FM BULLETIN

THE NATIONAL

FM 'ERS' JOURNAL

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Box 9535
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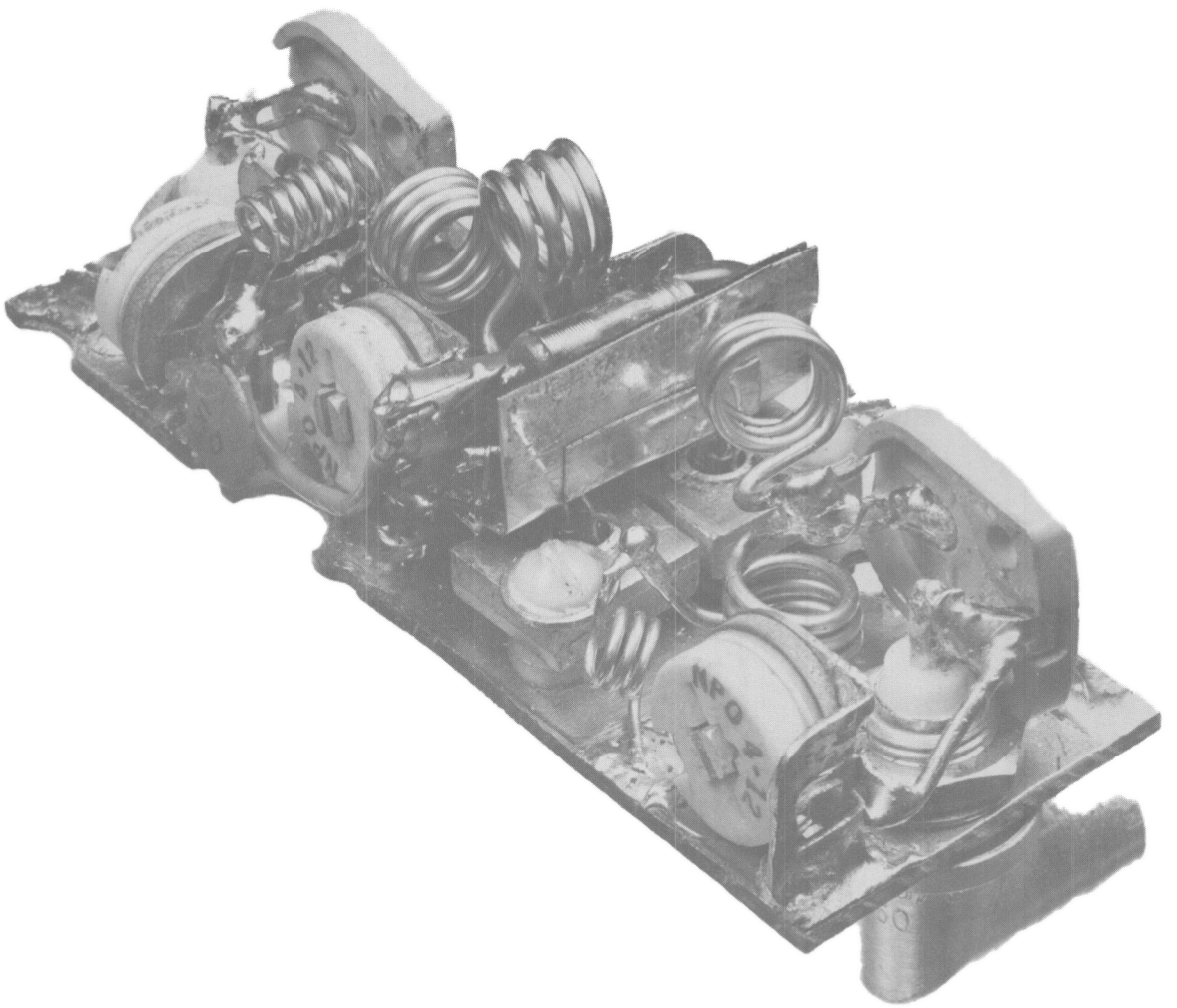
9/68



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FM BULLETIN

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Michael Van Den Branden, WA8UTB
Editor & Publisher

Ken Sessions, K6MVH
Associate Editor

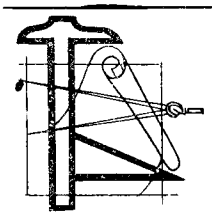
FMB ANSWERS AUTOCALL

To Our Readers:

The article shown at left below appeared in the January edition of Autocall. If you are extremely diligent, you can get past the author's grammatical inaccuracies and backwoodsy expressions to see the gist of his text. He says, in essence, that repeaters are useless, and begs to be enlightened.

It is difficult to imagine how such an ill-informed amateur can hope to receive enlightenment by mere words considering his own obvious lack of understanding in this regard. But it behooves the editors of FMB, acting -- for the moment -- as the FM'er's voice, to attempt to show author Anderson where he "missed the boat." (And please pardon the hackneyed expression -- we're trying to respond on Anderson's own level.)

On the left, then, is Autocall's questionable column, reprinted verbatim. We editors of FMB have added asterisks here and there so you readers will know the mistakes aren't ours. We were going to accompany the appropriate parts of Autocall's text with an occasional "sic" but thought better of it because of the very strong likelihood such a term would be misunderstood by the opposition. (We envisioned the possibility of them blindly adding k's and mailing the edited version back to us.) Our responses, by the way, are published in the right-hand column, adjacent to the paragraph under discussion.



ANGLES AND CURVES

c/o EDITOR, AUTO-CALL
R. V. ANDERSON, KØNL
528 MONTANA AVE.
HOLTON, KS 66436

This editor must confess that he is somehow unable to understand the exuberance of those possessed with the wide-band 2 meter FM bug. This "misunderstanding" (which it surely is, otherwise we'd probably be exuberant also) certainly can't stem from the type of modulation itself because it has been proven that 2 meter FM is far superior to 2 meter AM. Perhaps then it must be the system employed by the amateurs themselves.

To my knoledge*, admittedly limited, very few installations have more than one frequency available short of changing crystals (which to some means a pair of long nose pliers). A great majority of the units used are surplus and were equipped for one channel only. Occasionally there are two channels. And virtually no one has seen fit to provide a second channel on either transmit or receive. Therefore the question of which channel becomes important.

Since the entire country is on basically the one frequency, that should be available - that's for sure. And since repeaters are fairly well standardized with their transmit/receive frequencies, that should be a second channel. But let's see. The use of repeaters has become widespread. Let us call the receive frequence channel A and the transmit frequency channel B. Now, should our one channel transmitter be equipped for the repeater frequency or not? And should the receiver be on the same frequency or on the repeater frequency? Let's presume we equip for the repeater. Now if the other mobile you are working comes within working range without the repeater, you're stuck! If you meet him coming towards you (which we did) and you are both working through a repeater and the signals are marginal (which they were) you are within 50 feet of him and still can't work him. Real* hot stuff, eh? Suppose you provide a switch so your station is on the repeater receiving frequency. Then you and the other station yak away oblivious of the fact that the repeater is repeating your QSO because you are not listening to it. So you use the transmitting frequency of the repeater for your QSO. Trouble here is that everyone else in town is trying to receive on that frequency and they can't do any business. Real hot business!! If you will analyze the situation, you will find that three channels are need* if you live in a repeater area and expect to use it now and then. Which nobody has got.*

The next question is use. Back on the farm when I was bein' fetched up we had a party telephone line. This was fine when no one else wanted to use it. But you had to keep the yak yak short because some one* else just might want to use it. Now suppose a repeater has a very favorable location. This means there are perhaps 50 to 100 potential users of the system. If anyone says more than five words he is, to the rest of the boys, loquacious. And they will remind you also. And what damn good is any communication system if you can't use it?

It should be noted that to get distance, height of antenna is necessary. So we see fellows with towers way up there. In fact you can't even get in the swim without at least a 50 foot tower, and this puts you in the kindergarten class. The peculiar* point is that with the same power on 75 SSB you can get there just the same and with an antenna not over 20 feet above the ground. And you don't need a repeater. And you have all kinds of channels available. And you can move if you wish.

We have no quarrel with the first paragraph. Anderson himself recognizes the superiority of FM, although the point he's trying to make here is rather obscure.

As Anderson admits, his "knoledge" is certainly limited. FMB editors estimate that 60% of all FM radios have multifrequency capability. Probably less than 1% of the FM gear in use is surplus. But we fail to see the significance of the argument anyway.

Now we see what he's driving at. He wonders: Why must a one-channel FM rig be tuned up to receive a repeater output while it is set for transmit on a repeater input?
It shouldn't. The legality of such a system could probably be successfully challenged. It is the responsibility of each amateur to monitor his own transmit frequency before putting a signal on the air. If he is within range of a repeater, he can monitor his frequency by merely listening to the repeater output; if he's out of range, what good will a .34 transmitter do him if he's listening on .94? Obviously, he'll make no contacts and will be forced to either transmit on .94 or receive on .34. So where's the hangup?

There probably aren't as many fetched-up-on-farm FM'ers as there are AM'ers, and we've yet to see an FM'er who talks as much as the average AM'er. What Anderson doesn't seem to realize is that FM is an evolutionary cut above AM, and longwinded soliloquys are abandoned in favor of normal conversation. Wouldn't it be interesting to see how much conversation Anderson and his fellow operators would be left with if they were to remove all idle chatter and meaningless clichés from their transmissions? Chances are good that 75 meters would be left with a lot of dead air time.

The many advantages of FM over AM and the several advantages of FM over SSB are not the only reasons FM'ers group together on two meters. Anderson is probably right when he says a given distance may be covered with less power and a lower structure on 75 meters. But on 75 we'd have to contend with the trite

FMB ANSWERS AUTOCALL
(Continued)

Now then repeaters are not without troubles to these selfsame people who use them. Or try to!! The usual procedure is to run the squelch just below breaking point. It is certainly a lovely thing to listen to when the squelch just breaks open and the signal is marginal. A lot of hogwash. Turn down the squelch a bit? It still happens on the louder signals. Turn it down more? Then you miss the station you do want to work. Now then, there is in this area a repeater which has the receiver/transmitter ratio out of balance. The transmitter keeps the squelch open on all these receivers, but no on has yet been able to get into the transmitter. So the transmitter keeps the squelch open yet these boys are denied use of the repeater because they can't break it. Will the repeater condescend to change it? Hell, no! (He might, we understand the FCC is being approached). In my own case I had to quit monitoring continuously because of the problems of squelch openings on marginal signals.

We fail to understand what was so stupenduous about sending a signal from Montreal during the Convention way down the east coast by using several repeaters. Engineering wise it was perhaps useful, but when a simple station at Montreal and another simple station in Washington could have exchanged signals directly, why go to all this trouble? And look at all the people who were denied the use of these frequencies while it was being done?

So we're wondering. Where do we miss the boat?

* *

HEY LOOK ME OVER!!!!!
FM Bulletin's circulation has climbed to unprecedented heights during the past several months. And there are bigger things in store! Take our next issue, for instance...

old ways and words most of us try so desperately to avoid. Then, too, distance isn't the only factor to consider in a point-to-point contact. When a 75-meter signal makes contact between two points, one can only be certain of one thing: Contact is established between two points. On the other hand, when an FM repeater allows contact between two points, one can be reasonably certain that the entire area between the two points is similarly covered. And this is the crux of the differences between FM and the other modes. The FM'er is interested in range and coverage. The non-FM operator wants nothing more or less than distance.

We can't make sense from this paragraph. Perhaps Anderson can get an interpreter to explain it for us.

It's funny how the FM'er seems to be the only amateur left who remembers why he's here in the first place: to pioneer; to probe; to experiment. The editors would like to ask Anderson a few pointed questions:

- Why does COMSAT orbit satellite repeaters when repeaters are so worthless?
- Why do governments and municipalities insist on VHF FM for assured coverage when 75 meters is so far superior?
- Why do commercial stations use FM almost exclusively?
- Why are our mountaintops studded with remotely controlled FM repeaters and transceivers on commercial bands?

Perhaps if Anderson finds the answers, he can also answer this one:

- Why is FM the hottest thing in hamdom today?

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A CALIFORNIAN'S VIEW OF SORAC (AND FIRST NATIONAL FM CONVENTION) IN LAS VEGAS

Modulated Vibrator Hash

by Ken Sessions K6MVH

Bewildered in Vegas...

I was lucky. I'm a greenhorn from the country and I don't know the ropes. My friend Walt says I'd be fleeced like a lamb if I were to wander the streets of Las Vegas without a seasoned man-about-town such as himself to watch over me. So I was lucky at the Las Vegas convention last month.

My friend was Walt Podolece (pronounced Puh-DOUGHLESS, which is how I eventually left Las Vegas, anyway) and he's a swinger. He's been around a lot. He has his own business and his own plane. His call (W6UDP) is proof that he's even been in ham radio almost forever. Walt knows everything. And he was my guide.

Five of us California tenderfeet followed Walt from casino to casino as he carefully outlined the protocol we should be observing if we wanted to pass ourselves off as salty big-timers.

I'm green, all right; but Jack Bankson (WA6JXG) is maybe even greener yet. We two were particularly enraptured by Walt's fancy footwork as he "played the scene" for us. But we sure blushed after one memorable incident, which occurred in the lobby of the Sahara.

Walt pointed to a very attractive young lass who stood alone near a bank of telephone booths. "Now, there's a pro," he told us casually, but with a wisdom that was profound beyond his years.

Everyone but Jack and I knew immediately what he meant, and we had to have it spelled out for us.

"A hustler, Man; a professional hooker," he said. Even though I'd never heard of those terms before, I got the message. But I couldn't see how he could be so cockeyed certain.

Learned leader that he was, my wizened friend displayed only a trace of annoyance at my incredulity, perhaps because Jack was as skeptical as I. So he very generously offered to show me how to spot a hustler. "Come on," he said. "Let's move in closer."

The five of us trailed after Walt and pulled into a tight huddle about fifteen feet from where the pretty thing stood.

Walt spoke just loud enough for us to hear over the clinkety-clanking of the nearby slot machines. "First of all," he said, "look at the way she stands; it's a dead giveaway."

Admittedly, she was looking rather conspicuous. She was more leaning than standing. She stood balanced on one leg leaning backward against a wall pillar. Her other leg was drawn up so the knee stuck out and the sole of her shoe was parallel with the pillar.

"Notice the expression on her face -- the eyes, in particular," Walt told us.

Obediently, we noticed. Her eyes were hard and emotionless. They had a curt look of smugness. Walt really knew his stuff; that was obvious. We were almost convinced.

"Why is she standing there all alone, though?" I asked. I couldn't see how she could possibly strike any bargains unless she -- well -- got out and hustled.

"She's waiting for someone to make her an offer," Walt said, simply.

I was thunderstruck! "You mean a man just walks up and...?"

"Exactly!"

"I don't believe it," I told him. "What if she's just waiting for someone..... I mean, how could you be so sure?"

"I can see I'll have to show you," Walt said. "I'll just walk up and ask her if she's a pro, and that will prove it." He turned and walked the few paces to where she stood, but he didn't get the chance to say much. Her husband came out of the phone booth and spirited her away before he could even get the words out.

Speaking of Protocol...

Staff writer Don Milbury helped, too. He taught me not to ask favors of strangers. Every time I asked a doorman to get my car for me or a maid to get me a towel or a station attendant to get me a map or a lot boy to park my car away from the doorbangers, Don would whisper into my ear, with irritating repetition: 'Tip-tiptiptiptiptiptiptiptiptiptiptiptiptiptip." I think the favors cost more than the convention registration fee.

The Convention....

The convention, by the way, was highly successful. For the benefit of those of you who couldn't attend, here are a few of the highlights:

The FM Bulletin attracted a great many new amateurs. It served as yet additional proof that today's ham wants more than DXing, traffic-handling, and rag-chewing. The world of FM and repeaters and remote control can look pretty good to aggressive amateurs who tire of the same old stuff.

This fact is being recognized by leading radio publications. Jim Fisk bought a long and comprehensive "description and how-to" article on repeaters and remote control from me shortly before giving up his editorship of 73 Magazine.

Which brings us to another highlight of the convention. Editor Jim Fisk is still editor Jim Fisk. Only now he's editor of a fresh new magazine which he says is devoted to the modern amateur, the thinking amateur, the technically competent amateur. He's lined up top authors like Bill Orr and Frank Jones, to name but two. Jim assured me that his new magazine will not be closed-minded on such subjects as FM, remote control, and other advanced concepts in amateur radio. The format of his new monthly (he calls it Ham Radio) looks pretty impressive, too. Want to see it? Drop him a postcard and he'll send you a complimentary booklet that is a "preview" of the first issue. His address is:

Ham Radio Magazine
Greenville, New Hampshire
Zip 03048

And please...
Be SURE to tell him you learned about it in the FM Bulletin.

FMB Staff Writer checks out Motorola's new low-profile mobile rooftop antenna

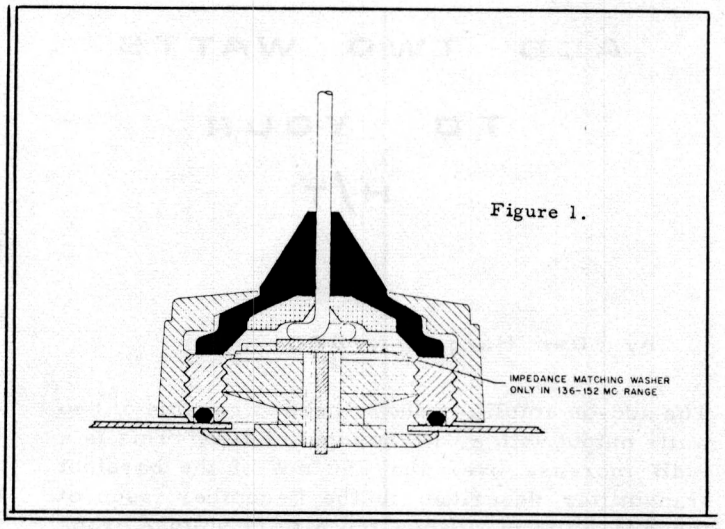


Figure 1.

new products

There has always been something about the old "black ball" base that displeased me. It's just that radios kept getting handsomer and smaller while the antenna remained basically unchanged over the years. The black blob has always been a black blob -- an unsightly and conspicuous black blob.

Why doesn't Motorola do something about it? I used to wonder. But it availed me naught. And when I bought my racy red roadster, I decided I'd rather do without two-meter operation altogether than garbage up my new car's beautiful lines by installing one of the ugly eightballs.

Then someone showed me a brochure for a brand new two-meter spike. It's shiny but inconspicuous, tiny but sturdy, and esthetically pleasing for all of that. Needless to say, my car is no longer twoless.

The cross-sectional sketch (Fig. 1) shows the construction. The blackened portions in the sketch are soft rubber. The chrome-plated outer shell is about the size of a half-inch stack of half dollars. This shell part screws down onto the body-mounted bushing assembly to hold the curled spike end in solid contact with the inner conductor of the transmission line. The chrome holddown piece also maintains contact with the car body through the threaded retainer.

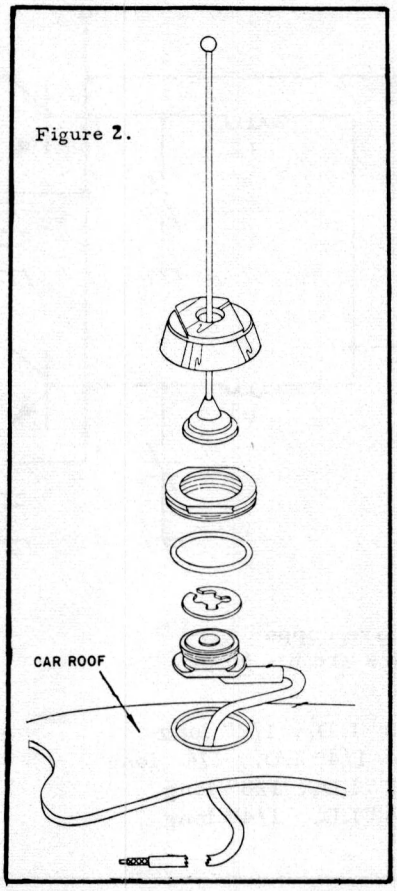
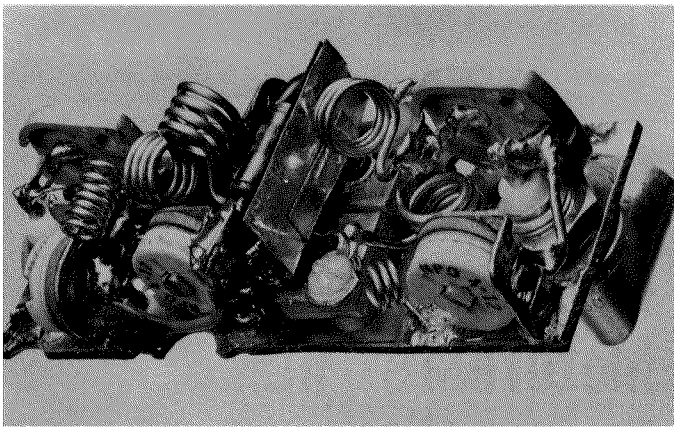


Figure 2.

Figure 2 shows an exploded view of the new Motorola two-meter spike. There are six models incorporating the same basic design; these differ only in length of the whip itself. The ideal one for two-meter operation is Model TAD 6112 A (Motorola Part 1C 83938 B 02). This antenna is cut for operation between 144 and 152 MHz. According to the specification sheet supplied by Motorola, the vswr at 147 MHz is less than 1.2 : 1.

The best I've saved till last: The new Motorola superspike costs no more than the ugly old eightball.

ADD TWO WATTS TO YOUR H/T

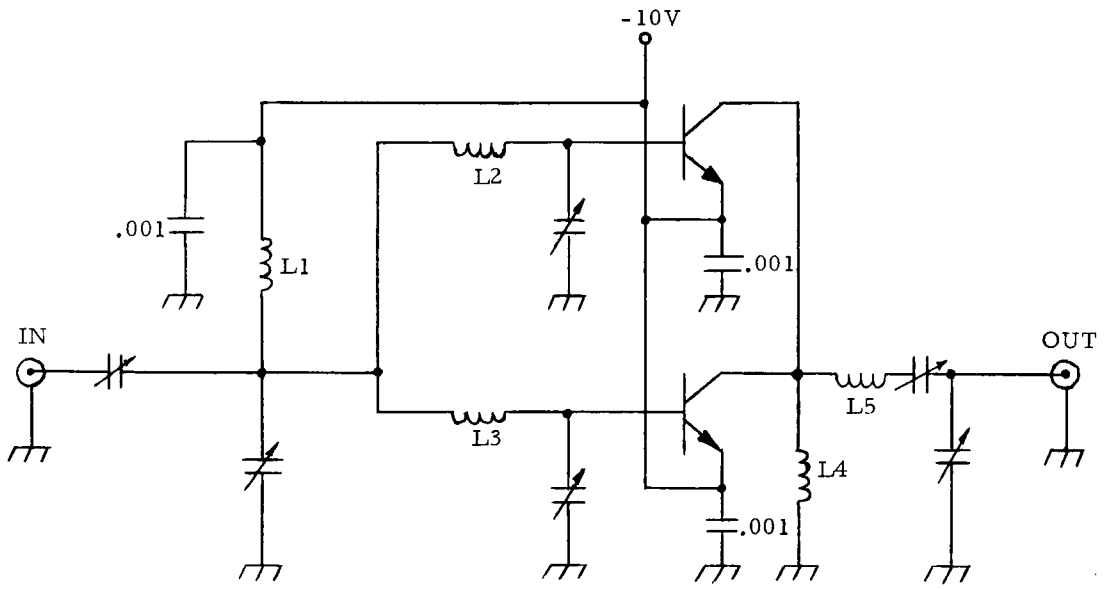


by Dan Harger, W8BCI

The add-on amplifier shown here is capable of two watts output with a battery input of 10V. This is a 9 dB increase over the 250 mW of the barefoot transmitter described in the December issue of the FM Bulletin. When the battery voltage drops a volt or so, the final output may go down to about 1.5 watts.

The transistors are RCA 40405, silicon epitaxial NPN's, each of which is capable of delivering 700 mW at frequencies as high as 500 MHz. These transistors, by the way, are exceptionally good as multipliers -- so good, in fact, that I intend to use them almost exclusively for multiplication and buffering on future transmitters. The RCA 40405 is in the right price range, too. The $1.25 price tag keeps the cost of transistors for this final to only $2.50.

The transistors are manufactured in standard TO52 cases and are only about an eighth of an inch in diameter. Of course, they must be mounted to an appropriate heatsink for protection and adequate heat dissipation. A good makeshift heatsink is a small rectangular sheet of 3/16-inch aluminum panel (0.5 x 1.25 inches).



Notes:
All coils use tinned bare copper wire
All variable capacitors are 8 - 60 pF, type not critical.

L1 - 7 turns #20, 1/8" I.D., 1/2" long
L2, L3 - 4 turns #16, 1/4" I.D., 1/4" long
L4 - 3 turns #20, 1/8" I.D., 1/8" long
L5 - 3 turns #16. 1/4" I.D., 1/4" long

Four holes are drilled in the heatsink: two #14 drill-size holes for the transistors (force-fit) and two holes for passing 6-32 nylon mounting bolts. Two #14 holes should be placed in the center of the heatsink, and spaced about equidistant from each other and the ends of the heatsink. The mounting holes are drilled just close enough to the transistor holes so that the head of the mounting screw will hold the flange of the transistor in its hole without touching the leads. The collector and the case of the transistor are common to each other, so if the screw happens to be metal it won't matter if it is close enough to the collector lead to actually touch.

I was able to obtain some nylon 6-32 bolts and some 1/16-inch washers to space the block off the chassis. I would strongly advise against using thin mica as an insulator between the block and the chassis, as the capacitance added to the collectors might make it difficult or impossible to tune without additional modifications.

The final itself is mounted on a 3.5 x 1.25-inch copper-clad board. It fits nicely beside the batteries and leaves a reserve of space in the box.

The six variable capacitors in the final circuit allows tuning of any driver and any antenna to the final; also, it provides a means for balancing the two transistors for optimum output. (Tuned slugs could be used for this purpose if extra miniaturization is a requirement, but the variable capacitors proved the easiest way out for me.)

A shield is mounted between the input components and the output components (including the heatsink). It was possible to obtain more output with the shield than without; this was apparently due to some out-of-phase feedback without the shield. Overall stability -- with the shield -- is extremely good.

Construction is not really critical at all. The important thing to remember is to keep the leads short (ordinary good engineering practice) and the amplifier in a "straight line" configuration.

Checkout

When the amplifier is completed, apply 250 mW or so of drive without any voltage, using an indicating device of some kind on the output. You should be able to see drive "leakthrough" -- a phenomenon common to rf transistors. Tune all stages for maximum output (without voltage, remember) to get the final "in the ballpark." Following this procedure, apply approximately 6V and tune for maximum output again. You should be able to produce around 700 mW. Then, with 10V on the final and 250 mW of drive, the output should increase to somewhere near a full two watts. For my own tests, I used a Bird Thruline wattmeter with a 3W plug to measure output power.

Results

The efficiency of the amplifier is quite surprising! With 2W of power from the battery (0.2A at 10V), the rf output is negligible less than 2W. The total battery drain from the entire 250 mW transmitter and 2W final is 300 mA at 10V. To verify these figures, I have used two other wattmeters; all readings tally closely! Incidentally, I blew out the #49 pilot lamp used in Motorola's 250 mW load, so I installed a #47 in its place. The resultant vswr is not as impressive, but its life is greater -- and it gives a good indication that the final is still operating. Its color is a dim orange-yellow with a 1.5W signal; the color turns more yellow as power increases.

Now for the striking results! From inside a metal structure, I could not be heard when I transmitted on the 250 mW unit. The increase to 2W, however, brought the signal up to a quieting level. Attesting to the overall communications capability is this fact: If a signal can be heard full-quieting on the Roll-Your-Own receiver, it can be worked with the 2W final. This was not always true with the straight-through 250 mW unit; the receiver has a tendency to outperform the basic transmitter.

A plus feature of the final is that it is compatible with any transmitter in the quarter-watt class. The only difficulty in such an application is that of providing a 10V power source and a means for antenna changeover. Individual ingenuity should solve both these problems with ease, however.

One last note: The amplifier oscillated when I had the wrong coils inserted. This can be avoided by applying drive without voltage (as mentioned earlier) and adjusting the variable capacitors to see if they all tune effectively. At one time, the aluminum block got too hot to touch (when the final had the wrong coils), and was oscillating with a current drain of 400 mA. Fortunately, my heatsink performed well, and the transistors lived through the ordeal. I eventually did blow the transistors, however, by shorting some of the transistor leads to ground with no drive applied. Foolishly, I was adjusting the final without cutting off the supply voltage. The proper power supply with overload protection would have prevented this.

One learns to anticipate the unexpected. A famous man once said, "Moments of despair are the lot of men with vision." Likewise, unforeseen incidents are the lot of the experimenter. But don't let them dampen your spirit. Keep trying. The results will be most rewarding!

In closing, I wish to thank all the people who have assisted me in getting this project completed: Harry Taylor (WA8TCD) for his photography, and Wedemeyer and Fulton for their successful aggressiveness in obtaining parts for the handie-talkie.

.....W8BCI

THE national FM'ers' journal

FM BULLETIN

REPORTING ON AMATEUR FM ACTIVITIES

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One very sound reason for uniting

by Tom Burford, K7TDQ

What the amateur radio FM operators of this country needs right now is a national FM association. Since none of the national amateur radio organizations seem to even remotely recognize that there is such a thing as FM operation on any scale, I would suggest that it is time that we operators of this mode unite and form a national organization and push for some regulations that we can live with.

As is known under the present rules there are few provisions for automatic repeater operation. We have gotten around this problem by putting remote stations on the air all around the country, and licensing the operations under separate and often unique agreements with the FCC. In using a Mountaintop machine, the operator can talk to anyone he wants to as long as he makes the proper entry in his log, but if the station he is talking to is 200 miles away in another state, that operator cannot very well sign the log, which is required for any licensed amateur who speaks or operates the station of another.*

This writer is proposing that repeater users, groups, owners, and clubs, get together during the next year and put together some ideas and come up with some solid proposals for rulemaking. Next January would be an ideal time to hold our conclave on repeater operation. We have a full year to think of objectives, air our views, and discuss various points. Then, during the next national FM convention (held in conjunction with SAROC) in Las Vegas, we can act singularly to pass intelligent resolutions.

Several repeater groups have come up with workable proposals in the past. Using some of the ideas these groups have proffered, we can almost certainly be persuasive enough to win the rule changes we need and want.

As a national FM publication, the FM Bulletin is an ideal outlet for mass communication to interested amateurs; it is also a ready made mode of national interchange of ideas between organizations. I would like to hear any comments on these proposals or on any proposed rulemaking. Address all correspondence to Las Vegas Repeater Assn, 6328 Shawnee Ave., Las Vegas, Nevada 89107

*Ed. note: The FCC does not require repeater operators to sign the log. A recent communique from Mr. Ben Waple, the FCC's amateur licensing secretary, declares that legality is maintained when the control operator turns on his repeater and makes an entry in his log denoting the system is in repeater operation. Author Burford is trying to point out that it is time repeater operation was covered in the general rules (Part 97) rather than treated as isolated instances subject to such rules as the FCC may deem appropiate in each case. We are 100% behind him with his plans for the January 1969 FM convention and we shall do all we can to promote it. Of course we have already made plans to attend. Will you???

TWO-METER COLLINEAR

by Bob Lans, VE3BXA*

Our repeater group has been investigating high-gain vertical antennas for the Uxbridge site. In the August, 1967 issue of QST, a good collinear antenna is briefly described. So as not to be left behind in antenna construction and theory, we decided to construct one also.

Figure 1 illustrates the general layout; figure 2 gives a detailed view of the connections. The cable is Amphenol low-loss 50 ohm polyfoam (621-111 8/U). The velocity factor of this cable is 0.8 (most others are 0.66). For this cable at 147.0 MHz the length of cable for each half-wave section (end of copper braid to end of copper braid) is 31.2 inches as per formula $\frac{5904V}{f}$.

For solid dielectric, the sections are 26.5".

Soldering the sections together was complicated by the low melting point of the Polyfoam. This was solved by insulating the copper braiding from the dielectric with a thin sheet of flexible fiber glass. For weatherproofing and ease of mounting, the antenna will be encased in PVC electrical conduit (1 in. diameter), with the possible addition of coating of fiber glass for strength.

Preliminary field tests were conducted using a 30 watt rig (to a 5/8-wave antenna with a low swr) and then switching to the collinear. Three reports gave me a poor signal report (40-80 miles) on the 5/8-wave vertical, but quieting on the collinear.

Figure 3 is a matching device suggested by some to match the antenna to the transmission line. We used seven half-wave sections and no matching device and found we had a very low swr.

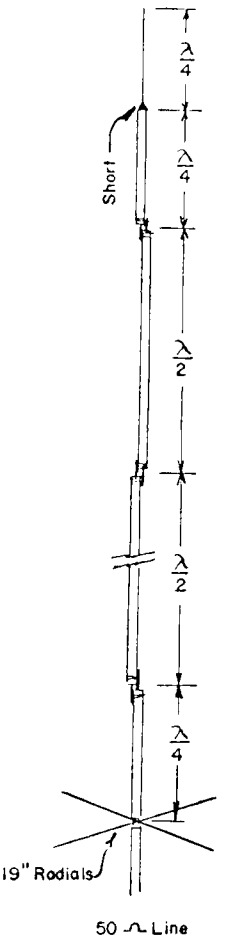


FIG. 1

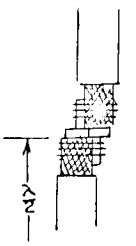


FIG. 2

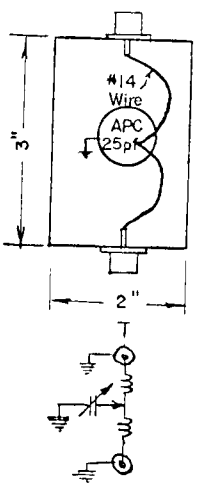


FIG. 3

*condensed and reprinted from
Toronto FM Communications Association Bulletin.

FM across the NATION

Up-to-the-minute reports on FM action thruout the U.S.

NEW MEXICO

New repeaters are sprouting up around New Mexico like toadstools after a spring rain. In addition to those in Albuquerque and Roswell, a two-meter FM repeater has just been established in Alamagordo. The Alamagordo "machine" is controlled from 450 MHz. The repeater uses 60W GE Progress Line equipment.

PENNSYLVANIA

State College, Pennsylvania will soon have its .34/.94 repeater working full time. The 450 control repeater operates on 448.1 MHz input and 449.1 MHz output. (It's all FM, of course.)

A unique "separated" system has been undergoing exhaustive testing in Pennsylvania. It consists of a 146.34 MHz receiver located in Newtown Square, Pa., and a 146.76 MHz transmitter situated some seven miles distant, in the city of Merion.

ILLINOIS

A special repeater meeting was held in late November at W9LFO in Greenview with the objective of organizing a group to cooperate in installation and operation of a .34/.94 repeater. Site of the proposed repeater was tentatively established as the K9KGO residence in Petersburg. The repeater is already in limited operation and awaits FCC remote-control authorization.

Glenn Hill (WA9GCK) reports that the St. Louis repeater is fully operational, and many of the Central Illinois stations are operating through it. The St. Louis machine repeats 146.34 to 146.94 MHz.

MISSOURI

The Ham Monitor, a monthly publication from the Ø area, reports that a six-meter repeater is now operational in Kansas City, retransmitting 52.7 to 52.525 MHz. According to the Monitor, the repeater facility is privately owned, and was started a year or so ago by John Prosser (WAØEEU), Dick Chevalier (KØFRA), Don Kline (WAØJMC), and Darrell Hanson (KØZMJ).

The repeater reportedly has the unique capability of allowing automatic crossband operation between six and two meters FM. The Monitor article stated that the Mid-America FM Association, after using the 6/2 function to conduct a roll call on two bands, has expressed an interest in adding the repeater to its own existing two-meter facility (WAØAMR). The Ham Monitor speculated that this interest is proof that a growing number of Kansas City amateurs are becoming keenly interested in advancing ham FM technology.

ARIZONA

By now the Phoenix, Arizona machine should be operational. Mary V. Brown, secretary of the Arizona Repeater Association, reports that a .34/.94 FM repeater is being installed at KOOL, the local television tower site. (See Ariz. Repeater Assn. article, this issue.)

NORTHERN CALIFORNIA

Jon O'Brien (W6GDO) reports that he is installing a 450 MHz repeater atop Mt. Vaca in Northern California. Mt. Vaca, he says, is 2800 ft in elevation and will, hopefully, provide coverage in such areas as Sacramento, San Francisco, Stockton, Modesto, Marysville, and Yuba City. The repeater call will be W6GDD.

An Air Force MARS two-meter repeater has only recently been established at the same site. The MARS FM system was put together from equipment that Jon converted. It is currently being used by more than 40 stations, Jon says. (See "Letters.")

FM Across the Nation (Continued)

SOUTHERN CALIFORNIA

The .34/.94 repeater at the 3300 ft Radio Ranch site has been shut down temporarily. Clyde Anderson (WA6BBD), spokesman for the W6FNO repeater, stated that the input frequency was too active with AM'ers and the result was a heavily jammed FM channel. Most .94 FM'ers sighed with relief when the system was deactivated. Anderson said the machine would be reinstalled, but some form of selective-use system would be instituted to keep AM'ers from tying up 146.94, the prime channel. Presumably, he intends to use a PL tone decoding scheme on the repeater input frequency.

NEVADA

Plans are being feverishly formulated to install a .34/.94 repeater on one of the peaks outlying Las Vegas by the next national FM convention (and SAROC). Several Southern California amateurs are working toward interconnecting the Los Angeles area with Las Vegas via a series of UHF FM links between key repeater stations in the two states.

DX FM

Recently, two Los Angeles FM stations worked some excellent DX, considering the signal path and power levels. Dick Bremer (WB6DNX), operating portable on Blueridge summit (8000 ft), worked William Burford (K7TDQ), who was mobile on Diablo Peak near Las Vegas, Nevada. Dick was using a one-watt walkie-talkie and a whip antenna. The same day, Gene Thieman (K6TVE), of Torrance, California also worked K7TDQ. Gene was running 20 watts to a vertically polarized twin-six beam. Torrance is only a few miles inland from the Pacific Ocean. All contacts were on 146.94 MHz; distances covered were approximately 250 airline miles over rough terrain.

On the 13th and 14th of October, FM'ers in St. Louis, Missouri found they had a band opening on two meters. The Owensboro, Kentucky repeater was copyable from early in the evening until past noon the following day. Allen Kempe (KØSSL), secretary of the St. Louis Repeater Organization, noted that on "rabbit-ears" he could pick up channel 7 TV from Evansville, Indiana. The picture, he said, was only slightly snowy. The conditions were good enough so that KØSSL and several others were able to work through the Owensboro repeater from their mobiles. Norman Edman (WAØQMI) operated through the Kentucky repeater with his one-watt walkie connected to his base station groundplane. Owensboro is about 175 miles east of St. Louis.

LETTERS

Sentry Splash!

In the two-way radio business, we have to be pretty finicky about the types of crystals we order. Most of us pay premium prices, but we know the crystals will be on frequency and will require no "bending." When Sentry placed a full-page ad in your magazine I decided to give them a try on my next commercial crystal order. Their service, I am happy to report, was quicker than I'm used to, the quality was top-notch, and the crystals oscillated dead on frequency without oscillator adjustment. I'll be using them from now on and recommend them for amateur use. I hope Sentry continues to support your fine publication.

Fred Daniel W6NQS
Owner - Manager
Communications Specialties
Pomona, California

Was pleased to see Sentry Crystals advertising in your magazine in the December issue. I'm going to order a few of their crystals commercially to see if the quality and tolerances are comparable to International.

Bill Miller W6WXQ
Service Manager,
Autophone, Incorporated
Los Angeles, California

The Southern California FM Association wishes to express appreciation to Sentry for buying space in FM Bulletin (back cover, December 1967). It was disappointing to find Sentry's ad missing in the January edition. FM is a natural advertising market for a crystal manufacturing firm, and I sincerely hope Sentry decides to continue its support of FMB. I've heard a lot of good reports on Sentry crystals; many SCFMA members have expressed an intention to order all their crystals in the future from Sentry.

Jack Bankson WA6JXG
President (Acting), SCFMA
West Covina, California

Comments on Articles

You're doing a whiz-bang job. The articles are sophisticated and really geared to the FM'er. The remote telephone article (in December issue) was great except for one minor detail. How does one turn on the transmitter after dialing on the remote telephone?

Barry Flint WB4DHP
U.S. Army

A SET OF NORMALLY CLOSED CONTACTS ON THE TELEPHONE ENABLE RELAY SHOULD KEY THE PUSH-TO-TALK AT DIAL-ON. THIS WAS INADVERTENTLY OMITTED FROM THE CIRCUIT.

(Continued next page)

BUFFALO, NY REPEATER

BY Gilbert Boelke, W2EUP

The Buffalo repeater is owned and maintained by the Buffalo Amateur Radio Repeater Association. Presently, it is licensed to the Radio Association of New York as a remotely controlled station with K2GUG as trustee. It has been inspected and cleared by the FCC, local rumors to the contrary notwithstanding.

This repeater has been operational since 1962 from several locations and under several calls. The present site is a temporary one; it is situated in Depew, New York, about three miles east of Buffalo.

The repeater input is 146.34, and the output is 146.94 MHz. The output, however, is remotely switchable to 147 MHz. A whistle or tone at 1600 Hz for a few milliseconds activates the transmitter power supply, which will remain on for five minutes (or continuously, as long as the repeater is in use). Logging is accomplished with a remotely operated tape recorder which records at a speed of less than 1 ips. The recorder is activated by a 90 Hz subcarrier on the repeater signal; it records the first eight seconds of each transmission. User stations are expected to mention the date and time at least once during the recording process to allow a means for accessing the taped data later.

The automatic identification system consists of an mcw coded identity burst on the outgoing signal at regular intervals.

Remote control is accomplished via a 450 MHz link from the control point using a two-tone dial system for use by the authorized control operator. User control is available by means of a standard 2805 Hz pulsed-tone system. Functions available include turn-on, shutdown, identification, channel switching, and link system controls.

The link system is a multiaccess switchboard that allows stations to dial into and out of the system on a number of available access channels. These include a 450 MHz link to Toronto and a 52.525 MHz translator at present; links to other areas have been provided for in the system, and they will be accommodated as interest increases in other areas.

Some of the cross connections are disabled temporarily pending a solution to the logging problem (hopefully by action from the FCC as a result of our recently filed petition).

Performance figures: Power output on 146.94 MHz is 50W. The two-meter receiver has a 2 dB noise figure. Antennas are 6 dB collinears, vertically polarized and spaced 15 ft apart. Cavities are used to minimize desensitization.

LETTERS (Continued)

In the December edition of the FM Bulletin, the Southern California FM Association promoted the adoption of certain two-meter frequencies as standardized FM channels. The frequencies listed were first published by the Lynchburg, Virginia group in 1962 and have been accepted by the majority of FM stations as the standard frequencies to use since then. What is new in the December Bulletin listing is the method used in designating the channels. The system used in the northeastern section of the U.S. and in Canada is shown below. Although some areas may not wish to adopt this system, I think it should be published so that mobile FM operators encountering channel letter designations will not be baffled by what they hear.

AE 146.04	G 146.64	P 147.24
AD 146.1	H 146.7	Q 147.3
AC 146.16	I 146.76	R 147.36
AB 146.22	J 146.82	S 147.42
AA 146.28	K 146.88	T 147.48
B 146.34	A 146.94	U 147.54
C 146.4	L 147	V 147.6
D 146.46	M 147.06	W 147.66
E 146.52	N 147.12	X 147.72
F 146.58	O 147.18	Y 147.78
		Z 147.84

Joe Cusimano VE3OV
Willowdale, Ontario
TORONTO FM COMMUNICATIONS ASSN

The Roll-Your-Own transceiver makes a good article, I suppose, but it sure seems silly to build one when a tried-and-true Motorola quarter-watt job only costs about $25 used. I really dig your book. It's getting better and better. Keep it up!

Art Garn
Burlington, Kansas

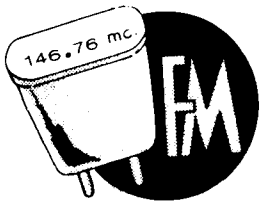
Miscellany

On November 24th there was a meeting at W9LFO's in Greenview to organize a club to put a .34/.94 repeater on the air at K9KGO's QTH at Petersburg. W9LFO was elected president and K9KGO was elected secretary and trustee.
...Thanks for the good job on FM Bulletin.

Glenn Hill WA9GCK
Greenview, Illinois

We have just established a USAF MARS... repeater using equipment that I have converted, and there are presently over 40 stations using this circuit. If you would care to send some sample copies (of the FM Bulletin), I would be happy to distribute them, and you may pick up more subscribers.

Jon J. O'Brien W6GDO
Northern California



CHRONICLES OF SEVEN-SIX

By- Ken Sessions K6MVH

PROLOGUE

Last Month:

The seven-six Organization, with its Frequency Coordinators, Master Control Stations, and special news service, resulted in the establishment of customs totally alien to traditional hamdom. Original expressions developed, as did operating habits which were unique to the F M frequency of 146.76 MHz. And through this self-imposed regimentation, a number of outstanding and interesting individuals appeared. Such was "Mr. Seven-Six."

V. MR. SEVEN-SIX

A particularly colorful character on seven-six was Vern Thompson, with a different (but legal) set of call letters for each of his many remotely operated amateur radio F M stations (WB6AAD, W6ZJU, WA6PCN, and several more). Vern could best be described as a rabble-rouser, but his impish nature, flamboyant attitude, and congenial personality tend to make him defy general classification.

Vern likes to mislead people--lure them--then leave them wondering if they'd been had. And he likes to impress people. He spent thirty dollars one evening to conjure up a ten-minute hoax on seven-six that never was debunked.

Vern gets to travel a lot in his occupation. He appeared on seven-six one night immediately preceding the 10 o'clock newscast, and announced that he was in San Francisco. He said he had set up a series of radio relay links to span the 500-mile area between Los Angeles and San Francisco, and that he would be repeating seven-six's Newsbeat into his system for output on the popular Frisco FM channel. When I transmitted the news a few minutes later, I welcomed the Northern California network to the seven-six organization. At the end of the newcast I was allowed to talk to the San Francisco stations. Many of us on the Los Angeles FM channel conversed with many of them; and we were one and all noticeably impressed with Vern's remarkably high-quality system.

Vern didn't let me in on his "secret" for two weeks. I was viviting him at his Granada Hills home when he casually remarked, "That L. A.-to-San Francisco phone call cost me thirty bucks." --A phone patch at each end of the circuit effected the long-range 2 meter communications.

Vern set up a very powerful remote station at a particularly good vantage point once. The remote transmitter was activated by the tail end of an on-channel transmission. Each transmission heard by his hilltop receiver would be automatically recorded. Then, as the carrier dropped, the recording would play back through his remote transmitter.

Such a delayed repeater device could prove highly beneficial in cases where any two stations are out of range of each other. But it doesn't take too much imagination to envision the bedlam that might develop if the two stations are within good two-way range. Each station must sit through two identical transmissions before responding. This gets particularly aggravating when either of the two communicants are wordy. This wasn't the only questionable purpose for which Vern's remote system has been put into service. Vern remembers with pride the one-sided conversations he has "fabricated." When an operator speaks in hackneyed, stock phrases, Vern records. He plays back these tidbits at carefully timed opportunities, so that an unsuspecting operator might strike up a conversation with what is actually a taped playback of an actual month-old communication.

I was astounded one night to hear a seven-sixer engaged in pleasant chit-chat with Helen, my wife. Ordinarily, I wouldn't be too surprised, because it's not out of character for her to make an occasional appearance on the Preferred Frequency. But she was sitting across the room from me reading a book! She came over and listened to "herself" talk. Only half the conversation was live, we learned. While the "sucker" transmitted, Vern searched his "Helen" files for appropriate responses, and played them back right on cue.

Not too many seven-sixers know of Vern's little deceits. When his little game is over, he doesn't let the other station know he's been duped. He merely rewinds his tape, chuckling to himself, and prepares to trap the next guy. Vern doesn't seem to mind that his audiences are pretty small; he derives a sence of intense satisfaction from just knowing he's hoodwinked an unsuspecting lamb.

With his many call letters, his unusual and distinctive traits, and his characteristic, slow deliberate, ever-smiling speech, Vern was particularly easy to satirize. He naturally received justifiable coverage on Newsbeat. His forte is perhaps "bafflegab" - the art of explaining something in such a way as to sound reasonable, but cleverly designed to confuse the listener. In perfecting his bafflegab technique, Vern developed the habit of connecting all sentences with "ands," "whiches," and "buts," so that regardless of the length of his transmissions, they seldom comprised more than a single sentence.

Vern is often heard using what he calls his "Wristmitter." His explanation of the device to a channel newcomer has become a seven-six classic:

"I just coupled a few integrated rf circuits together with a few choice transistors," he'd say with his grinning drawl, "and the result was the Wristmitter which I load into a standard watchband." When Vern goes into depth on theory of the device's operation, even the most competent of us get lost. He undeniably uses a portable unit of some kind, because he transmits from the tub, the underside of a car chassis, the breakfast table, and sometimes from the office. One occasionally even hears the unmistakable sound of a flushing john.

The signal from his Wristmitter drives his home station, which in turn keys a remote transmitter on Mount Wilson. Multiple squelch tails verify the existence of an additional transmitter in the string; and the exceptionally poor audio quality during his Wristmitter transmissions makes the story almost believable, even if not plausible.

When I learned what his Wristmitter really was, I featured this phony interview on Newsbeat:

Newsbeat takes you now to Washington and Walter Krimptite:

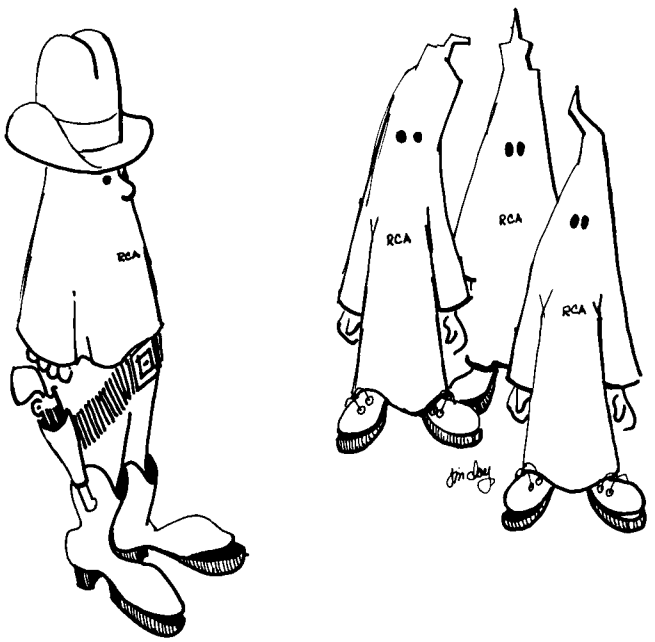
"Good Evening. I am speaking to you from inside the U. S. Patent Office, where Deputy Patent Officer Hinklemeyer is interviewing renowned amateur radio operator W6ZJU. Let's see if we can pick up their conversation."

"You are Vern Thompson?"
"Yeh, Man. Didn't you get my letters?"
"We got them. Just answer the questions, please. Now what, exactly, is this Wristmitter?"
"Hey, Man, this is my supersophisticated, supersecret, ultra-compact, wristmounting, short-range voice transmission system which took me four years of heart-breaking, slave-driving, grueling research and experimentation to develop it and this ingenious device (broad smile) operates through a household broadcast radio receiving...."
"Yes--Well, Mr. Thompson, this Wristmitter looks to me like an ordinary phono oscillator."
"Yeh-Right! That's what they said to Marconi when he invented the electric light."
"I'm sorry, Sir, but the circuit belongs in the public domain. Why don't you go out and invent something else.....maybe come back in a few years."
"Hey, Man. I was going to show you my automatic K6MYK repeater frequency shifter."
"Goodbye, Sir."
"Hey, Man....Hey!"

"This is Walter Krimptite returning you now to our studios."

With his slight stature, rough western attire, and casual manner, Vern didn't look too much like "officer material," but he seemed to be leader of a tight-knit group. Members of his group could be characterized by their exclusive use of RCA equipment (as opposed to G. E., Motorola, or Bendix, more common types to outsiders). It could have been my imagination, but the group arreared to have a tendency to snub newcomers. What bothered me even more was the fact that they called Vern not by his call letters, but by the unlikely title of "Valley FM Radio." With a more than ample surplus of calls, it just didn't make sense. So, I decided to feature him once again on Newsbeat, drawing attention to his apparent hostility to amateur society, his many calls, and his ridiculous title. As a last minute gesture, I even threw in a dig at his nasty dog, Spot:

We take you now to the beautiful estate of Mr. Vern Thompson, W6ZJU, where it looks like there's some activity going on. Yes ....There are a group of hooded men gathered in the parlor. Each man has a large RCA emblem emblazoned on the front of his cloak. Let's move in and pick up the conversation. I can't see the speaker's face because of the white hood, but from the looks of his Levi's and cowboy boots, I'd say he was our host, himself--W6ZJU. Listen....



W6ZJU (Vern): ... I don't know. What do you think Paul? Shall we let Helen into our superexclusive group?
K6CHR (Paul): Stand by, Vern, I'm jamming MVH!
Vern: What do you think, Lee?
K6CJE (Lee): Stand by Vern, I'm applauding CHR. Check with KQC.
Vern: What do you think, Gordon?
WB6KQC (Gordon): Whatever will make Paul happy will please me. I'm a follower.
Paul: All right, What's your call, Helen?
Helen: WA6SPT
Paul: Swell. Keep a log?
Helen: Yes, Sir.
Paul: Sign your call?
Helen: Sometimes I do.
Paul: Jam a lot?
Helen: Only the bad guys.
Paul: Sorry--That's discriminating! Application denied!
(KNOCK, KNOCK, KNOCK)
Paul: See who's at the door, Vern. And take off that damn sheet!
(FOOTSTEPS: VERN OPENS DOOR)
Vern: Hello.
Visitor: Yes, I am Harold Channelcleaner of the FCC. I'd like to speak to you for a few minutes if you're W6ZJU.
Vern: Yeh, come in. Looks like my puppy dog made off with a good-size portion of your right thigh. Careful of those wires, there. They trip my

string of unattended transmitters.

Harold: That's part of what I wanted to talk to you about. We've been monitoring over the past 24 hours. You jammed out 14 QSO's, disrupted three chess games, swore twice, used unlicensed transmitters,.....

Vern: Gee. (Proudly) Did I do all that?

Harold: We're going to have to suspend your license, Vern.

Vern: Well, I've got lots of those.

Harold: Sorry. They're suspended.

Vern: Gee. Even WA6PCN?

Harold: Sorry, All of them.

Vern: Gee. That's tough. How about if I just sign with "Valley FM Radio"?

Harold: Not if I can help it.

Vern: Tsk, Tsk. Sic'im, Spot.

No one could cover the seven-six story without mentioning Vern's cuckoo clock. Five minutes after my first seven-six receiver was operative, the distinctive sound of an old-time cuckoo clock chortled the hour. It was five minutes slow.

That was nearly two years ago. Moments ago it was 10 AM. In three more minutes, the hour will be heralded again by the same clock. The reliable old timepiece has been cooing each hour (but not on the hour) for the past six years. Vern proudly claims that not once--in all that time--has the cuckoo agreed with WWV.

Anyone can chime out the correct time, Vern says. His way is unusual, original--it's a happy touch of individuality. Thus, the clock is seven-six's trademark. And its operation typifies the channel's modus operandi: insanity; inanity; reason without logic--the true "Spirit of 76."

NEXT MONTH: FALL OF THE EMPIRE

SOUTHEASTERN WASHINGTON.....

By H.R. Hughes, Jr. K7VNV

There is a respectable amount of activity here in Southeastern Washington, and it is steadily building up. Two frequencies, 53.29 and 146.76 MHz capture the lion's share of the FM activity, but some expansion is taking place. 146.34 MHz is used as the two-meter repeater input and, with few exceptions, is standard for this purpose all over the northwest. Locally, we **had** a six-meter repeater on the air with 52.525 MHz as the input frequency. (The past perfect form of the verb is used because this spring both receivers and the transmitter were stolen; 'is'is thus no longer applicable.) A new repeater installation is in the works and may be on the air this winter.

Local calls heard frequently on six meters FM are K7TGH, K7NEW, WA7EAQ, WA7FFM, WA7FXA, and K7VNV. (The last call mentioned in the string was my own.) W7OEB and WA7DUH will probably be heard shortly.

To the west of the tri-city area, there are additional active FM'ers: W7KFM, K7ZUR, WA7ADD, W7QYO, WA7DOG, K7LAV, naming but a few. To the north, there can be heard W7PAE, WA9EKR/7, K7NXW, W7NKA, and several others.

Equipment used most in these parts is GE and Motorola. The density on standard channels is somewhat less than what might be considered typical in larger areas, and repeater operation proves quite useful. Distances of 40 - 100 miles between small centers of activity are common; a well equipped base station can generally cover the distances with no assistance other than a good beam. The repeaters prove indispensable for mobile operation, however. The six-meter repeater can be (and often is) worked by mobiles at distances up to 100 miles. The repeater output is a modest 25W, but the receiver is particularly sensitive (less than 0.4 μV typical for 20 dB quieting). The antenna is a half-wave end-fed type, vertically polarized at 50 feet above the ground. Repeater elevation: 3500 ft above sea level.

BACK ISSUES COVERING AUG., SEPT., NOV., DEC., & JAN. ARE 25¢ Each.

CLASSIFIED ADVERTISING

This Classified Advertising Service is FREE to our subscribers. Send your non-commercial ads for a one issue run each to: FM Magazine, 2005 Hollywood, Grosse Pointe, Michigan 48236. Include your Phone number and Zip Code. To avoid mistakes - type it!

WANTED....Motorola P-8464 AC Power Supply - either in usable or repairable condition. Have a RCA MI-31309 and a MI-31237 AC supplies available for swap or sale. Also have RCA P-fones: MI-17325-B, MI-17346A and MI-17324 for sale or swap. Jule Fantaski, W8EYO - 3020 Mansueto Dr Stevensville, Mich. 49127 Phone: 616- 429-4219

WANTED...Donations of Ham Gear needed to get started the University City High School A.R.C. Contact by mail: Ken Birkmann, WAØNVT at 8353 Fullerton Ave., St. Louis, Missouri 63132

WANTED.....2FM mobile and base stations for the Blossomland Radio Club. looking for 6 or more units at Ham Prices....Contact: W8EYO - Jule Fantaski, 3020 Mansueto Dr., Stevensville, Michigan 49127 Phone 616- 429-4219

FOR SALE.....RCA 6-Meter FM Transmitter, just $20 by Carl F. Sensebaugh, WA4VQC at 110 Adams Drive, Lynchburg, Va. 24502 Phone: 703- 239-0687

WANTED...2FM mobile gear. Prefer either a converted or unconverted commercial unit. Send info to Joseph Snyder, 12650 Travilah Rd., in Gaithersburg, MD. 20760 Phone: 301- 948-9090

WANTED.....MO-KAN Amateur Repeater Club, needs info leading to purchasing six meter F M equipment. Contact Fred Frank, KØMZZ, at 6400 73rd St., Overland Park, KS.

WANTED.....1/4" Scrap magnetic recording tape for log keeping on WAØCJQ FM repeater. Any length okay- Joe Addison, WØPKD, 908 So. 11th, Salina, KS. 67401

FOR SALE.....Motorola 5V transceiver on freq w/ xtals on 146.940 Mhz also has mic, speaker etc. $45.00.....2 Meter Gd. Plane Ant. at $4 and a 2 Meter, 5db gain, mobile Ant. A/S..$10 Contact Glenn Pohl, K8IYZ 20245 Oakfield in Detroit, Mich. Phone: 313- KE3-4741

FOR SALE.....6 Meter FM Mobile rigs GEs- 2 case units. 6 units @ $35 each. Contact: Dick Barrington, K8TGH, 26975 W. 12 Mile rd. Southfield, Mich. Phone: 356-1516

FOR SALE.....2FM Mobile rig...RCA. Contact: Joe Addison, WØPKD 908 So. 11th, Salina, KS. Zip- 67401

FOR SALE....Anyone for a highpowered 6 Meter repeater? I have the 1/4 KW base station that was used at Detroit Edison for years, on about 46 MHz It includes panel for remote telephone operation, two of Link's best (Type 2450) rcvrs. I have the books for the cabinet and transmitters but not the receivers. Weights 450 lbs in 6 1/2 foot cabinet. I will split the cost on a U-haul trailer with buyer. $125 takes it. Contact: Fred E. Haneline, W9UDD 6014 Westhampton Dr Fort Wayne, Ind. Zip 46805

WANTED.....Ideas for cartoons for this, your, FM Magazine. To: William Ridenour, W3HI at 427 Wyndhurst Rd., Coraopolis, PA 15108

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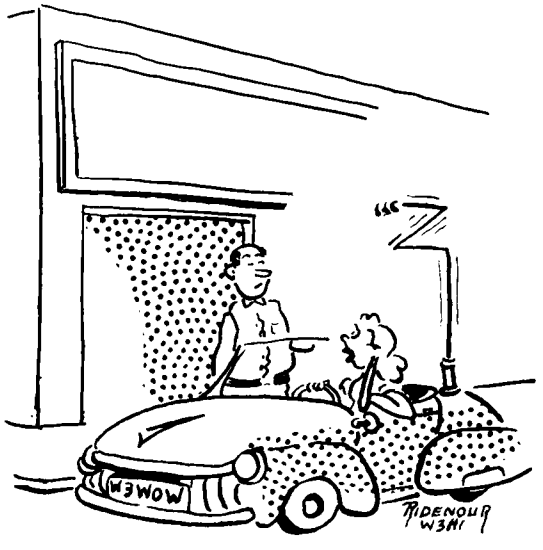

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