SHACKNEWS

HIGHVELD AMATEUR RADIO CLUB

PO Box 1111, Bedfordview, 2008 **March 2004**
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COMMITTEE

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Sunday morning BULLETINS - 145.7875 MHz & 7062 KHz @ ±08h45.

COMMUNICATION IS THE NAME OF THE GAME

Meeting The March meeting had a good turn out of members where a couple of new amateurs joined the branch. Tom Haylock, ZR6SWL and Stan Englebrecht, ZS6SEE are new members. A special welcome to Dave Hudson, G4WOE who has joined us all the way from Bexhill in England. Discussion around the motions for the forthcoming AGM took a while as well as the signing of proxies that I will be taking along. After that a general discussion on various amateur topic's took place. Meeting closed off with the usual refreshments.
Paid up membership is now at 17. Thanks to all who have paid

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Southern Suburbs Radio Club Six members as per the register were present. Did the rain have something to do with it? Did receive an apology from ZS6LT. OM Johnny ZS6EH again kept us entertained with the happenings in amateur radio and its characters from yesteryear. Certainly interesting times when amateur radio was amateur radio. Thanks Johnny.

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A minister told his congregation, "Next week I plan to preach about the sin of lying. To help you all understand my sermon, I want you all to read Mark 17."

The following Sunday, as he prepared to deliver his sermon, the minister asked for a show of hands. He wanted to know how many people had read Mark 17. Every hand went up.

The minister smiled and said, "Mark only has 16 chapters. I will now proceed with my sermon on the sin of lying."

Brainteaser

A highway barricade has two blinking lights. One light is on for **three** seconds and off for **two** seconds. The other is on for **two** seconds and off for **two** seconds. If both are turned on at the same time, both are on simultaneously for **two** seconds.
During which seconds will they again both be on simultaneously for **two** seconds?

Solution next issue of SN

HF OPERATING HINTS

In an article on the ARRL website earlier this year entitled *Surfin': Repeaters, Echolink and DX* Contributing Editor Stan Horzepa, WA1LOU pointed out that with the growth of our hobby, there is a large number of license amateurs who have never operated on HF frequencies. He said that the procedures on short-wave are a bit different to a local ragchew on the repeater. This is a summary and adaptation of the HF operating hints that he gives in his article.

1. Know Your DX Prefixes: Have a DXCC or ITU call sign assignment list readily available if you are unfamiliar with prefixes. This will help you establish where the person you are talking to is.

2. Know the international or standard phonetic alphabet. Cute words are most confusing to others. There are other lesser-known alphabets used mostly for domestic contacts, but in general, it is best to "stick to the standard."

3. Have a metric conversation chart handy. This you helps when discussing distances andtemperatures with hams in non-metricated countries.

3. Time Zones apply to the Internet. Remember that UTC/GMT is the international standard. If you want to meet on the air again, you have to have a base to start from. Don't forget the International Dateline, as it is possible to talk to tomorrow.

5. Speak slowly. While English is taught in the schools of most nations, and is one of the most common languages on HF, it is a second language for most DX stations. So take your time, speaking in an unrushed fashion, clearly pronouncing each word

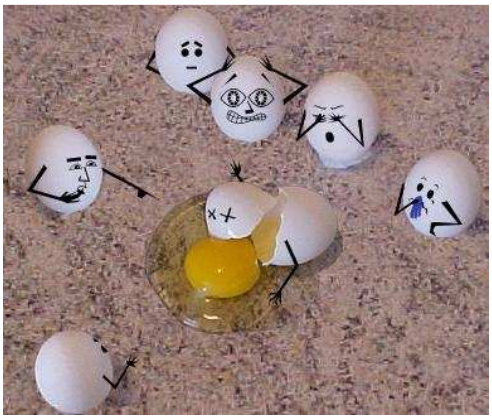
6 Identify in English. As long as you identify your station's call sign in English, in accordance with the rules, you may try to converse in the other operator's languages. In the true ham spirit of enhancing international good will, try using some phrases in a foreign language. DXers have long known that a friendly "Hello" works wonders. DX operators are always glad to help you out with pronunciation and phrasing.

7. Follow the Amateur's Code. As with all Amateur Radio conversations, they should be friendly, informative and enlightening.

8. Stay away from politics and other hot button issues, as they do little to build bridges.

See www.arrl.org/news/features/2004/01/16/1/?nc=1 for the whole article which is centred around Echolink. (Tnx to Dipole March 2004)

Eggcident



President's Net:

You probably know that the SARL President holds his net at 12.00 hrs on the last SUNDAY of every month. Because propagation conditions vary from good to bad and from area to area, it has been decided to spread the transmission across various frequencies, and using local repeaters. Please note, then, that as from Sunday 28th March, there will be a relay of the SARL President's net on various repeaters and that this will become a feature of every last Sunday of every month. Remember: NOON time!! For those who have issues could find this a good platform to raise them.

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On the outskirts of a small town, there was a big, old pecan tree just inside the cemetery fence. One day, two boys filled up a bucketful of nuts and sat down by the tree, out of sight, and began dividing the nuts. "One for you, one for me. One for you, one for me," said one boy. Several dropped and rolled down toward the fence.

Another boy came riding along the road on his bicycle. As he passed, he thought he heard voices from inside the cemetery. He slowed down to investigate. Sure enough, he heard, "One for you, one for me. One for you, one for me." He just knew what it was. He jumped back on his bike and rode off. Just around the bend he met an old man with a cane, hobbling along. "Come here quick," said the boy. "You won't believe what I heard! Satan and the Lord are down at the cemetery dividing up the souls."

The man said, "Beat it kid, can't you see it's hard for me to walk."

When the boy insisted though, the man hobbled to the cemetery. Standing by the fence they heard, "One for you, one for me. One for you, one for me..." The old man whispered, "Boy, you've been tellin' the truth. Let's see if we can see the Lord." Shaking with fear, they peered through the fence, yet were still unable to see anything. The old man and the boy gripped the wrought iron bars of the fence tighter and tighter as they tried to get a glimpse of the Lord.

At last they heard, "One for you, one for me. That's all. Now let's

go get those nuts by the fence and we'll be done."

They say the old man made it back to town a full 5 minutes ahead of the boy on the bike.

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BACK TO BASICS

Receiving Frequency Modulation

Frequency modulation is widely used, particularly on frequencies above 30 MHz. It offers many advantages, particularly in mobile radio applications where its resistance to fading and interference is a great advantage. It is also widely used for broadcasting on VHF frequencies where it is able to provide a medium for high quality audio transmissions.
In view of its widespread use, scanners and many other receivers are able to demodulate these transmissions. Naturally there are specifications and figures that receiver manufacturers quote for the performance of their sets when receiving FM.

What is FM?

As the name suggests frequency modulation uses changes in frequency to carry the sound or other information that is required to be placed onto the carrier. As shown in Figure 1 it can be seen that as the modulating or base band signal voltage varies, so the frequency of the signal changes in line with it. This type of modulation brings several advantages with it. The first is associated with interference reduction. Much interference appears in the form of amplitude variations and it is quite easy to make FM receivers insensitive to amplitude variations and accordingly this brings about a reduction in the levels of interference. In a similar way fading and other strength variations in the signal have little effect. This can be particularly useful for mobile applications where charges in location as the vehicle moves can bring about significant signal strength changes. A further advantage of FM is that the RF amplifiers in transmitters do not need to be linear. When using amplitude modulation or its derivatives, any amplifier after the modulator must be linear otherwise distortion is introduced. For FM more efficient class C amplifiers may be used as the level of the signal remains constant and only the frequency varies.

Wide band and Narrow band

When a signal is frequency modulated, the carrier shifts in frequency in line with the modulation. This is called the deviation. In the same way that the modulation level can be varied for an amplitude modulated signal, the same is true for a frequency modulated one, although there is not a maximum or 100% modulation level as in the case of AM.
The level of modulation is governed by a number of factors. The bandwidth that is available is one. It is also found that signals with a large deviation are able to support higher quality transmissions although they naturally occupy a greater bandwidth. As a result of these conflicting requirements different levels of deviation are used according to the application that is used.
Those with low levels of deviation are called narrow band frequency modulation (NBFM) and typically levels of +/- 3 kHz or more are used dependent upon the bandwidth available. Generally NBFM is used for point to point communications. Much higher levels of deviation

are used for broadcasting. This is called wide band FM (WBFM) and for broadcasting deviation of +/- 75 kHz is used.
To receive FM a scanner may have two different modes, one labelled WBFM and the other NBFM. The correct mode must obviously be selected for correct reception. Also if it is anticipated that reception of both modes is required, then the receiver must have the capability of receiving both of them.

Receiving FM

In order to be able to receive FM a receiver must be sensitive to the frequency variations of the incoming signals. As already mentioned these may be wide or narrow band. However the set is made insensitive to the amplitude variations. This is achieved by having a high gain IF amplifier. Here the signals are amplified to such a degree that the amplifier runs into limiting. In this way any amplitude variations are removed.
To convert the radio frequency signals appearing at the output of the IF stages of the receiver into audio voltage variations to be amplified by an audio amplifier an FM demodulator must be used. This converts the frequency variations of the carrier into audio voltage variations. This is done using a circuit where the output voltage is dependent upon the input frequency. The linearity of the response is obviously important otherwise distortion is introduced. A number of circuits can be used to do this. Two popular circuits that use discrete components are the ratio detector and the Foster-Seeley detector although today FM demodulators are contained within integrated circuits and the only requirement is for a coil and capacitor to connected to the chip to provide the frequency dependent circuit.
Another method is to use a phase locked loop. The way in which this circuit operates to demodulate FM is very simple. The circuit is set up to operate as shown in Figure 2. The FM signal from the IF stages of the set is connected to one of the phase detector inputs as shown, and the output from the VCO is connected to the other.

With no modulation applied and the carrier in the centre position of the pass-band the voltage on the tune line to the VCO is set to the mid position. However if the carrier deviates in frequency, the loop will try to keep the loop in lock. For this to happen the VCO frequency must follow the incoming signal, and for this to occur the tune line voltage must vary. Monitoring the tune line shows that the variations in voltage correspond to the modulation applied to the signal. By amplifying the variations in voltage on the tune line it is possible to generate the demodulated signal.

Squelch

When a receiver switched to FM and no signal is present it is found that high levels of audio noise are heard. This is very unpleasant and to overcome this most receivers have what is called a squelch circuit. This cuts off the audio when no signal is present. Many scanners and hand-held VHF or UHF transceivers have a control to adjust the signal level below which the audio cuts off. By using this control, the set can be adjusted to detect very low level signals if necessary.

Quieting specification

One of the advantages of FM is its resilience to noise. This is one of the main reasons why it is used for high quality audio broadcasts. However when no signal is present, a high noise level is present at the output of the receiver. If a low level FM signal is introduced and its level slowly increased it will be found that the noise level reduces. From this the quieting level can be deduced. It is the reduction in noise level expressed in decibels when a signal of a given strength is introduced to the input of the set. Typically a broadcast tuner should give a quieting level of 30 dB for an input level of around a microvolt.

Capture effect

Another effect that is often associated with FM is called the capture effect. This can be demonstrated when two signals are present on the same frequency. When this occurs it is found that only the stronger signal will heard at the output This can be compared to AM

where a mixture of the two signals is heard, along with a heterodyne if there is a frequency difference.
A capture ratio is often defined in receiver specifications. It is the ratio between the wanted and unwanted signal to give a certain reduction in level of the unwanted signal at the output. Normally a reduction of the unwanted signal of 30 dB is used. To give an example of this the capture ratio may be 2 dB for a typical tuner to give a reduction of 30 dB in the unwanted signal. In other words if the wanted signal is only 2 dB stronger than the unwanted one, the audio level of the unwanted one will be suppressed by 30 dB.

Summary

FM is widely heard on frequencies above 30 MHz where it is the most widely used mode for voice transmissions for point to point radio. Below 30 MHz it is rarely used although some radio amateurs can be heard at the top end of the ten metre band on FM. In view of its widespread use above 30 MHz it is an essential mode for any scanner or other wide band receiver.

73
Berridge