HAM HUM

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Post Office Box 291
Omaha, Nebraska 68101

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New member initiation fee	$1.00
Regular member	$3.00
Regular member and spouse	$3.60
Student member	$1.05

NEXT MEETING

WHEN: TUESDAY, APRIL 11, 1978

TIME 7:30 P.M.

PLACE: JEWISH COMMUNITY CENTER
333 South 132nd Street
Omaha, Nebraska 68154

PROGRAM: Spring is here and it's finally warm enough to get out and fix up. put up or replace the most important part of your station.

Al McMillan, WØJJK, will give us some pointers on how to get the best possible signal out of the antenna.

Be prepared to work all the openings this summer.

73s WBØPHP

* * *

VISITORS WELCOME – REFRESHMENTS – EYEBALL QSOs

THE PREZ SEZ

After the worst flood in many years in the Platte and Elkhorn Rivers, area amateurs can certainly be proud of their actions which helped save people. [illegible]o service was given to the Red Cross, Civil Defense, and the city and county officials involved.

Flooding occurred at the confluence of the Missouri and Platte also. So many amateurs from Omaha, Council Bluffs, Fremont, Lincoln and surrounding communities helped that I will not try to list them here. All that can be said is "THANKS."

An outstanding number of amateurs from Offutt Air Force Base worked with the A.R.E.S. effort. These hams deserve special recognition because most of these fellows are not even from this state, yet gave of their time for the flood victims.

For the first time our membership application data was used to seek four wheel drive vehicles, and with success. The need for these was for a windshield survey in damage assessment which was carried out in conjunction with REACT. The results were a great aid to the Red Cross and eventually the figures developed by them were presented to President Carter for his decision on whether to declare the area eligible for Federal assistance.

For the first time our 220 MHz repeater in North Omaha was used in an emergency. It served well into the [illegible]ley area, just as well as 2 meters. The load on the 34/94 repeater at the Chapter House was decreased, and an open net situation could then be carried on.

Personally, I had the unique job of accompanying Dick Novotny (brother of WBØDRS, Don) who is with the C.A.P. and Ron West (of the Des Moines Red Cross) on an aerial damage assessment over areas totally flooded and inaccessible to four wheel drives. The view we had of isolated towns, washed out roads, and property flooded was awesome. The flyovers scheduled were King's Lake and the joining of the Big Mo and Platte. The view from the air doesn't tell you much about the human end of it though.

Over 500 people were housed temporarily at Boys Town, and over 1100 homes were affected. Being prepared does help. Damage assessment training, weekly nets with the associated discipline all contributed to the success of the communication the amateurs provided through A.R.E.S.

K9BL, Bob is now the Emergency Coordinator for Douglas/Sarpy County A.R.E.S. and WBØPPF, Jerry is his assistant. Sign up if **you are not** a member.

An informative **weather program** was scheduled by WBØPHP, Earl for the March meeting. It dealt mainly with the severe weather associated with spring. The many present felt the meeting one of the best weather programs they had ever attended. Let's continue to be prepared.

WAØGEH, Marty has accepted the responsibility of liaison for the City/County E.O.C. and the preparations needed for occupancy in the room in the City/County building in Downtown Omaha.

Due to a good PR effort we are considering a novice only class. If you could be an instructor, let WAØDHU, Bob hear from you. We are not sure yet if this will be held but would like a list of possible instructors.

A big "thank you" is due our current instructors who have turned out another fine group of potential and upgrading amateurs. Very soon after our April meeting, these students will take their examinations and you will soon hear new calls on our frequencies.

Help will soon be needed at the Club station. Some maintenance work will be required on the antenna systems. Please respond to WØUQJ, Bob when he calls for workers.

Our auction should be history for this year when you read this. Maybe you are fondling that newly acquired equipment while reading the Ham Hum. Next year we know will be even bigger and better, so arrange your shack accordingly.

The small computer fair planned for June has been postponed into next year. WBØMUL, Art regretted making the announcement at our March meeting. More and more amateurs are becoming interested in micro-computers. If you are, please let Art know with a word, phone call or by mail in order to be involved the next time.

The March board meeting was delayed a week due to flood activities and, therefore, no board meeting report will appear in this issue.

See you at the Jewish Community Center!

73s
Jim, WBØQGV
****

COMPUTERS
By Bill Wilkinson, CET

In the past couple of years, a phenomenon known as "home computing" has been growing on the consciousness of electronic hobbyi[sts]. In popularity, it has come to riva[l] Anateur Radio. Although most Hams have a natural curiosity about anything new in electronics, quite a few who came into the Heathkit store in Omaha ask such questions as "What does it do?" "How does it work?", "What are the basic requirements for an operating system?" and, most important, "How can I use this with my amateur station?". In this, and perhaps future articles, we'll attempt to answer these and other questions.

What does it do?

It is tempting to answer, "anything you want it to do." One way of looking at a mircocomputer (or mini-computer or full-sized computer for that matter) is to consider it an electronic device that can be programmed to imitate almost any other electronic device, such as, digital clocks, code practice oscillators (one is on display at the Heathkit store), sophisticated home protection devices, etc. It can play games of chance and skill, it can balance your household budget, and it can make a fantastic addition to the Ham Shack (more on this later).

How does it work?

An operating computer is composed of two equally import[ant] components; hardware and software. Hardware is the term for the actual electronics of the computer, and is almost entirely made up of digital circuitry. Compared to an amateur

transceiver, the signal paths may be confusing as several circuits (both send and receive) can be connected to the same signal path (or data buss). Time-division multiplexing is what's used in this type of case. Some circuits activated at the right instant while others are deactivated.

Software refers to the computer program. There are three basic types of software: (1) Machine code, which is communicating with the computer on its most direct level—of programming in logic ones and zeros—which is tedious and time consuming; (2) Assembly language, where letters are substituted for machine-code instructions, making programming somewhat easier; (3) High-level languages, such as, BASIC, FORTRAN, APL, etc. These are closer still to the English language and easiest to program in. Currently BASIC is the popular language among computer hobbyists. It's easy to learn. Both assemblers and high-level languages are broken down into machine code by the computer prior to program execution.

What are the basic requirements of an operating system?

To be useful, a microcomputer must have an input-output (I/O) device—such as a video terminal or teletype, sufficient memory to store the program—such as random-access memories (RAMs), cassette tapes or floppy disks (where data can be stored or retrieved from a 5 to 7 inch disc in the same manner as a cassette tape), the central processing unit (CPU)—the heart of the computer system that handles programming, arithmetical and logic functions, controls the I/O devices, etc.

How can I use this with my amateur station?

A few articles have appeared in various electronic magazines on how to program your computer to convert Morse Code into the teletype data and vice-versa. If you run RTTY, the computer can handle a good portion of the traffic—sending and responding to CW's, keeping the station log up to date, etc. For the advanced user, it may be possible to perform computer-generated alpha-numerical characters for slow scan television, perhaps even processing the received SST signal itself for improved picture quality. Needless to say, the computer is an asset if you are rolling your own piece of electronic gear for the shack, and you get to a point where you must solve a series of complex equations that would be tedious even with a pocket calculator.

This article has barely scratched the surface of hobby computers. It is as interesting as amateur radio and combining the two should bring four times the enjoyment!

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LOCAL NEWS

KØBOY is homebrewing a 10-15 meter 4-element quad.

KØLST sent for DXCC with 105 confirmed in about six month's time.

KØSST is also putting up a new 4-element quad this spring.

KØKES needs only two more zones for WAZ on 20 CW.

Hats off to the Sorters at the QSL Bureau from KØBOY, KØLST, KØSST and KØKES for the fb job they are doing.

73's
Joe, KØKES

****

ADDITIONS TO ROSTER

John F. Davey, WØWEM
8120 North 40th Street
Omaha, Nebraska 68112
Phone: 455:0512

William A. Humphrey, WDØEWH
2859 Crown Point Avenue
Omaha, Nebraska 68111
Phone: 455-5402

Donald R. Kavalec, WDØGWI
4210 North 100th Street
Omaha, Nebraska 68134
Phone: 572-1767

David S. McCallum, WA1ONP
2742 Beale Circle
Omaha, Nebraska 68123
Phone: 291-2980

Virginia E. McCallum
(XYL of WA1ONP)
2742 Beale Circle
Omaha, Nebraska 68123
Phone: 291-2980

Thomas J. Neumann, WØNJL
9106 Larimore Avenue
Omaha, Nebraska 68134
Phone: 572-0183

Edward G. Sullivant, Jr., WB5MAP
1112 – 17th Avenue
Plattsmouth, Nebraska 68048
Phone: 296-4977

****

Debbie Pin-up

By popular demand . . . this Pin-up of Debbie. And it's a favorite antenna of the Larsen Line that she's showing too . . . the JM-150. That's the mount that requires only a 3/8" hole in the vehicle and has the fewest parts of any. Oh yes . . . it's patented too . . . U.S. Patent 3,944,722. That means it meets the government standards for being unique, different and an **improvement** over other ways of doing the job.

JOHN M. GEBUHR – WBØCMC – Phone: 553-6414
2340 NORTH 64th STREET - OMAHA, NE 68104

Larsen Antennas

*you **HEAR** the difference*

RECENT CONTRIBUTORS

Ham Hum Postage
James V. Wilson, W4GDK

Repeater 34/94
Earl K. Bacon, WBØWYA
Everett P. Dietz, WBØYZR
Dan C. Pettengill, WBØBXC
Kent A. Sinram, WBØBOR, and XYL Jan
Harold D. Wetzel, WØFHA

Repeater 22/82
Everett P. Dietz, WBØYZR
Dan C. Pettengill, WBØBXC

Repeater 40/00
Earl K. Bacon, WBØWYA
Dan C. Pettengill, WBØBXC

Thanks to all!

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FLOOD EMERGENCY

Amateur radio operators, noted for their willingness to help in emergency situations, proved their worth once again. During the Platte River flood emergency in March, many hams volunteered to provide a communications link to the disaster area.

It was Saturday, March 18, when Emergency Coordinator Bob Neben, K9BL, was first alerted to provide an ARES disaster team for the Venice, Nebraska area. Twenty-four hours later the ARES Net was called up when serious flooding threatened Valley, Nebraska and its surrounding area. Huge ice jams on the Platte caused a breach in a dike west of Valley. The overflow into the Valley, Ginger Cove, Ginger Woods and King Lake residential areas resulted in the evacuation of many homes and businesses.

Ham volunteers were sought to operate their 2 meter equipment to provide emergency communications and many came forth. Net Control was established at the Red Cross Chapter House in Omaha and heavy use of the 34-94 repeater began.

By late Sunday night, hams had set up a radio headquarters in the Emergency Center located in the old high school at Valley. The three, Ed, WBØBCB, Rick, WAØROP, and Marty, WAØGEH, were with the last group to leave Valley when the town was ordered evacuated on Monday. They left cars and equipment behind.

Other amateurs were operating at the Red Cross headquarters in Omaha, and also established communication sites at Papillion, Bellevue, Waterloo, Elkhorn, Boys Town, Venice, Offutt Air Force Base, Linoma Beach and other sites near the water's edge and helped coordinate Red Cross traffic to Fremont, another area which was affected by the flood. The hams coordinated the movement of people food, helicopters, amphibious vehicl and buses and the set-up of shelters for the Red Cross.

A group of amateurs from Lincoln, headed by Reynolds, KØGND, provided a link between Omaha and the State Emergency Center in Lincoln.

In addition to the communications for the Red Cross and governmental agencies, hams also reported water levels of the Platte and Missouri Rivers at the request of the Governor.

By Tuesday afternoon, some ARES damage assessment teams were dispatched to the affected areas to provide house-by-house ascertainment of damage. The teams were out in full force on Wednesday and again on Thursday following briefings at the Red Cross Chapter House. The damage assessment schools held less than a month earlier certainly proved helpful, said Emergency Coordinator Neben.

One of the damage assessment team members, Dave, KØQCV, made good use of his 2 meter rig in a life-saving effort. At mid-afternoon on Tuesday, Dave was at King Lake when he encountered a van attempting to transport an elderly man with severe chest pains to a hospital. Noting the seriousness, Dave called Net Control only to learn that the ambulance arrival time would be approximate 20 minutes. A med-evac helicopter was then dispatched and transported the man, whose condition was not available at deadline, to a hospital. Dave stated he was riding in a jeep

operated by REACT member Ken Hunt whose CB radio didn't have the range to communicate the distance needed for the emergency traffic.

Many of the amateurs took time off from their jobs to provide the emergency communications service. Some lost many hours of sleep. But the end result was a "professional" job typical of the radio amateur.

Here is a list of those who helped. Unfortunately, there are probably others who helped whose calls have been omitted. To them, we apologize.

K9BL	WAØDHU	WAØFTH
WBØPPF	WDØAQX	WBØSLF
WDØCSC	WØWRT	WBØGXT
WB9PII	WØNVE	WDØADF
WBØBCB	WAØHBS	WDØDLN
WBØWOT	KØRJE	WBØGXD
WD8LOQ	KØJFO	KØSW
WBØWXS	WØMAO	WØCKE
K3CRF	WBØHMS	K5LBS
WAØGEH	WBØTYB	KØLHW
WØPYA	WAØWOT	WBØPHP
WD5HKI	WAØZUR	WBØVRG
WAØROP	WBØNVL	KØCFQ
WBØTIV	WBØCMC	KØGHK
WD5MAP	WØODL	WØKVM
WBØWYB	WA6GKH	WBØHPP
WØFHA	WBØMWB	WBØQPP
WØRMB	WBØYLA	WAØWYG
WBØEGR	WØUQJ	WBØLYU
KØPQR	KØQCV	
WAØOMB	WBØWGN	
KØGND	WBØGQT	
WBØMUC	WØEKB	
WBØQGV	WØUVU	

Submitted by:
Joe Niemann, WBØFWB

****

LADIES ONLY

What remote stations have you lady amateurs contacted recently? Have you had a chance to be on the air when 10 meters is open? For lady novices: have you reached anyone on 10 or 15 meters CW?

I had the "opportunity" to be on the air (a real treat with four of us sharing the rig) when 10 meters was open recently and made my very first phone contact on that band – to another XYL in Hollywood, Florida. That QTH is not so remote, but did you know that there is a gal among us who contacts amateur stations in Guam, on ships at sea and also on the small island of Diego Garcia? Now a geography question...where is Diego Garcia? Well, I must admit that I had to do a little checking during a phone conversation (land line, that is) with Connie Bowen, WAØMYF. She reports that the island is in the Indian Ocean and that she sets up phone patches from these locations on MARS frequencies four days a week from about 8 a.m. (after everyone's out of the house) until early afternoon. In addition, you may recall from last month's issue, that she is one of the gals in the code and theory class working toward the Amateur Extra Class license. It seems that after working the MARS frequencies, she seldom has time to work other frequencies and still garden, play volleyball, softball and keep house too! Can you see why??? Congratulations, Connie!

I wanted to bring up the unusual geographical locations in Connie's case to encourage all lady hams to try operating on frequencies that are a

little harder to find open and contact stations in out-of-the-way places. When you do make some of these contacts, I'd appreciate your contacting me so that we can make others aware. (571-7541 after school hours). Who knows...the XYLs who are not hams may become interested in similar QSL cards which the OM has received, and other lady hams may get some new ideas for operating.

So...until next month, good luck to all the gals who are trying for a new ticket, and do let me know about your unusual contacts.

33s
Jill, WBØNYH
****

WHAT'S A "Q" SIGNAL?

There was an interesting discussion the other night on the 2 meter ARES net about the use of Q Signals for a voice net-operation. It specifically involved the use of QRU versus No Traffic. There was no concensus, but it started me thinking about Q Signals.

When I first obtained my ham license I quickly learned the basic five – QTH, QRM, QRN, QSB and QSY. Then during contest operation I was forced to learn that QSL was not just a card exchanged (sometimes one-way) to confirm a contact, but it also was used to acknowledge receipt of the message.

But I heard a new one while listening on 15 meters. This fellow was QRZeding the frequency. That's what he said, "QRZed the frequency." That sent me back to the Q Signal list, puzzled. I had always thought QRZ meant, "Who is calling me?" I had heard it used that way by station operators who thought they were being called after putting out a CQ or completing a QSO, but weren't able to copy the call letters of the other station. Well, the book confirmed that QRZ meant, "Who is calling me?'

So if I took that "QRZed the frequency" literally, it would mean "Is the frequency calling me?" Now, I'm not so dumb to believe a frequency could call someone. It would have to be a station calling someone. Then finally it came to me. That fellow ham was really trying to find out if the frequency was in use. Now it sure would have saved me a lot of bother if he had just asked simply, "Is this frequency in use?"

Sincerely,
Joe Niemann, WBØFWB
4405 Morningside Dr.
Omaha, Nebraska 68134
****

MEMBER NEWS

New address for Carl, WBØTUE/5, and Sandy Quijas: 2837 Perry Drive, Biloxi, MS 39531; phone 601/435-5456.
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...And then there's *this* definition of an efficiency expert: a fellow smart enough to tell others how to run their business—but too smart to start one of his own!
– Service

VHF COLUMN

Auroral Propagation, more commonly called just Aurora, is most common during the spring and fall months. The peaks are usually in March and September with a secondary peak in December.

What is Aurora, and how to make use of it on the VHF bands will be this month's topic.

Charged particles emitted from the sun, usually from solar flares, strike the atoms and molecules of the gases in the rarified atmosphere, at the extremities of the earth, causing them to ignite, forming an aurora. Also called Northern Lights, they occur at E layer height in the ionosphere about 60 miles high.

The excessive ionization that causes auroras also causes severe signal absorption on the HF bands, acting somewhat like a screen, blocking shortwave signals from passing through. However, when conditions on the HF bands are below normal or disturbed, there is a good chance that

unusual ionospheric propagation may occur on the 50 and 144 MHz bands.

Although HF signals can be blocked, VHF signal can be returned to earth from the auroral region, but the varying intensities of it will cause multipath distortion, or garbling to the modulated signal. This is the effect that makes SSB signals sound like a whisper and CW signals sound at least a T 2, very rough tone.

If you have difficulty in getting any of the intelligence out of an Aurora signal, it would help if you would always tune higher than the incoming signal then slowly bring the dial down until you can understand what is being said by the station you are tuned to. SSB is the most common mode to be found during an Aurora, but is harder to understand than CW.

The propagation is generally from the north to northeasterly directions and a beam type or directional antenna is a must. You should turn your antenna in an arc from approximately 345 degrees through 45 degrees until maximum signal strength is being received.

Maximum range for Auroral Propagation is around 1200 to 1300 miles, with the norm being from 200 to 900 miles on most Auroras. The most active stations are located in the northern states above and to the east of Nebraska. So most stations worked will be in the Dakotas, Minnesota, Wisconsin, Michigan, Ohio, and New York from the Omaha area. However, during strong, intense Auroras, it is possible to work stations in states south of Nebraska as well.

One way to check for favorable conditions for an Aurora besides constant listening, is to monitor radio station WWV on either 5 or 10 MHz for the solar terrestrial report given 18 minutes after the hour. The standard format of the report is an example:

"Solar Terrestrial Indices for 19 March follow: solar flux 129 and A index 6. The Boulder K index at 18(UTC was 3 repeat 3....." The report then goes on with a status report on the ionosphere and solar activity. The parts that we are interested in for Aurora info is the A index and more importantly the K index.

It is a fact that auroral propagation is common at A index peaks and at the beginning of its decline. The "A", or daily index, and the "K", or 6 hourly index, measure the activity of the earth's magnetic field, or radio storminess. The A index is the previous day's total activity, while the K index, being updated every six hours, will give you the current activity and the chance to be on the air when an Aurora begins.

The K index is a measure of the extent of disturbance in the earth's magnetic field. The higher the value of "K", the greater the influx of solar particles. The K index scale runs from zero to nine. K figures from zero to three are considered quiet, while figures four through nine are considered disturbed.

So if you are monitoring WWV and notice that the K index is rising, say from 4 to 5, you can look for a probable Aurora opening on six or two meters and it would pay to turn the beam north and monitor. If you noti(that the previous day's "A" index wa around 30 or above, you probably missed an Aurora opening; hi.

Aurora is just one of the things that makes the VHF bands special, unusual

and fun. See you on the air and at the Club meetings.

Solar activity has been low to moderate the last 30 days. The 27 day forecast up to April 10th calls for solar activity to be low to moderate, with tive conditions probable toward the end of March and first part of April This is recurrent activity, with a good chance for Aurora.

An Aurora occurred February 26 and 28th. The 26th from 0050 til 0200 UTC and the 28th from 0325 til 0400 UTC. Stations heard and worked from N.D., Minn. and Wisconsin. Both openings were noted on six only. No signals were heard on two.

Oscar 8 is up and working well on both modes. Hopefully it will be available for general use by the time this is in print.

John Bruckner, WAØMRH

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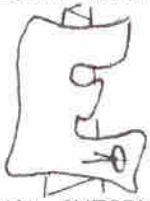

ADDITIONAL INFORMATION
CALL
DON MCMULLEN, WBØMUC 895-2178
KEN MOLACEK 571-8833

What It Is!

It isn't the number of guards you put on
Or the stairs with the well-kept rails,
It isn't the lights that they install
Or the lack of rusty nails;
It's true that these do help a bit,
But when all has been done and said,
The thing that prevents the accidents
IS THE WAY YOU USE YOUR HEAD!

— Service

SWOOP
by Elise White
from the "Round Table," Denver Radio Club

I have long wondered why hams had receivers. Very few use them when they are on the air. Listen to any conversation and hear more than one question asked at a time and I'll bet that 9 chances out of 10: 1. Both will be ignored; 2. They will become scrambled; 3. They will get so confused that a sensible answer is impossible.

I thought just the older hams who were losing their hearing or had grave problems were the ones affected but after listening to several new hams, find that the switch from transmit to receive just don't work.

It remains in transmit position even though they have closed their faces. Get a newcomer over the original mike fright and I firmly believe they become convinced that, that screen thing is a lifeline.

The desperate look on their faces when someone else is talking makes strong men weep.

If it were possible or practical they would probably take it to bed with them and operate when eating and bathing. If a cordless mike is ever invented, God help us all. They would probably wear it like a necklace. If it were possible to change frequency by vox, just imagine, they could have a mike in both hands.

With some, it's almost that bad now. One ham talked for 2 weeks before he found that the receive section of his rig was blown. On the other hand maybe they are clairaudient and don't need a receiver. Who Knows?

****

IT HAPPENED IN APRIL

April 1, 1931 — Virne Beatrice "Jackie" Mitchell, nineteen, was the first woman pitcher engaged by an organized male baseball team. She played for the Chattanooga (Tenn.) Baseball Club.

April 4, 1841 — President William Henry Harrison was the first President of the United States to die in Washington, D. C.

April 7, 1933 — The first bridge with open-mesh steel flooring was opened at Seattle, Washington.

April 11, 1789 — The first political newspaper in the United States, *Gazette of the United States*, was published in New York City.

April 14, 1863 — The first printing press to use a continuous web or roll of paper was patented by William Bullock, of Pittsburgh, Penna.

April 17, 1941 — The first helicopter flight from water was accomplished by I. I. Sikorsky.

April 20, 1837 — The first carpet loom was patented by E. B. Bigelow of West Boylston, Mass.

April 24, 1783 — The first college named after George Washington was established — the Washington College in Tennessee.

April 27, 1938 — The first yellow baseball was used in the Columbia —Fordham game in New York Ci

April 30, 1940 — Bell Martell of Van Nuys, Calif., became the first woman referee licensed by the California State Athletic Commission.

– Service

HAM HUM SWAP

NO CHARGE FOR SWAP ADS (NON-COMMERCIAL) SUBJECT TO SPACE LIMITATION. MUST BE SUBMITTED IN WRITING TO P.O. BOX 291. SEE COPY DEADLINE PAGE 2.

FOR SALE: ICOM 211 all mode 2 meter rig. Near new, excellent condition. Asking $650.00.
Call Rick Brown, WAØZQX, 341-1529 days; 553-5932 evenings and weekends.

FOR SALE: Galaxy GT550A SSB/CW transceiver with calibrator, power supply and speaker console – $390.00.
Dick Wolf, KØTVF, 9605 Ames Avenue,
Omaha, NE 68134; phone 571-1502.

FOR SALE: 2 meter mobile antennas, Vibroplex bug, TV 3300 low pass filter.
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Omaha, NE 68147; phone 731-0128.

FREE: For hauling away – QST 1970 thru 1975 plus 73 magazines 1970 thru 1975.
Art Gaeth, Sr., WØFQB; phone 455-3769

FOR SALE: ICOM 22S with Drake 1525 EM mike, Larson and Ringo antennas, rubber duck, 50' foam coax.
Jim Belt, WAØJIH, 1006 N. 76th St.,
Omaha, NE 68114; phone 397-5720.

****

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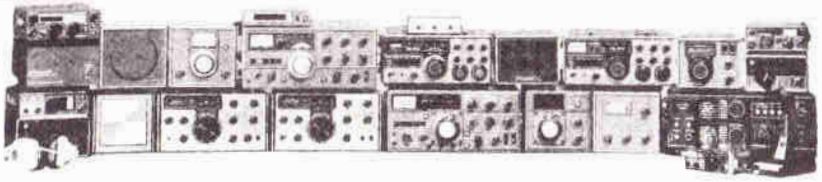

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CW-820	$ 49.00	SHARP, 500 HZ, CW FILTER REDUCES QRM.
DS-1A	$ 65.00	ADDS 12VDC OPERATION TO THE 820 & 520 UNITS
TS-520S	$ 739.00	TRANSCEIVER, 160/10M, 200 WT. AC USE
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TV-506	$ 249.00	6M TRANSVERTER, 10W OUT (10M IN)
R599D	$ 549.00	RECEIVER, 160/10M & CB. SOLID STATE W/AC.
T599D	$ 549.00	TRANSMITTER W/AC, 80/10M, 200 WTS.
S599D	$ 25.00	SPEAKER FOR R599D & UNIVERSAL USE.
CC29A	$ 35.00	2 METER SOLID-STATE CONVERTER FOR R599D.
CC69A	$ 35.00	6 METER SOLID-STATE CONVERTER FOR R599D.
R300	$ 249.00	GEN. COVERAGE RECEIVER; .17/.41 & .52/30 mHz.
TS600	$ 699.00	TRANSCEIVER, 6 METER, AM/FM/CW/USB/LSB, 10W.
TS700S	$ 729.00	TRANSCEIVER, 2M, DIGITAL, CW/FM/AM/USB/LSB, 10W.
VFO-700S	$ 129.00	REMOTE VFO FOR ABOVE TRANSCEIVER, ANY SPLIT.
SP-70	$ 30.00	MATCHING SPEAKER FOR TS-700A/S
TR-2200A	$ 229.00	2 METER BATT. OPERATED 2 WATT, 12 CH.
TR-7400A	$ 399.00	SYNTHESIZED, 2 METER TRANSCEIVER, 5 & 25 WATTS.
TR-7500	$ 299.00	PROGRAMED TO 50 CHANNELS, 1 & 10 WATTS.
HS-4	$ 16.00	8 OHM MONAURAL HEADPHONES FOR COMMUNICATIONS
MB-1A	$ 13.00	MOBILE BRACKET FOR TR-2200A
MC-50	$ 39.95	DYNAMIC MIKE, SELECTABLE LOW/HI Z USE.
SP-820	$ 49.00	SPEAKER FOR 820, WITH FILTERS/DUAL SWITCH
AT-200	$ 149.00	ANTENNA TUNER, 160/10 WITH ANT. SW./WATTMETER.
TL-922	($?)	HF LINEAR, 2KW, 160/10 METERS. Late spring.