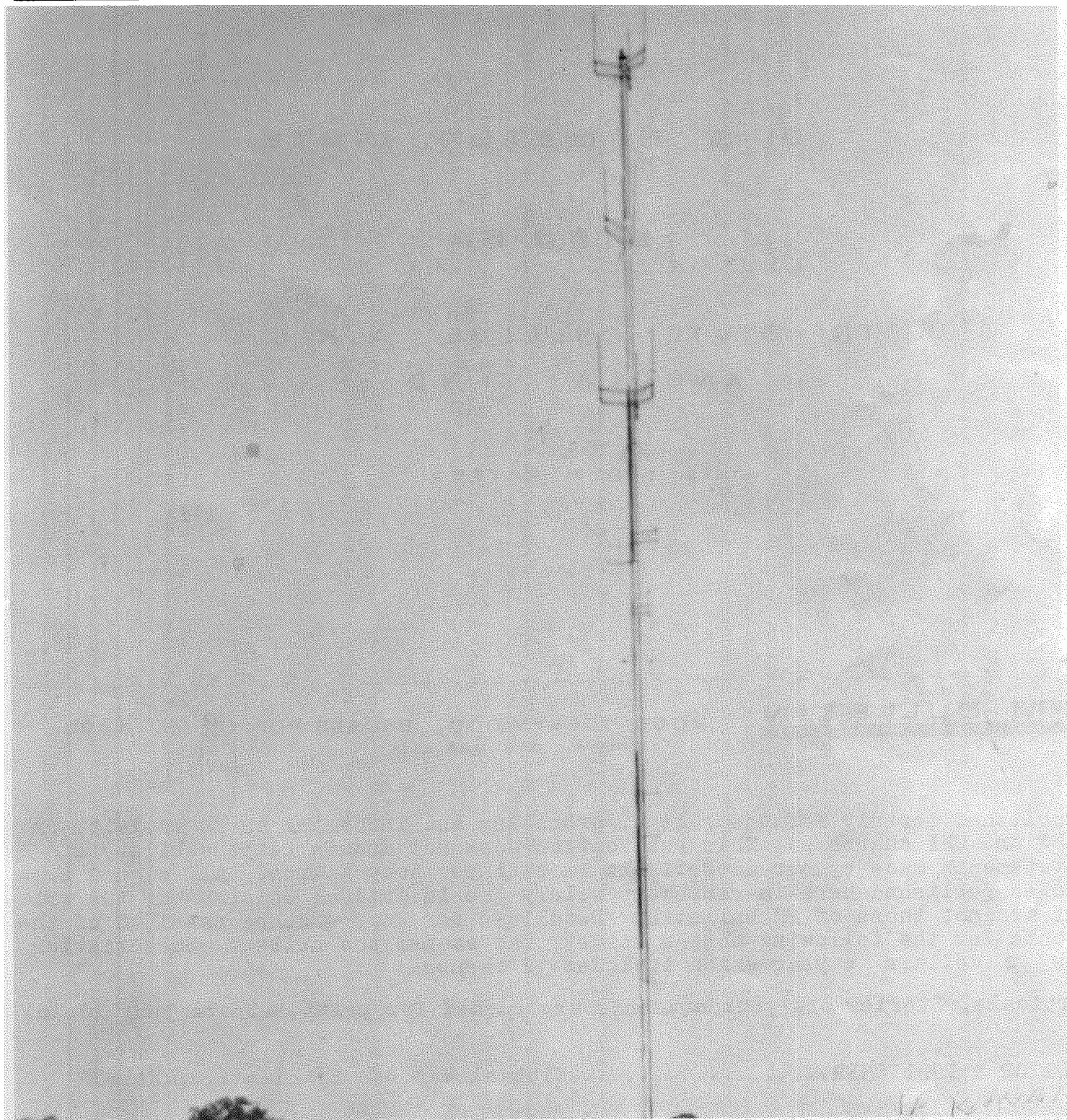


FM BULLETIN



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VOL. 1

NO. 8

F M S T A T I O N D I R E C T O R Y

2 & 6 M E T E R L I S T S

\$. 5 0 E A

**TRI - STATE COLLEGE A . R . C .
ANGOLA , I N D .**

STATE 6 or 2 METERS .

FM BULLETIN

**2005 HOLLYWOOD, GROSSE POINTE, MI. 48236
PHONE - 313-886 4115**

Published monthly for the sake of promoting and informing on FM activity on VHF and UHF channels. This publication does not assume responsibility of statements made by our advertisers in business competition. All signed articles published here-in represent solely the individual opinions of the writer and not those of FM Bulletin. Deadlines for copy must be the 15th of the month for the following months issue. The sooner the better! Subscription is 2 dollars a year which includes 12 issues.

Articals, Stories and your comments are needed for print. Share your ideas!

EDITOR & PUBLISHER.....Michael Van Den BrandenWA8UTB

PLEASE!!! THANK OUR ADVERTISERS-----

BY- KEN SESSIONS K6MVH

The third annual all-channel F M Jamfest, held last month in Los Angeles, was the most successful F M picnic ever staged in Southern California. More than 100 southland F M'ers brought their families to picnic in the park while they guzzled free beer during the all-day affair. The grand prize a Motorola transistorized walkie-talkie (two frequencies, five watt, on two meters), was won by E. E. Pittman W6VHU, 9560 Kennerly Ave., Temple City, Calif. Other prizes were G E dynamic microphones, mobile and base station gain antennas, Motorola control heads, transmitter strips, Motorola handbooks, push-to-talk handsets, and hundreds of new tubes, vibrators, and relays. The bulk of the prizes were donated by Mann Communications, 18669 Ventura Boulevard in Tarzana, Calif. As the center of FM sales activity, Mann is the primary source of used FM gear and accessory hardware.

JAMFEST CONTESTS were:

- . Annual Mobile Capture Kontest (146.76, 146.82, and 146.94 MHz)
- . Battle of the Giants (all channels)
- . Transmitter Hunt
- . On-Channel Competition.

THE KAPTURE KONTEST, mobile operators of a given frequency were instructed to orient

(cont. on page 4)

MONTREAL, N.J.?

BY- Gordon Pugh W2GHR

Two Meter FM mobiles visiting Montreal for the convention, were using a unique repeater system, capable of multiple access. The main repeater guards 146.46 and transmits on .940. In addition, a receiver on 146.94 re-transmits a milliwatt signal on 146.340 to a nearby repeater operating 146.34 into 147.5 out. Thus a station transmitting on 146.34, 146.46, or .940 in the Montreal area can be heard on 147.5. You have to count the squelch bursts to determine the input channel in use! This setup worked well, but was subject to some of the usual problems encountered by repeaters.

2 sessions at the convention were concerned directly with F M. Motorola demonstrated a working repeater (the brand-new, solid-state kind ----yum-yum!) On Saturday. The talk was interesting and covered the basic operation of an in-band repeater. Time did not permit discussion of the specific aspects of amateur repeaters and the special control requirement in the U.S.

A two-hour talk and demonstration on Sunday afternoon included description and slides of several working repeaters in the US and Can. The session was conducted by VE2AUU. A demonstration QSO was

(cont. on page 4)

SAN ANTONIO NEXT YEAR

BY- GEORGE MUNSCH W5VPO

There were several excellent sessions devoted to VHF-FM at the ARRL National Convention, held in Montreal this year. Judging from the size and enthusiasm of the audiences, the medium is rapidly gaining momentum. We intend continuing the emphasis on FM at the national convention here in San Antonio next year.

There has been FM activity in Texas since the late 50s. The first group effort that was successful was (is) a 6M repeater in Dallas by the Kilocycle Club. Later efforts started in the early 60s and almost all metropolitan areas are now on either 52.525 or 146.940, with 2M repeaters in almost all cases.

According to footnote 319A in Part 2 of the FCC Rules, it states: "The Band 449.75-450.25 Mc/s may be used for space telecommand, subject to agreement among the administrations concerned, and those having services operating in accordance with the Table, which may be affected". This should be kept in mind when choosing frequencies to be control links. I am using 449.8 at present, & have heard some weird signals during openings into Florida. I thought this might save money on crystals, which might soon be useless.

Jamfest cont.

their mobiles in any way they desired within a set of preestablished boundaries. Judges monitored the frequency from a central point on a small walkie-talkie. On command from the monitor (W6JAM), mobiles were to transmit for one minute, with each operator repeating his call letters over and over during this time. Whoever is heard above the rest in a Kapture Kontest is judged the victor. Paul Signorelli (K6CHR) was the big winner in this category. He was dubbed Mobile Kapture King and was awarded a \$10 gift certificate from Mann Communications. Paul's secret of success was his unique antenna. On his front bumper he sported a Stationmaster, which towered 30 feet above the car but yielded nearly 6 db gain omnidirectionally.

THE GIANTS CONTEST was held to determine which of the many twometer remotely controlled stations was capable of putting in the most potent signal at the Jamfest site. Judging was accomplished by taking limiter readings from during the transmissions of each "remote" and then comparing the results. The winner was Joe Alvin (WA6VHC), who had, the preceding day, moved his remote station to within a mile of the Jamfest site. For that type of effort, he deserved to win.

THE TRANSMITTER HUNT was held on 146.35 MHz AM, and was judged on the basis of lowest mileage. The winner, Ed Hershey (WB6GS0) was first to find the hidden transmitter and showed the lowest mileage: 4.68 miles.

THE ON-CHANNEL COMPERITION proved once again that FM'ers stray from frequency by groups and areas. The West Los Angeles operators were typically low in frequency; San Fernando Valley operators tended to be high. A Gertsch FM7 (donated by the local Gertsch branch) was set up so that all groups could zero in on their respective operating channels.

BIG SUCCESS! When the bills were paid and all costs tallied, the Jamfest netted \$70. This profit was promptly donated to the S. Calif. FM Assoc..

Montreal cont.

made from the conference hall to a rather bewildered mobile in New Jersey via a network of repeaters using the 6, 2, 1½ and ¾ meter bands.

The original interconnection as previously reported was changed because of other activities on the main channel and loss of one station in the circuit. It was also necessary to install a repeater in the Boneventure Hotel to get any signal out of the massive reinforced concrete structure.

W1K00 Rpt., Mt. Mansfield, Vt., was turned off during the demonstration because it covered portable units providing communications at a golf tournament in Burlington, Vt. The path between Montreal and Killington, Vt., was more than satisfactory to bypass W1K00 and the golf tournament with no mutual interference.

The remainder of the interconnection between Montreal and New Jersey was through WB2NNZ, K2SDP, and K2IEZ. Without the aid of these stations and the assistance of W2EWY and WA2SLP the demonstration would not have been possible.

FACTS & FIGURES ON ROCHESTER, N.Y.

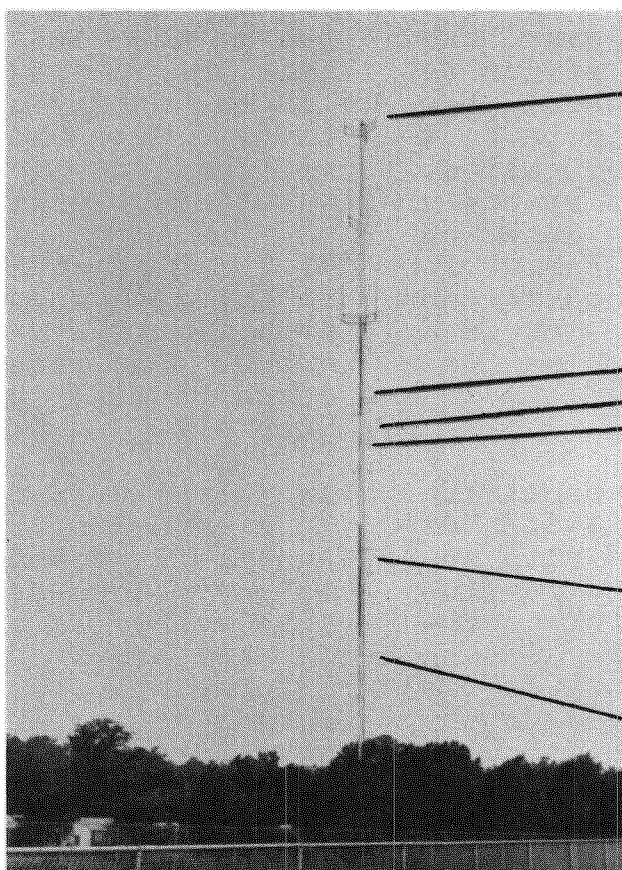
BY- MEL STOLLER K2A0Q

A few facts and figures of this area might be useful. There are about 10 to 15 stations on in the roch. area, but only about 5 - 6 on much to speak of. We have a very hard time of procuring any equipment in this area for some unknown reason. (Being employed with the city doesn't help, much.) Mostly GE and Motorola in use in this area. We do not have a repeater going as yet, but things in that direction are looking better, the city will be releasing some equipment soon, and I am trying to get it for the gang here. We may have a 60w. repeater going within the next 6 months or so. Up to now we have been using the repeaters in Toronto, Buffalo, and Syracuse, with best results via Toronto repeater, VE3RPT

THE

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REPEATER



146.340 Receive

146.760 Transmitt

52.525 Receive

146.820 Transmitt

450 Receive &
Transmitt

Spare 2Meter
Ground Plane

BY- Bruce Carpenter W3YVV

After being off the air for the last 6 months the Baltimore area repeater, WA3DZD, is now back on the air with all functions completely operational. Functions consist of repeating 52.525 to 146.82, 146.34 & 448.10 to 146.76 and 449.10.

The remotely controlled 52.525 base station in Baltimore jointly operated by W3BQR, W3TRG, K3NZZ, W3YVV, W3DTN, K3QQW, K3NBM is also back on the air.

Repeater activity on 146.34 to 146.76 has picked up greatly and it is reported that the Baltimore Area repeater is out-doing the Washington Area (W3JCN) repeater in some areas of Northern Virginia. Lets get buzy there Bob and get in tip-top shape.

HOW WA3DZD RPT. WORKS.....

A signal received on either 146.34MHz or 448.1MHz will be repeated out on 146.76MHz & 449.1MHz simultaneously. Maximum transmission length limited to three minutes. For those who are long winded, let the carrier drop out and then start again. A 3 second delay is used on the transmitter to keep mobile flutter from letting the transmitter drop out. Both transmitters will be identified twice during the three minute transmission, or at least once during any less than three minute period of on the air time.

A signal received on 52.525MHz will be repeated out on 146.82MHz. Maximum transmission length limited to ten

minutes with a 1 1/2 second transmitter delay time. The identification of the 146.82MHz transmitter is the same as the above.

Control is accomplished over the 448.1MHz receiver however if due to equipment failure, etc, it should become necessary, control may be done on any of the received frequencies. The FCC requires control of remotely controlled stations to be done on frequencies of 220MHz or higher. It is to be understood that control on 52.525 and 146.34 is only used as a safety factor, and insures a more positive control.

IN OTHER WORDS: A mobile transmitting on 146.34MHz & receiving on 146.76MHz will be able to communicate with another mobile transmitting and receiving in the same fashion over a considerable distance and will also be able to communicate with any of the eight control stations (fixed) or any other fixed station transmitting on 146.34MHz and receiving on 146.76MHz. Fixed stations are urged not to transmit on 146.34. This enables a mobile operating in a fringe area to break-in easier. If a fixed station desires the use of the repeater he is urged to use the 448.1MHz frequency. When the fixed station is using 448.1 MHz any mobile on 146.34 may easily be recognized, as both signals will be repeated.

The 52.525MHz to 146.82MHz operation is mainly used by the control stations. Several of the control stations have individual station licenses for a 1/4 KW 52.525MHz transmitter which is located within one mile of the channel 2 TV transmitter. This virtually eliminates the TVI problem.

In future issues of the FM Bulletin I hope to be able to pass on to all, some of the ideas that Mr. Grenfell of the Amateur and Citizens section of the FCC, Washington DC passed on to me recently. One thing he did emphasize strongly is that it will greatly help in the paper work on both the part of the Amateur and the FCC if all persons interested in making application for a remote fixed

station consult someone who has gone through this and has an operating remote station. He said many times the amateur does not submit enough information or the information submitted is not clear, requiring the FCC and the amateur to correspond at length, thusly causing extra work and time. Much time can be saved if all information is clear and answers all questions the first time.

If I can be of any help to any one as to the do's and don'ts feel free to drop me a line. I will attempt to answer your question and if it is necessary will put in a call to Mr. Grenfell.

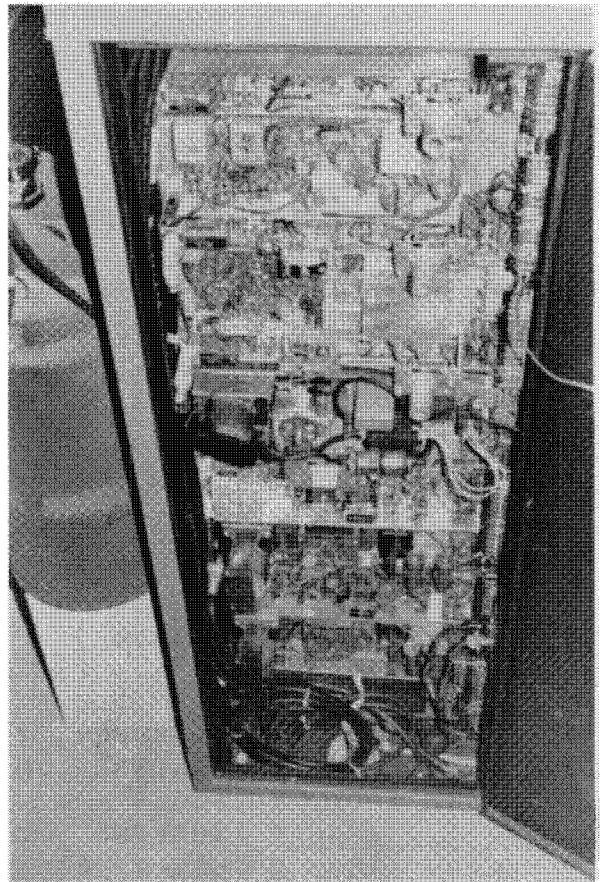
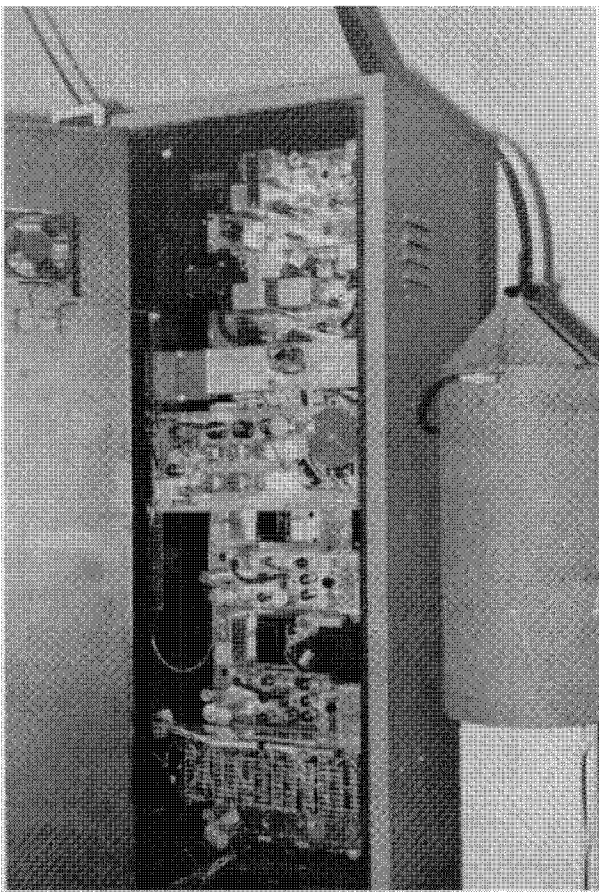
Another item which may be of interest in discussion at the FM picnic in Angola I found out that several remote stations recently licensed have received calls in the WA#DZ series. I asked Mr. Grenfell about it and was informed that since all calls are issued by computer from Gettysburg except special remote or club calls a block in the DZ series was deleted from the computer and is being used or hand issue from Washington. I understand this applies to all call areas.

Thus far I have heard nothing of your praise for the FM Bulletin. Keep up the good work.

Members of the Maryland FM Assoc., hopes to be able to explain in detail some of the circuits in use in this system in future issues of the FM Bulletin.

OUR HAMFEST which was on Sept. 4, '67 at Adams Co. Fair Grounds showed in this area how important FM is. We used K3PQZ Repeater 146.34 to 146.76 which was at our Club House R.D. #7 York, Pa. - Elevation 1000 Feet. We also had a portable repeater at the Hamfest 146.34 to 146.94. We had more mobiles call in for information on how to get there than 6 or 2 Meters AM.

WA3ICQ near Harrisburg, Pa. has a repeater operating on 146.34 to 146.76.



(FRONT) top to bottom

146.340 MHz Receiver
52.525 MHz Receiver
448.10 MHz Receiver (partially hidden by 450 MHz preamp
and identification panel)
146.820 MHz Transmitter
146.760 MHz Transmitter
449.10 MHz Transmitter (partially hidden by function,
timer, and control panel)

(BACK) top to bottom

146.340 MHz Receiver
52.525 MHz Receiver
448.10 MHz Receiver
Secode decoder
146.820 MHz Transmitter
146.760 MHz Transmitter
449.10 MHz Transmitter

The cathode followers are visible mounted on the lower right side of each receiver (back view)

The 146.340 MHz Receiver has a bottom shield.

The 449.10 MHz Transmitter has a bottom shield.

▲ Motorola cavity is beside the cabinet. This is used on the 146.760 MHz Transmitter.

▲ small exhaust fan is on front and rear doors. (rear door fan not visible in photos)

Cabinet is a Motorola outdoor type.

The round disc (front, center right) is the code wheel.

BALTIMORE AREA REPEATER

<u>INPUT FREQ.</u>	<u>OUTPUT FREQ.</u>
146.34 or 448.1 ---	146.760 and 449.1
52.525 -----	146.82

OPERATED BY: The Maryland FM Assoc.,
Inc. (W3YVV Trustee) Harmans, Md.

REPEATER LOCATION: State Highway 108
1/2 mile West of State Highway 175,
Howard County, Maryland.

(520 Feet above sea level)

REMOTE CONTROL: 448.1 MHz (if neces-
sary for emergency control 146.34
or 52.525 MHz may be used); 1500Cps
SECODE; Eight (8) control locations
authorized by the FCC.

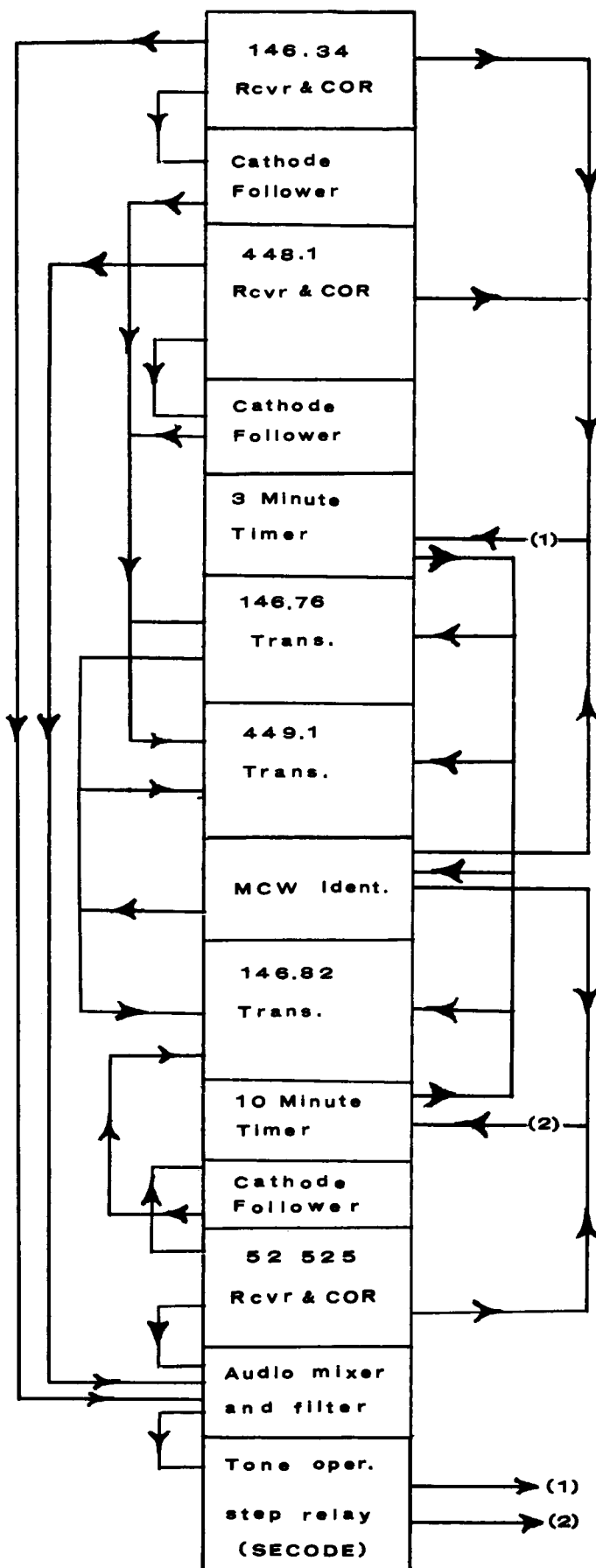
TYPE OF EQUIPMENT: General Electric
progress line receivers and trans-
mitters; SECODE Corp. tone decoder
for control; Home made MCW identifi-
cation wheel, 15 WPM, 2800 cps,
every 3 minutes; Home made function
switches, timers (solid state),
audio and keying isolation circuits
(solid state); Home made delay cir-
cuits (solid state) not shown on
diagram.

ANTENNAE:

- 52.525 MHz- Unity gain ground plane
(150 Ft. above ground)
- 146.34 MHz- Commercial 3db Gain
(280 Ft. above ground)
- 448.1 MHz- 5/8 wave ground plane
(110 Ft. above ground)
- 146.76 MHz- 5/8 wave ground plane
(170 Ft. above ground)
- 146.82 MHz- 5/8 wave ground plane
(105 Ft. above ground)

- 146.34 MHz- 1 inch pressurized line
- 52.525 MHz, 146.82 MHz- RG-8U
- 146.76 MHz, 448.1 MHz and 449.1 MHz
RG17-U

LOGGING: Accomplished by a tape re-
corder. Individual logs are main-
tained by each control station as
to time on and off the air, and of
any unusual circumstances, visiting
stations, etc.

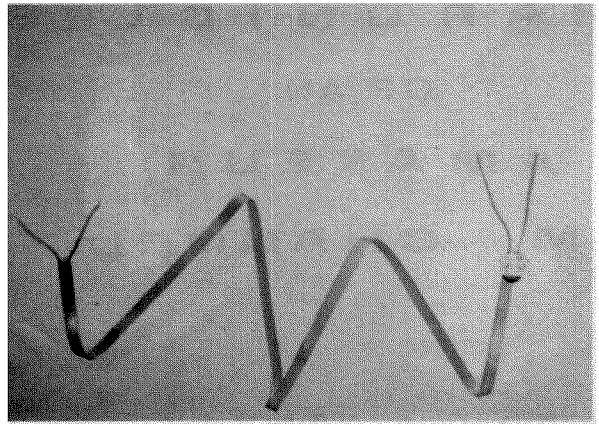


"THE INTERGONE"

BY- Willard J. Shears, Jr. W8HYE

All you FM operators with a channel 2 station nearby take note! We have the answer to your TVI problem. Chanced upon trying to make a filter for Harry Ewell, K8WMI and his many sets with transistor amplifiers and easily upset parents, the following gadget resulted. We call it the "INTERGONE" a name that took longer to figure out than the gadget. It should be used in pairs, one at the antenna and one at the set, and at each set, if there are more than one. Based on the old gimmick that was made by taping a length of twinlead to the sets' lead-in, and tuned, this wrinkle will allow a fairly precise tune up. I tune mine up by attaching it to the rig in tune position, and to a Waters dummy load. Turn the rig on and tune for minimum output, and there you are. I have reduced 80 watts to less than 8. The lead gets hot, though, at the far end. The intergone should be attached with the condenser at the input, that is the antenna side, for the best results. By using the best kind of wire, no swr should result. The picture should explain the construction.

Here goes: first, take about 48" of four conductor rotator cable, I used Belden, and separate the outside conductors from the two center conductors, leaving these two together, at both ends. Cut off 3" of the center two conductors on each end, leaving long enough leads to connect to the set, maybe even to connect spade lugs for convenience. Now! the meat of the device. Take a trimmer, either a compression type of 25 to over 100pf, or a ceramic type 7--45 pf and a 27pf fixed type across it, and pull off about a half inch of center conductors and splet them and solder the capacitor to them. This will make a sort of tuned line at 52.525 or .640 or what ever. At K8WMI's location,



channel two in Detroit can be seen with no crosshatch or audio interference visible. The antenna setup at Harry's is as follows: The six FM antenna, ASP 5/8 wave antenna, is mounted above the TV antenna (Target) on the same mast. It is 75 feet high and the antenna has a mast mounted transistor amplifier on the TV antenna, and the lead connecting the antenna to the booster is a "INTERGONE" just long enough for the job. We pretuned the filter in the described manner, and trimmed it up with the antenna at ground level, and a 60 watt mobile to supply the signal to be eliminated. Even at ground level we could tune out all the crosshatch and see channel two clearly. We sealed it with tape, but maybe someone could figure out a way to epoxy it in. So, all you faint-hearted Detroiters can rejoice! I was planning with Harry to make these things, but time is short and we cannot seem to find the time for it. Now you can try it the cheap way. Go To It! See you on six in the Motor City and elsewhere there is channel two.

CQ CQ CQ --HELP WANTED

Why not work at a job you enjoy
and earn \$10,000 - \$15,000 a year!
Two-way technicians needed. Steady work.

Call Area Code 419-531-1681, Hillebrand
Electronics, 4665 W. Bancroft St.
Toledo, Ohio DE W8QUO Bill Hillebrand

CHRONICLES OF AN AMATEUR FM CHANNEL

By - Ken Sessions K6MVH

Cartoons by Jim Day

GENESIS

From nothingness an FM empire evolved on 146.76 mc in California. As operators settled on the channel, the frequency became an untamed world - not too unlike the San Francisco of the early nineteenth century. And, as in the early west, posses and vigilante committees were hurriedly formed to keep maverick stations in line. Special licensing procedures were initiated by self-appointed guardians of the frequency. And the Organization grew and grew, held together by special "governors", secret "police," and a jointly operated evening news broadcast on 146.76 mc. Then the Organization died, with the help of the FCC. This story is fascinating! Here are the chronicles:

I. THE ORGANIZATION

When 2 meters became overpopulated, a few of the FM'ers in Southern California thought it might be a wise idea to stake a claim on one frequency just to sort of save it from the wolves. So they did! Someone somewhere had a crystal that multiplied out to 146.76 mc, a frequency which had been rumored to be a national FM channel. So that's where the empire started.

AM stations tuned across the channel during these early days and liked the operation. One by one, the AM'ers sold their equipment in favor of FM gear so they could join the group on "seven-six" (so called by operators on 146.76 mc).

With the unprecedented advent of settlers to the frequency, certain problems inevitably resulted: Getting some 500 stations operating harmoniously on a single frequency is not dissimilar to successfully bringing off La Traviata by the Philadelphia Orchestra from one of those shacks with a crescent on the door.



Stations had to transmit while someone else was transmitting or simply give up. A clear channel was next to nonexistent. Such practice, however, constitutes interference - not necessarily malicious, but interference nonetheless. And such practice became a commonplace but necessary commodity.

There was much talk among the seven-sixers of forming an organization to shape up the band. But continual incessant interference kept serious organizers from coming to any on-the-air agreements. Through repeated efforts and predawn schedules, however, an organization was eventually formed.

The Organization - it was called just that - was actually a Government whose primary purpose was to rule the private FM channel on 146.76 mc. It

was comprised of the charter stations who operated originally on this Preferred Frequency. Almost immediately it became imperative to appoint subgroups to perform such services as remote-control frequency allocation, police enforcement, public relations, and similar political functions. As these appointments were successfully accomplished, the Organization flourished. And seven-six became more popular than ever!

The Organization's Governing Body felt that the influx of operators to seven-six must be discouraged. They decided to allow only a select number of newcomers on the Preferred Frequency in a given time period. To accomplish this, the expanding Frequency Coordination Bureau was endowed with the power to screen applicants - permitting some to operate; refusing others. (Naturally, a priority system was devised, based on the applying individual's influence, likeability, technical background, seniority, etc.)

So operation on seven-six grew to be regulated to some degree. But it was still multioperator use of a single channel. And an unfortunate thing about single - channel operation is that lengthy transmissions by any individual tend to tie up the frequency for everyone. But occur they did, and harsh words were the inevitable result. As often as not, the recipient of the hostility would reciprocate by transmitting an unmodulated signal for an hour or so. And here's where the police subgroup came in.

The seven-six police were appointed by the Governing Body and empowered to seize and confiscate unauthorized equipment as well as equipment belonging to stations not conforming to established policies. It would never do to make known the identities of the individuals who performed these rig seizures, so clearances were issued to authorized seven-sixers on an "as necessary" basis. Only those TOP SECRET channel clearances would know who the Seven - Six Secret Service agents were. Of course, it would be impracticable to dispatch SSSS men to handle a simple case of incorrigibil-

ity in a remote area, just as it would be impossible, through centralized control, to maintain a state of serenity in all operational regions simultaneously. Local control, on a limited basis, was the only answer.

So the Southern California area was divided into sections based on concentration of operators. A Master Control Station was appointed as a governor for each section. Local problems were to be handled by the appropriate MCS, if possible, who would levy such minor sentences as boycott, limited banishment, and rumor instigation.

Other agencies began to appear as the need arose. Most stations took enough pride in their individuality to warrant a distinguishing title; such as "The Squeal" for the station with feedback, "The Drone" for the fellow with the hum, or "The Mouth" for the operator who seemed to dominate the channel. To preclude the possibility of more than one station using the same title, a title-issuing and logging service was instituted. The agency which provided this service was called TABOO, for Title Authorization Bureau for Official Observance. No title was officially observed unless duly assigned by TABOO and recorded in the master TABOO directory. Once issued and logged, however, a title could not be assigned to or used by any other authorized seven-sixer.

The need for a documentation center was becoming increasingly apparent, because of the pyramiding paperwork. And so the Central Hall of Records was founded. (The CHR was placed under the custodianship, appropriately, of K6CHR.) The Central Hall of Records maintained full and complete accounts of Organization appointments, activities, services, banishments, boycotts, immigrations, and all other operational functions of the blossoming empire.

The Frequency Coordination Bureau became perhaps the most important agency in the Organization. It was made up of a group of operators (under the directorship of W6ZJU) who

maintained a continuous liaison with out-of-state frequency coordinators to establish a useful set of frequencies for FM operation in the eleven western states. The FCB assigned FM frequencies on the 2 meter band (in 60 kc increments) and subordinate or control frequencies in the 440-to-450 mc region. Once a frequency was assigned to an operator or group by the FCB, that channel was considered to be "owned" by the assignee, whose exclusive rights to it were protected by the SSSS. Another important function of the FCB was the screening of applicants who desired to operate on the Preferred Frequency. (Oddly enough, these were in considerable number.) Once accepted, a newcomer was assigned to a TABOO title and a maximum power limit. (The power restriction varied according to the individual, but was not less than 10 milliwatts nor more than 8 kilowatts. The imposed limit was not to be exceeded under any circumstances.) The statical data and restrictions were typed on an official seven-six authorization card by the local MCS, who was responsible for laminating the card in plastic before issue to obviate the possibility of subsequent alteration. The seven-six card, shown below, was presented to the lucky candidate by the local MCS in a short but ceremonious gathering (where, incidentally, it was traditional for the recipient to defray the cost of quenching the seemingly insatiable thirst of those present).

The FCB kept an accurate and continuously updated secret record of all stations, remote control facilities, and repeaters, as well as a file of all supersecret control codes and tone systems of private remote base stations.

To keep the Organization members apprised of the continuing expansion and to maintain the solidarity of the expanding group, it was more than once suggested that a news agency be formed, by which all members could be daily informed of changing developments. But the idea was temporarily shelved because no one was available who could really keep fingers on the pulses of both the Governing Body and the channel inhabitants.

A news service was sorely needed. It just seemed that no one knew what anyone else was doing; official decrees were passed, but not all operators got the word. Impressive SSSS movements took place, but without the backing of all Organization members. The result was confusion and mistrust. Tempers flared frequently, but the world of seven-six lived on.

This is the backdrop for the Chronicles of Seven-Six. Such was the environment for the many following incidents, power wars, intrigues, and other unlikely events.

NEXT MONTH: FUNTIMES

FOLLOWING the hamfest in Adams County Pennsylvania sponsored by the York County Amateur Radio Clubs on Sept 3, '67 the following FM'ers got together in York, Pennsylvania for dinner and a gab session: W3AES, K3ZTP, K3DCD, WA3AAD, W3DTN, W3YVV, K3PQZ, K3AAK, K3IVE, K3OYC, WB2ZEZ and WA2EMB. A good time was had by all.

K3SVO RPT...New Bedford, Pa. is now in operation with 146.34 into 146.940.

WINDSOR, ONT....comes alive on FM with two stations on .940. Ted Mellanby - VE3FIH, and Cy Linney - VE3LA.

high-band fm radio communications

OFFICIAL AUTHORIZATION

Call _____ Name _____

Title (TABOO) _____ Special Services _____

This authorizes the above-named individual to operate, using wide-band frequency modulation, on the preferred frequency of 146.76 megacycles, at a power level not to exceed:

_____ watts

CLEARANCE

Vern Thompson

FCB Director

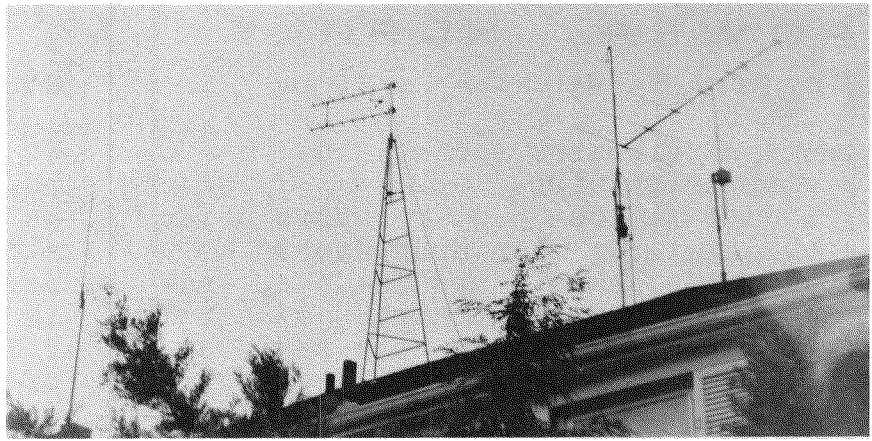
" 76 " SEVEN-SIX

RIGS

NEED

ANTENNAS!

BY- BOB ENGLAND W3JCN



About the time we would have written an article for last month's issue, we were on our way to Montreal and EXPO.

We went north through Harrisburg, Pa. and Geneva, and Syracuse, New York; and, with minor exceptions were appalled at the lack of activity (maybe we have more than our share in Washington). Worked a couple of stations in Montreal going in and a couple more leaving, including one eyeball, but for the most part, found few base stations in the area which had receivers good enough to hear anything but the VE2MT repeater...which brings us to our soapbox.

Some years ago (4-5 '63) Seymour Paul and Warren Middleton writing in the now defunct FM NEWS published in Lynchburg, Va. (guess who they work for?) pointed out -- "Another problem (there are more) if people have access to a repeater, this encourages 18 inch coat hanger basement antennas and low performance operation. Limiting the use to mobiles helps-- some." Amen.

In fairness to our Canadian friends, and others who repeat to 146.940 MHz, I suggest a re-reading of the above. I cannot quarrel with their choice of 146.460 MHz input frequency, for this was apparently chosen to avoid conflict with repeaters on the American side of the border.

I do strongly suggest that regardless of the present activity in your area and the difficulty of a few in "2-frequencying" some receivers, that you consider repeating to some freq. other than 146.94 MHz, and that operation be restricted primarily to mobiles for the following reasons:

1. When activity on .940 increases you will have planned ahead to reduce QRM from the repeater.
2. Gives mobiles a clear channel.
3. Forces all operators to improve the technical operation of their stations thus enabling greater proficiency on the part of the operator and greater point-to-point communications. (Yes, 0.1 to 0.2 microvolts for 20 db quieting is entirely feasible by adding a good pre-amp).

On the east coast of the U. S., we have established 146.760 MHz as the repeater transmit frequency. At its inception, it was strictly an arbitrary decision since it was the only frequency between 146.70 & 146.94 MHz not being used somewhere in the area. Unless you have special reasons for some other frequency (and remember compatibility with those passing through your area), I strongly recommend 146.34 MHz input and 146.76 MHz transmit. I fully realize the temporary hardship of converting, crystals, etc. (Yes, I had to discard a .94 transmit crystal when we made the change.) It's nice to have a repeater on a unique set of frequencies, but even better to have one standard.

Next (and now off the soapbox), the issue of FM NEWS which we referred to above is long since out of print, but has become something of a Bible for repeater builders. If there is any demand and the authors don't object, perhaps it would be possible to re-print in serial form, the 24 pages of the original. (What say Mike?) Write to me at: 10606 Huntley Place, Silver Spring, Md. 20902.

So much for the soapbox this month. More later!

A C THE GE-EP 2 POWER SUPPLY

BY- Gary Hendrickson W3DTN

1. Ground vibrator socket pins 5 & 6 with heavy wire.
2. Locate 7.5 ohm 5 w. resistor under chassis near mike connector. With the chassis upside-down, remove the 2 orange wires connected to the upper end of this resistor.
 - A. Tape up the orange wire going into the cable to the upper side of the chassis.
 - B. Leave the other orange wire that goes into the relay can disconnected. Save for use in Step 3B.
3. Mount a 1amp silicone diode on a 2 terminal strip. Mount strip on the mounting screw that holds the 7.5 ohm 5 w. resistor, in Step 2.
 - A. Connect a 500 mfd. capacitor from the cathode (✓) of the diode to ground (-).
 - B. Connect the orange wire from Step 2B to the cathode of the diode in Step 3.
4. Run a wire from pin 1 of the vibrator socket to the anode of the diode in Step 3. Steps 2, 3, and 4 provide ✓ 12 VDC for the relays.
5. Jumper pins 2-4 and 5-6-7-8 of the 8 pin power connector together, respectively, with heavy wire.
6. Mount a 6 volt A.C. 20 amp transformer on the chassis top.
 - A. Connect one 6 volt secondary lead to ground.
 - B. Connect the remaining 6 volt secondary lead to pins 5-6-7-8 of the power plug in Step 5. (Note) Do Not Use the secondary center tap lead, if provided.
 - C. Connect the primary of the 6 v. transformer to the heavy unterminated green and orange/green wires in the cable under the chassis. Steps 5 and 6 supply 6 volts A.C. to the primary of the vibrator power transformer and to the filament string.
7. Connect 117 Volt line cord to the upper terminals of the on-off switch on the control head. (Note) The 8 pin power connector in Step 5 should be left inside the case and a blank cover plate used to cover the hole left on the front panel

TOLEDO'S "TEAR"

BY- Willard J. Shears, Jr. W8HYE

We are an active bunch here, with 52.525, 52.640 in use a lot, & 52.720 as an alternate. Some use is also made of 146.940 and plans are made for repeater on both bands. Our group is active in Red Cross work and provides communication for them in times of disaster and even in small emergencies. Often we help take out the canteen to fires, which the RC does as public service to the firemen. Mr. Ernest Malohn is the disaster and first aid head, and our leader is Jim King, K8DPE, who is disaster communications chairman and I am his asst. We have formed a club called: Toledo Emergency Amateur Radio, Inc. or "TEAR" like teardrop. Hi. We have a really complicated setup, with antennas and remote controls for the mobiles at all the hospitals, which we will man in time of disaster and send mobiles to the scene to inform the hospitals of what sort of treatment need, and in case of needed blood, we can either assess the supply at the hospital and transfer needed blood or get it from the Red Cross. The Red Cross has supplied us with GE prog line in their Canteen (2 Freq) and the tower for the antennas at hdgtrs. They have a 125 ft. tower and the following antennas: Theirs (47 mc), 5/8 wave ASP for 6, 6db gain on 146.940, and two small gp's in high band for monitors. Also, we have surplus equipment and parts mostly from Erie Army Depot, before it closed. These parts and such, are available to all members. There is much more, but I do not have room here.

I might mention as a last note, that we are involved in a little fund raising project. Maybe one of your readers would like to help. We have been selling for a year now, GE progress line equipment on low band. If anyone would like the particulars, drop us a line at the Red Cross. Please address your letters to : T.E.A.R., INC., 2205 Collingwood Ave., Toledo, Ohio 43620. All the equipment we sell is under waiver.

GE & MOTOROLA UNITS FOR 450 MHz AMATEUR USE

by

Ken W Sessions Jr (K6MVH)

A salty FM'er doesn't need to be told that GE and Motorola are THE standards when it comes to amateur FM equipment. And the quality of the two manufacturers' units has always been comparable -- for frequencies up to 450 MHz. However, for FM units operating in the commercial band of 450-470 MHz, the picture begins to change. There were a number of design deficiencies in the early and middle 1950's that are now the legacy of amateurs converting them for use in the 420-450 MHz amateur region.

Oddly, GE's chief problem is its MC-306 receiver; Motorola's problem is the T44 (A7 version) transmitter. The GE is curable; the Motorola is not. In the Motorola unit, the final plate tank circuit is difficult to keep in resonance because of the poor design of the driver and tuning mechanisms. Both the final and driver are built into special cavity sections with removable covers. Tuning is accomplished by varying the capacitance from the cavity cover to the plate of the tube (2C39). Since the cover must be removed periodically to change tubes, in time the cover-to-case fit becomes sloppy; the holes for the cover hold-down screws get widened and the threads strip. Inevitably, the cover-to-case resistance gets erratic and the internal capacitance begins to shift, causing the driver and the final to stray from their positions of resonance.

An even more serious problem is the locking system. The tunable screw-type capacitor is secured by tightening a lever that binds the capacitor shaft. As the shaft is secured, it is forced to move slightly from its resonant position. Plate current goes up and output power drops just enough to shorten tube life and impair efficiency of the transmitter output stages.

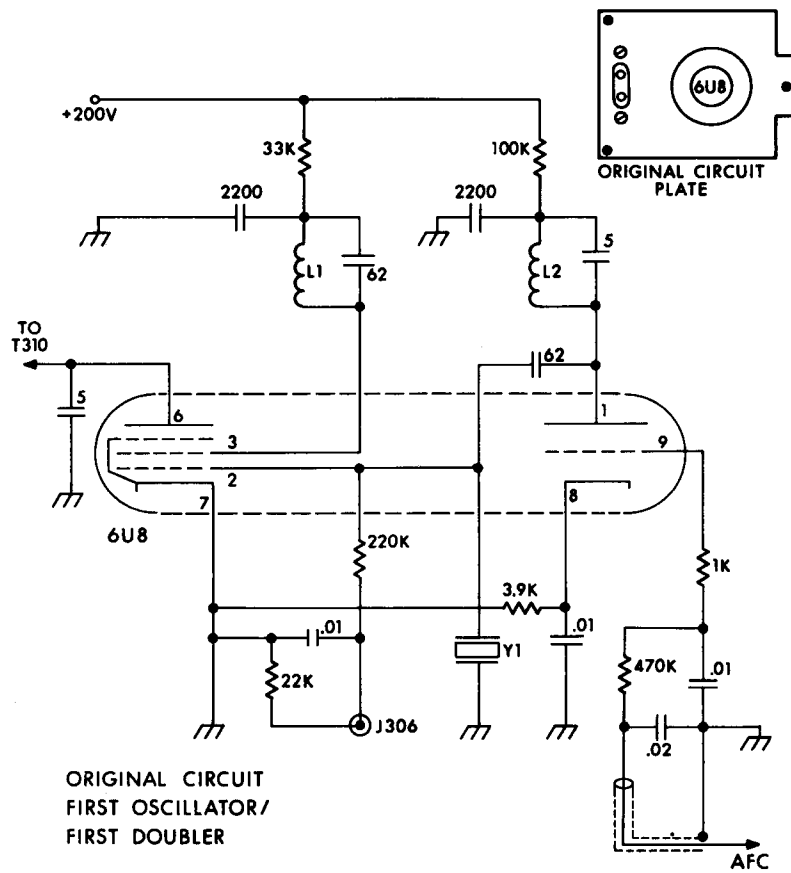
GE's answer to the T44 was the MC-306, known by amateurs across the country as the "Preprog" (for Pre-Progress Line). The GE Preprog transmitter has never been plagued with the T44's problems because some bright engineer designed the capacitance tuning into the sides of the cavities, rather than into the covers. And knurled knobs were incorporated for easy hand-adjusting. But the design engineers apparently were so engrossed in the transmitter that they were blinded to the problems which were developing in the receiver.

The Preprog 450 MHz receiver is typically very broad and highly unstable. The oscillator is characteristically low in output -- it peaks about 0.75 volt when measured at the test point (J306) with a dc voltmeter. Temperature extremes turn the oscillator into a vagabond; it may wander as much as 150 kHz between dawn and midday.

The built-in AFC allows the oscillator to be pulled by any signal within 60 kHz of its design frequency. But the drifting problem is often so severe that even the AFC doesn't help.

These problems are annoying and frustrating when the receiver is being used in repeater service. Transmitters must be tweaked and crystals "bent" to chase the receiver across the spectrum. But in a mobile application, the situation can get downright intolerable.

Since the Preprog is the most common single piece of equipment in use by California amateurs for the 420-450 MHz band, a number of amateurs have made changes to improve the receiver's performance. These changes vary in complexity, from reducing the AFC's pull-in range with diodes to completely redesigning the oscillator circuit.



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Figure 1
Original Oscillator Circuit

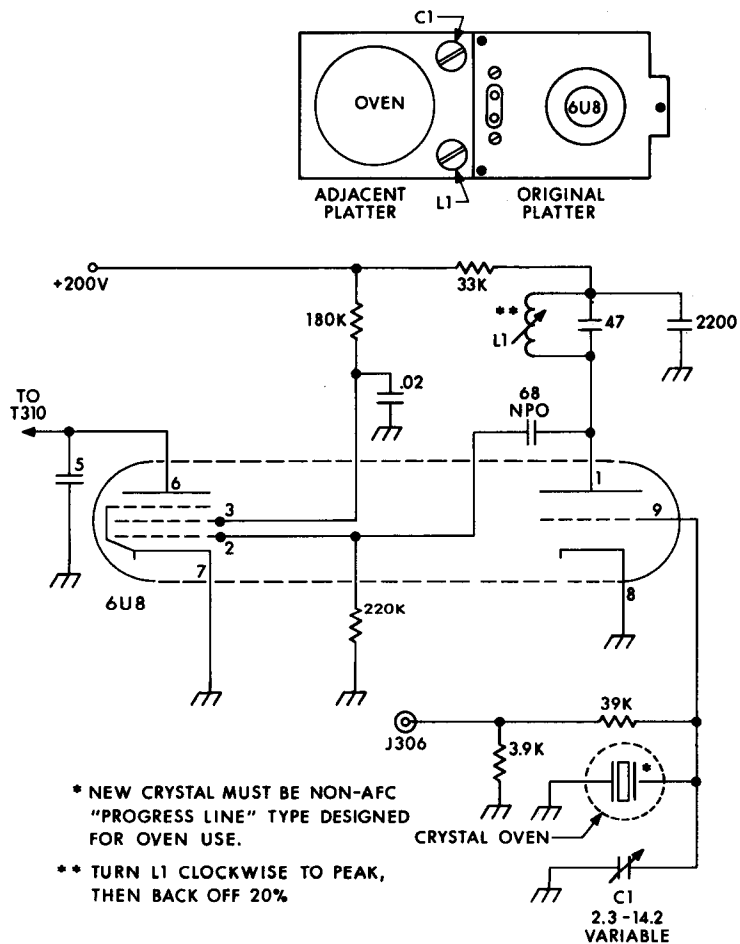


Figure 2
Modified Oscillator Circuit

The AFC pull-in range is reduced in order to keep the receiver from responding to adjacent-frequency signals. This is done by simply cross-connecting a pair of diodes so the anode of the first one attaches to the cathode of the second, and the cathode of the first attaches to the anode of the other. This diode pack is then connected from the AFC bus to ground.

Probably one of the most effective circuit improvements is the oscillator modification designed by James J. Lev (K6DGX) of Long Beach, California. His modified Preprog oscillator circuit is compatible with a design by which several oscillators may be used with the single GE multiplier for converting the Preprog to a two- or three-frequency system. But the most important feature of his oscillator design is its stability. The circuit has, in fact, become such an adopted conversion around Los Angeles that a Preprog sale will -- as likely as not -- hinge on whether or not the oscillator has been modified per Jim's design.

The K6DGX modification involves total removal of the oscillator chassis plate from the Preprog receiver and building a new oscillator which will use a Progress Line crystal AND OVEN. The result is a receiver stability of 0.0005%.

For the convenience of those who want to incorporate the DGX oscillator into their own GE Preprog units, the circuit is included. Figure 1 shows the configuration of the original oscillator as it comes from the factory. Figure 2 is the modification. As can be seen, the new oscillator is actually somewhat simpler than the original.

The thing to remember when modifying your Preprog oscillator circuit is to re-order the receiver crystal. The old one

will oscillate in the new circuit, but it will be around 150 kHz low in frequency. Also, it will not have the same 0.0005% frequency stability characteristics of the new one. When ordering the new crystal, specify the following information:

- Receive frequency
- Crystal frequency ($f_{\text{xtal}} = \frac{f_{\text{rcvr}} - 48}{36}$)
- GE "Progress Line" oscillator circuit
- 85°C crystal oven, F605, 4ER26
- Non-AFC use

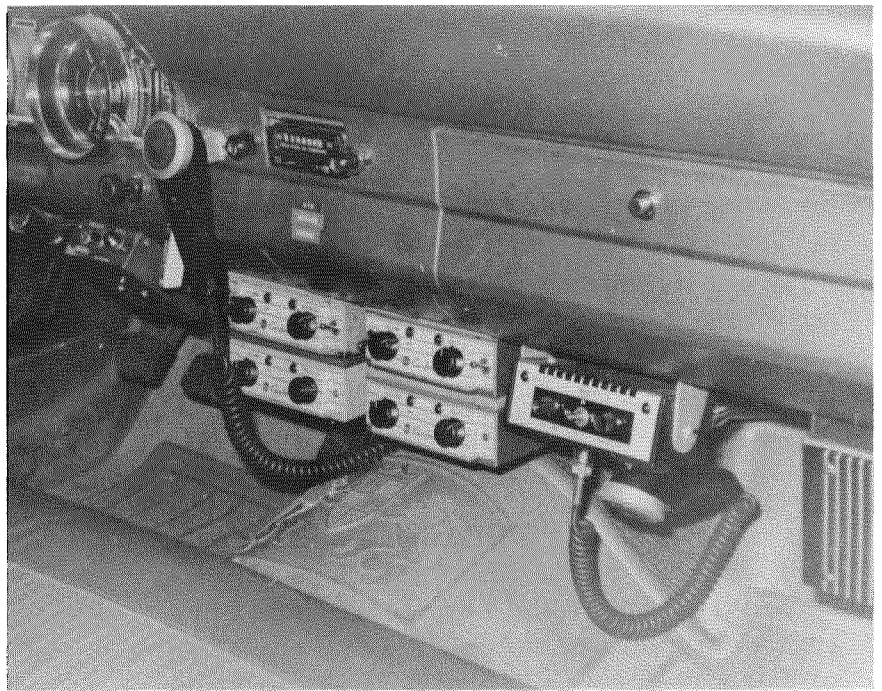
There will be no room on the original circuit plate for the crystal oven. But there is an abundance of plates on the Preprog receiver, so the oven can be easily mounted onto the adjacent plate. Chassis holes through which the original tuning coils were mounted can be used for the new variable capacitor and slug-tuned coil. The tuning range of the variable capacitor is not critical, and can be anywhere in the general region shown in figure 2.

There really isn't much that can be done about Motorola's T44 transmitter problems. Corrective action would involve a major mechanical redesign. (Perhaps I'm underestimating the ability of FM'ers. In any case, the world awaits a satisfactory solution to Motorola's T44 design blunder.) Most owners of the T44 simply grit their teeth and live with the problems. They probably feel that the design discrepancies of the transmitter are more than compensated for by the excellent stability, selectivity, and sensitivity of the T44 receiver. And they may well be right.

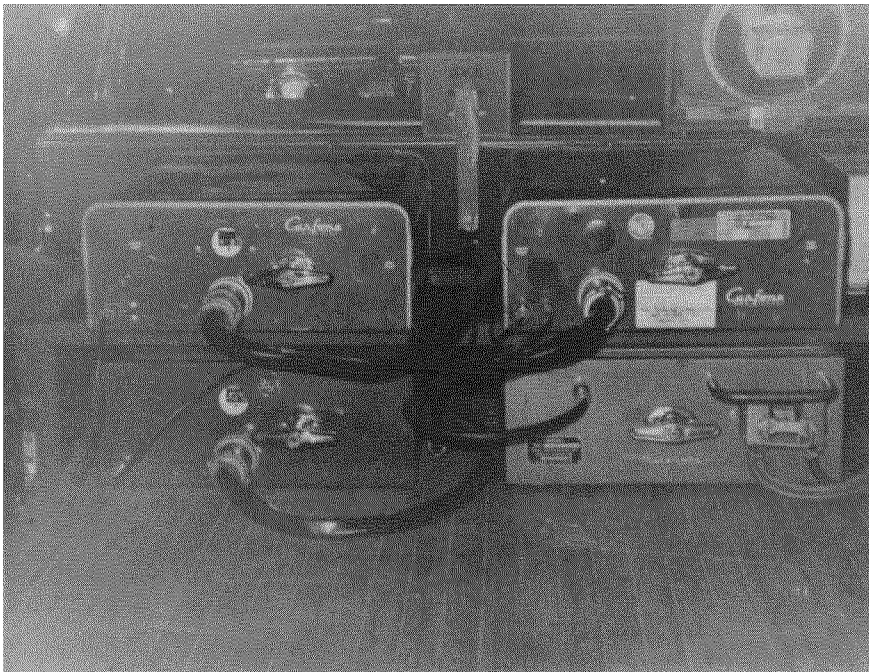
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K 8 E N Q / M

W O O S T E R , O H I O



David Bixler, K8ENQ, of Wooster, Ohio, is hardly ever without FM in hearing range. Pictured in his mobile, a R C A Company car - 1966 Falcon, Dave has units on 52.525 MHz. , 146.940 MHz, 146.979 MHz, 146.340 MHz, and 146.76 MHz. in the Ham bands. Also are units on the Ohio Turnpike State Patrol and Ohio Turnpike Commission. Would you believe Dave works for R C A on the Ohio Turnpike at present. Your not suppose to notice the Motorola rig in the bottom picture. Happy mobiling Dave!



**MOTOROLA SNEAKS INTO
R C A SERVICE CAR**

MAIL BOX

Dear Sir,

Just a few lines to tell you how much I enjoy your fine FM Bulletin. As you know it is very hard to get any news of Amateur FM activity from Ham Magazines. Your Bulletin is just the answer. Glen Hill WA9GCK told me of it and I in turn told Joe Feagans, W9HCI about it. They both enjoy it also. What little activity we have hereabouts is mostly on 146.940. At present we are attempting to get a repeater going. We have a receiver sight already located at a water tower and have the interconnecting telephone line installed. We hope to use 146.34 input and out on 146.94. We are especially interested in the news of Amateur repeaters from your Bulletin. So I am looking forward very much to future issues of the FM Bulletin.

73- Bob McNeal K9KG0
Petersburg, Ill.

Dear Editor:

Word has filtered down to us that you are starting a publication dealing with F M. We are interested in your venture and would like to subscribe on behalf of the Tulsa Repeater Organization. We have written several articles about FM which have appeared in various national publications. If we could contribute, in this way, please let us know. Of general interest to Hams, also, is the thirty minute color slide-tape recorded presentation, "The Tulsa Repeater Story". This show has been viewed by several hundred Hams at various conventions and club meetings While the prime subject deals with the technicalities of the repeater operation here, it gives a few pointers on forming a good workable repeater organization. It is available from us, free for use by any club or organization. However, we ask that they pay postage and insurance both ways. 73's Pat V. Devlin WA5BFS

President,
Tulsa Repeater Organ.

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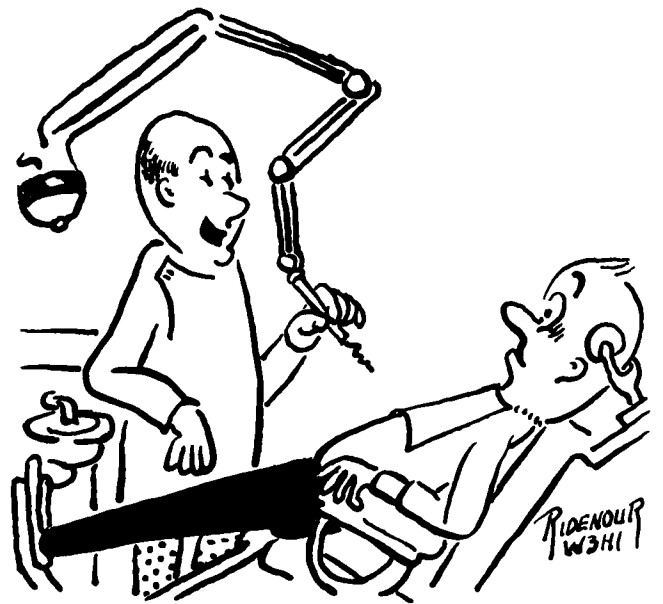
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