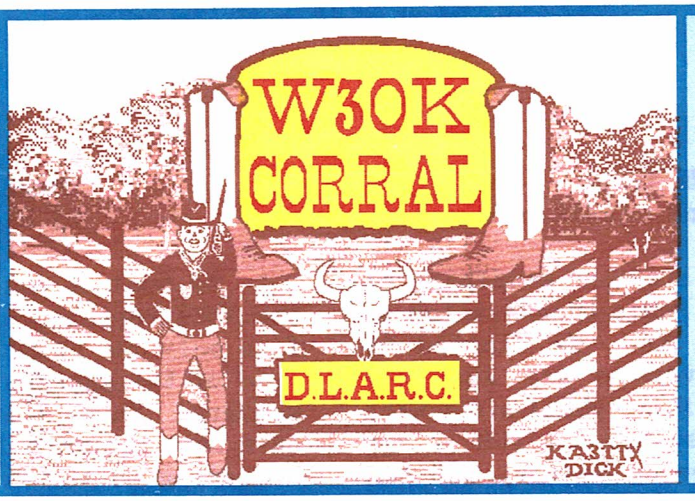
DELAWARE-LEHIGH AMATEUR RADIO CLUB, INC. W3OK

August 1991



SPECIAL SERVICE CLUB

ARRL Affiliated Club

DLARC PICNIC TO BE BIGGEST EVER

WHY ARE BAND CONDITIONS BAD?

by Bill, K3ANS

(DLARC Program chairman)

Uh Oh! The bands died.... Wow I worked New Zealand on 75 meters.....I hear Massachusetts on 20 but I can not hear California, Europe, or Asia! What is the Solar Flux Index today? What does that high A level mean. What is a K level? On WWV at 18 minutes after every hour, I hear the announcements of SFI, A, and K..but I do not understand them as well as I wish. What time should I work Asia on 40? What direction is Long Path versus Short Path to a DX station? Why do I hear Australia south west at night, but north east in the morning? What is a skewed path?

How does the solar cycle work. What are these sunspots doing to my radio signals? John Fisher, K2JF, will answer all these questions and more on Aug. 1 at 7:30 PM at the DLARC meeting. John was in charge of propagation research and consultation at RCA before his retirement. He continues to teach courses about propagation and electrical engineering at colleges in southern New Jersey. We are lucky to attract this very popular expert. Bring your video camera or tape recorder to save this educational seminar for future reference. >>

Propagation also affects 2 meters and 10 meters. Novices and Technicians are worried about 10 meters dying out in the solar cycle null. Two meters has crazy skip and openings occasionally. What causes them?

Come find out at the August 1st meeting of the Delaware-Lehigh Amateur Radio Club.

de Bill, K3ANS

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REMEMBER THAT MEMBERSHIP IN ARRL IS NOT JUST A MAGAZINE SUBSCRIPTION

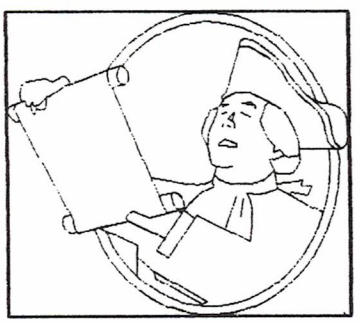
DLARC PICNIC AUGUST 18th

by John, N3IGA

(DLARC Picnic Chairman)

Everyone knows that when DLARC does something, they do it right. There were 90 at last years picnic and I hope there will be more this year.

The picnic will be held at Hacketts Park in Easton on August 18th, with a great day planned.



The food will be great, and as always all members are asked to bring some type of covered dish. Salads, Cakes, Fruit, Pies, baked beans, and any other types of dishes. The Club will supply the liquid refreshments, the hamburgers and the hotdogs. The corn will be supplied by the "Tired Dirt Farmer", Ray, from his plantation in Coopersburg. Music will be supplied by Marvin, KA3TEO; his wife Dee, KA3WOB; and with a little pressure, I am sure that Billy, KA3LSI will help.

At least two more members of the club are needed to help with the picnic. Anyone interested should contact me, N3IGA and let me know if you will help with the preparations.

It is expected that someone will defeat last year's champion Chess player, Bill, K3ANS, and Ray, W3TDF and Bob, KB3RI will again try to beat all comers in horse shoes.

RADIO ON THE TRAIL
by WD5BRP, Dave and KA3WJF, Bob

Six Scouts joined us atop the mountains of Camp Trexler, BSA to find Radio transmission is not shifting from AM to FM. We started by taking apart a transceiver to see what was inside, just as all inquisitive young minds want to know. The scouts discovered a VOM is not "Video Of the Month" scoring device, but can tell them why a battery doesn't work anymore. It also could tell them how much resistance there is in a Scout versus a Scoutmaster.

They also found through the magic of radio they could be heard all the way back to Easton. This was beginning to be as much fun as talking to the Staff from the other side of Camp. They even had a QSO with ***Clarence "Marconi"***, Although they thought he was the one who invented the "elbow marconi" we had for dinner the night before. They were learning how to communicate in another language.

After they discovered that radio transmission is just like carrying a stick across the lake, all you need is something to make waves. We listened and attempted to talk to so stations from north of Atlanta, GA. They soon learned that we would need to do something to make our signal stronger. They came up with the idea to add an amplifier, but since I didn't have one or the needed parts to build one. I had some wire and insulators so why not try building a different one. After talking some about wavelength they used their scouting skills to figure out the length it would need to be. We wanted it to be directed east-west, and that is no problem for a scout to figure out the direction. We needed to get this wire up as high as we could and have a better chance of getting out. All we needed was a way to attach the wire at the top of a tree. Knowing we could find pitchers among these scouts, it wasn't long before we had cord over a limb high in the tree. Radio propagation not always being the way you want it to be, we tried at different times of the day and finally had some QSOs. We heard some DX stations, Mexico and Argentina, and they soon discovered the value of the "Q" signals.

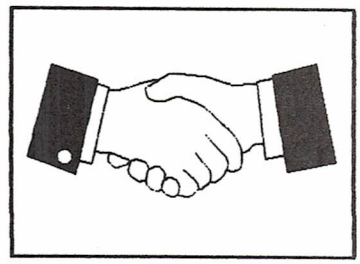
All the scouts had a chance to use what they learned during the week and complete the Radio Merit badge. We had a good time working with these boys and plan to do it again next summer.

de KA3WJF & WD5BRP

FROM THE OLD MAN
by Clarence, W3PYF

As most of you know, I probably monitor the W3OK repeater as much as any one else. I find only one thing that bothers me more than some of the aggressive attitudes of some our members. Maybe I am a little sensitive as I have been around a long time. Let's stop the bickering on the frequency, and I may be as involved as anyone.

Let us return the Delaware Lehigh Amateur Radio Club repeaters to the way they were in the past. Why not welcome the strangers who come into the area. Don't just sit there if you hear them because you don't know them. If any of you have traveled to many of the other areas, you will find this a habit on many repeaters. You don't have to carry on a long winded conversation, but at least a hello and a welcome, is sufficient. If you find that you have something in common stay on for a few minutes but, if not excuse your self with a 73.



One correction from last months write up on the funeral of KA3MNY, I missed the call of Bill Fahs, NC3P, who was one of the pallbears.

Editor W3PYF, Clarence

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VE TESTING JULY
by John, K3GQJ

The July VE session at Gracedale was unusually quiet. Ten candidates took a total of 17 elements. There was one upgrade and one new Technician. The Up-grade was

David A Vogel, **N3JGX**, to Advanced;

New Technician is John A Sherer Jr.

The VE Team consisted of NE3K Charlie; WA3T, Robin; WF3H Bob; NX3R Hank; NS3J Bill; WA3MVQ Glade; WG3C Alex and K3GQJ John. The August session will have team 4 in attendance.

de John K3GQJ, team liason

At the Murgas Hamfest the following members upgraded. WC3T aided as a VE.

N3IGA to General,
N3GDV to Advanced.

IMA LIDD

HARMONICS

by Van K3CP

"Hi Elmer," said Ima Lidd. "How are you today? I've some questions about harmonics."

"Hello, Ima," replied Elmer. "I would be glad to discuss harmonics with you. What are your questions?"

Ima answered, "What are they, where do they come from and what impact do they have on amateur radio?"

"We should talk first about the "fundamental". A properly designed oscillator running at 7 Mhz. will produce a sine wave whose fundamental frequency is 7 Mhz. The second harmonic is 14 Mhz., the third harmonic is 21 Mhz. and so on."

Ima Lidd interrupted, "I know all that, Elmer. What I would like to know is how all that happens."

"Good question," said Elmer. "The fundamental is a pure sine wave as shown in figure 1 below. Notice that the second half of the wave is just like the first half except it is above the line.

The third harmonic is shown in figure 2. It's the same as figure 1 except for its amplitude and it goes through its cycle 3 times.

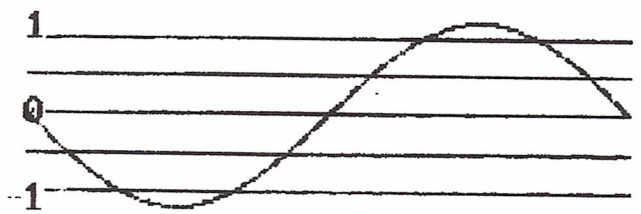

Figure 1

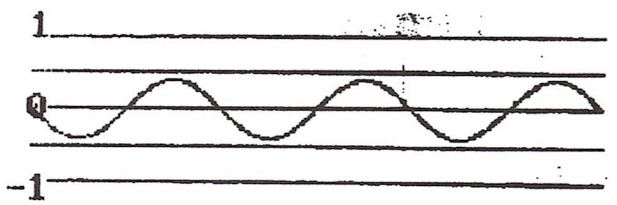

Figure 2

"Figure 3 shows both the fundamental and the third harmonic on the same graph. When these two wave forms are combined they form the wave shown in figure 4. The wave form in figure 4 is derived by adding the points of both waves in figure 3. You can prove this to yourself, Ima, by using a drafting compass and measuring the distances above and below the line for each separate wave and adding them together and plotting the figure that results. Be sure to make all units above the line positive and all below negative."

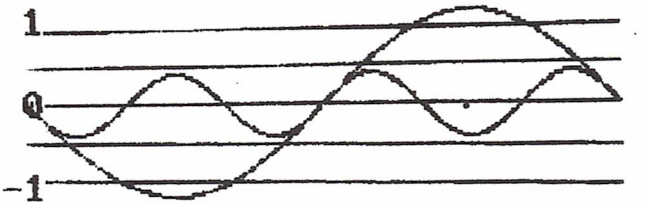

Figure 3

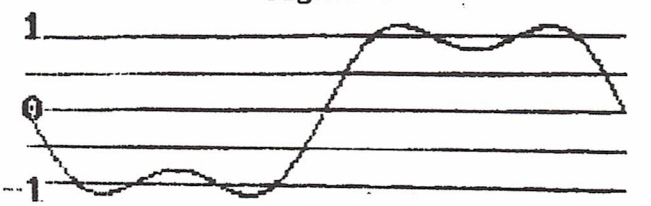

Figure 4

Ima interrupted. "Elmer, maybe it's my imagination, but figure 4 resembles a square wave."

"You're absolutely correct, Ima. If you continued the mixing of odd harmonics, i.e. the 5th, 7th and so on, the resulting wave would get very steep and the hollow in the center would level out. Now, take a look at figure 5.

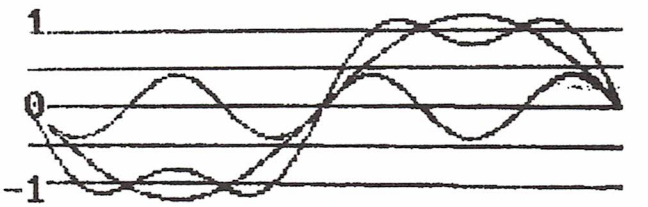

Figure 5

"Notice that it contains the fundamental, the 3rd harmonic and the results of combining the two. This combination is still oscillating at the fundamental frequency, as you can see.

"Another wave form known as a sawtooth wave is formed in a similar fashion, except the fundamental is combined with all harmonics (2nd, 3rd, 4th, 5th, etc.)."

"Well," said Ima Lidd, "this has been a very interesting talk. Thanks a lot, Elmer. See you next time."

SEVERE WEATHER SPOTTING

With the proliferation of bad weather, the need for increased awareness of weather spotting procedures becomes important.

The following information is excerpted from: Spotters Guide for Identifying and Reporting Severe Local Storms, published by the U.S. Department of Commerce.

When making reports you should include the following:

What you have seen: wall cloud, tornado, funnel cloud, waterspout, heavy rain, etc (3/4" or larger hail).

Where you saw it: the direction and distance from a known location, e.g. 3 miles south of Beltsville.

When you saw it: make sure you note the time of your observation.

What it was doing: describe the storm's direction and speed of travel, size and intensity, and destructiveness. Include any amount of uncertainty as need, Amt> "funnel cloud, no debris visible at the surface but too far away to be certain it is not on the ground".

Identify yourself and location.

Estimating Hail Size

Pea size: 1/4"; marble size 1/2"; penny size: 3/4"; quarter size: 1"; golfball size: 1 3/4"; baseball size: 2 3/4".

Estimating Wind Speeds (mph

25-31..Large branches in motion: whistling heard in telephone wires.

32-38..Whole trees in motion; inconvenience felt walking against the wind.

39-54..Twigs break off trees; wind generally impedes progress.

52-72..Damage to chimneys and %V antenna, pushes over shallow rooted tree.

73-112..Peels surface off roofs, windows broken, light trailer houses pushed or overturned, moving automobiles pushed off roads.

113-157..Roofs torn off houses, weak building and trailer houses destroyed, large trees snapped and uprooted.

158 & up..Severe damage, cars lifted off ground.

Spotter Safety Rules

1. Always have a safe place nearby to protect yourself from wind or hail.

2. Cars ar safe places in case of lightning, but not in case of tornados or high wind.

3. Moving water is very powerful, it only takes a slight current to push a car off the road.

4. Large hail often falls just in advance of a tornado, especially large tornados.

5. Tornados generally move toward the northeast at 25 to 35 MPH when associated with fronts and squall lines, but can travel at 70 MPH. Go to a substantial building instead of trying to outrun an approaching tornado.

6. The first gust of wind to reach you from a thunderstorm is frequently the strongest.

7. Wall clouds from the rain free base often 15 to 20 minutes before a tornado occurs.

8. Overshooting tops are an indicator of a very strong storm.

Reprinted from Ham Radio News Outlet
from RACES BULLETIN (Short Skip)

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DAVE PORTER, K2BPP
KARL MORRIS, N2CHZ

On July 11, **Karl Morris, N2CHZ**, one of the areas oldest active amateurs died at the age of 87. Although he was not a member for the past year, he was a member until he took ill. He was a regular member of our EMA networks in the past.

On July 13th, **Dave Porter, K2BPP**, a member of the DLARC and avid dxer, died of Pneumonia from complications arising after a fall while working on Ascension Island. His many talks to the Delaware Lehigh Amateur Radio club will be missed. His love for DXing, was exceeded only by his love for travel. A member of the Explorers club, he was planning a 1000 day trip around the world. He operated many times from the QTH of Bill, K3ANS and was a big help as the antennas were being built.

MINIMUM POWER RULE AND SSB

by Russ, KF8IO

It would appear that with the recent 'survey' by the FCC, some amateurs are evaluating their own compliance with the minimum power rule. Some confusion exists regarding operating at less than maximum power with transmitters lacking a 'power output' knob. 'CQ' Magazine even published a quote from an amateur who claimed "my TS-930 doesn't give a provision for power reduction. It goes flat-out all the time.

This lack of a power output control seems to mean that the power is fixed at the maximum transmitter rating.

All this means, folks, is that the transmitters in question have no power-limiting feature. Since a ssb transmitter operates in the linear region (if it doesn't, it distorts, right?) Simply reducing the audio input (mic gain) reduces the output. Simple. Problem solved. I can't believe so many people claim it isn't so.. Of course, if you turn the mic gain down, and then scream into to mic, you are back where you started, since the transmitter isn't limited except by the ALC. Spread the word..

de Russ, KF8IO

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EASTON HOSPITAL RUN

by Clarence, W3PYF

Here we go again!. The Easton Hospital will again sponsor a **5K RUN and 1 MILE WALK** on Sunday, August 4th beginning at 9 AM. Bob Mulrooney, KB3RI has asked for 7 or 8 members to help with communications.



The entire event will take no more that two hours or so, it will not effect your plans for Sunday afternoon. Proceeds from this run go to the Valley Health Foundation and benefits Easton Hospital. Contact me, W3PYF, Clarence if you will help. "T" shirts will be awarded to all who help in this event.

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** CONTEST CALENDAR **

by Barry, KU3X

Aug.3-4 YO DX Contest
ARRL UHF Contest
Aug.6 West Coast Qualifying Run 10-35 WPM
YL-OM SSB Sprint
Aug.7 W1AW Qualifying run 10-35 WPM
Aug.12-13 European DX Contest CW
Aug.17-18 SARTG RTTY Contest
Maryland-DC QSO Party
New Jersey QSO Party
SEANET SSB Contest
Aug.24-25 Empire State QSO Party
Aug. 27 W1AW Qualifying Run 10-60 WPM

I see by the above calendar there are a few QSO Parties going on this month. As I have said in the past,"it is a good way to practice for the PA QSO Party". Forty and seventy five meters are good bands to use to work the three QSO Parties mentioned above. Being so nice outside this summer, why not try some portable operations for these contests?

Since I have been doing this column, there has been at least one CW qualifying run every month. What are they trying to tell us?

de Barry, KU3X

K3ANS ENTERTAINS RUSSIANS

Bill, K3ANS instead of talking to DX had an opportunity on June 27 and 28 to have them as house guests at his home in Easton.

Romeo Stephanenko, formerly UB5JRR from the Ukraine and his wife Alyona operated from Bill's home during their visit talking to their friends in the Soviet Union.

They were accompanied by his business partner Yuri Brajenko.

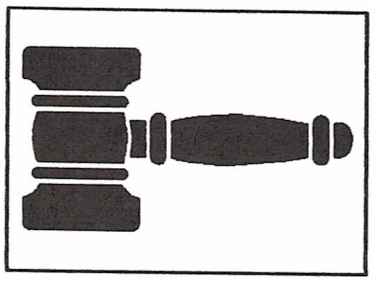
On June 27th, members of the FRC and DLARC entertained these visitors at Flurer's Hotel. Romeo, famous for his DXpeditions has operated from Afghanistan (YA0RR) Vietnam (3W3RR) and Spratly Island (ISIRR) was welcomed by Gerald Seyfried, County Executive, who presented them with a pewter dish showing the Northampton County Court House.

They will be the first to operate legally from Burma in the near future.

THE GAVEL SPEAKS

by Ray, W3TDF President DLARC

Since coming to the 'Valley' and becoming a member of The D.L.A.R.C., (to say nothing of the honor of becoming President thereof), about 6 years ago, I have met many interesting people, formed some very special friendships, and even hurt some feelings along the way. A few of those lost friendships cause me some sadness. I am sorry if I acted in a way that displeased them. I am only human, and I make mistakes too. I guess what I'm leading up to is that I'm probably going to lose more friendships as a result of trying to make our club better. If I step on your toes, ask yourself if you deserved it, OR, was I out of order, too quick to leap without looking, then call me, PLEASE.



On the brighter side, the sweet corn is looking great. I hope the picnic, Aug.18 will be as great as Field Day. The horse-shoe championship should be fun, especially if my former partner, K3OO, shows. Also the chess and pinochle games, and just general visiting. C.U. There.

de RAY, W3TDF

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LEAGUE SEEKS ACCESS TO 216-220 MHZ

Says Space needed for packet links; sharing plan possible

The ARRL has petitioned the Federal Communications Commission for a new spectrum allocation to help replace that at 220-222 MHz which will be lost on Aug. 27.

On June 4, the League filed with the FCC a Petition for Rule Making, seeking a secondary, non-interference allocation for the Amateur Radio Service at 216-220 MHz, to "provide reaccomadation for those present and future wideband data intercity links and other point-to-point fixed amateur stations which stand...to be displaced from the 220-222 MHz band." The idea of replacement spectrum had its genesis with Congressman Robert E. Wise, Jr., of West Virginia, Chairman of the House Government Information, Justice, and Agriculture Subcommittee. During the subcommittee's May 11, 1989 hearings on the FCC's 220-MHz decision, in calling attention to the fact that 216-220 MHz was underutilized, ARRL Executive Vice President David Sumner, K1ZZ, had testified that "radio amateurs would love to have access to the 216-220 MHz band in the rest of the country where it is not used for waterways communications. We'd make very good use of it."

The 216-220 MHz band currently is occupied by the Maritime Mobile Service and by some fixed and mobile assignments. In addition, part of the range (specifically, 218-21-8.5 MHz) also is under consideration for use by a new Interactive Video Data Service.

The League contends the FCC's assumption that amateurs could merely move operations from 220-222 MHz "up the band" was incorrect; that such a move is not possible "because of the differences in the technology used in the different segments."

The use of 222-225 MHz for voice repeater operation is expected to grow as new Technician class licenses occupy the band, further compounding the problem of finding space for the wideband channels necessary for high speed packet operation.

Most new high-speed modems for packet radio "were designed specifically for the amateur 220 MHz band," the petition says, and notes that while in 1987 30,000 amateur packet stations were thought to exist, the number today is thought to be more than 100,000.

de Bill, WA3SCW

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WHERE ARE THEY NOW?

FCC AMATEUR RADIO CALLSIGNS

as of July 1, 1991

EXT	ADV	T/G	NOV
Radio District Two			
AA2FH,	KF2CJ,	N2MYJ,	KB2NET
Radio District Three			
WO3H,	KD3XR,	N3JVU,	KA3ZFE

NOVICE/TECH CLASSES

Entry level classes will begin on September 16th. Classes will be held in the Greystone Building at the Gracedale Complex near Nazareth from 7 to 9 PM. Those interested in either code and codeless licenses are welcome. Traditional novice license tests will be given during class sessions. A book order will be taken at the first class session. However, for those who want to get started early we will be teaching from the new ARRL publication "Now You're Talking". The FCC Rule book published by the ARRL is highly recommended. For those wanting code instruction we highly recommend the ARRL cassettes "Your Introduction to Morse Code".

Please pass the word. Interested persons should call the DLARC phone bulletin board at 215-820-9110 and leave their name, address, and brief message to obtain an information packet.

Current hams are also welcome to come and share their views and experiences with the students.

We can't guarantee a license but those who have attended all the classes have had a very high success rate. < de Chris, NU3L >

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JUST THE MINUTES

by Dave, N3EYT, Secretary

The July 11th meeting of the DLARC was called to order by Ray, W3TDF at 7:35 pm. A total of 84 members and friends attended the meeting held in Kiva Hall on the NCACC campus.

The minutes of the June meeting were approved as printed in the W3OK Corral. Dick, KA3MOU gave the treasurer's report with a balance of $4770.98 as of June 30th. Motion to accept by W3PYF, second by KW3W, passed. A call for volunteers for communication for Derriere in the Delaware on July 28th. Contact Dick, KA3MOU if interested. Also, the Sewyco Fire Co. asked for help on July 20th, N3CP and N3GXV volunteered for communications.

The motion to consider the creation of the office of financial secretary was not approved. The treasurer, KA3MOU, has computerized the club bookkeeping and has the situation under control. The Board of Directors appointed Robin, WA3T, as a member to the board of directors to fill the position left by the change of KA3MOU to treasurer and the death of KA3MNY. Approval by the Board was unanimous. The DLARC welcomes the following new members:

Paul Ryan, NOKIA
Laurie Eisenberg, N3JUN
John Remington, KA3ZDA
David Vogel, N3JGX
Brian Smith, N3IVX
John Paulus, N2MWQ
Peter Marcipo, KA3MLX
Robert Sunbury KA3ZGM
Alfred Antonelli, KA3YYD
Burton Swayze, KA3ZBE
Theodore Edwards, GO/W3TB
Robert Friedrich, N3JVE
Thomas Walsh, N3JVA
Randy Vance, N2MQZ

KW3W presented the PA QSO awards:
High Club score-Bill, K3ANS;
High QRP score-L.E.Batchler,KB3TS;
Novice/Technician- score-John, N3GXU.

Field Day report by Bob, KU3K, indicates a club score of 8358 which includes 1300 bonus points.

Adrienne, KA3YEB; volunteered to work on the membership committee doing mailings each month to new licensees in our geographic area amounting to between 10-30 letters per month.

The new Novice/Technician classes will begin September 16th at Gracedale. Contact NU3L, WA3T, WF3H, K3EX or N3IYX for details or if you are willing to help with the classes. Call the club bulletin board at 820-9110 to leave a name and address for an information packet about the classes.

Over the past months eight W3OK CORRAL articles have appeared in other publications. This is a credit to the writers and editor of the Corral. Congratulations!

Bill, K3ANS, gave a report about the visit of Soviet Amateur Radio operators to our area.

Bob, KU3K, mentioned the 250th anniversary of Bethlehem and our Christmas City station operation. He said we should try to operate from Bethlehem and promote the special anniversary. Dave, N3EYT will contact Bethlehem officials concerning the operation of the Christmas City station by the DLARC.

The program was presented by Joe Fairclough, WB2JKJ, on education through communication. Joe is an educator in a New York City Junior High School and uses Amateur Radio to teach and motivate students.

de Dave, N3EYT

DIGITAL COMMUNICATIONS

A Very Clean Oscillator
by Joel, K9TBD

There are numerous uses for a very clean audio oscillator. I use one to check levels of microphone inputs or packet boxes or just as a signal source for audio work. You might make two of them to make a two-tone SSB rig test box. I do not own a good signal generator so I built this 'weekender' out of one operational amplifier and a few other parts. The trick to this design is that it uses a non-linear device (a light bulb) to control the gain of the oscillator. An oscillator is an amplifier with just the right feedback.

The circuit is very simple but very elegant. The way any oscillator is made (thing of pumping a kids swing) is that you pump it up just exactly at the right time (phase) with just the right amount (amplitude). To keep the kid in the swing going just right, we sort of judge by eye and feel, to do the same thing for an electronic oscillator is a different matter. If you have too much feedback for an oscillator it will increase in amplitude until it bangs on the power supply rails and the waveform flat-tops which produces a dirty (harmonically rich) signal. If you do not give it enough feedback, it just won't oscillate. (old timers recall the 'Q-multipliers' and regenerative detectors). So one of the requirements to make a good oscillator is to control the amount of feedback very carefully. This circuits uses a light bulb in the feedback path to accomplish automatic gain control action for the oscillator.

When a light bulb is cold, it has very low resistance; as it heats up, its resistance rises. The gain of an opamp circuit is controlled by the ratio of the feedback resistance (from output to negative terminal) to that of in input resistance (negative terminal to ground). So if we use the light bulb for the input resistor, as it heats up then the gain of the amplifier goes down. So, if the amplifier has just a slight excess gain when the light bulb is cold, the oscillator will reliably start and as the resistance rises the amplifier gain goes down. If the oscillator were to quit, the light bulb would cool off and the gain would go back up so - we have a perfect regulator (automatic gain control) with this simple device.

Here is the simple circuit. First select two pairs of identical resistors and capacitors (RC's). These should be selected for the frequency desired (frequency is one over the RC time constant) or thereabouts. For dual audio opamps such as LM741 or LM358, the pins are as follows: Opamp #1, output (1), plus input (3), minus input (2); opamp #2, output (7), plus input (5), minus input (6); the power pins for both are Plus (8), Minus (4). That covers all 8 pins of the dual-inline-package. You only need to use one of these opamps to make the oscillator - I used the second one as a follower and drove a speaker with it to listen to my success.

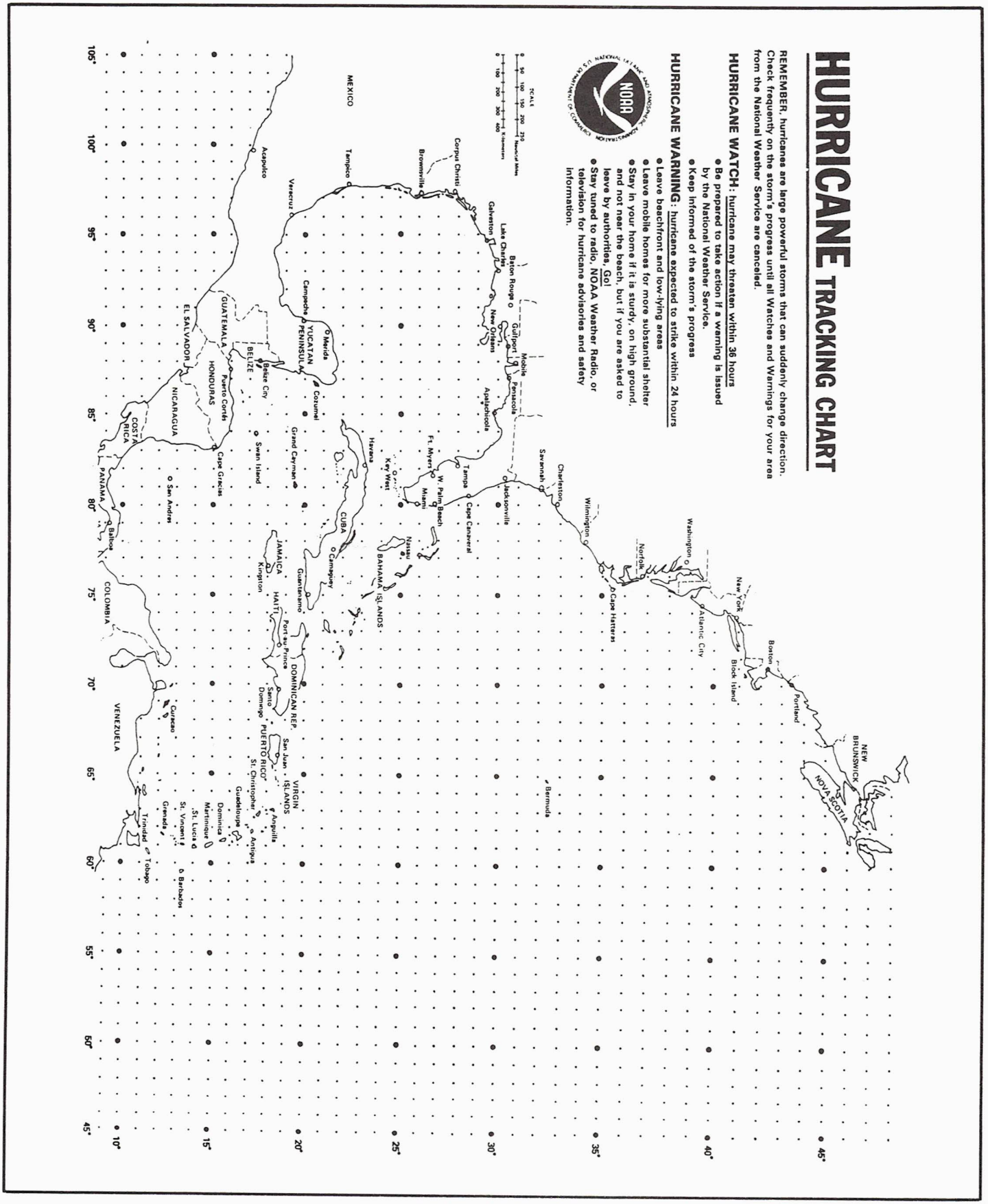
Connect a series RC from output (1) to plus input (3); connect a parallel RC from plus input (3) to ground. This completes the frequency determining components. Connect a resistor (to be selected dependent on the light bulb used my light bulb required that I use a 100 Ohm resistor here) from the output (1) to the minus input (2); connect the light bulb from the minus input (2) to ground. This completes the gain control components.
If you wish to use the other opamp (in the dual pack) for a buffer, connect the negative input (6) to the output (7). This completes the feedback loop for unity gain. Connect the output of the first opamp (1) to the plus input (5) of the second opamp. Use the output (7) of the second opamp to drive the load (say a speaker or earphone). The other end of the load goes to the common ground reference. This completes the buffer and load connections.

If you don't have a (+,common,-) type power supply, just connect two nine (9) volt batteries in series (+) [plus...minus] [plus...minus] (-). The (+) end goes to pin (8) and the (-) end goes to pin (4), and the joint between the two batteries is the common reference ground.

I used an experimenters plug board and it took ten minutes to hookup everything. Once you are satisfied with your circuit - you can do the finished circuit on a PC board or wire-wrap in put in a nice little box. You may wish to put a little divider network on the output so you can accurately adjust levels for the device you wish to drive with this oscillator. If you wish to use it for code practice (don't key any oscillator) put a key in series with the speaker. I hope you enjoy this 'get back to building' useful little project. 73 Joel, K9TBD

Hurricane Tracking Chart

Here's a handy chart for tracking hurricanes during this year's hurricane season. The season runs from June through October. Listen to local NOAA weather VHF radio broadcasts for updates on storm coordinates.



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All Amateur Radio Operators are invited to participate in the DLARC, RACES & ARES nets on 146.70 W30K/rpt, with an alternate of 145.11, W3PYF/rpt.

The Nets are held on Sundays at 9:30 AM and on Wednesdays at 7:00 PM.

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DLARC INFORMATION LINE 820-9110

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All regular meetings of the D.L.A.R.C. are held on the first Thursday of each month at 7:30 PM at the Northampton County Community College

TALK IN ON 146.70

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