

JANUARY-1972

the Groundwave



EDITOR MIKE BRYAN
PUBLISHER - LARRY EMMERSON

**A PUBLICATION OF
THE OTTAWA AMATEUR RADIO CLUB**

"GROUNDWAVE IS THE OFFICIAL BULLETIN OF THE OTTAWA AMATEUR RADIO CLUB, AN ASSOCIATION OF RADIO AMATEURS DEVOTED TO THE PROMOTION OF INTEREST IN AMATEUR RADIO COMMUNICATION AND EXPERIMENTATION IN THE OTTAWA REGIONAL AREA, AND TO ADVANCEMENT OF THE TECHNICAL COMPETENCE AND ACHIEVEMENT OF CLUB MEMBERS."

CLUB ADDRESS: Ottawa Amateur Radio Club,
Box 8873,
Ottawa,
K1G 3J2

The club holds regular meetings on the first Wednesday of each month, between September and June inclusive. Meetings are normally held at the National Research Council Auditorium, 100 Sussex Drive, Ottawa. Visitors are always welcome at these meetings.

C L U B N E T : 20:00 HOURS MONDAYS

Check into the Capital City Net, via the VE2CRA club repeater, each Monday evening at 20:00 hours. VE2CRA has input and output frequencies of 146.460 and 146.940 MHz respectively.

OTTAWA AMATEUR RADIO CLUB EXECUTIVE FOR 1971-72

PRESIDENT:	Tony Vandenbelt - VE3FXG --	699 Trojan Ave., 745-6928
VICE PRESIDENT:	Colin Rowe - VE3AZY --	2310 Fox Cresc., Apt. 707 728-9240
SECRETARY:	Hank Harley - VE3BR --	Orleans 824-3895
TREASURER:	George McCullum - VE3DIH --	2299 Alta Vista Dr., 733-3600
DIRECTORS:	Larry Kayser - VE3QB --	59 Westfield Cresc., 829-3407
	Mike Waters - VE3BYO --	1045-159 Morrison Dr., 829-2762
	Larry Emmerson - VE3GGA --	883 Dunlevie Ave., 728-7307
	Ray James - VE3CUA --	43 Ashburn Dr., 221-7243

FIFTH REGULAR MEETING---1971-'72 SEASON

DATE: Wednesday, January 5, 1972

TIME: 8.00 p.m.

PLACE: Main Auditorium, NRC Building, 100 Sussex Drive

--AGENDA--

1. Call to Order
2. Welcome to Members and Guests
3. Minutes of December Meeting (attached)
4. New and Old Business
5. Reports
6. Program: Program Chairman VE3QB, Larry, was putting the finishing touches on an "all HF" program, to include a presentation by at least one local supplier, when GROUNDWAVE went to press.
7. ADJOURN for Coffee and Eyeball Ragchewing.

HELP WANTED: FOR FIELD DAY--

Club President VE3FXG, Tony, is looking for volunteers to handle the duties of field day co-ordinator and 'phone chairman. A CW co-ordinator has already volunteered. If you are willing to fill either of these two important roles for the club next summer, please see Tony -before the meeting, or, at ragchew time.

SEEK TO FORM AMATEUR CLUB ON OTTAWA U CAMPUS:

Any club members who either teach or study at University of Ottawa are asked to contact Pedro (CX6BEK/VE3) about the possibility of starting an amateur club on the U of O campus. Pedro Rona can be reached at home at 225-2077, or, at the University, 231-2937.

CARF ASKS STANBURY NOT TO GIVE AWAY OUR FREQUENCIES TO CBERS:

Noting that any possible reassignment of portions of the 220-225 Mhz band to U.S. CBers "will be followed by a similar petition to release Canadian Amateur Frequencies for use (here) by the Canadian General Radio Service," the Canadian Amateur Radio Federation has written Communications Minister Robert Stanbury, asking that any such petition for expansion of the GRS into VHF territory be turned down. Amateurs, says CARF, stand ready to help GRS enthusiasts who wish to operate on 220 gain the right to move on up "the ladder of personal communications" as technician class amateurs, under CARF's proposal for such a licence.

MINUTES OF THE FOURTH REGULAR MEETING FOR 1971-'72

Wednesday, December 1st

THE regular monthly meeting of the Ottawa Amateur Radio Club was held Dec. 1 in the main auditorium of the National Research Council.

THE meeting was called to order by the president at 20:10 hours.

IN his opening address, the president extended a welcome to two visitors, VE3DTJ and VE2BRE.

THE minutes of the previous meeting were drawn to members' attention and a motion for adoption was requested. Cliff Moffett so moved and Nick (VE3FFW) seconded the motion.

CARRIED

Under the heading of new business, the president outlined a news release from the Department of Communications, stating that its publication had proven to be premature.

He told the membership that it had been pointed out the club was not affiliated with the Radio Society of Ontario and he felt such affiliation would be beneficial to the club. Roy Maskell moved the OARC become affiliated with RSO. Motion seconded by Bernie Best.

CARRIED

REPORTS from committees were then called for:

George Roach reported on behalf of the membership committee that the club now had 181 full members and 94 with associate status.

Cliff Moffett reported on beginners' classes. He said they were going well. One student had already passed his examination for the amateur operator's certificate.

Roy Maskell reported for the auction committee that a very successful club auction had been held and the club treasurer reported a net profit to the club of \$82.31.

Ray James reported for the construction group that assembly kits were ready and waiting for those participating.

It was reported that Motorola portable (VHF) sets previously offered for sale had been withdrawn because of a small response.

Larry Kayser, program committee chairman, reported his scheduled guest could not appear. Larry then took over himself.

He presented an interesting talk and demonstration of the "Bell Boy" radio paging device.

The meeting closed at 22:10 hours. It had an attendance of 59

-----HENRY HARLEY,
Secretary. OARC

LETTERS TO GROUNDWAVE:

Editor, Groundwave:

" I do wish you editors would stop playing loose with your role and set yourself up as authorities on the League in Canada, until you have done a little checking of source material. I did so much enjoy your little article on 'The Worth of ARRL to Canadian Amateurs' in the September edition of GROUNDWAVE, even when you tried to justify your joining by economic reasoning alone, but to follow it in October with such a different position is slightly ridiculous. To start with, you have used one single item to base your cost figures on. That is how much is allowed the Canadian Division Director and does not include his expenses and travel associated with the IARU. It does Not include the postage and travel expenses of each Section Communication Manager; the postage and cost of brochures and forms for each Section Emergency Co-ordinator. Nor does it cover expenses when an affiliated club asks for technical and other types of educational assistance. I might add that my postage is never less than \$20 a month and I am also allowed to make 10 trips a year within the province on League business. Multiply this by the other Canadian SCMs and the figures are pretty impressive. I just don't think we can ever agree on an economic reason for belonging to anything because there is the personal aspect which always knocks everything out of kilter. Let's try to put the whole thing into a different context, shall we? And for what it is worth, let us also agree that it would be nice if we had a purely Canadian organization. OK? Here is a list of awards, contests and programs sponsored by the League in the field activities area (this is my baby). It is here where 99% of the active licensed amateurs spend 99% of time on air. The other 1% of active licensed amateurs spend 1% of their time on the air and the other 99% of their time philosophizing on how nice it would be if we had our own purely Canadian organization and 'let's get rid of anything American.' Just for fun, why don't we try to see how many of the following are sponsored by any other organization, anywhere: Awards like, Rag Chewers' Club; Worked All Continents; Worked All States; Five-Band WAS; DX Century Club; Five-Band DXCC; Code Proficiency Award; A-1 Operators' Club; Old Timers' Club; Brass Pounders' League; Public Service Honor Roll. Contests like: VHF Sweepstakes; CD Parties; Novice Roundup; ARRL International DX Competition; Frequency Measure Test; VHF QSO Party; Field Day; Simulated Emergency Test; All-Band Sweepstakes; 160 metre contest. Programs like: Code proficiency; Amateur Radio Emergency Corps; National Traffic System; Production of Repeater and Net Directories. NOW, ...add all this to the best amateur magazine on the market and I think common sense would dictate that you just can't afford NOT to belong to the ARRL. On the membership of the OARC are three senior representatives of the ARRL: VE3CJ; VE3YT and VE3DV. We are always ready and willing to discuss the merits of belonging to The League."

'73

Holland Shepherd, VE3DV
Area SCM, ARRL

EDS NOTE: Holland makes some very cogent points to back up our contention that the ARRL is the finest organization (who could question it?) that organized amateur radio has going for it. We would just like to point out that we did not, in the October Groundwave, attempt to justify our joining by economic reasoning alone, as Holland suggests. What we did say was that the value of QST alone made League membership well worth it, in a non-monetary sense. No one can question the points Holland makes. But it still remains to be answered whether Canadian amateurs ought to **back** a made-in-Canada, based-in-Canada voice to speak to the DOC.

LETTERS TO BRETTEL

It ought to be realized that, right now, the League, with men of the calibre of Noel Eaton, Holland and VE3YT, is very ably represented in Canada and has tremendous prestige and financial resources to back up any submissions it makes on our behalf to the DOC. At this moment, it appears the League is in a position of possible leadership in the matter of representation in regulatory matters. But no one should down-play the excellent and very sincere efforts being made by Art Blick and the Canadian Amateur Radio Federation, as well. It is a question of principle. Should we recognize the League's obvious superiority in so many ways and be content to have an American-based organization represent us? Or, would we be better serving our long-term interests by beefing up CARF or some other "made-in-Canada" organization. The question resolves itself solely into one of principle. The same principle that must be faced by governments facing the decision of which is better: Canadian-owned and directed industries, with perhaps a lower standard of living? Or American-owned corporations, with their greater resources, bringing advantages in terms of higher tax revenues and employment. It might be suggested that we should consider the matter in this light: If our first allegiance is owed to 'amateur radio' as a world-wide fraternity and hobby, exceeding national boundaries, then we should opt for ARRL as our first choice. But if we decide that our first allegiance is to Canada, then we might ponder other considerations. I'm all for ARRL in every aspect except regulatory matters!

--VE3CGT

The Editor and Club Members,
Ottawa Amateur Radio Club

Dear Sir:

"As an ex-member, and as a lifetime member; and as an ex-president of the OARC; and, as an interested amateur, I note your editor's attempt to get some correspondence going. Well, he succeeded with me. I refer to the "I'm on the fence, Joe, don't ask me to decide on the facts" type of position. I refer to the minutes (December) paragraph 5 (dealing with the CARF proposal for a new licence class). Maybe I should do a small educational type bit of reasoning exercise:

Effect: The GRS are demanding part of the amateur 2 metre or other band for extension of their activities. They are organized like 25,000 voters.

Cause: Multi GRS users. ONE narrow frequency band. Lack of amateur occupancy in other bands. If it is used, you don't lose it; corollary: Use it, or lose it. Do you think we can get the 11 metre band back for amateur use?

Reason: Not enough amateurs to populate the band. A lot of them are causing QRM to each other on the DX bands.

Reason: The stepping stones to a full Amateur licence are pretty hard. A youngster finds the 10 wpm requirement and the theory darn steep. So we get some pretty good amateurs. We also LOSE some pretty good ones, too!

Action: CARF and ARRL recognized the problem and proposed a type of beginners' licence which would be good for one year (or more) to initiate the beginner a little more gradually. CARF requested your advice.

/Cont'd.....

LEAGUE SEEKING NEW ONTARIO SECTION EMERGENCY CO-ORDINATOR:

Ed Doyle, VE3EWD, of Tecunseh, assistant SCM and Section Emergency Co-ordinator for Ontario, recently asked to be relieved of his SEC appointment.

Ed has held the important ARRL post since June 1969 and SCM Holland Shepherd, VE3DV, credits him with having done an outstanding job in serving not only Ontario amateurs, but the public as well.

Shep is looking for the right man to replace him, but is willing to assume VE3EWD's duties temporarily, until that man is found. Ed has agreed to hang on himself until the completion of the 1972 simulated emergency test if a suitable replacement hasn't been found by that time.

What are the duties of an SEC? Here's what the League says:

"The SEC is, in effect, 'assistant SCM for AREC organization...His duties include...encouragement of amateurs to establish a local emergency organization; making recommendations on section emergency corps planning...promotion of AREC membership drives...meetings, activities, tests, procedures' and so on.

He also maintains contacts with other communications services and keeps up liaison at section level with all agencies served in the public interest, particularly in connection with emergency measures and Red Cross functions. The SEC post is one of top importance in the section, and its holder should devote all possible energy and effort to this one important organization program for amateur radio. Only one SEC is appointed for each section in the ARRL field organization.

SHEP INVITES NOMINATIONS:

"Here is the chance for someone to make a real contribution, not only to amateur radio, but to Ontario in particular, by taking on the task of running our emergency communications program.

"I am not so naive as to think I will be immediately deluged with applications,...but I am confident that among our 1,450 ARRL members in Ontario we can find the right man for the job.

"In the meantime, THIS IS IMPORTANT AND IT IS RIGHT NOW!"

Shep invites further inquiries and/or nominations. His address is 3016 Cowan Crescent, Ottawa, K1V 8L1

(Shep's term as Ontario SCM ends next May 11. He has indicated, in a bulletin to Ontario League appointees, that he is willing to accept another 2-year term, if duly nominated and supported by a petition bearing the names of five full members of the ARRL. Shep is 60 years old and says he has been a staunch CW man since he was 16. "I find it nearly impossible to become a strong advocate of some of the more exotic phases of amateur radio that have arrived on the scene in the last few years...yet, if this is where the interest lies in Ontario, then it is time someone was nominated as SCM to fill this need," he writes. "I think the field activities sponsored by the League are the most important thing in amateur radio today," he believes "and an active SCM is one of the best guarantees that they will remain." He urges League appointees to "get on with the job and see that it is done right."

OARC ACTION: (Taken from the December Minutes) "If the decision was in favor of a technician class licence, or if this class of licence was instituted by the DOC, the club would like to have an input as to the conditions of licensing. The vote in favor of the VE2NM amendment was: 47 for; 8 against; 45 abstentions."

Unless I'm mistaken, any regulation put out by the DOC is binding on amateurs in Canada. What makes you think you will be asked for an opinion a second time?

There was once a bird that didn't use its wings. It was called a DODO. It is extinct.

ANY similarity between it and OARC members is purely coincidental

'73,

Steve

(Steve Chisholm)

VE4AI, VE3ATU, VE2ZM

371 Harcourt St., Winnipeg R3J 3H6

SONNY, ED AND GEORGE TOPS ON 2-METRE NET:

Nick, VE3FFW, who convenes the Capital City Net each Monday evening at 20:00 hours local time via the club repeater, VE2CRA, 146.460 Mhz in and 146.940 out, has compiled statistics on net attendance for the 26 weeks ending Dec 6, 1971.

Top Six to check into the Net were:

<u>PLACE</u>	<u>NO. OF CHECK-INS</u>	<u>CALL</u>
1st	23	VE3GX, VE3BTS, VE3EQH
2nd	16	VE3ARJ
3rd	15	VE3DIH, VE3FXG
4th	14	VE3BYO
5th	13	VE2NM, VE3DTC, VE3GNW
6th	11	VE3BR, VE3CPY

There was a 5-way tie for 7th place among VE3YQ; VE3AZY; VE3CEZ; VE3DHB and VE3GDW, with 10 check-ins each.

Average attendance on the net was 18. Largest check-in list totalled 32 calls; while the smallest net had only seven.

Longest time for a single net was 57 minutes; the shortest, six minutes.

Average net time was 21 minutes. Many thanks to VE2NM, VE3DHB, VE3DTC, VE3BTS, VE3ARJ, VE3BYO for filling in at appropriate times.

--NICK
VE3FFW

F O R B E G I N N E R S

THE PHONETIC ALPHABET:

By
Cliff Moffett
VE3FZX

When voice operation is used on the air, the similarity of many speech sounds can easily lead to errors in copying.

To overcome this problem and ensure accuracy, a 'phonetic alphabet' is generally used.

One of the first phonetic alphabets used was the Western Union alphabet (Adams, Boston, Chicago, Denver and so on).

A popular one developed by the military during World War 2 was the JAN (Joint Army-Navy) alphabet: "Abel, Baker, Charlie, David" etc.

Perfect voice communications is nowhere more important than when used in flying operations. The International Civil Aviation Organization (ICAO) developed another phonetic alphabet that has an important advantage over others: It contains words that can be understood in any language. And the most important reason for using a phonetic alphabet is to make one's self understood. This can best be accomplished if all amateurs would learn and use the ICAO phonetic system:

A--ALFA	H--HOTEL	O--OSCAR	U--UNIFORM
B--BRAVO	I--INDIA	P--PAPA	V--VICTOR
C--CHARLIE	J--JULIETT	Q--QUEBEC	W--WHISKEY
D--DELTA	K--KILO	R--ROMEO	X--X-RAY
E--ECHO	L--LIMA	S--SIERRA	Y--YANKEE
F--FOXTROT	M--MIKE	T--TANGO	Z--ZULU
G--GOLF	N--NOVEMBER		

----Cliff

Victor-Echo-Thu-ree-Foxtrot-Zulu-X-Ray

SWAP NET OFFERS SELLING, BUYING AND 'SWAP' LISTINGS:

We Goofed when we said VE3GX presented his swap net on Sundays. Sorry about that, Ed. Actually, the popular selling-buying-swapping information service run by Ed and Doreen (VE3CGO) is heard on Saturdays ONLY, on 3760 Khz, SSB, as part of the Ottawa Valley Mobile Radio Club's 'Pothole' Net. It is repeated on the Capital City Net, via the OARC's VE2CRA repeater (146.460 Mhz in; 146.940 out, for the newcomer to local VHF activity) each Monday evening at 20:00 hours local time. The Pothole Net, by the way, is on the air at 10:00 hours local time Saturdays. To list an item wanted; for sale or 'swap,' simply call VE3GX or VE3CGO on 3760 Khz (SSB) or via VE2CRA. Or, if you're not on the air yet (and you don't have to be a licensed amateur to take advantage of the service) phone Ed or Doreen Morgan at 733-1721. Items are normally listed for a period of one month, unless otherwise cancelled or reinstated. This service to local amateur radio is, of course, free. But please remember to let Ed and Doreen know if you sell or obtain the item listed.

DIGITAL LOGIC

By
Colin Rowe,
VE3AZY

PART #3

MULTIVIBRATORS:

When two inverting gates are coupled back-to-back, we form a multivibrator. The method of their interconnection determines whether the device has zero, one, or two stable states. (We saw last month that an R-S flip flop is a bistable multivibrator.) Multivibrators find uses as oscillators, pulse shapers, time delays, latches and frequency multipliers. Since the R-S flip flop was discussed last month, this month we will devote our discussion to monostable and astable multivibrators.

The Monostable --

We saw that the R-S flip-flop could be set and held in either of two stable states. If we were to force the bistable back to one preferred state, it would form what is known as a monostable vibrator.

One such method of achieving this end is to provide controlled positive feedback by the charging and discharging of a capacitor.

Consider two inverters, coupled back-to-back, with an R-C timing circuit, as shown in Fig. 3-1:

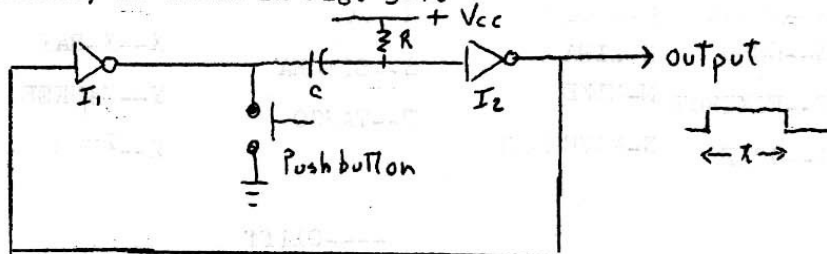


Fig. 3-1 Monostable multivibrator

Suppose the circuit above is undisturbed for a long period of time (compared to the RC time constant). Capacitor 'C' is then charged, supplying base current to inverter I₂, causing its output to be held at ground—hence the output of I₁ is high. When the push-button is closed the input to I₂ is forced to ground, since the capacitor discharges and the current following through R is predominantly that needed to start charging capacitor 'C.' At this time, the output of I₂ is high and hence the output of I₁ is low, holding one end of capacitor 'C' near ground potential. As the capacitor voltage reaches a high enough level to cause the inverter to turn on, the output of I₂ goes to ground. At this point, the output of I₁ goes high, reverting the circuit to its original condition. (The output is a pulse---of duration that is governed by the R-C time constant. An electronic method of triggering this circuit

(rather than a mechanical pushbutton) can be developed by changing I to a 2-input NOR gate, depicted in Fig. 3-2. The "on time" of such a monostable is: $T_{on} = 0.8 RC$.

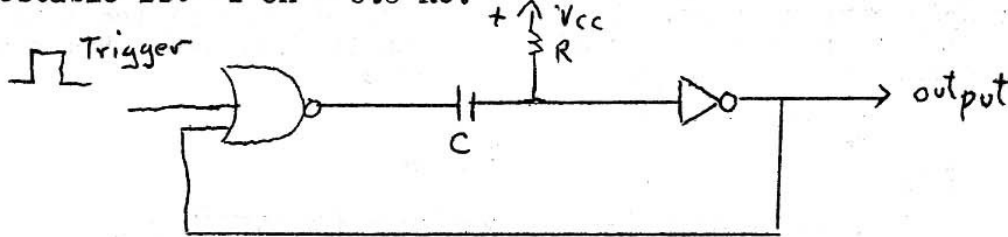


Fig. 3-2 Electronic triggering of a monostable

Where: T_{on} is in milliseconds
 R is in Kilohms
 C is in microfarads

The monostable finds uses in time interval generators, time delay circuits, pulsegenerators and many other timing applications.

THE ASTABLE:

Suppose we again consider two inverters connected back-to-back. This time we employ an R-C timing circuit between both inverters. Then both states will be unstable and we form an astable multivibrator as show below in Fig. 3-3:

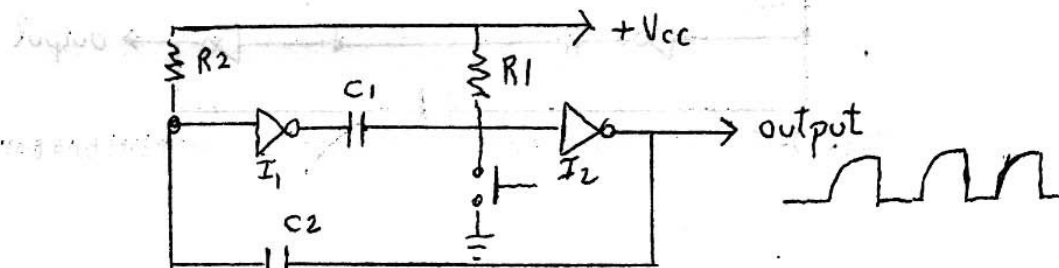


Fig. 3-3 Astable multivibrator

By momentarily closing the pushbutton, the output of I_2 swings positive and capacitor C_2 charges via resistor R_2 . The output of I_1 is grounded and C_1 starts to charge via R_1 . At a certain point, the output of I_2 switches to ground (as its input goes above +0.6volts). The input to I_1 then must swing negative, turning off I_1 . Since C_2 starts charging via R_2 , it cannot hold I_1 off forever. However, while I_1 is off, capacitor C_1 starts charging via the I_1 internal load resistor. When the output to I_1 exceeds +0.6 volts, its output switches to ground. The charge on C_2 cannot change instantaneously and inverter I_2 is turned off by the input swinging negative. This process continues to repeat, at a frequency controlled by the RC time constants. If $R=R_1=R_2$ and $C=C_1=C_2$, then the period of the astable is given by $T = 1.4 RC$, where T is in milliseconds; R is in Kilohms and C is in microfarads. The corresponding in Khz is:

$$f = \frac{1}{1.4 RC} \quad (\text{For } R \text{ and } C \text{ in the same units.})$$

ASSYMETRY AND FREQUENCY OF THE ASTABLE:

It was mentioned previously that the period of the astable is

given by $T = 1.4RC$. A more accurate description is: $T = .7(R_1C_1 \text{ plus } R_2C_2)$. The time an inverter stays on is determined by either the R_1C_1 or R_2C_2 combinations. A simple method of varying the time for which one inverter stays on or off is shown in fig. 3-4. But note this does not change the frequency of the astable:

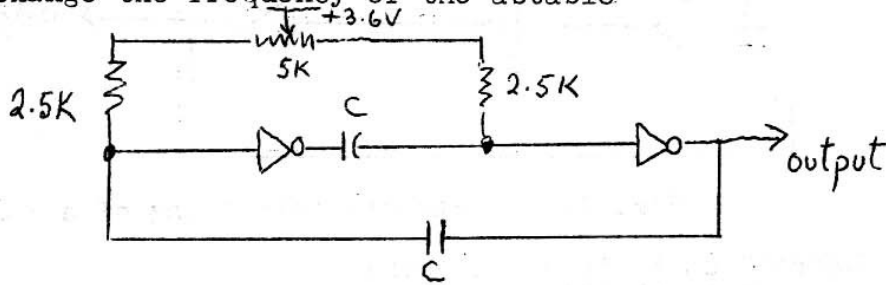


Fig. 3-4: Assymetry adjustment for astable multivibrator

The terminology used for the ratio of on to off time (or duty cycle) is the assymetry of the waveform. With the circuit shown, the assymetry can be adjusted from 3:1, through 1:1 to 1:3. The frequency of the astable can be varied by including a dual potentiometer, as shown in fig. 3-5

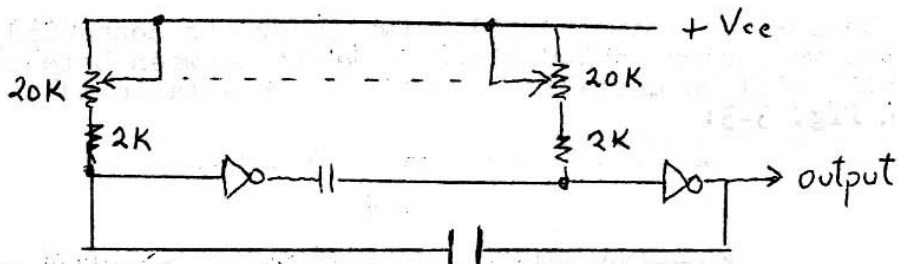


Fig. 3-5: Variable frequency astable multivibrator

STALLING:

It is possible to stall the multivibrator if the unisolated output becomes shorted for a while. This results because there is little change on either feedback capacitor. A simple trick to avoid this problem is to add two diodes, providing a source of charging current for the timing resistors, as shown below in Fig. 3-6:

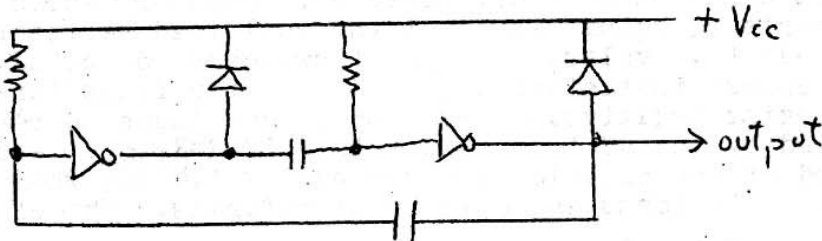


Fig. 3-6: Astable multivibrator with 'anti-stall' diodes

Next month I'll discuss other types of flip-flops (The type D and J-K) and decimal counters.

---VE3AZY

ALL SOLID STATE TRANSMIT-RECEIVE SWITCH

By

VE3FUA

(This T/R switch was designed by Dick Bonnycastle for the 2-metre FM transceiver described by Dick in last month's GROUNDWAVE)

--Ed

This type of T/R switch is very attractive for a low power transmitter, since it requires far less power than an ordinary relay.

The complete circuit is shown in the diagram. The circuit on the left switches the +9 volts line between receive and transmit and the one on the right isolates the receiver from the antenna, when the transmitter is turned on. The DC switching is done by transistors Q₁ and Q₂, which are driven hard enough to ensure they saturate.

When the push-to-talk switch is open, enough current flows through R₃ and R₄ to turn Q₃ on hard, but R₂ is small enough that Q₂ can't turn on. The current through R₅ and Q₃ turns Q₁ on and +9 volts appears at the +9 VRX terminal. When the PTT switch is closed, Q₂ has enough base current to turn on, and Q₃ and Q₁ shut off, since no current can now flow in R₄. Now +9 volts appears at the +9VTX position. +9VRX drops to zero. Resistor R₆ was required with this circuit to help hold the +9VTX rail down...On receive, since diodes D₃ and D₄ in the T/R switch put current into the transmit rail on receive.

The RF part of the T/R switch is operated by the +9VTX and RX rails, as follows:

On receive, diodes D₃ and D₄ are biased on and the signal from the antenna flows through to the receiver. D₁ and D₂ are open circuits, with less than 700 millivolts applied and therefore keep the signal from being lost in the transmitter. When the transmitter is turned on, Diodes D₃ and reverse, biased by 9 volts, so the transmitter RF forces D₁ and D₂ to conduct and then goes to the antenna. Any transmitter signal getting to the receiver is held to less than 700 Mv by diodes D₅ and D₆. If the transmitter signal exceeds +9 volts peak, D₃ and D₄ start to conduct slightly and charge up C₄ and C₅ to increase the reverse bias on the diodes and maintain the isolation. The filter circuit prevents transmitter harmonics generated by the diodes from reaching the antenna. Any filter that provides more than 20db suppression at the 2nd harmonic would be sufficient. For different voltage and current levels, the design details are as follows. Supply voltage is V volts; Transmitter current is IT amps; receiver current is IR amps.

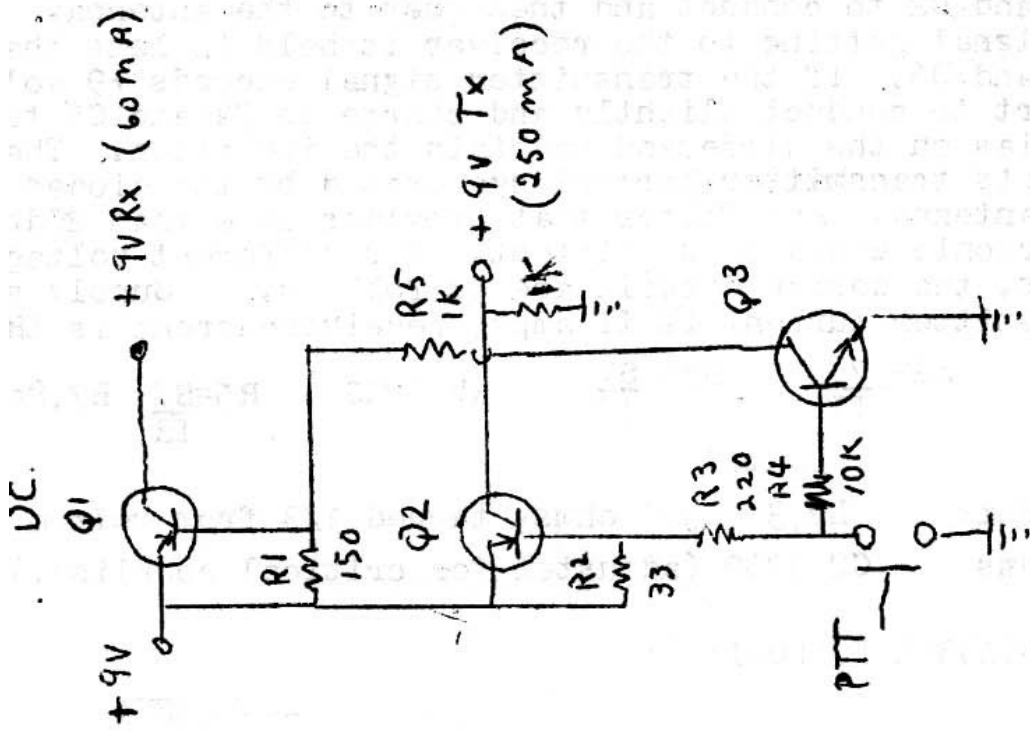
$$R1 = \frac{7}{IR} \quad R2 = \frac{7}{IT} \quad R3 = \frac{SV}{IT} \quad R4 = 10RS \quad R5 = \frac{SV}{IR} \quad R7,8 = 200V$$

(ohms)

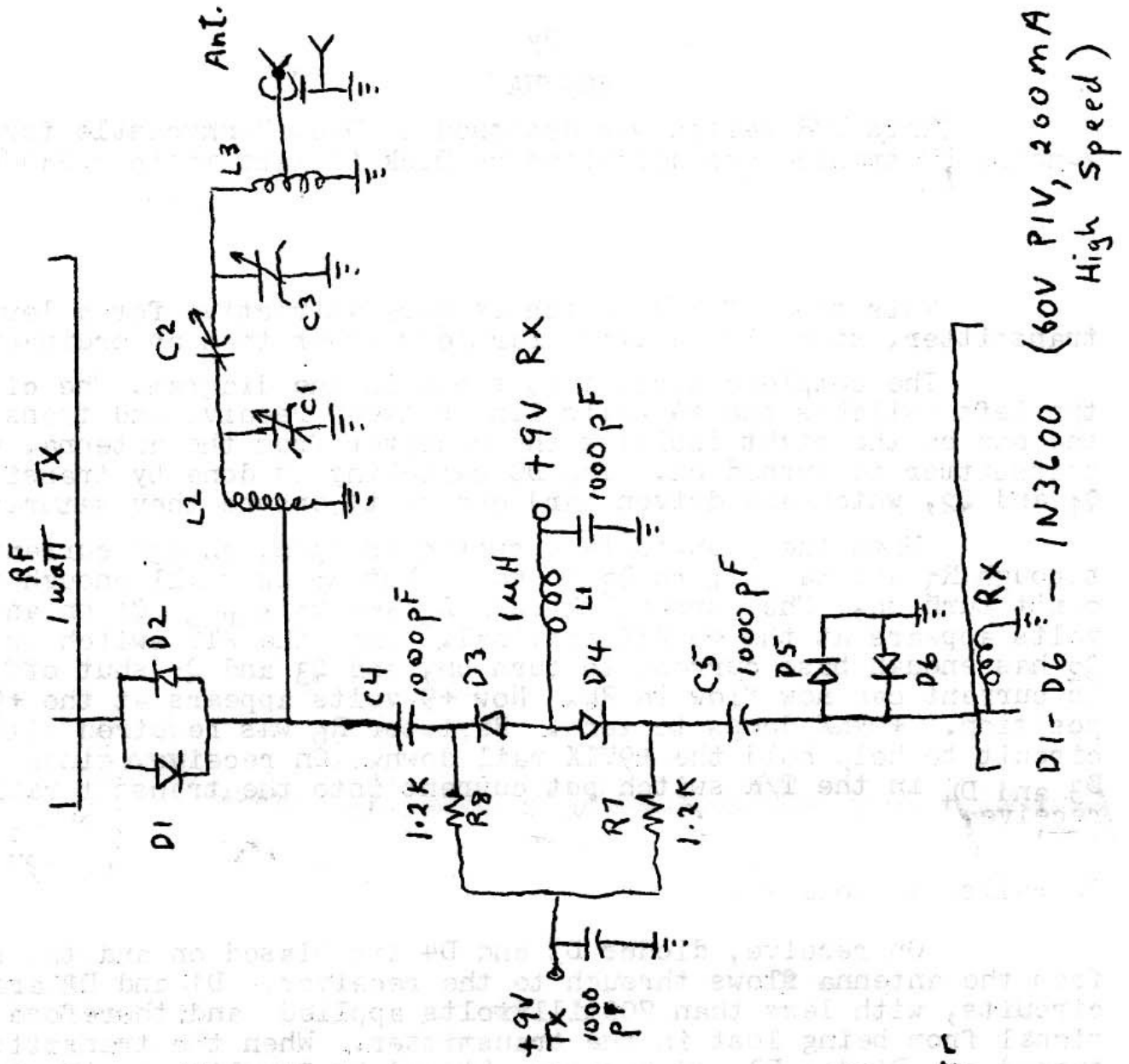
L1, /j500 ohms L2,3 j50 ohms, tapped 1/3 from bottom
C1,2 -j50 ohms C2 j200 (adjusted for critical coupling.)

(SEE DIAGRAM FOLLOWING)

---VE3FUA

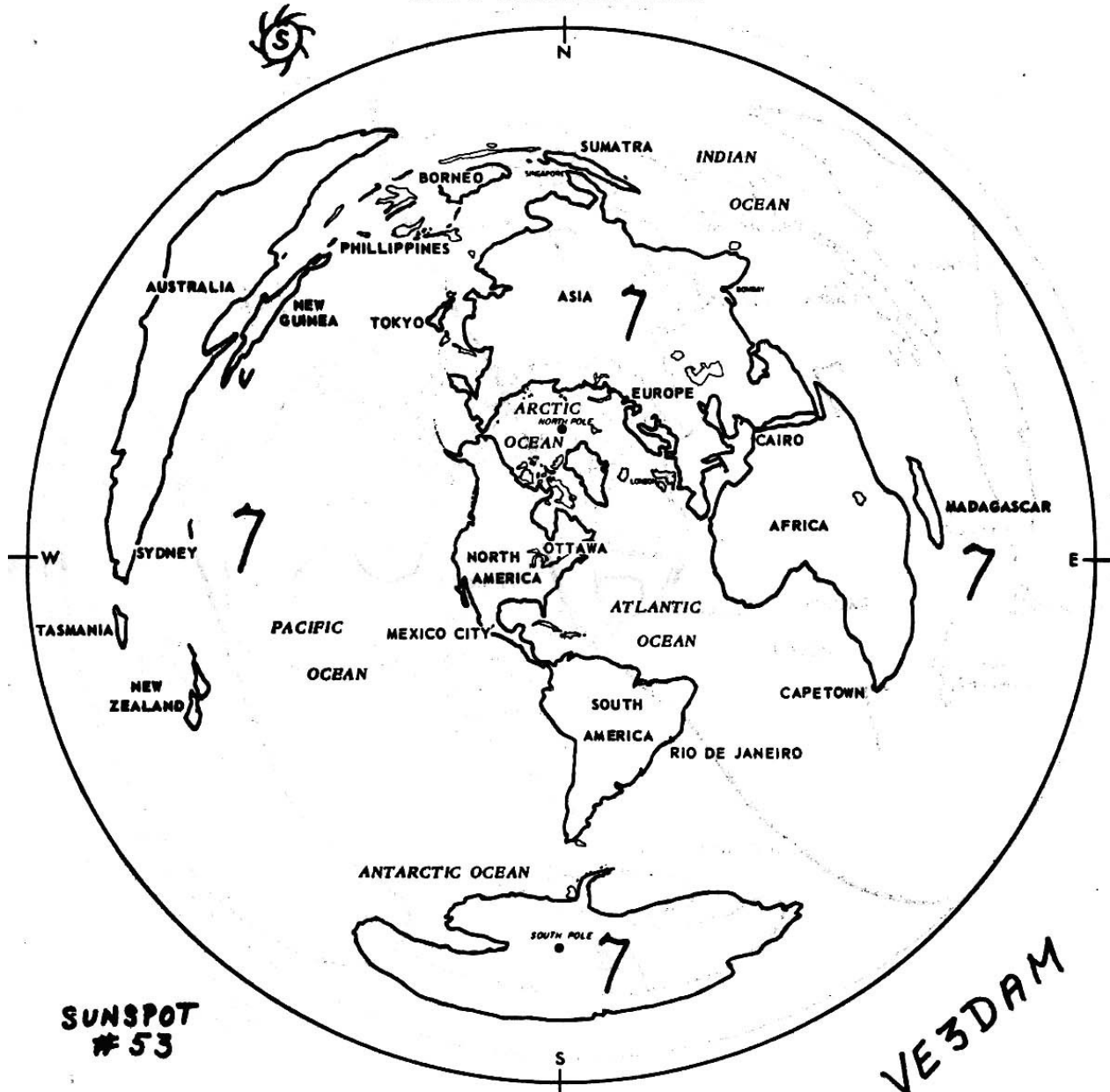


- Q1 - Any PNP Silicon Power
- Q2 - Any PNP Silicon Power
- Q3 - Any NPN Silicon



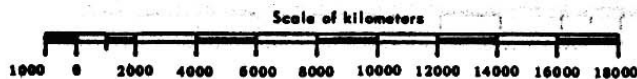
0600 GMT-JAN. 1972

AZIMUTHAL EQUIDISTANT PROJECTION OF THE WORLD
(POLE OF PROJECTION AT OTTAWA)



SUNSPOT
53

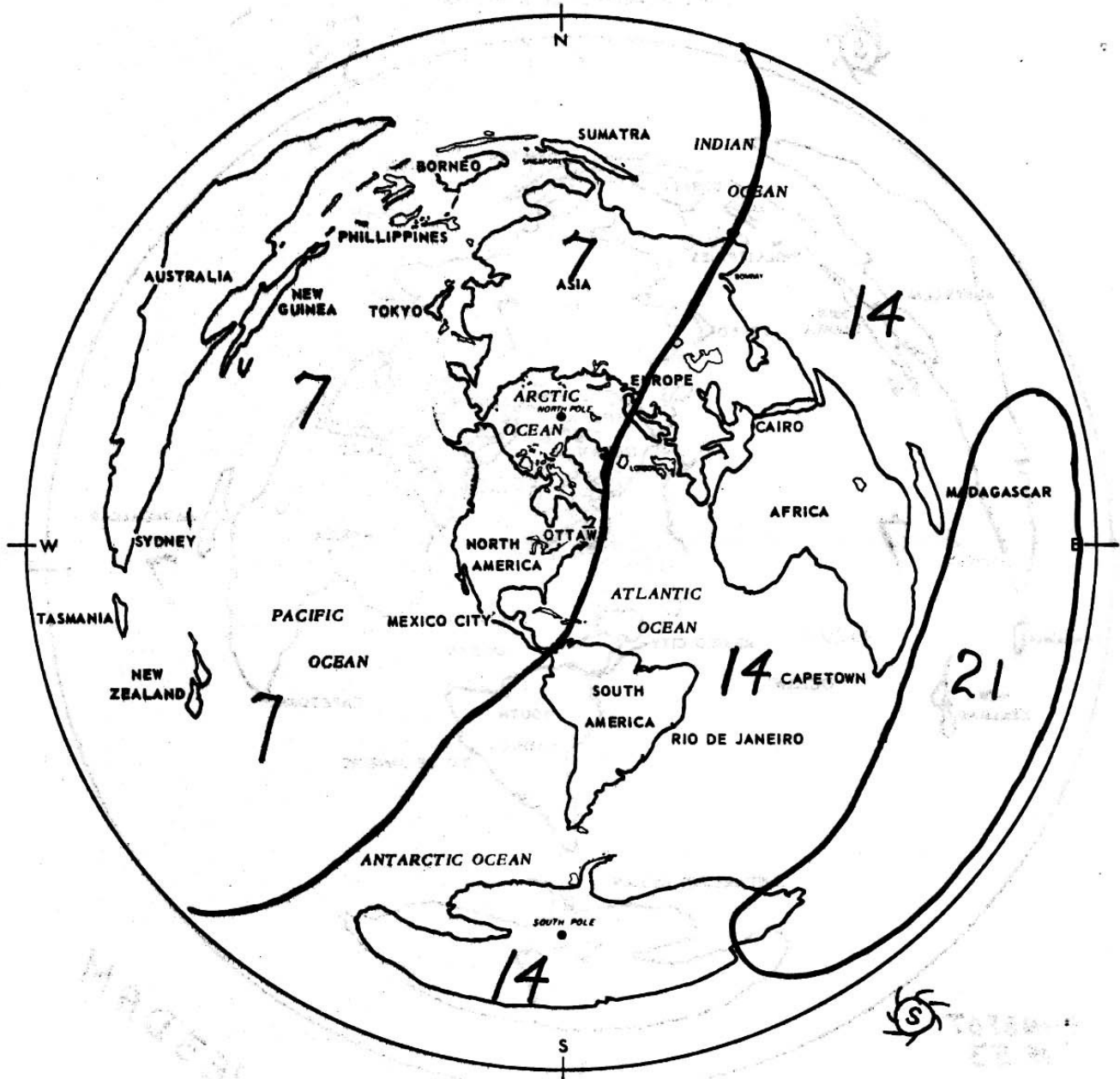
VE3DAM



0100 EST

1200 GMT - JAN. 1972

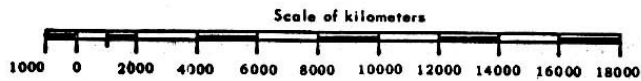
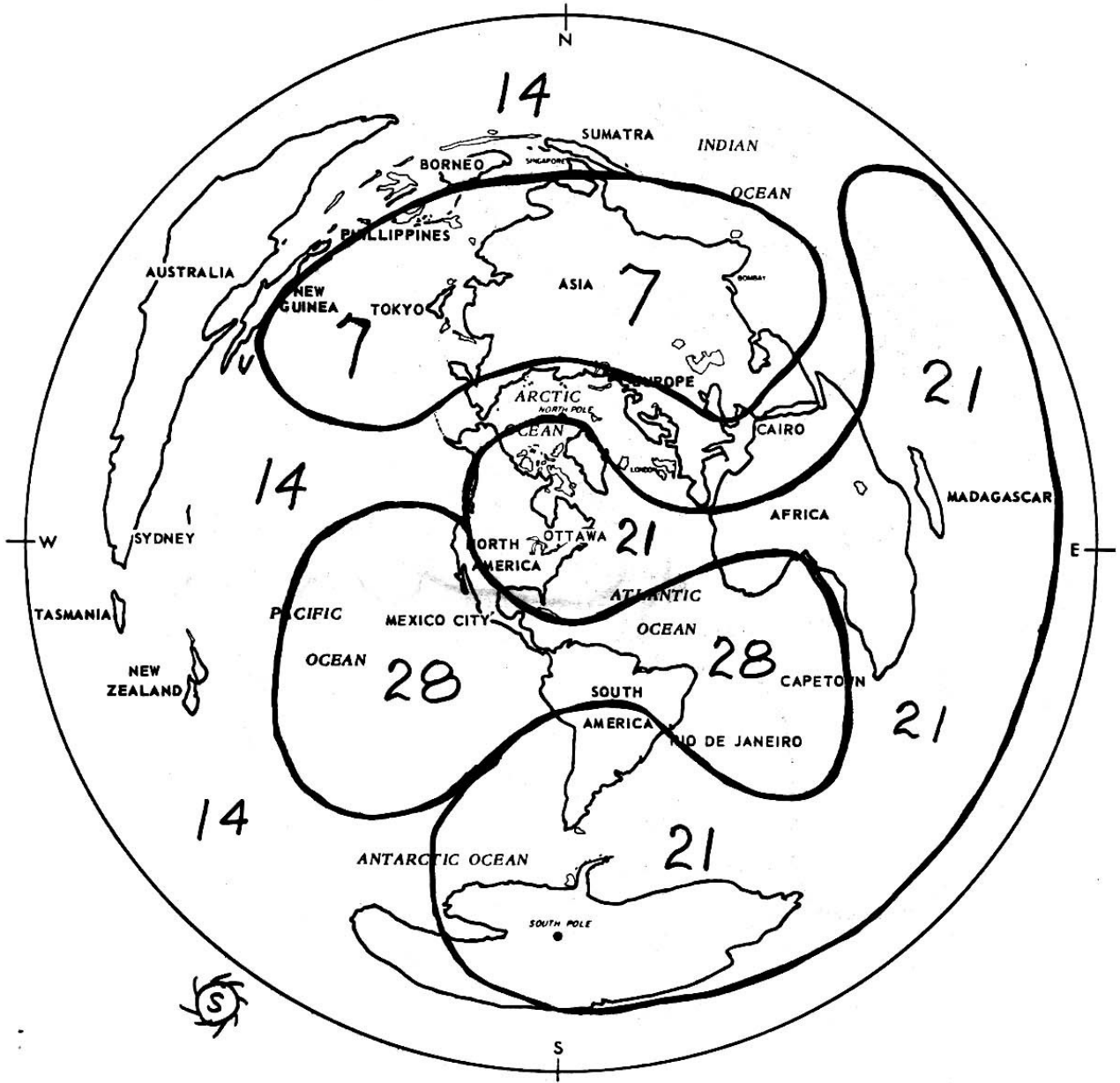
AZIMUTHAL EQUIDISTANT PROJECTION OF THE WORLD
(POLE OF PROJECTION AT OTTAWA)



0700 EST

1800 GMT - JAN. 1972

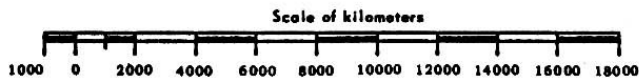
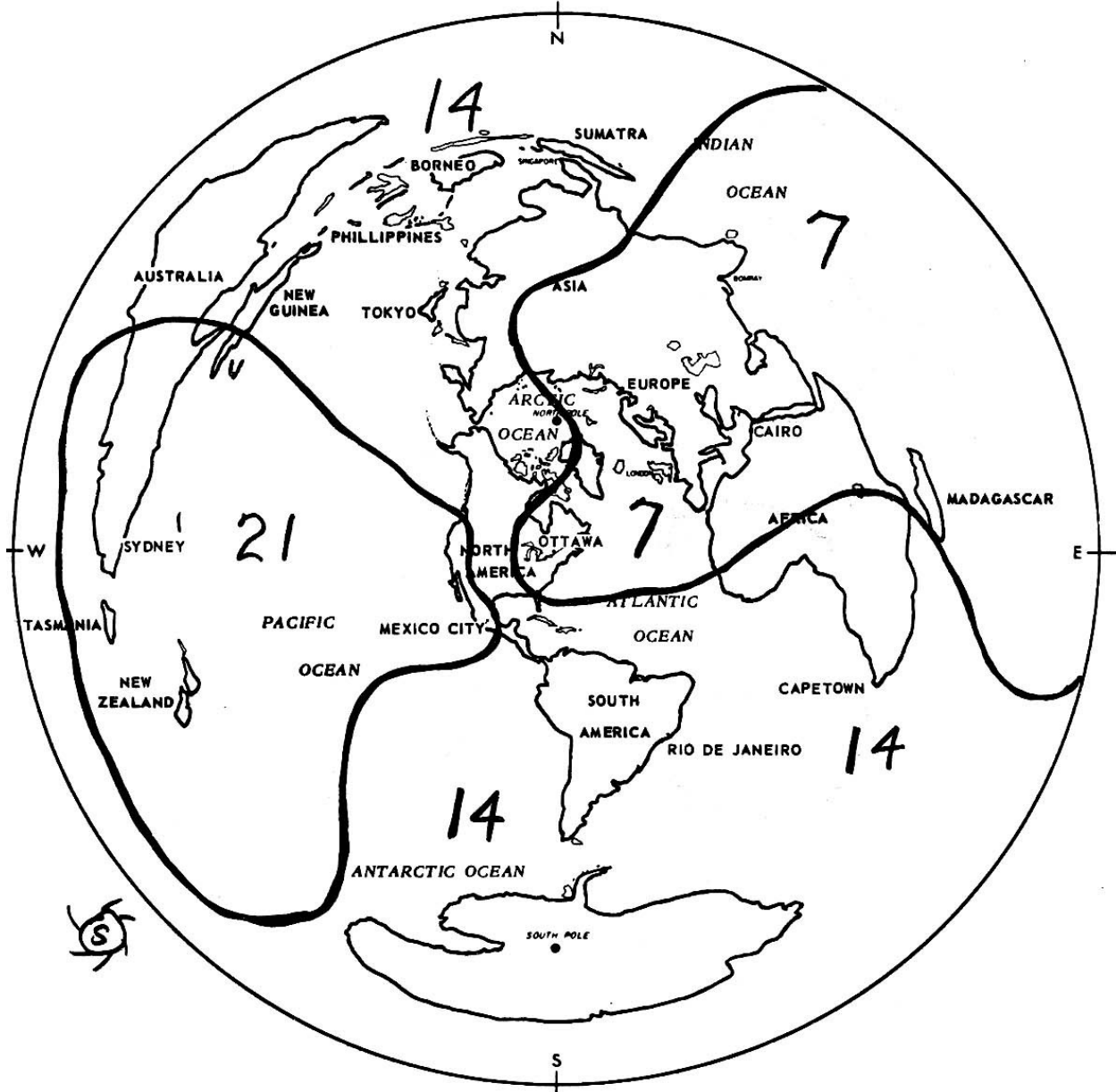
AZIMUTHAL EQUIDISTANT PROJECTION OF THE WORLD
(POLE OF PROJECTION AT OTTAWA)



1300 EST

0000GMT-JAN-1972

AZIMUTHAL EQUIDISTANT PROJECTION OF THE WORLD
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1900 EST

HEATHKIT IM- 102 DIGITAL MULTIMETER.....
LABORATORY PRECISION AT HALF THE COST OF COMPARABLE WIRED
DMMs.

- . 3½ digits for 100 uV resolution on 200 mV range, 1V on 1000V
- . 10 voltage ranges (5AC, 5 DC)
- . 10 current ranges (5AC, 5 DC)
- . 6 resistance ranges to 20 megohm
- . Furnished, assembled DC calibrator permits 0.2% accuracy DCV (can be lab calibrated to 0.1%)

80 MHz FREQUENCY COUNTER

ANOTHER HEATH FIRST IN LOW
COST, HIGH QUALITY LAB.
INSTRUMENTATION

- . Stable , accurate counting from 10 Hz to over 80 MHz
- . New light- emitting diode (LED) readout.
- . Advanced solid -state design- 26 integrated circuits, 5 thick- film resistor packs, 11 transistors
- . New Texas instruments 74S series superspeed Schottky TTL logic
- . 5 digit, high visibility LED readout with kHz/MHz ranges and overrange gives 8-digit capability
- . Computer- type storage circuitry eliminates counting-up and blinking readout
- . Crystal- controlled master clock escillator for exceptional accuracy
- . High input impedance
- . Compact design
- . Complete with versatile gimbal mounting bracket
- . Rigidly quality controlled
- . Factory assembled and tested
- . A research quality counter for a fraction of the cost of comparable instruments

Assembled SM- 105 A
from
HEATH
SCHLUMBERGER
MISSISSAUGA, Ontario.

FOR THE NEXT GENERATION OF ENGINEERS

A NEW HEATHKIT ELECTRONIC WORKSHOP SERIES

CHOOSE ONE OF THE THREE

NEW HEATHKIT LEARN- BY- DOING WORKSHOP

- . Hours and hours of fun
- . Educational
- . Easy to assemble and disassemble
- . Modular bread board design
- . Teaches basic electronic theory and design
- . Safe battery operation--- Plug-in connections

NO SOLDERING REQUIRED

- . OVER 200 PARTS IN EVERY KIT

MODEL JK- 1033	36	- Experimental Workshop	39.95
MODEL JK- 1022	25	- Experimental Workshop	31.50
MODEL JK- 1011	12	- Experimental Workshop	24.50

A LOW COST HIGH. QUALITY WATTMETER

The new HM- 102 measures RF power output from 10- 200 W and 100- 2000 W in two switched ranges. Built- in calibrator permits 10% accuracy 1.8 to 30 Mhz. Negligible loss permits permanent insertion in any 50 ohm line. Exclusive remote detector allows placement of the meter in any location. The built- in SWR Function has a minimum sensitivity of less than 10 watts.

HEATH

SCHLUMBERGER

Mississauga Ontario.

SPECIAL NOTICE

Members of the OARC who teach or study at the University of Ottawa are asked to phone Pedro (CX6BBK / VR3) about the possibility of establishing an Amateur Radio club on campus. Please call Pedro at the following numbers

Home 225- 2077
Office 231- 2937

⁷³
signed
Pedro