

Second Class Mail Registration
Number 5073

TCA



FEBRUARY 1986

The Canadian Amateur
Radio Magazine

La Revue des Radio
Amateurs Canadiens

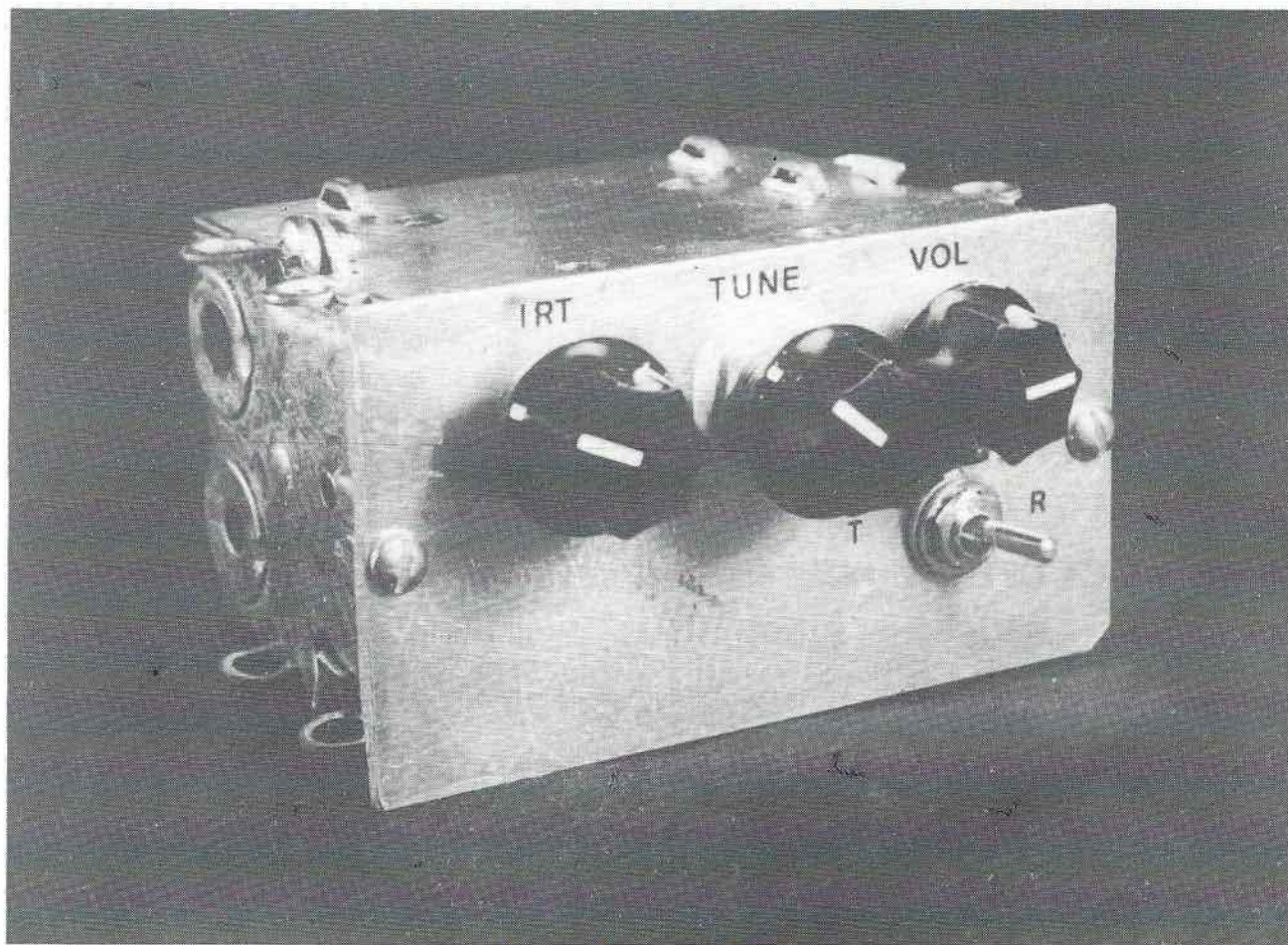
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—See Page 26



Mark Space's FOXX

**Crosswaves — JRSD Fund Update
Readers reply to Mike VE2AM
— More —**

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February 1986

Vol. 14 No. 2

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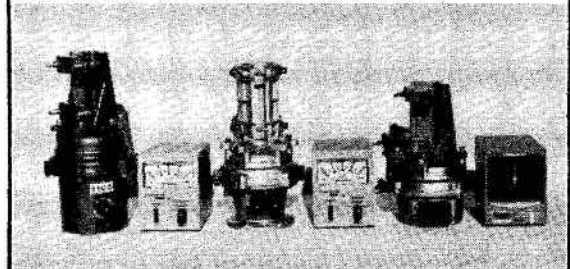
The Canadian Amateur Radio Federation, Inc. is incorporated and operates under a federal charter, with the following objectives:

1. To act as a coordinating body of Amateur radio organizations in Canada;
2. To act as a liaison agency between its members and other Amateur organizations in Canada and other countries;
3. To act as a liaison and advisory agency between its members and the Department of Communications;
4. To promote the interests of Amateur radio operators through a program of technical and general education in Amateur matters.



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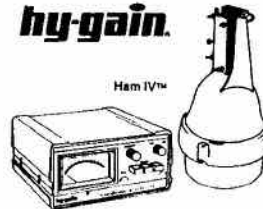


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Note: All items are used unless indicated otherwise. Items never stocked "in depth" and in many cases only 1 or 2 of each are in stock. This listing is correct at time of submitting ad to printers which is never less than 40 days before the 1st of the month of publication date. All dimensions given are in inches. Weights are the unpacked/uncrated weights. Depending on weight & size, shipments may be by rail, truck, post, bus, or parcel service.

Signal generator, military BC1236A. Calibrated attenuator, built in voltmeter and 110v pwr supply. Covers 15-40 MHz and 90-220 MHz in 2 bands. Portable case with protective lid. Size 14x12x10 deep. \$15.00.

HF exciters, TMC Model STE, SSB solid state units. Self contained pwr supply, SSB filter etc. Nice internal construction. Control for CW/SSB/20db carrier/AME/MCW. Plug in RF modules to cover the range 2-30MHz. One module included with each unit usually in 2-4 MHz range. Modules may be modified. Rack mounting, size 19x1-3/4x15 deep. \$20.00.

VHF receivers, Federal Electric FTL-14/NUS1647. 10 channel manual or remote select, covers 100-160 MHz. 2" meter for osc current. Built in pwr supply, blower cooled. Designed for rack mounting, size 19x19x19 deep. \$18.00.

Antenna multicoupler, TMC Model AMC6-2/75U. Six outputs all S0239 type coax fittings. Self contained pwr supply, rack mounting, size 19x8-3/4x10 deep. \$10.00.

Facsimile demodulator, TMC Model XFD-1. Rack mounting, size 19x3-1/2x5 deep. No data. \$8.00.

Micro-micrommeter made by Keithley Instruments, Model 410. Uses 4" square meter to read 10x10 to the minus 4 down to 3x10 to the minus thirteen in 20 ranges. Designed for rack mounting size 19x5x10 deep. Self contained pwr supply. \$75.00.

Sound survey meter, General Radio Model 1555A. Built in mic., size 6x3x2. 2" sq. meter. \$18.00.

Kodak print straightener Model D. Meter driven 14" canvas apron, adjustable water heating unit, overall size 19x12x22 deep. Table top design. \$10.00.

Print dryer Rexo Model 66. Two photographic surfaces approx. 18x24 each. Adjustable mounting stand, adjustable thermostat control. \$10.00.

Scope dollies, Tektronix Scope-mobile Model 500/53A. Built in storage drawer, twin compartments to hold 500 series plugins, rear mounted power bar, bottom storage shelf, casters. \$85.00.

Scope dollies, Tektronix Scope-mobile Model C/200-1. Built in storage drawer, bottom shelf, and casters. Oscilloscope table has adjustable tilting feature. \$110.00.

Line level test set, Sierra Model 850A-1. Built in 3x2 CRT calibrated in Db and ohms on the Y axis and calibrated in frequency on the X axis. Separate digital frequency display. 8KHz shift, 30-20000 and 200-4000 receive or xmt. Auto or manual tuning, adjustable sweep return loss and xmt level. All solid state, table cabinet. Size 17x5x12 deep. \$500.00.

Echo boxes, military TS-488/UP covers 8990-9610MHz. With 3" D:20ua meter, calibrated W/G piston type attenuator. Very nice brass tuneable cavity overall size 9x3-3/4. Appears that range can be altered by mechanical modification. Type N fittings throughout plus W/G to N adaptors. In gasketed aluminum carrying box with removable lid size 8x10x16-1/2. Some accessories including spare 1N23C xtals, horn antenna, coax length with fittings. \$25.00.

Collins Radio control console Model 913Q3. Brand new in original packing. With handset. 20 channel thumbwheel selector as well as controls for Auto Alarm, lights, clarifier, squelch, mode etc. Built in speaker. Approx. size 10x18x10 high. \$55.00.

Wood operating console made by Measurement Engineering Ltd. On castors. "U" shaped. Left & right horizontal desk top measures 13x22; horizontal front desk portion measures 12x26; sloping front portion measures 5x32. Overall size approx. 52x48x58 high. With rear doors & inside storage space for equipment, etc. Specially priced at \$25.00.

Canadian Navy gunnery console made by Saab in Sweden. Very interesting unit 20x66x45 high capable of simulating 3 batteries of 4 guns each. With separate fire controls as well as controls for setting fuse length, altitude, flare, fragmentation, etc. All solid state with over 28 controls and 28 push buttons. Computer control panel has indicators for sector, parity check, burst, etc. No manual or data. Full of PCB's, pwr supplies, etc. \$140.00.

British Royal Navy deck navigation watches. These are Elgin 2" diameter pocket style watches with sweep second hand in chrome/stainless steel cases. Come in lined mahogany cases 5x3-1/2x1-1/2 with glass window in lid to view watch. Watch appearance is exceptional. With military broad arrow marking on dial face as well as engraved on rear of case. This item rarely seen on today's market. \$175.00.

Interesting conversation piece. Heavy chrome plated brass assembly used in operating rooms to contain the anesthetic compound Penthrane. Unit approx. 8x5 diameter. Contains chamber for chemical, calibrated valve, contents indicator plus various fittings, inlet, outlets, etc. Very highly polished & in new/reconditioned shape. Original cost easily over 100 times the low price of \$3.00.

Swiss Mettler ultra micro chemical balance or scales. Model UM7 for table top use. Microscope type eyepiece to view both scale image and micrometer. Full of lenses, mirrors, prisms, etc. to direct various light beams. Overall size 12x18x18. With manual. \$50.00.

Pulse generator, GR Model 1395A mainframe complete with two Model 1395-P1 pulse unit plugins, three Model 1395-P2 pulse delay plugins, one Model 1395-P3 pulse shaper plugin and one Model 1395-9604 power plugin. With manual. \$125.00.

Bulk tape demagnetizer made by Consolidated Electrodynamics Model TD2903-4A. Blower cooled heavy demag xmr. Operates on 115v, automatic operation. Size 19x16x22 deep. \$35.00.

Universal M/W power supply Model ZB17A made by FXR. Contains 7 meters to read filament, collector, anode, G1, and G2/3/4 voltage and current. Also two meters to read beam volts & beam current. Built in modulator. Beam voltage adjustable 0-3500 volts. Rack unit installed in cabinet 19x24x19 deep with side carrying handles. \$50.00.

Magnetic tape recorder/reproducer, Sangamo Model 3500. Six speeds, 14 channels, 7 track head. Accepts up to 16" reels. FM & direct recording. Rewind & fast forward at 750 ft/min. Coax type reel drive, bi-directional operation. Complete with control unit for loop drive operation, regulated pwr supply, reels of tape and box of assorted plugin modules. Complete system mounted in very nice blue rack cabinet with hinged rear door, hinged access side doors, hinged front dust covers and castors. Overall size approx. 58x22x24 deep. \$160.00.

Rack cabinets, heavy construction with front & rear tapped rails allowing rack panels to be installed on either end. Complete with top ventilating fan. Size approx. 72x29 deep. Available in the following forms:

- | | |
|---|--|
| (a) less side panels & rear door, with pwr distribution box @ \$25.00 | (b) As above but with rear door @ \$30.00 |
| (c) As in (a) above but also with vertical power bar. U gnd rept. @ \$40.00 | (d) As in (c) above but also with rubber foot rest and castors @ \$65.00 |

Pulse generator, Steinwood Industries Model TPG 3-70. 10, 100, and 100 pps. Battery operated, solid state. Compact case 5x8x3. \$15.00.

Small medical wide mouth glass bottles similar to the old cream bottles. With pouring lip & calibrated in oz. and cc. These are brand new 6 oz. bottles packed 72 to a case. Made by Professional Specialties Co. for urine samples. Very handy as disposable mixing bottles for paint, libreglass, etc. An attractive bargain at \$10.00 per case.

Shaking incubator, Dubnoff Metabolic. All stainless steel with built in temperature indicator & heater. Overall size 14x13x23. Shaking tray 10-1/2x10-1/2. \$20.00.

Power supply made by Power Mate Corp., Model BP118. Regulated, voltage and current limiting. Separate meters for volts and current. 0-30 volts and 0-1 amp. Size 7x4x8 deep. \$50.00.

RF impedance bridge GR Model 1806A covering 400Hz to 60MHz. Reactance ± 5000 OHMS. Resistance 0-1000 OHMS. Size 12x9x10 deep. Weight 23 lbs. Measures directly R & X of ant., transmission lines, networks & components. \$200.00.

VOM, AVO Model 8. Mirrored scale. AC 2.5 to 1000V in 6 ranges, DC 2.5 to 1000V in 7 ranges; AC amps 100mv to 10A in 4 ranges; DC amps 50ua to 10A in 7 ranges. Resistance 0.5 ohms to 20 megohms. Built in overload cutout. Size 7-1/2x6-1/2x6. \$30.00.

RF power meter, Narda Model 443R. Cabinet style 7x7x12. 0.3uw to 100mw in 24 scales. Recorder output, built in charger for battery operation. With Narda Model 472 coax thermocouple mount or head 0.03-100mw. \$85.00.

Chart recorder, Cole Parmer Model Mark VII. Operates from 110 line or battery pack consisting of 8 Ni-cad batteries (D Cells). Movement 0-1MA, solid state amp adjustable span and damping controls. Uses 4-1/2" paper. Case size 9x7x10 deep. Built in battery charger. With batteries. \$30.

Traffic speed measuring unit. Old style which uses two timing hoses across road. Operates from 6 volts DC. Indicator calibrated from 8MPH to 100MPH. In aluminum case 11x10x10. \$15.00.

Colour TV monitor, Sony solid state Model 1200U Trinitron Colour Monitor. Jacks on rear for VTR. Monitor audio & video; line audio & video; TV out audio & video. CRT mask 10x8, diagonal 12". Portable unit with handle on top. \$165.00.

Audio amplifier, Philips EL5342. No data. Tube type, push-pull output, built in pwr supply, 3 slider controls, aluminum case 6x11x16 deep. sloping front panel. \$8.00.

Antique balance or scales made by Rollet Smith. Contained in wood storage case 11-1/2x12-1/2x7-1/2 deep. Unit has circular scale, reads up to 125mg, each division 0.5 mg. Levelling feet and bubble level. Glass enclosure to protect pan (pan missing). With instruction sheet dated 1936 superceded a 1933 sheet. \$45.00.

Power supplies, regulated adjustable Lambda Model LA8-08BM, solid state, dual meters. 75 to 330 Volts DC & 0 to 800 MA. Thermal overload, rack mounting 3-1/2x19x14-1/2 deep. \$55.00.

Vacuum tube voltmeter, HP Model 400D. Covers 10 MV to 300 V in 12 ranges over 10Hz to 4MHz. AC operated, cabinet mount size 7-1/2x11-1/2x12 deep. Weight 18 lbs. \$25.00.

DC microvolt-ammeter, HP Model 425A. Positive & negative voltages from 10uv to 1v in 11 steps. Pos. & Neg. currents from 10pa to 3ma in 18 steps. AC operated, cabinet mount. Size 7x12x12 deep. Weight 17 lbs. \$50.00.

Dictating units, reel to reel made by Philips. Size 10x4x7 deep, uses 1/4" tape. Complete with microphone, earphones and a manual. Operate from AC pwr. \$6.00.

Utility drawer for rack mounting. Similar to Hammond 1409-B. Open top deep chassis type on slides. Metal pull handle, grey finish. Overall 5-1/4x19x15 deep. Like new. \$25.00.

Digital to analog converters, HP Model 580A. Accept 4 line BCD input & provide output for conventional strip chart and XY chart recorders. Operate from AC pwr. Size 17x4x11 deep, lab'g cabinet convertible to rack mounting. \$35.00.

As above except in table cabinet size 8x6-1/2x9 deep. Wt. 8 lbs. \$40.00.

Vinyl tubing (spaghetti tubing) Various sizes & colours, no selection possible at \$1.00/spool.

Isolation xmr, Hammond Model 95795. Xmr with adj. taps mounted in cabinet 13x8x8 deep. Rated 690VA, fused & with 4" square 0-150V meter. Duplex recep. on front panel. \$25.00.

Power supply, regulated Sola Model 281125. input 100-130VAC, output 125VDC at 2 amps. Rack mounting 19x5-1/4x9 deep. \$5.00.



Multimeters, solid state 3 digit plus polarity indicator. Made by Fairchild Model 7050. 1.5V to 1.0KV in 4 steps. 1.5 ohms to 15 Megohms in 5 steps. AC operated. \$20.00.

Audio VTVM, Heathkit Model AV3. Ten ranges 0.01 to 300 volts. Size 4-1/2x7-1/2x4 deep. With manual \$8.00; less manual at \$5.00 and with cracked plastic meter case.

Tone DC converter, solid state Type FES 2038D. Built in dual Lambda regulated pwr supply, filtered and regenerated output. Size 19x3-1/2x17 deep. \$20.00.

Demodulator, IF Type MD-766/UR. Video band width & IF bandwidth controls. FM/AM/Pulse. Input attenuator, RF/IF and AF gain controls, signal strength and tuning meters. Solid state. Size 19x3-1/2x18 deep. Built in AC pwr supply. \$50.00.

Beat Frequency Audio Oscillator, Bruel & Kjoer Model 1015. Covers 2Hz to 4 KHz in 2 ranges. 4" square output meter. Size 20x16x8 deep. Impedance matching 60,600 and 6000 ohms. Built in 60Hz calibrator. \$125.00.

Chart recorders, Mosley Model 680. Solid state built in amplifier 5MV to 100V in 10 ranges. 8 speeds, size 8x6x8 deep. Uses 6 inch paper. Operates off 110v 60Hz. \$25.00.

Chart recorder, Esterline Angus Model AW. 115V 60Hz chart drive with pen and set of speed change gears. Movement 0-1 MA. \$75.00.

Fax transceivers, Muirhead Courier Model K-442-G. Appearance like new. Complete with manuals, spares kit and 4 rolls of paper. Uses dry paper process. \$200.00 Extra paper available at \$10.00 per box of two rolls 9"x350" with purchase of machine.

Flowmeter kits in hinged wooden cases 6x10x6 deep. Units have calibrated glass tube mounted in stand with floating ball. Primarily for gas/air flow. \$10.00.

Plotter, XY type made by Varian Model 1130. Vacuum paper hold down. Size 21x19x6 high. Accepts 11x17 or 8-1/2x11 chart paper. Weight 35 lbs. With manual \$80.00.

Receivers/field strength meters, Stoddart Model NM10A covering 14KHz to 250KHz in 4 bands. Calibrated attenuator, uv field strength meter, BFO, recorder and scope outputs. With separate power supply but less cables and accessories. Size rcvr unit 7x18x9 deep. \$50.00.

Pulse generator, General Radio Model 809A. Size 16x9x11. Controls for phase, amplitude, width and output. \$25.00.

Frequency synthesizer Model XUC made by Rohde and Schwarz. Covers 470MHz to 1000MHz. Also fixed output frequencies of 0.1, 1.0 and 10.0 MHz. 50 ohm output. Mean daily drift less than 2 x 10 to the minus 9. Complete with manual. \$125.00.

Gas chromatograph, Barber Coleman Model 5320-100 with twin flame detectors. Size 18x19x24 deep with a 5x7x7 oven. Column oven operates at 400 degree C. Built in electrometer with 12 step attenuator. Flow rate 0-200CC/min. Complete with manual. \$150.00.

Audio signal generators, HP Model 205A covering 19Hz to 20000Hz. Calibrated and metered output. Adjustable load impedance of 50,200, 600 or 5000 ohms. \$45.00.

Test oscillator, HP Model 650A covering 90Hz to 10MHz in 6 bands. Calibrated output meter & attenuator. Max output level 3 volts. \$90.00.

CO analyzer made by Mine Safety Appliances their Model D. Portable carbon monoxide unit with shoulder strap. Measures 0-500 parts/million. Direct reading on 2" meter. Size 5x6x9. With manual. \$50.00.

Ozone generator made by Tritech Inc. Size 6x9x11 deep. AC operated. With variable & fixed flow controls and flow control shutter. Internal UV source. \$20.00.

Centrifuge International size 3. With variable speed 3 phase 550V 60Hz motor, speed control, tachometer and wiring diagrams. Size 32x50x41 high. Weight 1300 lbs. Mounted on steel "truck". Complete with #261 windshield 4 place head and four #369 1000ml slotted cups. \$200.00.

Oscilloscope chassis units 3x2x12 deep. Contain 2" CRT with 1-3/4x1 mask. Front controls for stability, Rec/Rep, sweep 30Hz to 100KHz in 8 ranges. Rear adjustments usual gain, focus, intensity etc. Pwr and signal input on rear. All solid state, very compact. No case or pwr supply. \$18.00. Rack mounted pwr supply designed to accept 7 of these miniature scope units which plug in from the front. 110v to 60Hz operation. Pwr supply only \$20.00. Units made by Electro Instruments.

Microwave signal generator, Military TS147DIUP covering 8.8-9.6GHz. In aluminum case with lid. Size 11x19x13, weight 47 lbs. Built in AC pwr supply. Lots of W/G items including E and H bends, thermistor mounts, klystron mount with W/G, frequency meter unit, calibrated att., step att., etc. With manual. \$20.00.

Overhead projectors, Beseler with 14" lens. Accepts up to approx. 10x10 transparency. Maximum projection bulb 1000 watts. \$45.00.

Sound level meter, Phon meter Model B. Built in mic., 50-80000Hz. 40-125 db. Battery operated. Size 5x3-1/2x2. Leather case and manual. Wt. 1.06 lbs. Made by Heirick Spyrri, Switzerland. \$20.00.

Water flow meters, Neptune Meters Ltd. Model Trident. Measures in litres, 7 digit. With impulse switch for remote indication. 1" inlet and outlet. \$45.00.

Remote indicators for use with above \$15.00.

Digital voltmeter, Solartron Model LM1420. 2. Six ranges 20mv to 1000v. Switchable filter. Auto or manual sample. Rack mounting, 19x5x15 deep. Four digit, solid state. \$25.00.

Video amplifier strip, dual units made by Vicom Model V200VA, solid state. Each unit with gain and HF gain controls, camera and monitor jacks on rear. Each with self-contained pwr supply. Size 19x1-3/4x6 deep. Units may be separated by cutting 1-3/4" rack strip. \$50.00.

Tower, Hygain HG52S. 52 ft. crankup. New demonstrator. complete with 3 coax arms, 10-ft. stub mast and HD thrust bearing. \$1200.00.

Chart plotter, Calcomp Model 560 XY type. Carriage & pen can run either single step or continuous. Accepts 12" paper. Overall size 18x9x14 deep. \$50.00.

Chart recorder, Varian Model G10. Single speed, 50mv sensitivity. Uses 6-1/2" paper. With copy of manual & 1 roll chart paper. Size 10x7x8 deep. \$20.00.

Portable aluminum case with carrying handle for above. \$7.00.

Stabilized RF ratio meter (SWR) made by Weinschel Engineering Model 1810. Very nice solid state unit, table cabinet 7x17x17 deep. Recorder output, adjustable BW, direct reading 0-20 db in 4 ranges. Dual scales, built in calibrated signal attenuator for input, BNC fittings. Less bolometer head. \$100.00.

Yaesu Model YU901 multiscopes with bandscope option installed. Appearance excellent plus. Complete with cables and manual. \$275.00.

Beam antenna, Telex Hy-gain 4 element triband Explorer, new, boxed. \$300.00.

Oscilloscope, Military ANIUSM-50. Response 3Hz to 15MHz with sweep delay. 3" CRT. Built in markers at 0.2, 1, 5, 20, 100, 500, 2000 usec. Size 15x19x16. Wt. 70 lbs. With protective front cover. With schematic. \$59.00.

Multimeter, ME-9/TS-352, portable VOM. Aluminum case with protective lid. 1000 ohms/volt AC/DC or 20000 ohms/volt DC only. Measures AC-DC volts 2.5 to 1000V in 6 ranges. DC amps from 250 ua to 10 amps. Ohms from x1 to x10K. 4" meter. Jack for measuring 5000VDC. \$35.00.

Variac, GR Model W20. Rated 20 amps 120V. With knob & dial plate. \$40.00.

Chart recorder, HP Model 7123A. 10v span, 6"/min. event marker, 10" paper. Size 3-1/2x17x19 deep. Weight 42 lbs. Built in pwr supply option. \$75.00.

Scope dolly, mostly Tektronix Model 500. Fortunate purchase allows these to be offered at \$55.00. All come with rear pwr bar, drawer, bottom shelf and air on castors.

Power supplies, HP Model 721A. Regulated and output protected. 0-30 volts DC at 0-150 MA. Size 3x4x5 deep, weight 4 lbs. Built in meter for volts & current. \$25.00.

Power supply, Tektronix Model 133. Powers any 500 series lettered plug in. Size 10x7x19 deep. Weight 36 lbs. \$75.00.

Crystal bandpass filters, plugin type using octal socket. Made by Spectral Dynamics Corp. Model SD100AR-2A. Centre freq 100KHz, 3Db bandwidth 2Hz. Z1 = Z2 = 3K ohms. Size 4x4x2. \$15.00.

Deviation meters, maker unknown. Appears to read frequency as well as deviation. 3" square meter. Deviation range 10KHz and 100KHz in two positions. Built in AC pwr supply. Two BNC inputs for RF and Test. Channel selector control 1 to 20 in 4 positions. All solid state. Table case 8x12x7 deep. \$25.00.

Telegraph word generator made by Digttech Inc., Model DT103. Portable case 7x8x9 deep. Bias and baud speed controls. Any 5 letter word can be set up via switches. Loop current meter. 110V 60Hz operation. Solid state. \$20.00.

Here's an item with many uses. Memory disc packs. Multilayer oxide coated aluminum discs in protective plastic covers used with the larger computers. Size 14" diameter by 6 high. Plastic covers useful for pie or cake covers??? Only \$1.00.

Test tubes, new pryex brand 50ml size. Appro. 1" in diameter by 8 long. 50c each.

Strong Motion Recorders Model AR240. Made by Earth Sciences, a Teledyne Co. Used for seismic recording. Lots of light sources and lenses. Built in DC test voltmeter with motor driven recording magazines and 1 spare magazine. Contained in aluminum cabinet gasket sealed with carrying handles. Size 14x14x15. \$40.00.

Magtape unit Dec Model TU-10 seven channel. Made by Digital Equipment Corp. Installed in very nice rack cabinet 6' high with removable sides, rear door and castors. Included is top fan, drive blower, power distribution box, power supplies and controller. \$150.00.

Optical tape reader, HP Model 2748B. 500 char/sec; 8 level code. Table cabinet 17x7x16 deep. Complete with manuals. \$45.00.

Chart recorder, single pen Moseley Model 80A. Uses 10-1/2" paper. Size 15x10x15 deep with rack side adaptors. Chart mechanism mounted on slides in cabinet. Amplifier 5mv to 100v in 10 ranges. 6 pushbutton chart speeds of 2 to 60 inches/min. \$30.00.

Blueprint copier, Bruning Model PD80. Accepts paper up to approx. 46 inches wide. \$85.00.

Oscilloscope, Tektronix Model 551, dual gun dual plugin mainframe DC-25MHz bandwidth. Supplied with two dual trace plugins Models 535/4C — 4 traces produced on CRT. \$300.00.

Oscilloscope, Tektronix Model 555, dual gun. Uses 4 plugins, mainframe DC - 30MHz bandwidth. With sweep delay. Supplied with 21A and 22A time base plugins and a Type L and Type K plugin. Unit defective, no sweep. \$300.00.

Wow and Flutter meter, Bruno Woelke Model ME101 (German). Has two 3" square meters for % drift and % wow/flutter. Measures between .02% and 2.5% either linear or weighted or minus. Size 12x8x7 deep. 110v operation. With manual. \$40.00.

VTVM, HP Model 412A also measures ohms and amps. Mirror scale. 1mv - 1000v and 1ua to 1a in 13 ranges. Also 1 ohm to 100 megohms in 9 ranges. Size 11-1/2x7-1/2x10 deep. Wt. 12 lbs. Complete with probe/test leads. \$45.00.

Signal generator HP 608C, 10-480 MHz in 5 bands. Calibrated att and output meter. Size 20-3/4x12-1/2x14-3/4 deep. Cabinet style. Wt. 46 lbs. With manual. \$150.00.

Signal generator HP 608DR, 10-420 MHz in 5 bands. Built in xtal calibrator. Calibrated att and output meter. Rack model, size 19x14x18-3/4 deep. Wt. 62 lbs. May have minor damage such as cracked knobs, cracked meter glass, etc. \$75.00.

Signal generator HP 608A, 50 KHz to 65 MHz in 6 bands. Built in xtal calibrator. Calibrated att and output meter. Cabinet style. Size 20-3/4x12-1/2x14-3/4. Wt. 46 lbs. With manual. \$200.00.

Xmtr, Racial 10KW linear. Model TA184C with Racial exciter Model MA228F. Freq synthesizer controlled 2-30 MHz, all modes SSB/AFSK/AM/CW, manual or servo tuned. 4CX10000D in final. Complete with line voltage regulator & spares including 4CX10000D tubes, sockets, servomotors, transformers, etc. Will crate for shipping; pickup recommended. \$5000.00.

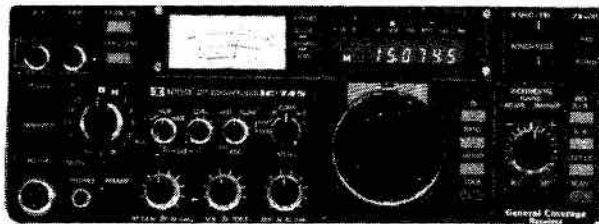
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ICOM IC-751 BASE REGULAR \$1794.00
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- 32 Memories
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- 12 VDC Operation
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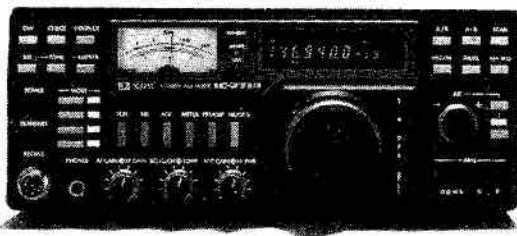
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50 - 150MHz (VHF Band) 50W
Meter Sensitivity 100 uA F.S.D.
Connector M Type (SO-239) 1 x TX, 2x ANT
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Accessory Rare Antenna 1pc.

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Power Range 0 - 20, 200, 1000 watt - 3 ranges ±10%
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Impedance 50 - 52 ohms
Punctual Power 3.5 - 30MHz - 1000 watt
50 - 150MHz - 50 watt
Connector M TYPE (SO-239)
Accessories Connector cable for illumination lamp.
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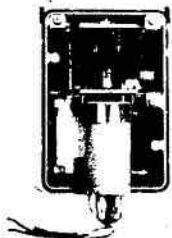
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30W Maximum
Frequency Range: DC-150MHz
V.S.W.R.: Below 1.2

Major features: MR-750PE; MR-750E; MR-750U

- The main rotator frame can house up to 4 motors to increase the torque and load capacity according to requirements of your antenna system at present and in the future.
- Each motor unit has its own brake system, "SUPER WEDGE & CLUTCH" which works independently from the main frame gear train.
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- Low voltage motors (24 V AC) are used to ensure safety during installation work on the antenna tower.
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- The direction panel of the controller can be easily removed to calibrate the direction pointer and change the great circle map.
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 - To offer the exceptional holding power.
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Rotation time	MR-750E/PE		MR-300E	
	50 Hz	70 seconds (50 Hz input)	25 seconds (50 Hz input)	60 Hz
Output torque				
Brake power				
1 motor	\$449*	(608 lbs/inch) (5,215 lbs/inch)	250 kg/cm (217 lbs/inch)	2,000 kg/cm (1,738 lbs/inch)
2 motors	\$598*	(1,217 lbs/inch) (9,560 lbs/inch)	500 kg/cm (435 lbs/inch)	4,000 kg/cm (3,476 lbs/inch)
3 motors	\$747*	(1,825 lbs/inch) (13,906 lbs/inch)	750 kg/cm (652 lbs/inch)	6,000 kg/cm (5,215 lbs/inch)
4 motors	\$896*	(2,433 lbs/inch) (18,251 lbs/inch)	1,000 kg/cm (869 lbs/inch)	8,000 kg/cm (6,953 lbs/inch)
Rotation angle	37.5 degrees			
Permissible mast size	38 mm - 63 mm (diameter)			
Control cable	6-wire cable 0.5sq - 1.25sq (AWG16/18/20 etc.)			
Continuous running	5 minutes Max. permissible			
Unit weight	7.5 kg (with 1 motor unit fitted)			

* ADD \$50 for PE Model.

DAIWA

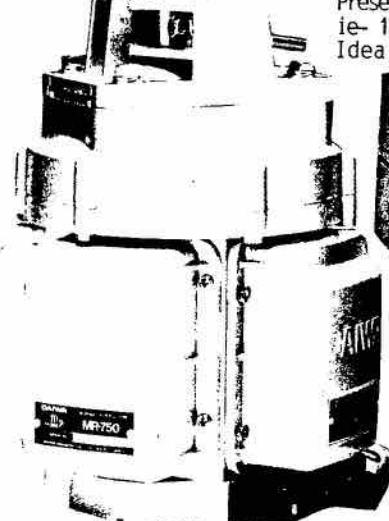
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Vertical Load 200kg (440lbs)
End-of-Rotation Stopper Mechanical
Rotation Time 60sec/50Hz, 50sec/60Hz
\$ ELEVATION (KR-500)
Rotation Torque 1000kg - Cm (866lbs - in)
Stationary Brake Torque 2000kg - Cm (1730lbs - in)
End-of-Rotation Stopper Mechanical
Rotation 0 to 180 (+/-)°
Permissible Mast Size 438 - 443
Permissible Boom Size 432 - 443
Continuous Operation Time Max. 5minutes
Antenna Wind Load Area Less than 0.8m² (8.5sqft)
Control Cable 6-Conductor
Input Voltage AC 115/230V, 50Hz/60Hz
Motor (Rotor Unit) AC24V
Meter Indication Differential
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The LEARNING ROUTINE teaches individual characters. Each character is sent at 20 WPM, but with 3 seconds between characters so you will learn the code by sound. Let's suppose you have progressed to session 5. The new letter that you will be learning is "T". Select "groups of 1" and the program sends: "TTTTT....." Select "groups of 2" and random 2-letter groups are sent consisting of "T" and any 1 of 4 previously learned letters: "TK BQ QT FB TO TF....." Select "5 letter groups" and the program sends at random all 5 letters that you have learned in 5 letter groups: "FKBOT BQFKT TBQKF BTFBK QBFTK....." The number of times the new character appears can be selected so that it is sent all of the time, half of the time or at random.

The PROFICIENCY ROUTINE sends a random sequence of characters with options as to practice duration, start speeds and finish speed. For example, you can start at 5 WPM and the speed will gradually increase to 20 WPM over a 10-minute period.

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In the RECEIVING GAME, a series of thunderclouds passes over the ham antennas in a small town. After the characters have been sent, a lightning bolt is released. If you correctly type in the characters that were sent, you zap the lightning bolt. If not, or you are too slow, the bolt will knock down one of the antennas. The game is over when 19 antennas are down.

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Simply Powerful

The versatile Pakratt controller shows messages and connect status simultaneously on your Commodore with a unique split-screen display. And it lets you send letter-perfect text from the text editor software while monitoring incoming messages. The 20K byte QSO buffer stores more than 20 video screens of text! Disk commands let you save specific operating parameters for quick set-up for emergency services, clubs, and multiple frequency use. And the Pakratt controller's standard, TAPR style modem gives you 300 and 1200 baud operation with great HF/VHF performance.

We can't possibly list all of the important features of Pakratt here. But the absolutely best part of the Pakratt PK-64 is that it's at your dealer now. So stop reading, run down to your local dealer, and check Pakratt out. Because the real challenge will be to find one after the other hams see it.

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- Easy, positive tuning with triple LED tuning indicator;
- AFSK sine wave output;
- FSK output;
- Plus or minus CW output keying;
- Automatic PTT;
- Scope outputs available;
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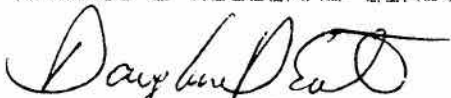
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We trust the foregoing outline will be of some assistance to you.

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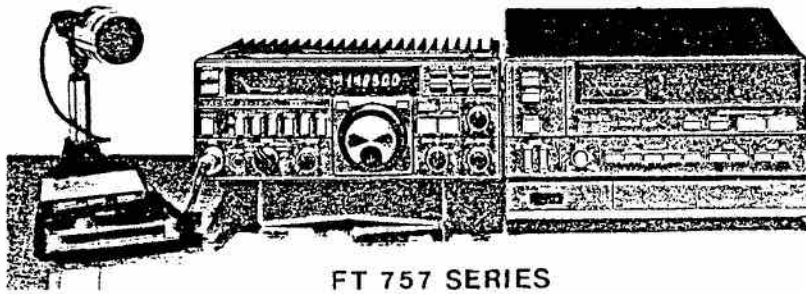

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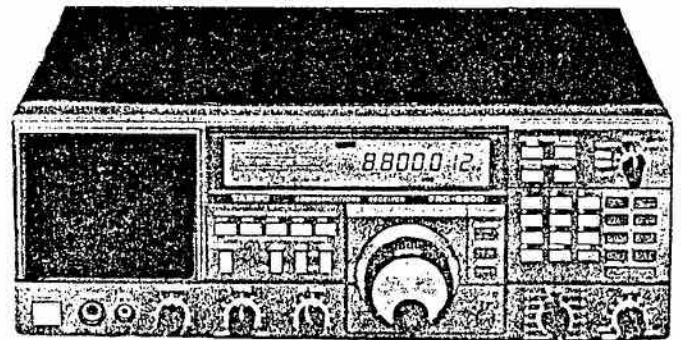
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COMPUTERS

Lyle Blake

Please address correspondence to the Editor at Box 855, Hawkesbury, Ontario K6A 3C9, telephone 613-632-9847.

COVER PICTURE

Mark built the FOXX, as you know. He cast about for a cabinet, and came up with this cheap and serviceable one.

Several people have asked about the Federation's position with regard to the Jack Ravenscroft case.

CARF is doing everything in its power to lobby and advise in all aspects of this case. Both our head office and DOC liaison have worked hard at informing and convincing officials in many departments of its importance. Ark Stark VE3ZS and Ralph Cameron VE3BBM have put in many hours of work.

We have tried to convince officials and agencies that this case could be very important to their industry. We have received confidential indications that other departments are taking it seriously: their actions will hinge on its outcome.

This is a court case. We will keep you up to date on results but we also don't want to make pre-trial publicity!

All our work is done in consultation with officials and at no charge to Jack or his fund. We fully support the idea of the JRSD fund. We have advertised, solicited and collected funds for Jack; again, at no charge. However, in consultation with CRRL, CARF decided not to put a direct contribution into the fund.

Our reasoning for this is simple! This would set a precedent for the Federation. The fund is a personal fund. If we contribute to a personal fund, we are duty bound to contribute to all personal defenses. People put forth the argument that this is a precedent setting case. Of this there is no doubt!

However, there have been and probably will be other precedent setting cases. Examples are the Tower Rights By-Law in North York and even the Jim Head Case, in Picton, years ago. Each of these involved the influence of non-DOC rules and people in the case.

We are a national organization and must treat all members equally.

Every case of an Amateur being affected by RF interference is a land-

mark to him/her. I think people are naive to think CARF can assume legal defense costs for \$20.00 per year membership dues.

People seem to assume that CARF is an endless pit of money and labour. I venture a guess that if CARF had announced financial support, people would have figured that all expenses were covered and personal contributions would have been significantly less. Many CARF officials have personally contributed to the fund. I also feel that a small token contribution would be an insult.

If this were a *defense fund* for all Amateurs and had representation from across the country (not just Ottawa) to determine the support needed, we could put a motion before the board to consider contributions.

Remember only about 30% of Amateurs support national organizations. This 30% of all Amateurs would carry the legal costs for everyone. Is this fair? Should we offer support only to members? What about a case like Jack's in which the person was not a member? We can offer our behind the scenes support to any Amateur!

As a national organization our reputation would suffer greatly if we directly financially aided a case in Ottawa and did not support a case in Vancouver B.C.

However, we have tried to find a solution. An investigation by past president Don Slater VE3BID has led us to develop a group insurance which will protect Amateurs from legal costs and from liability for RF interference to any electrical device and for damage caused by their antennas and towers.

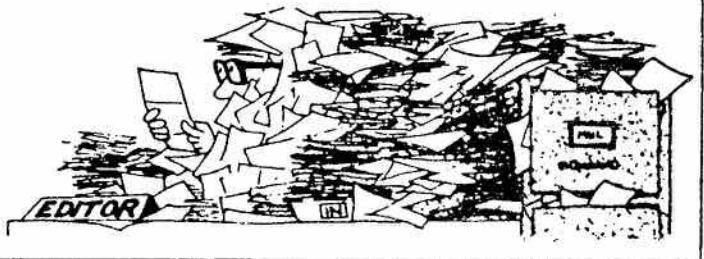
We can only offer it to CARF members as it is a group policy. Our Federation is the group. It is the only way to do it.

We have not been inactive, just quietly doing the job you expect of us!

—VE3IDW Δ



LETTERS



CARF/CRRL MERGER

I definitely agree, a CARF/CRRL merger is needed and could benefit the Canadian Amateur far more than the current situation. However, I must disagree with President Walsh, that now is the time to do so!

Especially because of DOC's proposed Amateur Service restructuring, both the undivided attention of CARF and CRRL must be given to that matter. This cannot happen if attention is being focused on a merger at the same crucial time.

73 Leigh VE1ZN
CARF-CRRL-RSGB

Read with a great deal of interest the article in December 1985 *TCA* by CARF President VE3IDW Ron Walsh.

I sincerely believe that Ron is zero beat on the time being ripe for CARF and CRRL to merge, others may think different but I have been in favour of this for a long time. I have been a member of CARF prior to getting my Amateur licence plus I presently hold the position as Section Manager (MB) ARRL/CRRL.

It is my opinion that by merging we could have a very good league to represent us with concerns or suggestions to the Federal Government.

In the past it has made me sad and disgusted with the dickering that went on between CARF and ARRL/CRRL.

Again in my opinion we have mature elected leaders in both CARF and CRRL whom I am sure could sit down and compromise to the betterment of us all.

I have in the past discussed this type of merger with a couple of individuals who stated we need competition but lo and behold they do not belong to either body??

Do we need competition or representation?
Let's forget our past squabbling and support a merger.

73, Jack Adams VE4AJE

I am strongly supportive of a merger of CARF and CRRL and I know that some if not all CRRL executives share your views and mine. The time is propitious and the task is well worth the doing. I have been a supporter of both organizations for several years, although not very vocal and I feel that one

organization is always better than two or more, when you want to get things done.

As a case in point, I am also a competitive shooter; a sport in which each discipline has a national, provincial and sometimes a local organization. This is very expensive, fragments the membership and generally leads to duplicate, less efficient operations.

Go for it, Ron!

73, Dick VE3LRB

SILENT KEY

It is with deep regret that I have to inform you of the death of Doug VE7DRO (ex WE4AFQ). Doug was a giving person, through Ham Radio he gave countless hours of his time to help people. Always available to run phone patches, to allow loved ones to keep in touch, whether they were in Alert or Middle East. He was known by many for the patches he ran from VE8RCS (Alert).

He passed away on Sept. 17, 1985. He is survived by his wife Louise, daughter Trisha and son Chris. He will be missed by all those who knew him.

Marcel VE7MNO

ON COOKED HAM

Some references were made in a recent issue of *The Canadian Amateur* to an article in a medical journal called the *Lancet* in April 1985 pertaining to the leukemia mortality rate in electrical workers in New Zealand and radio Amateurs generally. As a radio Amateur and physician, these things are of more than passing interest to me and I took the time and trouble to obtain a copy of the articles in question and read them as well as some other information provided by a number of other CARF members. It was suggested to me that some comments with respect to our service and general health might be appropriate.

Observations and articles on these subjects appear regularly in just about every Amateur radio or electronics magazine and cautions on exposure to these hazards of electrical shock and RF burns are probably the

most commonly encountered injury. There have been three articles in *TCA* of a rather comprehensive nature pertaining to these subjects. One was a book review by Peter Reuterman, June 1978 and the article 'No Cooked HAM Please' by the same author in February and March of that year.

I am enclosing a photocopy of some government guidelines with respect to electro-magnetic radio frequency radiation at various frequencies, provided to the Ottawa Amateur Radio Club by a physicist from the Department of National Defence; they may be worth publishing.

With respect to the article in the *Lancet*, the observations made are interesting, however hardly conclusive, and to a certain extent can be subjected to some criticism because of their retrospective nature and the way in which the statistics were manipulated.

Articles have appeared from time to time in various trade journals for electronic technicians working around and servicing broadcast equipment. With respect to the causes of death in more senior members of that profession, to the best of my knowledge at this date, there is no conclusive evidence to suggest that leukemia or any other type of malignancy can be related to electro-magnetic radiation including radar. X-rays, however, are another matter.

I think that a careful perusal of the articles mentioned will make anyone aware of the hazards commonly or uncommonly run into by practitioners of our hobby and I seriously doubt that there is any kind of an iceberg phenomenon involved, i.e. we are not going to suddenly discover 20 years down the road that we are all going to die of some horrible malignancy because of exposure to electro-magnetic radiation levels commonly used in Amateur practice or that there will be any grievous genetic results either.

Mr. Reuterman should be congratulated on his thoughtful and objective comments.

I enjoy reading your magazine and I look forward to more construction articles.

DE JACK ADAMS VE3JBX



RADIOFREQUENCY RADIATION SAFETY RULES FOR AMATEUR RADIO

1. Avoid RF burns caused by touching 'hot' circuits or wires.
2. Be aware of possible radiation hazards.
3. Avoid unnecessary exposures.
4. Minimize exposures when they are necessary.
5. Do not rely on the sensation of radiofrequency heating to warn of hazardous exposures.
6. Remember that all surfaces, and especially metals, are good reflectors of radio waves. This can increase exposure several fold.
7. Use the safe-distance table.

MAIN-BEAM SAFE DISTANCE FOR 1 mW/cm² (60 V/m) EXPOSURE

Radiated Power (W)	Antenna Type & Gain	
	Omnidirectional (3 dB)	Yagi (15 dB)
1	0.13 m	0.25 m
10	0.40	0.79
100	1.3	2.5
1000	4.0	7.9

A FOXX HOUND

Thank you for the note regarding my article in November *TCA*, and I can well appreciate your problems. Most comments I hear are, "It's getting better all the time" to which I agree.

I have a trivial question on the FOXX rig shown in September *TCA* where the value of the variable resistor from the first BC108 collector is unmarked. I presume its value is around 500 to 1K.

I am trying to find Ferrite cored chokes but so far those I have are of unknown value. They are likely not too critical in the circuit anyway, so chances are I will substitute the ones I have and adjust the circuit board accordingly.

If nothing else, this little article has got me sorting out my collection of transistors, NPN in one box, PNP in another and those that check poorly in the junk box or garbage.

Trouble with transistors is one minute you have it on the desk top and the next you're on your knees searching on the floor for it only to later find it stuck to your sweater. Alas, I still miss the old vacuum tubes!

Fraternally,

C.J. (Chuck) Palmer VE3AZA

Thanks for the compliment, Chuck. The resistor marked with an asterisk is adjusted to give a power output of one watt from the final amplifier. Any choke of near the correct value will serve. To keep transistors under control, see TCA for March 1985, page 45.—Editor.

ON DEREGULATION

I wish to applaud and support the article 'ON DEREGULATION' by James Gibb VE3FED, in *TCA* November 1985, 100%!

A very intelligently expressed opinion, and I think this is the point of view CARF should be expressing to DOC in the interest of all radio Amateurs.

Please record my vote on this topic. Thanks for a good magazine.

73, Bert VE7PHD

HELP!

Can you advise me as to where or how I can obtain circuit diagrams, operator's manual and/or conversion data for a Bendix TA-12G Aircraft transmitter?

73, Richard G. Moore VE3LRB
235 Epworth Ave.
London, Ont. N6A 2M2.

FROM SCOUTS CANADA

On behalf of the National Council, I extend our sincere thanks for the help and support your organization has extended to our many members across Canada. We look forward to working with you and the Canadian Ham Radio operators as we continue to serve our Canadian youth through the annual 'Jamboree on the Air' (JOTA), held the third weekend of October.

Best regards,
Phil Newsome
National Program Director

FIRST BOTSWANA

This is to let you know of some recent good fortune with the George Collins operations.

A QSO with him Nov. 1 in Lesotho yielded a QSL card on the 22nd! Talk about quick turnaround...

Then his timing in Botswana couldn't have been better appearing during the lunch hour in Saskatchewan sans QRM below 14,150 kHz. I drove the 10 miles home (temp -25C) I made the contact and returned to work on time. 18 years licenced—first Botswana.

73, Denis VE5KX

STORM WATCH

In response to your challenge for other clubs to take up the 'Storm Watch' along the 401, the Kingston Amateur Radio Club/ARES also provides the same service as offered by the Heritage Amateur Radio Club. The two clubs worked together last year in a similar endeavour after it was proposed by H.A.R.C. executive.

Our two primary operators, Ross VE3GRM (ARES Kingston Net Controller) and Jean VE3MNI are ARES members and may be found on the Kingston repeater VE3KER at 146.34/94 MHz. Auto patch facilities are available on VE3KNR at (146.19/79 MHz), however the codes

are not disclosed 'on air' due to unauthorized non-Amateur use. A quick QSY from 34/94 will get you any local number, including the weather service and road report.

The 'storm watch' is there! Use it if you must but we hope you don't have to.

73, George Sansom VE3LXA
ARES Emergency Co-ordinator.

CANADIAN BROADCASTER VESAAS

Commencing in 1948 as a relief fire alarm operator, Johnny Sandison worked its way through a fascinating career in broadcasting. Johnny's broadcasting began in 1953 at CKRM, and after 30 years on the air



he has become one of the most admired broadcasters in southern Saskatchewan. His book is a wonderful lighthearted look inside what went on behind the scenes in Regina's broadcasting history, including the stars, political bigwigs, and other radio personalities he has encountered. The text is enhanced by more than 70 photographs.

His story *Hi! I'm Johnny Sanderson* is a really fine book that we recommend highly. It is published by Bridgens Publications, 1150 8th Avenue, Regina, Sask., Canada S4R 1C9.

MORSE EXAMS

DOC is considering releasing the Morse examinations to Amateurs. Three Advanced Amateurs with 15 years or more experience between them would swear affidavits that the applicant could read Morse at 10 wpm for 3 minutes. This proposal is proceeding separately from the restructuring proposal and a decision may be expected by mid-1986.



Crosswaves

By Ralph Cameron VE3BBM
30 St. Remy Dr., Nepean, Ont. K2J 1A3

October 28, 1985
Mr. David Sumner
The American Radio Relay League
225 Main Street
Newington, CT 06111
U.S.A.
Re: VE3SR-JRSD Fund

Dear Mr. Sumner,

You are probably aware of the temporary court injunction preventing VE3SR from operating any aspect of his Amateur Radio Station. The Jack Ravenscroft Susceptibility Defence Fund was set up to help Jack defray costly civil litigation expenses (\$6,100 to date).

The prospect of being labelled a 'general nuisance' in a court of law has raised the indignation of many Canadian Amateurs. Surprisingly, many American Amateurs and at least one General Radio Service, 'REACT' group have responded financially, in a Canada wide appeal.

To date the fund has received over 420 separate donations and has grown beyond \$16,000. One U.S. old timer (84 years) sent in five one dollar bills and stated "I can give up a meal to see justice done." Is there a message here?

In Jack's case, a transmitter was deemed to interact with a furnace controller, a microwave oven, an electronic organ, several TV's and Hi-Fi equipment. Only one other neighbour mildly complained although several were polled.

The legal inference that an Amateur Station is 'interfering,' must surely be negated when the Station operates within the terms and conditions of its licence. Furthermore, the regulating authority can attest that this is so.

The other side of the argument is one of reciprocity. Many home appliances lack any form of immunity to radio emissions, although some office equipment employing micro-processors is required by law to be suppressed.

In the U.S. as well as in Canada, transmitter owners and operators are protected and governed by legislation, as shared spectrum users. Why not manufacturers who similarly use this spectrum but design equipment lacking any immunity whatsoever? The argument that market forces preclude responsible engineering should not be accepted by managers of the spectrum. While an intangible resource such as the spectrum cannot continue to be

polluted such as a river or a forest, must the Amateur fraternity resort to litigation against manufacturers and forget the spectrum experts?

The J.R.S.D. Fund has been set up to protect an Amateur and Amateurs are responding. Others would do well to support us—the implication of preventing any transmitter owner from broadcasting through a civil suit, is all too evident.

Ralph Cameron VE3BBM
Chairman, JRSD Fund
Box 8873 Ottawa,
Ont. K1G 3J2

When you write to DOC, commenting on their proposal (see January TCA), please send a copy to the editor for publication here. This will stimulate discussion, and ensure that the spectrum of opinion is widely understood.

Dr. A.K. DasGupta, Director
Medical Devices Bureau
Helath & Welfare Canada
Environmental Health Bldg
Tunneys Pasture, Ottawa

Dear Dr. Das Gupta,

This letter is written to you from a member of the Canadian Amateur Radio Federation, Electromagnetic Interference committee; and concerns an observation which begs your attention.

A local Amateur Radio Operator, Mr. Fred Noble of 839 Wingate Dr., Ottawa K1G 1S2 has reported malfunctions of an intravenous pump due to the presence of local radio frequency interference. Mr. Noble was connected to this pump at the Riverside Hospital from Nov. 16-21 (5th floor). Upon operation of a small battery operated VHF transceiver of the 'walkie-talkie' variety, the pump stopped and returned to the 'Reset' mode. It was simply manually reset to recommence pumping.

The Pump in question was a 'Model 3,' manufactured by Abbot/Shaw. (No serial number known.) The pump, as I understand, can be manually adjusted with a digital wheel arrangement to deliver 60ml/hour or 125 ml/hour dependant on requirement.

Operation of the radio equipment did not appear to affect the pump at distances greater than approximately

six feet, although no exhaustive testing was attempted.

The transceiver in question is of modern design, all solid state and manufactured by Yaesu Electronics Corporation, Japan. Model is 208R. Power output is a nominal 2½ watts into a very short antenna known as a 'rubber ducky.'

The obvious cause of this type of interference is a lack of any immunity in the pump electronics. The same situation could occur with operation of similar radio equipment by more common safety/security agency personnel in close proximity to the pump.

It would be of great interest to myself and this organization to study the electronic control circuitry of this pump. It is very likely a simple inexpensive suppression technique would completely eliminate this potential safety hazard.

Yours truly,
Ralph Cameron
Chairman, EMI Committee

Organs Again

Last month mention was made of the case of the elevated organ. In this case interference was made to a Buon Tempio electronic organ located on the 22nd floor of an apartment building.

The Amateur involved is quite successfully using a 100 watt transceiver from a 22nd floor vantage point, overlooking the Ottawa River. The neighbouring apartment experiences interference on most bands— 80m being the worst. The effect on the organ seems to be caused by ground loops. To arrive at this conclusion it was necessary to run back and forth several times between the two apartments to try different equipment settings. There is also some direct radiation.

Apt. Antenna

The antenna used is of the Marine radio variety and can be used on several bands. It is of very high quality and adequately braced and attached to the balcony metal railing. Line of sight to the neighbour's organ is less than 20 feet as the crow flies. (Several seen!)

Grounding

The apartment buildings have been built in the last 10 years and make use of a very wide metal strip joining most balconies at each floor level. It was noted that baseboard heaters in the apartments were commonly connected. It was here that



the ground loop problem was thought to occur. Some ground currents could be detected with a sensitive wave meter held close to the heater shield and the line cord from the organ. Actual effect on the organ was really quite minimal but still objectionable.

Observations

The organ line cord was lying for several feet on top of the heater base-board shield. This cord was bundled out of the way and a toroid was tried right at the back of the cabinet. It was not felt the cabinet should be opened at this point. It is better to establish one's credibility by showing the effect can be reduced by the toroid rather than jump right in! Neighbours have a right to be concerned about strangers working on their equipment— not to neglect the legal implications. Festine lente as Caesar used to say (Make haste slowly).

The toroid had a small but minimal effect on the audio note issuing from the speaker when the TX was keyed. It has been noticed before that conducted RF i.e. that on the line cord

enters the power supply and can go anywhere from there. A raucous hummy CW note is the usual result.

Time did not permit further tests at this location but three things were established which will allow continued operation at this location. a) The Amateur established a responsible relation with the neighbour soon after he was notified. There was cooperation. b) the neighbour understood why his organ was affected and was willing later to have a line filter installed internally. c) The Amateur was willing to install the ground system mentioned in March '83 QST which tends to reduce the effects of ground loops to an absolute minimum.

Conclusions

The lesson learned from this case is that sometimes it may be necessary to compromise operation, particularly in a location such as an apartment. The old days of blasting away with lots of power and gay abandon are long gone— appliance susceptibility won't permit it. Δ

Canada/UK Third Party Traffic

Two wise Amateurs called the editor to enquire about the notice in an American magazine, stating that third party traffic between Canada and the UK is now legal. This is true, but only in a very restricted sense. Certain special event licences with GB calls are permitted to handle greetings from unlicensed people to Canada, the Falkland Islands, and the U.S.A. The licensee must at all times be in control of the station. We do not have carte blanche to ask a G Amateur to phone patch Aunt Sophrony for us.

American publications are not reliable guides to Canadian matters. Wait until CARF and TCA report them! TCA aims to be first, though never the hastiest, with the news.

JRSD Fund Update— Dec. 9, 1985

VE3SR remains off the air as a result of the temporary injunction served him last July 25.

The DOC report which details results of tests run over a four day period in October has been received by Jack's legal counsel. The report confirms the absence of any interaction with the microwave oven at the plaintiff's home. It is hoped to publish excerpts from this report at a later date; however, it is presently the property of Jack's representative— his legal counsel.

The tests which were performed lacked any measurements of field strength or conducted susceptibility but were quite objective. Three inspectors and one District Manager from DOC participated and were present during most of the tests. As an independent observer at VE3SR I can state emphatically that personnel appeared professional, efficient, objective and courteous under somewhat frustrating conditions. Throughout the testing VE3SR had no knowledge of what was being tested.

To paraphrase the conclusions in the test report, there were no surprises. All of the effects being observed at the plaintiff's could be remedied by application of well-established filtering techniques.

Jack's trial has been set for the week of Jan. 13.

The JRSD fund continues to enjoy support and donations totalled over \$17,200 at the beginning of December. Legal fees accrued since

the hearing July 25 and an independent legal opinion based on court transcripts have brought total expenses to date to \$7500. Subpoenas for witnesses are expected to be issued shortly.

The following list of donors to the JRSD fund continues from that published in January. It comprises clubs and individuals whose call sign was not stated.

ALDORA A.R.C.
ALLEN CLEGGMAN-VANCOUVER (B.C.)
AMATEUR RADIO LEAGUE OF MANITOBA
ANTHONY BATTEN
ARROWSMITH A.R.C.-PORT ALBERNI (B.C.)
B.V. AMATEUR RADIO SOCIETY-SMITHERS (B.C.)
BARRIE A.R.C. (ONT.)
BRETT DELMAGE (OTTAWA)
BRUCE WIGHTMAN (OTTAWA)
BRITISH COLUMBIA DX CLUB
BURLINGTON A.R.C. (ONT.)
BURNABY A.R.C. (B.C.)
C.A. BAKER
CALVIN MARSHALL-MISSISSAUGA (ONT.)
CHAMPLAIN REGIONAL REPEATER ASSOCIATION (ONT.)
CHARLES HERALD
CHATHAM-KENT A.R.C. (ONT.)
CHILLIWACK A.R.C. (B.C.)
CLUB DE RADIO AMATEUR DE L'OUTAOUAIS
COMMUNICATION 3J ENR. (QUE.)
CONOR VALLEY WIRELESS CLUB
COURT BROAD (TORONTO)
COWICHAN VALLEY A.R.C. (B.C.)
DAVID LAZARUK-EDMONTON (ALTA.)
DX ELECTRIC CO.-IRVING TEXAS
EDMUNSTON A.R.C. (N.B.)
ELINOR CAVANAUGH-FORT HOPE (ONT.)
ERIC STEVENS-BARRIE (ONT.)
FREDERICKSON A.R.C. (N.B.)
GILLES NADON-BORDEN (ONT.)
GRANDBY A.R.C. (QUE.)
HERB LAWRENCE-NANANESHA (MAN.)
HERITAGE A.R.C. PORT HOPE (ONT.)
HOBYTRONIQUE INC. DOLLARD DES ORMEAUX (QUE.)
HOBYTRONIQUE-DOLLARD DES ORMEAUX (P.Q.)
KINGSTON A.R.C.
L.K. ABBOTT-MONCTON (N.B.)
LAKEHEAD A.R.C.-THUNDER BAY (ONT.)
LOCALVISION ENR.-ST. HYACINTHE (QUE.)
LOYALIST CITY A.R.C.-SAINT JOHN (N.B.)
MARLE RIDGE A.R.C. (B.C.)
MICHAEL MACKAY-GLOUCESTER (ONT.)
MIRMAN MEDICAL CENTER-SPRINGFIELD (P.A.)
MONTREAL A.R.C. NORTHERN ALBERTA
RADIO CLUB-EDMONTON (ALTA.)
MONTREAL AMATEUR RADIO CLUB
MOOSE JAW A.R.C. (SASK.)
MR. AND MRS. EARLE PORTER-YARMOUTH N.S.

MR. AND MRS. W. MOOREHOUSE-NANAIMO (B.C.)
NIAGARA PENINSULA A.R.C.
NORTH BAY A.R.C. (ONT.)
NORTH SHORE A.R.C.-OSHANA (ONT.)
NORTHERN ALBERTA RADIO CLUB

NORTOWN A.R.C. (ONT.)
NOVA SCOTIA A.R.C.
ONCHARD CITY A.R.C.-KELOWNA (B.C.)
ORILLIA A.R.C. (ONT.)
OTTAWA A.R.C. (ONT.)
OTTAWA VALLEY MOBILE RADIO CLUB INC.
OTTAWA VALLEY MOBILE RADIO CLUB INC.
OTTAWA VALLEY MOBILE RADIO CLUB INC.
PAUL SAMUELS-SOUND BEACH (N.Y.)
PEACE BRIDGE REACT #3650 INC. FORT ERIE (ONT.)
PEACE RIVER A.R.C.-GRANDE PRAIRIE (ALTA.)
PEEL A.R.C.-BRAMPTON (ONT.)
PENTICTON A.R.C. (B.C.)
PERCY HAWKINS SALT SPRING ISLAND GROUP (B.C.)
PETERBOROUGH A.R.C. INC. (ONT.)
PIONEER A.R.C.-OTTAWA (ONT.)
PORT ELGIN REPEATER TEAM-BRUCE COUNTY (ONT.)
QCWA-NATIONA CAPITAL CHAPTER -OTTAWA

QCWA-SOUTHERN ONTARIO CHAPTER
RADIO AMATEUR SAGUENAY LAC ST. JEAN (QUE.)
RADIO AMATEUR SUD OUEST
RADIO AMATEUR QUEBEC INC.
RADIO SOCIETY OF ONTARIO-CONVENTION
REGINA A.R.C.
RICHARD GUINDONE-ORLEANS (ONT.)
RICHMOND A.R.C. (B.C.)
ROSE CITY A.R.C.-CAMROSE (ALTA.)
SAMANICH PENINSULA RADIO CLUB (B.C.)
SCARBOROUGH A.R.C. (ONT.)
SKYWIDE A.R.C. (ONT.)
SOUTH GEORGIAN BAY A.R.C. (ONT.)
SOUTH PICKERING A.R.C.
SOUTH WEST A.R.C.-SHIFT CURRENT (SASK.)
SOUTHERN ALBERTA A.R.C.
ST. THOMAS A.R.C.-ELGIN AMATEUR RADIO SOCIETY
STEVEN GUINDONE-SALMON ISL. (B.C.)
SYDNEY A.R.C. (N.S.)

THE ONTARIO TRILLIUMS A.R.C.
THREE HILLS A.R.C.-ELMORA (ALTA.)
TIMMINS A.R.C. (ONT.)
TOTEM A.R.C. (B.C.)
TRAIL-ROSSLAND F.M. CLUB (B.C.)
TROY A.R.C. (N.S.)
UNION METROPOLITAINE DES SANS FILLISTES (QUE.)
VANCOUVER ISLAND SEN. CITIZENS RADIO RPTR. ASSN.
VICTORIA SHORT WAVE CLUB (B.C.)
WELLS GRAY A.R.C.-CLEARWATER (B.C.)
WEST CARLETON A.R.C. (ONT.)
WEST ISLAND A.R.C.-POINTE CLAIRE (QUE.)
WEST ISLAND A.R.C. (QUE.)
WESTCUM A.R.C. (N.S.)
WINDSOR A.R.C. INC. (ONT.)
YORK NORTH A.R.C. NEWMARKET (ONT.)
YUKON AMATEUR RADIO ASSOCIATION

NOTE: Number of entries indicates number of donations.
More to come!



How to find 'em

Halifax Club hosts display

By Jim Cleveland VE1CHI

Members of the HARC turned out in full force on Saturday, Oct. 5 at a local shopping center mall to promote fall courses in Amateur radio.

Plans for the display began back in May when a list of volunteers was obtained at the monthly club meeting.

During the summer months, we spoke to the shopping center administrative staff and a roof tour by the building superintendent revealed an air vent which seemed a likely spot to drop coax to the mall floor about 20 metres below... it was!

With the advent of fall and Amateurs beginning to return from holidays and summer cottages, the job of successfully phoning volunteers became a reality and the display idea began to take shape.

On the morning of Oct. 5, the early birds met at 7:30 a.m. and began the task of setting up the tables and erecting the antennas— 20 and 40 m dipoles with a five-eighths two metre mag mount. The roof ventilator acted as a convenient ground plane. Murray's ancient, paint-laden, wooden step ladder acted as a convenient support for a 12-foot two-by-four which center-supported the dipoles at right angles. These were anchored by cinder blocks which, in turn, nicely anchored VE1ALS Murray's ladder in place.

To display prefix maps, QSL cards, posters and other paraphernalia, masking tape was used to make a rectangular box out of four sheets of styrofoam. This was not planned initially, but when plan 'A' fell through, the old adage, 'necessity is the mother of invention' really came true. This contraption, when stood on end, made an excellent, four-sided, light-weight display column! There ... and you thought you weren't going to learn anything by reading this!

The Saturday morning shopping crowd began to filter in after 9:00 a.m. and by lunchtime, we found ourselves rather busy in the 'show and tell' department.

Our display consisted of two HF rigs, one on 40 m CW and one on 20 m phone, two metre and repeater information, code oscillators with a certificate issued for name sending, a

VCR and TV on loan from Radio Shack with a film about the WSLFL Shuttle mission, a QSL card display, a computer 'learn code' program, as well as handouts from CARF, CRRL and information regarding local courses. The local DOC office supplied copies of TRC 24 and 25.

If you have ever been involved in a public display such as this, you'll know what I mean when I say that the day just melted away. The time flew by quickly and we barely had time to eat, it seemed. It is difficult to estimate the numbers of visitors but 200 plus would not be too far wrong.

A great number of Amateurs not directly connected with running the display dropped in to see how things were going. Herb VE1ADA reported in excess of 30 QSOs on two metres during the day so the word was out to those who may have forgotten. It was encouraging to see such support.

It is very difficult to determine the effectiveness of a display such as this— I don't think that anyone was 'converted' on the spot— we'll just never know if it made anyone decide that day to 'go for it.' We did place public service announcements on the



local broadcast stations a few days in advance— perhaps that brought out a few that would otherwise not drop by to see us.

A few thank yous are in order, first the driving dozen that made it all work properly— Mel VE1VX, Murray VE1ALS, Clarey VE1AVP, Bruce VE1AVH, Fred VE1BSY, John VE1BIR, Herb VE1ADA, Ron VE1RW, Andy VE1BV, Bob VE1PQ, John VE1AFX and Jim VE1CHI and also thanks to Randy VE1AKQ, Don VE1AMC, Brit VE1FQ, John VE1WS, Jack VE1OU, Dave VE1AJP, Earl VE1CJW, Peter VE1JI, Bob VE1QX, Don VE1CEM, Dan VE1JV, Spud VE1BV and Bernie VE1??? at the time and now VE1BLM, and to all those that just dropped by to see how things were going— thank you.



Bob VE1PQ and Randy VE1AKQ man the rigs while Bob VE1QX and Frank K2SQM look on. Anyone recognize the fellow standing behind VE1PQ?



Spud & Dan's Deluxe Course

By Dan Dawson VE1JV

We didn't know what we were getting into. It all started innocently enough, when Spud mentioned that a few of his neighbours were after him to get an Amateur Radio class going. I offered to help, and from this modest beginning there evolved a series of radio classes for both the Amateur and Advanced Amateur certificates. The rewards of doing these courses have exceeded our wildest expectations. New friendships develop, and a lot of other positive things happen, when a group of people get together for a common purpose.

So, here is how we did it.

Before the First Class

This is also known as the great round-up. We shake down the local clubs, our other friends, and relations for the names and phone numbers of prospective students and invite them to attend our course. Thanks to the vigorous support of the local Amateur community, we have always had a good turnout on that first night.

The first class

The all-important first class begins with a 15 minute pep talk, during which we extol the many virtues of ham radio. We don't use more than 15 minutes for this, because we don't want to put our listeners to sleep. Besides that, we usually leave our shovels at home (for the first class, at least).

Also, during the first class, we review the course format: 1. 60 hours duration. 2. two classes a week, Mondays and Thursdays. 3. Two 45 minute instruction periods, with a half-hour break between periods. We never tell them exactly what they're getting into. But we do tell the students as long as they show the interest, we will guarantee the result. Anyone of average intelligence can easily acquire the skills and knowledge necessary for earning an Amateur certificate. The difficult part is convincing the student that the rewards are worth expending their time and effort for.

Any questions?

After discussing the course format, we entertain questions from those who are still present and awake. Then Spud gives them an ear-catching introduction to Morse code with his super duper CW sender.

Then, it's break time, which gives everyone a chance to mingle, or fondle the ham gear and gadgets we brought along.

After the break, we entertain more questions from the floor. Then, it's on to Easy Theory Lesson One.

The Course

We try to keep it simple. I say we try, although it doesn't always work out that way. Around the middle of the course, when interest starts to falter, we bring in a few guest speakers. Even my own mother would get sick of looking at my face so often. (She said so.) Besides, an instructive evening with VE1ZL is one the student is hardly likely to forget.

And, with a renewed vigour, we do our final sprint to the exam date.

After the Exam

We congratulate the successful applicants, and console those who weren't as successful. Then we invite everyone from the class to attend antenna-raising parties for those needing help getting a station together.

With the unsuccessful applicants, we help plan a course of action for the next exam. Either by phone, or by extra classes in Spud's or my home, they are able to review the course material at their own pace. Those embarking on this follow-up program, we're happy to report, usually earn their certificate at the next exam sitting.

For both the successful and unsuccessful alike, Spud and I strongly recommend they join the local Amateur radio club of their choice. The club members have years of experience to share, and their input at this point in the students' hobby is essential.

Some Do's and Don'ts

DON'T B.S. No one is going to waste their precious evenings listening to someone froth at the mouth. They can stay home and get that on TV.

DON'T avalanche the students with hand-outs, especially on the first night. Two or three sheets of new information each class is plenty. Otherwise, it's the Information Overload Syndrome, soon followed by the Absent Student Syndrome.

DO call in outside help. Spud and I know this DOC Radio Inspector who is eager and willing to lecture our

class on the virtues of TRC 24. He is a whiz at cutting through government gobbledy-gook. One of his TRC 24 sessions is worth 20 of ours.

DO call out inside help. Local Amateur radio clubs can render invaluable administrative and moral support.

DO be enthusiastic. It's contagious. △

Help Wanted

CARF is interested in improving our bulletin and news service. The main problem is that we do not hear from sources of news. This is especially true for items of regional interest. We need someone to dig this information out and send it to our main office and our bulletin editor.

I would therefore request that interested Amateurs apply for the position of regional bulletin assistants. This would entail a commitment to:

- actively search for input of news from your region.
- active submissions to the National CARF News Service
- active submission of articles of interest from your area with the target of a monthly news bulletin and eventually bi-weekly for your area and perhaps, the National News Bulletin.
- active searching for CARF News Bulletin Stations with an aim to building the service and acting as a focal point for inquiries.

This would strengthen our service to all Amateurs and keep our regions updated on all Amateur activities.

I hope to see an active Assistant in each region of our country. Remember, CARF is only as good as the people who work for it. For CARF to work for you, we must ask you to work for CARF.

73, Ron Walsh VE3IDW
President, CARF

GANDER DISASTER

Within minutes of the occurrence of the Gander aircraft disaster, the Amateur Radio Club of Central Newfoundland, ARCON, was asked to help. The club members rendered services to the authorities for some 36 hours after the crash, on HF and VHF. Full story next month.



Another First!

Any member of CARF may now buy insurance coverage against interference lawsuits, and against damage caused by towers. The premium is \$26 a year, the coverage, \$1,000,000.

This is a group policy. You have to be a CARF member to take advantage of it. All Amateurs should seriously consider buying the insurance, until laws setting interference rejection standards are passed. Britain will be setting British Standard 905— which sets, for the first time, immunity standards for TV receivers— into legally binding regulations as soon as possible. It will become an offence in Britain to sell, manufacture, or import TVs that do not comply with the Standard.

While BS 905 only provides minimum immunity standards, it is a start down the right road for spectrum management. The standard is of interest to

Canadians for it will point the way to rational legislation here.

However, legislation will take years. In the meantime, we would be wise to protect ourselves. This the insurance policy makes affordable.

Tower Coverage

The tower coverage included in the insurance is valuable protection. Anyone who has had a tower misbehave during erection knows the risks underlying towers.

A tower, or an antenna part it carries, may fall by an act of God— windstorm, say, or lightning— and injure a passerby, or damage property. The insurance covers these risks.

Every Amateur should assess his situation. Unless a city dweller only works QRP to an indoor aerial he would be wise to consider purchasing the insurance.

Only those country dwellers,

with no near neighbours and the room to put up a tower where it cannot possibly do damage to anything except itself, should ignore this opportunity.

Readers of Crosswaves know well the type of EMI dispute a powerful transmitter can cause in a suburb. They know the complete lack of immunity some consumer electronic devices show.

Video cassette recorders, for example, are getting cheaper all the time, and the best of them that VE3BBM has tried are wide open to interference. When every suburban household has one, the possibilities for interference will be extremely high.

If past patterns hold, one or two of our 23,000 Amateurs will say: "This insurance should be given free to all Amateurs by CARF as a PR gesture!" It is difficult to understand how anyone with that lack of common sense can pass our licensing tests.

The Firsts

1967— CARF formed as a Federation of Provincial Amateur Radio Societies.

1968— Introduction of a 'DOC Liaison Committee,' based in Ottawa, to deal directly with DOC Ottawa day by day on matters affecting the Canadian Amateur Radio Service.

1969— Recommended Guide Lines for Amateur Auto-Repeater licencing and operation that formed the basis for subsequent Ministerial Guide Lines.

1970— Established the first Canadian National QSL Bureau to assist foreign QSL bureaus in forwarding cards to Canada.

1970— Published the first Edition of the 'Canadian Amateur Radio Regulations Handbook.'

1972— CARF reorganized as a federal corporate entity, CARF Inc., with individual Associate Membership.

1973— First edition of 'The Canadian Amateur' published.

1973— First Canadian News Service Bulletins published and

distributed to selected stations for on-the-air broadcast and to CARF Affiliated clubs and provincial A.R. societies.

1975— CARF Inc. reorganized with individual membership control through their election of Regional Directors.

First 'Canadian Amateur Certificate Study Guide' published. First meeting of a Canadian National Amateur Radio organization with the Minister of Communications. Among other items discussed CARF requested that a competent Amateur be included in the Canadian delegation to WARC '79, subsequently approved by the Minister.

1976— First edition of the 'Canadian Amateur Advanced Study Guide' published.

A staffed HQ Office established in Kingston, Ont.

The national station— VE3VCA— established in Kingston, Ont.

1977— CARF supplied, at the request of DOC, a codification of

Radio Regulations pertaining to Amateur Radio. This codification was accepted as a basis for future changes and amendments to the Regulations.

At the request of DOC, CARF sponsored the first Canadian National Amateur Radio Symposium held in Ottawa, Ont.

1978— Initiated the prestigious 'CANADAWARD' certificate and the 'CANADA DAY' Contests.

1979— Initiated an outgoing QSL Service, free to CARF members.

1980— First presentation to DOC on the need for restructuring the Canadian Amateur Radio Service including different examination procedures, a lessening of the technical knowledge requirements, an annual review of questions used and a rewrite of certain sections of TRC-24.

First sections of the 'Canadian Amateur Reference File' published.

1985— First group insurance plan against EMI suits and tower damage for Canadian Amateurs initiated.

New Assistant Director (B.C.)



J.F. (Hoppy) Hopwood VE7AHB is a native British Columbian residing at North Vancouver. He was introduced to telecommunications by his father who was a land line Morse operator and manager with CP Tel for almost 50 years. His working life has followed the family tradition through 35 years of a communications career with BC Tel from line and cable construction to modern digital switching exchanges to microwave radio and data transmission. He is currently assigned to network planning and project management

roles with the west coast phone company.

Hoppy received his first Amateur certificate and station licence VE7AHB in 1956. He operates on all HF bands except 160 meters and enjoys ragchews on SSB and chasing DX on CW, plus working with computers in both career and ham radio applications. He has been a member of various Amateur radio clubs over the years and more recently the Burnaby Amateur Radio Club. He writes articles for ham magazines, the latest on Two Metre Repeaters in B.C. for TCA in September 1984. He monitors the B.C. Public Service Net daily and the Trans-Canada Net on weekends and, whenever possible, the Pow Wow club at 3.750 MHz during evenings.

In addition to ham radio, Hoppy is working on his B.A. in Sociology at Simon Fraser University. He has held various community posts with the Chamber of Commerce and as a Town Planning Commission Advisor during his career assignments around B.C. He also enjoys golf, photography and playing the piano.

DOC REGULATION 64.5

'64.5 The licensee of an Amateur station shall notify the Department of any change in his postal address.'

So if you're moving, send your local DOC office a card advising them of your new address. And while you're about it, send Debbie one as well at Box 356, Kingston K7L 4W2.

The Manning Awards

(NOMINATE AN AMATEUR FOR THIS)

The \$75,000 PRINCIPAL AWARD is presented annually to a person who has shown outstanding talent in conceiving and developing a new concept, procedure, process or product of potential widespread benefit to Canada and to society at large. Also in 1986, up to two \$25,000 AWARDS OF MERIT will be available, rather than one as in the past, and there will be increased opportunity for innovations in the early stages of development. The AWARDS OF MERIT are for persons who, without the benefit either of advanced education or of substantial corporate, institutional or other outside support, show great talent and promise in creating new concepts, processes, procedures or products of potential benefit to Canada and to society at large.

Nominees for the Awards must be Canadian Citizens resident in Canada. Nominations for the 1986 Awards close on March 1, 1986. An information Pamphlet and Nomination forms may be obtained by writing to: The Manning Awards, 2300, 639 Fifth Avenue S.W., Calgary, Alberta T2P 0M9.

RABC Meeting, Dec. 5, 1985

By Barc Dowden VE3TT

CARF Representative on RABC

The Radio Advisory Board of Canada comprises representatives from about 30 Canadian organizations. Manufacturers, broadcasters, police, telecommunication companies, for example have umbrella organizations who are sponsors of the RABC. CARF, CRRL are Board members, and the DOC is also represented.

The RABC's purpose is to advise and generally influence the government with respect to the contents of new or existing legislation and regulations for radio. It is a sort of lobby group with the difference that it contains members who are often on opposite sides of the fence, and so, the Board has to operate by consensus.

The work of the RABC is done in committees. The EMC Committee is of greatest interest to Amateurs at this time. Ralph Cameron VE3BBM is the CARF member on this committee. Largely due to the influence of CARF/CRRL, over half of the committee's time is now spent in

immunity problems. Efforts to increase the development of voluntary standards in CSA and the subsequent application of these will have priority during the next year.

At the meeting I pointed out that if the Ravenscroft Case went to trial and a judgement against Ravenscroft was made, then this precedent would have serious implications for all RABC organizations whose members operated transmitters. It was agreed that the Board executive would establish a group to investigate the problem.

The DOC's 'Discussion Paper on Restructuring the Amateur Radio Service' has just been issued. This affects all of us, particularly potential Amateurs. In addition to comments to DOC from individuals, CARF will be summarizing the feedback received and so the RABC will be one of the forums in which we will try to influence the DOC as to how the 'restructuring' is to be done. Try to get your comments to DOC and CARF as

soon as you've had a chance to see the contents of the paper. (See January TCA.)

Some other miscellaneous items from the meeting are:

- Limits on unwanted radio emissions from power lines will be in regulations by 1987.
- A small percentage increase in licence fees for the following year is possible.
- The proposed changes to the Radio Act (to be described in TCA) will probably not get through the House of Parliament until two to three years from now.
- Extension of AM broadcast from 1600 to 1705 kHz will probably arrive by 1991.
- The RABC will recognize outstanding efforts and service to the RABC. Bill Wilson VE3NR was mentioned as a prime candidate for recognition.
- A photo taken of hams present at the meeting revealed eight. Eight out of 40 attending is not bad. △



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With the User Friendly



List Price \$579



The KDK FM-240 features:

- 25-watts of power (5-watts in Low power)
- 16 memory channels plus one priority channel
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- Easy to see Alpha-numeric LCD readout system
- Simple tuning & programming—nothing complicated
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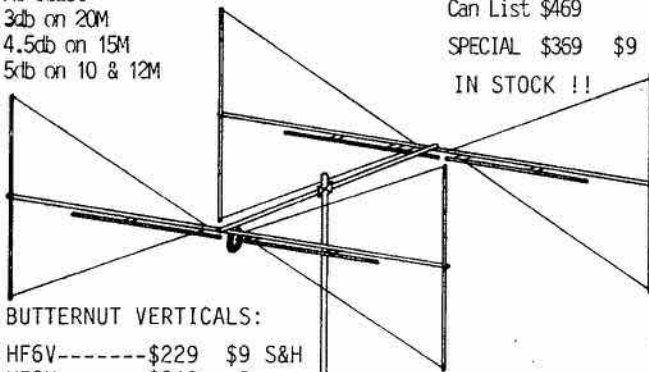
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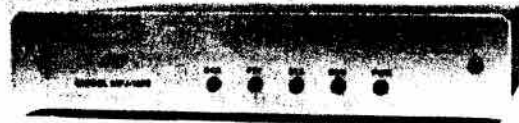
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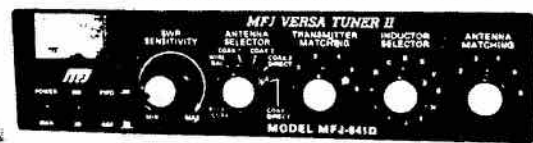


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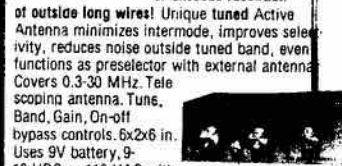
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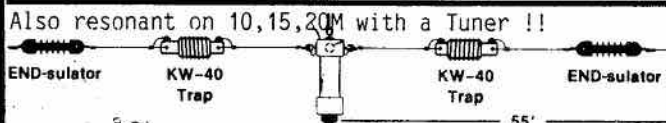
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Power Meas. Accuracy ± 10% of reading [add 5% of reading between 1.6 and 3.5 MHz]
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SWR Measuring Range 1.0:1 to infinity
Insertion Loss: less than 0.1 dB
Input/Output Impedance 50 ohms
Input/Output Connectors SO 239
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Weight 680g (24 oz.)
Power Requirements 13.8V DC @200mA



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New life for a dying service?

I would like to respond to the editorial that appeared in the October issue of *TCA*.

I am referring to the opinion of Mr. Masella that we should introduce a Novice licence class. He proposes that his new class would permit CW between 50 MHz and 430 MHz, and all privileges above 900 MHz.

I believe that this would certainly not help new people get into the hobby.

Firstly, many Amateurs were attracted to the idea of our hobby by the excitement of long-distance (i.e. worldwide) communication.

Second, it was and still is, relatively inexpensive to get into operation on the HF bands where such communication is possible.

Who can one possibly work on 50 MHz CW? or 900+ MHz Phone? Sure you can talk to a few locals. Of course you can always work via satellite. If you have a few thousand dollars to spend for equipment and antennas.

In closing I would like to say that I also believe that we may need a 'Novice' type licence, but it must offer some low cost and interesting possibilities. Sincerely,

James VE4AIX
(Advanced/Digital)

In his editorial in October *TCA*, VE2AM says that we should scrap the digital Amateur licence and institute a novice class licence. The digital licence is a flop, according to Mike, since it has brought little increase in the ham population. On the other hand, a novice licence, with minimal technical requirements, would swell the Amateur population and fill the VHF and UHF bands that are at present underutilized. This, Mike claims, is necessary for the survival of Amateur radio.

I have always had difficulty with some of these arguments, and I would like to take exception to some of the things Mike said in his editorial. First of all, is the digital licence really a flop? I personally know of individuals who obtained their licences by the digital route, people who probably would never have become Amateurs otherwise. These people are characterized by strong technical and engineering backgrounds, and have become leaders in Amateur experimental activities. Mike, are you saying there's no place for these

people in Amateur radio?

Next, Mike calls for a novice licence. This would permit people with little or no skill in communications and electronics to share our frequencies. Mike, we already have a radio service for this; why do you want to open the Amateur bands to them as well? How can the Amateur service benefit from unskilled operators? One of the reasons governments justify an Amateur service is because we can provide emergency communications in times of disaster. Will these operators be able to contribute to this?

Mike, I've changed your headline slightly. Has your file of QSL's ever been raided by a fanatic with a steamy kettle, taking your stamps? If someone did, they were a stamp collector, a hobbyist. When disaster strikes, they don't call on stamp collectors, they call on you, as they did, Mike, from September 21 to 26 last. Amateur radio is not a bovine hobby, it is a service.

As we've learned from our field day experiences, it often takes skill and ingenuity to set up and operate an emergency station.

There is an old argument that goes, 'use it or lose it.' There is always a rumour that some Amateur band or other is about to be taken away from us and re-allocated to another service. Occasionally this actually does happen, although overall we seem to be doing all right. I'm not sure what arguments propel the government to take Amateur frequencies away from us, but I wonder if a modest population of novices would be enough to convince the government to keep its hands off a band that it otherwise has decided to grab. Interestingly, I don't hear much activity on 10 metres these days, but then nobody else seems to want that band either right now.

Mike, how will unskilled novices be able to explore VHF, UHF and SHF frequencies? Even skilled Amateurs have trouble experimenting with those bands, almost all of the gear used is commercial. Unless they can go to the store and buy it, those novices will be on two and 440 along with the rest of us.

I have heard that ham radio needs to grow to survive. Almost everyone accepts this statement without thought. Is this really true? Is quantity

the only requirement? What about quality? It's true that we would benefit by an increase in our numbers. But it is wrong to think that 'anyone' would make a good Amateur. We need people who are committed to Amateur radio, people who understand what communications is and who have the skill to set up and operate a station under emergency conditions. Amateur radio would benefit far more from one individual who is ready and able to experiment or organize than dozens of novices who can only chatter away on our higher bands.

Mike, Amateur radio may be a 'dying hobby' for you, but for me it is a new and exciting world waiting for me to get involved. Try something new, you may find a little excitement there yourself. But please, let the hordes stay where they are, they're probably happy there too.

73, Jack VE3LNY

I refer, of course, to your editorial in October 1985 *TCA*.

I do not agree with your first premise, that the Digital Certificate is a flop. There are problems with the digital certificate and I identify two:

1. People writing the Digital exam are expected to meet a level of competence in questions of radio theory that we do not expect of other Amateurs until they have been licensed one year. The radio theory section of the Digital exam is identical to that of the Advanced exam. That may be a bit much for a computer enthusiast with no experience of radio to handle.

2. While study guides abound for candidates for the Amateur and Advanced exams, nothing, apart from Dr. John DeMercado's PhD thesis, is available for Digital candidates. (*TCA published live tutorials between 1981 and 1983.—Editor.*)

The Digital certificate, new as it is, and as fraught with problems as it is, has not been given a chance. The reluctant attitude of many Amateurs does little to help the situation.

The whole question of a Novice class of licence is a separate issue, and deserves a separate discussion. Digital and Novice licences are not an 'either or' proposition.

Your proposal for a Novice certificate has some gaps. There is little CW activity above 50 MHz, yet you propose that newcomers, who will need plenty of CW experience to advance to higher classes of licence,



be restricted to 50 MHz and above, CW only on bands with any sort of population. This is a descendant of the old idea that no-code or limited code licensees be ghetto-ized into parts of the Amateur spectrum where they will meet only other newcomers. How does such a newcomer learn to be a ham under those circumstances? Remember that there is more to being a ham than simply passing an exam. You learn from observing other more experienced people how to conduct yourself on the bands. If these newcomers are segregated they will make up their own ways of doing things, perhaps operating in a way that would scarcely be identifiable with Amateur practice.

You suggest that local clubs, provincial societies and our national society would benefit. Significantly, you do not mention how the rest of the Amateur community, or even the prospective new Novices would benefit from such a class of licence.

You propose VN calls for the new Novices. I question the need for a separate series of callsigns. What reason do you have for a distinctive callsign series for these newcomers? No other class of licence needs them.

As for the cost, if you think that changing the regulations, setting up a new class of licence, allocating a separate series of callsigns and establishing a new exam syllabus is cheap, or will represent 'no financial burden' to DOC, think again. No change in the licencing structure is cheaper still.

You propose that clubs and local groups handle the examination process. How would a prospective Novice in a remote location be served by either a distant, and probably eclectic, examination schedule or by a licence granting severely restricted VHF privileges?

As for K2EEK's forebodings about the Amateur spectrum, I dispute his conclusion. In the years before WARC '79 'use it or lose it' was the principal slogan and scare tactic used by Amateur organizations trying to rally their members. Despite all the predictions that Amateur Radio would be dealt a serious blow at WARC, the hobby came out of the conference in a stronger position than it has ever been. We increased and strengthened our allocations in every part of the spectrum. Doomsayers serve only to generate pessimism. We are 14 years away from another WARC. Panic, such as demonstrated in K2EEK's article is not necessary or helpful. Amateur Radio's position is secure.

The most disheartening aspect of your proposal is how very common it is. Many people, well-intentioned like you, have expended a great deal of energy advocating change in the licencing structure. If you succeed in

getting the changes you want, what then?

I believe the basic problem is not the difficulty of the examination process, but Amateur Radio's lack of publicity. Even the most lax licencing structure in the world will not entice people into the hobby who don't know about Amateur Radio. The hobby is what motivates people to join, not the exams.

If the energy we put into proposing new classes of licence, into trying to justify local clubs, provincial societies and CARF could be redirected into introducing the hobby to our neighbour, our local Scout troop, our local Guide company, local senior citizens club or our local computer group, we might have some success. If the objective is to encourage more people to become Amateurs, don't complain to other Amateurs or waste DOC's time. Invest your time in those people you would like to attract to the hobby. Invite people to see your station. Tell your friends, and strangers too, what excites you about the hobby. Above all, don't show them what phone patching is. That gives people the impression that Amateur Radio is a way to cheat the phone company.

Let us look at the U.S. experience of Novice licencing. While the U.S. has had a Novice licence for over 30 years, the problems of slow growth we suffer are even worse among our friends to the south. The number of licenced Amateurs has actually fallen in the U.S. The present difficulties must come from another source. ARRL is so concerned that they have set recruitment targets for new Amateurs.

I question the motives of an official of an Amateur society calling for a more relaxed licencing structure. New licenced Amateurs are new potential CARF members. A larger membership makes both CARF and its Directors more important. Is your proposal not even slightly self-serving?

I was a member of CARF's executive for about six years. Just before I left the organization, I remember one high official seriously suggesting a relatively easy no-code licence as a way to check the decline in CARF memberships. That is hardly a rational position for someone occupying a position so responsible.

In short Mike, and all the hundreds of well-meaning tinkerers out there, put your effort not behind your pen, but on your feet. Get out and introduce people to the hobby. Tell them what you get out of being a ham. The hobby is fun. Regulations change is boring.

73, Dave VE6TG/VE2ZP.

There has been much talk recently concerning our diminishing numbers, and how we might inspire

newcomers to our ranks. Most of these suggestions, I think, would distract people from pursuing the hobby.

The thrust seems to be to call them a second-class citizen by giving the 'novice' a special callsign identifiable from the standard Amateur call. Some might say it is to identify this individual to make sure he is following the regulations. Balderdash!

Why treat them any differently from the Amateurs or Advanced Amateurs? Some would even have the newcomer go up to the UHF and higher frequencies. This is like saying: we don't really want you, so go where we don't have to associate with you.

We all know what will happen if we follow these suggestions. We have the situation already in the 11 metre band.

It may sound terrible for one in the ranks to say, but be honest, if we are not using the frequencies, why try to hold them? How may of us use the high frequencies? I might hazard a guess at 1/10 of one per cent. (*That would be only ten Amateurs all told, of our active population— Editor*)

If we honestly want to increase our ranks and not just our numbers I see two good ways to accomplish this end:

First, tap the large group who could contribute greatly to the hobby, the electronics engineers. For this class of licence the pre-requisite would be an iron ring. The code requirement should be eliminated for them, they should pass an examination on regulations and operation.

Second, introduce a 'novice' class who would be able to operate on all the normal bands in CW but with frequency spectrum restrictions and power limitations, similar to our friends to the south.

The novice would be required to pass exams on code, but at reduced speed, principles of electronics, i.e. block diagrams, what transistors, capacitors and so on, are, and regulations and operation.

In both of these cases I believe Amateurs can invigilate the examinations and if the novice wishes, though not mandatory, they may advance to the Amateur and Advanced Amateur in the normal manner.

73 Bill VE3OLJ

1900-2000 kHz

Canadian Amateurs will not be affected by the American decision to give 1900-2000 kHz to the radio-location service.

Should DOC decide at some future time that it is necessary to follow the American example, the Canadian rules could not be changed for at least two years.



Long Delayed Echoes

By Doug VE3CDC

Here goes for another trip back in time, starting with a look at:

40 Years Ago and XTAL Magazine

The January and February issues were combined and as the content was reviewed last month, let's look at its unusual cover. The editor of the day showed some initiative by skipping the usual technical display on the cover and instead used a full-page photo of an unnamed but comely lass regarding with some puzzlement an array of transmitter parts laid out on the floor. Would anyone recognize her?

35 Years Ago— Skywire Magazine for February 1951

The editorial page, prophetically entitled 'Sidebands,' commented on the increasing number of mobile units since 1950. This looks rather quaint in view of the commonplace two-metre FM mobiles of today but back then mobiles were a novelty. Your columnist remembers about that time he was one of the only two 80 metre mobiles in Ottawa. It was home-brewed xmtr coupled with a Gonset converter hooked to the car radio.

Transmitter power in those days was usually furnished by a war surplus dynamotor which, on transmit, dimmed the headlights as it whined away in the trunk. More than one mobile enthusiast was left with a reluctant or dead battery if he had found a good spot to park and operated with the engine off.

The editor recommended the purchase of the Harvey-Wells band-switching rig to those fortunate enough to possess the necessary funds. Readers were urged not to despair of suppressing the inevitable 'hash' from the ignition and generator and various remedies were described.

In those days parts suppliers were few and far between and it was announced to the joy of prairie home-brewers that Canadian Electrical Supply had opened a store in Edmonton... its third in the country.

The articles included one entitled 'Cut the Cackle,' a lecture on poor operating which still holds good today. The author criticised the poor procedures and the garrulous operators who gave repeated farewells and 'final' transmissions. The technical articles showed how to build an AM modulator pre-amp and

its amplifier stage, using the familiar 6J5 and 6J7 tubes. Another article promoted methods of cutting audio bass response for better speech quality.

An interesting story on the problems caused to telephone companies by 'Insects, Animals and Birds,' detailed their depredations on such things as lead-covered cable and open wire lines. Described was a 'lead beetle' which bored into lead-sheathed cables. It was described as common in parts of Canada and was called the long-horned beetle with the

only nine pages of articles. They were beginning to plug complete equipment by Marconi, Harvey-Wells, Eddystone, Hallicrafters and what looked very much like a National receiver called the 'Commander,' sold by EMI of Ottawa. Radio parts suppliers were well represented in contrast to the earlier days when radio supply houses were practically unknown and one had to send to such places as the original Allied Radio Shack in Chicago.

15 Years Ago— VE News for February 1971

In sharp contrast to the professionally-produced *Skywire*, which folded in 1950, the small 7" x 8½" mimeographed pages of *VE News* had no advertisements. It strove valiantly to promote a totally Canadian organization and it regularly printed a report by the then-struggling Canadian Amateur Radio Federation. This issue noted in the CARF president's report by Art Blick VE2AHU, that CARF had recovered from its low point in organization and finances in 1970. In contrast to the Federations' operation today with its cash flow of more than \$150,000 annually, the 1970 revenue was only \$662.90!

News from across the nation informed readers that VEONS was assigned to the Canadian submarine Okanagan with VE1ANO as the op; RAQI declined to join CARF, being busy with organizing in its own province and the Saskatchewan ARL was not at the time in a joining mood either. (CARF at that time did not have individual full membership but was only a Federation of provincial societies.) It did not carry any technical articles but printed DOC news such as a letter in reply to a CARF enquiry about DOC's position on Amateur matters at the then forthcoming ITU conference on space.

It was also reported that (as on a couple of later occasions) local DOC offices were upset because Amateurs, through CARF bulletins and newsletters, which were faster than the downward seeping of information from Ottawa, were learning of regs changes before DOC field personnel

Ten Years Ago— TCA for February 1976

Back in 1976 the magazine was still called 'The Canadian Amateur'



scientific moniker of Ceramphycidae. Another creepy-crawly was a wood-boring beetle, the *Scobia declivis* which wreaked havoc on poles. Squirrels were (and still are) a menace with their habit of chewing on anything in sight.

TV receivers were becoming household fixtures and an article on TV theory urged readers to get into the service business. It mentioned the growing spread of TV which would be, the writer stated, "earlier than one anticipates due to the greater range made possible by Stratovision (the relaying of TV from a high flying airplane), which is now undergoing tests." Fortunately, this was not practical and we were spared the hour-after-hour drone of aircraft engines overhead.

This issue's 24 pages seems to have done well in the ad department— 15 pages of ads, plus the covers, for



CW Traffic Handling during an emergency

By Marshall VE3KK

The recent Mexican earthquake disaster once again proved the usefulness of the NTS (National Traffic System) with its proficiency, discipline and fast handling of welfare messages.

On the day after the first quake, EAND (Eastern Area Net) soon became overloaded in the U.S. so I, reporting in as the Eastern Canadian Net Rep, was asked to take as many messages as possible to the IATN (International Amateur Traffic Net). Fortunately, the net manager of IATN happens to be Devere, VE3AJN at Kemptville whose husband Henry VE3GNW reports into all the Grey Bruce traffic nets. Henry took all my traffic and cleared it to Mexico City on the IATN net. He reported that at one time, the LIST had 125 messages ahead of his but that he managed to clear everything within two days. Soon we were getting replies back, some with happy news but some not too cheerful.

At the beginning many of the messages were long and full of useless questions; so, soon a strict rule was in force limiting the welfare messages to the ARRL format with name of addressee; telephone number in full; three word text (ARL nineteen Name); signature of sender with full address and full telephone number.

ARL Nineteen is the ARRL Numbered Radiogram list for REQUEST HEALTH AND WELFARE REPORT OF A PERSON OR PERSONS. W for Welfare was sent in the preamble of each message instead of the usual R for Routine. By the end of the month, my traffic total was 516, most of it being welfare requests and replies. Here are two examples of Welfare messages as handled during the disaster:-
NR6 W AJIG Ar13 Stonington CT Sept 22 Alberto Mizrachi, Mexico City, Tel 503 520 2638 = ARL Nineteen family = Jerry Barnett, Bethany CT, Tel 203 393 3266+ (Recvd from W1TIQ on EAND at 1905Z. One of 30). (Sent to

VE3GNW on GBN at 2230Z same day).

Replies received on 24th. This one, NR28 W VE3GNW 12 Kemptville, Ont Sept 24 Jerry Barnett, Bethany CT, Tel 203 393 3266 - Your NR6 INQUIRY RE MIZRACHI MEXICO CITY X FAMILY ALL OK = Henry VE3GNW/IATN. (Recvd at 2220Z on GBSSN & sent 2310Z on OSN/ECN)

The telephone numbers included the area codes. This was one of the stipulations made by the Mexican stations as not all messages were destined for Mexico City.

—From the *Kilowatter*,
November 1985 Δ

Spread Spectrum

No communications technique has generated more of an aura of secrecy than has spread spectrum. Perhaps all of the mystery has been caused by its ability to offer communications where its signal is not always easily recognized nor easily detected. The two most commonly encountered SS techniques are frequency hopping (FH) and direct sequence (DS). A new book entitled *Direct Sequence Spread*

Spectrum Techniques, by J.E. Hershey, is actually the Dept. of Commerce's NTIS Report 82-111.

The book covers all technical and nontechnical aspects of DS type SS, especially as it relates to the Amateur Radio Service. The 151 page large-format (8½" x 11") book sells for \$32.80 from Aegean Park Press, P.O. Box 2837, Laguna Hills, CA 92654. Δ

▷ Continued from Page 30

but the later abbreviation of TCA keeps it from being confused with an earlier magazine of the same name, published in 1950. TCA's fourteen 8½" x 11" heavy white paper pages had only six pages of advertising, all for 'store-bought' equipment—no



"..... Watcha mean, poor quality only \$3. pull the string tighter then"

longer was home brewing as common it was ten years before.

Readers were informed that federal funds under the New Horizons program were still available for senior citizens' groups to set up Amateur clubs and stations. Numerous hazards endemic to the hobby were quoted in one article, including a warning to avoid exposure to more than a few watts of RF at 450 MHz and above and a warning as to the effect of RF on the heart pacers of the day.

The Canadian Repeater Advisory Group marked the second anniversary of its column with updates on repeaters and an item noted that already CARF was preparing for WARC '79 by setting up a working group to prepare input to DOC on Amateur frequencies for the information of the Canadian delegation.

Notice was given that the age restriction on candidates for Amateur certificates had just been lifted and an unusual technical article by Gord Ball VE3CSH proved that although DOC later took the word 'Experimental' out of the name of the service, some far-out experimenting was always around.

Gord reported on the scatter phenomena he observed with lightning flashes. He reported "that when a two-metre signal strikes the highly ionized region near lightning flashes, the incident energy is scattered and part of it is reflected back towards the earth. (It) lasts only as long as the lightning exists and openings of a few seconds are normal." He continued, "most of the scattered signals I have heard had a path length of 100 to 200 miles... usually the transmitter is just over the horizon..."

I'll wind up 'Long Delayed Echoes' for February by thanking the donors of those old magazines received since our last column; VE7CZJ, VE1CL, VE7ABJ and VE7EGO. I'm still looking for VE News for 1966 to 1968 inclusive, October 1970 and August 1971. The *Skywire* file needs all of 1948 except July and September, all of 1949 except October and November, November 1951, April 1952, all of 1953 except February and April... and any more of the wartime *XTAL Junior*. The QTH is 151 Fanshaw Ave., Ottawa, Ont. K1H 6C8. Tel (613) 733-7108. Δ



From the Clubs

By George Morgan VE3JQW
687 Fielding Dr.,
Ottawa K1V 7G6



From Raymond Ellis VE3NCH/G3BKM, and the Niagara Peninsula ARC's *FEEDLINE* by way of the Scarborough ARC's SARC News, entitled 'The Short Wave Listener.'

There is a popular misconception that to be a radio Amateur one must hold a transmitting licence and operate a radio station. NOT SO! One of the best Amateur radio enthusiasts that I ever knew never took out a transmitting licence, but there was very little that went out over the short wave bands, Amateur and broadcast, that he wasn't aware of.

His shack.

His radio shack contained just about everything worthwhile in the way of HF, VHF/UHF receivers, Panasonic adaptor, signal generator, oscilloscope, frequency counter and tape recording equipment. His cross-indexed QSL collection of short wave, broadcast and Amateur CW and phone stations was something to behold. He once told me he had no time to talk on the air because of his other Amateur radio involvements. What were these?

He was General Secretary of the local radio club, organizer of twice-monthly meetings, committee meetings, club outings to places of radio and technical interest, visits to other clubs, organizer of the national field day event, annual radio rally, hamfests, annual dinner and dance, and childrens' parties at Christmas time.

For 15 years he ran these events with just a little help from committee members, with never a word of criticism from members. Every meeting throughout the year had a different speaker; some came back each year with a new topic and became old and respected friends of the club. The best were 'invited guests' to the annual dinner.

It takes all sorts

At the end of one particularly interesting meeting, when the applause had died down and members were filing out, I noticed him standing at the side of the room with the usual faint and slightly whimsical smile on his face. I asked him if he had enjoyed the lecture, and he said, "Well, a lot of it went over my head because I am not very technical, but I

got my reward seeing the look of rapt attention on your faces during the lecture and hearing the applause at the end of it."

It takes all sorts of people to make up the world of Amateur radio. A short-wave listener like my friend was indeed a treasure to his club; he will be long remembered by those who knew him. Unfortunately he has now passed away—the club still carries on—but somehow the meetings are not quite the same, he set such a high standard.

Perhaps his selfless example as depicted in this true-life story may inspire some other short-wave listener who is too busy to talk on the air to find personal satisfaction in this rare aspect of the Amateur radio service.

The SARC News included this gem from the Halifax ARC; take note all those having antenna problems.

A ham radio tower— why do people get upset when one puts up a radio tower? A few things in its favour...

It doesn't squeal its brakes, screech its tires, blow its horn, roar its motor, slam its doors at ungodly hours, shine its headlights in your bedroom window, nor does it backfire.

It doesn't drop leaves that you have to clean up, grow branches over your house, drop fruits or nuts that block your downpipes, block your view like a tree or a building, grow roots that damage your walk or driveway, nor do its roots plug your drains.

It doesn't bite you, bark or meow, leave deposits on your property (!) dig up your garden, scratch at your back door, widdle on your trees, nor does it nose through and scatter your garbage.

It doesn't have boisterous parties, or play loud music, or have swimming parties through the night, or ring your phone (accidentally), nor does it ride bikes across your lawn.

It just keeps quiet and has nothing to say!

In one of its recent bulletins CRRL announced that it was introducing an affiliate club program identical in every way to the one run by CARF for a number of years. It has been said that imitation is the sincerest form of flattery, so, in addition to wishing it

well, the CARF affiliate club program says to CRRL, "Thanks for the compliment."

We have decided to run a little contest during 1986 to encourage clubs and readers to take advantage of affiliation.

First, we will keep a record of all clubs requesting affiliation during that period and select one to receive a copy of the Canadian Amateur Reference File. To keep this fair, we will also select one current affiliate club to receive a copy of the File or other CARF publications.

Second, we will keep a record of all new CARF memberships or renewals submitted during the period through an affiliate club, and will select one such member to receive a copy of the File.

Third, we will keep a record of all affiliate clubs through which new memberships or renewals have been submitted, and select one such club to receive a copy of the File or other CARF publication.

Attention seniors. Here is a very interesting proposal from the EMITTER via the ARL of Alberta's VE6 magazine for those Amateurs over 55 with more time than money and an interest in two-metre communication.

There is an area northwest of Edmonton without two-metre coverage. A solution to this problem is to apply to New Horizons for funding (available to groups with 50% of members over 55 years, half of whom are over 60) in order to start a club whose object would be to solve the problem. A group of seniors is required. If anyone is interested, get in touch with either Spence Jamison VE6BOY, or Jack Chislett VE6BOX, in Edmonton.

Amateurs helping with the Rocky Mountain Rally had an exciting time. According to the Calgary ARA's Key Klix, May 11, 1985, started off a beautiful day as the Calgary Sports Car Club held its annual Car Rally from north of Cochrane to about the Arctic Circle, but the 30 members of CARA who met for breakfast at 7:30 a.m. had no idea that Mother Nature was about to unload a bunch of her frustrations on them within a few minutes.

The road from Calgary to Waiparous Ranger Station laid a coat of dust on all the cars, then the white stuff took over. Eight inches of snow in



two hours took them all by surprise. Bud K7DNV provided his van as a temporary shelter for several (all in running shoes and with no coats). The rest of the communications group were either warm and dry—such as those near the north end of the route—or making igloos elsewhere. Since only four-wheel drive vehicles could make it to the check points for most of the day, the intrepid communicators either stayed where they had driven to earlier or played in the snow. The busiest people were those in two trucks who aided many stranded motorists.

Paul VE6CPG with his 4WD gave transportation to the rally organizer so that the rally could be organized according to what roads were snowed in.

Tom VE3OIG reports that members of the Niagara Peninsula ARC had quite a time last September with 'The Run for the Grapes'; I hope everyone has recovered by now.

The day started about 7 a.m. at Montebello Park, where they met to organize for the day. Eric VE3ISD managed net control and Bill VE3OZT took care of the park events. Pete VE3DSW and Ron VE3NDI managed the St John Ambulance and waved to Jerry VE3COP, Bob VE3KYA, George Turner and Joan VE3OZF, who were watching the checkpoints on the way.

OVERHEARD

Overheard on 20M SSB, a VE6 remarking to a W5, his surprise at being able to talk so well with all the mountains between Edmonton and Florida.

Then there was the two stations worked together on 20M, each using a kW reported my 40W as 599 yet they were only 20 dB over S9 here.

Being unable to advise three VE7s on SSB they were 10 kHz outside the SSB lower portion of 80M phone band was most disconcerting. Another VE7 on SSB moved on to their new assignment to advise them. A comment from one culprit before moving, "I couldn't understand the CW screaming." Which was QRG? but to him was screaming.

A certain Federal Department is threatening to retest aircraft pilots in the not too distant future. Maybe we should have a retest for Advanced Amateurs with one slight added twist. They must be able to receive by ear at least one word per minute for each year they have been licensed and send by hand at half their received rate, using Morse code. Give them the benefit of doubt again by allowing their choice between International, Continental, Russian, Turkish, Greek, Japanese etc., of course!

Vy 73, Moe VE6BLY

Dennis VE3OIF joined Len Wallace at the starting point of the parade to keep things running smoothly. Donna VE3OIT kept the race results flowing to the announcer as Ron VE3GAN radioed them from the lead truck. Don VE3OIH paced the runners on his bicycle-mobile and Tom VE3OIG joined him after seeing the two-and-a-half-mile run through.

They then concentrated on the 'Grande Parade.' Donna and Chuck kept Channel 11 informed as to the order of the floats in the parade as radioed by Pete, net control. Dennis, still with Len, filled in the fine details on the floats and bands. George, Joan and Ron kept the parade information flowing to net control while Sally VE3NDF, Ron VE3GAN, Don, Eric and Tom monitored the parade route.

Dennis VE3LYI ran in the Run for the Grapes and then did back-up communications in the festival office to get the float order to the officials in the reviewing stand.

After the parade all the volunteers were rewarded with fermented grape or hops. Pete, Don and Tom went to the YMCA where Run for the Grapes organizers, runners and volunteers ran for the bottles, after which they passed ideas back and forth with one of the officials so that next year things will run more smoothly. They then found themselves at the Bill Burgoyne Arena, where the awards for parade floats and bands were presented, and had a really great time over a glass of wine discussing the highlights of the day. △

A 1986 Award

Scarborough Amateur Radio Club Inc. offers the 40th Anniversary Award

To qualify for this award you require 40 points to correspond with the 40th anniversary.

For Canadian stations:

1. Contact 20 VE3 and 20 other stations from the remaining Canadian Provinces and Territories = 40 points. Contact with each station counts 1 point.

2. Five bonus points for contact with a special Canadian prefix station or a Scarborough A.R.C. member's station. Ten points for contact with the Scarborough ARC station VE3WE.

For U.S.A. and DX:

One contact is equal to 2 points and bonus points are doubled.

ALL CONTACTS MUST BE MADE DURING 1986 ONLY.

ONLY ONE CONTACT FOR EACH STATION.

Available to licensed Amateurs and SWL's.

To receive the award send a

copy of your log signed by two Amateurs and \$1.00 or 3 I.R.C.'s to Scarborough Amateur Radio Club Inc., Awards Chairman, P.O. Box 174 Station D, Scarborough, Ont. M1R 3C0

The club is also running an internal contest until April 23, 1986, their 40th anniversary. This internal contest should generate more operating by the club members and by the club call VE3WE.

Thank you for your participation, Jim VE3BZQ, SARC Awards Chairman.

(Look for VE3WE—SARC's call—on 28.4 MHz from 1400 Z to 1600 Z Sundays. This frequency is generally monitored from 1500 Z to 0300 Z by club members. Expect some use of the call on other net frequencies including 2 metres. Use of call by club members ends April 23, 1986.)

COMMUNICATIONS SYMPOSIUM

The Queen's University Department of Engineering will hold its 13th Biennial Symposium on Communications June 2-4, 1986. The Symposium is co-sponsored with DOC.

Registration fee is \$50, waived for full-time graduate students.

Anyone wishing to submit a paper should write to Peter S. McLane, Department of Electrical Engineering, Queens University, Kingston, Ont. K7L 9Z9. Deadline for abstract and summary of papers is March 2.



Memory System

There are two principal types of memory used in Micro-Computers. These are Read Only and Random Access (ROM and RAM for short).

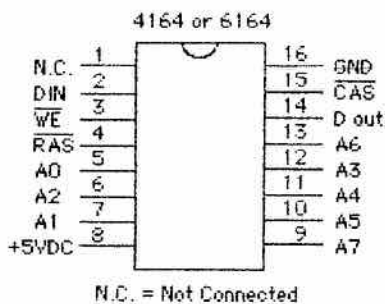
ROM is generally used to hold start-up instructions for the CPU to enable some sort of orderly behaviour after a Power Down or Reset. Due to the huge variety and simple operation of ROM chips the balance of this article will deal only with RAM.

RAM is where all the action takes place in our system. User programs, data, intermediate results and often the Operating System are stored here.

Dynamic Ram (DRAM) is the most frequently used in modern machines. These are tricky little devils to get operating and require a fair bit of extra hardware to support them.

Fig. 3 shows the pin connections for a 6164 64K DRAM chip. Some of the fun gets obvious when we see that there is only one data output and one data input. Further there are only eight address lines which requires data be strobed only after the address has been divided into two groups of eight lines (64k requires 16 Binary lines) and each has been strobed in by RAS and CAS. Figure 4 shows the timing required. In a 4 MHz Z-80 system each cycle must complete in

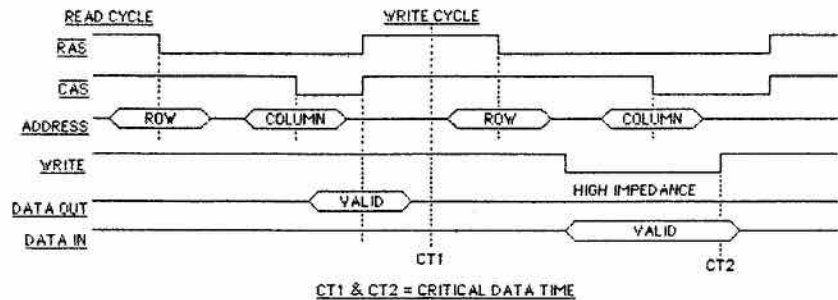
Figure 3 64K DRAM



250 Nano Seconds (.25US) or the whole thing will go away into 'Digital never-never land.'

In almost every computer in use today a system of shared memory is used. Video and CPU each get their turn at the DRAMs. This of course requires considerable care in timing to avoid a Conflict of Access. This is handled by using Wait states. When Video is accessing memory the CPU must wait until the next cycle and vice versa.

Figure 4 DRAM Cycles



If all this were not enough, there is the further complication that each Memory Cell in DRAM can only hold information for about two milliseconds before it forgets. This requires that a Memory Refresh circuit also have access to the DRAMs. DRAMs are refreshed each time RAS is asserted and all 256 cells on the Row are refreshed, therefore memory Refresh counters simply assert RAS but not CAS on each of 256 addresses to keep things going.

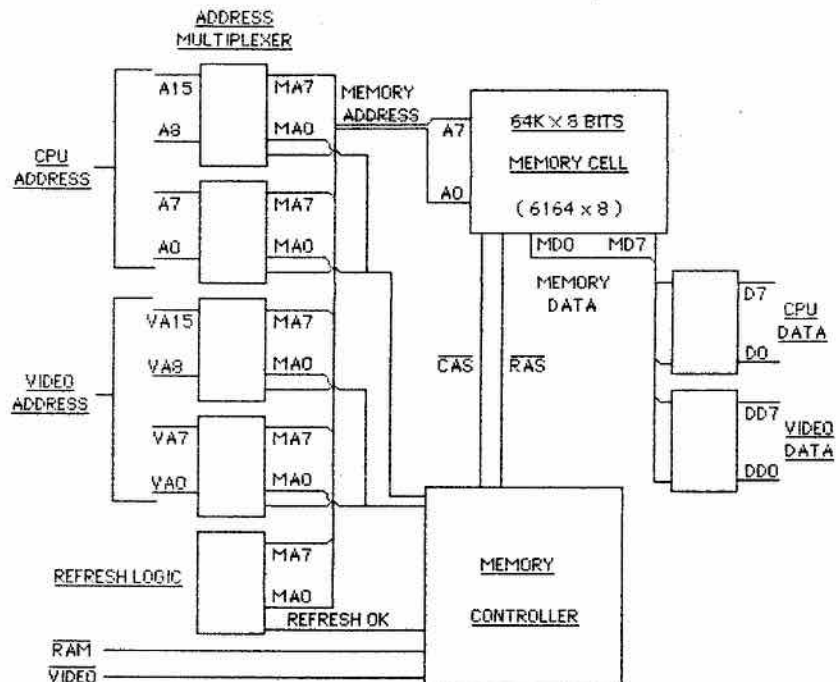
Fig. 5 shows in block form the requirements to deal with all the chaos around the DRAMs. It is interesting to note that eight DRAMs are needed to form 64k of RAM but typically 16 to 20 chips are needed to get it all working.

Video Generator

Our TV sets generate images by sweeping an electron beam from left to right and top to bottom of a screen coated with phosphorescent material. To produce an image from our computer we need only scan memory and present the image to the TV in a synchronized fashion. This means the video-generator must produce Read cycles to RAM, Horizontal and vertical synchronizing pulses and a 'Dot Stream.'

Each character to be displayed on screen is a different combination of on (1) or off (0) dots in a 'cell' or zone of the screen. The most popular is an 8 x 8 cell arranged as 80 x 24 cells on the screen. This provides 1/2 page of text for Word Processing. Δ

Figure 5 Multi-Access Memory



CONTEST SCENE



By John Connor VE1BHA
18 Deerfield Dr., Apt. 1112, Nepean, Ont. K2G 4L2

Feb 8/9— YL OM Phone
Contest
15/16— ARRL DX CW Contest
21/23— CQ WW DX 160M SSB
22/23— YL OM CW Contest
Mar 1/2— ARRL DX Phone
Contest
15/16— Bermuda Contest

Oh, my pounding head.

Yes, the CQ WW CW Contest is over for yet another year. Conditions were not as good as in the phone contest, with very little on 10 and 15 only so-so. But both 40 and 20 were very good, with lots of activity and lots of DX.

It didn't really sound like anyone in Canada was going all out to make a big score. Maybe that is the best approach to take in this part of the sunspot cycle. Then again, maybe it isn't. Down New Hampshire way, John K1AR repeated his performance from the phone contest, breaking the US Single Operator All Band record. Hmm. Maybe conditions weren't all that bad?

Just a small side note to illustrate the kind of thinking and attention to detail that go into record breaking scores. K1AR operated from the station of K1GQ. The station there is set up so that one can change bands by throwing one switch only. That one switch is actually the band switch on the transceiver. It takes care of switching amplifier and antennas in addition to switching the transceiver. Small things like this can add up to

the difference between a good score and a great score.

Anyway, that was there and this is here, or something like that. Back in VE2 land, Kent VE2FGG operated from the wild wastelands of Zone 2 in the CQ CW. It seems that even being in the middle of nowhere isn't enough to get away from Mr. Murphy, as Kent had him as a houseguest for the weekend. Intrepid operator that he is though, Kent persevered and came out with about 700 QSOs and 81 multipliers for 135k, single op all band. It would undoubtedly have been better if Kent hadn't had to go to work on Sunday. But for now, VE2FGG will just have to find comfort in the Contester's Motto— "Wait till Next Year."

In other news, George VE7EIK has passed along his score from the CQ Phone Contest this year. He ran up 865 QSOs for 219k on 20 metres monoband. Nice job.

ARRL DX Competition

Checking the calendar, we find the ARRL DX Competition coming up in February (CW) and March (Phone). In this contest, Canadians can only work

DX stations, so it is a good opportunity to increase your DXCC totals. This year should be the perfect time to increase your score on the low bands. Then, having gotten that job out of the way, you will be all set when the next sunspot cycle gets underway. All you will have left to do will be to work some DX on the high bands, which is like shooting fish in a barrel compared to the low bands, and you will be well on your way to 5 Band DXCC.

Speaking of the next sunspot cycle, I had a conversation recently with one of the local Big Guns. He will soon be in a position to begin building the successor to his previous contest station, which was felled by the untimely failure of a guy clamp. As well, it appears that several other people in VE3 land are in the preparatory phases of building some big contest stations. In four years or so, it appears likely that there will be four or five large contest stations in Ontario. Bridgewater, take note.

That's it for another month. In next month's column, we will take a look forward to the CQ WPX Contest, the unofficial end of the contest season.

Book Review

Beam Antenna Handbook

The Beam Antenna Handbook has been around for a long time, so I looked on the title page to see what edition the review copy might be. To my surprise, the edition is not mentioned; the word 'new' on the cover means what it says.

The book is almost entirely devoted to Yagi arrays. Quads are not mentioned, the 8JK only briefly. This is logical, since most Amateurs' beam antennas are Yagis.

To an old hand who has been building Yagis according to the simple instructions learnt long ago, the modern, computer-assisted design techniques are intriguing, and the up-to-date corrections for element taper and boom effects enlightening.

As would be expected from authors Bill Orr W6SAI and Stuart Cowan W2LX, these refinements are explained clearly and fully. Besides

these theoretical considerations, the book carries numerous practical antenna designs. There are full and detailed instructions for making all the small yet essential parts. The Amphenol instructions for preparing types UG, N and BNC connectors are reproduced, for instance.

The instrumentation for adjusting antennas is fully covered. No detailed design for a Standing-Wave Ratio meter is given; the authors considering that only high quality commercially built equipment is reliable. They do, however, give plans for an antennascope and a noise bridge.

The printing is clear, the illustrations generally plain. I found few errors, none important, and only one misprint. In all, a useful, practical handbook on the Yagi antenna.

The Beam Antenna Handbook is

published by Radio Publications Inc.
Box 149, Wilton, Conn. 06897, U.S.
\$9.95.

HELP!

CARF needs the addresses of these Amateurs. If you know where they are presently living, please tell Debbie. Her address is CARF, Box 356, Kingston, Ont. K7L 4W2.

Name and last known address:
M. Moorehouse VE3MCM, 244 Mineola Rd E., Mississauga, Ont. L5G 2G3.

L. Yater VE5MP, F4 Trans-Can Tr Cres., Moose Jaw, Sask. S6H 0N3
Ken Bell, 844 Fairford E., Moose Jaw, Sask. S6H 0G4

BULLETIN BOARDS

Please let Lyle know details of your local computer bulletin boards. He's trying to compile a directory of them.



MICROWAVES

By Michael Ross VE2DUB
988 Hudson
St. Bruno, Quebec J3V 3Y2



10 GHz Cumulative Contest Announcement

In November *QST* (page 81), the ARRL announced the first North American 10 GHz cumulative contest for the fall of 1986. Cumulative contests, involving more than one operating session, have been very popular in Europe, with entries numbering in the hundreds. The multiweekend format allows the time to try different paths and locations each period. Due to the mainly line of sight propagation at 10 GHz, mountaintop or rooftop locations are most desirable to make contacts over greater distances.

While the details have not been finalized, the proposal calls for two sessions of Friday to Saturday night, separated by one weekend. Final score would be the sum of the two weekend's scores. Repeat contacts with the same station would be

allowed as long as one had moved at least 10 miles.

The ARRL is accepting preregistrations from stations wishing to participate and will distribute the final list of stations, locations, equipment, etc. Before the contest I will be sending a copy of the preregistration form to all known 10 GHz operators in Canada and would be happy to hear from anyone else that would like to get involved. There is lots of time before next fall to assemble a station and participate.

Getting on the 10 GHz band is not hard. A surplus motion detector and simple modulator gets the transmitter on the air and a regular FM broadcast receiver can be used for reception. A review of past *TCA* articles over the last year will give you an idea of what is involved. I will be working on publishing a bare bones transceiver construction project over the next

several months so start searching for those old motion detectors today.

TCA 10 GHz Articles

10 GHz Repeater Frequencies P 37 Dec 85
10 GHz Band Plan for 30 MHz Receivers P 32 Nov 85
VE7CVJ's Dishes, VE3BFM Transceiver Description P 38 Oct 85
1 GHz Beacon Reception P 42 Sep 85
WB5MAP 10 GHz ATV Modulator P 34 J/A 85
Tuning Motion Detectors to 10 GHz, VE7 activity P 35 Jun 85
Path Plotter for Checking Microwave Paths P 35 Apr 85
PAOKKZ/VE5 Equipment Description P 23 Mar 85
VE7CVI Equipment Description P 37 Feb 85
Parabolic Antennas and Feedhorns P 39 Jan 85
Canadian Record 100 Miles, ARR 10 GHz Transceiver P 34 Dec 84
Visit to VE7AII & VE7CVI, Equipment Description P 48 Oct 84
X-Pro P 33 Jun 84
Canada to US 75 mile Contact P 30 Jan 84
(Reprints of these 14 articles are available from the CARF office for \$2.50. Write Debbie at Box 356, Kingston, K7L 4W2.)

SWAP SHOP

ESTATE SALE: Kenwood TS930S/AT \$1795.00, Kenwood MC85 mike \$125.00, Dentron Amplifier 1200L and Antenna Tuner DTR-3KA \$800.00, Kenwood CW Filter YK88CN 270 Hz \$79.00, Kenwood TU-79 Tone Unit \$55.00, Heathkit Power Meter HM-102 \$45.00, B&W Phone Patch 3002 \$125.00, Larsen 5/8 PO M/M \$55.00. VE2OU, 2785 Valcourt St., Ste Foy, Quebec G1W 1W2.

WANTED: Propeller pitch; 2 KW-up linear amplifier. Confirm specifications and best price. VE2OU, 2785 Valcourt St., Ste Foy, Quebec G1W 1W2.

FOR SALE: Drake T4X, AC4, R4B with Sartori mods, \$575, Icom 551, \$400, Yaesu FT202, \$75, TH6DXX, \$375, Yaesu FT101, \$325, will consider trades. **WANTED:** Icom 720, 730, 745, Yaesu FT102, 902. W. Richardson, Site 20, Comp. 63, RR 1 Whitehorse, Yukon Y1A 4Z6.

FOR SALE: Microlog AKB-1 programmable keyboard for Morse and RTTY also Microlog AVR-2 Video Display Terminal for Morse and RTTY with split screen option. Also Model

35 RO Teletype Printer. All in excellent condition. Price for all \$300.00 plus shipping. V.F. Smith VE1CU, 46 Beaconsfield St. Fredericton, N.B. E3B 5H2, 506-454-0609.

COLLECTORS: Collins original sideband transceiver, vintage mid-50's in excellent condition. KWM-1 transceiver; 516F1 Power Supply; 312B2 Speaker/Control Unit; plus manual, cables and some spares. Any offers? Don Murphy VE7CN, Apt. 807 195-21st St., West Vancouver, B.C. V7V 4A4 (604) 922-4696.

ATTENTION DXERS: Must move. For Sale. Probably the best DX location on Vancouver Island. 5BDXCC—Honour Rolls. 3 bedroom house—orchard, large garden, aeriels for all bands 2-160 mtrs. In the city of Duncan, Canada's mildest climate. Interested? Write for pictures and more information. Price \$65,000. Alex Stronach, 371 Brae Rd., Duncan, B.C. V9L 3T9. Phone 604-748-9559.

WANTED: Vintage Canadian radios (Marconi, N. Electric, DeForest, Rogers Batteryless); Tubes; Magazines. Also Plastic Addison.

Member AWA CVWA. A. Nolf, 539 Kastelic Pl., Burlington, Ont. L7N 3R5. 416-639-4768.

WANTED: Hallicrafters SX-62, 62A, 62B or SX-42 Communications Receiver. Hallicrafters R-46B or R-47 Speaker. Ernie Baird, 1307-39 St., Edmonton, Alta. T6L 2M6. Phone: (403) 463-6104.

FOR SALE: Apple II Plus clone computer. All shielded, filtered and RF suppressed. Many extras. Disc drive and daisy wheel TTX printer with 32K buffer. Many programs, RTTY, CW, Slow Scan TV, word processor, flight simulator, etc. Includes RTTY-CW interface unit and desk on casters. \$1500.00. Pick-up only. Eric VE3CTP (416) 291-0088.

Send your 'Swap Shop' notices to the TCA Swap Shop, Box 356, Kingston, Ont. K7L 4W2. Single insertion is \$1.00 minimum (10 words) and \$1.00 for each additional 10 words. To renew, send copy and payment again. Please print or type, and put your membership number and call (not counted) at the end of your ad. Include your full address with postal code; if using a phone number, include the area code. TCA accepts no responsibility for content or matters arising from ads. This feature is for the use of members wishing to trade, buy or sell personal radio gear.

KINGSTON COURSE

The Kingston Amateur Radio Club is sponsoring a course in Basic Amateur Radio. Call George at 389-5108 or Jim at 389-0144.





YL NEWS & VIEWS

By Cathy Hrischenko VE3GJH

Return by Popular Demand

The Canadian Girl Guides will have a J.O.T.A. again this year. The dates are Feb. 16-23, 1986. Saturday Feb. 22 is Thinking Day and will probably be the most active. Both OMs and YLs are asked to invite Brownies, Guides etc. to their shacks that week.

Try to make skeds so they can talk to other girls their age. Susan VO1OI is working on the East Coast arranging skeds and operators. I'll do what I can from this area. I found out at least one VE7— VE7YL Elizabeth— was on last year. We've put the word out and hope we can get operators and girls all across Canada.

Check with your local Girl Guides. Try to put out the word. Contact your local paper. Take pictures and PLEASE let me know all about it. Girl Guide Headquarters is most excited about the feedback received from our J.O.T.A. last year for the 75th anniversary.

Just received the special card from CG3SAS (below).

YL Contests

YL-OM Phone 1600 Saturday, Feb. 8 until 1800 Feb. 9 1986.

CW 1800 Saturday, Feb. 22 until 1800 Feb. 23 Sunday.

BYLARA contest Thursday Feb. 27 and Saturday March 1, 1986.

New CLARA 40 Metre Net

Frequency 7.088. Time Tuesday 14:00z (13:00z during daylight time).

Local time does not change:

10:30 Newfoundland time

10:00 Atlantic

9:00 Eastern

The CLARA 20 Metre Net now meets at 14:133 Tuesdays 19:00z.

The Maritime Sparkettes celebrate 20th in 1986. They operate via their net only as of this year.



Four happy conjunctions of beauty and brains! Lower Left: Violet VE3DEX, 80 CW and builds her own gear. L.R. VE3BGG Marie likes 80. U.L. Ethel VE3DTU operates 10-2 from Port Wilder light house on Lake Ontario. U.R. VE3DGT Margaret, all bands. (Picture taken 1952).

(Anyone know where Marie and Violet are now? If you do, please let Cathy know).



CG3 75th CELEBRATION SAS CANADIAN SPECIAL EVENT AMATEUR STATION



The home of Mary Malcolmson. Canada's first official Guider, site of first Guides in Canada.

75TH ANNIVERSARY GIRL GUIDES OF CANADA 1910 - 1985

The first Canadian Girl Guide Company to be officially registered was formed on January 10, 1910 in St. Catharines, Ontario, Canada.

Best 73's & D.X. VE3 FO1
PSE QSL TNX Dave Digweed
To Bureau or: 12 Frederick Street,
St. Catharines, Ontario,
Canada L2S 2S2

Station	Date	GMT	Freq.	Mode	RST
CG3 GJH	2.19.85	0108	3.75	2X SSB	5/9.



TECHNICAL SECTION

TECHNICAL EDITOR
Frank Hughes VE3DQB
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Hawkesbury, Ont. K6A 3C9



The Vertical Antenna

By Bruce Lauer VE3MJV

The vertical antenna offers several advantages to the radio Amateur:

- It is neat in appearance, modest in cost, and occupies minimum space,
- It may be mounted on the ground, on a rooftop or on a mast,
- It is reasonably portable and is easy to erect and tune,
- It produces a low angle of radiation close to the horizon, making it ideal for DX.

On or above the ground?

The vertical may be mounted over actual ground in which case an image antenna can be considered to extend down below the ground surface to a distance equal to the height of the antenna. In effect, therefore, we have doubled the actual length of the antenna. In theory, a quarter wavelength ($\lambda/4$) grounded vertical behaves as a half-wave ($\lambda/2$) dipole suspended vertically in free space.

The reason the antenna usually deviates from its theoretical performance is that the ground is not a perfect conductor. Ground resistance thus causes dissipation of power which would otherwise be radiated. *If you decide to opt for a ground-mounted system, you should expect to direct a large portion of your efforts to reducing ground resistance.*

If mounted in the air, a quarter-wave antenna can make use of a simulated ground consisting of 2 and preferably 4 or more $\lambda/4$ wires radiating from the base, each radial in any given pair arranged to oppose the other in direction. If the vertical element and any one radial are considered, we again have, in effect, a half-wave dipole electrically.

The reason for arranging the radials to oppose each other is to allow the actual $\lambda/4$ vertical element to radiate in all directions and to minimize half-wave directive effects. What happens is that each of the $\lambda/4$ radials cancels out the opposite's effect. While an infinite number of $\lambda/4$ radials in a circle at the base of the antenna is

ideal, four radials at right angles to each other is practical.

The advantage of mounting your vertical above ground is that it will enable you to radiate a signal above ground energy absorbing structures which often surround antennas at ground level, particularly in the city. Also not to be ignored is the fact that by elevating the antenna, ground losses are virtually eliminated and up to 3 dB gain is achievable from the antenna and its image, which together form a collinear pair.

Ground-Mounting: How Many Radials?

While fewer and fewer radials are required when we elevate a vertical into the air, the situation is drastically more complicated if the antenna is to be mounted a foot or two off the ground. In such a case, we need 50-150 $\lambda/4$ radials to shield the antenna from the lossy ground in the immediate vicinity of the base, whereas, as previously indicated, only 3 or 4 would be required when the base is raised $1/2 \lambda$ into the air.

How tempting it is to dispense with radials entirely and use only a ground rod at the base of the antenna when mounting close to the ground! As the author found out, the end result of this short-cut is a weak signal with attendant marginal QSOs. The reason for this is that, unless you live in a swamp—or even better, in a salt water marsh, transmitter power is dissipated via $I^2 R$ losses due to resistance between the rod and the ground or the ground-resistance generally in the vicinity of the antenna.

One of the characteristics of a vertical antenna is that there is a high current density in the area around and beneath the antenna. In other words, the ground provides the return path for the antenna current. There is unfortunately a difference between a physical ground sufficient for lightning protection and an electrical ground for HF work!

The efficiency of an antenna system may be defined as the ratio of the power radiated by the antenna, P_r , to the power supplied by the transmitter, P_s . This ratio can be expressed as a percentage by multiplying by 100:

$$\text{Efficiency} = 100 \times P_r/P_s$$

The power radiated by the antenna, P_r is the product $I^2 R_r$ where R_r is the radiation resistance of the antenna (36.5Ω for a $\lambda/4$ radiator).

The power supplied by the transmitter, P_s , is dissipated primarily through the radiation resistance of the antenna, R_r , and through the ground resistance, R_g i.e. $P_s = I^2(R_r + R_g)$.

Thus we can rewrite Equation (1) as follows:

$$\begin{aligned} \text{Efficiency} &= \frac{P_r}{P_s} \times 100 = \frac{I^2 R_r}{I^2 (R_r + R_g)} \times 100 \\ &= \frac{R_r}{R_r + R_g} \times 100 \quad (2) \end{aligned}$$

Note: It is recognized that Equation (2) is an over-simplification. The efficiency is actually the ratio of the radiation resistance (R_r) to the total resistance of the system, R_t . R_t includes radiation resistance R_r , ground resistance R_g and resistance in conductors, dielectrics and loading coils, the latter three being generally negligible for vertical radiators.

For soil in residential areas, R_g can be as high as 6500Ω . If we assume a ground mounted vertical employing no radials:

$$\begin{aligned} \text{Efficiency} &= \frac{36.5 \Omega}{36.5 \Omega + 6500 \Omega} \times 100 \\ &= 0.56\% \end{aligned}$$

For marshy soil, R_g is about 124Ω and in this case things are more optimistic: the efficiency is 22.6%. But by using 40-50 radials, each only $.2 \lambda$ in length and placed about $1'$



below the earth surface, it is reported that R_g can be lowered to 2Ω in the case of a $\lambda/4$ radiator. Now look what happens:

$$\text{Efficiency} = \frac{36.5 \Omega}{36.5 \Omega + 2 \Omega} \times 100$$
$$= 94.8\%$$

Not much more need be said, except it can be easily seen from the above and Equation (2) that in the case of a $\lambda/4$ radiator, we have to lower the ground resistance to the same value as the radiation resistance (36.5Ω) in order to achieve at least 50% efficiency.

So, how can we make a ground system assuming that, unlike Radio Canada International, our antennas are not located in marshland? Here are some ideas:

- Use lengths of bare copper or aluminum wire, AWG No. 10 or 12, each $\lambda/4$ in length.
- Use as many radials as possible, solder the lengths together at a common point, and bury the radials with the center-point directly under the antenna. The antenna is insulated from the radials and the mast. The feedline inner conductor is connected to the antenna and the braided shield of the coax is connected to the radials.
- Consider having the radials emanate from a ground rod driven 10 feet into the ground and sticking a few inches above the ground to facilitate connection to the antenna.
- To increase ground conductivity in the vicinity of the ground rod, dig a circular trench of 18" inside diameter and 24" outside diameter and 12" deep, fill it with dry rock salt, magnesium sulphate or copper sulphate, flood the trench with water and then cover it with earth (lifetime of 50 lbs. treating material: 2-3 years). Note: may be phytotoxic; for example, toxic level of copper to plants is about 25 parts per million (.0025%). Not recommended for use around gardens.

Multi-Band Verticals

Rather than having monoband verticals for each band, you will probably wish to consider purchase of one of the 10-80 metre multiband verticals that are available for home-station use. For your reference a list of some of the more popular verticals currently available in the market place is given at the conclusion of this article.

Most, but not all, of these are quarter-wave radiators that employ traps (high-Q parallel resonant circuits) which 'automatically' isolate various sections of the antenna, depending on the frequency employed. You will recall from your basic radio theory that at resonance, a parallel-tuned series-connected

circuit will present an extremely high impedance at the resonant frequency. Thus at 10 metres, for instance, the lower section of the antenna below the first trap is resonant, as is the first trap (the 10 m trap). The first trap thus has a high impedance and the result is that the entire portion of the antenna above the first trap is electrically disconnected.

Similarly, at 15 metres, the portion of the antenna up to the second trap is resonant, as is the second trap up from the bottom (the 15 m trap), so the second trap presents a high impedance, thus isolating the portion of the antenna above it. The lower trap at 15 metres merely presents a small reactance, thus permitting the two bottom sections to act as one. And so it goes.

Installation if you must mount on the ground

The following procedure has worked well for the author for installing a ground-mounted vertical:

1. Dig a hole about 4 feet deep and 12-15 inches in diameter.

2. At the top of this hole, install a square wooden form, 12-15 inches to each side and about 6 inches in height, so that it protrudes about 2 inches above the surface of the ground.

3. Drive the bottom of a 1.5 inch diameter steel mast, 6 feet in length, to a depth of 1 foot below the bottom of the hole. The mast should thus protrude 1 foot above the surface of the ground. Make sure that the mast is centered in the hole and that it is vertical. If not, make adjustments using rocks wedged in the bottom of the hole to position the mast.

4. Drive a 10 foot steel ground rod into the bottom of the hole such that the rod is positioned about 6 inches away from the mast. The ground rod should be driven into the ground so that only about 6 inches protrude above the ground surface.

5. Run a 1 inch PVC pipe from the antenna site to your house. The author buried his pipe about 6 inches below the ground surface. At the antenna site, bring the pipe into the hole and up through the form. This may now be the opportune time to install your radial system. Remember, the ground rod in itself is not sufficient. (Bruce has assured me that he will install his radials any week now—Ed.)

6. There should be three items visible above the form: the mast in the center protruding 1-1.5 feet above the surface, the ground rod 6 inches from the center and protruding 6 inches above the surface, and about 6 feet of excess pipe through which the RG-8/U coaxial cable will be fed. It is wise to leave an excess because you will probably wish to allow for a partial loop in order to prevent rain from entering the pipe.

7. Fill the hole with ready-mix concrete and rocks. When you reach the form, fill to the top with concrete only.

8. You are now ready to mount the antenna to the mast, connect the ground system, and feed the coax through the pipe. You will find that this base is sturdy and will withstand high winds to which your antenna may be exposed.

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—Originally published in the Ottawa ARC *Groundwave*. Δ

TECHNICAL EDITOR

The editor could use some help, someone to find technical articles, to review them or send them to a specialist reviewer, and to edit them for publication.

Any Amateur who could help the magazine in this way is requested to get in touch with the editor at Box 855, Hawkesbury K6A 3C9.

NEW CATALOGUE

Those of us who have used the 1981 J&J Electronics Catalogue these past four years will be glad to see its big brother, their 1986 catalogue, just issued.

J & J is a parts supplier. They sell a wide range of prime, first grade, material; including semiconductors, capacitors, resistors, breadboards, PCB items, hardware, tools, test equipment and books. Write them at Box 1437, Winnipeg, R3C 2Z4 for a copy, and please mention TCA.

Anyone who would like actual prints of the sketch on the December TCA cover or of other historical Great Lakes ships should write to: Paul Papps, c/o North Channel Studies, RR #2, Bath, Ont. KOH 1G0. 613-352-3408.

If you know of a new Amateur, tell Debbie. She'll send him or her a free copy of TCA.



Un bureau fonctionnel pour vos equipments

An ergonomic desk for your equipment

par/by Claude Vallée VE2ARU

Mon XYL et moi avons décidé l'achat d'un condominium, et comme je tiens à opérer ma station radio amateur, n'ayant plus de cave pour mes installations, je dois donc utiliser une des chambres. Comme il s'agit d'une bâtisse neuve, pas question d'utiliser mon ancienne table... J'ai donc sorti ma table à dessin et mes crayons et compas et j'ai dessiné une table fonctionnelle pour mes transmetteurs, ordinateur, vtr, etc... J'ai du tenir compte du style de notre condo, et me résigner à utiliser mélamine, utilisé ici, pour les armoires et garde-robes, matériel que je travaillais pour la première fois.

Pour les dimensions de la table, j'ai tenu compte des équipements en main, et je voulais pour raison d'économies, que le tout, soit fabriqué à partir d'une feuille de 4' x 8' x 1/2" que l'on trouve facilement sur le marché, utilisant les retailles pur renforcer les pattes et la table principale. Je dois avouer qu'une fois le projet terminé, il n'y avait que très peu de matériel non utilisé.

Les différents morceaux sont

retenus ensembles au moyen de petits équerres métalliques (1.25" x .875") que j'ai trouvés au même magasin, et le tout est visé en place au moyen de vis No 6 x 1/2 pouce.

La finition des tablettes est faite au moyen d'un ruban (de type mélamine) de un demi pouce, qui est collé en place à l'aide d'un fer à repasser ajusté à la température 'coton.' Vous trouverez les dimensions et la configuration des tablettes en figure 2.

Lorsque le temps est venu d'ajouter l'équipement requis pour la communication par satellite, il fallut changer le dessin original en modifiant la tablette du milieu, et en ajoutant une autre tablette à mi-chemin entre la table principale et le plancher, ce qui fut réalisé facilement, en achetant les trois quarts d'une deuxième feuille de mélamine... (voir fig. 4). Notez bien que le nom de 'shack' a dû être changé pour celui de 'chambre des ordinateurs.' Bonne construction et 73.

My XYL and I are living in a condominium, and as I wanted to operate my Amateur radio station, no

way could I move in my old table. So I had to pull out the drawing board and design a suitable table that could take my equipment, and at the same time keep modern style to go with our new condo.

I figured out the dimensions of the desk to be functional, and with enough room for the equipment I had on hand at that time (transceivers, computer, printer etc.) I had to work with 'melamine' and wanted for economy reasons, that the shelves and legs fitted into a 4' x 8' x 1/2" board. I joined together the pieces with metal squares (.875" x 1.25") and screws No. 6 x 1/2", the finishing of the shelves (front) with 1/2" 'melamine tape' that I glued in place with the XYL's iron, heated to cotton temperature; you will find the dimensions in Fig. 2.

When I bought my satellite equipment, I needed more table space, this was easy to get by altering the middle shelf, and adding a fourth shelf midway between the main table and the floor.

Well now, one cannot call this equipment room a 'shack' anymore... we had to rename it the 'computer and transmitter room of VE2ARU.' **△**

The Super Twit

By Richard G. Moore VE3LRB

One Sunday, while contemplating the vagaries of sermons and organ pipes, I wondered if a resonant air column could be used to enhance a specific audio frequency—to wit, the preferred frequency of my audio filter. I assembled the bits and pieces for construction: a round whisky bottle container, a small speaker, some 5 mm plywood, some cotton batting and a mini phone jack.

I cut out and sanded a couple of plywood circles to fit snugly inside the tube and cut out the centre of one to fit the core of the speaker. Measuring up about 40 mm from the plastic capped end, four slots 15 mm wide are cut, leaving enough between them for support.

Now I inserted the ring to just below the slots, glued it into position, and then glued the speaker to the underside of it. Next the jack was mounted, wired to the speaker, and the cavity filled with cotton batting

and then the lid was replaced. The idea of the cotton is to raise the resonant frequency of the speaker above that of a lot of the usual QRN.

The next step is to cut off the closed end of the tube, insert a nail or screw into the centre of the remaining disk

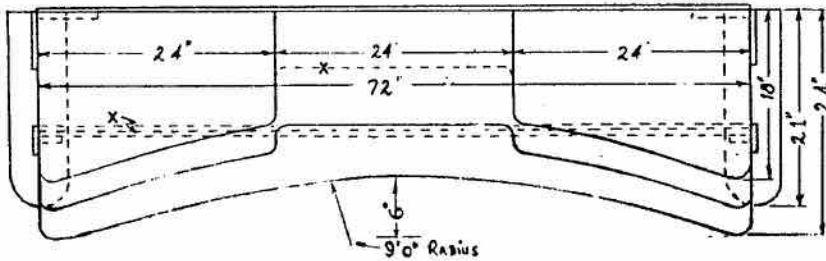
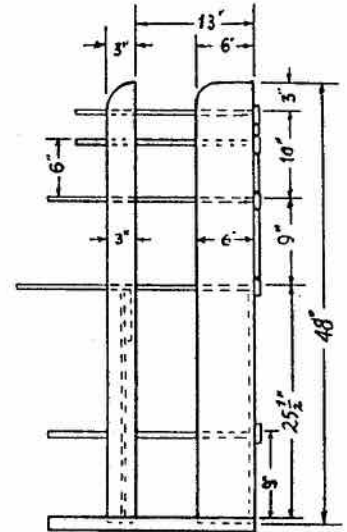
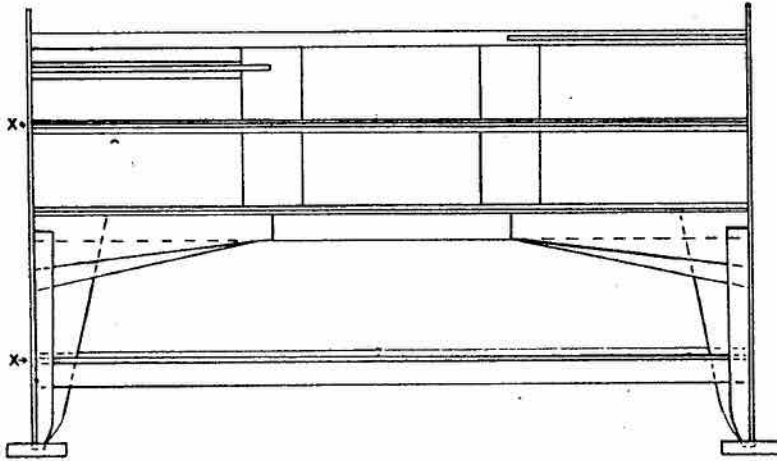
and place it inside the tube. While listening to your favourite CW pitch or that of an audio generator, move the disk up and down inside the tube to peak this frequency, glue it into position and trim off the rest of the tube. Voila!—your own special 'Super Twit.'

For a variation, cut out your call sign rather than the slots—this requires a steady hand which is not improved by consuming the previous contents of the tube.

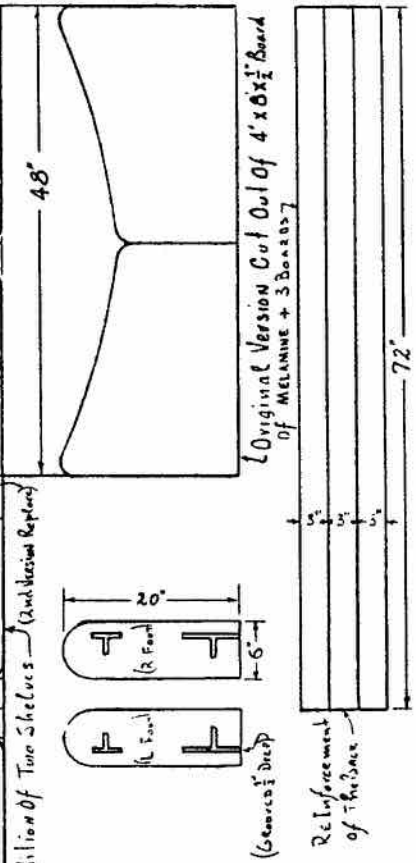
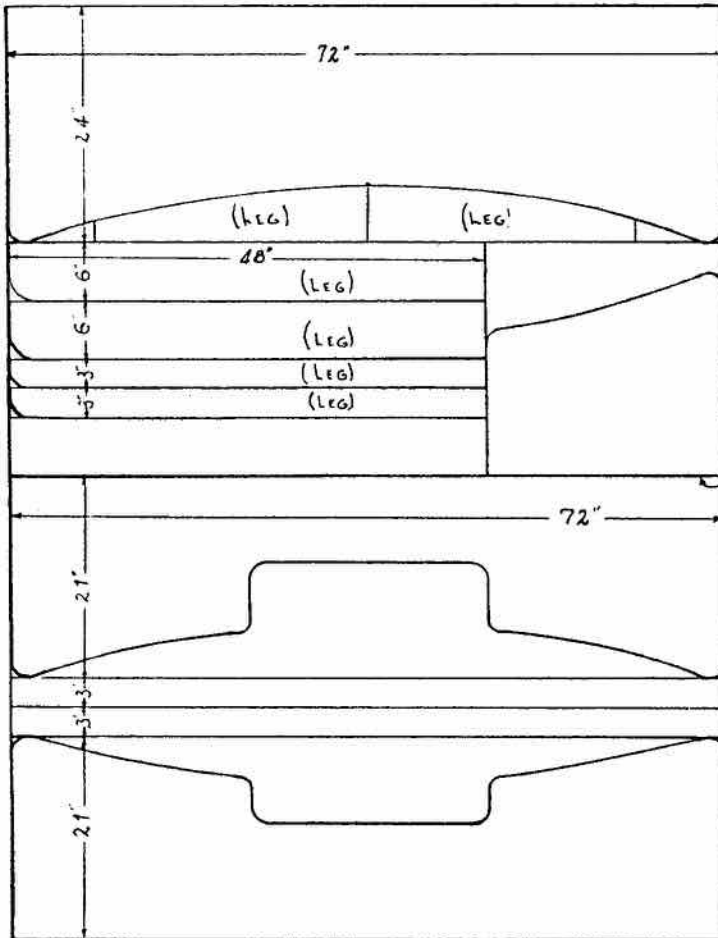
So there you have it, and I make no claims for originality, but it's cheap and it works. Having made a number for friends, I hear that they work well when coupled with the usual speaker for a quasi-stereo effect. As some receivers use additional components in connection with their phone jacks, either use more AF gain or connect it to the external speaker jack. I am also interested in improvements and mods—there must be many. **△**



Le bureau— The desk.



- X = addition.
Materiel Requis
 1 feuille Melamine 8'x 4'x 1/2"
 1 planche Melamine 8'x 8'x 3/4" (1 3/4)
 Equerres De Coin En Metal 1 1/4" (≈ 60)
 Ruban De Finission 1/2" & 3/4"
 Vis 1/2" (≈ 120)
- 1 sheet Melamine 8'x 4'x 1/2"
 1 board Melamine 8'x 8'x 3/4" (1 3/4)
 Metal corners 1 1/4" (≈ 60)
 Finishing tape 1/2" & 3/4"
 1/2" (≈ 120) screws



Cutting Pattern

VE2ARU

Note: All Pieces joined together with Metal Square Brackets 1 1/4" & 1/2" Screws



Compact Keyboard generates Coherent CW

By Bill deCarle VE3OBE

Although many have home computers capable of generating Morse code, for various reasons most CW operators don't regularly use them on the air. The rule seems to be that a computer which has been designed to run many different programs is not the best choice when it comes to getting top performance and ease of use in one specific application.

For example, the operating position in most hamshacks will already be surrounded with useful and necessary equipment (like radios), and open desk space can be scarce. A general-purpose computer, with its video monitor, disk drives and other paraphernalia just doesn't belong there. Consider also the hassle of having to load the CW program into memory each time you want to operate. The solution is to put the computer back into the kids' playroom and build the automatic sender described here. This machine was designed for one purpose only: to send Morse code efficiently and conveniently. Small and self-contained, it takes up little more space than a regular keyer, and is a real pleasure to use.

Circuit Details

I started out with a surplus keyboard for an Apple clone computer because it was very compact and the keys had a nice typing 'feel'—but just about any keyboard you might find at a fleamarket can be salvaged and put to use in this project. The basic requirement is that it must be scannable, each key should produce a simple contact closure when it is pressed.

My keyboard came with some IC's in it to do the scanning and output a 7-bit ASCII code. All of this circuitry was removed and set aside, leaving only the mechanical keys and switches. Since the new 'works' will require only a few components, it is best to use wire-wrap sockets and a small piece of perf-board for construction. Make it long and narrow so it will fit easily inside the existing keyboard housing. The heart of the circuit is an 8035 CPU chip, from Intel's 8048 microcontroller family.

For those who like to operate QRP, all of the components used have readily-available pin-for-pin equivalents in CMOS, making it

possible to build a sophisticated keyer that needs essentially no power to operate. Our basic approach is to keep the hardware simple and let the

program do all the work (software doesn't take any power). In addition to handling operator commands, buffering text and generating perfect Morse code, the program scans the keyboard and even debounces the switch contacts.

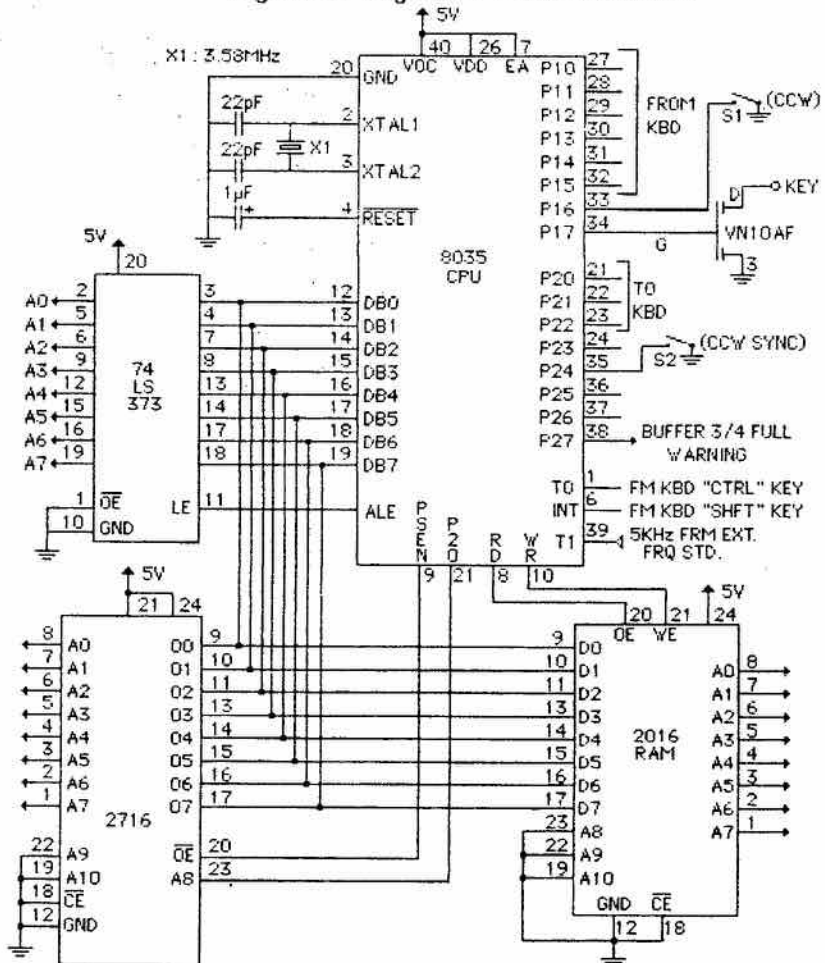
The keyboard switches should be arranged as shown in Fig 1. Each key is located on a grid, and pressing the key connects the row and column lines at that point. In turn the program grounds each of the eight row lines, then senses the column lines to see if any one of them has been pulled low by a depressed key. Two-key rollover is automatic, so even if you press a second key before the first has been released the machine will still see them in the right order. The shift, control and reset keys are brought out separately, not scanned.

Figure 1

Row	0	1	2	3	4	5
0	≡	?	0	9	8	7
1	!	@	#	\$	%	&
2	ENTER	P	O	I	U	Y
3	ESCAPE	Q	W	E	R	T
4	→	←	↑	L	K	J
5	Z	X	C	V	B	SPACE BAR
6		/	?	<	M	N
7	A	S	D	F	G	H

UPPER GRAPHIC IS SHIFTED. LOWER UNSHIFTED
 != Commencement * = SR (End of Contact)
 & = AS (Wait) - = Breaksign
 = = AR (End of Trans) = = BR
 → = Error (8 dots) ← = Silent (Deletes Last Char)

Figure 2. Keyboard Code Generator



There is a look-up table built into the program which gives the Morse equivalent for each key (what it should sound like). If the keyboard you want to use is a real oddball, you might consider changing the order of entries in this table to match the particular unit you have available and save some re-wiring.

The actual keying circuit consists of a VMOS FET operated open-drained, so you can leave a telegraph key connected across it for manual embellishments without compromising the keyer's normal operation. To key the transmitter, the CPU drives the FET's gate high, resulting in a low resistance to ground at the drain. When the gate is low, the drain is essentially an open-circuit.

Check your rig's keying requirements to make sure the voltage and current ratings of the FET will not be exceeded. It will work fine with most solid-state rigs, where a small positive current at around 12 volts is switched to ground to key the transmitter.

Fig. 2 shows the CPU wiring. A 3.579545 MHz TV crystal is used for the timing. Although the program needs only 512 bytes of ROM and uses but 256 bytes of RAM, the 2716 Eprom and 2K x 8 Ram chips are used because they are available everywhere these days at rock-bottom prices. The Apple clone keyboard I found already had a 2716 on it to do the ASCII conversion they needed. Instead of throwing it away, I just erased it with ultraviolet light and reprogrammed it with the 8035's object code.

For very QRP operation, NEC makes a CMOS version of this CPU chip (the 80C35), which costs only a few dollars. CMOS substitutes for all the other IC's are available from Active Component Sales. A single positive 5-volt supply is all you need to run this keyer. CPU pin 38 goes high whenever the text buffer is more than 3/4 full. You might want to install a warning light activated by this signal.

Take note that CPU pin 21 serves a dual purpose: it is an address line to the ROM, and also helps scan the keyboard. The whole program is small enough to be entered directly in Hex. Use the checksum provided to verify that you haven't made any typing mistakes before actually programming the Eprom.

RFI Considerations

The CPU operates at logic levels—signals are switched between 5 volts and ground with fast rise and fall times, so plenty of RF will be generated. If your receiving antenna is close to the operating position, make sure the keyboard is well shielded to keep all this stuff inside the box. Use RF chokes on the lines entering the box, and of course, the

enclosure itself should be grounded.

It is best to always follow good RF practices so your rig responds only to signals picked up by the antenna and not to stray RF inside the shack. If your antenna is some distance away and the keyer is properly shielded there will be no trouble. I operate mine a few inches away from a transceiver with no problems at all.

How to use it

On powerup, or when the reset key is pressed, the program defaults the code speed to 18 WPM. If the CCW switch was on (S1 closed), the speed is set to the standard CCW rate of 100 milliseconds per bit (about 12 WPM). As characters are typed, they go into the buffer and are clocked out at the designated speed.

The standard spacing is as follows: one space after each signaling element (dit or dah) within the character, two extra spaces after each complete letter (total of 3 spaces), and two extra spaces again after each word (total of 5 spaces). To get the shift effect, the shift key must be held down while the next key is typed. Not so with Control. Press the control key first, release it, then press the next key. The control (CTRL) key tells the computer that you are entering a command, not message text.

Commands are never sent out over the air. The command sequence is CTRL, letter, value, Enter. Single letter commands are: S (change speed), L (change the number of spaces after each letter), W (change the number of spaces after each word).

For example, to pick a speed of 25 wpm, you would type CTRL S 25 Enter. The upper limit for speed is 145 WPM. In CCW mode, the speed is entered the same way, but the value is not in WPM, it is specified in units of 10 msec per bit. Thus entering a value of 10 would call for a sending rate of 100 msec per bit, about 12 WPM. In this mode, very slow sending is possible, down to 2.5 seconds per bit, or less than one word per minute. These slow speeds are used in extremely weak signal experiments.

You can pause the sender at any time by typing CTRL P. Sending resumes when the Enter key is hit. This lets you type a message into the machine's memory and send it out later by pressing Enter.

When S2 is closed, the program will generate the standard CCW synchronization pattern (a continuous stream of dots). This is to permit the distant receiver to calculate the phasing of the incoming data stream. When S2 is opened and you start typing, the characters sent out will be synchronous with respect to the phasing established at the distant receiver, a requirement for optimum signal recovery at that end. Pauses in sending do not affect synchro-

nization, as the program will automatically fit the code into the proper time slot when you resume typing.

When using the CCW mode, a precise 5 kHz pulse train must be injected at CPU pin 39. These timing pulses can be obtained by dividing down the output from the station's frequency standard. The external standard is not required for normal (non-CCW) operation.

Certain keys have special Morse significance (see bottom of Fig. 1 for a complete list). For example, at the end of a QSO, type * to send di-di-di-dah-di-dah (sk). If you make a typing mistake while entering text, the (←) key may be used to remove the last character in the buffer. As long as you keep comfortably ahead of the sender, you can correct most typing mistakes before they go out over the air. If all else fails, you can use the (→) key to send 8 dots—the error sign. The escape key may be hit at any time to clear the buffer and abort any outgoing message in progress.

Once you get used to this machine, its operating ease and convenience will really be appreciated. Using a code practice oscillator, the unit is great for teaching code to new students. By sending at a normal speed (15 WPM) but adding extra spaces after each letter and word, there is enough time for even the slowest copiers to write everything down. As the students improve, the number of extra spaces is gradually reduced until standard timing is achieved and the students are easily copying 15 WPM. ▲

CALENDAR

1986

Feb. 8: Niagara Peninsula ARC 1986 Hamfest. Details January TCA.

Feb. 12: DOC licence examination.

March 19: Applications for DOC licence examination.

April 16: DOC licence examination.

May 21: Applications for DOC licence examination.

June 18: DOC licence examination.

July 12-13: Ex-Whitehorse RCAF Communications reunion.

Sept. 17: Applications for DOC licence examination.

Oct. 15: DOC licence examination.

Oct. 19-20: Jamboree on the Air, Scouts Canada.

Publicize your get-together here. Write the Editor, TCA, P.O. Box 855, Hawkesbury, Ontario K6A 3C9.

Let TCA know about your events three months in advance to list them in the Calendar.



Antennas for 20, 15 and 10 Metres

By VE3DQB

Continued from last issue

Visualize such a terminated 2-wavelength antenna set up near ground. The two big lobes in the diagrams are now a cone cutting the ground at 35 degrees each side of the antenna. In some direction between zero and 35 degrees above the ground the angle will be ideal for ionospheric reflection at that moment. Such an antenna can be aligned to favor a given direction for communication. It is a typical 'long wire.'

Now suppose another similar 2-wavelength antenna is erected from the same feedpoint, and at 70 degrees from the first one. (Fig. 67A) Now the major lobes of both point in the same direction, along the line bisecting the angle between the two wires. This is now a terminated V-beam, and is excellent for point-to-point communication (Fig. 67B). If the terminating resistors are left off, the energy they would absorb returns down the antennas to form a second beam similar to the one in Fig. 67B, at 180 degrees to it.

These terminated V-beams require two first-class grounds. Putting four antennas together gives the RHOMBIC antenna, shown in Fig. 68. This is a frequently used commercial antenna, and is preferred where expense is not spared. The shopping list for a rhombic can be formidable: four 60 foot timber masts, or four 50 foot towers with guys, 6000 feet of No. 12 hard-drawn copper, and at least three acres of land.

A rhombic, if unterminated, has a bidirectional pattern along its major axis, and is resonant. If one end is terminated, it becomes unidirectional, and nonresonant: that is, it can be used over a wide band of frequencies, retaining the same pattern between, in the one illustrated, 7 and 30 MHz.

These antennas give the most reliable communication practicable, and are much used for commercial point-to-point work.

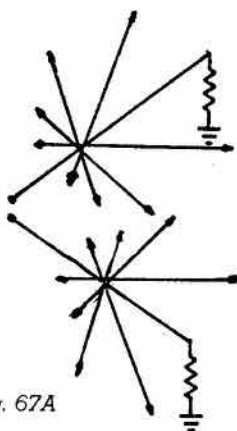


Fig. 67A

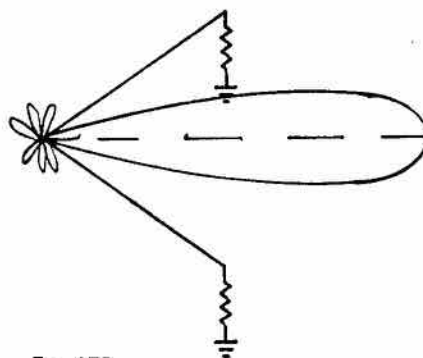


Fig. 67B

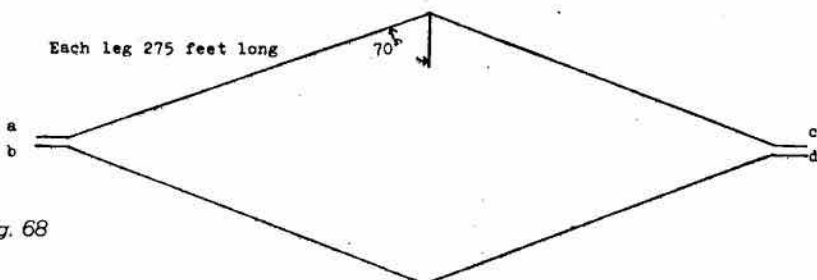
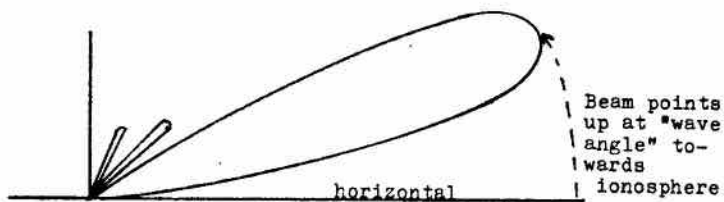
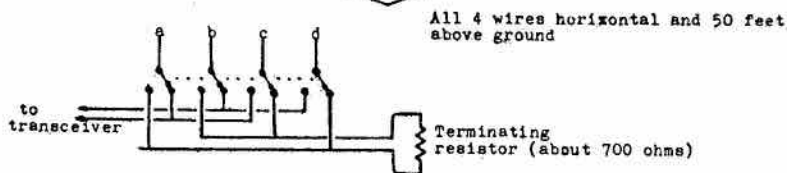
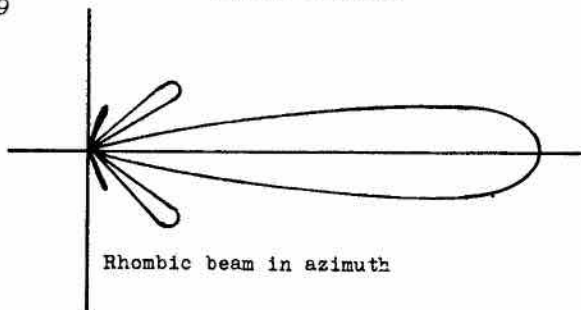


Fig. 68



Rhombic beam in altitude

Fig. 69



Rhombic beam in azimuth



The Amateur blessed with the necessary real estate can erect one pointing in his preferred direction, and by bringing transmission lines from both ends into the shack to a four-pole, double-throw switch, can use the antenna in both directions. Either end can be connected through a matching network to the rig, or to the terminating resistor.

The pattern from a rhombic is shown in Fig. 69. At A is shown

the pattern in elevation, and at B, in azimuth. The two most important side lobes are shown as well. The greatest part of the energy is directed in the preferred direction. Thus the nominal gain of a rhombic—in the Amateur use, about 10 dB—is all directed to the ionosphere at a good angle. Most other antennas—five element yagis, for instance, that have a similar nominal gain, put some of this gain in less useful

directions.

The theory of the rhombic has been thoroughly worked out, and there are several kinds described in the literature. The one detailed in Fig. 68 will suit most Amateur purposes. Being designed for 20 metres, it will work satisfactorily from 30 to 7 MHz. Three of them can be nested to give world-wide coverage from a circle of 500 feet diameter.

Chapter 8

VHF Antennas

In the VHF region, wavelengths are shorter, and elements of antennas are smaller. The antennas used for HF can be used at VHF, but more complex structures are practical.

Thus the yagi antenna, restricted practically to three ELEMENTS on 20 metres (an element is a reflector, a director or the 'DRIVEN ELEMENT' itself), can be a 5 element beam at 10 metres, or ten or more elements on 2 metres. Moreover, stacking yagis one above the other, or setting them collinearly (side by side) and rotating them can be done when the separation is 7 feet

(a wavelength at 2 metres), but not when it is 70 feet, as it is at 20 metres.

VHF antennas, then, can be more complex than HF ones, merely because they are physically smaller and more easily handled. Aluminum alloy tube is universally used: wire antennas rarely, at these wavelengths. Reflectors can be made of wire mesh.

These differences are made use of in the erection of antennas of broader bandwidth than HF ones. Combined with the broader bandwidth, there is a stronger directivity available.

6 Metre Antennas

Antennas for the 6 metre band are generally yagis. Multi element designs are practical, with up to five elements. A 16-foot boom will accommodate a 5-element 6 metre beam, and the elements are only 10 feet long. The gain is 10 dB.

If a 40 foot mast is available, two yagis of three elements each can be set up, one at the top of the mast, the other one wavelength (20 feet) below. This combination will have the same gain as the 5-element beam, or perhaps a dB or so more gain.

Or two, three-element beams

Continued on next page ▶

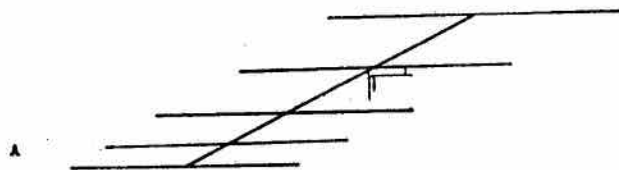
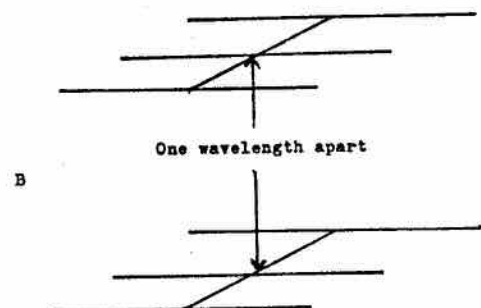
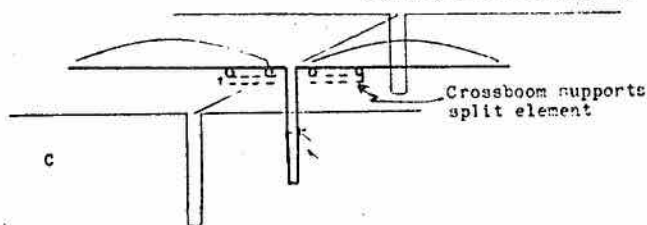


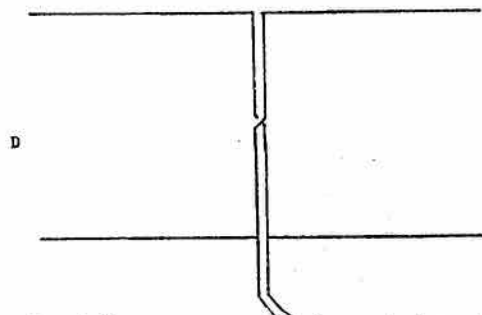
Fig. 70A— A five element yagi, like this, is far less unwieldy at 6 metres than at 20 metres.



B— And stacking two yagis a wavelength apart in height (they interact if set closer) is practical when the separation is 6 metres.



C— If two dipoles are set end to end, 'collinearly,' and connected where they meet by a quarter-wavelength long stub, the electrons move in the same direction in both, doubling the signal strength received. The feed-line can be tapped down the stub for the best SWR. Reflectors and directors can be added.



D— Collinear antennas can be stacked, too. This arrangement is called a 'lazy-H'.



could be set side by side on the same boom, and connected at the center by a quarter-wave stub. The stub is a piece of transmission line a quarter of an electrical wavelength long, shorted at the free end. Such an antenna is called **COLLINEAR**.

Such a 6-metre collinear has to be split in the middle, and supported by a crossboom, as in Fig. 70C. For this reason the design is seldom used: but here, at this wavelength, such designs begin to become usable.

2 and 1-1/4 Metre Antennas

At 2 metres, the antenna dimensions, for the same transmitter gain, are only one-third those of 6 metres, and only one-tenth those for 20 metres, and the more complex designs are not only practical, but popular. An 8- or 10-element yagi can be supported on a 12 foot boom. (12 feet is a standard piping length.) (Fig. 71.)

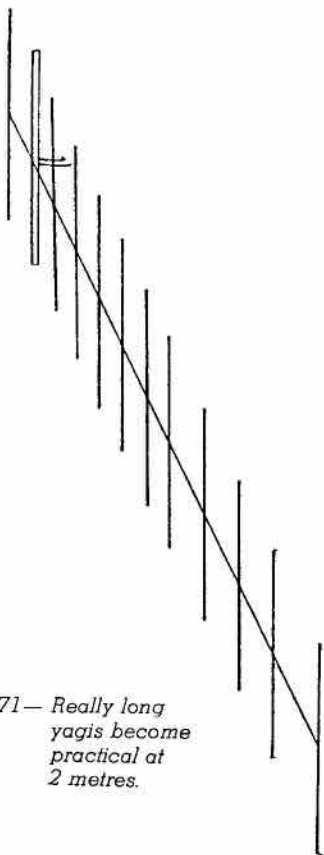


Fig. 71— Really long yagis become practical at 2 metres.

Two such beams can be mounted a wavelength apart, horizontally or vertically (Fig. 73). Or four at the corners of a square, and still be within the

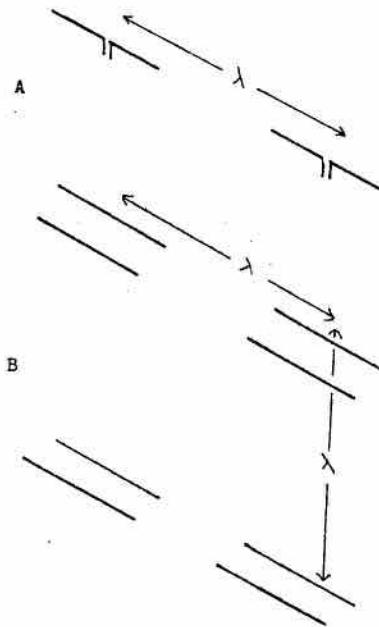


Fig. 72— Various arrangements of yagi or collinear antennas, practical at the short wavelengths. Greek λ is often used for 'wavelength.'

reach of the home constructor. If the gain of one 8-element yagi is 12 dB, two of them, properly spaced, have 12 + 3 or 15 dB gain. Four 8-element yagis, properly spaced, have 12 + 6 or 18 dB gain. The bandwidth of such combinations is narrow, and the design—the exact lengths and spacings of the elements—is cut-and-try, there being no theory capable of predicting them. Reflectors are

always longer, and directors shorter, than the driven element.

A similar gain, with much wider bandwidth, can be obtained by going to collinear antennas with reflectors. One such is shown in Fig. 73. It has about 14 dB gain compared to a dipole, and is easy to construct.

Collinear designs like this are usable at HF, too, but their size makes them far too unwieldy to rotate. They can only be used for point-to-point circuits.

At 125 cm wavelength (220 MHz) antennas are scaled down again. The reciprocity theorem says that an antenna performs with the same pattern on receiving as transmitting. However, the smaller the antenna, the smaller its **CAPTURE AREA**. A dipole on 2 metres collects only a fraction of the energy a 20 metre dipole does, because it is so much smaller.

There is a premium on size, then, for VHF (and above) antennas. The unwieldiness of HF antennas is exchanged for feed wiring complexity. Feedlines must be correctly phased for proper operation of the larger VHF antennas.

In transmitting, too, front-to-back (F/B) ratio does not matter much— forward gain is far more important. At high frequency, F/B ratio is a most useful

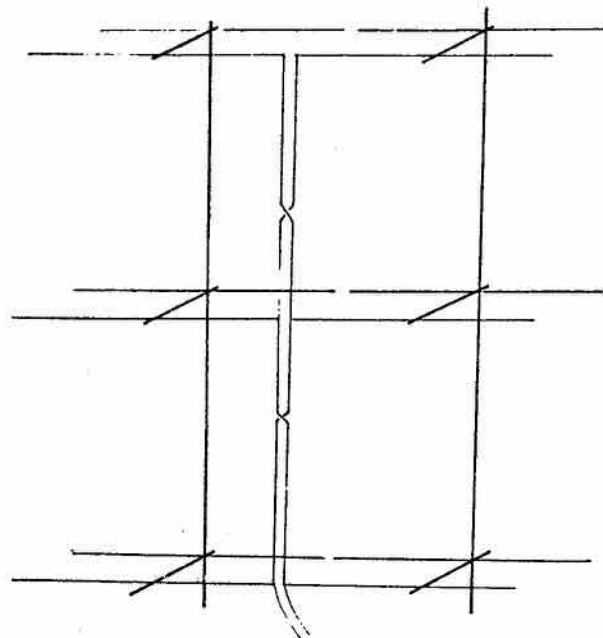


Fig. 73— Six collinear antennas with reflectors, an excellent arrangement at 2 metres.

property, and a good antenna design makes it available. At VHF and above, though, the limit to reception is not signal to external noise, but the noise generated by the first few stages of the receiver. The high forward gain antennas are best.

Antennas for 70 Centimetres

At this wavelength, there is another transition. Here, either rod or tubing antennas are useful and used, but large, plane reflectors are worth considering.

Reflectors can be made of fencing wire, stretched across a wooden frame and stapled in position. The grounded element of the feedline is carefully soldered to the wire at the feed-point. Reflectors can be made of a series of rods crosswise, welded to a pair of uprights. No frame is needed to support this design.

The larger the reflector, the wider the bandwidth of the antenna. If it is a half-wavelength longer, and a half-wavelength broader, than the area of the antenna itself, the bandwidth will be ample for Amateur work.

At 435 MHz, mesh reflectors are the norm. They are as popular as yagis, quads, or the 'quagi' combination. They are much broader-band than yagis of the same gain, and can be more robust. A typical design is shown in Fig. 74.

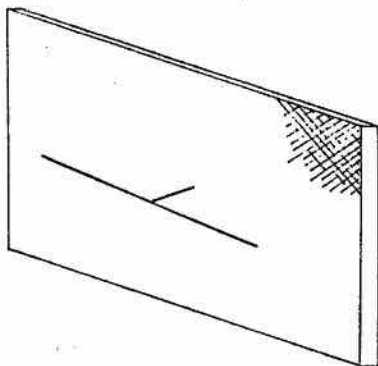


Fig. 74— A dipole supported in front of a wire mesh screen combines wide-band properties with directivity.

Helical Antennas

Another antenna useful at VHF is the helical antenna. This is a helix of wire, wound like a coil spring. The circumference of the cylinder round which the wire is wound is between 0.7 and 1.4 wavelengths, and the angle the

wire makes with the axis is between 5 and 15 degrees. The length lies between 0.6 and 1.4 wavelengths.

Such an antenna provides an excellent radiation pattern. It works against a ground plane, and the radiation from it is circularly polarized: the polarization depends on the direction of rotation of the wire. It will receive a wave horizontally or vertically polarized, or anywhere in between, but will not receive radiation polarized in the opposite rotation to its own.

Helical antennas of optimum design have a bandwidth of 2:1, so they can be used on pairs of bands in the VHF region. Its impedance is about 125 ohms.

The usual design is shown in Fig. 75.

Log Periodic Antennas

The log periodic antenna is a yagi in which the element length and spacing are varied continuously along its length so that several elements are resonant at any frequency within its range. The arrangement demands feeding the elements individually (not just one driven element), so each element has to be split in the middle, which is a problem mechanically at longer wavelengths.

Neither the helical antenna nor the log periodic seem popular for Amateur work. Single-band antennas seem to be the rule. Δ

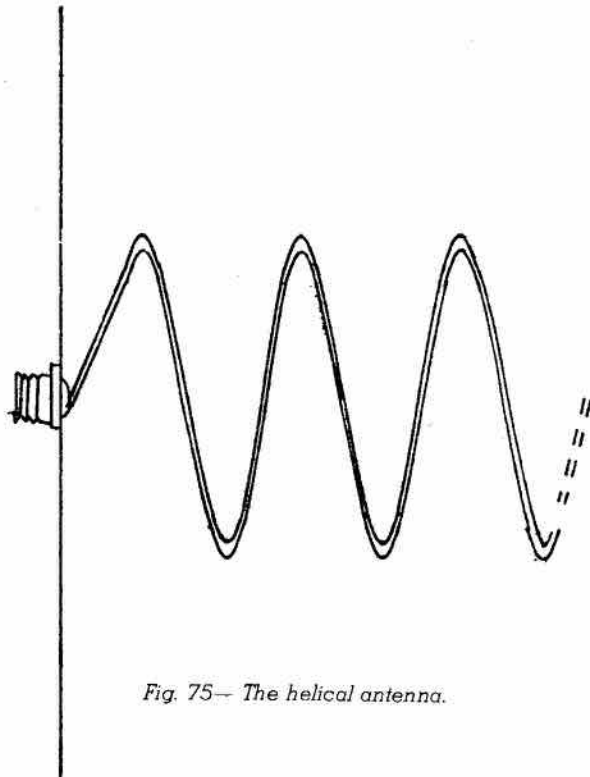
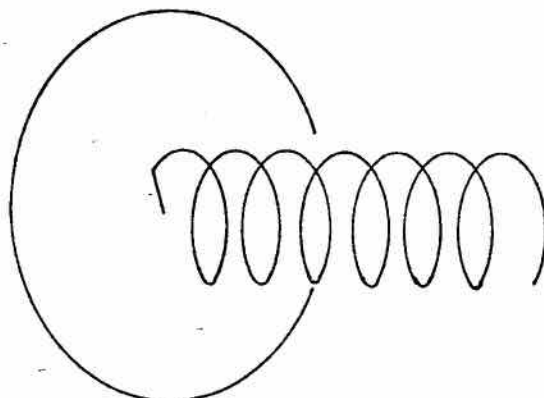


Fig. 75— The helical antenna.



Better than ever!

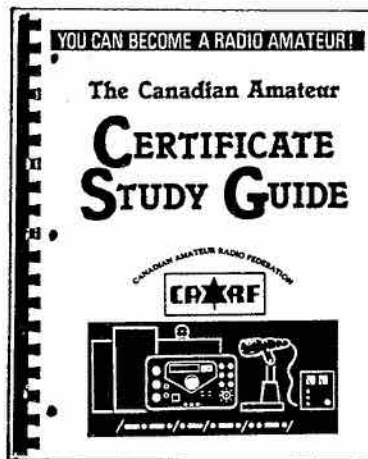
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Recycling Older Equipment

By Dave Gilmour VE7YG

After a visit to a Flea Market where one has succumbed to the temptation of Impulse Buying, one may stagger home with a fresh treasure.

If the Gods are with you, manuals may be included or even notes from a previous age of the person who passed on, trying to make it operational.

To start from scratch, look at the treasure. Seize pen and paper and start making a record of what you see, front, back, sides, inside and exterior case. Record the obvious, knobs missing, etc. and particularly look for clues such as pools of wax inside the case and note the area, as to which capacitors may have been weeping for attention. Make note. Check that the correct fuse is indeed installed. Before pulling the tubes and running them through a tester, mark or identify, in order that they may be replaced in the same sockets. Before replacing tubes the high voltage lines should be checked for shorts and bypass and coupling capacitors may be checked and replaced as required. Over time carbon resistors age and change value.

Equipment which has been operated in proximity of oily furnaces, heavy smokers or other adverse conditions show black switch plating, whilst those in a pure atmosphere may still be bright and shiny. All dust should be swept with a small paint brush and an airjet or similar adaptation used to ensure tuning capacitor plates are clean. Before replacing any noisy volume controls, check the capacitors attached in the circuit. Capacitors should never be high resistance resistors.

By keeping records, one is able to stop for a mealtime and return without duplication an hour, a day or a month later. Small containers may be required to keep small bolts and screws, so that they do not become lost. Before removal of any dial cords, keep a sketch of the original. Usually there is a simple re-stringing sequence, but finding it is not easy. Pull fuses and ensure that they are the correct rating.

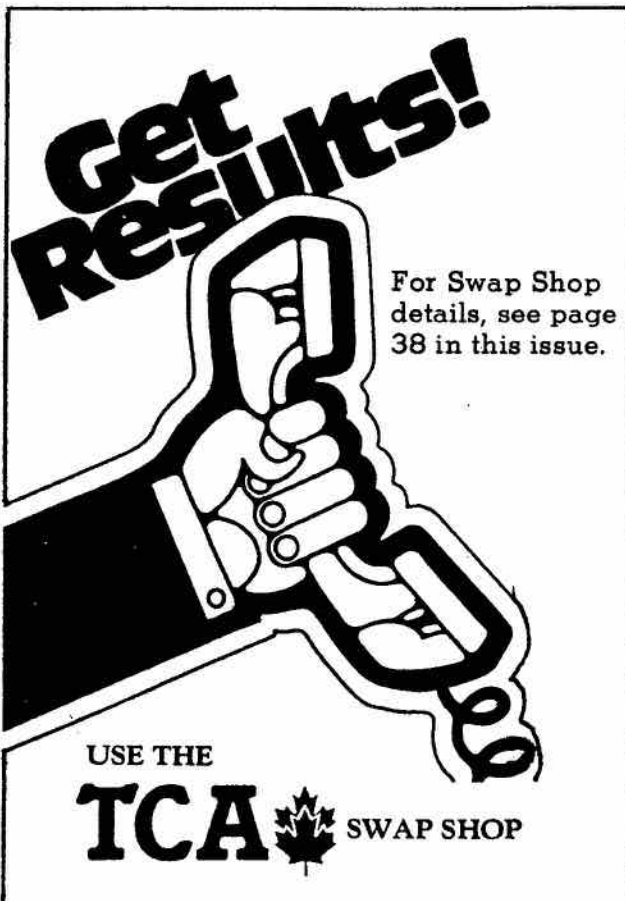
Before installing the rectifier tubes, a set may be plugged into the power line and visual note made that all tubes and dial lights do indeed light up. Keep the power cable plug right in

front of you while you are working on the set, then you know that the only thing that may be live are the storage capacitors. Check them out with an old voltmeter and you will see the voltage go down. Some of the latest FET voltmeters may take a long time to discharge a big voltage, thus old meters do have a place.

If the entire chassis is hot to ground, there may be a short in the power line area or the line input capacitors may be giving trouble. Keep your notes.


Many sets have kept their alignment; check the capacitors and resistors carefully before the alignment. My experience is not vast in that field and I tend to try to avoid it, however if you must tweak and peak, the gem passed on is that coils are generally peaked at the low frequency end and trimmers are trimmed at the high frequency end. This may not apply to every circuit, but is offered as a desperation lead.

Luck is of prime importance and may good luck travel with you. (Originally given as a talk at the Vancouver Amateur Radio Club, Sept. 10, 1985.) △



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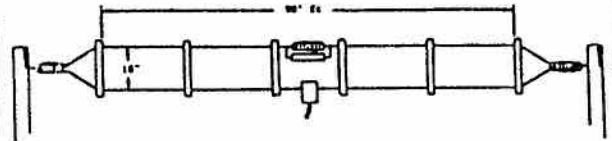
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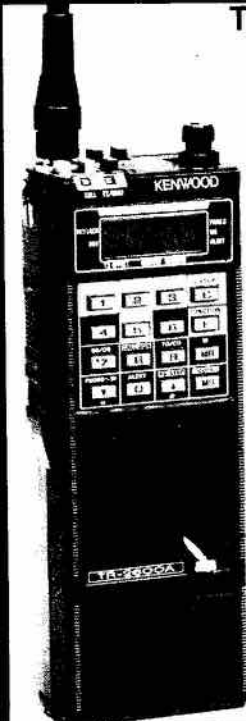
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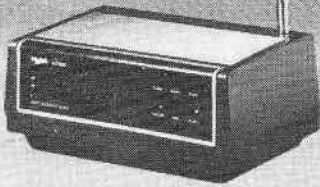
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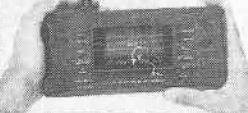


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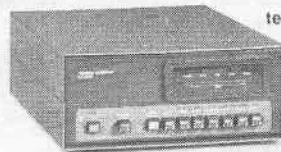


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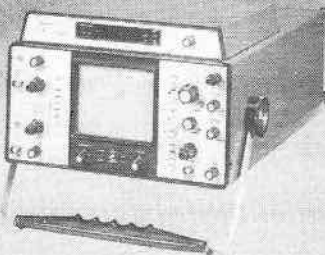
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