

Dec 1995

FEEDBACK

THE OFFICIAL NEWSLETTER OF THE
GEORGIAN BAY AMATEUR RADIO CLUB INC.

Sponsoring

VE3OSR FM REPEATER 146.940- Mhz BARROW BAY
VE3OST FM REPEATER 145.290- Mhz OWEN SOUND
VE3GBT FM REPEATER 146.895- Mhz MARKDALE
VE3IJD PACKET BBS 145.630 Mhz KEADY

REGULAR EVENTS

GBARC MEETINGS:
FOURTH TUESDAY OF EACH
MONTH

BREAKFAST MEETINGS:
SECOND AND LAST SATURDAY
OF EACH MONTH

GBARC INFORMATION:
INFORMATION REGARDING
MEMBERSHIP SHOULD BE
DIRECTED TO TOM VE3NEM
519-371-0655

Minutes of the November meeting

KEN, VA3KMS, OPENED THE NOVEMBER MEETING AT 7:30 P.M. TWENTY-ONE MEMBERS WERE IN ATTENDANCE. THE MINUTES OF THE OCTOBER MEETING WERE ADOPTED AS PRINTED BY BILL, VE3HMZ, AND SECONDED BY JACK, VE3DTS. VA3JRF,

JOHN, REPORTED THAT THE SANTA CLAUSE PARADE IN OWEN SOUND WENT WELL WITH 20 MEMBERS VOLUNTEERING THEIR SERVICES. VE3IJD, GENE, REPORTED THAT THE 440 RADIOS IN BARRIE GOT BAKED. THIS YEAR'S MEMBERSHIP DUES ARE NOW DUE. THE MEMBERSHIP RATE IS \$20.00 BEFORE DEC. 31, 1995 AND \$25.00 AFTER THAT DATE. MARVIN, VA3ACI, IS STILL TRYING TO MAKE THE CORRECT CONTACTS TO GET THE INFORMATION ON THE LOTTERY GRANTS. BOB, VE3X0X, BROUGHT A PROPOSAL TO CLUB MEMBERS ABOUT HAVING A BIG HOBBYIST FLEA MARKET IN OWEN SOUND ON JUNE 1, 1996 AT THE BAYSHORE ARENA. JOHN, VA3JRF, MADE A MOTION THAT THE CLUB PROCEED WITH THE FLEA MARKET PROPOSAL. VE3TUQ, AUBREY, SECONDED THE FLEA MARKET MOTION AND CLUB MEMBERS BY A SHOW OF HANDS OVERWHELMINGLY APPROVED. CONGRATULATIONS TO VE3TSA, TOM, ON WINNING THE CLUB'S AMATEUR OF THE YEAR AWARD. THE 50-50 DRAW WINNER WAS VE3WUD, RICHARD. THE MEETING WAS ADJOURNED AROUND 9:30 P.M.

IN PRAISE OF OLDER RIGS From Brad VE3RHJ

Sometimes it pains me to listen to the Ontario Swap Shop. Perhaps I have too long a memory. My first shortwave radio was a department-store 5-band radio that tuned from 4 to 10 MHz on a VERY approximate slide-rule dial. When I had saved enough money, I went to the local SWL's emporium -- Radio Shack -- and bought what I considered the deluxe receiver: a DX-150. It was much more sensitive, and had the all-important BFO, but it still tuned to the nearest mega-Hertz. I would slaver over the ads in the back of the Radio Amateur's Handbook, marvelling at the fantastic technology of a rig which could be tuned to any given KILOHertz! What precision! Surely forever beyond my reach, I thought...but if I could ever own such a fabulous rig, my dreams would be complete. I eventually acquired such a radio, of course. It was a modest rig, though, compared to the splendid spread of Heathkit equipment at my university's amateur radio club. And listening to my newfound fellow hams ooh-ing and aah-ing over the photos of Drake and Collins in the latest QST made me realize that there was still a higher plateau, the ne plus ultra of radios, the ham rigs of the rich and famous. Now, on occasional Monday afternoons, I read the Swap Shop on packet and see the glorious rigs of yore for sale. \$400. \$300. \$225. \$100! An SB-102 for \$100! An NCX-500 for \$75! Such fabulous rigs! I wish I could buy them all! I can't, though. It's not the money so much as the space, and the knowledge that I already have more ham gear than I can use. I have one modern HF rig -- cold, efficient, and beautifully functional -- and two older HF rigs that keep me busy with maintenance. But when they're working, the older rigs are my choice. I became a ham when vacuum tubes were the norm, and there's something about a warm glow emanating from the depths of a rig that still says "ham radio" deep in my soul. It conjures up memories of nighttimes in front of my buddy's Drake 2-B receiver, illuminated only by the dial light and the orange glowing tubes. The dusty smell of a warm radio, and the flow of heat from its top, recall long winter nights in the shack, chasing the elusive DX. Mine will be the last generation to have such memories. Modern rigs are all solid-state, and few new hams seek the Advanced license that is required to service transmitting gear. So the glut of older rigs will go unrepaired and unsold, and instead of enlivening the evenings of teenagers and aspiring hams, will end up in a landfill. It's a pity.

- Brad VE3RHJ

From: VE3RHJ

GBARC meeting **THIRD** Tuesday! Because our usual meeting day (fourth Tuesday) is Boxing Day this month, the Georgian Bay Amateur Radio Club will meet on the **THIRD** Tuesday, Dec. 19th, at the usual place.

GBARC Meeting Tuesday, December 19th 1995 7:30 pm Billy Bishop Regional Airport, Owen Sound, ON (just east of Owen Sound on Hwy. 26)

73, Brad VE3RHJ

Cassette Box Special

Replace that Guy Lombardo tape with a 5-watt 80m transceiver!

by Michael Jay Geier KB1UM

The search for suitable cabinets for my electronic projects has led me to everything from Radio Shack project boxes to dessert containers to pillboxes! My perennial favorite, though, is the cassette box. These cheap little gems are great for lots of things, including meters, battery holders, switchboxes, and even entire perfboarded circuits. And after I've used my \$1.50 housing, I still have a cassette! What a bargain.

So, naturally, it seemed like a good idea to try to build an entire transceiver inside one. As it turned out, it wasn't even an especially tight squeeze.

I wanted the rig to be stable and sensitive, to have some active filtering on the receiver, and to generate sidetone in transmit. Also, it should include a key, and put out enough power to make real contacts. And, as always with my projects, coil winding should be kept to a minimum (I hate winding coils).

The result is the Cassette Box Special. It's a 5-watt, 80-meter crystal-controlled rig with a direct conversion receiver. It has only one very simple coil to wind, and only one set-and-forget adjustment! It uses 12 volts, and pumps audio to a pair of "Walkperson" headphones.

Circuit Description

Q1 is the crystal oscillator for both receive and transmit. It's a MOSFET. Radio Shack used to carry it, but has discontinued it. Check your local store—there are still plenty of them on the shelves. In fact, that's where I got mine. If you can't find one locally, you can order it from the parts supply sources shown at the end of the article.

In transmit the oscillator's output, shifted down approximately 700 Hz by C4, feeds Q2 (the driver), and Q3 (the final), which is also a MOSFET (and is still in the Radio Shack catalog). The driver and final are keyed together, while the oscillator runs full time. Q3's output is filtered by L4 and its associated capacitors, and fed via the TX/RX switch to the antenna. C15 generates the sidetone by forcing the audio amps into oscillation. R14, at the audio output, cuts the sidetone level down to keep it from knocking your head off.

In receive, the oscillator feeds gate 2 of Q4, the mixer. Gate 1 is fed with the incoming signal, tuned by L1 and C12. Careful attention to the design of the input coupling (by L2 and C11) results in minimal detection of unwanted AM signals. The mixer's output is fed

to the high gain audio stages, Q5-Q7. Capacitors in the gate and drain leads of Q5 form a low-pass filter, removing some of the high frequencies which may be present in the received signal. C20, in conjunction with audio output transformer T1, provides a strong peak in the audio passband around 700-800 Hz and, with Q6, forms a fairly steep active filter. The transformer feeds the "Walkperson" headphones, driving them with plenty of volume.

Finding the Parts

The TX/RX switch has to perform six functions, so a single 6PDT switch is your best bet. You can buy one, or you may be able to scrounge one up for almost nothing. Kiddie walkie-talkies and cassette tape recorders have this type of switch—you may have a few lying around. I got my switch at a hamfest. Of course, you can also gang several switches together, or even use a relay, though it had better be a small one if you want to get this thing into a cassette box.

The crystal can be a surplus unit or one ordered from a crystal house. Try to get a high-activity crystal. Most rocks work well, but some can be sluggish, reacting badly to

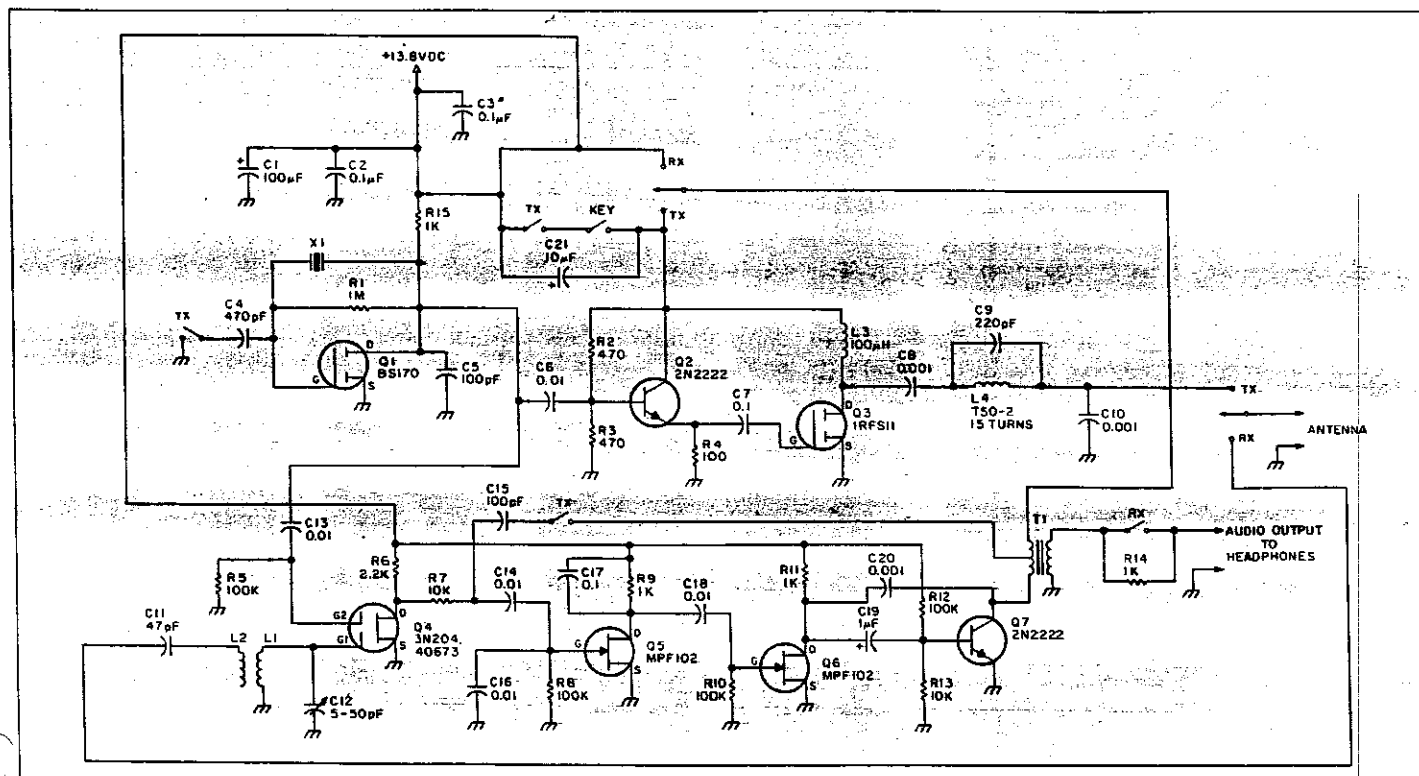
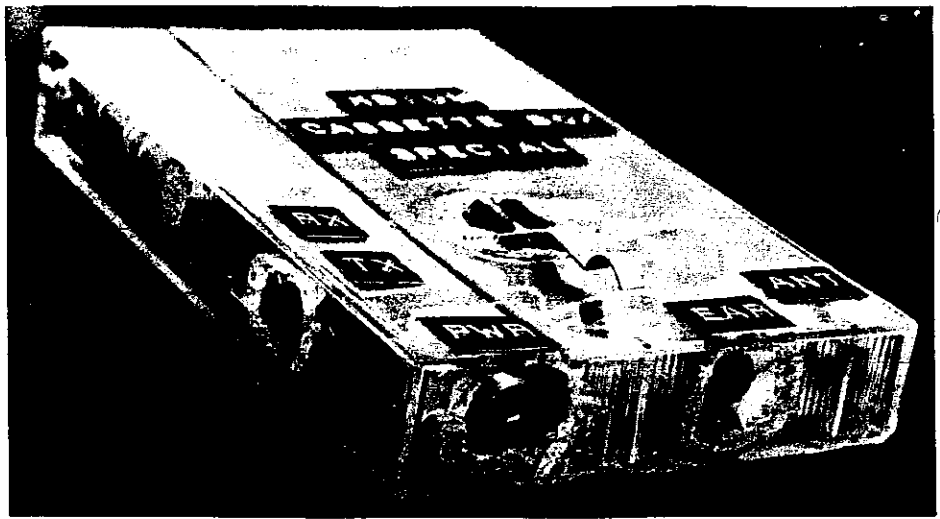
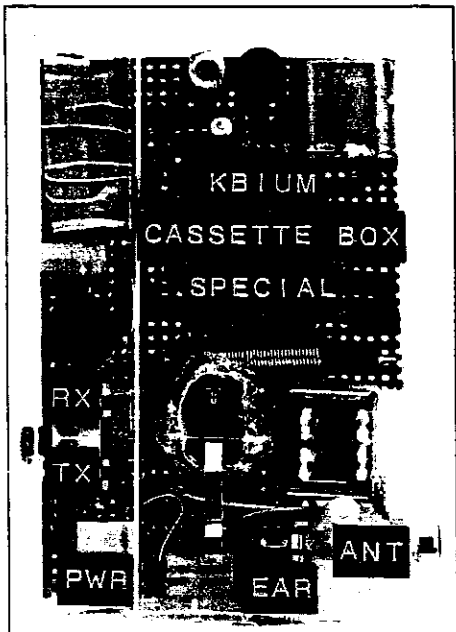


Figure 1. Schematic for the KB1UM "Cassette Box Special." The switch contacts are marked as when their functions are closed. That is, a switch marked TX should be closed in transmit and open in receive. *C3 mounted right at B + input.



The "Cassette Box Special" 80m CW transceiver.

the change in load presented to the oscillator when you key the rig. In particular, avoid 3.579545 MHz colorburst crystals, as many don't work too well. Besides, using that frequency is just asking for TVI problems, both to and from your neighbors. You'd be amazed at how loud their TVs' color oscillators can sound in your receiver. Good frequencies to try are 3.560 MHz and 3.710 MHz, the recognized QRP frequencies.

The type of crystal you use may affect the amount of transmit offset provided by C4. For more offset, increase the value of C4; for less, decrease it. You can get multiple frequency operation by using more than one crystal and a selector switch, if you can fit it all in the box. If the frequencies are as widely spaced as those two, though, you may have to retune C12 when you switch frequencies.

L1 is an antenna coil from an AM transistor radio. At worst, you can buy a radio and remove the coil. I used one from a Radio Shack Flavoradio, and it worked fine. Just about any AM coil should do. If it has a tap or other windings, leave them unconnected and use the longest winding. Simply remove the coil from its ferrite core and then wind 5 turns of wire-wrap or similar wire around it, spread out over its length, to make L2.

Winding

There's only one coil to make. Get a T50-2 toroid and wind 15 turns of #26 enameled wire, spreading it two-thirds around the toroid. Coat it with nail polish to hold the windings in place, and you're done.

Construction Details

The key word here is "flat." First, prepare the cassette box. I used a clear one, and I suggest you do the same. They're popular and easy to find, and the result is pretty and interesting. Separate the two halves, and then clip off the spindles with a pair of dikes. Be careful not to crack the box, as the plastic is very brittle. Now, run your soldering iron over the spindle stumps to flatten them out.

A few words about working with this kind

Parts List		
Q1	BS170	Digi-Key BS170
Q2,Q7	2N2222	RS 276-2009
Q3	1N914	RS 276-2072
Q4	2N2907 or 2N2907A	Jameco 40673
Q5,Q6	NEE01	RS 276-2062
X1	CEYS	
L1	AM antenna coil (from radio)	
L2	5 turns of #26 enameled wire on T50-2 toroid	
L3	100 nH	RS 273-102
L4	15 turns of #26 enameled wire on T50-2 toroid	Radiokit T50-2
T1	1700VA 250V 50/60Hz power transformer	RS 273-1380
C1	100 nF 50V poly	
C2,C3,C7,C17	0.01 uF	RS 272-109 (5 per pack)
C4	200 pF	
C5,C15	100 nF	
C6,C13,C14	0.01 uF	
C16,C18	0.01 uF	
C8,C10,C20	0.001 uF	
C9	220 pF	
C11	470 pF	
C12	5-20 pF trimmer	RS 272-1340
C19	100 nF 25V electrolytic	
C21	100 nF 25V electrolytic	
R1	1 megohm	
R2,R3	470 ohm	
R4	100 ohm	
R5	100K	
R6	220 ohm	
R7,R13	10K	
R8,R10,R12	100K	
R9,R11,R14,R15	1K	
RX/TX SWITCH	6PDT	
Heatsink	T0220	RS 276-1383
Sources:		
	Digi-Key Corp.	Radiokit
	1000 Lakeside Drive	P.O. Box 973
	Minnetonka, MN 55343	Peabody, NH 03601
	P.O. Box 877	(603) 635-2235
	Thief River Falls, MN 56701-0877	
	(800) 368-4633	

of plastic: The only way I've ever found to do it is with heat. Attempts at drilling resulted in a cracked or broken box. The stuff melts easily and can be shaped or formed any way you like. Try not to breathe the smoke, though, as it can't be very good for you. Also, always wipe and tin your iron tip after it touches the plastic, or the tip may become too

contaminated to melt solder. If possible, use a separate, cheap iron to do your plastic melting.

You will have to make some holes in the box, but save that until after you've built the board, because the holes' locations will depend on your placement of the switches and jacks.

Cut a piece of perfboard to fit the cassette box. If you use the Radio Shack audio output transformer, as I did, you will have to cut away enough of the board to allow the transformer to fit in the box, because it is too thick for mounting on the board. In fact, the transformer doesn't quite make it as it is, and the plastic flanges where the wires exit will have to be melted a little to make it slightly thinner. If you can get a smaller transformer, do so, although you may have to experiment with the value of C20 to make it resonate around 700 Hz. The exact frequency isn't critical; you just want it to peak somewhere near the CW pitch you like to hear.

The final transistor must be heat-sinked. Don't forget to use silicone heatsink grease for efficient heat transfer. Bend the fins of the heat sink flat so it will fit into the box.

Assemble the circuit, placing the TX/RX switch and power, earphone, and antenna jacks at the edges of the board. Although the audio layout isn't critical, try to keep the audio output transformer away from the antenna coil (L1/L2), or feedback can occur. Be especially careful to wire the TX/RX switch correctly. I have marked the switch contacts as to their function when closed. That is, a switch marked TX should be closed in transmit and open in receive. The two double-throw contact sets are marked in obvious fashion.

If you can't find a 100 μ F capacitor (C1) that's thin enough, use two 47 μ F caps in parallel. The exact value isn't critical. Also, place C3 (0.1 μ F) right at the DC power input jack for maximum pro-

tection from RF feedback and instability.

I used an eighth-inch earphone jack for DC power, a stereo jack for the headphone output, and a phono jack for the antenna. Wire the headphone jack using only the tip and midpoint, leaving the ground (ring) unconnected. That way, the left and right phones work in series, which seems to provide the best sensitivity. Also, I used a microswitch with a lever arm for the key, mounting it on the board so that it stuck out through a hole in the top of the box. If you elect to use a separate key, keep the wires under one foot in length. Do not use an electronic keyer, as all the current for the transmitter passes through the key!

After assembly, check for any wiring or polarity errors. Be especially careful to match the polarity of the DC power jack to that of your power source! Next, place the TX/RX switch in receive and then connect power, antenna, and headphones. Adjust C12 for maximum signal or band static. It should sit at about 1/4 total rotation. The peak is very sharp, and it may take a few tries before you get it just right. I made a hole in my box so that I could touch it up if necessary.

Slide the board into the large part of the cassette box and mark the spots for the holes for the switch, key, and jacks. When you're done making them, assemble the box and melt the edges together. That's it!

Operating Tips


The radio is designed to operate from 12 volts, and will work OK from about 10-14.

At 12 volts, it produces approximately 5 watts in transmit. Use D batteries or a gell-cell, as the transmitting current drain is substantial enough to wipe AA cells out in short order.

Like most direct conversion rigs, the receiver is fairly microphonic. That is, if you tap on it, you'll hear it in the headphones. It should not oscillate or show any other kind of instability. If it does, try reversing the output leads from T1 (the side going to R14). Also, the rig is best operated on battery power, to avoid hum problems. In some locations you may get some hum induced from the table on which the rig sits because there is no shielding in the box. Try placing the radio on the battery pack.

There is, of course, no sideband filter, so you'll hear signals on either side of zero beat. If you hear a strong signal but get no response to your call, the other station may be listening on the wrong sideband to hear you! Oh well, such is life in the direct conversion world.

Finally, avoid long keydown periods. Although the rig is stable into all but the worst SWR, the heat sink is small and gets pretty hot. You'll notice the box getting warm, but it shouldn't be a problem with normal use.

Enjoy your "Cassette Box Special." You'll have fun with it on the air, and it's guaranteed to turn a few heads when you show it around! 

Michael Geier KB1UM is 73's troubleshooting "Ask Kaboom" columnist. You can reach him at PO Box 64766, S. Burlington VT 05406.

YOU KNOW YOU ARE GETTING OLD WHEN:

Everything hurts and what doesn't hurt, doesn't work.

The gleam in your eyes is from the sun hitting your bifocals.

You feel like the night after, and you haven't been anywhere.

Your little black book contains only names ending in M.D.

You get winded playing chess.

Your children begin to look middle aged.

You finally reach the top of the ladder and find it leaning against the wrong wall.

You join a health club and don't go.

You begin to outlive enthusiasm.

You decide to procrastinate but never get around to it.

You're still chasing women but can't remember why.

A Ham's Christmas Eve (v3.0)

A HAM'S CHRISTMAS EVE

'Twas the night before Christmas and in the ham shack,
Was the warm glow of tubes in the transmitting rack.

The log book was brought up to date with great care,
In case the FCC might some day be there.

XYL and Harmonics were snug in their beds,
My strong RF waves safely from their heads.

I plugged in the mike and adjusted the VFO,
Getting all set for a late night QSO.

When up from the F layer there arose such a clatter,
I looked to the window to see what was the matter.

Then up on the roof by the forty meter beam,
There came QRM like a heterodyne scream.

On Icom, on Kenwood, on Yaesu and Ten-Tec,
On Comet, on Collins, on Alinco and Cushcraft.

Bias to the grid and volts to the plate,
Just watch the S-Meter while we all modulate.

As I turned to the rig and reached for the dial,
From the energized tuner Santa slid with a smile.

An RF choke he held tight in his teeth,
And coax encircling his head like a wreath.

A bundle of ham gear hung from his hand,
Was that MY name on a new dual band?

He had a snub nose like an egg insulator,
And his cheeks glowed bright red like a hot oscillator.

He spoke not a word but went straight to his work,
Laying out all the gear, then turned with a jerk.

And laying a wave meter along side of his nose,
Said, "Please QSL." and up the feeders he 'rose.

He climbed up the dipole, to his team gave a whistle,
And away they all flew like a jet propelled missile.

But I heard his last signal from the upper ionosphere,
Seventy Three, Eighty Eight, Merry Christmas... I'm clear.

Message from the Editor VE3TSA

I would like to take this moment to wish everyone a Merry Christmas and a safe and happy New Year. Thanks to all that helped out in any way during our club activities throughout 1995. Many club members extended themselves unselfishly and I would just like you to know that your efforts are appreciated.

I also find myself as the recipient of the Amateur of the year Award. I would like to take this time to thank you for this honour. Although I do feel that I didn't really deserve it, (however, I'm losing my hair and I don't deserve that either) as there were others in my mind, at least, that should have been recognized for their efforts before I received it for a second time. Nominees should perhaps have the option of declining if they desire. Or maybe the Amateur of the Year should be decided by a smaller group, say a committee of 4 or 5. Likely a coffee break at a meeting would be long enough. Food for thought!

This June 1st there is planned to be a larger fleamarket than we have had in the past. It will be at the Bayshore, in the arena and with any kind of turnout at all should be a success. It will be called a "Communication/Electronics Hobby Market". So right away we see that this is not your usual fleamarket. The intention is to increase the exposure of ham radio to the public. So how do you get the public to a ham radio fleamarket you might say. True, there will be ham radio operators, with tables of stuff for sale but we will also have radio controlled model hobbyists, cb'ers, computer people as well as demonstrations of the internet and solar power to mention a few. So we hope to attract people from all over, hobbyists of many descriptions. The Collingwood club will be assisting us and Kincardine and Port Elgin have both been contacted.

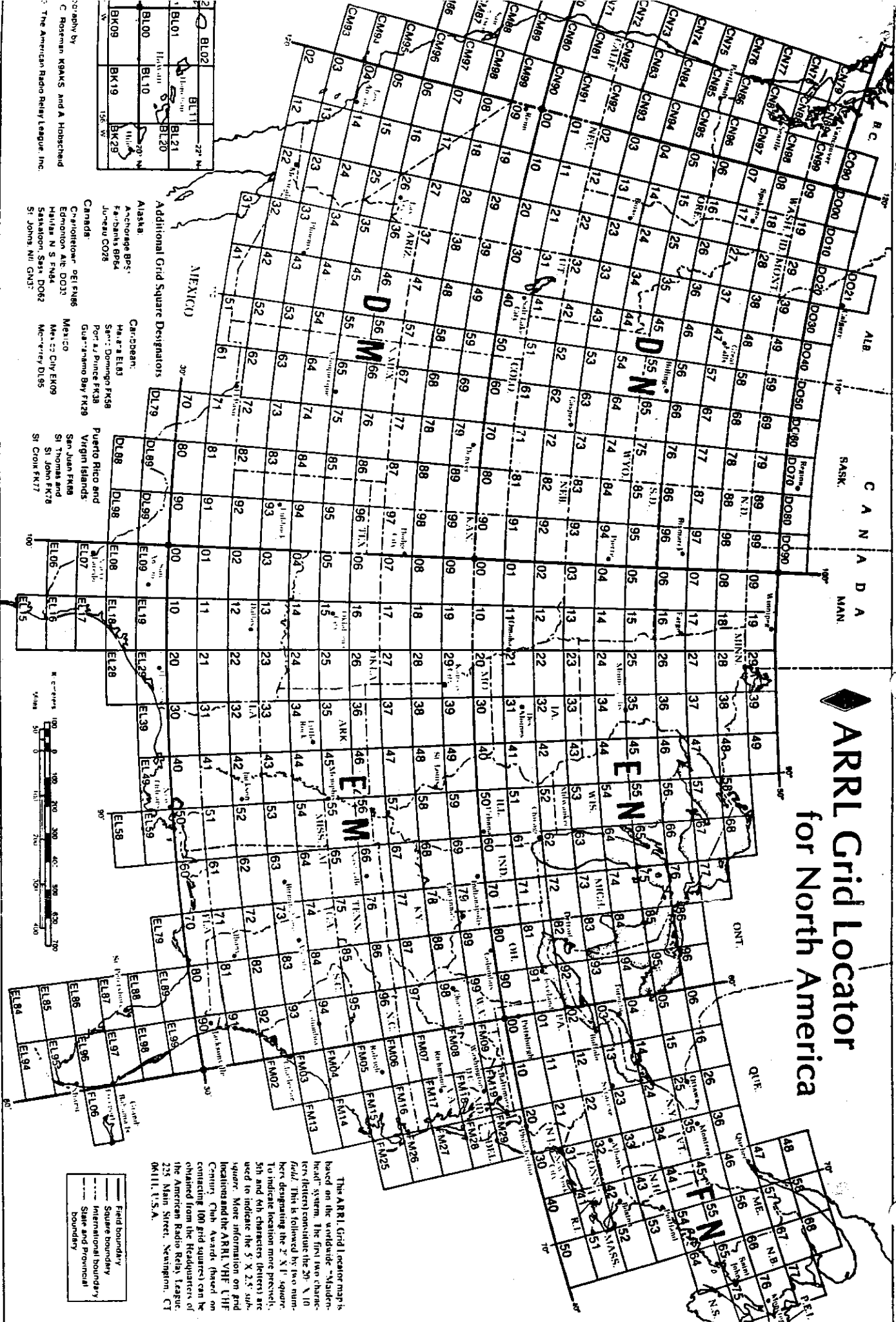
The committee members are as follows:

VE3XOX Bob - site co-ordinator (or head cheeze)
VE3TSA Tom - advertising and promotion
VA3JRF John - security
VE3WUD Richard - vendor contact
VE3NEM Tom - program director

So we will be looking for vendors for the fleamarket as well as volunteers.

Well thats about it for now, 73 Tom

ARRL Grid Locator for North America



Additional Grid Square Designators

Alaska:
Anchorages BPC
Fairbanks BPA
Juneau CO2

Caribbean:
Haiti EL83
Sant: Dominon FK38
Port au Prince FK38
Guantanamo Bay FK29

Puerto Rico and Virgin Islands:
San Juan FK48
St Thomas FK48
St John FK78
St Croix FK77

Mexico:
Mexico City EK09
Mexico City EK09
Mexico City EK09
Mexico City EK09
Mexico City EK09

Canada:
Charlottetown PE1N6
Edmonton AB103
Halifax N S FK44
Saskatoon Sask D062
St Johns NL GN37

Grid Square Designators:
CM93 CM94 CM95 CM96 CM97 CM98 CM99 CM00
CN01 CN02 CN03 CN04 CN05 CN06 CN07 CN08 CN09 CN10
CO01 CO02 CO03 CO04 CO05 CO06 CO07 CO08 CO09 CO10
DO11 DO12 DO13 DO14 DO15 DO16 DO17 DO18 DO19 DO20
EO01 EO02 EO03 EO04 EO05 EO06 EO07 EO08 EO09 EO10
FO01 FO02 FO03 FO04 FO05 FO06 FO07 FO08 FO09 FO10
GO01 GO02 GO03 GO04 GO05 GO06 GO07 GO08 GO09 GO10
HO01 HO02 HO03 HO04 HO05 HO06 HO07 HO08 HO09 HO10
IO01 IO02 IO03 IO04 IO05 IO06 IO07 IO08 IO09 IO10
JO01 JO02 JO03 JO04 JO05 JO06 JO07 JO08 JO09 JO10
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PO01 PO02 PO03 PO04 PO05 PO06 PO07 PO08 PO09 PO10
QO01 QO02 QO03 QO04 QO05 QO06 QO07 QO08 QO09 QO10
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ZO01 ZO02 ZO03 ZO04 ZO05 ZO06 ZO07 ZO08 ZO09 ZO10

Legend:

- Field boundary
- Square boundary
- International boundary
- State and Provincial boundary

This ARRL Grid Locator map is based on the worldwide "Standard" system. The first two characters (letters) constitute the 2° X 10° field. This is followed by two numbers designating the 2' X 1' square. To indicate location more precisely, 5th and 6th characters (letters) are used to indicate the 5' X 2.5' sub-square. More information on grid location and the ARRL VHF (HF) Century Club Awards (based on contacting 100 grid squares) can be obtained from the Headquarters of the American Radio Relay League, 225 Main Street, Newington, CT 06111, U.S.A.

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The American Radio Relay League, Inc.

From: VE3RHJ

A big THANK YOU to all who came out to help with the Santa Claus Parade in Owen Sound this last Saturday! Ten GBARC members worked for the duration: Gene IJD, Gary IOD, John JRF, Norm NBJ, Tom TSA, Aubrey TUQ, John TXB, Brad RHJ, Steve XKM, and Bob XOX...plus an eleventh ham, Doug VE3TVD from the Blue Mountain ARC. Thanks also to Marv ACI and Tom NEM who came to help but were unable to stay for the whole event. Kudos to our 2m net coordinator, John VA3JRF, for organizing a splendid turnout this year!

- Brad VE3RHJ

From VE3LKD

Here's a copy of the thank you letter that my XYL is sending to John VA3JRF on behalf of the Kiwanis Club:

Dear John,

On behalf of the Kiwanis Club of Owen Sound, I'd like to thank the members of your club who assisted us with the 50th Santa Claus Parade in Owen Sound on November 18th, 1995. We had the largest ever parade to line up (over 100 units!) and probably the largest ever crowds lining the streets.

The parade may have seemed to be organized chaos to some of your members, but it went off with very few problems. And this wouldn't have happened without all the help your members gave us. We couldn't have done it without you! Please give your group a well-earned thanks from us.

Hope to see your club participate in next year's parade.

Sincerely,

Linda Droine

Co-Chairman, Santa Claus Parade Committee

Split Rail Festival 1995



VE3XKM VE3FFN VA3RP VA3AAZ AND XYL

PHOTO'S BY JOHN VE3TXB



VE3BQW VA3RP VE3XKM VA3AAZ VE3FFN