

SQUELCH TALES

WB6WLV

SQUELCH TALES is published by the SAN DIEGO REPEATER ASSOCIATION : WB6WLV, P.O. BOX 5815 SAN DIEGO CALIFORNIA 92105
EXECUTIVE BOARD MEMBERS: WA6UHB, Acting President and Public Service Committee; K6GAO, Treasurer; WA6LBV, Secretary;
WB6APU, Engineering Committee; K6QKG, Membership Committee; WB6TFC, Editor in Chief and Director of Publications; BOARD
MEMBERS: K6DYD; K6GSG; K6KTP; WA6LAG; WA6OSB. Editor and Production Manager, WB6SQZ-WB6ZDJ.

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OUR NEW NAME

As announced in the last two issues of SQUELCH TALES, the Association has sponsored a contest for a new name to replace the antiquated and cumbersome handle of San Diego Amateur FM Radio Relay Association. At the November general meeting the preliminary votes for the entries which had been published in that month's issue were tabulated, and a run-off election was conducted among those entries which had garnered the top three number of votes. The winner of the contest was - SAN DIEGO REPEATER ASSOCIATION - contributed by Bill Cheverton WB6SQZ-WB6ZDJ. Bill, however, declined the contest award of one year's free dues for Association membership. He asked that the award be given to the Association as a gift from the WYB-SQUIZ Foundation.

If you collect the first letters of each word in the new name, you come up with an abbreviation of SANDRA, which might be in use in the future. Let's discuss this at the December General Meeting.

STATE OF THE REPEATER MESSAGE

The repeater is rapidly approaching a stable operational condition. The last few months have seen many problems come and go, and we are now confident that the worst of them are over.

The source of our commercial intermod problem has been located, and we are now waiting for the combination of good weather and a time when we can

get the service man and ourselves to the mountain. The problem will be solved within a month, barring extremely bad weather. I have noted with interest that our group is not the only one to be afflicted with 600 Khz split problems. I know of at least two other groups that are having to fight the same sort of problems, and one of them is caused by a pair of FM Broadcast stations separated by .6 Mhz! We can be thankful that we do not have this problem.

Our building still has a leak in the roof, but we have put a temporary cover over the equipment which diverts most of the water to the floor. This should be satisfactory until it can be repaired.

Some of you noticed that the repeater was weak on transmit and receive on December 8th. This condition was caused by something that almost never happens on Otay, namely SNOW! Antennas work very poorly when covered by snow, and this certainly was the case this day. Ordinarily, a snow condition at the elevation of Otay will completely clear up the following day as the temperature rises.

The same weather that brought us snow also brought moderate winds. The winds caused the mounting for our transmit antennas to vibrate, and the antennas rotated by 45 degrees. At that time, the best coverage was toward the eastern end of El Cajon. We have now changed

NORTHERN CALIFORNIA REPEATERS

A Presentation of Ham Shack
Tours, Ltd.

The following list of Northern California repeaters was contributed by WA6JAW. The stations listed represent repeaters actually on the air during the 1972 Thanksgiving holiday season. These repeaters can be accessed by the average itinerant mobile FMer. The list is necessarily incomplete; additional certified listings would be welcomed by the EDITORS of SQUELCH TALES.

REPEATER	OPERATOR CALL	ANAL. FREQ. (MHz)	OPER. FREQ. (MHz)
San Francisco	W6JAW	146.00	146.95 (Repeater)
Phoenix	W6JAW	146.10 (200)	146.95 (Repeater)
Stockton	W6JAW	146.10 (200)	146.95 (Repeater)
Chico Lake	W6JAW	146.10	146.95 (Repeater)
Palmdale	W6JAW	146.10 (200)	146.95 (Repeater)
San Jose	W6JAW	146.10	146.95 (Repeater)

NEWS FLASH!!!

The U.S. Army operates its own remote base on top of Nui Ba Den, a 3000 foot high peak in South Viet Nam, and they won't put up with Jammers, freeloaders or ZWS types. A platoon of armed U.S. Marines, with their own artillery, lives with the radios. The Association is investigating the feasibility of adopting these advanced concepts for its own use. A vote will be taken at the general meeting in December. Plan to be there.

ATTENTION, S.O.C.O.N. II!

— ATTENTION ALL INTERESTED AMATEURS —
What has happened to the amateur "Fraternity" or the "freedom" of the amateur bands?

Most of us have been on two meters for some time and accept amateur radio as a pleasurable hobby.

Are we prepared to accept the dictation of a select group of amateurs making a feeble attempt to "own" the top half of two meters??

This group is already in jeopardy, as they have been warned by the F.C.C. to "clean their closet" **OR ELSE!** By foolishly attempting to run other amateurs off parts of two meters, they are asking for legal "trouble".

We must ignore these threats and, if they cause problems, write the F.C.C. and file a complaint!

The SOCON II net has been threatened with "discredit," "jamming", and general problems by people representing various repeaters in San Diego. The net was already driven off 146.10 after years of peaceful operation in favor of a small group of disliked amateurs.

DO NOT ALLOW any further pushing by these groups. To do so would be criminal!

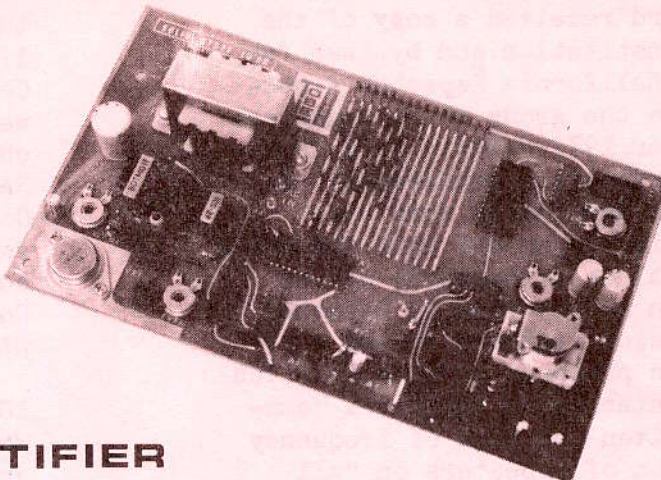
Remember! Point to Point communication can squeeze very nicely on 146.0f or any frequency.

For the first time, technicians have the top three MHz of two meters, let's **ALL** use it — not just some of us!!!!

For those who do not know, SOCON II is the group that has picked our frequency for their net in violation of the frequency coordination conference. EDITOR.



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Minutes of the December 1972
Board of Directors Meeting

All Board members except K6KTP
were present

1. The meeting was called to order by WA6UHB, acting President, at 8 pm on December 7 in the San Diego Paper Box Company Executive Refrigerator. The Board expresses its special thanks to the executive caterer, Ms. Darlene Boyle, for the gingerbread cookies and to K6GSG for making an emergency beer run.

2. Commercial display advertizing for this issue was reviewed.

3. WA6LBV introduced the acronym SANDRA for use as an abbreviation for the new San Diego Repeater Association name, chosen by vote of the members at the November monthly meeting.

4. WA6LBV reported receipt of the final shipment of 146.640 MHz crystals for Motorola radios from the Los Angeles group which previously used the channel. The Board approved a payment of \$128.90 to complete the crystal purchase. These crystals are offered for sale to members by SANDRA; see the announcement elsewhere in this issue.

5. The Board received a copy of the proposed constitution and by-laws for a Southern California Repeater Association, from the group which organized the September 1972 Baldwin Park frequency co-ordination conference. A cover letter and ballot were also inclosed, with a request that the Board vote approval or disapproval of the constitution and by-laws by December 15. Discussion centered around a point in the proposed by-laws in which the newly established Technical Committee was given the task of frequency co-ordination of repeaters on "all VHF frequencies." Since the scope of the Baldwin Park conference was limited to 2 meter repeaters, the Board voted approval of the constitution and by-laws with the limitation that frequency co-ordination by the

So. Calif. Repeater Assoc. be limited to 2 meters.

6. It was reported to the Board that a meeting had been held between SANDRA representatives and members of the K6VBT San Gabriel Valley 04-64 machine, concerning interference to the WB6WLV repeater by their machine and members of the SOCON II AM traffic net. The results of this meeting are reported elsewhere in this issue. The Board voted to reimburse the SANDRA representatives for their travel expenses.

7. Discussion was held concerning the possibility of making changes in the format of the Sunday night net. The Board made no decisions concerning changes, but decided to seek suggestions and comments from the members during the next several net meetings and at the December monthly meeting.

8. It was decided that a supply of SANDRA membership information letters and application forms would be distributed to each Board member. SANDRA members who wish applications sent to their friends can request them from any Board member. Also, members who wish corrections made to their listing in the roster are requested to mail said corrections to the SANDRA post office Hatheway.

9. The Board received a report from the group which is organizing the 1974 ARRL Southwestern Division Convention. They have requested that we appoint a Transportation Committee chairman (WB6TFC and WB6SQZ from SANDRA are serving as Publicity Committee co-chairman). The Board decided to notify the covention committee that a Transportation Committee chairman will be appointed at a later date.

10. K6GAO reported the passing of W6NSW, an amateur who joined SANDRA just a few weeks before his death, and who never had the opportunity to use the WB6WLV repeater. The Board voted to refund W6NSW's initiation fee and first year's dues to his widow. It was also reported that SANDRA will purchase small

"In Memoriam" plaques with the call signs of deceased members, and will install these plaques on the repeater cabinet.

11. The Board discussed several instances of San Diego amateurs using the repeaters for commercial advertising of sales/service of ham products. No action was taken, but members are reminded that such activities jeopardize the repeater license, and are counter to the principles of the Association. K6GSG reported that several units of a new brand of solid-state 2 meter FM transceivers are causing interference to a local governmental radio system.

12. WB6APU gave a brief Engineering Committee report; his comments are reported elsewhere in this issue.

13. WA6UHB reported that the Humane Society Reserve will conduct 4 field drills during the months of February and March, 1973. SANDRA members who are also members of the Reserve are requested to participate in one of the four drills. The Reserve picnic, cancelled because of rain, is rescheduled for May, 1973.

14. WA6LAG reported obtaining "such a fine deal" on two 30 cup coffee makers. The Board voted approval of a \$25 (total) purchase.

15. K6GSG reported dual-freqing the Humane Society base station radio. The second channel will be set up on 146.520 MHz simplex, in line with the decision for a San Diego area simplex channel reached at the November monthly meeting.

16. The Board discussed nominations for Rogues Gallery, and also decided to establish a listing of hams who have just recently begun using the repeater, in order that SANDRA members know who they are and can issue them an invitation

to join the Association (many new FMers assume that amateur repeaters, like commercial TV stations, merely "exist," and may not be aware of SANDRA).

17. The December hidden-transmitter hunt has been cancelled; the next hunt will be in January.

18. The next monthly meeting will be held on Thursday, December 21, and will feature a technical talk on another popular brand of FM radios.

19. WA6OSB left the meeting at 10 pm to meet "Elaine"; the meeting was adjourned at 10:45 pm.

de WA6LBV, Secretary

OPERATING ON FM CHAPTER III

It was the Thursday night after the week-end I had given Bill some of the early history of amateur FM, and he had volunteered to give me a ride to the local radio club meeting. As we drove I noticed that his 75 meter side-band rig, usually burbling quietly in the background, was stone cold.

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James Hurry



R. M. Cheverton



Griffith Hayes



William Cheverton

We provide the Insurance for this Association, and we would be glad to do the same for you.

WB6SQZ
WB6ZDJ

"You r Drake busted?" I asked.

"Naw. I just don't get on 75 very much any more. Guess I'm getting tired of the constant receiver fine tuning. And that 'Donald Duck' audio is starting to get to me."

I smiled to myself.

"Tell me some more about FM history--you know, where we left off last Sunday," Bill said.

"Well, let's see. Back in the early 60's, after the FM pioneers had developed the 'Finer Mode', some of the active VHFers in southern California started tooling up on the new FM channels. Equipment became easier to get, although prices were higher than those for comparable equipment today. Remember in those days hams were often bidding on equipment which could still "legally" be used in commercial radio systems. Still, an enterprising FMer could get a piece of excellent surplus equipment for less than the purchase price of a new AM ham transceiver.

"A simplex channel was set up on 76, and over the course of the years it evolved into quite an elaborate social system. If you ever run across some old copies of the "FM Bulletin" be sure to read the series by Ken Sessions called "Chronicles of 76" to find out about the history of the 'Preferred Channel.' Small, mostly private 2 meter in-band repeaters were set up, although they were generally crude by today's standards.

"Other adventurous hams, sensing the need to extend their talking range on 76, got access to mountaintop radio sites, and installed 76 transmitters which were remotely controlled from their homes by 450 MHz radio links, using G. E. Pre-Progress Line, RCA Carfone, or early Motorola B44 base stations on

both ends of the link. These remotely controlled transmitters worked so well that soon 2 meter receivers were added on the mountains, and the remote base was born: a complete 2 meter base station situated on top of a mountain, operating on the popular 2 meter simplex channels, and joined to and controlled by a 450 MHz in-band repeater, also located on the mountain.

Although the systems were technically unsophisticated, they proved that the concept would work. Very quickly the remote base owners bought 450 MHz mobile radios, so that they could use their mountaintop machines from their cars for greatly increased mobile talking range. Advances in control systems were incorporated into the remotes, as well as special features like telemetry, links to other remote bases, and automatic telephone patch systems. Other simplex channels came into use by both remotes and "direct" stations: some were for calling other stations, some were private "secret channels", some for specific local regions, teletype, etc. And so FM in southern California grew during the 60's."

"Well, it's all news to me, even though I was on two meters during that time," Bill said.

"True enough. At that time the total number of FMers was still fairly small, and almost all the activity took place between 146.5 and 147 MHz, a region for which the AMers had no use. Consequently there was little interaction between the two groups. At the beginning of this period it was thought that FM would be a passing fad, like VHF teletype before it, enjoying an explosive start and then a gradual loss of interest. But a small group of dedicated FMers developed, and they persisted through the early 60's, trying new ideas, discarding those which didn't work, and advancing the art; sort of similar to the earlier development of HF single sideband.

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GENERAL:

- Front Panel Size: 6 1/2" x 2 1/2"
- Over-all Dimensions: 9" deep x 6 1/2" wide x 2 1/2" high
- Number of Transistors: 11 all silicon transistors, 4 diodes, 5 FETs, 3 integrated circuits
- Power Supply: 12 VDC System, negative ground
- Current Drain: Receive .09 amps
 Transmit: High 5.0 amps, Low 1.7 amps
- Frequency Range: 144 to 148 MHz
- Number of Channels: 10
 (includes 146.940 MHz. Remaining 9 frequencies, at nominal charge each for installation at factory or by owner.)
- Weight: 5-lbs. (approx.)

RECEIVE:

- Sensitivity: less than 0.5 microvolts for 12 db SINAD
 less than 1 microvolt for 20 db quieting
- Image: More than 45 db
- Spurious: More than 50 db
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- Audio Output: 1.5 watts at less than 15% distortion
- Modulation Acceptance: More than 7.5 kHz.
- Squelch Threshold: 0.5 microvolt max.

TRANSMIT:

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- Output Impedance: Matches standard 50 ohm amateur antennas
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"Then, in 1968, everything started to change. A couple of Japanese electronics manufacturers, seeking new markets, brought out all solid-state 2 meter FM transceivers which were designed, priced, and marketed specifically for amateurs. Although they were not well engineered by commercial radio standards, they hit a popular response among hams interested in starting on FM. Installation was quick and easy: just fasten the radio under the dashboard of your car, attach it to a convenient 12 volt electrical line, stick on an antenna, and in 15 minutes you could begin talking on FM. Gone were the "initiation" requirements of obtaining surplus commercial equipment, repairing and retuning it, mounting the radio in your trunk and snaking cables up to the front of the car, and, of course, the heavy power draw which the commercial tube radios put on the car's electrical system. Of course equivalent (and better engineered) solid-state commercial radios were still in commercial service during the 60's and generally were not available to the hams.

"These ham-only radios really started a boom in FM. They were relatively inexpensive compared with other ham equipment, because they were low-powered and did not require the manufacturer to build in a power supply. They were extremely convenient to use, and they offered an easy way for the "ham who had everything" to get into something new."

"What do you mean by that?" Bill asked.

"Well, about this time the HF bands became saturated. You know what I mean-- everyone had converted to SSB, and they all had multi-kilowatt linears and tri-band beams. Congestion of the bands was unprecedented. So, more and more, hams began looking for someplace to slip away when they got tired of fighting the QRM. FM was that place, and a good number of hams actually 'hung it up' on sideband and stayed.

Then too, long-time VHF AMers soon converted over when they saw activity growing; CBers who were fed up with 11 meter lunacy and who remained interested in reliable local communication got licenses and came in; and the usual number of bootleggers showed up. The FM population doubled and redoubled.

"With all these new hams having low-powered mobile FM transceivers set up for easy QSY to lots of different channels, the demand for more and more mobile repeaters was established. And so the "open to the public" repeater population boomed. With the increasing availability of low cost surplus commercial equipment, more and more of the "old timers" went into remote base operations. And the remote base population escalated. The existence of repeaters to talk through and the heavy promotion of FM in the ham magazines further stimulated the sales of FM equipment, and that's how we got to where we are today."

"So that's how this business developed!" exclaimed Bill. "It sure is interesting. But would you answer a question for me? If I were going to buy my own FM radio, which kind should I get? I mean, a solid-state ham radio, or a surplus commercial radio? And how would I go about choosing one?"

"Well, that's sort of a long story. And, as you can see, we've just pulled into the parking lot. Let's take that one up next time."

cont'd next month

CLANDESTINE RADIO DEPT.

As will come as no surprise to most SANDRA members, there is another repeater in Southern California operating on the 04-64 channel pair, as well as other simplex activity on 04. Recently several Board members met with representatives of the group which runs the other repeater; a brief history of the problem and the results of that meeting are reported here.

At the time of the November Board meeting, the existence of another repeater on our ("our" meaning the ones assigned to us by vote at the coordination conference) channels had just been established. Very quickly the call of the other radio, K6VBT, and the names and telephone numbers of its cognizant members/officers were obtained, and initial contact made. It turned out that the VBT radio was built for use by the SOCON II net, which is a Los Angeles based traffic-handling operation previously operating on 146.1 MHZ AM simplex. This frequency was assigned as an FM repeater input at the Baldwin Park conference, at which time the SOCON representative (net control K6ASK) made a bid for co-sharing the 04-64 pair with San Diego; after vigorous objection by our delegates their net was specifically instructed by the conference as a whole NOT to use the San Diego pair, and was not assigned a repeater pair because their operation consisted entirely of base stations, all of whom are in easy simplex reach of each other.

K6VBT decided that his repeater, already under construction by him for the SOCON II net, could indeed co-exist with the WB6WLV repeater, thought by him to be in some far-distant area called San Diego, an astounding 120 miles away. He put it on the air from his house in El Monte, and at the same time the net moved operation to 146.04, still mostly AM and still mostly simplex. The "bootleg" operation was "caught" almost the first night they were on, when the 04 simplex stations keyed up WLV (and K6ASK FM 04 was contacted and promptly spilled the beans to some of our people). The VBT 64 transmitter could be heard repeated back on the WLV 450 talkback, which was operating remote base.

Initial telephone contact with K6VBT indicated that their people had believed their operations would be shielded from San Diego by Santiago Peak (??!!!) and other Southern California mountains, hence would not be detected by Mt. Otay and its users.

They insisted that they had been unfairly denied channels by the Baldwin Park conference, and that their machine had a "right to exist." Initially they felt that they could limit their radiated power of base stations so as not to cause interference to the Otay repeater, but later appeared to have been persuaded otherwise. They did express some interest in jointly alleviating the problem, however.

A telephone call to K6AEH, Fred Deeg, one of the sponsors of the Baldwin Park conference, brought forth the response that no formal association had yet been organized, and hence there was no technical committee to mediate the problem. He also indicated a good deal of indifference to the entire matter.

On December 3, K6DYD, WB6TFC, WB6APU, WA6LBV, and WB6EAX motored to El Monte and met with K6VBT, K6ASK, and another ham, at VBT's house to discuss the problem. The meeting was very cordial, and lasted about 3 hours. The SANDRA reps presented the current state of affairs in great detail, explaining the nature of the WLV system and the realities of Southern California 2 meter propagation. The VBT group indicated

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that the few Fm'ers in the SOCON traffic net were considering splitting away from the AM traffic net, since the AMers had missed several deadlines in conversion over to FM, since they were and are apparently quite reactionary about the current state of FM (see the notice reprinted elsewhere in this issue), and since they are even less technically proficient than the FMers in the crew. After much discussion it was decided that the VBT repeater group would attempt to move the AM net off of 146.04 to an unused frequency, and that the VBT FM group would become a private lightly-used machine operating on 04-64 until other officially sanctioned channels could be found, or until they cause the WLWV repeater a significant amount of interference. The SANDRA reps invited the few FMers from the group to use the WB6WLWV repeater whenever they were in San Diego, and offered to advertise 04-64 crystals in Squelch Tales for those members who wished to sell their rocks. The evening ended with the SANDRA people passing along some tips on operating a modern repeater system.

No time limit was set for the AM net to leave 04, since hard-core AMers are notoriously slow to act. However, word was left in El Monte that our group will not patiently stand by for an extended period of time. Since these AMers appear to be quick-to-insult, the Board requests that WLWV users not communicate either directly or indirectly with any SOCON station. This point was strongly reinforced by the VBT crew, largely for the good of the whole situation. With the passage of time the AMers will drift away, and we will be rid of this plague. Your cooperation is most earnestly solicited. Members will be kept up to date through the newsletter and the Sunday net.

Editors note: If nothing else, the meeting in El Monte did produce some results--enough raw material to construct a 40 meter beer can vertical. The antenna hardware was given to our hosts as a token of our esteem. DE WB6TFC EDITOR



ROGUES GALLERY

In the recent past, the following San Diego County Stations have been using the WB6WLWV repeaters consistently, and have to date, not joined or rejoined the Association. While the repeaters are designated community repeaters, owned and operated in the public interest, convenience and necessity, by the Association under authority granted by the Federal Communications Commission; it is the policy of the Association that the Amateurs who utilize the repeaters over an extended period of time for the conduct of their communications should be the ones who help support the operations of the repeaters. Membership in the Association is open to all who wish to join.

You, the members of the Association, are subsidizing these non-paying users of the repeaters. The Board of Directors request that members NOT COMMUNICATE through the WB6WLWV repeaters with the following stations:

<u>W6LFQ</u>	<u>WA6CCB</u>
<u>WB6CCA</u>	<u>K4FTZI</u>
<u>K6JMZ</u> -long time free- loader- He refuses to ship out	(fox trot zulu india)

HEARD ON THE REPEATERS

The following new calls have been heard on the WB6WLV repeater system in the last month. The Board of Directors would like to extend a "Welcome Aboard" to these Hams and, if these new stations plan to live in California's "First City", invite them to join SANDRA. It would be appreciated if Association members would extend this invitation while talking with these stations. Membership information and applications are available from any Board member or from P.O. Box 5815 San Diego California 92105. Information is also available at Western Radio and TV Supply, India at Ash in San Diego.

WB6ZNL	WB6CVR
WB6NVL	WA6NWL
W6DAW	WB6SOM
WB6SMT	KFA3146

UNDERSTANDING FM

This is the first of a series of articles intended to present a qualitative explanation of what actually happens between the mike and the speaker of an FM system. The articles will be technical, but not highly so. The intent behind the presentation is to equip everyone with the knowledge he needs to get the best results from his equipment.

The first area of interest is the FM signal, as seen by the receiver. We will assume that the signal was generated by a transmitter in good adjustment. When the signal left the transmitter, it had a certain power which is constant, regardless of the applied modulation. The total power output of the transmitter does not care what frequency it is on, just that it has a certain strength, which is the transmitter's output power. As modulation is applied to the transmitter, the frequency that

contains all the power is being changed by a small amount. It is this change in frequency that is carrying the information from the transmitter to the receiver. Any changes in power level (amplitude) are ignored by the receiver, thus allowing a tremendously wide range of operating strengths in an FM system.

The receiver sees at the antenna terminal typically one trillion times weaker than the transmitter is delivering. This is easy to understand when you consider all the places that the signal is, just waiting to be caught by someone's antenna. Even with this great attenuation, the signal is still ten thousand times stronger than the noise at the receiver. The noise is due to many factors, mainly imperfect devices in the receiver, random vibrations of electrons in the antenna due to its temperature, nearby power lines (DYD take note), automobiles (including FORDs), etc. Some of these sources can be eliminated, while others can only be minimized. But still we have a ten-thousand times advantage over the noise over the hypothetical case being discussed. Thus, the receiver will see at its antenna terminal what our transmitter is putting out, and not very much of anything else. This simplifies the analysis and explanation considerably. Later we will talk about what happens when the signal is not so strong, and the noise begins to become bothersome.

Most receiver in use today are of the superheterodyne type; this type will be discussed here. There are some other types of receivers that have special advantages and that will give a sensitivity improvement of 4 times over the best superhet, but these are very cumbersome and expensive, therefore very few of them are in use.

Most superhet FM receivers have the following stage lineup:

RF amp, mixer and local oscillator, IF filter, IF amp, limiter, and then frequency discriminator. After the discriminator come audio and squelch stages, but these are not pertinent to FM systems alone, and so will only be briefly mentioned. The RF amplifier provides both frequency selectivity and some gain to help build up the signal. The mixer and local oscillator subtract a fixed frequency (selected according to channel in use) from the incoming RF signal, and put out a signal at the intermediate frequency. The IF filter allows only the desired channel signals to pass and greatly attenuates all others. The remaining desired signals are built up in amplitude by the IF amplifier until they are strong enough to saturate the limiter stages. The limiter output (now a constant amplitude version of the input signal) is fed to the frequency discriminator. The discriminator is the real heart of the demodulating scheme, and it deserves special attention.

Many forms of frequency discriminators are in use, but they all share one feature in common: they convert an incoming frequency to an output voltage. If the input frequency is steady, then the output voltage is steady (DC). If the input frequency is changing, then the output voltage changes to follow it. This is the stage where our transmitted signal gets converted back into a voltage similar to the microphone output at the transmitter. Discriminators are linear; if we put in twice as much frequency change, we get out exactly twice as much voltage. This property is important--it is responsible for the need for de-emphasis circuits, as will be shown later.

As is evident from the foregoing discussion, the entire purpose of the FM receiver is to convert the incoming frequency into an output voltage, linearly. We have ignored many factors in this discussion, such as adjacent channel interference, and noisy signals. These and their effects on receiver performance will be discussed in subsequent issues.

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