

SHACKNEWS

HIGHVELD AMATEUR RADIO CLUB

PO Box 1111, Bedfordview, 2008

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e-mail zs6bfl@telkomsa.net

COMMITTEE



Office		Call sign	Telephone number
Chairman :	Left vacant		
Secretary / Treasurer:	Berridge Emmett	ZS6BFL	011-893-1291
Repeater/Packet Radio/Technical	Ton Van Dijk	ZS6ANA	011-683-2424
Shacknews-Print & Posting:	Harry Lautenbach	ZS6LT	011-888-5362
Shacknews Editor: This Issue	Berridge Emmett	ZS6BFL	011-893-1291
Website manager	Yvonne Van Dijk	ZR6TBL	082-623-3704
Bulletin relays	Rex Pattison	ZS6REX	011-948-9533
QSL Manger & membership list:	Reg Hartslief	ZS6ALH	011-902-1432

Sunday morning BULLETINS - 145.7875 MHz & 7062 KHz @ $\pm 08h45$.

COMMUNICATION IS THE NAME OF THE GAME

MEETING

The last meeting held on 1st March 2003 had a small turnout. A total **SIX** according to the register. There were a few apologies tendered. What has happened to the other members? An informal discussion was held on different subjects on radio and others. The most interesting was on magnetic antennas for restricted space operations. There is plenty to be found on the internet on this subject covering all aspects of design and construction details. The next meeting is on 6th April 2003 which is a SUNDAY. It will take the form of a braai which will be held at the QTH of OM Rex. Please bring whatever you want to braai, salads, and drink. As well as eating utensils, plates glasses, mugs etc. etc..... . Also chairs etc. Remember at the last social it was decided that the next do Rex & Ingrid will have a break from all the preparation. In the mean time Ingrid has had a serious operation, which will not allow her to do all the things she normally does. So it is up to us to do what is necessary to make this an enjoyable event.

SSC Meeting

This meeting was held on 7th March 2003. Also a small turnout. Shaun, ZR6SMR, brought along an antenna he obtained at a flea market. Comes in a small bag and has spring-loaded elements and mast. The antenna analyser showed that it is resonant on 38 MHz and 76 MHz.

Believe it or not

This story happened in a little town in Mexico, and even when it sounds like an Alfred Hitchcock tale it's real.

This guy was on the side of the road hitch hiking on a very dark night and in the middle of a storm. The night was rolling and no car went by, the storm was so strong he could hardly see a few feet ahead of him. Suddenly he saw a car coming towards him and stop. The guy without thinking about it got in the car and closes the door - just to realise there's nobody behind the wheel! The car starts moving forward slowly. The guy looks at the road and sees a curve coming his way, scared he starts to pray, begging for his life. He hasn't come out of shock, when just before he hits the curve, a hand appears through the window and moves the wheel!

The guy, paralysed in terror, watched how the hand appears every time they are before a curve. The guy gathering strength gets out of the car and runs to the nearest town.

Wet and in shock goes to a cantina and asks for two shots of tequila, and starts telling everybody about

the horrible experience he went through. A silence enveloped everybody when they realise the guy was crying and wasn't drunk. About half an hour later two guys walked in the same cantina and one says to the other: "Look Pepe, that's the *(^&(^%p_+ that got in the car when we were pushing it!!!"

SWAPS

This column is still FREE for you to advertise anything that you would like to. Just give the editor a call. 011-893-1291 or e-mail zs6bfl@telkomsa.net

Lifted from the WEB

TUNING FM RADIOS, PART 1

At some point every ham working with FM radios has need to do some tuning of the transmitter and receiver. If you are like me and lucky enough to have professional test equipment, this task is easy. If you don't have access to professional equipment, you just have to be a little cleverer.

Note that a good deal of what I have to say here applies equally to the popular Mitrk and Maxar Motorola radios along with most other crystal controlled amateur and commercial radios. The basic principles are the same. If you become confused by what I have to say about local oscillators, mixing and "IF strips," I strongly recommend reading about those subjects in the ARRL handbook. The knowledge you will gain you will find extremely valuable in the future.

EQUIPMENT

Setting the frequency of both the transmitter and receiver in a crystal controlled radio is pretty straightforward. Frequency counters that work on the 2 meter and 70 cm bands are common place and affordable. A decent counter in calibration gives you a good test equipment foundation that is hard to beat for the cost.

With a counter transmitter frequency alignment is pretty simple and straight forward. First off allow all of your equipment (this includes the radio to be serviced) time to warm up so all of the oscillators are stabilized. I would wait at least 20 to 30 minutes.

Make sure that YOUR test equipment is in calibration! It sure does not hurt to run a calibration check of your own gear before working on something as sensitive as a 9600 baud data radio or a repeater. If you are using a ham type counter keep in mind that most inexpensive counters do not have crystal oven. This means that it is very easy for your counter to be off frequency and lead you astray.

If you are lucky, your counter will use a time base crystal that is on one of the WWV standard frequencies. This makes zero beating the counters time base crystal against the standard very easy. Before you buy a counter, check what the calibration procedure is. Check the calibration of all of your test equipment before doing any critical work.

SETTING THE FREQUENCIES

Setting the frequency of a FM transmitter is easy with a counter as you can read out the frequency directly on the digital display. You can also set the frequency of receivers using the old two way service techs trick of measuring the local oscillator frequency with your service monitor or counter.

When you are confident that your test gear has stopped drifting, loosely couple your counter/service monitor into the local oscillator section of the radio. Note that this trick works on ANY FM radio. Use a patch cable with a BNC connector on one end and a pair of alligator clips on the other for this type of testing. Connect the cable to the frequency meter and ground the cables shield to the radio chassis.

Fish around the L.O. section of the radio with the clip connected to the centre of the coax. At some point (like on a shield can) you're going to find enough RF to make a measurement. If you can't you might have to consult the radio's schematic and temporarily connect the counter into the L.O. output with a small value capacitor (5-100pF).

LOCAL OSCILLATOR FREQUENCY

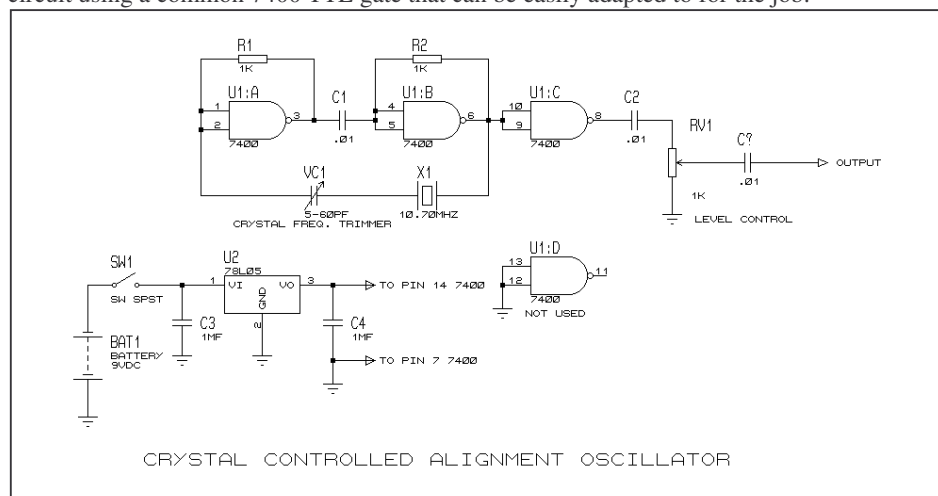
When you get a stable reading, calculate the correct L.O. frequency. For example on the Maxar you subtract the I.F. frequency (10.7Mhz is the most common) from the desired receive frequency. The result is the frequency that the L.O. signal should be on. Lets use the example of a data radio on a receive frequency of 445.000Mhz:

$445.000 - 10.700 = 434.300\text{Mhz}$ L.O. frequency

NOTE: Most FM radios use 10.7 as the I.F. frequency. Odd exceptions are Motorola Micor radios that use 11.7Mhz and old Bearcat scanners that use 10.8Mhz.

After you've set your receiver local oscillator on frequency you might want to check the discriminator tuning. Proper discriminator tuning is critical to obtaining good audio recovery and low audio distortion. The Motorola radios use a quadrature detector whose only adjustment is a single slug tuned coil. Rarely will you need to adjust this coil. If you do, you will need a signal source exactly on 10.7Mhz (or what ever the detector frequency is).

If you lack a signal generator, you can build yourself a simple crystal oscillator for the popular I.F. frequencies. With a crystal and a few junk box parts, you have yourself a very useful alignment oscillator. The schematic shown has a simple circuit using a common 7400 TTL gate that can be easily adapted to for the job.



DUAL CONVERSION

Many radios are dual conversion. That is they convert the frequency of interest (say 146.52 for example) first to 10.7Mhz and then convert the 10.7Mhz IF frequency down to 455Khz for detection. In all cases the second IF conversion is crystal controlled. Unless in the very unlikely case this oscillator crystal has drifted, you can use your 10.7Mhz signal generator to align the entire IF. Remember that the 10.7Mhz signal you inject into the IF strip is converted down to 455Khz.

This system of double conversion allows the designer to use less expensive ceramic filters to determine the radios selectivity. In the single conversion design where all amplification and detection is done on 10.7Mhz, expensive multipole crystal filters must be used. Double conversion is used in most of the low cost radios using the popular Motorola MC3357 series IF/detector IC's where the entire IF and detector circuitry is combined into one IC.

Getting back to setting discriminators, keep in mind that there are many different types of FM detector (discriminator) designs. The Maxar, for example, requires you to tune the detector coil (L23) for a specific voltage (5.1 volts +/- 0.2 volts) at a test point (pin 13) on the rear chassis connector. Other radios will require different specifications. For this reason it is vital to have the service manual for instructions when working on any radios IF and detector.

If you choose to build a 10.7Mhz test oscillator it has another use as well. You can use it to "zero beat" your radios local oscillator crystal on frequency. Let's say for example that you want to set a crystal for 145.01 receive on frequency. Have a friend transmit a carrier with no modulation on that frequency. Loosely couple the signal from your 10.7Mhz alignment oscillator into the radio. Vary the coupling of the 10.7Mhz signal till you can clearly hear a beat note. Then adjust the receive crystal's trimmer for zero beat.

HERE'S HOW IT WORKS:

What you are doing is beating the signal of your 10.7Mhz oscillator against the incoming received signal after it has been converted to 10.7Mhz by the radios mixer and local oscillator. If there is any difference in frequency between the two signals after mixing, a beat note will be generated. For example, let's say that your new crystal for 145.01 receive is 1Khz low in frequency.

$$145.01\text{Mhz} - 134.309 = 10.701 \text{ Mhz}$$

That is, the signal in the IF is now 1Khz HIGH in frequency. You mix that with your alignment oscillator signal and:
 $10.701\text{Mhz} - 10.700 = 1\text{Khz}$ tone heard as the beat note!

As you trim the local oscillator crystal on frequency, the error decreases and the frequency of the beat note you will hear will decrease. This method works so well that many professional service monitors use it in preference to digital displays. In their case the error frequency is displayed on an analogue meter as well as hearing the beat note on a meter.

Next month, some methods of tuning receivers for best sensitivity.

David Metz, WA0AUQ (many thanks Ed.)

Here are some signs that you won't find anywhere else in the world except in Africa.

In a restaurant in Zambia "Open seven days a week and weekends."

On the grounds of a private school in South Africa: "No trespassing without permission."

On a window of a Nigerian shop: "Why go elsewhere to be cheated when you can come here?"

On a poster in Ghana: "Are you an adult who cannot read? If so, we can help."

In a hotel in Mozambique: "Visitors are expected to complain at the office between the hours of 9.00 am and 11.00am daily."

On a river in the Democratic Republic of Congo: "Take note: When this sign is submerged, the river is impassable."

In a Zimbabwean restaurant: "Customers who find our waitresses rude ought to see the manager."

A sign seen on a hand dryer in a Lesotho public toilet: "Risk of electric shock-Do not activate with wet hands."

In a Botswana jewellery shop: "Ears pierced while you wait."

On one of the buildings of a Sierra Leone hospital: "Mental Health Prevention Centre."

In a maternity ward of a clinic in Tanzania: "No children allowed!"

In a cemetery in Uganda: "Persons are prohibited from picking flowers from any but their own graves."

In a Malawi hotel: "It is forbidden to steal towels please. If you are not a person to do such a thing, please don't read this notice."

A sign posted in an Algerian tourist camping park: "It is strictly forbidden on our camping site that people of different sex, for instance a man and woman, live together in one tent unless they are married to each other for that purpose."

In a Namibian nightclub: "Ladies are not allowed to have children in the bar."

In a photo studio in Chitungwiza (Zimbabwe): "Photos taken while you wait"

Tnx to whoever e-mailed me this article

73 Berridge ZS6BFL