

CROSSTALK -- Official Publication of the
 GLOUCESTER COUNTY AMATEUR RADIO CLUB, W2MMD
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AREA NETS

GCARC RTTY NET:	Tuesday,	8:00 PM 147.78/18 Rptr
ARES NET:	Sunday,	8:00 PM 147.78/18 Rptr

Club Repeaters: 147.78/18, 223.06/224.66, 447.10/442.10

General Meeting: First Wednesday of each month at the V.F.W. Hall in Woodbury, NJ. Meetings begin at 8:00 pm sharp.

Contributions: CROSSTALK, Tony Starr,
 Deadline: Ten (10) days before each general meeting.

HAMFEST MESSAGE -- 1986

Hello! Welcome to the GCARC annual Hamfest. We are happy to see all of you once again. This year's Hamfest has so much more to offer; a new location, more prizes, expanded food service, children's activities, more covered selling spaces, and electricity.

I hope this Hamfest proves beneficial to anyone looking for a special item, from the smallest transistor, to the largest tower.

Please do not miss our Hospitality Table, and help yourself to some literature on New Jersey and it's interesting sights to see. Don't forget to buy a chance to win a Kenwood TH-21AT, only \$1.00!

Stop by the ARRL table for some literature and updated information on the ARRL.

Hope you enjoyed our Hamfest. The committee found it rewarding to try to bring you our best Hamfest yet.

73 Virginia Martin, N2FJM
1986 Hamfest Chairperson

FROM THE EDITOR'S DESK

We are very pleased to bring you this special issue of CROSSTALK, the official publication of the Gloucester County Amateur Radio Club. We publish 12 issues per year for our membership, but this one is prepared especially for you, our guest, at our all-new 1986 HAMFEST. We would like to dedicate this issue to the memory of Rose Ellen Bills, N2RE, who recently passed away. It was Rose Ellen who originally conceived the idea of a special HAMFEST ISSUE of CROSSTALK, and, for several years, edited and published it single-handedly. Rose Ellen was a valuable member of the Hamfest committee, even this year, until her untimely passing earlier this summer.

I have taken the liberty of including in this issue the obituary which was written for our July issue. Please take a moment to read it and find out why we at GCARC were so proud of this special member, and why we will miss her so much, as we do today at our Hamfest.

Thank You and 73
Tony Starr, WA2FZB
Editor, CROSSTALK

ROSE ELLEN BILLS, N2RE

It is with deep regret that we must inform you of the loss of one of our most active and respected members, Rose Ellen Bills, N2RE. This

is one who submits questions or prepares written or telegraphy examinations for amateur operator licenses. Preparing VE's are not permitted to provide specific test designs to applicants since Part 97 rules require that these be held secure against disclosure.

Breakdown of new Parts:

New part 97.27 (b) now provides for examinations being prepared by either the VEC or the administering VE's according to instructions from their coordinating VEC.

New part 97.27 (c) specifies that neither the same telegraphy message nor the same question set may be re-administered to the same person.

New part 97.27 (d) requires that each VEC and VE must hold telegraphy messages and question sets for current and future examinations in confidence.

New part 97.29 specifies that the examiners are responsible for determining the correctness of the candidate's answers.

New part 97.517 (a) authorizes VEC's to provide VE's with code and written tests.

New part 97.517 (b) specifies that only EXTRA Class amateurs may prepare Element 1B (13 wpm) and 1C (20 wpm) code exams. Element 1A (5 wpm) may be prepared by EXtra, Advanced or General Class VE's.

New part 97.517 (c) specifies that only EXTRA class amateurs may prepare question sets or submit pool question for Elements 4A and 4B. Advanced and EXtras: Element 3. Extra, Advanced, General or Technician: Element 2.

New part 97.521 outlines VEC question pool requirements. Each question pool must contain at least ten times the number of questions required for single examination. No question may be used unless it appears in a published list made available to the public prior to its use for making question sets.

New part 97.21 (b) specifies that a telegraphy examination shall consist of a prepared message containing ALL the letters of the alphabet, numerals 0-9, period, comma, question mark, AR, SK, BT, and DN. Previous part 97.27 (a&b) stated that "The applicant is responsible for knowing, and MAY be tested on....etc."

The transfer of the question pools to the VEC's has resulted in the deletion of PR Bulletins 1035A, B, C, and D, which contain the FCC question pool.

FOR YOUR INFORMATION

Once again, as we did last year, we have included in our special HAMFEST EDITION of CROSSTALK, two outstanding articles which appeared in our regular monthly editions of our publication during the past year. The author of both articles is our No. 1 contributor John Fisher, K2JF. John is one of our most knowledgeable technical experts, and an excellent instructor. He is retired from RCA Corporation in Camden, where he worked in a multitude of engineering capacities. He has also done much teaching in local institutions in the areas of electronics and physics.

The first article, "A VERY SHORT COURSE ON BASIC ANTENNA THEORY", was reprinted from our February, 1986 issue. The second, titled, "SOME TECHNICAL INFORMATION", deals with the measuring of VSWR in the VHF and UHF bands, and appeared in our December, 1985 issue. We hope you will find these articles informative and valuable to your Amateur Radio activities. Once again, we thank you for attending our HAMFEST.

A VERY SHORT COURSE ON BASIC ANTENNA THEORY

Inputs to the club for a short dissertation on Antenna theory will be attempted. This will be very basic and will not go into the fine art of exotic antennas such as rhombics, beams, multi-directional, or special types like the Delta loop, but, we will attempt to give some basic understanding of why antennas work and how. So to begin, let us start with this write-up of the basics.

An antenna system is comprised of all the components which are used between the transmitter or receiver and the actual radiator. Therefore, such items as the antenna proper, transmission line, matching transformers, baluns, and Transmatch qualify as parts of an antenna system.

When something occurs at one point in space because something else happened at another point, with no visible means by which the "cause" can be related to the "effect", we say the two events are connected by a FIELD. In radio work, the fields with which we are concerned are the ELECTRIC and MAGNETIC, and the combination of the two is called the ELECTROMAGNETIC FIELD. The Danish physicist Hans Christian Oersted during a lecture demonstration, performed in the year 1819-1820, caused a strong current to flow in a north-south line above a magnetic compass needle. He was "quite struck with perplexity" to see the needle deviate toward an east-west direction. Oersted had the immediate presence of mind to reverse the direction of the current in the wire, "and the needle deviated in the contrary direction." Thus was made one of the most momentous scientific discoveries of any age. The whole

subject of electromagnetism was opened for investigation, a subject which within a half a century was to embrace the phenomenon of light as well. Oersted's original discovery was that a current in a circuit affects a compass needle at some distance; in other words, the current sets up a magnetic field, and the strength of the field is proportional to the current that produced it. For a long straight wire the field strength at a point varies inversely as the distance (NOT THE SQUARE OF THE DISTANCE) of that point from the wire.

Now that Oersted showed us that magnetic fields can occur when we pass a current through a wire, we find now that we have some important conditions to concern ourselves with. In electromagnetic induction, a changing magnetic field induces an emf in a nearby wire loop or other conducting path. Thus a changing magnetic field is equivalent in its effects to an electric field. The converse is also true: a changing electric field is equivalent in its effect to a magnetic field. This is true even in empty space, where electric currents cannot flow. Electromagnetic waves occur as a consequence of these two effects -- a changing magnetic field produces a magnetic field. The two constantly varying fields are coupled together as they travel through space. In 1864, James Clerk Maxwell, a renown mathematician, hypothesized the theory of electric and magnetic fields, and from his notation that an electric field that varies with time gives rise to a magnetic field was that electromagnetic waves spread out in space from an initial disturbance in the same manner that waves spread out from a disturbance in a body of water. (Throw a rock in a pool of water and notice the waves). When electromagnetic waves spread out from an electric or magnetic disturbance, their energy is constantly being interchanged between the fluctuating electric field and the fluctuating magnetic field of the waves.

SOME TECHNICAL INFORMATION

This information is primarily for the Technician Class but you fellows with higher ratings may read it also. This is about VSWR and some of the little problems that creep up after you get above 2 meters. Many of the VSWR bridges that are used today for in-line operation consist of diodes that are connected in such a way as to read Forward and Reverse detected RF voltage and then send it to a meter that is calibrated (generally you set the calibration on the VSWR scale) in the forward position. When you throw the switch it reads the Reverse RF and then from this gives you a reading of relative VSWR. When you get above the 150 MHz region, things begin to change considerably. The most important item that will influence the performance of your operation up here is a good, high-quality, gain antenna of 50 ohms impedance for fixed or mobile. In the UHF as well as the low band, every watt of ERP makes some difference. Therefore, 50 watts average output plus 3db of gain antenna equals 100 watts ERP, presuming low VSWR of course. The few extra dollars invested in a gain type antenna is well worth it. There are, however, some pitfalls to be aware of.

For example, do not attempt to adjust an antenna for lowest VSWR when using a diode VSWR meter not engineered for UHF applications. As mentioned above, invariably the reading may have an error of 40% or more. Instead, use an in-line watt meter similar to the Bird model 43 or Sierra model 164B with UHF cartridge. In calculating the VSWR for one of these, non converting, type of meters you have to do just a little mathematics as follows: The VSWR is related to reflection coefficient: - (Gamma - Complex propagation constant)

Pf = Forward Power reading

Pr = Reverse Power reading

γ = Propagation constant

$$\text{VSWR} = 1 + \gamma / 1 - \gamma$$

$$\text{Where } \gamma = \sqrt{\text{Pr/Pf}}$$

Example: Pf = 25 watts
 Pr = 2.25 watts

$$\gamma = \sqrt{\text{Pr/Pf}} = 2.25/25 = .09 = .3$$

$$\text{VSWR} = 1 + .3 / 1 - .3 = 1.3/.7 = 1.85:1$$

or a VSWR of 1.85

So now you know. If you want any more of this type of information put into CROSSTALK, please let the Editor know. If no feed-back, we will not bore you with anymore technical data. Oh yes, one last word, the above information will apply to the 220 band, 440 band and the new 920-928 MHz frequencies and higher.

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We hope you have enjoyed this special issue of our newsletter. Complimentary copies of our regular monthly editions are available at our regular monthly general membership meetings, where all guests are welcome. The meetings are held at the VFW Hall in Woodbury, NJ on the first Wednesday of each month. Meetings begin promptly at 8:00 PM. Hope you will join us soon. 73.