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

January 1997

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

Message from the EDITOR by VE3TSA

Hello to all, here we are in 1997 and the beginning of another successful year for GBARC and its members. I hope everyone enjoys the newsletter and the articles I find here and there to put in them. I always try to have some sort of project as a feature in each issue. Since our hobby is one of experimentation, it is my desire to present topics of interest, to increase the general knowledge base of our members by encouraging the construction of electronic circuits, from a ham radio perspective of course. I endeavour to keep them simple but the odd one sneaks in that is meant for the more serious experimenter. Still, most can be tackled by anyone, especially the ones that deal with station accessories. Like antenna's or test gear etc. I have always enjoyed fox hunting and in the past provided several articles on foxhunting antennas and transmitters. This months Feedback has an article by Terrence WA4BVY, written in 1978, and describes a Doppler Scanning Antenna system for use in finding hidden transmitters. I think I'll build this one myself. I'll be able to give Terry VE3CAB from Collingwood a run for his money Hi. The next few issues of the newsletter will feature a three part series on the facts and fallacies of VHF antenna systems. I look forward to presenting these and even though they were written in 1964, they still contain good information for anyone interested in experimenting with VHF antennae. A big thanks to Jim VE3BFV who passed along a whole bunch of QST and 73 magazines from whence most of these articles were derived. See you at the next meeting.

best 73 Tom

Success is not permanent, but neither is failure.

How to Work MIR UHF Repeater
From: WA6LIE @ N0ARY

Here are the following frequency pairs I programed into my rig to compensate for the +- 10kc Doppler present.
* An astrik indicates the real frequency!

Memory #	RX frequency	TX frequency	PL	NOTES
U.	438.000	---	---	freq scanning
L.	437.900	---	---	freq scanning
18.	437.960+-	435.740	141.3	Repeater
17.	437.955+-	435.745	141.3	Repeater
16.	* 437.950	435.750	141.3	Repeater
15.	437.945+-	435.755	141.3	Repeater
14.	437.940+-	435.760	141.3	Repeater
13.	437.935+-	435.715	151.4	QSO mode
12.	437.930+-	435.720	151.4	QSO mode
11.	* 437.925	435.725	151.4	QSO mode
10.	437.920+-	435.730	151.4	QSO mode
9.	437.915+-	435.735	151.4	QSO mode

If you scan the memory channels in your radio with these frequency pairs, you will be assured that you make a repeater QSO with someone else, or you might lock on to the QSO freq, and talk to one of the Cosmonauts! Yes,it does happen!

I am currently running 35 watts with a Yaesu FT-712RH to a 14 element Yagi satellite antenna. 7 elements vertical, and 7 elements horizontal. (circular) This set up seems to work fairly good. I have the antenna pointing UP about 20 degrees, which is a good AVERAGE angle for this QTH. This antenna picks up the pass as low as 1 degree above the horizion and works the whole pass as long as I QSY the frequencies, as above, to compensate for the Doppler! Also, the antenna is only 20 feet above the ground and turns via and old Radio Shack TV rotator. The repeater seems to be DEAF, and takes a big signal to capture the RX. With a 2.2 mhz offset, and it running 25 watts, it is my belief that the RX is being desensed by the transmitter. I have made many QSOs thru the repeater, but activity is low. I also have worked it MOBILE with 35 watts to a 3' dualband vertical. This was usually done on a good overhead pass!

In addition, I highly reccomend a satellite tracking program. It should also show you the Doppler change so you can know what frequency to shift to. If you SCAN these frequencies in MEMORY, it will STOP on the one that it is receiving best. (hopefully) I am running STSPLUS version 9615 which can be found on the internet as a SOPxxxxxa.zip and this information is in the latest issue of SpaceNews OCT-21 edition. The graphics and modes are exellent!

I hope to se you on the MIR repeater! 73, Scott WA6LIE@N0ARY.#NOCAL.CA.USA.NA

THERE are two things that everyone must face sooner or later; a camera and reality. A smile is a big help in both instances.

A DoppleScAnt

Lost any transmitters lately? Find them even when simple methods fail by using a Doppler Scanning Antenna. Ham ingenuity is far from dead, as this project demonstrates.

By Terrence Rogers,* WA4BVY

When our repeater society decided to sponsor a 2-meter transmitter hunt, a buddy and I joined in enthusiastically. Rochester, NY (where I lived at the time), is a high-technology area so we were correct in expecting a high level of competition. A minimum of a Yagi beam, a portable receiver with limiter meter, and good terrain maps seemed to be the order of the day. Although we expected to place well up in the standings, our best finish using the traditional Yagi method was fifth out of 13. This would not seem a humiliating defeat until you consider that we are comparatively poor losers!

A New Method of Direction Finding

A local university library provided the first directions toward a better solution, with a short paragraph about Doppler antennas. The theory of operation is reasonably simple. Radio signals received on a rapidly moving antenna experience a frequency shift due to the Doppler effect, an effect well known to anyone who has observed a moving car with its horn blowing. The radio-frequency shift may be detected by a frequency-modulation receiver which, of course, is the type most often used on 2 meters. The rapid antenna movement can be simulated with a special antenna array and a scanning adaptor, while the audio output of the receiver is analyzed to provide the direction of the received signals, based on the Doppler shift.

Fig. 1 shows a quarter-wave antenna being rotated in a circle about point P, with some constant angular velocity, omega (ω). The instantaneous tangential velocity of the antenna is $V = \omega \times R$. As the antenna approaches the transmitter, the received frequency will be shifted higher. The highest frequency is achieved when the antenna is exactly at point A with maximum tangential velocity toward the transmitter. Conversely, the lowest frequency occurs when the antenna is at point C, with maximum velocity away from the transmitter. The amount of frequency shift due to this Doppler effect is proportional to the channel frequency and the tangential velocity, which is itself a function of the radius R and the angular velocity.

*46 Oakwood, 6901 Buffaloe Rd., Raleigh, NC 27604

Fig. 2 shows a plot of v_t, the component of the tangential velocity in the direction of the transmitter. Comparing Figs. 1 and 2, notice that at B in Fig. 2 v_t is crossing zero from the positive to the negative and the antenna is closest to the transmitter. The Doppler shift and consequent audio output from the receiver discriminator follow the same plot so that a negative-slope, zero-crossing detector will locate the direction of the transmitter.

The relationship between v_t and the Doppler shift is quantitatively:

$$f' = \frac{f(c \pm v_t)}{c} \qquad \text{(Eq. 1)}$$

where: f' = Doppler-shifted frequency
f = transmitter frequency
v_t = velocity of antenna toward or away from the transmitter
c = speed of light

Solving for the actual Doppler shift of $f \pm f'$ yields

$$\Delta f = \frac{f v_t}{c} \qquad \text{(Eq. 2)}$$

Since $v_t = v \cos\Theta$

$$f = \frac{f v \cos\Theta}{c} \qquad \text{(Eq. 3)}$$

where $\Theta = 0$ at A in Fig. 1

For example, we could find how fast an antenna would have to rotate to give a 147-MHz transmitter a 1-kHz Doppler shift. First, solve Eq. 2 for v_t:

$$v_t = \frac{\Delta fc}{f} = \frac{1\ \text{kHz} \times 3 \times 10^8}{147 \times 10^6}$$

$$= 2000\ \text{m/s} \qquad \text{(Eq. 4)}$$

This is about six times the speed of sound, making the mechanical rotation of the antenna impractical. When this type of antenna is connected to an fm receiver a tone is heard. Knowing that $v = \omega R$, we can solve for ω when R is 0.5 meters. ω = 4000 radians/second, or 637 Hz.

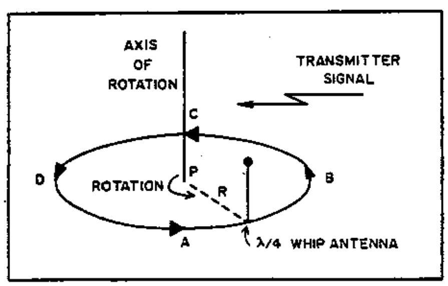
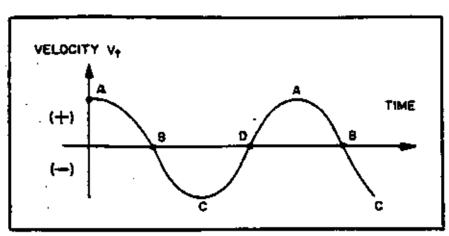
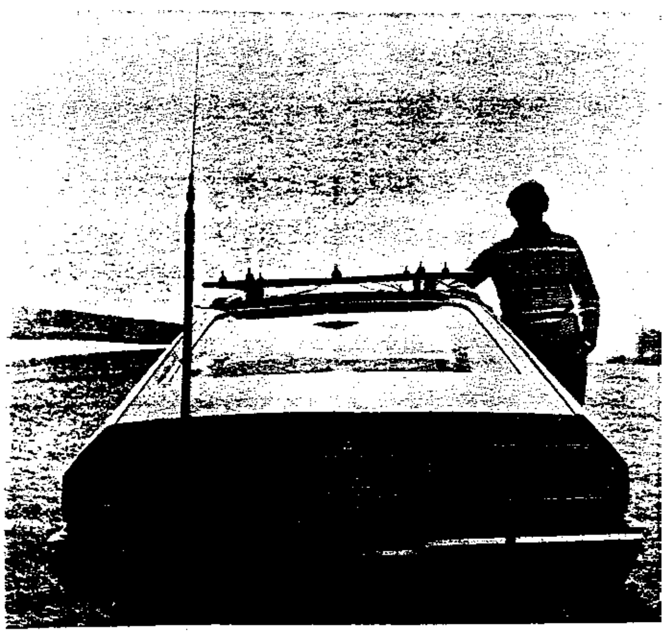


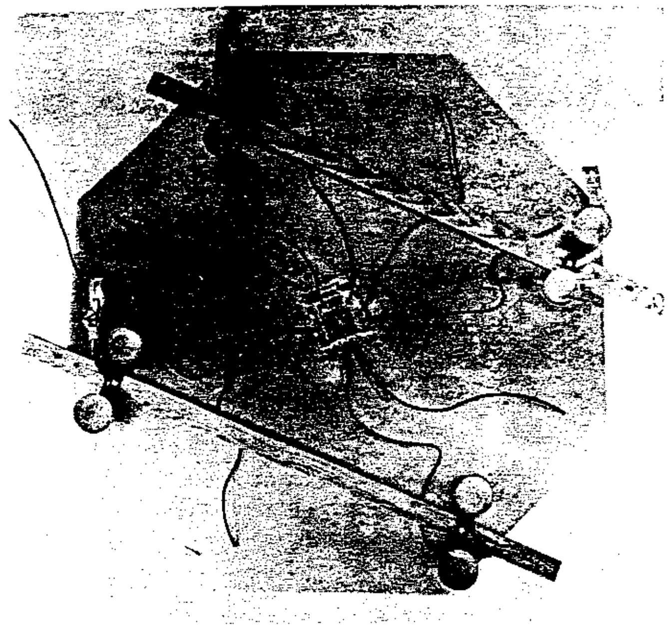
Fig. 1 — Pictorial diagram of the theoretical Doppler antenna, circling at six times the speed of sound.

Fig. 2 — This graph illustrates the frequency shift related to antenna movement toward and away from the signal source. *Both* antenna rotation and signal are time-based.





Shown here is the former Mustang II, along with the author and the Doppler antenna system. The pole-mounted whip for 2 meters had no effect on the Doppler system.



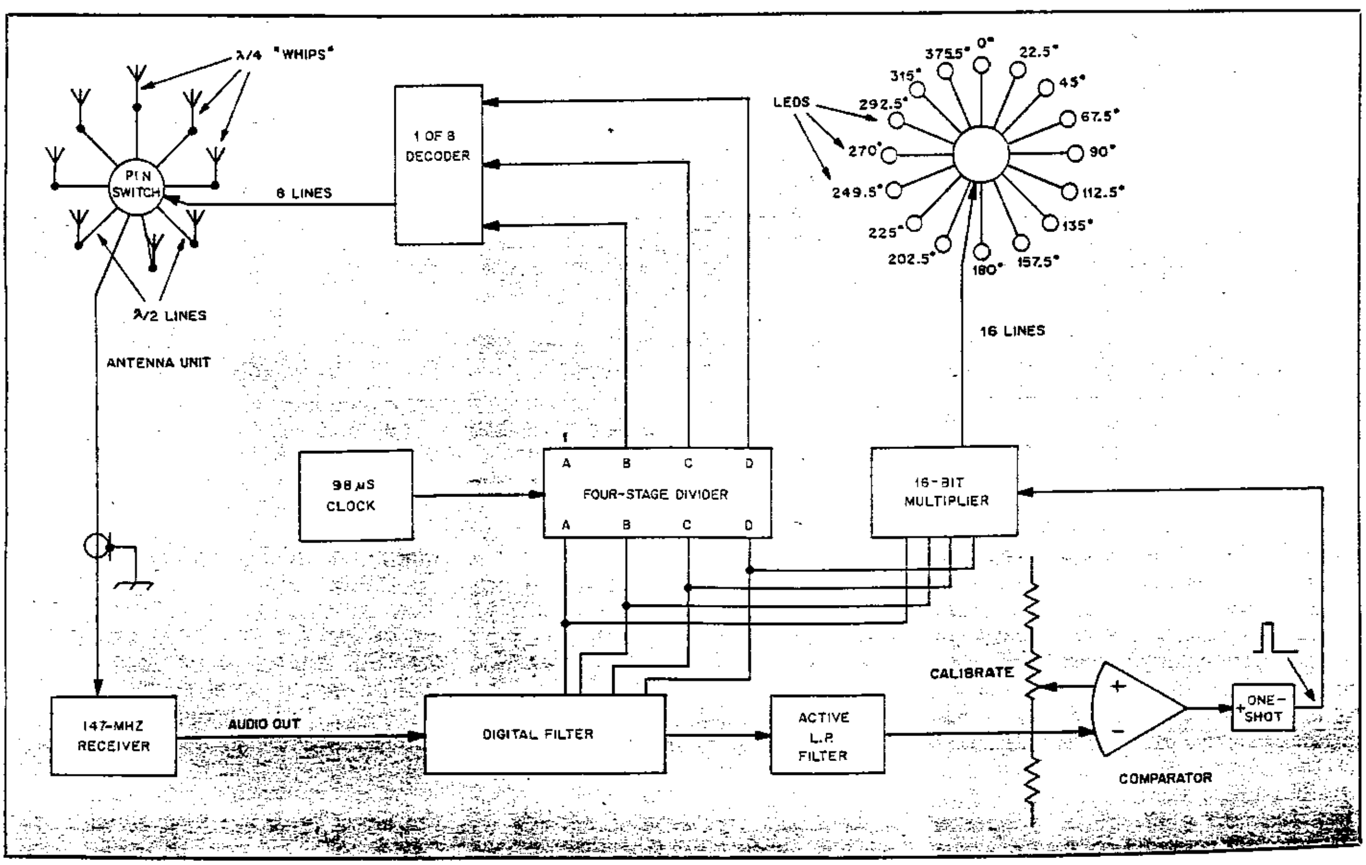
An underside view of the Doppler antenna mounting plate; note the eight equal lengths of small coaxial cable. The PIN diode circuitry is on the circuit board in the center.

Now refer to the system diagram in Fig. 3. The rotation is accomplished by constructing an array of eight antennas equally spaced in about a one-meter (half-wavelength) diameter circle. Any greater diameter leads to an ambiguity in direction. The antennas are then electronically scanned in sequence to approximate the rotation of a single antenna. We used PIN diodes to connect the individual antennas, since they allow us to stop the scan and transmit through the antenna system. The PIN diodes are capable of conducting more rf current than the dc bias current would indicate, whereas ordinary signal diodes will work but not conduct any appreciable rf current.

How the DoppleScAnt Works

Eight antennas are scanned in 1.57 milliseconds, so the clock must operate at

Fig. 3 — System diagram of the Doppler direction finder.



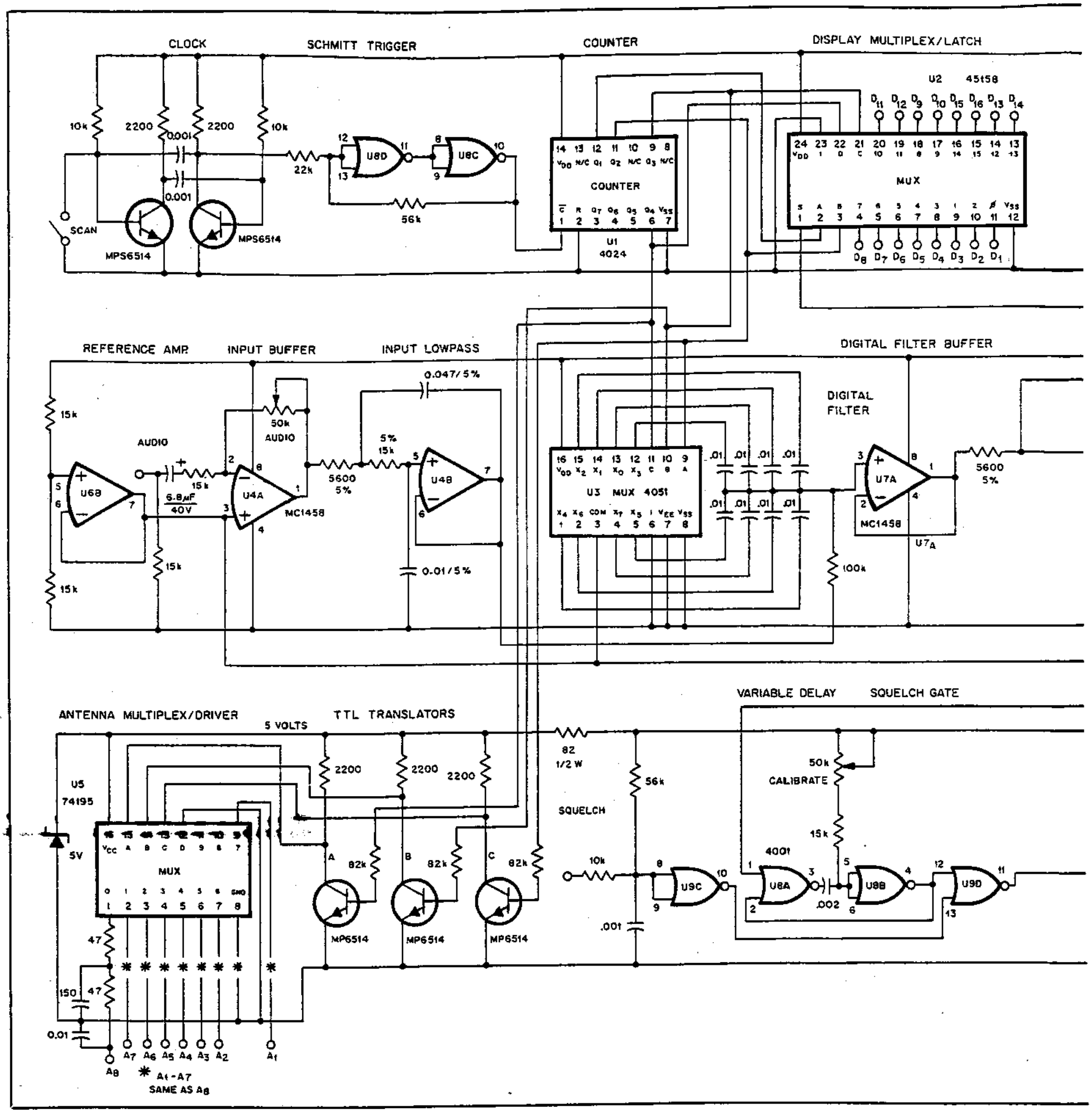


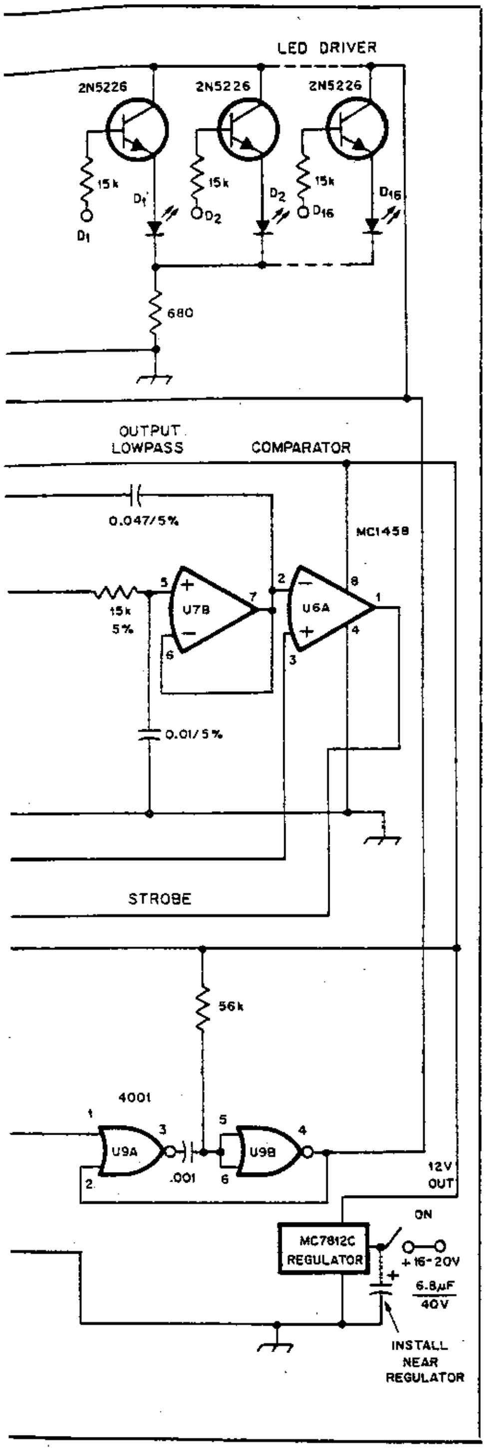
Fig. 4 — Schematic diagram of the control unit used in the vehicle. All resistors are 1/4 watt, 10 percent, unless otherwise noted; capacitor values less than one are in μF, more than one in pF unless electrolytic. All electrolytics are in μF. All capacitors are 20-percent tolerance unless noted. Connect pin 7 of each U8 and U9 to VSS and pin 14 to VDD.

1.57 ÷ 8 or 196 microseconds. We actually chose 196 ÷ 2 microseconds since our compass rose has 16 positions. The 637-Hz tone must be extracted from the composite audio output of the receiver by a narrow filter. However, such a narrow filter introduces considerable phase distortion with just a little mistuning. Therefore, we used a digital filter which is operated by the same clock that controls the scanning. The effect is to have a filter automatically centered on the scan tone even when there is some frequency drifting. A residual phase shift caused by the audio circuitry is calibrated out of the system.

How does the circuit work? Q1 and Q2 form a flip-flop operating at 16 times the scan rate of 600 Hz, or 9600 Hz. The RC waveform output is converted to square waves by the Schmitt trigger formed from U8C and U8D. The scan may be stopped for transmitting by closing the switch.

U1 is a seven-stage ripple counter, of which only the first four stages are used. The Q1, Q2, Q3 and Q4 outputs of U1 are all connected to U2, a four-bit latch and 4-to-16 line decoder. U2 is used to scan the LED display compass rose and to latch an output *only* when a pulse appears at pin 1, the strobe input from the calibrate single shot.

The LEDs are actually driven by 16 pnp switching transistors Q3-Q18, needed because of the low current output of the CMOS IC. All the LED directional



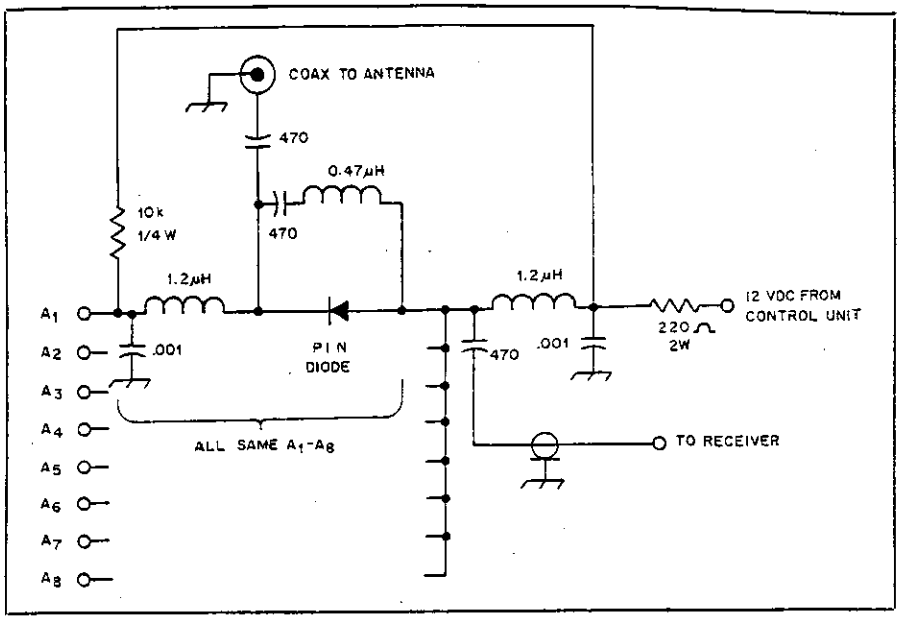


Fig. 5 — Schematic diagram of the PIN diode circuitry mounted beneath the antenna; eight identical circuits are used.

displays have a common current-limiting resistor, R61, since only one LED is on at a time. The diodes are mounted in a circle every 22.5 degrees on the front panel with D1 at the top (zero degrees) and proceeding counterclockwise (the same direction as the antenna is scanned). Number "one" antenna is usually at the right but its exact position is determined in the final test.

U6B is used to provide a stiff source for reference bias for the other op amps.

Audio input is to U4A, which is an adjustable buffer amplifier. It is set so that at typical levels of audio from the transceiver, clipping does not occur at pin 1 of U7A, which is the buffer for the digital filter. This is about 1.6 V rms when an 8-volt supply is used. U4B is a low-pass filter which reduces voice audio peaks and overloading to the digital filter.

U3 is fed by outputs Q2, Q3 and Q4 of U1, so a complete cycle for its eight outputs occurs in step with the 16-step cycle of U2. This eight-way-decoded, bidirectional multiplexer is connected as a digital filter with a bandwidth of 10 Hz or less. The stepped output of the digital filter is smoothed by U7B, another low pass.

U6A is a comparator connected to go positive on a negative half of the sine-wave input. This fires the variable single-shot of U8A and U8B. This is used to calibrate out variations between radios, component aging, and so on. A second short-pulse single-shot is formed from U9A and U9B; it fires on the fall of the calibrate single-shot and provides the latching pulse to U2, which then illuminates whatever LED position was decoded at the time of the pulse for the next cycle.

U5 is the only TTL circuit. Its drive comes from Q2, Q3 and Q4 of U1 for the same reasons that U3 is so connected. The CMOS level is translated to TTL levels by Q19, Q20 and Q21. The outputs are open collector and are rated to drive the PIN diodes in the antenna unit directly.

The single-shot which latches the LED display drive may be gated on and off by the receiver squelch. This connection to U9C is labeled SQUELCH and is arranged so that a low potential produces the gating which locks in the current display. This allows the unit to lock on very short transmissions of about 250 ms after the squelch opens. The digital filter is quite narrow and so the sine-wave output usually does not decay to unusable levels by the time the typical squelch has closed.

Fig. 4 is a schematic diagram of the control (adaptor) unit used in the auto. A control cable goes to the antenna unit, which is mounted on the roof with cartop carriers. The circuitry shown in Fig. 5 is mounted on the underside of an aluminum plate which forms the ground-plane for all antennas. Aluminum plate of 0.0625 inch (1.6 mm) thickness is quite adequate. The antennas used are commonly available quarter-wave whips. These antennas must be identical, especially in length. The interconnecting half-wavelengths of coaxial cable must all be of the same brand and the same length to within about one-quarter inch.

The capacitor and coil combination around the PIN diodes forms a parallel-resonant circuit with the capacitance of the diodes to increase isolation from "off" units. Note that changing the diode will change the value of the coil. This circuit may be checked with a grid-dip meter. It is not too critical and might be left out with low capacitance diodes. The commonly available Motorola MPN3402 diodes survive a 25-watt, 2-meter transmitter signal if the scan is stopped when one transmits.

Following construction and preliminary trials, the unit should be taken to an open field for calibration. Adjust the audio gain control at a comfortable speaker level, taking care not to overload the digital or low-pass filters (8 volts pk-pk). Set the calibrate control in the middle of its range. A 2-meter (or other band used) transmitter is placed some distance off and the antenna array rotated until the compass rose reads true relative to the direction of the vehicle.

For aesthetics, the antenna may be rotated a slight amount before it is drilled and secured to the cartop carriers. Then the calibrate control may be adjusted to compensate for this movement. A walk around the auto with a handheld transceiver will reveal if the installation is functioning properly.

We first used a cable connector between the adaptor and the antenna unit which was not polarized. At one of the following practice sessions when the plug was reversed, the driver was instructed to follow the signal into Lake Ontario! Under such conditions the indicator reads correctly ahead and behind but reverses left and right, so it is best to check with a walk-around. Once calibrated in one direction, we did not find it necessary to compensate in other directions to the limit of readout accuracy. We left the pole-mounted, 2-meter antenna on the rear bumper during the tests and found no significant interaction.

Finding Bunnies

Use of this system does demand some skill. When driving down a street one may notice that the display will "dash around" the compass rose. This indicates the presence of multipath reflections that the Yagi competition will also have to weed out. You, however, will know that you are in a high-reflection area, whereas they often do not. If the car is stopped in a reflection the tone will sound distorted (tinny). Rock the car for the best note and then take the reading. You can also remain in motion, which is the best strategy, and have a companion watch the display. Every two or three seconds in a high-reflection area the display will momentarily come to rest. This reading is invariably accurate.

As time goes on and the competition becomes aware that you are using the DoppleScAnt, some countermeasures will have to be brought into play. Encourage the "rabbit" to reduce the time the hidden transmitter stays on the air. Since the system will lock on a bearing in about 250 ms you can find a hidden transmitter which is nearly "off the air" completely. You have just eliminated your Yagi competition!

Our targets tried power and polarization switching to throw us off. The first time that happened our team was not aware of it until we actually found the transmitter, because the system makes no use of amplitude or polarity information. Next, high power was used, as this causes the attenuators used by other contestants to be turned all the way up in the vicinity of the hidden transmitter, so that signals enter the receiver directly and the Yagi becomes useless. This trick is ineffective against the "octopus" system because it does not use an attenuator.

Finally, the sly devils tried transmitting a 600-Hz tone. This might have been effective but the digital filter is only 4 Hz wide and the rabbit does not know what exact frequency the clock is on, due to the tolerances of the components. We also realized that we could adjust the regulator voltage so the pitch changed slightly to avoid the interference.

Some remarks on strategy should be a fitting end to this article. It is sometimes of benefit not to drive immediately in the direction indicated, but rather at quite an angle to it, so that the approximate location of the bunny may be determined by "triangulation" as soon as possible. This will allow a course to be plotted to avoid the general flow of traffic and accompanying delays. The higher accuracy of the "octopus" should allow you to do this in situations where the small portable Yagis will not suffice.

We found that a three-person team is best: a driver, an equipment operator and a strategist. The driver pilots the auto while the operator sees to "calling" the bunny and interpreting the display. (The pictured Mustang II no longer exists, as a result of driver error while said driver was watching the electronics.) The operator also adds the relative bearing to the magnetic bearing of the car and thus obtains the magnetic bearing to the transmitter. The strategist then plots this information, discarding older, more distant (and thus less accurate) bearings, as the hunt progresses. The strategist is also responsible for the first coarse guess of the actual location, so that obstructions such as rivers with no bridges may be avoided in time. This task requires no technical expertise and is a good job to invite a nonham to do.

We found the DoppleScAnt to be our key to winning at an immensely entertaining club activity. If you have the competitive urge, get your club to start up a transmitter hunting program this spring; meanwhile, start building your "secret weapon!"

May 1978

[Editor's Note: Photocopies of the circuit-board patterns provided by the author are available from ARRL hq. for one dollar (to cover handling) and a business-size stamped return envelope. The author has indicated that he can offer assistance in obtaining ready-made circuit boards and hard-to-find parts. A stamped return envelope sent to him will bring more information.]

Easy & safe tar cleanup

From: N2XUC@KB2OBB.#WNY.NY.USA.NA

This is the season when many of us in the northern hemisphere are getting ready for wintry weather. In my case (and probably many others), this includes sealing rooves & driveways with tar (asphalt) type sealants.

The biggest problem I have with the stuff is it sticks to human flesh better than it sticks to anything else. The traditional means of removing it from skin is with mineral spirits or gasoline, etc. Not only is the stuff flamable, it's rough on skin, kidneys, livers, etc.

Today after finishing coating a roof, I tried removing the mess from my hands & arms with vegetable oil. The oil removed the mess almost as quickly as gasoline would have, and HAD to have been better for my health. I simply rubbed a liberal amount of vegetable oil onto the mess, and washed it away. Overall I used perhaps a cup of oil and am now cleaned up.

Once the tar is dissolved, the vegetable oil wipes off with an old cloth or paper towels (I used the shirt I'd worn to work on the roof, as it was shot anyhow). The remaining vegetable oil washes off easily with a small amount of dish detergent.

Perhaps some of you reading this message have other useful household hints that could help to make our fellow amateurs' lives easier, and perhaps even a bit healthier. If so, please share them.

73 Thanks for reading this. John - N2XUC

FILE PHOTO

Engineer plots lightning hot spots

By Michael Smith
TORONTO STAR

Afraid of being struck by lightning?

Stay away from Walkerton; it's Ontario's hot spot.

But Metro is middling safe and remote Webequie is the province's most lightning-free zone, according to data compiled by Wasyl Janischewskyj, University of Toronto engineering professor.

In 1991, a sensor in Walkerton, northeast of London, registered more than 4,500 lightning strikes — the highest in Ontario.

The sensor in Webequie — deep in the heart of the Winisk River Provincial Park, about 360 kilometres (225 miles) north of Thunder Bay — showed just 175 hits during the year.

And Janischewskyj's "lightning map" shows the Metro area was just about in the middle — a slightly above average 1,812 lightning strikes registered on a sensor in Kleinburg.

With the aid of local power companies, Janischewskyj has installed lightning sensors across all but two provinces, and hopes to have Alberta and British Columbia hooked up soon.

The sensors register lightning strikes within a 20-kilometre (12-mile) radius. There are 18 in Ontario and 60 so far across Canada.

An average lightning bolt has a peak energy of 30,000 amperes, Janischewskyj says, enough to light 30,000 100-watt bulbs. They would only flicker, though; the peak lasts only 2-millionths of a second.

Still, "it's definitely an energy that can cause damage," he says.

The 11-year study — now entering its fourth year of collecting data — is aimed at understanding how lightning varies from year to year and place to place.

It's not just intellectual curiosity, Janischewskyj says. The findings will be useful for fighting forest fires and for planning electric power grids.

For instance, knowing that a certain region is prone to lightning strikes could mean a fire-fighting station is built nearby, cutting the response time when fire breaks out.

Power lines are often targets for lightning strikes, he says. "If hydroelectric utilities know where power failures will occur, they can prepare for outages."

And sometimes power companies can redirect power "out of the path of lightning," avoiding millions of dollars of costs related to power failures.

Janischewskyj has collated data for the first two years of the study, 1990 and 1991, and is still studying data for last year.

The study is intended to last 11 years because, for reasons that aren't understood, lightning is directly affected by sunspots, which vary according to an 11-year cycle.

Over the next few years, Janischewskyj expects the average number of lightning strikes to rise and then drop off again as the sunspot cycle winds down.

But any particular spot could go up or down at random, he says. "These are statistical readings and they vary from year to year."

New software for packet...

K-TERM is a full featured, multiconnect terminal program for use with the DOS operating system and the KANTRONICS KPC-3 TNC although it should work with any TNC.

K-TERM uses the TNC's HOST mode and also supports MODEM operation.

K-TERM also has the 'ROBOT' feature which allows automatic collection of mail from your favorite BBS and also allows automatic DOWNLOADS at a preset time that you designate. (TNC mode only, not for MODEM operation).

K-TERM also features off line message creation, built in Editor (better than DOS's editor and uses less than 2k of memory), automatic signing of messages with your name, H address, time and date for messages created off line and then uploaded to your BBS, three Up & Download protocols for ASCII and BINARY files, scrolling menu for selection of KTERM's many features, online help, surf your HD from the program, automatic HD or disk maintainence, ability to monitor while connected, adjustable split screen, color coded text for each connect, MODEM support, WEFAX, programmable 'F' keys, callbook server access while connected or not, 2 optional servers, gateway to DOS and many other features including the radically new MRM.

MRM (Message Reading Module) is exclusive to KTERM. MRM is a completely new concept for selecting, reading and saving to disk messages from your local BBS. Never again will you have to deal with message numbers when reading msgs from a BBS. MRM has never been used in a HAM packet terminal program until K-TERM.

This latest edition now has the ability to access any callbook server, not just the Buckmaster CD. KTERM, version 1.12, last compiled January, 1997.

If you would like to try this new software, send 1 high density disk, any size, in a S.A.S. disk mailer to:

N3DFD (Joe)
912 Ramona Ave.
Philadelphia, Pa. 19124.

News from the Blue Mountain ARC

Congratulations to Aubrey VE3TUQ being named the "Amateur of the Year" for BMARC .... editor

It is with great pleasure that I introduce BMARC's Amateur of the Year for 1996 - Aubrey Alderdice, VE3TUQ.

At the last meeting of 1996 and coincidentally our annual general meeting, one of the most important things we did was to announce the recipient of the Amateur of the Year award for 1996. This award was chosen by you the membership in a mail-in vote a couple of months ago. Keeping it a secret, now that was a challenge and a half.

Dr. Robert (Bob) MacDairmid, VA3DRB (presenting it to Aubrey) worked very hard manufacturing the base of the trophy and as you can see in the photo, its a dandy. The Silver Eagle D104 that stands atop Bob's base was donated by Don Greig of Markdale. All-in-all its one super trophy.

But its going to a super guy so you would expect no less. Aubrey deserves this acknowledgment from his peers and we will be forever in his debt. Spearheading and/or working many projects both with our club and with that of the Owen Sound group that he is also a member of, Aubrey has always worked for the best interest of the club and for the best interest of amateur radio.

Amateurs Play Important Roll in Special Olympics

By: Doug Measures VE3TVD, Chairman of Communications for '97 Special Olympics World Winter Games Collingwood venue and Mike Yanocko VE3SYT, BMARC President.

On February 1 1997 a wonderful event will be taking place here in Ontario. We will be host to 1997 Special Olympics World Winter Games. Some 2000 athletes with mental disabilities, their coaches, escorts, and families from 88 countries will all be visiting the Toronto and Collingwood area. These athletes have trained hard, very hard, in some cases for years to compete in these games and their courage and spirit will live on in our hearts long after the Special Olympics World Winter Games come to an end.

In Canada, the late Harry "Red" Foster founded the Special Olympics program, opening new doors to achievement and recognition for thousands of people with mental disabilities. Special Olympics Chapters are established in all Provinces and Territories. These chapters conduct training programs and competitions in thousands of communities across Canada.

From February 1 to 8, 1997, Collingwood and Toronto Ontario Canada will be the centre of World Special Olympics sport.

The winter sporting venues for the '97 Games will be:

- Figure Skating, North York Centennial Centre, North York.
- Floor Hockey, Better Living Centre-Exhibition Place, Toronto.
- Speed Skating, Varsity Arena, Toronto.
- Eisstocksport (demonstration), Better Living Centre Exhibition Place, Toronto.

Collingwood will Host:

- Alpine Skiing, Blue Mountain Resorts, Collingwood.
- Cross Country Skiing, Highlands Nordic, Duntroon.
- Snowshoeing (demonstration), Highlands Nordic, Duntroon.

In addition, the opening ceremonies will be held in Toronto's Skydome and will be televised worldwide, as will closing ceremonies held at Toronto's Molson Amphitheatre, Ontario Place. Tens of millions of viewers will see television coverage of the Games on TSN in Canada and ABC Sports worldwide.

The Blue Mountain Amateur Radio Club (BMARC) is very proud to be the Special Olympics World Winter Games amateur radio and communications liaison. In this position volunteers of BMARC will have responsibility for all forms of communications in the Collingwood area venues. This encompasses; the Main Operations Centre located in Collingwood, and the site Operations centres at Highlands Nordic, in Duntroon and the Blue Mountain Ski Resort West of Collingwood.

In addition to all this, the Blue Mountain Amateur Radio Club will be operating a HF special event station, under the club call sign of Victor Alpha Three Blue Mountain Radio, VA3BMR, from the main operations centre. Special Olympics World Winter Games QSL Cards have been printed and will be a must have for any amateurs collection. This special event station plans to operate on 20, 40 & 80 meters as conditions permit, and to lesson the possibility of interference will be transmitting at 150 watt's output power both ssb and cw. This makes contacting us even more exciting and the QSL you'll receive more rewarding.

If you would like to receive more information about the Special Olympics or to become a volunteer please contact: 1 800 557 9777, 705 446 2486, 416 397 9250

If you would like to receive more information about amateur involvement or volunteer with communications at the Collingwood venues please contact:

The Blue Mountain Amateur Radio Club, P. O. Box 273 Collingwood Ontario, L9Y 3Z5 or Phone Doug Measures, VE3TVD @ 705 445 1937

You can also contact us on the Web at: www.georgian.net/bmarc

or E-Mail: bmarc.georgian.net