

the RARA RAG

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VOL. 55

JANUARY 2003

NO.5

WOOPEE IT'S 2003

JANUARY PROGRAM ECHOLINK ????

Jon Dickason N2JAC

I'll be explaining Echolink, a method of connecting repeaters and individual hams on their computers. If you have a computer with sound and an Internet connection, you can connect to 1000 repeaters and individuals around the world. If you don't have room for antennas, or they're not allowed on your apartment, you can talk around the world from your HT. If your HF gear is in the attic, but your office is in the basement, you can listen to hundreds of repeaters on your computer. If you've moved away from your hometown and want to keep in touch with your ham buddies, they may have an Echolink enabled repeater nearby. I'll be explaining how the 145.29 Xerox repeaters are connected to Echolink, and how you can use K1RFD's FREE software from www.echolink.org to make contacts.

SCHOLARSHIP RE-MINDER

Dick Goslee K2VCZ

The deadline for submitting applications for the third annual RaRa Memorial Scholarship is April 15, 2003. The "Rochester Amateur Radio Association Memorial Scholarship" has been established with generous donations made in memory of Leland Zwack, W2WPF, William Buchan, W2OMV and William Resch, K4VOS. The scholarship is available to any

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Amateur Radio Exhibits at RMSC

Peter Fournia, W2SKY

The annual Science and Technology Fair are now running at Rochester Museum and Science Center, Dec. 27, 28, 29, 30. Amateur radio is among the exhibits. This is a great time for you and your family to visit these special hands-on activities for all ages. A HF station will be operating on the weekend hosted by RDXA. It is led by Mile Rundle, N1OKL. This is always a big hit with passers by. The RAPS group is planning to host an APRS exhibit. This may be the last chance to connect with PCsat before it is permanently silenced. Jack Tripp, W2JAT also hopes to display the many packet connections in Europe. The usual Radio Coach hands-on exhibits will also be available. These have been very popular with the very young kids. The Kodak-RARA Electronics Explorer Post 621 will bring a new and exciting face to our exhibit this year. The new post has completed 5

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RaRa MEETING

January 3, 2003

8:00 PM

HENRIETTA FIRE HALL
3129 E. HENRIETTA RD.

ECHOLINK

PRESENTED BY

Jon Dickason N2JAC

the RARA RAG

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THE PREZ SEZ...

MaryKay Vesco KC2DPG

I hope everyone had a wonderful Christmas and wish everyone a Happy New Year. We had a great Joint meeting with the Kodak Club at the Theater on the Ridge for our December Meeting. I want to thank everyone for coming. Looks, looks like it was a big turnout with a great program. The subject was: WSJT (Weak Signal Communications, By K1JT) presented by John Gilly, W3OAB/2 and Jeff Tewskbury, N2JQR. They use two digital signal modes with the computer, FSK441 and JT44. If you missed the were unfortunate to make the meeting and want more information, you can do a search on the internet for "WSJT" and you'll find lots of helpful information along with some free programs.

Thank you John and Jeff for presenting such a great program.

Don't forget that coming right now is the Holiday Science and Technology week - December 27, 28, 29, and 30. If you haven't signed up to help out, you still can come on down and help. This, this will be a great event to show others in our community what we can do. I want to thank you in Advance for helping to support Amateur Radio in our Community.

I also would like to give Irv Goodman, AF2K a Big Thank You!! He has been in our club for a long time and has volunteered a lot. In addition, he takes care of our Club Hot Line, Makes sure it is always updated and working properly and forwards information as needed. He has done a lot for our club over the years. So, next time you see him or hear him on the bands, make sure to let him know he is greatly appreciated. Thank you Irv Goodman, AF2K!

If you have an interest in helping kids on the air, two upcoming events: School Round up and Kids Day. Are coming. For more information and to volunteer, please contact Past President Keith Freeburg, N2BEL. Please In addition, give him a huge Thank You! He spends a very lot of time volunteering and heading up a lot of activities. He has done with for many years as well as being Past President of RaRa at least twice. Thank you Keith Freeburg, N2BEL.

Thank you for listening and reading. Hope to see everyone and a guest at our

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Problem-Solving Methods

III-B

Günter Wegener

(Translator's note: This article is the last of three written by Günter Wegener for the major German amateur radio magazine, *Funkamateur*, 51/3, Mar., 2002, pp. 255-259. It appears by permission, translated and adapted for publication in the RAG. This section is the second, and last, of part III. See part III-A for the introductory notes.)

The Signal Insertion Procedure

Picture 7 shows once again an example of the probe sequence for signal injection in a radio receiver. If you use a multi-vibrator (broad-band generator) for a quick test, you can avoid the troublesome switching to different frequencies.

However you can achieve more reliable results with a test signal tuned to the middle of a frequency band. When testing RF stages and to avoid distortions, feed the high frequency test signal through a small capacitance or through an inductance. Observe the proper polarity of coupling capacitors for AF stages (Picture 8). The sequence of the probes on an

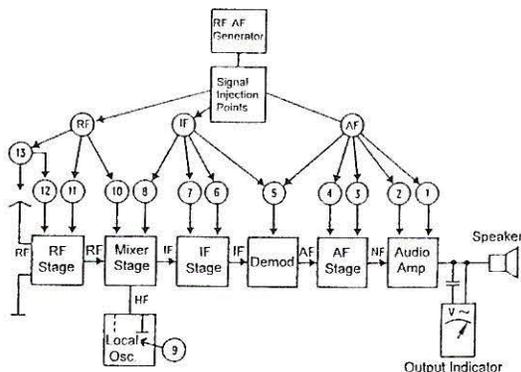


Fig 7: Troubleshooting a receiver using signal insertion (signal injection).

AF amplifier with an integrated circuit is shown in Picture 9. With the help of the test signal you can test the receiver oscillator by making comparisons. If you suspect the oscillator is not oscillating, then you can insert the square wave signal, or better still, use a frequency generator in place of the oscillator, at the oscillator's intended frequency. If a transmitter is now audible or – in the case of a TV –

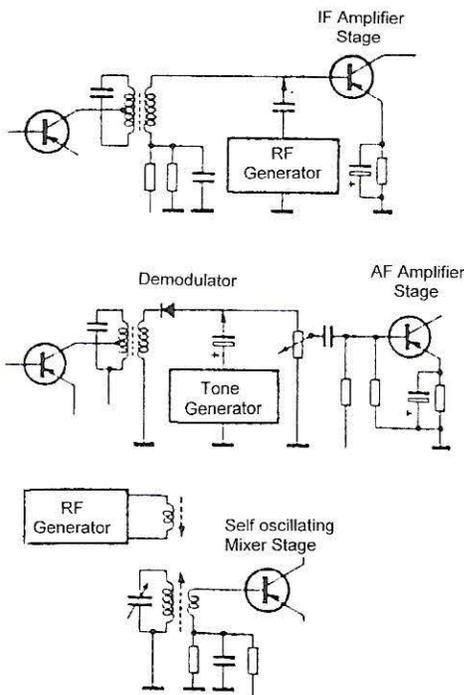


Fig. 8: Decoupling A Test Signal.

if a picture appears, even if it is of poor quality, then the receiver oscillator is defective.

Tests with the Oscilloscope

Tracing a signal with the scope in connection with a signal generator might be the most reasonable type of dynamic troubleshooting. Proceeding stage by stage, you can observe both the qualitative and quantitative aspects of a signal. Here you need a problem-free test signal at the input, (unless you are testing generators in deflector stages of a TV or in auxil-

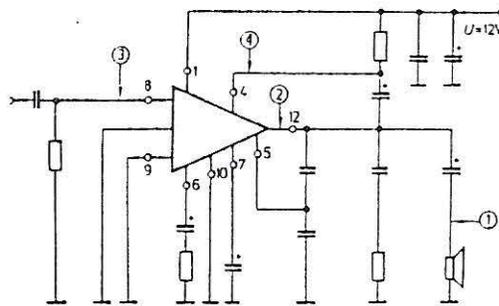


Fig. 9: Testing Of Final Stage IC.

ary oscillators).

Picture 10 shows the control of the pre-magnetized current in an audio recorder. The form and amplitude of the signal can be easily

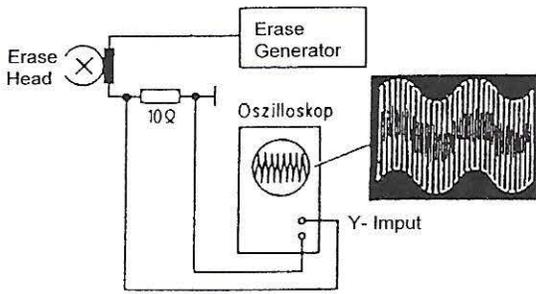
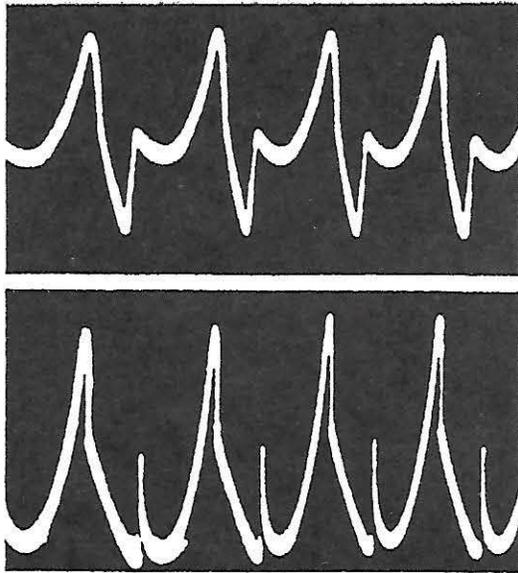


Fig.10: Testing The Erase Function Of a Recorder Using a Scope.

measured. Be sure that the peak-to-peak value is always portrayed on the scope screen. Over-driving and non-symmetry in an AF amplifier can easily be seen, due to a wrong conducting point, for example. To test this out, insert an adjustable sine wave voltage at the amplifier input and the scope at the output jack. The sine wave voltage will appear on the scope screen. By gradually increasing the voltage level at the input, a limit to the symmetrical sine wave will be reached, at which point the amplifier will be over-driven. If the limit is already present or if the sine curve is clipped on only one side, then it is likely that the amplifier stage is defective.

Fig.11: Testing a Final Amplifier Stage at the Emitter.



Top: Final stage shows clean Symmetry.

Bottom: Final transistors are not matched.

By probing at the individual "function blocks" the problem can easily be localized. Similar tests can be done on final stages. In Picture 11 the oscilloscope image shows how this non-symmetry can occur in a push-pull final stage, when the values for both transistors are not matched.

Testing Amplifiers with a Square-Wave

Using a square wave test signal, you can easily and quickly test the frequency behavior, particularly of an AF amplifier. Even self-oscillations can be observed.

Square wave voltages comprise a wide frequency spectrum, due to their steep skirts. Thus, only a few basic frequencies are needed to sufficiently observe the behavior of an amplifier. Before beginning a test, insert the square wave voltage directly to the scope. Then, later changes in the signal can be observed more easily. This works optimally with a two-channel scope, which permits an imme-

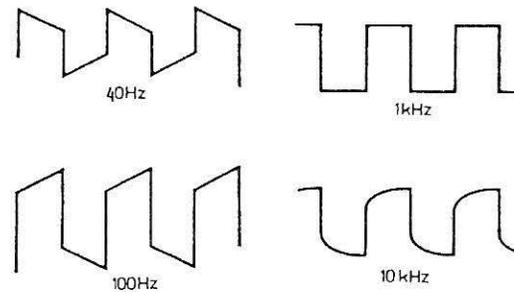


Fig12: Square wave distortions in an amp.

mediate comparison. If the two square wave voltage images appear at the output, as matched on the scope, without any appreciable deformation, you can then assume that the amplifier in question has no phase or amplitude problems. If, on the other hand, deviations appear at the upper or lower sides of the square wave, so-called roof slopes, then you can assume an insufficient level of amplification of the lower frequencies (i.e., 40 Hz). Insufficient high frequency amplification (i.e., 10 KHz) is observable with rounded waveforms (Picture 12). The frequencies given in the picture are sufficient. But be absolutely careful not to over-drive the amplifier.

Static Search Methods with the Oscilloscope

You can also use the scope for static troubleshooting. Since it is actually a voltmeter, practically every measurement can be reduced to an amplitude measurement. You must set

the levels, so that the measured signal fills the entire screen. With the scope voltages can be visually imaged only against ground potential, i.e., against the housing or chassis. Before every measurement you must establish a ground contact between the ground of the device being tested and the ground jack of your measuring instrument. Furthermore, observe that the oscilloscope housing is in continuity with the instrument's supply current, via the ground plug (3rd prong) of the power cord, whenever the power setup is not potential-free via an isolation transformer

The input sensitivity setting, i.e., the deflection coefficient in volts or millivolts per unit part indicates which voltage is required to deflect the electron beam to around 1 centimeter. Given the height of the screen is "y" and the

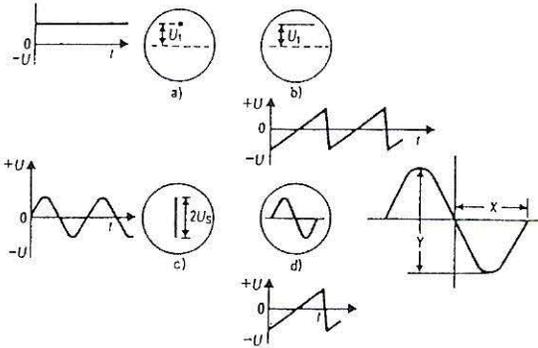


Fig.13: The Scope Is Also Useful For Voltage Measurements.

deflection coefficient in V/cm is "a," then the amplitude of the measured voltage will be the relationship $V = y * a$. [V = "U" in the Pictures.] If a divider probe is inserted, then this value must still be multiplied by the divider factor. To measure voltage you can also turn off the horizontal deflection (sweep). Then only a vertical line will appear on the screen, having a length that corresponds to the amplitude.

A direct current is represented as a deflected

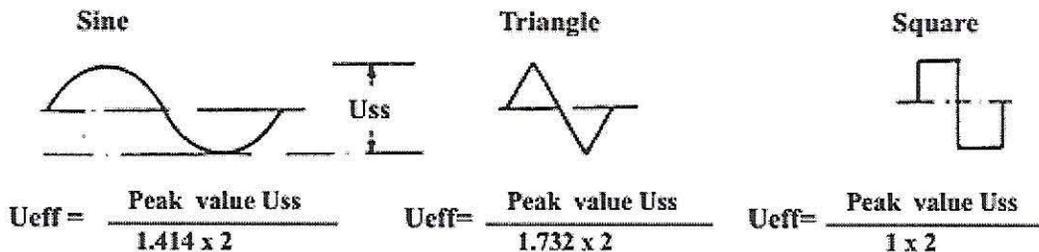


Fig 14: The scope always shows the voltage value U_{ss} (peak-to-peak); here are the calculation factors for the effective value for these waveforms.

point (the input switch must then be placed at "DC") (Picture 13). With AC the scope always shows the peak-to-peak value U_{ss} . If a recalculation is needed to obtain the effective value U_{eff} , the relationship for sine wave voltages will be $U_{eff} = U_{ss} / 2 * \sqrt{2}$. Picture 14 shows the recalculation factors for two other waveforms.

Using a signal generator you can also measure current values on the scope by the indirect method. To do this, make a measurement with the scope. Take the measurement

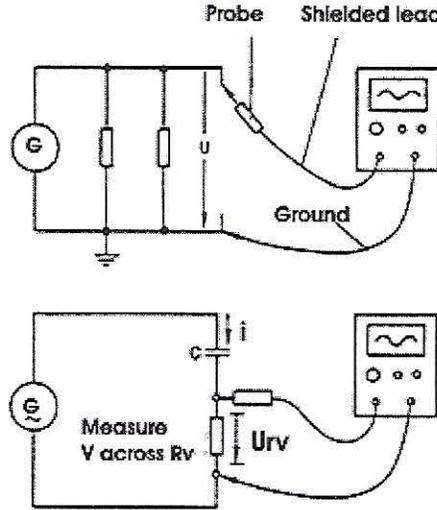


Fig 15: Attaching the scope for voltage "U" and current "i" measurements.

in parallel with a resistance already present in the circuit or an inserted resistance of known value, and then calculate the current according to the well known Ohm's Law formula $I = E/R$. A resistance R_V that you add to the circuit must be as small as possible, so that the measurement result will not be falsified. ***

January meeting. Promises to be top of the line program, "Echolink". Have a wonderful New Year, See you in 2003 at the January Meeting.

CONTINUED FROM PAGE ONE

of its 10 sessions featuring a wide range of electronics presentations and hands-on discovery delivered by AA2YV, N2JAC, KC2GXV, WB2IHM and W2SKY. Many other hams have been essential to the leadership, planning and execution of the explorer post. Some of their projects will be displayed for the older boys and girls.

RaRa Rag 20 Years Ago, January 1983

Ed Gable K2MP

The January meeting found us at a new venue, the 40/8 (forty and eight) club at 933 University Avenue across from the Gleason Works. Presenting the program was Mr. George Peter of Cornell University presenting an updated program describing the huge radio telescope facility at Arecibo, Puerto Rico. George Muller, WA2IEO, prepared the refreshments. Bill Gillette, WB2KIW, wrote trying to pump up activity in the ARRL January VHF contest. Bill reported a new rule prohibiting the use of 146.52 simplex for contesting. Tom Richmond, WB2IEY, reported that WB2RRE/3 would operate the VHF contest from EPA Section with a big yagi towards Rochester. RaRa announced the date for the Valentine Dinner Party to be held at the Packet room of the Hilton Inn on the Campus. \$15.00 brought you a dinner, entertainment by the Ralph Zwald banjo group and dancing to the hotel band. In an unprecedented display of Amateur innovation and technical abilities, a joint effort by the Rochester Repeater Assn and the Genesee Radio Repeater Assn, brought a teleconferencing session, via 12 ham repeaters from Arizona to Washington, DC, to 250 local amateurs. The conference topic was AMTOR for the Radio Amateur. Writing for the RRRA, Ed Neubauer, N2BXA, announced a planned trip to the Strasenburg Planetarium. For the RDXA, Rick Berg, KS2F, wrote telling of their program being on the KP2A DXpedition to Desecheo Island. We also heard from Lia Zwack, WA2NFY, urging all to join the

YLRL SSB and CW nets on 40 and 75 meters. Lia was the 2nd area chairwoman for the group. Scientific Radio Systems, of Orchard Street, had a large advertisement looking for Electronic Technicians. From the Want Ads, Roger, WB2BWQ, really *Wanted* his IC-225 back which he reported "was removed from vehicle without owners permission."

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JANUARY 18, 2003

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(Use South Entrance Park in lot across
the Street. from entrance)

RaRa LICENSE CLASS

Ray Pickens WA2MYG

The second semester of the 2002 RaRa License program is now history. I think it went out in a blaze of glory.

There are 7 new entry level Technician class operators and 1 Technician W/HF privileges. Joining Operators Joined our ranks: John Zobel, Charles Rettig, Carl Decker, Rowan Hawkins, Anand Choudri, and David Thompson, are Technicians with Palmer Lindblom the Technician W/HF privileges. Two more Members of that class Robert Rchow KC2JKV passed his element 1 (CW) exam at the Scheduled 11/16/2002 RaRa VE exam session upgrading to General Class. At And at that same session Howard Douglas passed his entry level Technician exam. Out of 13 starting members of that class 10 passed their studied for exams with 2 failing and 1 dropout. I have contacted the 2 students who failed informing them of RaRa's policy permitting of them being able to attend the next semester (2003) to retry If they so desire at no extra charge.

Of the 3 members of the General Theory class all 3 upgraded to General: Bill Holtz KA2WNS, Ed Martin KC2JQV, and Don Walters KB2BWT. Don who couldn't wait until the Dec. 9th class VE Session went to the W5YI Dec.5th session at Kodak Park and upgraded there.

Of the 5 starting members of the Extra Theory class we have to include KB2CHY and his dual Role as instructor and student. He received his he went in to this with an Advanced Class license. We had 1 dropout and the same week picked a new student. Bottom line; 4 Extra Class upgrades: Brad Allen KB2CHY, Keith Freeberg N2BEL, Bob Horner KB2YEM, and Lou Kline K2LKK. Congratulations to all 4 Classes.

My thanks to the instructors: Art W2YGY CW, Al N2VY Technician Theory, Ron N2TOX General Theory, and Brad KB2CHY Extra Theory.

The second semester starting Feb.10th 2003 will have Kevin WB2QMY CW with Al N2VY and Ron N2TOX continuing their respective Technician and General Theory. It looks like I will need an Extra Theory Instructor if any one is interested please let me know 334-8724 or wa2myg@arrl.net. If It appears

that Brad KB2CHY or any of the new Extra Class upgrades are for that matter will be down off cloud nine by Feb.10th we could use the help.

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JANUARY RAG DEADLINE JANUARY 21, 2003

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licensed Amateur Radio operator who is or will be *pursuing* any degree of Associate level or higher in any accredited school beyond high school. The individual must be a member of RaRa and a resident of New York State. The scholarship is for one individual for one year, but the recipient may reapply for subsequent years.

Applications for the scholarship may be obtained at RaRa general meetings, by mail at P.O. Box 93333, Rochester, NY 14692-8333 or by calling the RaRa phone at 442-0587. Additional information and a copy of the application are available on the Rochester Amateur Radio Association web site at <http://www.rochesterham.org/> or from one of the officers.

Additional "tax exempt donations" in memory W2WPF, W2OMV, K4VOS or any other silent key may be sent to: Rochester Amateur Radio Association, Inc., Memorial Scholarship, P.O. Box 93333, Rochester, NY 14692-8333.

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