Taps can then be added to the coil permitting selection of the exact number of turns (inductance) required.

An air-wound coil with 6.2 milliHenrys (5.7 mH + 10%) requires a LOT of wire! The diameter might be several inches and the length twice that long. For this frequency at least an air-wound coil would probably be a pain.

(2) A ferrite or powdered-iron core greatly increases the inductance of a coil. Fewer turns are required and the whole assembly can be made smaller. The core can be a "stick" like you see "loopstick" antennas on receivers, or it can be in the form of a "toroid". "Toroid" is simply anther name for "doughnut".

The wire is threaded through the hole in the doughnut, brought around and fed back through the hole again. This makes one turn. You just do this as many times as needed to get the proper number of turns.

A good toroid core for the job would be AMIDON's T-184-41. The formula for finding the number of turns for a particular inductance is:

$$100 \times \sqrt{L_{uH} / A} = \text{turns}$$

Where L is the inductance in MICROHENRYS, and "A" depends on the type of material used for the core. To change milliHenrys to microHenrys multiple by 1000. For the T-184-41 the "A" = 1640.

THE ANSWER: about 190 turns.

Of course the wire diameter must be properly chosen so you can get 190 turns through the core (less than an inch diameter). On the other hand the wire diameter must be large enough to handle the power delivered by the transmitter.

To permit adjustment of the inductance taps should be added every 2 to 4 turns of the last 10% (19 turns for our example) of the turns. If you build one of these use **VARNISHED** magnet wire. For this example the largest wire that will fit is #28.

The same techniques may be used at higher frequencies. The AM broadcast band for example is 3 to 10 times higher in frequency than 175 kHz. This means the inductance would be 3 to 10 times LESS. Loading coils would therefore be easier to construct. At VHF frequencies the antenna itself is usually short enough that loading coils are not required - you simply make the antenna 1/4 wavelength long.

Two excellent books are available on the subject of antennas. The ARRL Antenna Book (about $8.00) and the ARRL Amateur Radio Handbook. Most good book stores can order them for you. Also try amateur radio supply stores and the public library.

NICE TO KNOW

According to our sources Volume 2 of the FREE RADIO HANDBOOK is scheduled for printing in the next few weeks. The selling price should be around $2.00. Among the features will be schematics and an article on what to do when the FCC arrives. For more information contact DVS Communications, Box 5074, Hilo, Hawaii, 96720

For those with computers with modems....Find out what's going on at the ARRL, FCC, and in the amateur radio world. Call Amateur World BBS at (213) 377-0450 (Rancho Palos Verdes, California.

ACE, A publication dealing with loggings of AM, FM and SW pirates is produced by the Association of Clandestine Radio Enthusiasts. Sample issues are $1.50, Annual subscription/membership fee $12.00 (U.S and Canada) and $18.00 World Air Mail. Address is ACE, PO Box 1744, Wilmington, DE 19899

SOUND CHOICE is a fairly good size magazine for the price. Run down on music of every description, artists, records, tapes, books, etc. Contact Sound Choice, PO Box 1251, Ojai, CA 93923

"T" shirts, bumper stickers, posters, postcards, photos of.....Radio Caroline, Laser 558, other notable pirate stations. Numerous publications dealing with pirate radio. ANORAKS UK , PO Box 539, Blackpool FY1 4RE, England

There are 10,144 licensed radio station in the United States. Of these 3,975 are FM stations, 4,893 are AM stations, and 1,276 are FM educational stations. How come they never list the number of pirate stations?

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WANTED: AM Carrier-Current type transmitter up to 5 watts. Operating or in reparable condition. Write: Harvest Productions, PO box 463, Kadoka, SD 57543