

November 1996

FEEDBACK

The OFFICIAL Newsletter of the
Georgian Bay Amateur Radio Club Inc.

Sponsoring
VE3OSR FM REPEATER 146.940- OWEN SOUND
VE3IJD PACKET BBS 145.630 KEADY

REGULAR EVENTS

GBARC MEETINGS: 4th Tuesday of each month at the Billy Bishop Airport 7:30 P.M.

BREAKFAST MEETINGS: 2nd and last Saturday of each month at the Rockford Esso , 9:30 A.M.

GBARC INFORMATION: Information regarding membership should be directed to VE3NEM Tom Merner RR#4 Owen Sound, N4K5N6 371-0655

FEEDBACK: Submissions or letters to the editor should be directed to VE3TSA Tom St.Amand, 1232 3rd Ave . East, Owen Sound N4K2L5

MINUTES OF THE MEETING OF OCTOBER 22. 1996:

The general meeting was called to order by president Bob Vary with sixteen members present. The minutes of the september meeting were reviewed and moved for acceptance by Jack VE3DTS and seconded by John VE3TXB and passed. Tom VE3NEM provided the members with a report of the clubs current bank balance of \$975.61 with \$361.14 outstanding. A motion to accept the treasurers report was moved by Henry VE3UWD and seconded by Jack VE3DTS and passed. John VA3JRF reported to the club that further checking into the insurance for the club was being done. The club insurance is due in mid November and John will report to Tom VE3NEM as to his findings.

Bob VE3XOX reported to the club the current status of the Wiarton airport proposal. Transport Canada has informed the commission that the tower on-site is an experimental tower and will not be available for the clubs use. The airport commission will allow us on-site provided we can supply a tower installation. Bob reported that the airport commission has advised us to pursue funding through the local service clubs. A presentation by our club to the service organizations will be done for their consideration. Steve VE3XKM reported on the Split Rail festival in Flesherton. Both hf and packet modes where used during the event and the attendance was very good. Bob VE3XOX reported on the JOTA at the Wiarton airport. The event had an attendance of seventy boys and twenty girl scouts. Both hf and packet modes were demonstrated and contacts with numerous other scouts troops was achieved. The scout leadership was very pleased with the clubs help in this event.

Brad VE3RHJ reported on the fall basic license course. There are about fifteen people listed for a class. Tom VE3NEM has asked for a motion to increase the membership fees of the club. Concerns that the current fee structure does not allow the club adequate cash flow and a proper bank balance reserve are the basis of this motion. This motion moved by John VE3TXB and seconded by Jack VE3DTS will be voted on at the November meeting. Particulars of this motion will appear in the next feedback. Bob VE3LKD formally requested the clubs participation in the Santa Clause parade on November.16th. Gary VE3IOD will be co-ordinating this year. A 1997 hobbymarket was approved with a number of members volunteering at the meeting to assist in the preparations.

A motion was moved by Aubrey VE3TUQ and seconded by Jack KA1QU that Bob VE3XOX review the charges required for installing a phone patch donated to the club. Brad VE3RHJ moved a motion to send Grey Bruce communications a copy of the feedback as thanks for the use of their tower for the Owen Sound repeater. This was seconded by John VA3JRF and passed. A motion to adjourn was moved by Bob VA3DRB and seconded by John VE3TXB and passed.

The 50/50 draw was won by Bob VE3LKD.....minutes by Norm ve3nbj

Message from the President

Well another month has zoomed by, and in the change of months, we seem to have had a change in seasons... Who would have thought that only a week ago we were sitting in a 70 degree weather system and bang!, before you can send a signal report, we are into full winter, with all the trimmings...

Friday morning here in Woodford, I took my two girls out to catch their school bus at 8 a.m. The odd flake of snow was in the air. By Saturday morning there was 3 inches of snow here. Saturday evening there is 5 inches on the ground and on Sunday Nov. 3rd, we are covered with 10 inches of that great Christmas spirit... Only thing is we had to get out and shovel it....hi.

Lots of things happening in the next little while...keep tuning into those two meter and 80 meter nets for lots of details...

Looks like the GBARC spring amateur radio course is on for the last three Saturdays in the month of January and the first two Saturdays in February at the Kilsyth community rink...so if you know of any one wishing to grab their basic. Either give me a call or get the person to drop a line to the club with their telephone # and address a.s.a.p.

Hope to see you at the next meeting...Which by the way is the fourth Tuesday of the month, and also am working on a December Christmas Eat Till You Drop type meeting some time in the month of December.

Bye for now and 73 and don't let the white stuff pile too high...

Bob VE3XOX

GBARC 80m Net Schedule (tentative)

From: VE3RHJ

Sundays, 9:30 am local time, 3.783 MHz

VE3BFV Nov 10 Dec 29

VA3RP Nov 17 Jan 5

VE3HXX Nov 24 Jan 12

VE3DIQ Dec 1 Jan 19

VE3RHJ Dec 8 Jan 26

VE3DXO Dec 15 Feb 2

VE3FFN Dec 22 Feb 9

Want to borrow: Basic Manuals

Do you still have your Basic Licence Study Guide? We're trying to help some impoverished Scouts who want to take the Basic course this January. Every "loaner" manual will save a Scout \$25...and possibly mean one more Scout in the course! Contact Brad, VE3RHJ, on packet, 2m net, 80m net, or 519-986-4266.

Want to borrow: Camcorder

Have you a camcorder or video camera you can loan us for five Saturdays? We'd like to videotape the next Basic course, which runs each Saturday from January 11 to February 8. A tripod would be useful too. We'll provide the tapes, of course. Contact Brad, VE3RHJ, on packet, 2m net, 80m net, or 519-986-4266.

To all members: A motion to amend By-Law #3 of the G.B.A.R.C. reads as follows. This motion brought forward by Tom VE3NEM treasurer of the club and moved by John VE3TXB and seconded by Jack VE3DTS will be voted on at the November general meeting of the club by all members in attendance.

Motion that By-Law #3 Section (c) read as follows:

(c) The schedule of dues for members in good standing shall be as follows:

- (i) Full membership - \$35.00, discounted to \$30.00 per year if paid before December 31st.
- (ii) Family membership - First full member - \$35.00 discounted to \$30.00 per year if paid before December 31st.
- Second full member - \$25.00 discounted to \$20.00 per year if paid at the same time as the first full member and before December 31st.
- (iii) Associate membership - \$25.00 discounted to \$20.00 per year if paid before December 31st.

Motion that By-Law #3 Section (d) read as follows:

(d) The schedule of dues for new members shall be as follows:

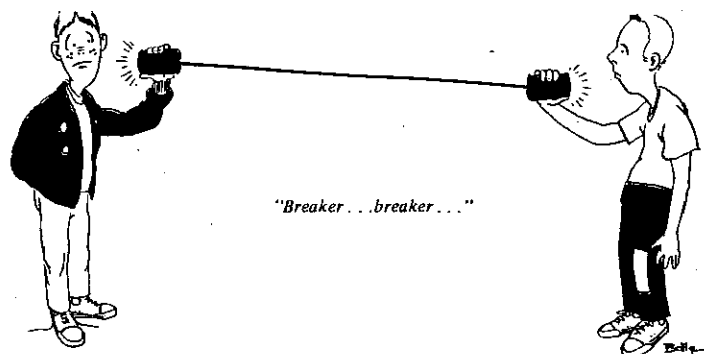
- (i) New Full members - \$35.00
- (ii) New Family members - \$25.00 for second full member and each additional full family member.
- (iii) New Associate members - \$25.00

WANTED

Battery Pack for ICOM IC02AT 2 metre Handheld

Cells are .66" diameter x 1.1" length 250milliamphour type

Contact Jim VE3BFV if you can help



WWV - INFO

Submitted by VE3IJD

The hourly transmissions of WWV (each hour+18 min) and of WWVH (each hour + 45 min) are radiated on 2.500, 5.000, 10.000, 15.000 and (only WWV) on 20.000 MHz.

1. These informations are updated eight times a day at 00, 03, 06, 12, 15, 18. and 21 UTC.
2. The solar 10cm energy flux is the daily value obtained at 20:00 UTC at Penticon, B.C. (120 W, 49 N)
Therefore this actual solar daily flux value is transmitted at 21:18 UTC for the first time.
3. For the time interval 21:18 - 23:45 the AK number is only estimated. Later transmissions contain already definitive AK information. AK is measured in units of 2 Nanotesla (nT), e.g. AK=10 mean 20 nT.
4. The K numbers contain the maximum variations of the earth magnetic field for each 3 hour interval (0-3, 3-6, 6-9...UTC). The measurements are done at Boulder, Colorado.
- 5 The K scale is the following: K=0: 0-5 nT, K=1: 6-10 nT, K=2: 11-20 nT, K=3: 21-40 nT, k=4 41-70 nT, k=5: 71-120 nT, k=6: 121-200 nT, k=7: 201-330 nT, K=8: 331-500 nT, k=9: >500 nT.
6. Looking back the information of solar activity is given by the following scale: very low, low moderate, high, very high and the information on the earth magnetic field by quiet, unsettled and active, related to the day before.
7. The flares are communicated according to their strengths in classes C, M, X, major flare and proton flare.
8. The solar 10cm flux F and the sunspot numbers are correlated according to:
$$F = 63.7 + 0.73 * R + 0.0009 * R^2$$

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(this formula is valid statistically only)

## MIR INFO

From: VE3NBJ

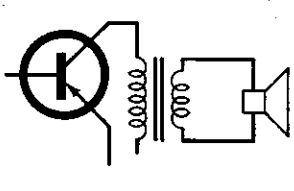
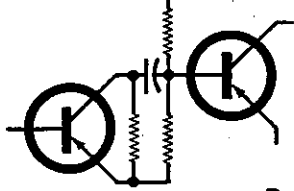
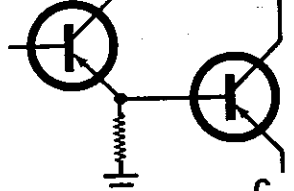
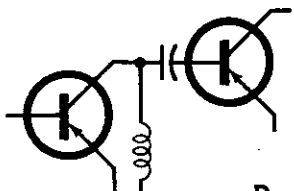
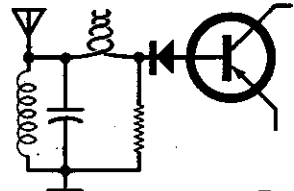
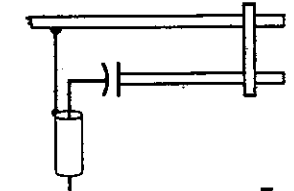
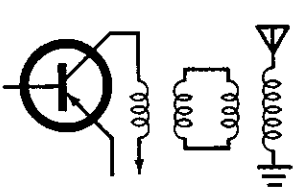
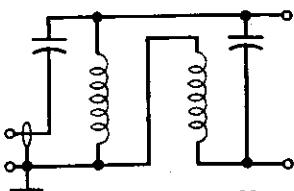
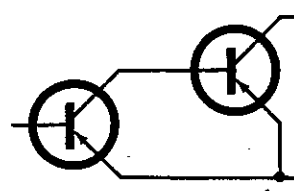
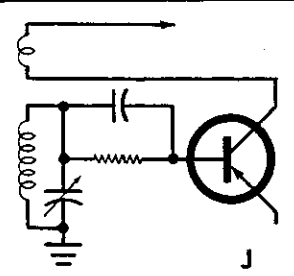
If you are listening for the mir packet station it has changed frequency as of november first. the new frequency is 145.800 simplex and on voice it is now 145.800 rx / 145,200 tx. I guess they have decided to go to split for the voice...Norm

# ELECTRONIC COUPLING QUIZ

BY ROBERT P. BALIN

**M**ANY TYPES of coupling circuits are employed in electronics to meet matching requirements in feedback networks and between amplifier stages. Others are used between amplifiers and speakers, transmission lines, or antennas. Test your knowledge of coupling circuits and devices by matching those shown in A-J with their names numbered 1 to 10 at the right. The answers are below.

1. Balun
2. Direct coupling
3. Emitter coupling
4. Gamma coupling
5. Gimmick, or capacitive, coupling
6. Impedance coupling
7. Link coupling
8. RC coupling
9. "Tickler," or inductive, coupling
10. Transformer coupling

|                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                |   |    |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|---|----|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|  <p>A</p>   |  <p>B</p>                                                                                                                                                                                                                                                                                                                               |  <p>C</p>   |   |    |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|  <p>D</p> |  <p>E</p>                                                                                                                                                                                                                                                                                                                             |  <p>F</p> |   |    |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|  <p>G</p> |  <p>H</p>                                                                                                                                                                                                                                                                                                                             |  <p>I</p> |   |    |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|  <p>J</p> | <p><b>ANSWERS TO COUPLING QUIZ</b></p> <table style="margin: auto;"> <tr> <td>A</td> <td>10</td> </tr> <tr> <td>B</td> <td>8</td> </tr> <tr> <td>C</td> <td>3</td> </tr> <tr> <td>D</td> <td>2</td> </tr> <tr> <td>E</td> <td>4</td> </tr> <tr> <td>F</td> <td>5</td> </tr> <tr> <td>G</td> <td>7</td> </tr> <tr> <td>H</td> <td>1</td> </tr> <tr> <td>I</td> <td>9</td> </tr> <tr> <td>J</td> <td>6</td> </tr> </table> |                                                                                                | A | 10 | B | 8 | C | 3 | D | 2 | E | 4 | F | 5 | G | 7 | H | 1 | I | 9 | J | 6 |
| A                                                                                            | 10                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                |   |    |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| B                                                                                            | 8                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                |   |    |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| C                                                                                            | 3                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                |   |    |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| D                                                                                            | 2                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                |   |    |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| E                                                                                            | 4                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                |   |    |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| F                                                                                            | 5                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                |   |    |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| G                                                                                            | 7                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                |   |    |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| H                                                                                            | 1                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                |   |    |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| I                                                                                            | 9                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                |   |    |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| J                                                                                            | 6                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                |   |    |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |

Locating Lightning Flashes by Radio

# An Electronic Storm Finder

BY THOMAS P. LEARY,\* WØVTP

Few hams can afford their own radar weather stations, but weather is an active interest for many of us, as evidenced by the "storm nets" operating in many parts of the country. It is possible, with relatively simple equipment, to survey an area with a radius of more than 500 miles, and find the bearing of the electrical disturbances associated with lightning. While the equipment to be described here will not alone produce highly accurate range readings, two such stations, separated by 50 miles or more, can triangulate their azimuth readings and thus produce fixes on centers of severe weather.

This device operates in the e.l.f.-v.l.f. portion of the radio spectrum, at what may be more commonly called audio frequencies. A lightning stroke in the atmosphere radiates an enormous amount of radio-frequency power in a few microseconds, and an appreciable fraction of this energy is concentrated at the longest wavelengths. These signals propagate to great distances and their direction of arrival can be instantaneously indicated on the face of an oscilloscope tube.

Basically, the system consists of two shielded loop antennas, crossed at right angles and erected vertically, aligned north-south and east-west. A vertical loop antenna has zero signal response to energy arriving from a direction at right angles to the plane of the loop. The response increases gradually as the loop is rotated, and becomes maximum when the plane of the loop points at the signal source. The north-south loop is connected, through push-pull resistance-coupled amplifiers, to the vertical plates of the scope tube, while the east-west loop drives the horizontal plates. With this elementary arrangement, the bearing line produced has a 180-degree ambiguity. In order to resolve this it is necessary to apply the amplified signal from a vertical antenna to the grid of the cathode ray tube to intensity-modulate the electron beam. The line pointer on the tube face will then indicate the true direction of the "sferic" signal. The face of the tube should be marked off in degrees, with north at the top. The various types of indications produced are shown in Fig. 1.

### Loop Construction

The sensitivity of the loop antennas is a function of the number of turns and the diameter of the loop. Adequate pickup is realized by a loop with 50 turns of No. 20 Formvar, three feet in

\* 218 So. 95th St. Omaha, 14, Nebr.

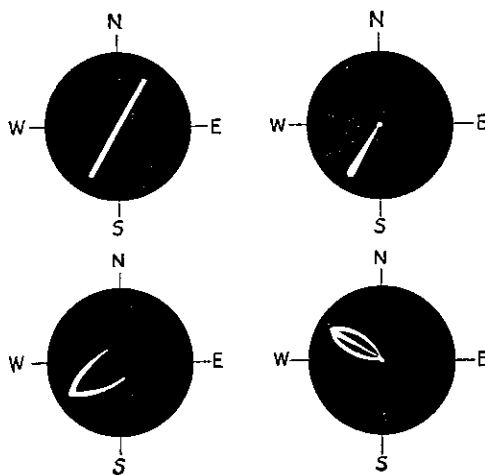


Fig. 1—Typical scope presentations of lightning discharges. Upper left: Bearing without sense indication. Upper right: Same bearing with sense modulation added. Lower left: Horizontally-polarized signal (cloud to cloud discharge.) Lower right: Combined ground wave and ionosphere-reflected wave ("night effect").

diameter. These coils may be wound on forms made of 1-inch plastic plumbing pipe, or on "hula hoops" if any of these can still be found. A section about a half-inch wide was cut out of the perimeter of the pipe to provide a space for winding the antenna. The ends of the wire are brought out and connected to phono jacks mounted on a metal plate and attached to the loop. The entire loop is then wrapped with strips of aluminum foil about two inches wide and grounded to the metal plate. It can then be wrapped with masking tape to keep the shielding from coming loose. Diametrically opposite the connections to the loop a cut, about 1/4 inch wide, is made in the foil so that the electrostatic shield will not act as a shorted turn. The com-

*Here is an off-the-beaten-path activity that is not only interesting in itself, but which also offers an opportunity for an unusual type of public service by the amateur. Storm nets using equipment of this kind could provide valuable storm-warning information.*

pleted loop is shown in Fig. 2. The loops should be accurately aligned north-south and east-west about 20 feet high; the attic is a good location. The vertical antenna, about 25 feet or more long, can be placed anywhere within 50 feet of the loops.

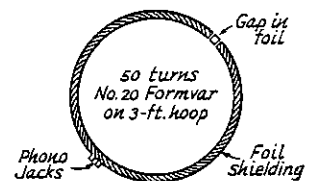


Fig. 2—Essentials of loop construction. The support can be a piece of plastic pipe or hose formed into a circle, with a lengthwise slit to allow wire to be wound in it. Outside is covered with aluminum foil, except for the gap shown, for shielding.

Connection between the antennas and loop amplifiers is made with four equal lengths of small-diameter coaxial cable such as RG-58/U. Plugs and phono jacks are also provided at the receiver to facilitate switching the inputs around in order to properly orient the complete system. Means is also provided at the loop input to connect both amplifiers in parallel across one of the loops; this is necessary in order to equalize the gains of the two amplifiers as will be described.

### Amplifiers and C.R. Tube

The push-pull amplifiers, two of which are required, are of straightforward design and cover a range of about 100 to 12,000 cycles. The mechanical layout of the parts is not critical but, as in any high gain audio amplifier, all ground connections for each stage must be made at the same point and the input and output cir-

cuits separated as much as possible. The complete circuit is shown in Fig. 3. Any well-filtered power supply which produces 250-300 volts at about 100 ma. and 6.3 volts at 5 amp. can be used. A separate filament winding is required for the cathode ray tube. All tubes should be shielded.

The sense amplifier is shown in Fig. 4. The series input capacitor and 50,000-ohm potentiometer provide the proper phase shift to intensity modulate the cathode-ray tube grid; this control also permits the signal strength to be attenuated for very strong sferics. A lightning arrester should be connected to the sense antenna.

complete 2700-volt power supply and 3JP1 circuit is shown in Fig. 5. The tube and a shielded mount and socket are available surplus. With the high post-anode accelerating voltage used, the 3JP1 produces a bright green trace which can be viewed in subdued lighting. The high-voltage transformer should produce 2500-3000 volts a.c. at at least 2 ma. It should be remembered that these voltages, stored in the filter capacitors, are very dangerous; pull the line cord and short the capacitors before working on the equipment. The centering controls, the two 300K potentiometers, can be mounted at the rear of the chassis; they are adjusted only when a tube is installed or replaced.

The focus and brightness controls operate at high potential and should be mounted under the chassis on insulated mounts with insulated coupling to shafts brought out to the front panel. The 1.25-megohm section of the voltage divider should be made up of four or five 2-watt carbon resistors in series to prevent voltage breakdown. Power transformers should be mounted behind the base of the cathode ray tube or on a separate chassis to avoid modulating the electron beam with an a.c. magnetic field.

High-voltage insulated wiring should be used in the 2700-volt supply and in the high-potential leads to the cathode ray tube.

All amplifiers should be tested for self-oscillation at maximum gain with an oscilloscope before use. Sometimes a signal pulse with a steep gradient will cause a transient oscillation in the audio range which can only be detected by this means.

#### Preliminary Adjustments

The loop connections to the amplifiers are initially made at random, being certain only that the north-south loop drives the vertical plates of the oscilloscope and the east-west loop drives the horizontal plates. The coax shield should be electrically connected at both ends of the four lead-in cables and grounded to the receiver and to a water pipe.

Once the equipment seems to be operating properly, connect up all antennas and wait for thunderstorm weather. The first adjustment to make is to equalize the gains of the loop amplifiers. Turn both loop gain controls to maximum

and connect both amplifiers in parallel across one loop by means of the d.p.d.t. toggle switch in the antenna circuit. A sferic signal should produce a line across the tube face from 45° to 225°, and the gain of one of the amplifiers should be reduced until it does. Then turn the switch to the opposite, or operating, position.

Now the observer has to determine by some other means what the true bearing of a thunderstorm is. Most of the United States is covered

by weather radar stations, and a call to the local Weather Bureau office can usually get you up-to-the-minute reports of thunderstorms within 200 miles if you explain why you need the information. Failing this, radio range stations operating between 150 and 350 kc. give continuous reports of weather conditions within a 250-mile radius of the station, and reports of thunderstorms in progress are given. As a last resort, visual observation of an isolated distant thunderstorm can be used. At any rate, once the true bearing of a storm is known the lead-in cables from the loop antennas should be switched around until the sferic signals from the storm produce line indications on the cathode ray tube in the proper direction. The process should be repeated and the bearing of another known storm,

about 90 degrees removed from the first, should be checked. Bearings from any direction can then be assumed to be accurate if the loops are correctly oriented, but the amplifiers should be realigned for equal gain occasionally.

#### Distance Range

The lengths of the bearing lines on the scope indicate only signal strength, but after a little practice it is possible to guess whether the storm is at long, medium or short range. The pips for a storm at 500 miles average about 1/4 inch long; for 200 miles, about 1 inch long; and at about 100 miles the line indications will begin going off the face of the tube. Gain should be reduced and re-equalized when this happens.

Access to weather reports on low-frequency radio-range stations can also be very helpful in determining the approximate range of lightning radiation. Hourly reports of the progress of frontal systems and squall lines are given and, since many thunderstorms occur along the line of a cold front, strong azimuth indications on the scope in the direction of a known front can

give reasonably accurate fixes. The weather around my own location (Omaha) most often approaches from the west or south-west in summer so maximum attention is devoted to these directions. If an isolated storm, not connected with any major front, is observed over a period of hours, it can be determined whether or not it is moving in your direction. The sferic signals will grow in intensity and the azimuth of the storm will remain the same if it is headed toward you. Most cold fronts move at about 20-25 m.p.h. in summer so some estimate of the time of arrival of bad weather can be made.

The intensity, or brightness, control is ordinarily set so that the beam spot is barely visible in the absence of any signal and it should be accurately centered with the centering controls. Optimum positions of the sense input potentiometer and the sense gain control depend on the closeness and intensity of the signals radiated by lightning, and their operation will be learned

with a little experience. Maximum resistance of both controls, with respect to ground, produces maximum gain.

#### Signal Characteristics

The rate of flashing in a particular storm is a

measure of the probable intensity of the severe weather to be expected. Bearing lines repeated at the rate of about 20 per minute usually indicate that a storm is in progress — the repetition rate may go over 100 per minute and such a storm is inclined to be dangerous, with high winds and hail. A "giant thunderstorm" may also occasionally be detected; these enormous thunderheads often give rise to tornadoes. The height of clouds in such a disturbance may reach 12 miles into the stratosphere and they may be seen approaching over 150 miles away; these may produce sferics pips too rapid to count visually.

A sferics storm net, consisting of two or more such stations, could give much more accurate fixes on severe weather centers, if communication between them can be established. Unfortunately, the static produced by lightning washes out most of the lower-frequency ham bands. Six-meter stations with beam antennas and coverage of fifty miles or more would be least likely to be affected by static. Because of the v.h.f. radio horizon, radar stations on the ground cannot detect low-altitude precipitation at more than about 100 miles, so the broad coverage of an amateur radio sferics net could provide a real public service for short-term severe-weather forecasting. It should also be noted that a sferics

fix may be more valuable than some radar weather reports because radar does not distinguish between electrically active and inactive weather cells.

A note on polarization, or night effect, error: The reception pattern of a loop antenna is altered when the signal arrives at an angle, as when it has been reflected from the ionosphere. Such signals produce an elliptical pattern which may not point in exactly the same direction as the source of the signal. However this is not serious in ordinary practice because it can be recognized by the oval pattern, produced by the sky wave, superimposed on a straight line, caused by the ground wave, and the latter is the only reliable direction indication.

A great deal remains to be learned about this subject and the best reference for the amateur is *Atmospheric Electricity*, by J. A. Chalmers (1957, Pergamon Press, New York City). Photographs of cloud-to-ionosphere lightning strokes now exist, and some scientists are speculating that the real source of the electric power dissipated in huge quantities by thunderstorms is the ionosphere itself. The field is wide open for original research, and in such areas the ham has always excelled. Good hunting!

QST

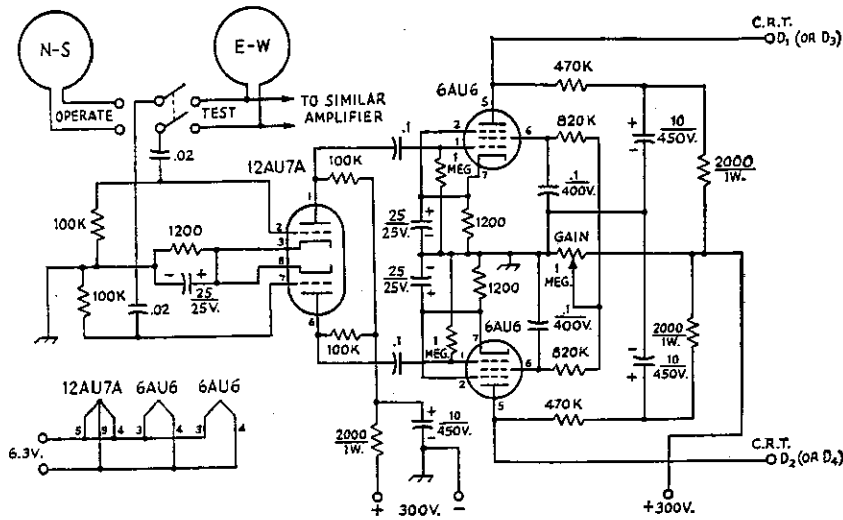


Fig. 3—Push-pull amplifier between loop and c.r. tube deflection plates. Two of these are used, one for each loop and deflection-plate set. Capacitances are in uf.; capacitors are paper (400-volt rating unless otherwise indicated) except those with polarities marked, which are electrolytic. Resistors are 1/2 watt except as indicated; resistances are in ohms, K = 1000. Controls are linear taper.

Fig. 4—The sense amplifier circuit. Component values and types same as in Fig. 3.

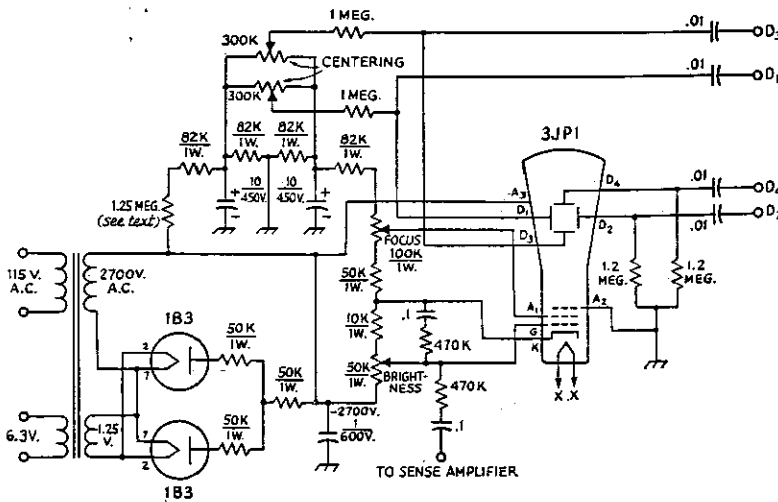
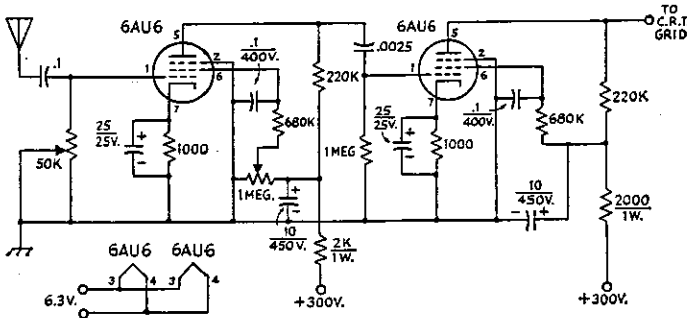


Fig. 5—Cathode ray tube and power supply. Component values and types same as in Fig. 3. Of the commonly-available power transformers, the Thordarson 26R29U and Stancor P-8151 have approximately the correct voltages. With these transformers the 183 filaments should be connected in series for operation from a 2.5-volt winding.



**Exc. pts from the Ontario Electrical Safety Code which apply to Amateur Radio Installations.....editor**

**SECTION 54—COMMUNITY ANTENNA DISTRIBUTION AND RADIO AND TELEVISION INSTALLATIONS**

309

**Section 54—Community Antenna Distribution and Radio and Television Installations**

*Section 54 of the Canadian Electrical Code is deleted.*

**54-000 Scope**

(1) This Section is supplementary to, or amendatory of, the general requirements of this Code and applies to:

- (a) Community antenna distribution; and
  - (b) Equipment for the reception of radio and television broadcast transmission; and
  - (c) Equipment employed in the normal operation of a radio station licensed by the Government of Canada as an experimental amateur radio station.
- (2) This Section does not apply to equipment and antennas used for broadcast transmission and for coupling carrier current to power line conductors.
- (3) In Subrule (2) "broadcast" means one-way communication other than by community antenna distribution.

**54-004 Equipment.** Equipment referred to in this Section shall not require approval in accordance with Rule 2-024, except where specifically noted in this Section as requiring approval.

**54-006 Receiving Equipment and Amateur Transmitting Equipment Rules.** Rules 54-800 to 54-1006 apply to:

- (a) Radio and television receiving equipment; and
- (b) Amateur radio transmitting equipment.

**Receiving Equipment and Amateur Transmitting Equipment**

**54-800 Lightning Arresters for Receiving Stations**

- (1) A lightning arrester shall be provided for each lead-in conductor from an outdoor antenna to a receiving station except where such lead-in conductor is protected by a continuous grounded metal shield between the antenna and the point of entrance to the building.
- (2) Lightning arresters for receiving stations shall be located outside the building or inside the building between the point of entrance of the lead-in and the radio set or transformer, and as near as practicable to the entrance of the conductors to the building.
- (3) Lightning arresters for receiving stations shall not be located near combustible material nor in a hazardous location.

**54-802 Lightning Arresters for Transmitting Stations.** Each conductor of a lead-in to a transmitting station from an outdoor antenna shall be provided with a lightning arrester or other suitable means which will drain static charges from the antenna system except:

- (a) Where protected by a continuous metal shield which is grounded; or
- (b) Where the antenna is grounded.

**Grounding for Receiving Equipment and Antennas for Transmitting Equipment**

- **54-900 Material for Grounding Conductor.** The grounding conductor shall be of copper, aluminum alloy, copper-clad steel, bronze, or other corrosion-resistant material unless otherwise specified.
  - **54-902 Insulation of Grounding Conductor.** The grounding conductor may be uninsulated.
  - **54-904 Support for Grounding Conductor.** The grounding conductor shall be securely fastened in place and may be directly attached to the supporting surface without the use of insulating supports.
  - **54-906 Mechanical Protection of Grounding Conductor.** The grounding conductor shall be protected where exposed to mechanical injury.
  - **54-908 Grounding Conductor to be Run in a Straight Line.** The grounding conductor shall be run in a straight line as is practicable from the lightning arresters or antenna mast, or both, to the grounding electrode.
  - **54-910 Grounding Electrode.** The grounding conductor shall be connected to a grounding electrode as specified in Section 10.
  - **54-912 Grounding Conductors.** The grounding conductor may be run either inside or outside the building.
  - **54-914 Size of Protective Ground.** The size of the protective grounding conductor for receiving and transmitting stations providing ground connection for mast and lightning arresters shall be in accordance with Section 10.
  - **54-916 Common Ground.** A single grounding conductor may be used for both protective and operating purposes, but must be installed so that disconnection of the operating ground will not affect the protective ground circuit.
  - **54-918 Equipment in Hospitals.** Exposed non-current-carrying metal parts, if they could become energized, of radio and television equipment installed in general, intermediate, and critical care areas of hospitals as defined in Section 24 shall also be grounded to conform with Rule 24-104(6).
  - **54-920 Radio Noise Suppressors.** Radio interference eliminators, interference capacitors, or radio noise suppressors connected to power supply leads shall be of a type approved for the purpose and shall not be exposed to mechanical damage.
  - **54-922 Grounding of Antennas.** Masts, metal support structures, and antenna frames for receiving stations shall be grounded in accordance with Section 10.
- Transmitting Stations**
- **54-1000 Enclosure of Transmitters.** Transmitters shall be enclosed in a metal frame or grille, or thoroughly shielded or separated from the operating space by a barrier or other equivalent means.
  - **54-1002 Grounding of Transmitters.** All exposed metal parts of transmitters, including external metal handles and controls accessible to the operating personnel and accessories such as microphone stands, shall be grounded.
  - **54-1004 Interlocks on Doors of Transmitters.** All access doors of transmitters shall be provided with interlocks which will disconnect all voltages in excess of 250 V when any access door is opened.
  - **54-1006 Amplifiers.** Audio-amplifiers which are located outside the transmitter housing shall be suitably housed and shall be located so as to be readily accessible and adequately ventilated.

## TEN COMMANDMENTS TO AVOID STRESS

1. THOU SHALT NOT BE PERFECT, NOR TRY TO BE.
2. THOU SHALT NOT TRY TO BE ALL THINGS TO ALL PEOPLE.
3. THOU SHALT NOT LEAVE THINGS UNDONE THAT OUGHT TO BE DONE.
4. THOU SHALT NOT SPREAD THYSELF TOO THIN.
5. THOU SHALT LEARN TO SAY "NO" !!
6. THOU SHALT SCHEDULE TIME FOR THYSELF AND THY SUPPORTERS NETWORK.
7. THOU SHALT SWITCH OFF AND DO NOTHING REGULARLY.
8. THOU SHALT BE BORING, UNTIDY, INELEGANT AND UNATTRACTIVE AT TIMES.
9. THOU SHALT NOT EVEN FEEL GUILTY!
10. ESPECIALLY, THOU SHALT NOT BE THINE OWN WORST ENEMY, BUT BE THINE OWN BEST FRIEND.

## BASIC ELECTRICAL TEST

1. What colour is a green ground wire? \_\_\_\_\_
2. When hooking up a 200 volt heater, you must use 200 volt wire. True-\_\_\_\_\_ False \_\_\_\_\_
3. Electricity will leak out of pipes if they are not connected with rain tight fittings.  
True \_\_\_\_\_ False \_\_\_\_\_
4. To trip a circuit breaker, you must stick your foot out as it passes by. True \_\_\_\_\_ False \_\_\_\_\_
5. When using conduit, the O.D. must exceed the I.D. or the hole will be on the outside.  
True \_\_\_\_\_ False \_\_\_\_\_
6. A keyless fixture cannot be unlocked. True \_\_\_\_\_ False \_\_\_\_\_
7. A circuit breaker reads "20" on the handle. This means it can only trip 20 time before it is worn out.  
True \_\_\_\_\_ Fales \_\_\_\_\_
8. If you plug an item rated at 110 volts into a 120 volt outlet, 10 volts will leak out and make a mess. True \_\_\_\_\_ False \_\_\_\_\_
9. When pulling two 4/0 wires into 1/2" PVC conduit, the "PVC" stands for "PIPE VERY CROWDED"  
True \_\_\_\_\_ False \_\_\_\_\_
10. The gauge of wire tells you how many plugs can be hooked up to it. True \_\_\_\_\_ False \_\_\_\_\_
11. A flush mount device may only be hooked up to a toilet. True \_\_\_\_\_ False \_\_\_\_\_
12. Electrical inspectors are also known as \_\_\_\_\_.
13. High voltage wire is used on upper levels of tall buildings whereas, Low Voltage Wire is usually found in basements and underground areas. True \_\_\_\_\_ False \_\_\_\_\_
14. If you have a moulded-case circuit breaker, the mould can be washed off with warm soapy water.  
True \_\_\_\_\_ False \_\_\_\_\_



## The Georgian Bay Amateur Radio Club Inc.

P.O. Box 113 Owen Sound, Ontario, CANADA N4K5P1

VE3OSR 146.940 -

Dear

I would like to introduce ourselves and also invite you to one of our club activities. **The Georgian Bay Amateur Radio Club** has been active since 1975 and was incorporated in 1994. We have regular meetings at 7:30 p.m. on the 4th Tuesday of each month at the Billy Bishop Airport and a breakfast get together on the 2nd and last Saturday of each month at the Rockford ESSO. We invite you to drop in and meet some of our club members, talk shop and the breakfast isn't bad either.

In addition we participate in Field Day, the Scouts "Jamboree on the Air", the Owen Sound Santa Claus parade, the Terry Fox Run and CANWARN to mention a few.

We have **Nets** on the air:

**Sunday mornings at 9:30 local, 3783 khz and**

**Thursday evenings at 9:00 on the club repeater VE3OSR 146.940-**

We also have a Christmas dinner for hams and xyl's at the Tien-bo in December in lieu of a regular meeting, but at the time of writing this letter the date had not been set.

If you are interested, give me a call around the first of December as it should be finalized by then. We just order from the menu and everyone picks up their own tab, it makes it a lot simpler to organize, hi.

Yours truly,

VE3TSA

Home phone# (after 6:30 p.m.) 519-371-9805

# Georgian Bay Amateur Radio Club

P.O. Box 113, Owen Sound, Ontario N4K 5P1 Email: gbarc@sbbs.gryn.org

## 1997 Membership Application

Name \_\_\_\_\_ Call \_\_\_\_\_

Address \_\_\_\_\_

City, Postal Code \_\_\_\_\_

Telephone \_\_\_\_\_ Email \_\_\_\_\_

Class of license (optional)  Basic  5 wpm  12wpm  Advanced  Other \_\_\_\_\_

| GBARC MEMBERSHIP*                                                                                                                   |         |         |
|-------------------------------------------------------------------------------------------------------------------------------------|---------|---------|
| includes a subscription to <i>Feedback</i> , the GBARC newsletter, and full privileges on the VE3OSR, VE3OST, and VE3GBT repeaters. |         |         |
| <b>NEW RENEWAL</b>                                                                                                                  |         |         |
| (before Dec 31)                                                                                                                     |         |         |
| <input type="checkbox"/> Full                                                                                                       | \$35.00 | \$30.00 |
| (licensed amateur)                                                                                                                  |         |         |
| <input type="checkbox"/> Family                                                                                                     | \$25.00 | \$20.00 |
| (full member in same household)                                                                                                     |         |         |
| <input type="checkbox"/> Associate                                                                                                  | \$25.00 | \$20.00 |
| (not a licensed amateur)                                                                                                            |         |         |
| <b>TOTAL</b>                                                                                                                        | _____   |         |

| BITNET Packet Users Group MEMBERSHIP                                                                                                 |         |
|--------------------------------------------------------------------------------------------------------------------------------------|---------|
| includes full privileges on the VE3LJD packet Bulletin Board System.                                                                 |         |
| Membership is GBARC is <i>not</i> required to join BITNET.                                                                           |         |
| <input type="checkbox"/> BITNET                                                                                                      | \$25.00 |
| <b>TOTAL</b>                                                                                                                         | _____   |
| Please make cheques payable to <i>Georgian Bay Amateur Radio Club</i> . Our mailing address is P.O. Box 113, Owen Sound, ON N4K 5P1. |         |

\*New membership rates subject to approval at the November 26, 1996 meeting.

| New! GBARC APPAREL embroidered with GBARC logo and your callsign                      |                                     | _____                                             |
|---------------------------------------------------------------------------------------|-------------------------------------|---------------------------------------------------|
|                                                                                       |                                     | Callsign                                          |
| <b>Trimark 921 Spring/Summer Nylon Windbreaker Style Jacket</b>                       |                                     | _____                                             |
| <input type="checkbox"/> Small                                                        | <input type="checkbox"/> Medium     | \$45.00                                           |
| <input type="checkbox"/> Red                                                          | <input type="checkbox"/> Royal Blue |                                                   |
| <b>Trimark 931 Spring/Summer Nylon Bomber Style Jacket</b>                            |                                     | _____                                             |
| <input type="checkbox"/> Small                                                        | <input type="checkbox"/> Medium     | \$48.00                                           |
| <input type="checkbox"/> Red                                                          | <input type="checkbox"/> Royal Blue |                                                   |
| <b>Trimark 931 Polyfilled Quilted Winter Sportjacket</b>                              |                                     | \$75.00                                           |
| <input type="checkbox"/> Small                                                        | <input type="checkbox"/> Medium     |                                                   |
| <input type="checkbox"/> Red                                                          | <input type="checkbox"/> Royal Blue |                                                   |
| <b>Go North #1200 Interlock Golf Shirt with Pocket</b>                                |                                     | \$30.00                                           |
| <input type="checkbox"/> Small                                                        | <input type="checkbox"/> Medium     |                                                   |
| <input type="checkbox"/> Red                                                          | <input type="checkbox"/> Blue       |                                                   |
| <b>Baseball Cap</b>                                                                   |                                     | \$10.00                                           |
| <input type="checkbox"/> mesh back                                                    | <input type="checkbox"/> full back  |                                                   |
| <input type="checkbox"/> Red                                                          | <input type="checkbox"/> Blue       |                                                   |
|                                                                                       |                                     | _____                                             |
| All prices include GST, PST and Embroidery charges. <b>TOTAL ENCLOSED for Apparel</b> |                                     | _____                                             |
| Please make cheques payable to : The Georgian Bay Amateur Radio Club                  |                                     |                                                   |
| P.O. Box 113, Owen Sound, Ontario N4K5P1                                              |                                     |                                                   |
|                                                                                       |                                     | <i>Don't forget to select a size and a colour</i> |