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MAY ISSUE 1969 GLOUCESTER COUNTRY AMATEUR RADIO CLUB.  
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The next meeting of the club will be held Wednesday, May 7, 1969 at 8:00 P.M.  
on the sky terrace of the Pitman Borough Hall. Your presence is requested  
and visitors are always welcome . . .

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We have a very interesting program for you this month presented by Jack Layton, W3ESQ, a past president of GCARC, and now the engineer at WTEL in Philly. This program will cover commercial broadcasting and the work of expansion done on this station for one year before the FCC would O.K. it. Being a Ham at heart, Jack will present this program on a level whereby everyone will understand what he is talking about. Don't miss this.....

In this issue...

Our Technician Editor Bob Spain, WB2RVE has a nice article on Transmission lines.

## TRANSMISSION LINES (continued)

To reduce the level of a signal passing through a transmission line, w usually make use of a resistive attenuation pad. This pad may be designed to produce either a fixed or variable attenuation to the signal. Whatever the case, it is usually designed so that the characteristic impedance is the same as the line.

A dummy load is simply a non-reactive transmission line of infinite length. Whenever a line is terminated in a resistance the same as its characteristic impedance, it appears to have infinite length.

At high frequencies, coaxial transmission lines become highly reactive and inefficient. At frequencies above 1,000 megacycles, skin effect is predominant, and waveguides are usually employed as the transmission line. A waveguide is a transfer device that relies on skin effect to guide the signal down a hollow tubular device from generator to load. Waveguides are usually rectangular or square in physical appearance, and primarily used in a vertical plane. Long horizontal runs of waveguide are to be avoided, due to the fact that moisture might collect inside and stagnate, thur changing the electrical characteristics of the transmission path. Sharp bends and discontinuities in the waveguide are also be avoided, as they may present considerable antenuation to the desired signal.

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Two meter FM equipment may be purchased from Gene Mitchell, K3DSM, Congestoga Road, Devon, Pa. Harrisburg-Baltimore inter-city link (via 2 meter FM) now operation. WA2EQU is a new Advanced class license and is active on 80, 40, and 20 CW and 2 meter AM. WB2LZW is teaching at Drexel. FCC has legalized phone patches, as long as they are installed by Mother Bell. FCC has authorized commercial FM Broadcast stations to transmit weather charts and maps by fascimile on a 69 kc. sub-carrier. WFIL-TV has openings for full time maintenance personnel, also a full time night shift man for MCR operations (good pay, First Class desirable, not required). Many very attractive young secretaries riding the high-speed line during rush hour these days. Makes the morning ride more interesting.

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NOTE: Bob Spain is going to have the June Meeting program. It will be on Amateur FM & Repeaters.

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FOR SALE.....

Telex 20M 318

3 element 20 meter beam Complete.....\$50.00

Call 589-1983 on Weekends and Afternoons or give name to XYL.

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NOTE ANY ITEM TO BE SOLD BY MEMBERS OF THE CLUB SHOULD BE GIVEN TO WILLIAM A. FRAMBES THE FRIDAY BEFORE THE CLUB MEETING. AND I WILL TRY TO PUT IT INTO THE CLUB PAPER.....Bill Frambes, Printer

## SOLDERING ALUMINUM

Soldering aluminum or to an aluminum chassis not easy even with aluminum older. However, I've used this trick successfully: Take a strip of aluminum solder and a piece of rosin-core solder and hold the two together. Use a soldering gun of at least 135 Watts and apply the solder simultaneously. They will fuse together at a lower melting point. Rosin is the flux. The aluminum being soldered must be hot enough to secure a good bond.-L.D. Fortun.

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JFETS...what do you know about them?--an article on how they work, and how to use them makes for interesting reading in the May issue of RADIO-ELECTRONICS.

For anyone who happens to be interested, I have data on a simple and inexpensive cavity for six meters...Editor...

OFFICIAL BULLETIN #208 FROM ARRL HEADQUARTERS.....

The ARRL Intruder Watch is now into it's fifth year of operation, with an impressive record of reports leading to intruders being removed from the amateur bands. Additional work and constant vigilance are necessary. Volunteers, with two or three years amateur experience and good receiving equipment, who can spend two hours a week logging calls of non amateur stations in the amateur bands would be welcomed. Volunteers please write the Intruder Watch, ARRL, 225 Main St., Newington, Conn. 06111.

The FCC took action on March 14 to revoke the licenses of three amateur operators: Steven P. Bowman, Sikeston, Mo.; Kenneth C. Henry, Anderson, Ind.; and Gary Overman, New Castle, In.d. Not only was the charges of obscene, indecent and profane radio communications placed against the operators but also transmissition of false or deceptive signals or communications, and malicious interference, failure to identify properly and unidentified communications. The enforcement action followed investigations following complaints received from other amateur radio operators.

I hope by now that some of you members who are delinquent in this years dues took advantage of the coupon in last month's paper and forwarded your dues to our treasurer. As you know no one likes the job of dunning someone for money, but in so far that money happens to be the power that makes our club's wheels go round, we need it if we are going to keep progressing. I am pretty sure that the one's who are participating in the club's activities are getting their money's worth, and if you happen to be one who is not, then you aren't taking your part in the actaivities. We can only present the programs, you; must do your part. It's the old saying that you only get out of anything just what y;u put into it. Perhaps you have a suggestion that might be helpful. Why not present it, for you will never know until you try.

## TRANSMISSION LINES--Bob Spain WB2RVE

A transmission line is a system or medium, primarily used as a device to transfer electromagnetic energy from one point to another. It may take on various forms and sizes, varying from a single conductor with a O.D. of 1 mil to a nitrogen line a foot in diameter, or a rectangular waveguide with its characteristic ductwork.

Transmission lines are used for many applications. A resonant section of line can be used as a harmonic filter, or as an impedance matching device. For example, if a length of line is cut so that it will be a quarter-wavelength at the fundamental frequency, with the unterminated end shorted, it will look like an open at the fundamental frequency, and a short at the second harmonic. Such quarter-wave shorted stubs are frequently used in FM Broadcast transmitters as harmonic filters (most power amplifier stages in FM Broadcast transmitters are operated Class C). Such a filter is inexpensive and easy to construction and effectively antenuantes the high-level harmonics of the preceding class C amplifier.

A half-wave line will reflect the impedance of the load back to the generator, and is used in multiples in some VHF installations. This is usually only practical for use on the six and ten meter amateur bands. BELOW ten meters, a half-wave line becomes impractical, due to its physical length.

A quarter-wave line will reflect the inverse of the load impedance back to the generator; i.e.--a short at the generator end will look like an open at the load, and vice-versa. Using this principle transmission lines of appropriate length may be used to match impedances. This is what is done in a balun.

By the maximum power transfer theorem, we know that for most efficient energy transfer, the generator must have the same impedance as the load. Likewise, the transmission medium must have the same characteristic impedance as the generator, if maximum energy is to be transferred to the load. When the impedance of the line is not the same as that of the generator or the load, energy will be reflected back towards the generator. As the wave travel back the line, they will be alternately in and out of phase with the forward signal. Due to this, voltage peaks and nulls will exist along the line. If the mismatch is too bad, the voltage peaks may rise above the breakdown voltage of the line, and the dielectric may be destroyed. Due to high currents at some points along the line, the cable may heat up and suffer thermal damage. Another effect of a bad mismatch would be possible damage to the final PA tube and/or tank circuit by the reflected energy.

In audio work, unterminated lines may cause distortion and loss of power. In video and pulse circuits, an impedance mismatch may cause reflections, inversions, and ghosting in the picture. The sync pulses may appear widened by the out of phase reflections, and loss synchronization may result. To avoid these conditions in TV stations, lines not in use are terminated with resistors which are the same value as the characteristic impedance of the line. The industry has standardized and now uses 75 ohm coaxial lines for video, and 600 ohm balanced lines for audio.