

Crosstalk is published monthly by the
GLOUCESTER COUNTY AMATEUR RADIO CLUB

THE CROSSTALK STAFF

EDITOR:	Mark Wilson, WB2OSQ
HAM INTERVIEW:	Harry McCormick, WA2SEA
CONTEST CORNER:	Ken Newman, W2FBF
LES BELLES:	Rose Ellen Bills, WA2FGS
DX:	Wayne Wood, W2SUA
WHAT'S UP DOAK?	Bob Doak, WA2AIH
ARRL BULLETINS, ETC.	Della Parker, W2AFZ
TYPIST:	Bill Frambes, WB2FJE
PRINTER:	Gary Hitchner, WA2OMY
CIRCULATION:	Gary Hitchner, WA2OMY

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CLUB NETS

6 M AREC	50.9----Sunday, 8 PM local time
10 M Ray Chew	28.8----Friday, 9:30 PM Local time
Novice	21.115--Monday, 8:30 PM Local time

FEBRUARY MEETING: WEDNESDAY FEBRUARY 5th BEGINNING AT 8 PM.
PROGRAM: MARS TO BE FEATURED AT MEETING.

**DEADLINE FOR SUBMISSIONS FOR THE MARCH ISSUE IS SUNDAY, FEBRUARY 16,
1975. PLEASE MAIL ANY CONTRIBUTIONS TO: MARK WILSON, WB2OSQ,

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MARS TO BE FEATURED AT FEBRUARY MEETING

The program at the February membership meeting will be a joint presentation by Bill Frambes, WB2FJE/ADM2FJE, and your truly, WB2CR/NØEUW. The subject will be M.A.R.S. (Military Affiliate Radio System). Bill will represent Army MARS and I will represent Navy MARS. See all there on February 5th!

de Rich, WB2OCR

JANUARY PROGRAM / CLUB PROJECT

At the January meeting, Ken Newman, W2FBB presented the Six Meter Project. The receiver is a super regen type and can be used as a tunable receiver or as a fixed frequency 50.9 monitor. The receiver can be built with several options including a higher power audio amp and squelch.

The project should cost about \$30--\$35. A parts list is available from Rich, WB2OCR as Ken will be out of town at the time of the next meeting. Any club member may build a project and all parts can be procured through Ken. Just obtain a parts list, check off the part quantity needed. Return any completed parts list with money to Ken Rich.

Ken's project will receive all check-ins on the Sunday night net. The project is battery powered and will lend itself to portable operation. Squelch is definitely working.

de Ken, W2FBB

FLASH!! FCC ROLLS BACK AMATEUR LICENSING FEES !!

The Federal Communications Commission recently announced a reduction in license application and renewal fees as well as a reduction in fees for modifications. Beginning March 1st, 1975, an application for new or renewal of amateur licenses will drop to \$4.00 from the present \$9.00. That's right! A reduction of greater than 50%.

These new fees will bring amateur fees equal to those charged commercial tickets. Modifications will now cost \$3.00. Spread the word, the FCC also announced that they will not remit any excess money given them after this goes into effect.

W2SUA ASSISTS CONNIE MAC W3SW

Congratulations to Wayne Wood, W2SUA, who was recently re-appointed Assistant Director of the Atlantic Division (ARRL). Wayne will continue to do a very fine job in this position and we wish all the best of luck.

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PRESIDENT'S COMMENTS

It was good to see such a fine turnout at our last month's meeting. Our business meeting was probably too long and I promise to keep it shorter from now on. Ken, W2FBB, presented a FB program and it was obvious that he put considerable thought and individual effort into planning, organizing and presenting all the details of the Club 6M monitor project. This was really a first class piece of work and we are indeed grateful to Ken for bringing the project to reality. I hope that you will follow through and eventually monitor 50.9 Mhz. on a daily basis.

The various club committees are gradually being filled (with chairmen and members) and we plan to publish the complete list in next month's Crosstalk. We are particularly grateful (at this stage) to Bill, WA2VEE, and Steve, W2TDS, who have volunteered to serve as Membership and Banquet chairmen respectively. Also to Bob, WA2AIH, and Rich, WB2OCR, who have joined our Tech Advisory Committee (WB2FJE Chairman).

Be thinking NOW about our banquet which is tentatively planned for late this Spring. If you want to put aside two bucks a month for this affair, the shock will be lessened in May when the ticket \$ must be in.

Also many thanks to Mark Anthony, WN2WFZ for getting the refreshments underway so smoothly this year. Obviously the transition was helped by John, WB2GKH, who served so faithfully for so many years.

See you all on the 5th.

73 de WA2NPD

FRIENDSHIP NET PASSES INTO HISTORY

The Westside Radio club of Toronto, Canada, decided at a general membership meeting to terminate the WSRC/GCARC Friendship Net. Apparent lack of interest coupled with propagation and QRM difficulties were cited as the reasons.

I don't think that lack of interest, at least among GCARC members was a major cause as it applies to us. The net was unique in that two clubs were holding an international get-together.

We enjoyed it despite QRM and QSB at times. One must agree that both sides must get something out of it. The decision by WSRC, regretfully, passes the Net into history.

de WA2MEM

GLASSBORO HAM JOINS GCARC

We are pleased to announce that Stan Cohen, K2YYC, of Glassboro has joined the club. Stan teaches at Glassboro State College. His address is:

Stan Cohen,

Welcome to the club, Stan!

DX

Why it takes so long department: 23 sacks of mail lost from St. Helena, ZD7. If you sent a QSL and haven't received one, the mail will eventually turn up.

Prefix change: Bahama Islands VP7 changed to C6 as of Jan 1975.

Probably 35 or so countries were activated by the DX/ped route over 1974. Some were real goodies like Wallis Island, F Desroaches, VQ9/D; Nzvassa, KC4; and Tokelaus, ZM7, to mention. Those of you who were able to grab one or two should feel lucky considering the fact that DX'ers have to put up with going to some holding down a job and keeping peace in the family. All of this makes it pretty hard to keep skeds even when propagation is good. Some have been the best but the DX has been workable.

Want to see some wall to wall DX packed into several weeks? Why not try the ARRL DX Contest? Phone weekends: Feb. 1, & 2, Mar. CW weekends: Feb. 15 & 16, Mar. 15 & 16. See page 56 in Dec. QST for rules.

For some good reading, see "DX When and Where" on page 54 of 75 QST.

de Shorty, W2SUA

QRP OPERATION Part 3

by Bob Doak, WA2AIK

In this part of the series, I will give QRP operating tips.

The most important consideration of QRP operating is the band operation. I have found 80 and 40 meters to be the best for QRP operation. 20 and 15 meters aren't as good because most everyone on the bands is DX hunting. If you try to work the DX, you will only be stepped on by the KW's trying to work the DX. The lower bands are better because of the lower antenna system loss and higher equipment operating efficiency. Also, there is consideration of the persons who are trying to work. Most receivers are more sensitive on 80 and 40.

Now for some on the air operating tips. The QRP operator should scan the band listening for CQ's. The chances of making a QSO by listening CQ's is much greater than by calling them. A high power station calling CQ will listen harder than if he was just casually tuning. When answering another station's CQ, I sometimes send "Pse QSO, I'M listening" before I send K. Believe it or not, this does attract the other station's attention.

When QRP, keep transmissions short. This is to keep you aware of changing band conditions. If the band suddenly went out, you would be sending to nobody.

I believe you will find QRP work fun and a great challenge. To mention it's other uses such as portable operation, mobile operation, transmitter hunts, emergency operation, etc.

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OLD CALLBOOKS TO BE RAFFLED

The club's 1974-Callbooks will be raffled off at the February general membership meeting. The proceeds will help to offset the cost of new Callbooks. Tickets will be 50¢ and we need a minimum of \$10.00 or else we won't raffle them. With the rising cost of Callbooks, this is a good bargain.

CLUB PRESIDENT SPEAKS AT KIWANAS CLUB DINNER

Doug Gehring, WA2NPD, spoke about Amateur Radio and about the GCARC at a dinner held by the Woodbury Kiwanas Club. Doug received this invitation because of an article run in the Woodbury Daily Times. The article told about our new officers for 1975 and featured a picture of Doug at his rig. The publicity chairman, Steve, WA2AXJ, was responsible for the article. Fine job, both of you.

FIELD DAY CHAIRMAN

Harry McCormick, WA2SEA, has volunteered to be chairman of the 1975 Field Day, to be held in June. Anyone wishing to help out should contact Harry

SOME THINGS TO THINK ABOUT

by Bill Conrad, WB2FIF

Did you ever wonder:

If Shorty (SUA) is really 5'7" and wears stilts?

If Bob (AIH) will ever use those 2KVA and 6V 40A power transformers?

How Preston's (TSZ) liver can stand it?

What it is about oscilloscopes and Gary (OMY)?

If Steve (AXJ) will ever move out?

If Mark (OSQ) will ever make a mistake?*

*assuming he learns two more letters of the alphabet.

HAPPINESS IS:

Having a lower heating bill after you go that 2KW.

Finding a clear frequency on 40M phone after 4PM

Getting an answer to a CQ on 6 meter AM.

A quiet telephone whenever you firs up the rig.

Having an understanding family when you get up at 3 AM and start making "beep/beeps".

Working South AMierca on 3 watts and a wet noodle.

When Field Day coincides with Murphy's vacation.

SWAP SHOPPE

- FOR SALE: Hammarlund HQ110, \$90, Heath DX-35, \$25. Contact: Art Salin, WA2JRD,
- FOR SALE: Heath DX-60B with VF-1 VFO. \$50 takes all. Contact: Darrell Neron, WB2BVV
- FOR SALE: HA-750 with DC power supply and Halo antenna, \$65. Contact: Bill Frambes WB2FJE
- FOR SALE: Heath HW-16, \$80; Heath DX-60A, \$40; both good CW or Novice rigs. Contact: Mark Wilson, WB2OCR
- WANTED: Commercially built tansmatch. Must be in good condition. Contact: Bill Cardis, WB2IYB,
- FOR SALE: RCA (commercial) plate transformer. Pri. 220 V--Sec. 300V. 1 amp. Also matching filter choke. Hallicrafters HA/C six meter SSB transverter with power supply. Like new condition. RME DB 23 preselector, 80-10 meters. FB condition. Make offers on any of the above. Contact: Phil Catona, W2JAV
- FOR SALE: 75' self supporting tower (tilt Removal) TR44 rotator and cables, Prop-pitch motor, D-104 mic, Collins KWM-2, KWM spec. and power supply, Henry 2K-D (Desk) 2000 W. PEP linear amplifier, Mosley/TR6 all band antenna, all connecting cables and coax, monitor scope (brand new). Entire station in A-1 condition. Original price: \$3,425. Asking \$2000. Contact: Fred Newmann, W2EUX
- WANTED: A.C. Power supply for NCX-3. Contact Vic Dudley after 6 PM.
- FOR SALE: 1 dual trace Heath HF oscilloscope \$350 or trade for SSB transceiver. Contact: Gurdon, W2PAX at

If anyone has anything to buy, sell or trade, Crosstalk is the place to advertise. There is no charge. Call Mark Wilson to place an ad.

CLUB JACKETS

We still need 2 more orders to get club jackets. The minimum is 12 and only 10 members have ordered. Everyone should have one! jacket has the member's call on the front and GCARC on the back. Contact Rich Netherby, WB2OCR to place an order or for further details.

ARRL BULLETIN

January 18, 1975 to all radio amateurs BT The board of directors of American Radio Relay League in annual session January 16-17, 1975, considered FCC proposals for restructuring in Docket 20282 and laid the groundwork for an extensive survey of member attitudes and opinions to be gathered at a special board meeting called for May 16, 1975. Directors will report member reaction in each division but agreed to ask similar questions in each case so national as well as regional views can be tabulated. ARRL was authorized to take all necessary measures in opposing continued expansion in Government agencies to reallocate a portion of the amateur radio spectrum to a class E citizens radio service. In response to an FCC inquiry, the League will file a brief seeking U.S. support for expansion of amateur radio.

HOW TO PROPAGATE A RADIO SIGNAL (Part 2)

Last month, you will remember, we talked about what can happen to a radio signal after it leaves the transmitting antenna. We also made an attempt to describe why and how the atmosphere is ionized. Now we shall discuss the various layers of the ionosphere in detail.

The lowest ionosphere layer is the D layer. It represents an intensely ionized layer extending from about 30 to 55 miles above the earth. The density of ionization in this level is closely related to local sunlight conditions. It is extremely high over those portions of the propagation path which are in daylight, reaching a maximum at local noon in any given region. After sunset, the D layer is virtually non-existent.

The D layer is close to the earth and at this level the atmosphere is still dense. This dense combination plays a vital, but negative role in HF propagation. At these frequencies, the D layer's ionization in combination with the dense atmosphere counteract the reflective properties of the D layer and tend to attenuate signals. This is caused by collision and recombination of electrons, with other particles in the D layer. At higher altitudes the atmosphere becomes less dense so this collision happens less often. With more "free space" reflection is more likely to occur.

The next distinct layer is the E layer, found between 50 and 90 miles above the earth's surface. Similar to the D layer, the ionization in the E layer rises at sunrise to a maximum at local noon, and decreases after sunset. The incident wave (that wave traveling toward the E layer) strikes the E layer and is reflected back to the earth by refraction in the E layer. An incident wave leaving the earth at a low angle will require less refracting to bring it back. A low angle incident wave will also produce the greatest difference between transmitter and receiver.

An effect takes place in the E layer that is very important to propagation on ten meters and the VHF bands. This effect is called the Sporadic E layer. It consists of patches of a high ionization level which may last several hours before dissipating (except at the equator where it is fairly continuous). These patches usually appear in stretches of 50 to 100 miles moving along the E layer at a rapid pace. At northern latitudes these patches usually appear in the spring and early summer.

The next layer up is the F layer and it is the layer mainly responsible for DX on the HF bands. During the day, the F layer is divided into two distinct layers, the F1 and F2 layers. The F1 layer is closest to the earth, about 90 to 150 miles up (just above the E layer). Since the F1 layer is closer to the sun, it is more intensely ionized than the E layer, but it acts in much the same way.

Above the F1 layer is the F2 layer which stands out as the most unique and useful in DX propagation. This F2 layer is at a height of about 200 miles in the winter and about 300 miles in the summer. It is highly ionized due to its proximity to the sun. The F2 layer is the only layer which remains ionized 24 hours a day, diminishing just prior to sunrise.

During nights and sometimes in the winter months the two F layers combine to form one layer called the F layer (or F2 in some books). Because of its continual ionization, the layer is responsible for nighttime DX.

How to propagate (Cont'd.)

Last month it was stated that signals reflected from the ionosphere return to earth at a greater distance than is possible with ground wave communication. This distance is determined by the angle at which the transmitted wave leaves the earth and by which layer reflects it. The angle at which the signal leaves the earth is determined by the frequency and type of antenna used. The higher the frequency, the higher the angle. If the frequency is too high, the signal will penetrate and pass through the ionosphere without reflecting. The signal is then lost for purposes of reflection.

The distance between the transmitting antenna and the nearest point at which the reflected signal returns to earth is called the skip distance. Within the skip distance there are two smaller areas. The first (nearest to the transmitting antenna) is the ground wave area where communication is possible by means of ground waves. From the far end of ground wave area to the far end of the skip distance is the skip zone. The skip zone is the area in which there is no propagation and can be considered a "dead" area.

While the skip distance is the maximum distance that can be covered by skip, there is also a maximum area that can be covered in one reflection of the wave. This is called the one hop distance and is the result of a very low angle of radiation. It is possible for the signal to reflect from the earth back to the ionosphere and bounce off again back to earth. Worldwide coverage is possible by multi/hop paths such as this.

The maximum one hop distance varies with the height of the ionospheric layer from which reflection takes place. Typical one hop distance for E layer propagation is about 1250 miles; for F2 layer propagation the maximum one hop distance is about 2500 miles. Oops!

The Jouziny process referred to last month (named after the late Dr. Jouziny who passed away as a result of excessive plate current) is the process used to remove the vacuum from old 6146s. The intent of the author was to describe the ionizing process.

73 de Steve Asay, WA2AXJ

INTEGRATED CIRCUITS AND HAM RADIO

by Bob Spain WB2RVE

Several years ago, the electronics industry was sent topsy/turvy by the introduction of integrated circuits (ICs), or chips as they are commonly called today. ICs have enabled us to have pocket-sized calculators, compact ultra-high speed computers, and communications satellites, to name a few. These devices are gradually creeping into ham radio, being utilized in digital signal noise coring and filtering, frequency synthesis (utilizing a quartz crystal and multiple countdown, multiplier, and heterodyne circuits to provide VFO style tuning with quartz crystal stability), and digital frequency counters. ICs are also used as audio amplifiers, IF and RF amplifiers, FM detectors/limiters, and voltage comparitors/regulators in new reciver designs.

An IC is basically a micro-encapsulated (monolithic) device containing resistive and capacitive elements, along with transistor and diode elements, to form a miniature circuit. ICs are divided into two basic groups, linear and digital.

frequency divider, a very necessary item in frequency synthesis. This is also the operating principle of the new electronic mini-organs. Combining this with counters, and storage ICs, we can build a simple frequency counter.

Some linear ICs have a bandwidth of DC to 75 Mhz, allowing them to be used as RF and IF amplifiers in receivers. Some of these linear ICs also have AGC capability (MC 1545). Another application of ICs is in the security area; A/D (analog to digital) converters can convert an analog signal (voice, television, etc.) into a digital one, effectively scrambling the transmission of information. At the receiving end, the signal is run through a D/A (digital to analog) converter and returned to its original form.

Voltage regulation also can be accomplished by an IC. In this area we have progressed from the OB2 to the transistor, then to the zener diode, and now to the IC.

In the area of DSB and SSB, IC devices such as the MC-1596 can be used as a balanced modulator. This device can deliver up to 65 db of carrier suppression.

Other ICs, such as the MC-1595, can be used as frequency doublers and phase detectors. In the field of consumer electronics, a single IC can be used in a TV set as a sound IF, detector, limiter, and audio preamplifier (MC-1351). Others, such as the MC-1352, can serve as the 1st and 2nd video IF, AGC keyer and amplifier. An MC-1330 can be used as the 3rd IF amplifiers, driving a Limiter/quadrature detector such as the MC-1357.

These IC devices run on fairly low voltages (5 volts for digital, 5-25 volts DC for linear), and draw negligible current, as compared to their vacuum tube ancestors.

These are only a few of the practical uses of ICs in ham radio. Others include COR switches in FM repeaters, controlled access systems, and digital control of remote equipment. Some information provided in this paper was derived from material of the Motorola Technical Information Center.

LES BELLES

by Rose Ellen--WA2FGS

It is one again time to collect all your YL CONTACTS--the YL-OM CONTEST WILL BE HELD:

PHONE: Sat. Feb. 22, 1975, at 1800 GMT to Sun. Feb. 23, 1975 at 1800 GMT

CW: Sat. Mar. 8, 1975, at 1800 GMT to Sun. Mar. 9, 1975 at 1800 GMT

ELIGIBILITY: All licensed OM, YL and XYL operators throughout the world are invited to participate.

OPERATION: All bands may be used. Crossband operation is not permitted. Net contacts do not count.

PROCEDURE: OMs call "CQ YL" - YLs call "CQ OM".

EXCHANGE: QSO number, RS or RST report, ARRL Section or country. Entries in log should show band worked at time of contact, time, date, transmitter power. (ARRL Section list is shown in every issue of QST).

SCORING:

- A. Phone and CW contacts will be scored as separate contests. Please submit separate logs.
- B. One point is earned for each station worked YL to OM or OM to YL.
- C. A station may be contacted no more than once in each contest for credit.
- D. Multiply the number of QSOs by the number of different ARRL Sections and/or countries worked.

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- SCORING:**
- Phone and CW contacts will be scored as separate contests. Please submit separate logs.
 - One point is earned for each station worked YL to OM or OM to YL.
 - A station may be contacted no more than once in each contest for credit.
 - Multiply the number of QSOs by the number of different ARRL Sections and/or countries worked.
 - Contests running 150 watts input or less at all times may multiply the result of D. by 1.25 (low power).
- LOGS:** Copies of all phone and CW logs showing claimed scores, and signed by the operator, must be postmarked no later than March 25, 1975, and received by the Contest Manager (YLRL Vice President) no later than April 25, 1975, or they will be disqualified. Please remember to file separate logs for each section of the contest. Send copies of logs to:

Myrtle Cunningham - WA6ISY

- WARDS:**
- | | | |
|------------------|--------|--------|
| 1st Place Phone: | YL Cup | OM Cup |
| 1st Place CW: | YL Cup | OM Cup |
- 2nd and 3rd place winners in each contest will receive a certificate.

73's WA2FGS

DUES

I, _____, do hereby surrender \$9.00 (7.50 before March 1st) to the Gloucester County Amateur Radio Club in payment of my 1975 dues.

Mail to:

Rose Ellen Bills, WA2FGS