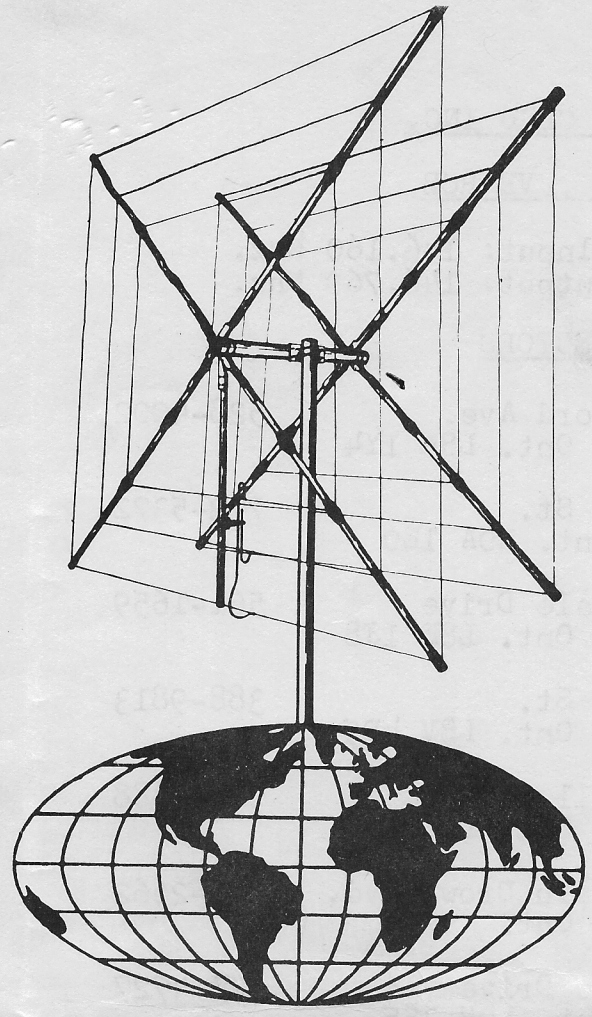


THE HAMILTON AMATEUR

HAMILTON AMATEUR RADIO CLUB INC.
P.O. BOX 253
HAMILTON, ONTARIO
L8N 3T8

Gerry Goldberg VE3HLI
17 Cottrill
Hamilton, Ont. L8S 3L5

THE HAMILTON AMATEUR RADIO CLUB INC.

Club Station ..... VE3DC .. VE3RCB

2 Meter Repeater .. VE3DRW ..... Input: 146.160 Mhz.
Output: 146.760 Mhz.

1978 OFFICERS AND DIRECTORS

PRESIDENT	STAN BOLIBRUCH VE3GFE	8 Rutherford Ave. Hamilton, Ont. L8M 1Y4	528-4002
PAST PRESIDENT	JOHN DYKSTRA VE3BOY	14 Talbot St. Cayuga, Ont. N0A 1E0	772-5372
VICE-PRESIDENT	PETER GOODSON VE3DOU	28 Riverdale Drive Hamilton, Ont. L8E 1J8	561-1659
SECRETARY	NORM FREIDIN VE3CZI	42 Lester St. Hamilton, Ont. L8V 4P5	388-9813
TREASURER	GERRY GOLDBERG VE3HLI	17 Cottrill St. Hamilton, Ont. L8S 3L5	528-7688
EDITOR	VIC FORDE VE3HPD	614 Mountain Brow Blvd. Hamilton, Ont.	385-2662
PUBLISHER	JOHN DOUGLAS VE3EYC	26 Skyline Drive Dundas, Ont. L9H 3S5	627-4727

COMMITTEE CHAIRMEN

Club Station Licensee	(VE3DC)	VE3BKM	Vern Huckle	388-6989
Red Cross Stn. Licensee	(VE3RCB)	VE3FHQ	Glenn A. Gibson	385-2786
Repeater Licensee	(VE3DRW)	VE3CFM	Bob Miller	529-2950
Health and Welfare		VE3EJD	Gino DiGennaro	692-3341
Membership		VE3EKY	Bernie Granby	527-7175
Public Service		VE3FHQ	Glenn A. Gibson	385-2786
Technical		VE3DVV	John VanDenBerg	692-3802
Refreshments		VE3ARX	Bill McCaslin	634-5190
Refreshments		VE3AHB	Irwin Merritt	634-3197
CARF Representative		VE3GCP	Fred Robinson	388-1976

Membership Year ..... January 1st to the following December 31st each year.

Membership Fees ..... $10.00 per year (all classifications).

PLEASE ADDRESS ALL CORRESPONDENCE TO:

THE SECRETARY
HAMILTON AMATEUR RADIO CLUB INC.
P.O. BOX 253
HAMILTON, ONTARIO. L8N 3C8

NEXT MEETING

Date	Wednesday, March 15, 1978
Time	8:00 P.M.
Place	Chedoke
Subject	How The Satellite Sees The Weather From Above.
Speaker	Ken Smith, VE3HWB

PRESIDENT'S MESSAGE

In spite of factory built equipment, some hams still find some time to experiment. The Club would like to thank and congratulate Max VE3DNM for the fine job he did on fabricating a solid state pre-amp, tuning it up and is now occupying a fine spot ahead of VE3DRW's receiver. Max, a job well done.

I would like to also thank Irwin Merret VE3AHB for finding the time to give the club R.F. Sniffer a face lifting. People enjoy keeping themselves neat and up to date, why not radio equipment.

Our Repeater Fund is constantly being added to, especially by the generous donations by Jim Thomas VE3FBU and the many others who are using VE3DRW and want to assist us by their donations.

There is a man in Burlington, who is asking for the assistance of all Radio Amateurs in the obtaining of wheelchairs for the handicapped. Dick Jordon VE3GKJ is still, co-ordinating the drive of collecting grocery receipt tapes from shoppers at Dominion Stores. If any of you shop at this store, could you please keep the receipt tapes and give them to me at the upcoming meetings, and I will pass them on to Dick in his constant effort to purchase wheelchairs for the handicapped, which are placed at shopping malls in the area.

The Ontario Hamfest is approaching and any leads for Door Prizes would be appreciated. Any club member who could possibly ask their employer for the donation of a prize, please give it to me, or the lead and I shall pass it on to the Prize Chairman for the Hamfest. Let's all help the Burlington Club make another super event at the Ontario Hamfest.

Don't forget the upcoming Burlington A.R.C. Annual Club Auction on March 28, 1978 (Tuesday) at 7:30 P.M. at the Central Arena. Admission is 50¢ with free draw tickets. Table space is $1.00.

On Tuesday, May 16, 1978, Fred Robinson VE3GCP will be giving a talk on Amateur Radio, during an Amateur Radio Demonstration being set up at Terry Berry Library. Assistance would be appreciated in the form of equipment and manpower. More details in the April Bulletin.

On October 13, 14, 15, 1978, the London A.R.C. Club will be sponsoring the 1978 RSO Convention in their fair city. Remember that if you contact VE3LON/3, the official station, you will receive a nice QSL card along with becoming eligible to receive a $1.00 discount from the registration.

The call prefix "VB3" is not a new country, it is the special prefix allotted to the CNIB in commemoration of their Diamond Jubilee. White Caners are permitted to use this prefix at their discretion.

Ross Huffman VE3AWB is temporarily residing at the Henderson General Hospital, Ward 171. Visitors would be appreciated.

A comment was heard recently that many of the students that are enrolled in the Amateur Radio Classes, in the city, have NEVER seen an Amateur Radio Station in operation, oddly as it may seem. Therefore, we would like to obtain names of those people who would like a small group of these students to visit your "shack" and see Amateur Radio in action. Don't feel bad if you don't have a Collins "S" Line to show off, as a good cross section of different station equipment should be seen to appreciate the basic beginner up to the veteran amateur with the specialized SSTV and RTTY equipment. If you would like to participate in this programme, please contact Norm VE3CZI or myself giving us your name and phone number on a piece of paper, and you shall be contacted in the near future.

Our Social Convener, Ron VE3IUV, is busy lining up a nice evening out with Dinner and Dance for our First (in a long time) Annual Club Social. It is estimated at a cost of $7.50 per person and is scheduled for Aprill 22, 1978. A small form was put into the February issue of the Bulletin, and it is suggested that the MYL fill it out and have it returned to the Club Meeting (or an executive member) along with $3.00 in order for Ron and his committee to have some idea of how many people to expect. Look at the calendar, doesn't that fall the weekend before the Dayton Hamvention!!!!! Let's go guys, get those forms in.

Again I must bring up the subject of money, and club membership dues are again in the fore. Club membership fees are $10.00 per year, which includes this fine Bulletin you are now reading, along with the many activities that your executive have planned for the upcoming months. I'm sure you will all feel that it is money well spent. However, there are a few of those who have commented that the increase is a bit much on their limited incomes as they are either Pensioners or still attending school. Your executive has ruled on a plan such that anyone who feels that they fall into the above areas, and would care to sit down and write the executive a letter, stating why they should obtain reduced rates, a club membership fee of $5.00 will be available.

See you at the meeting.

73's

Stan VE3GFE
President.

A.R.E.S. NEWS (AMATEUR RADIO EMERGENCY SERVICE)

The S.E.T. (Simulated Emergency Test) was started at 12 noon, February 12, 1978 without any previous notice. Eight (8) mobiles responded and participated in the exercise simulating flood conditions in the area that is under The Hamilton Region Conservation Authority. This required checking on water levels at different locations, as requested and reporting back to base, which was set up on Mineral Springs Road at headquarters.

Hamilton repeater, 52, 49 simplex and 75 meters were used, for passing traffic.

Officials of The Authority were on hand to observe the exercise and help originate traffic to be handled regarding the simulated flood condition.

I wish to thank Vic Forde who arranged with the Authority for the exercise and Vic VE3HPD was assisted in setting up the exercise by VE3SG/M, VE3HTC/M, VE3ANW, VE3CZI/M and VE3IEI/M.

The following persons also assisted in the exercise: VE3JTX/M, VE3GFE, VE3GVG, VE3HLI and YL, VE3EYC/M, VE3DTQ, VE3EJD/M, VE3JUC, VE3ITO/M, VE3JUF, VE3ISK, VE3ISX/M and YL, VE3DHJ/M, VE3ALM/M, VE3CIB/M, VE3FMG/M and YL, VE3DSP, VE3DQU, VE3EYO, VE3ITA, VE3BOY, VE3JTM, VE3ITO, VE3AHK/M, VE3DOU, Larry Langs, David Langs, Wendy Forde, John Field and others.

The following persons are Assisstant Emergency Co-ordinators, for our Hamilton group. Please call me or one of the following persons if you become aware of an emergency situation.

VE3DSP	Glenn Simpson	385-8478
VE3ARX	Bill McCaslin	634-5190
VE3BOY	John Dykstra	772-5372
VE3GFE	Stan Bolibruch	528-4002
VE3CZI	Norm Freidin	388-9813
VE3HTC	Dave Rypma	689-6161
VE3SG	Stu Graves	561-8203
VE3HPD	Vic Forde	385-2662

We have again been requested to assist Amity on their good turn day, 9:00 A.M., Saturday, April 15, 1978. Four to seven mobiles requested.

73's

Glenn Gibson VE3FHQ

COUNTER PROJECT

At the writing of this note there is no further up date on the counters. Thirty (30) units are expected to be available for the March meeting.

To insure everyone knows what is on order, the following summary is given.

The counter will be kit form. The basic unit is rated good to 60 mhz. The display is made up of 7 segment LED's and provide 8 digit readout.

The input is high impedance (about 1 Meg.) and sensitivity should provide a reliable count with signals of 25 mV minimum input.

The time base is crystal controlled. The basic count is measured for a period of 1 second. Therefore up to 60 MHZ, the readout is in HZ. To permit faster reading a 1/10 second time base should be available. This will mean that the smallest digit represents 10 HZ steps.

For the VHF and UHF applications, a prescaler has been included. This will divide the input frequency by 10. The prescaler is 50 ohms input and operates with an input up to 600 MHZ.

For many transmitter applications, the counter will need only a short (15") antenna to pick up enough R.F. to measure your Rig (be it on 70 CM to 160 M).

Next month we will describe methods that can be used on received signals.

Technical Committee.

MEMBERSHIP CHAIRMAN'S REPORT FOR MARCH 1978

The Club has received to date 130 new and renewal memberships, leaving 93 from the 1977 roster to be heard from. Please check your bulletin cover for a red sticker. This red sticker indicates our records show your dues for 1978 have not been received. Bring any errors to my attention. I am pleased to see how well the membership renewals are progressing. I hope to report all memberships renewed by the April General Membership Meeting.

H.A.R.C. welcomes the following new members:

Orville Reid, VE3JTM
Gary Titley, VE3DBL
Allan Solomon, VE3JUN
Carl Okimi, S.W.L.

A special welcome back to Charter Member, Elton French, VE3VJ.

Complimentary copies of the bulletin have been sent to the following Hams:

S. Blake, VE3IRY
Clarence Barbour, VE3IUO
Dave Webb, VE3JUR
Vernon McCabe, VE3JUQ
Ronald Price, VE3JUS
Chris Fauquier, VE3JTL
Gord Fraser, VE3HSF.

OM's we would like to meet you. Please consider your complimentary bulletin as our invitation to be our guest at the March meeting or a subsequent meeting.

Belated congratulations to Don Brown, VE3IUX. We just noticed your call officially Don. When you get your advanced let us know first.

Welcome to the fone bands: John Parr, VE3ITC, Bill Runge, VE3ITD our newest advanced amateurs. Congratulations! What a relief eh? No more exams!!! Don't let your CW go though fellows. This brings me to the next item which is primarily about CW. What has happened to you SWL's since you got your call sign? I know you are operating CW. How about a column in the bulletin about operating CW mode? If I can get some input from the new Hams, I will start reporting this info. Maybe we could find a brass pounder who would like to do this. Write down something and give it to me at the meeting. Who have you contacted, what were condx, what equipment, who was your first or most interesting QSL, or anything else noteworthy? How's DX? What bands are you operating on? Any good rag chews? Is it raining in Tokyo? You know what I mean ..... any earth shattering news.

TNX AGN I ENJOYED THIS QSO

73's ES CUL

Bern.

LETTERS TO THE EDITOR

Dear Editor:

I am writing this letter with the hope that other women in the same situation as I will take note and that the membership will understand and offer assistance.

My husband got into ham radio after taking the course last year taught by Glen Simpson (DSP). Ever since he came home with his ticket, my interest in ham radio has grown. I have attended various events over the last year and found them all quite enjoyable.

As you no doubt understand, I too, would like to get my certificate. I have considered signing up for next year's class, but I'm concerned about there being nearly all men in the class. I believe that this is not a unique feeling for the wife of a ham.

Is there a ham who would be ready to take on a class of women "SWL's"? Are there other women interested in undertaking to learn the code and theory required for a certificate?

I hope that this idea can be discussed and hopefully other views presented in the bulletin. Thank you.

Sincerely,

Frances Porter
SWL

Dear Mr. Editor:

It was with great interest that I read in the Feb. issue of "The Hamilton Amateur" under the ARES Report regarding the fine job done by Bob Richert, VE3FCU.

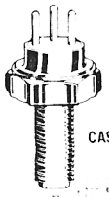
It is always nice to see our fellow Amateurs helping Mankind in various ways. However, it behooves me to understand WHY we are always telling EACH OTHER about our achievements, yet the local community probably passed their day without any idea of this activity in which Amateur Radio played a significant role.

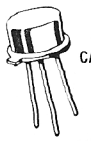
The advent of G.R.S. has indeed brought to the fore, a public awareness of Amateur Radio and G.R.S. Each deserve a place as to the services they render to their community. It is my feeling that this story of how Bob assisted those people from Alberta should have been made aware of, to the local news media since it would rate as a human interest story.

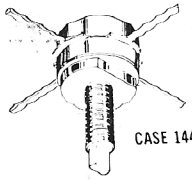
It is a shame that our club does not have anyone in a position who could take this type of information, along with any pertinent information of local Amateur Activities and pass them on to local or community news media. This person could also work with the Club President in setting up Public Demonstrations to show this fascinating hobby we all share.

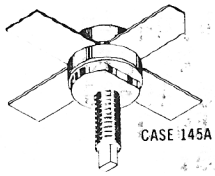
Yours truly,

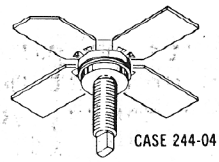
Norm Freidin
VE3CZI

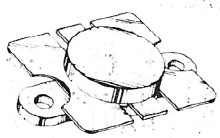












IN STOCK MOTOROLA RF TRANSISTORS *

	Pout	Gpe	Vcc	Package	TIP Price
30 MHz Types					
2N5070	25	13	28.0	TO-60	17.66
MRF450A	50	11	12.5	145A-07	19.90
MRF454A	80	12	12.5	145A-08	35.90
175 MHz Types					
2N5641	7	8.4	28.0	144B-04	6.27
2N5590	10	5.2	13.6	145A-07	8.06
MRF215	20	8.2	12.5	278-06	24.64
2N6082	25	6.2	12.5	145A-07	14.40
2N5591	25	4.4	13.6	145A-07	13.25
2N6083	30	5.7	12.5	145A-07	16.58
2N6084	40	4.5	12.5	145A-08	17.60
MRF216	40	6.7	12.5	278-06	32.64
MRF243	60	7.0	12.5	278-06	41.28
470 MHz Types					
2N3866	1	10	28.0	TO-39	1.40
2N5946	10	6	12.5	244-04	16.90
MRF644	25	6.2	12.5	278-06	22.08

* Please phone us for types not listed.

L. A. VARAH LTD.

505 Kenora Avenue, Hamilton, Ontario L8E 3P2
TELEPHONE (416) 561-9311 TELEX 061-8349

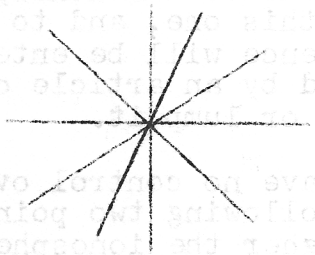
Everything I Know About Antennas
(But Was Afraid To Tell)
(Continued)

by

George Hrischenko VE3DGX

To further illustrate how unseen grounds can affect your antenna, consider the aforementioned 2 storey house with a roof size of 30X35 feet and aluminum foil insulation in the rafters of the same size. This would be an excellent ground on 2M; 10M; 15M and probably 20M (although the optimum on 20 would be 35X35 feet.) On 40M a 66X66 foot surface would be the ideal so a 30X35 foot surface would be $\frac{1}{2}X\frac{1}{2}$ or $\frac{1}{4}$ of the optimum and so would be operating at 25% of what it should be and the other 75% would be somewhere else. On 80M the optimum ground should be about 130X130 so the 30X35 would be approximately $\frac{1}{4}X\frac{1}{4}$ or 1/16 of what it should be or 6% to state it another way. The easy way out would be to design the ground, then, for the lowest frequency which will insure that it will get better as you go up in frequency, instead of designing for the highest frequency and then seeing it get worse as you go down in frequency.

The people who really worry about grounds are the broadcast people and their idea of a good ground is a system of wires radiating outwards from a central point like spokes of a wheel like shown here. They are not happy unless they have 120 wires a $\frac{1}{2}$ wavelength long (that's one every 3°). Figure that out for your favourite band!! Some ham authorities say you can get by with only 32 radial wires. An excellent article in March QST has some interesting charts, (fig. 2 on page 14) shows that if you are prepared to accept slightly higher losses, you could even get by with as little as 16. The article is a very good one and you should read it 6 or 7 times as I did in order to appreciate it. That's March QST 1973, page 13.



In any case, to improve their grounds even further, the BC boys also like to put the radials on or in marshy ground, or over salt water flats or best of all in polluted Lake Ontario (joke). So what does all this effort get you?

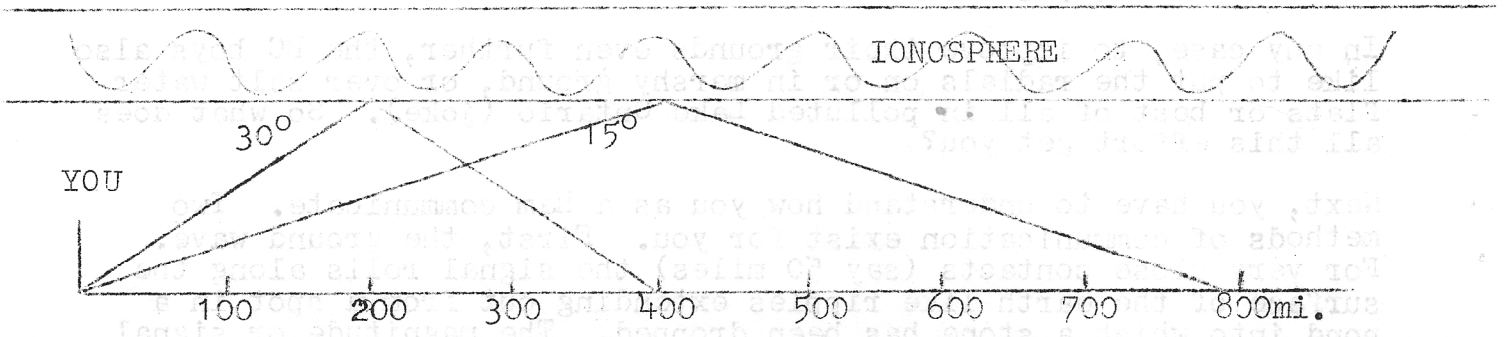
Next, you have to understand how you as a Ham communicate. Two methods of communication exist for you. First, the ground wave. For very close contacts (say 50 miles) the signal rolls along the surface of the earth like ripples extending out from a spot in a pond into which a stone has been dropped. The magnitude or signal strength gets smaller the further from the point of where the energy

was applied, (the stone in one case, your antenna in the other) since the wave front is spreading over an ever increasing circle, and is "thinning" itself out. If you work it all out mathematically, you will see that the wavefront or circumference of a 4 ft (or 4 mile) circle is equal to $C=TTr^2$ or 3.14 x 2x2 = 12.3 ft. (or miles) and the circumference of an 8 ft. (or mile) circle is 3.14 x 4x4 = 49.2 ft. (or miles) which means the energy is spread over 4 times the area and must be $\frac{1}{4}$ as strong. When the circle expands over 3 times the distance the energy is spread 1/9 as "thin" and when the circle is expanded to 4 times the energy is 1/16th etc. etc.

So you can see the energy diminishes with the square of the distance. Besides this (to get back to our rock in the pond) the friction and surface tension of the water itself will absorb some of the energy so it is further reduced by these losses. In the same way, the radio waves passing over the earth's surface which is an imperfect conductor will absorb some of the radio wave energy. The way to solve this problem is to extend your ground system out as far as possible, say a couple of hundred miles. If you can't afford to do this then move next to some low-loss parts of the world like next to an ocean. Ships at sea have just about the lowest loss surface and communicate incredible distances due to low ground losses. However, very few DX contacts are made via ground wave.

Most Hams communicate via skip. Generally we "bounce" our signals off the ionosphere and they come back to earth some distance away. The behaviour of the ionosphere in itself requires an article the length of this one, and to squelch criticism of this article, no correspondence will be entered into or published with anyone unless accompanied by an article on the ionosphere the same length as this one. Like or lump it.

Since we have no control over the ionosphere it will suffice to make the following two points:
1. The higher the ionosphere the further the skip will land.
2. The lower the angle of radiation the further the skip will land.



Note that two angles of radiation are shown above 15° and 30° the first skip for the 15° angle comes back to earth at about the 800 mile point and for the 30° at about the 380 mile point. Naturally (not shown) if your signal goes straight up it will come back straight down. If you wish to work DX you would be wise to get the angle of radiation fairly low, possibly at 12° - 10°. The reason for this is as follows: say your angle of radiation was such that the first skip returns to earth at 1000 miles, the 2nd would be 2000 miles, the 3rd 3000 miles, etc. To go halfway around the world (12000 mi.) would require 12 skips. If you got the angle down so the first skip was 1200 miles it would only require 10 skips to go 12000 miles. Now if each skip meant a loss of 10 dB in signal strength, 12 skips would mean a path loss of 120 dB but 10 would mean a path loss of 100 dB. Since most S meters go up one S unit for every 6 dB, a signal 20 dB stronger means over 3 S units better! It does not matter where you are on the S meter 20 dB stronger means a better signal. Now dont forget some of your competition may be 1 to 2000 miles closer to that DX station and some guys are at the fading dege of the skip and some guys are in the middle and some guys are on the leading edge of the skip. But if you are in a pileup with the locals (100 mile radius) the higher antenna will always beat out the lower antenna. To put it another way the higher your antenna, the lower the angle of radiation and we will demonstrate this shortly.

Just for now you will have to take it for granted that up to a height equal to one wavelength (at the operating frequency) the angle of radiation from a horizontal antenna is dictated by the height of the antenna above the electrical ground. Since on 20M most beam antennas are mounted 35-40 ft. or about a ½ wavelength up to 70-80 ft. or about a full wavelength this is the most significant factor controlling the angle of radiation. The angle of radiation for a horizontal antenna at about a ½ wave above the electrical ground is near 28° and the radiation angle for the same antenna at 75 ft. (or a full wave) is about 13°.

However other factors can affect your signal strength. Generally on a 4 or 5 hop skip the most power out of the antenna will be the loudest signal. After 8 or 9 skips the antennas with radiation angles between 15-10° will be the strongest. To use the original examples 100 dB loss against 120 dB loss means that the 1st signal will be 20 dB stronger in far DX countries. Even if the 2nd ham adds a linear he will only pick up 10 DB more or cut his loss to 110 dB. The 1st guy could run a simple rotatable dipole and the 2nd guy a 3 element beam and the 1st guy would still be 5 dB better, or 1 S unit. Naturally this difference would disappear at skip point 9 and skip point 11. This would be a good point for you to brush up on your geography and check to see what the angle of radiation is foryour 20M antenna; or more to the point where your first skip lands. Get a map of the North American continent and draw concentric rings out from your QTH in 1000 mile radii.

Keep a record of the nearbypeople you contact along with the signal report. Your first return to earth will be the strongest and if you find that the nearest cities you contact average 500 miles you can bet that this is your first return. If your first skip averages about 700 miles you are run-of-the mill, but if your first skip return is over 1000 miles you can stop reading right now. Be careful to avoid confusing the first and second skips. If you work anyone at the 500 to 600 mile point that means you have quite a hefty high angle lobe.

TO BE CONTINUED NEXT MONTH

Speaking of DX!!!

Starting next month in this spot, all the latest info on DX! What is happening, where to find it, DXpeditions, QSL info on the rare ones. Also some hints for the beginners.

73

Steve VE3HBX
&
Dan VE3HLC

IC OF THE MONTH 7447-FND507

General

The IC this month is a 7 segment display driver. The IC is a 7447 and require a display with COMMON ANODES. To aid in testing this IC, a 7 segment display has been included. It is a type FND 507.

As the display will be used to test the IC, the display must be checked out first.

Display

The FND 507 is a 7 segment, L.E.D. type display. The schematic is shown in Figure I. The pin layout as seen from the front of the IC is shown in Figure 2.

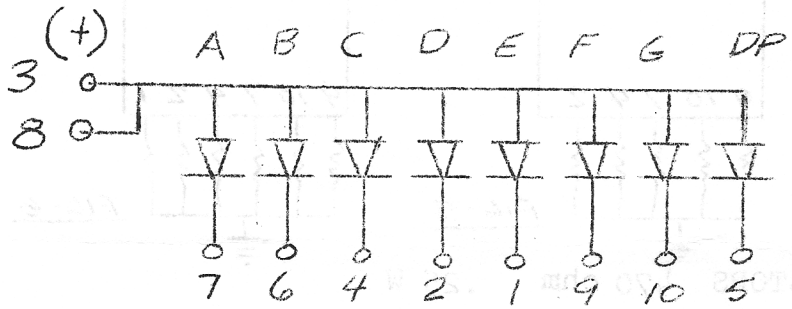


FIG-1

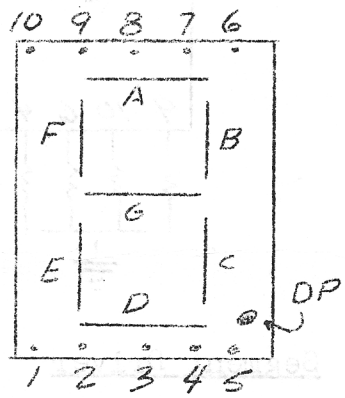


FIG-2

Testing The Display

Connect a 470 ohm resistor from either pin 3 or 8.
Connect the supply as shown in Figure 3.

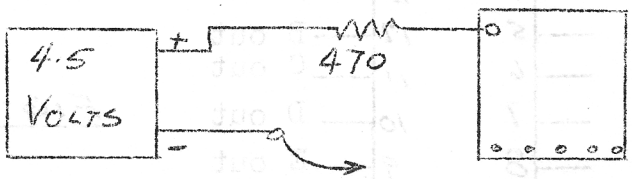


FIG-3

Touch the negative terminal to each of the following pins (one at a time): 7, 6, 4, 2, 1, 9, 10 and 5.
Each corresponding segment should have lit up.

Comment on the Display

The resistor is to limit the current. When using only one diode at a time, the resistor may be in either lead. Because the Anodes are COMMON (tied together), you will find that if you hook up several diodes at once, the brightness of the individual segment interact.

If you change Figure 3 so that the resistor is in the cathode lead, you will need one resistor for each cathode. Now you can operate several diodes at one time.

Make the diagram of Figure 4, 5 and 6 to see what the display shows.

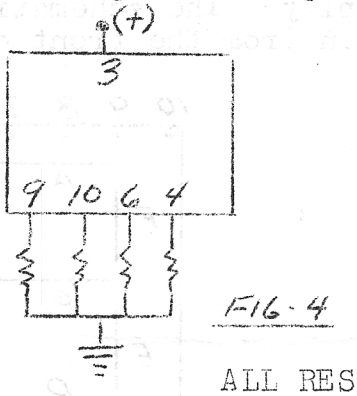


FIG-4

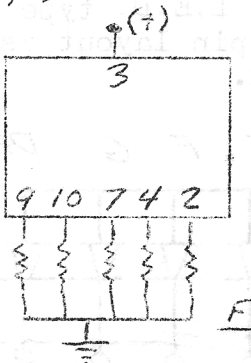


FIG-5

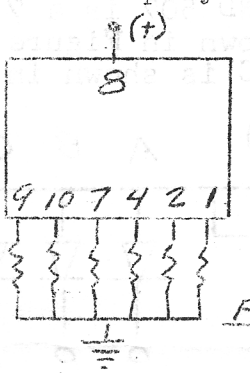


FIG-6

ALL RESISTORS 470 ohm .25 W

Segment Driver

The 7447 is intended to be a BCD to 7 segment driver. Therefore it only correctly displays values from 0 to 9. Figure 7 gives the pin layout.

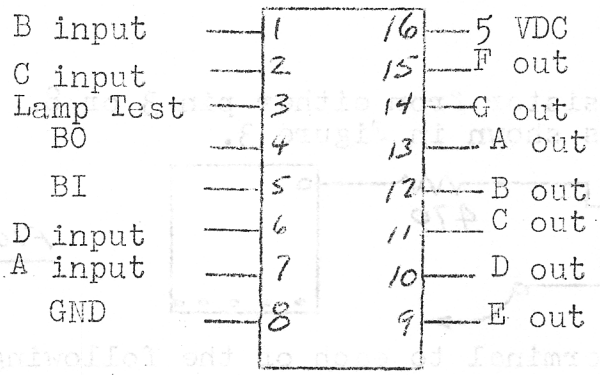


FIG-7

Each output is on open collector circuit (like the collector of an NPN transistor). Each collector of a 7447 can drive up to 12 MA Each collector of a 7447A can drive up to 40 MA. BO and BI are special purpose and can be used to blank the display if the output is a 0.

7447 Test

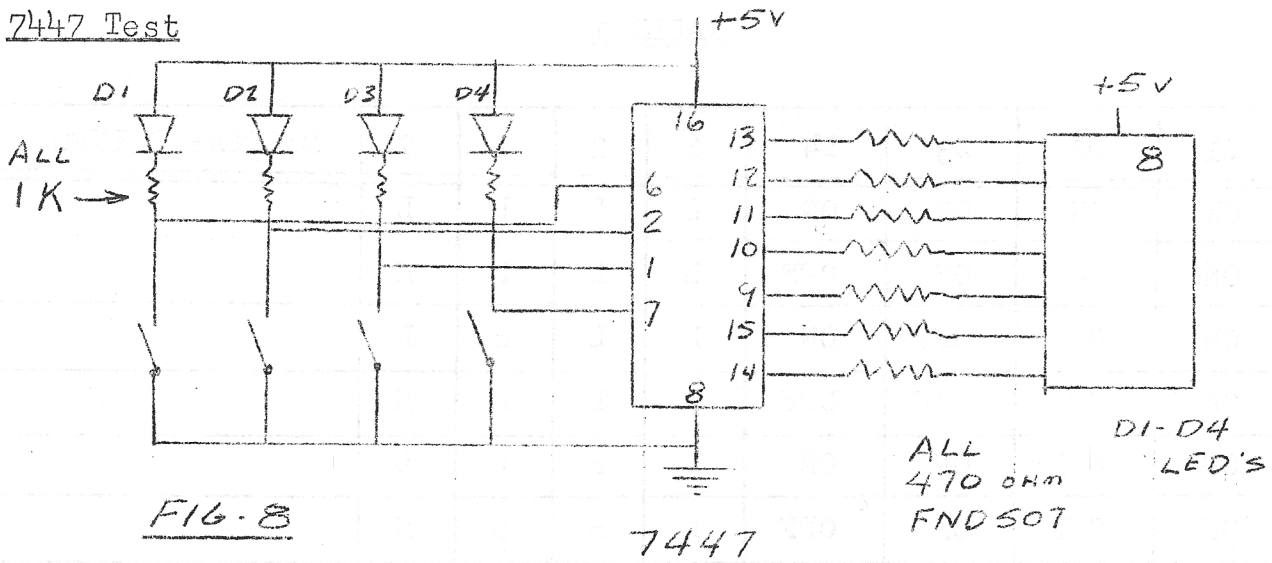


FIG. 8

Temporarily DISCONNECT pins 1, 2, 6 and 7 of the 7447.

Apply power (4.5 or 5 volts).

Gnd. pin 3 of the 7447. All segments should light (except the decimal point).

Remove the gnd from pin 3, all segments should go off.

Reconnect all leads shown above.

Close all switches. D1 through D4 should be ON. The display should show 0.

D1 through D4 indicate if an input is LOW. THEREFORE fill out Table 1 below by actual test.

(Notice that if the input is not 0 through 9, the display will be a special character.)

TABLE 1

D1	D2	D3	D4	6	2	1	7	DISPLAYED INFO
ON	ON	ON	ON	L	L	L	L	
ON	ON	ON	OFF	L	L	L	H	
ON	ON	OFF	ON	L	L	H	L	
ON	ON	OFF	OFF	L	L	H	H	
ON	OFF	ON	ON	L	H	L	L	
ON	OFF	ON	OFF	L	H	L	H	
	OFF	OFF	ON	L	H	H	L	
	OFF	OFF	OFF	L	H	H	H	
OFF	ON	ON	ON	H	L	L	L	
OFF	ON	ON	OFF	H	L	L	H	

More to come next month.

The following material should be in the 1978 Kit of parts:

Quantity	Part
1	7413
1	7486
1	74155
1	7496
1	7493
1	7447
1	FND 507
5	LED.

1978 VE3DRW Repeater Watch

MARCH

(1&2 Hour Watches)

MARCH		0600	0700	0800	1000	1200	1400	1600	1800	2000	2200
WED	1	GVG	ISX	CFM	JUF				ITA	GKJ	ALM
THUR	2	GVG	ISX	JTX	EC				SP	IEI	JUN
FRI	3	GVG	ISX	JK	BK				ITA	JUC	DTQ
SAT	4	GVG	GVG	EYC	JTM	BKM	DHJ	APK	FEZ	HZA	EJD
SUN	5	GVG	GVG	DQU	HTC	JTQ	DPB	DOU	CJW	CZI	DKD
MON	6	GVG	ISX	CKH	EGT				ITA	JUN	DNB
TUE	7	GVG	ISX	APQ	DNM				TO	JTX	AVE
WED	8	GVG	ISX	CFM	EGT				ITA	DZP	ALM
THU	9	GVG	ISX	JTX	GKJ				JUF	IEI	JUR
FRI	10	GVG	ISX	JK	EGT				ITA	HCL	DTQ
SAT	11	GVG	GVG	EYC	JTM	BKM	DHJ	APK	FEZ	HZA	EJD
SUN	12	GVG	GVG	DQU	HTC	JTQ	DPB	DOU	CJW	CZI	DKD
MON	13	GVG	ISX	CKH	JUC				ITA	JUN	DNB
TUE	14	GVG	ISX	JTX	EXR				JUO	SG	AVE
WED	15	GVG	ISX	CFM	JUC				ITA	DZP	ALM
THU	16	GVG	ISX	APQ	JUF				DNM	IEI	JUR
FRI	17	GVG	ISX	JK	JUC				ITA	HCL	DTQ
SAT	18	GVG	GVG	EYC	JTM	BKM	DHJ	APK	FEZ	HZA	EJD
SUN	19	GVG	GVG	DQU	HTC	JTQ	DPB	DOU	CJW	CZI	DKD
MON	20	GVG	ISX	CKH	EGT				ITA	IM	DNB
TUE	21	GVG	ISX	IUE	APQ				TO	SG	AVE
WED	22	GVG	ISX	CFM	EGT				ITA	DZP	ALM
THU	23	GVG	ISX	APQ	APQ				JUF	IEI	JUR
FRI	24	GVG	ISX	JK	EGT				ITA	IM	DTQ
SAT	25	GVG	GVG	EYC	JTJ	BKM	DHJ	APK	FEZ	HZA	EJD
SUN	26	GVG	GVG	DQU	HTC	JTQ	DPB	DOU	CJW	CZI	DKD
MON	27	GVG	ISX	CKH	DNM				ITA	SP	HPD
TUE	28	GVG	ISX	IM	EXR				TO	SG	AVE
WED	29	GVG	ISX	APQ	JUF				ITA	DZP	ALM
THU	30	GVG	ISX	CFM	IUE				ISY	IEI	JUR
FRI	31	GVG	ISX	JK	APQ				ITA	JUO	DTQ

NOTE: VE3APQ, VE3IBK, VE3FBZ to share the 6 hour watch between 0000 & 0600.

The following stations are backups:

HWB	FYQ	EBF
BK	HBX	IUD
ISK	ISH	HPD
BOY	FLZ	ANW
FEZ	EC	

2-31-1974 RAY HUNTER 290.00

The DRAKE TR-33C

Amateur VHF FM Transceiver

$289.00 +$4.00 shipping

- **Hand Held Convenience, 12 Channel Capability**
- **SCPC** *(Single Crystal Per Channel)* **Frequency Control**
- **Lower Receiver Battery Drain**
- **Expanded Portable Antenna Choice**

• 12 Channels—only one crystal per channel provides simplex OR repeater operation on ANY channel. 2 channels supplied. 5 transmit offset positions, 3 supplied. • All FET front-end crystal filter for superb receiver intermod rejection. • Small convenient microphone included. • New lower power drain circuit on squelched receive. • Nicad rechargeable batteries supplied. • Built-in battery charger. • Ac and dc power cords supplied. • Telescoping screw-on antenna supplied, rubber helix optional. • Channel indicator light when using external dc supply. • Carry strap supplied. • Meter Indicates receive strength, xmit output, or battery voltage. • External speaker jack on rear panel. • Auxiliary jack on rear panel—may be used for tone-pad connections, etc. • Traditional R.L. Drake service backup.

DRAKE TR-33C SPECIFICATIONS

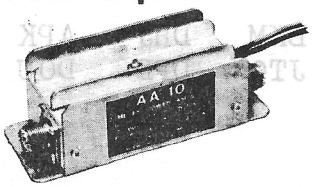
GENERAL: • **Frequency Coverage:** 146-148 MHz, 12 channels (2 supplied: 146.52 and 146.94). Crystal determines receive frequency. • Transmit frequency offset for repeater operation determined by 5-position switch: Simplex, +600 kHz, and −600 kHz supplied; any two additional offsets available with accessory crystals. • **Power requirements:** 13.0 volts dc ± 15% external supply OR internal battery supply. • **Current Drain (Batteries):** Squelched receive: 30 mA; transmit: 400 mA. External supply: above plus 45 mA for channel switch indicator lamp. • **Antenna:** 50 ohm external antenna through SO-239 connector OR screw-on telescoping whip antenna supplied, may be replaced with rubber helix antenna. • **Dimensions:** 5.5″ x 2.8″ x 8.5″ (13.8 x 5.8 x 21.6 cm). • **Weight:** 4.4 lbs (2 kg).

RECEIVER: • **Sensitivity:** less than .5 μV for 20 dB noise quieting. • **Selectivity:** + 30 kHz adjacent channel rejection greater than 75 dB. • **Modulation acceptance:** at least ± 7 kHz. • **Inter modulation Rejection:** 70 dB referenced to sensitity level. • **First i-f:** 10.7 MHz with monolithic crystal filter. • **Second i-f:** 455 kHz with ceramic filter. • **Audio Output:** nominal 1 watt at less than 10% distortion into 8 ohm built-in speaker or external speaker.

TRANSMITTER: • **Rf Output Power:** 1.5 watts minimum with 13.0 volts dc supply. • **Frequency Deviation:** Direct frequency modulation adjustable to at least ± 7 kHz deviation, factory set at ± 5 kHz • Separate microphone gain and deviation adjustments • Drake 1525EM Push Button Encoding Mike can be used direct with no modification.

DRAKE TR-33C ACCESSORIES

Drake AA-10 Power Amplifier



10 dB power increase greatly adds to the transmitting distance covered by any 2-meter fm transceiver running up to 1.8 watts output

Small size: 2″H x 2.1″W x 5.5″D (51 x 52 x 140 mm)

Drake AC-10 Power Supply

Powers the AA-10, TR-22C, TR-33C and TR-72. Simultaneously can charge the TR-22C/33C nicads. Supplies 13.8 volts up to 3 amps from 120 V-ac 60 Hz input. • **Accessory Crystals.** • **Model No. 1333 Drake MMK-33 Mobile Mount.**

- **Model AA-10 Power Amplifier** .....
- **Model AC-10 Power Supply** .....
- **Accessory Crystals** .....
- **Model MMK-33 Mobile Mount** .....
- **Model 7079 Vinyl Carrying Case** .....

Drake 1525EM Push Button Encoding Mike

- Microphone and auto-patch encoder in single convenient package with coil cord and connector. Fully wired and ready for use.
- High accuracy IC tone generator, no frequency adjustments.
- High reliability Digitran® keyboard.
- Power for tone encoder obtained from transceiver through microphone cable. No battery required. Low current drain.
- Low output impedance allows use with almost all transceivers.
- Four pin microphone plug: directly connects to Drake TR-33C without any modification in transceiver. Compatible with all previous Drake and other 2 meter units with minor modifications.

$63.00 +$1.50 shipping

Drake 1525EM, microphone with tone encoder –
Drake 7073DM without tone encoder —

230

DO DROP IN TO OUR MODERN SHOWROOM!!

R. L. DRAKE COMPANY DRAKE

HOURS--6:30 PM TO 11:00 PM--ALL DAY SATURDAYS!!

W S I SALES COMPANY
SWL RADIOS - HAM RADIOS - ACCESSORIES
18 SHELDON AVENUE NORTH
KITCHENER, ONTARIO N2H 3M2
Telephone (519) 579-0536

A SWISS QUAD FOR 2 METERS

By Bob VE3ANW

Mechanically, the arrangements are easy to duplicate; electrically, some frustrations were encountered, however by matching each antenna separately first, the physical size of the squares could be easily established. This was done by soldering an electrical half-wave length of RG-58 cable to each feed point (25 inches long), and by using an SWR bridge, the length of the gamma match wires were adjusted so as to attain a 1:1 match. This was done with each antenna individually before connecting two in parallel.

Several different feed systems were experimented with, using various lengths before settling on the one presented. Note that the feed is slightly different from that described in the Popular Science article, i.e., that only the top side of each loop is fed.

Using the dimensions shown, the SWR was just under 2:1 with the SWR bridge inserted at the coaxial "T". On the air tests indicate that the antenna does not seem to suffer from any minor lobes that so often accompany stacked beams. Using low power (2 watts) surprising results have been obtained.

Good luck building yours and hope you have as much fun as I did.

Exerpt from Popular Electronics

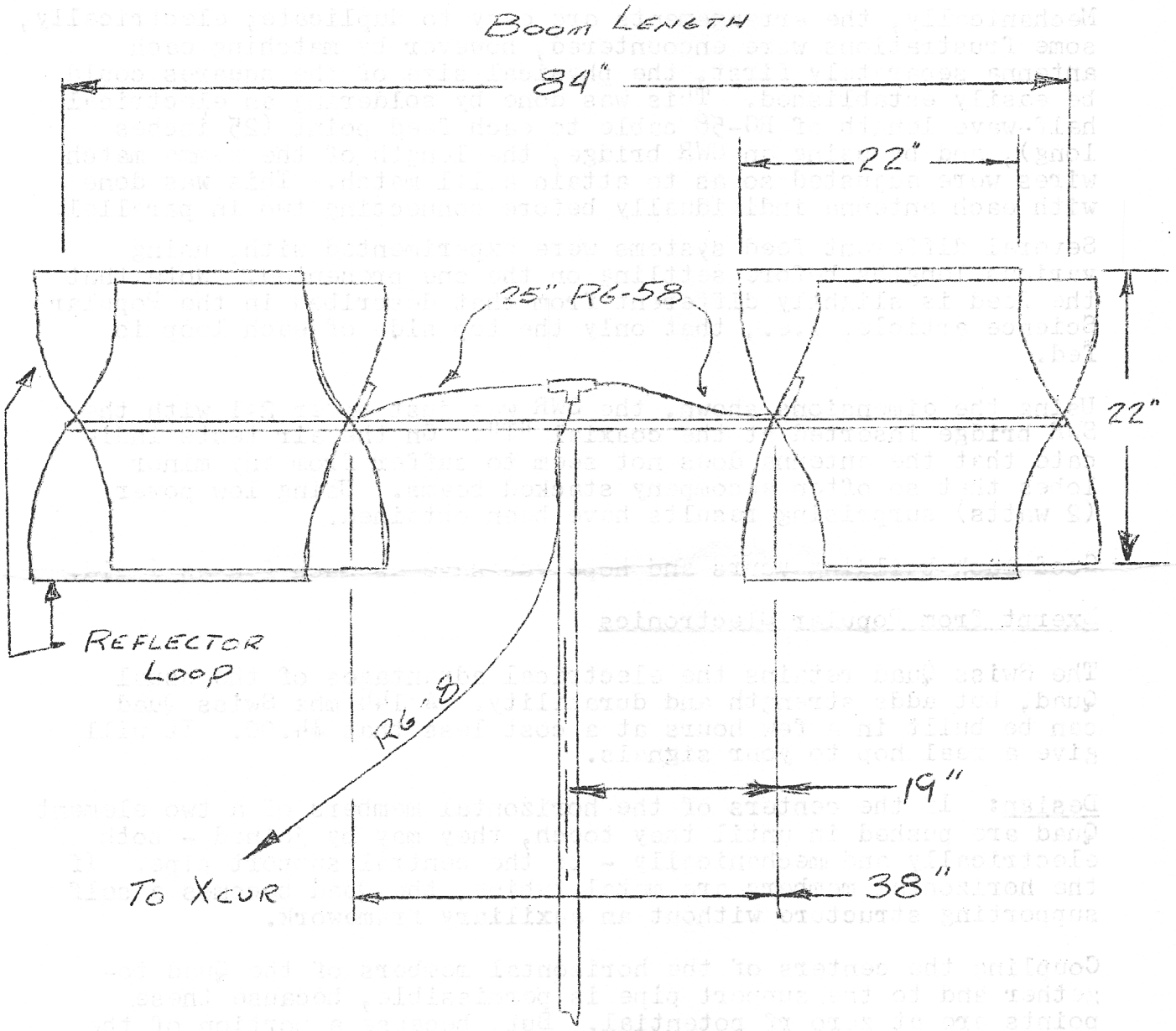
The Swiss Quad retains the electrical advantages of the usual Quad, but adds strength and durability. A 144 mhz Swiss Quad can be built in a few hours at a cost less that $4.00. It will give a real hop to your signals.

Design: If the centers of the horizontal members of a two element Quad are pushed in until they touch, they may by joined - both electrically and mechanically - to the central support pipe. If the horizontal members are metal tubing, the Quad becomes a self supporting structure without an auxiliary framework.

Coupling the centers of the horizontal members of the Quad together and to the support pipe is permissible, because these points are at zero rf potential. But, because a portion of the elements are partially bent back upon themselves, the overall dimensions of the antenna should be approximately 10% greater than for a conventional Quad cut for the same frequency.

The designer of the Swiss Quad, Rudolf Baumgartner, HB9CV, accommodated this increased size by adding to both the horizontal and vertical dimensions. I have found, however, that there is no significant difference in results if either the horizontal or vertical dimensions are kept the same as in a conventional Quad,

SWISS QUAD:



NOTE: - Gamma Length = 7"
- Reflector Loop Approximately 1" longer than the Driven Element Loop

and other dimensions are increased sufficiently to restore resonance at the desired frequency.

Construction: The 144 mhz Swiss Quad is made of copper wire and tubing which is available in hardware and plumbing supply houses. To build a duplicate of my Swiss Quad, first straighten the 3/16" copper tubing by rolling it on a flat surface while tapping it lightly with a wooden mallet. Cut off four 21" lengths.

Now take the hard-drawn 1/2" diameter copper tubing and drill a 13/64" hole a half inch from the top end. Line up the drill so that the bit passes through the diameter of the tubing and comes out on the opposite wall. Drill another pair of 13/64" holes 22" below the first pair in the same manner. Then rotate the tubing a quarter turn, and drill a third pair of 13/64" holes 3/4" from the top end and at right angles to the first pair; and drill a fourth pair 22" below the third pair. Finally, drill a 9/64" hole a half inch below the bottom 13/64" hole in line with the first and second pairs.

Mount the standoff insulator in the 13/64" hole on the supporting rod. Place a solder lug under and on top of the insulator. You may have to do a bit of juggling to line up the screw through the 9/64" hole from the inside to catch the insulator, but it can be done.

Slide the four pieces of 3/16" tubing through the 13/64" holes, and position them so that they all extend 10" from the center of the 1/2" supporting rod to one side and 11" from the center to the other side. Solder them in place, using a husky soldering iron (250 watts or larger) or a small torch.

Measure 5$\frac{3}{4}$" from the center of the supporting rod along the 3/16" tubing horizontally 45 degrees so that the end sections of each adjacent 10" and 11" length are parallel and spaced eight inches apart. It is not necessary that the bends be sharp; slightly rounded corners are preferred.

Remove the plastic insulation from the 14" length of #10 wire which serves as the gamma matching rod. The rod is appromimately 12" long and soldered at each end to the radiating elements; it is spaced an inch away from the elements. Do not solder the ends of the gamma rod, until you have had an opportunity to adjust it, as described. Cinch the solder lug on top of the standoff insulator around the center of the gamma rod, and solder it and the center conductor of the 50-ohm (nominal) coaxial feed line to the gamma rod. Solder the cable shield to the other solder lug.

Slice the insulation off the remainder of the #10 wire, and cut four 30" lengths. Four inches from each end of these lengths, bend the wire at right angles to form shallow U's 22" wide. Slip the ends of these U's into the corresponding top and bottom 3/16" copper tubing to the dimensions shown in the drawing.

Adjustment: Place an SWR bridge in the coax line and feed a small amount of r.f. into the line. Slide the wire U's in and out to obtain the lowest possible SWR. Move the U's no more than a quarter inch at a time, and keep the ratio between the "director" and "reflector" dimensions constant.

After the SWR is reduced to a minimum by adjusting the U's, vary the length of the gamma for a possible further reduction in SWR. It should be a simple matter to reduce the SWR to well below 1.2:1. These adjustments can be made in any reasonably clear space, as long as there is a separation of five feet or more between the antenna and the nearest large object. Be sure to solder all joints and connections.

Results: The front-to-back ratio of the Swiss Quad is about 25 db; its front-to-side ratio is over 35 db. In operation, a moderately strong signal from the front of the antenna will disappear off the back and sides. Indicated gain is a minimum of a solid 6 db over a reference dipole antenna. For its size and cost, the "Swiss Quad" is an excellent performer. By the way, it radiates a horizontally polarized signal.

Bill of Materials:

1 - 7' length of 3/16" copper tubing
1 - 3' length of 1/2" hard drawn copper tubing
1 - 12' length of #10 plastic-insulated copper wire
1 - 3/8" cone-type standoff insulator (E. F. Johnson #135-501 or equivalent)
2 - Solder lugs.

NOTE: To straighten and harden wire, clamp one end in a vise and the other in an electric drill. Then pull hard and "bump-trigger" to twist the wire a few turns.

DIODES/ZENERS

1N914	100v	10mA	.05
1N4005	600v	1A	.09
1N4007	1000v	1A	.15
1N4148	75v	10mA	.06
1N755A	6.2v	z	.25
1N758A	10v	z	.25
1N759A	12v	z	.25
1N4733	5.1v	z	.25
1N5243	13v	z	.25
1N5244B	14v	z	.25
1N5245B	15v	z	.25

SOCKETS/BRIDGES

8-pin	pcb	.25	ww	.45
14-pin	pcb	.25	ww	.40
16-pin	pcb	.25	ww	.40
18-pin	pcb	.25	ww	.75
22-pin	pcb	.45	ww	1.25
24-pin	pcb	.35	ww	1.10
28-pin	pcb	.35	ww	1.45
40-pin	pcb	.50	ww	1.35
Molex pins .01		To-3 Sockets		.45
2 Amp Bridge		100-prv		1.20
25 Amp Bridge		200-prv		1.95

TRANSISTORS, LEDS, etc.

2N2222A	NPN (2N2222 Plastic .10)	.15
2N3907A	PNP	.15
2N3906	PNP (Plastic)	.10
2N3904	NPN (Plastic)	.10
2N3055	NPN	.35
2N6055	NPN 15A 60v	.50
TIP125	PNP Darlington	.35
LED Green, Red, Clear, Yellow		.15
DL747	7 seg 5/8" High com-anode	1.95
XAN72	7 seg common-cath (Red)	1.25
MAN71	7 seg com-anode (Red)	1.25
MAN3610	7 seg com-anode (Orange)	1.25
MAN82A	7 seg com-anode (Yellow)	1.25
MAN74A	7 seg com-cathode (Red)	1.50
FND359	7 seg com-cathode (Red)	1.25

C MOS

4000	.15
4001	.15
4002	.20
4004	3.95
4006	.95
4007	.35
4008	.95
4009	.45
4010	.45
4011	.20
4012	.20
4013	.40
4014	.85
4015	.90
4016	.35
4017	1.10
4018	1.10
4019	.50
4020	.85
4021	1.00
4022	.85
4023	.25
4024	.75
4025	.30
4026	1.95
4027	.50
4028	.95
4030	.35
4033	1.50
4034	2.45
4035	1.25
4040	1.35
4041	.85
4042	.85
4043	.95
4044	.95
4046	1.75
4049	.45
4050	.45
4066	.95
4069	.40
4071	.35
4081	.70
4082	.45
MC14409	14.50
MC14419	4.95

T T L

7400	.15	7473	.25	74176	1.25	74H72	.45
7401	.15	7474	.30	74180	.75	74H101	.75
7402	.20	7475	.35	74181	2.25	74H103	.75
7403	.20	7476	.40	74182	.95	74H106	.95
7404	.15	7480	.55	74190	1.75		
7405	.25	7481	.75	74191	1.05	74L00	.25
7406	.35	7483	.95	74192	.75	74L02	.25
7407	.55	7485	.75	74193	.85	74L03	.30
7408	.25	7486	.25	74194	1.25	74L04	.30
7409	.15	7489	1.35	74195	.95	74L10	.30
7410	.10	7490	.55	74196	1.25	74L20	.35
7411	.25	7491	.95	74197	1.25	74L30	.45
7412	.30	7492	.95	74198	2.35	74L47	1.95
7413	.35	7493	.35	74221	1.00	74L51	.45
7414	1.10	7494	.75	74367	.55	74L55	.65
7416	.25	7495	.60			74L72	.45
7417	.40	7496	.80	75108A	.35	74L73	.40
7420	.15	74100	1.15	75110	.35	74L74	.45
7426	.30	74107	.35	75491	.50	74L75	.55
7427	.45	74121	.35	75492	.50	74L93	.55
7430	.15	74122	.55			74L123	.85
7432	.30	74123	.55	74H00	.15		
7437	.30	74125	.45	74H01	.25	74S00	.35
7438	.35	74126	.35	74H04	.20	74S02	.35
7440	.25	74132	1.35	74H05	.20	74S03	.30
7441	1.15	74141	.90	74H08	.35	74S04	.30
7442	.45	74150	.85	74H10	.35	74S05	.35
7443	.65	74151	.65	74H11	.35	74S08	.35
7444	.45	74153	.75	74H15	.45	74S10	.35
7445	.65	74154	.95	74H20	.30	74S11	.35
7446	.95	74156	.85	74H21	.25	74S20	.35
7447	.95	74157	.65	74H22	.40	74S40	.20
7448	.65	74161	.85	74H30	.20	74S50	.20
7450	.25	74163	.95	74H40	.25	74S51	.25
7451	.25	74164	.80	74H50	.25	74S64	.20
7453	.20	74165	1.50	74H51	.25	74S74	.35
7454	.25	74166	1.35	74H52	.15	74S112	.60
7460	.40	74175	.80	74H53	.25	74S114	.65
7470	.45			74H55	.20		
7472	.40						

74S133	.40
74S140	.55
74S151	.30
74S153	.35
74S157	.75
74S158	.30
74S194	1.05
74S257 (8123)	1.05
74LS00	.25
74LS01	.35
74LS02	.35
74LS04	.30
74LS05	.45
74LS08	.25
74LS09	.35
74LS10	.35
74LS11	.35
74LS20	.25
74LS21	.25
74LS22	.35
74LS32	.40
74LS37	.35
74LS40	.45
74LS42	1.10
74LS51	.50
74LS74	.65
74LS86	.65
74LS90	.95
74LS93	.95
74LS107	.85
74LS123	1.00
74LS151	.95
74LS163	1.20
74LS157	.85
74LS164	1.50
74LS367	.75
74LS368	.75
74C04	.25
74C151	2.25

9000 SERIES

9301	.85	9583	1.10
9309	.35	9601	.45
9322	.75	9602	.45

MICRO'S, RAMS, CPU'S, ETC.

74S188	3.00
1702A	4.50
MM5314	3.00
MM5316	3.50
2102-1	1.45
2102L-1	1.75
TR1602B	4.50
TMS 4044-45NL	14.50
8080AD	12.00
8T13	1.50
8T23	1.50
8T24	2.00
8T97	1.00
2107B-4, A	4.00
2708	11.50

MCT2	.95
8038	3.95
LM201	.75
LM301	.45
LM308 (mini)	.95
LM308H	.65
LM308K (8-14DK-8)	.85
LM310	1.15
LM311D (Mini)	.75
LM319 (mini)	.90
LM320K5(7905)	1.65
LM320K12	1.85

LINEARS, REGULATORS, etc.

LM320T5	1.65	LM340K15	1.25	LM723	.50
LM320T12	1.65	LM340K18	1.25	LM725N	2.50
LM320T15	1.65	LM340K24	.95	LM739	1.50
LM324N	.95	78L05	.75	LM741 (8-14)	.25
LM339	.95	78L12	.75	LM747	1.10
7805 (340T5)	.95	78L15	.75	LM1307	1.25
LM340T12	1.00	78M05	.75	LM1458	.95
LM340T15	1.00	LM373	2.95	LM3900	.50
LM340T18	1.00	LM380 (8-14 PIN)	.95	LM75451	.65
LM340T24	.95	LM709 (8, 14 PIN)	.25	NE555	.50
LM340K12	1.85	LM711	.45	NE556	.95
				NE565	.95
				NE566	1.75
				NE567	1.35

INTEGRATED CIRCUITS UNLIMITED

7889 Clairemont Mesa Boulevard, San Diego, California 92111

(714) 278-4394 (Calif. Res.)

All orders shipped prepaid — No minimum

Open accounts invited — COD orders accepted

Discounts available at OEM Quantities — California Residents add 6% Sales Tax

All IC's Prime/Guaranteed. All orders shipped same day received.

24 Hour Toll Free Phone 1-(800) 854-2211 — American Express / BankAmericard / Visa / MasterCharge

SPECIAL DISCOUNTS

Total Order	Deduct
$36 - $99	5%
$100 - $300	10%
$301 - $1000	15%
$1000 Up	20%

H.A.R.C. SWAP SHOP

Antenna Equipment:

VE3HJU Peter 534-5406 T.O.
- Hy-Gain Balun Model BN-86 $15.00

VE3DOU Peter 561-1659
- 60 ft. Heavy Duty Self-supporting Tower $250.00

Measuring & Test Equipment:

VE3CZI Norm 388-9813
- BC-221 Freq. Measuring Meter c/w Manual & Power Supply $25.00

Misc. Parts:

VE3GVG Cameron 628-6125
- 43GGT in disrepair. Available for parts $5.00

Hamilton A.R.C. (see Max VE3DNM 385-2530)
- Qty of SPDT miniature Centre-off Switches $1.25ea

VE3CZI Norm 388-9813
- Hammond output audio xfmr, 70 volt, used for intercoms #119N $1.50
- P.C. Board ONLY c/w spec sheet for 70 watt VHF RF Amp. $2.00
- Pieces of Mylar insulation, 3ft X 1ft 0.25¢ ea
- 2N4898 PNP switching transistors $1.00 ea
- 2N277 PNP Power Transistors $1.00 ea
- Miniature 10K pots with wire leads 50¢ ea
- IC's available: SN74156N, SN74104N, N8267B, MM500, u6A994559X, prices vary from 0.15¢ ea to 0.50¢ ea
- PREH connectors, similar to DIN German plugs; both plugs and chassis mounting sockets available; 3,4 & 5 pin configuration. .50¢ to $1.50 ea depending on item. Brand New.
- 6V Lantern Batterys, NEW $1.00 ea
- Hammond xfmr Model 720X25, 600V c.t. @ 300ma $15.00
- Hammond xfmr Model 757, 2500V c.t. @ 500 ma $25.00
- Jones Barrier Strips, Assorted, 0.25¢ ea
- Powerstat Variable Transformer, Type 21, 0-140VAC @ 3.75am, new condx, Rack Mounted $25.00
- Soldering Iron Holders, Hexagon Mfr. $2.00 ea

VE3DSP Glen 385-8478
- Quantity of parts from the IC of the month project:
  - single pole, double throw, centre off switches $1.25ea
  - IC's 7473 40¢ ea
    7490 60¢ ea
    7400 25¢ ea 7404 30¢ ea
    7408 30¢ ea 7432 40¢ ea
  - LEDS 20¢ ea
- One IC of the month kit complete, (Project board, IC's, LEDS, resistors etc) $20.00

V.H.F. Equipment:

VE3GIV Bob 388-5103
- Motorola Business Dispatcher Mobile Xcvr, converted to 2m Solid State Rcvr, Tube Tx, 15 Watts output, 2 chan, crystals for DRW, RSB, & 52 Sx, c/w manual $100.00
- WABCO VHF Xcvr, completely solid state Tx & Rx, 40 watts o/p, with GLB 400B channelizer, control head, desk mike and manual $300
- Marconi DT-65 Mobile Xcvr, operational on 2 meters, 25 watts o/p 2 channels, crystals for DRW & RSB, all accessories and manual $50

VE3FHQ Glenn 385-2786
- Motorola 43GGV, control head & access, not modified to 2m, $25
  Motorola 43GGV, modified to 2m c/w DRW crystals, $55

VE3ISX Barry
- UNIDEN xcvr, 12 channel with AC supply, c/w DRW, RSB, TOR, TFM 52sx $275. Will trade for a portable.

VE3GVG Cameron 628-6125
- Motorola H23AAC portable, c/w batteries & charger, with crystals for 6 channels, $100

VE3DBL Gary 689-5239 Waterdown
- Heathkit HW-202 xcvr c/w Tone Burst, 5/8 wave antenna, with 52sx 94sx, RPT, NRS, RSB, DRW, $200

VE3QD George 561-1083
- Kenwood KP-202, 2 meter portable, nicad batteries, rubber duck, c/w RSB, DRW, 94sx, 52sx, 13-73, 34Tx, $175

VE3GTE John 753-0536
- G.E. Transistorized Progress Line xcvr, c/w VE3TCR xtals, Solid State Rx & exciter with tube finals, $75

VE3CCY Clive 757-4336 (Toronto)
- Motorola D53AKB, 6ft rack mounted Base Station, 2 Rx; one VFO controlled, one xtal; 1 Tx c/w 12 channels, with Manual and built-in Test Set. $150

H.F. Equipment:

SWL Dale 380-5545
- AR-1155A General Coverage Rcvr $60

VE3SP Ron 387-1536
- Heathkit HR-1680 Ham Rx, Solid State $275

529.0901

500
500
40.
33.
135.
220.
44.
48
1520 + ANT

VE3DBL Gary 689-5239
- Heathkit SB-401 Tx, SB-303Rx c/w all filters, HD-15 Patch, SB-600 spkr, SB-610 monitor scope, SB-650 Freq. Display, HM-102 Pwr/SWR Bridge, HDP-21A mike, Hy-Gain Trap dipole Ant., Model 5BDQ

VE3DJF Jeff 388-1107
- Drake Line: T4X Tx, R4B Rx, MS-4 spkr, AC-4 Pwr Supply, complete $990

VE3EJD Gino 692-3341
- Drake 2C Rcvr c/w Q-multiplier & spkr $250

VE3HFQ Paul 662-7753
- Heath HW-12 xcvr c/w Pwr Supply, desk mike & manual $180
- Heath Cheyanne AM-CW, 5 Bands, 90 watts O/P, with manual $90

Accessories:

VE3GIV Bob 388-5103
- R.S.O. Low Pass Filter

VE3HJU Pete 534-5406 (Toronto)
- Telex headset with boom mike. Model CN-610 $25

VE3ALM Bill 632-7693
- 19" Rack Cabinet, 60" high with Doors front & back $65

VE3DUO Brian 637-2751
- Aluteous Lab Synthesizer, c/w crystals for 10.7, 12 & 5 Mhz I.F. $130

VE3CZI Norm 388-9813
- Heathkit SWR Bridge, model AM-2 $10
- Overvoltage protection circuits for Low Power xcvrs, $7.00 ea

WANTS:

VE3DJE John wants 6 meter SSB xcvr & 432 converter or transverter.
VE3EBF Brian wants Model 80 Signal Generator
VE3FGY Stan 884-2783 wants Drake R4B Rx
VE3ISH Dennis wants Heavy Duty TV Rotar & Control
VE3FLZ Dave wants AC pwr supply for HW series
VE3IHA Ron 529-8873 wants 4 channel Trunk mount 2 meter xcvr
VE3CJW Bob 662-7631 wants Tri-Band Beam
VE3IUZ Bob Brantford wants HA-201 Heath 2 meter Amplifier
wants SSTV monitor with P7 tube or equiv.
VE3FSI Ed 634-2520 wants Keypunch for computor cards, Model 029, 29 or 129 or equiv.
VE3JUC Tom 529-3119 wants: -Manual for Motorola PT-300 DCN Series
-DRW crystals for above
-Borrow or buy a Bird Wattmeter for UHF

WANTS cont'd:

VE3FSI Ed 634-2520 wants manual for Klienschmit TTY, Model T150 & T120

VE3JTM Orville 549-6066 wants a phone patch
VE3KDT Bill 491-4666 (Toronto) wants a rotator
VE3FWX John (416) 828-1896 wants -National VLF-10 Preselector
-Cabinet for HRO-500
VE3BAL Phil Niagara Falls wants a Yaseau FRG-7 Rx
VE3COE Done (519) 742-5005 wants Video Monitor
VE3IYA Don Cambridge wants a manual for Marconi DT-34

Additional items for sale:

VE3HTD Henry 648-2109
- HR10B c/w manual, Home Brew Speaker, 75 ft Antenna, 70ft of Lead in, $125

Hamilton A.R.C. (VE3DSP Glen)
- A large quantity of stranded wire for antennas. Wire is tinned and covered with a polyethylene insulation which is good from -40°C to +90°C:
  3000 ft of 65oz .010 dia.
  2000 ft of 7oz .0305 dia. .02¢ per lineal foot.

185
4
7.00

FT-101E

$ 1049.00

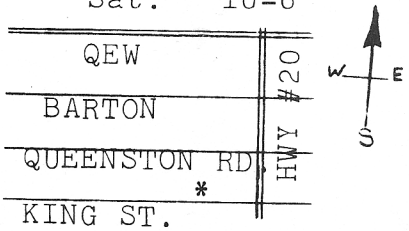
● Solid State 160 thru 10 Meter Transceiver

The world's number one transceiver now offers even more value and performance in one, compact, thirty pound package. An effective, RF Speech Processor is a built-in integral part of this exciting transceiver. Now you can realize that extra talk power to cut through the pile ups - without the addition of a linear amplifier. Except for the final and driver stages, the FT-101E/EE features the latest in solid state technology, incorporating time proven, plug-in "computer type" modules for unparalleled reliability and servicability. New lever type switches offer easier operation. Here is a complete radio station designed to go anywhere-ideal for todays active amateur. Just add an antenna and 12 VDC or 100-234 VAC for instant operation on 160 thru 10 meters. The FT-101E/EE is another step forward in amateur communications from the world's leader in communications equipment YAESU- The Radio Company.

* Built-in AC & DC power supplies
* Built in RF-speech Processor for increased talk power (E model only)
* 260 Watts PEP SSB, 180 Watts CW, & 80 Watts AM.
* Factory sealed, solid state VFO for optimum stability and accurate 1 KHz readout
* Effective Noise Blanker, threshold adjustable, for elimination of noise spikes
* Built-in, fully adjustable VOX
* Automatic break-in CW operation with sidetone
* Selectable 25 KHz and 100 KHz calibrator
* ±5 KHz receiver clarifier w/separate ON/OFF switch
* Built-in WWV/JJY reception
* Heater switch to shut off final tubes for conservation of current drain
* Reliable easy to operate lever switch
* Adjustable carrier level for tune-up and novice operation
* Built-in speaker
* High-Q, permeability tuned, RF stages to provide the performance required even in base station operation.
* Includes dynamic, hand-held type microphone
* Indicator lights for internal VFO and clarifier operation
* Eight pole SSB filter for unparalleled selectivity on today's crowded bands
* All mode operation – SSB, CW, & AM
* Built-in internal crystal control provision and Dual VFO adaptor
* Complete line of compatible accessories for flexible station design

STORE HOURS:

Mon.	closed
Tues.	10-6
Wed.	10-6
Thur.	10-9
Fri.	10-9
Sat.	10-6



NEW ITEMS IN STOCK

75 Ohm balanced feed line.
300 &450 Ohm open wire feed line.
Rubber duck antennas to fit most UHF,VHF portables.
A/S 2mtr beams, both 11 element & 5 element.
A/S 2 mtr verticals, both 1/4 & 5/8 wave.
Larsen mobile antennas & mounts.
VE3DNT antenna traps
"The Ringer" Lindsay 2 mtr base antenna.
Bearcat scanners.
"Hi-Q Balun" by Van Gorden Engineering.
Eico 4 amp & 6amp 12volt power supplies.
Leader amateur test equipment.

NEW ITEMS ARE ARRIVING EVERY WEEK

VE3EBF
Brian Fox

Fox Communications Ltd.

124-3 KING STREET WEST, STONEY CREEK ONTARIO L8G 1J2

TELEPHONE (416) 664-5433

CHARGEX VISA