

Results, Sixth Annual ARRL 160-Meter Contest

More new records despite poor conditions.

By Jeff Maass,* WB8JXS and Jim Cain,** WA1STN

Although generally conceded that conditions were poor for the sixth ARRL 160 Contest, December 6-7, 1975, a new single-operator all-time record was still set by K1PBW. Coast-to-coast propagation for the U.S. and Canada was certainly worse than in past years. The number of foreign entries was down markedly, reflecting the rotten conditions around the world. 306 entries this year is less than 50 percent of the stations known to have been active in the contest, but is still a fair showing, although not when compared to 354 in 1974.

We present herewith a story about the Ohio State University Amateur Radio Club, W8LT, and their 160-Meter Contest exploits, narrated by Jeff Maass, WB8JXS, in hopes that you will find it (as we did) interesting reading. Good things seem to come in bunches. . . K4DBZ sent us a story about his 160-Meter Contest expedition to Florida's No-Name Key, with W4OZF. We're saving that one, to print (we hope) in November QST, along with the rules for the 1976 160-Meter Contest. Just goes to prove one thing: Be careful what you send to the Contest Corner, because you just might end up seeing it printed in your magazine!

The 160 contest has long been a favorite of the operators at W8LT, since we usually do better, relatively, in this contest than most of the others. There's a bit of tradition, too. We were the number one multioperator station in the first ARRL 160 Contest, and we have been in the top ten each year since then, even though we have never again taken first.

*4410 Norwell Dr., Columbus, OH 43220
**Asst. Communications Mgr., ARRL

The station has changed since that first contest: In 1970 we had a BC610E, 75A4, Ranger II, and a five hundred foot longwire up 100 feet. In 1974 we began our major station upgrades, powered by money loaned by several of the members. (The university pays our phone bill and insurance. No money for equipment whatsoever!!)

The station for the 1974 contest was a Drake C-Line, and WA1LKU's modified SB220.

Antennas, always a favorite subject on 160, have undergone a lot of development and trial at W8LT. The evolution has gone from a kite, which broke loose, never to be seen again; to a balloon, which couldn't cope with the

up-and-down drafts surrounding the football stadium which houses W8LT; to the now-famous kitoon. The kitoon is a small (12-foot long) dirigible which is filled with hydrogen and/or helium to support a wire. For two years (1972-73) the wire was a quarter-wave vertical over a groundplane at 110 feet, and in 1974 the antenna was expanded to a five-eighth-wave vertical.

Could You Play Football At Our Observatory?

The long wire was available for all of the contests, and several dipoles were tried at various times, supported by the flagpoles which top the stadium. But we weren't satisfied by the performance



that we were getting in the contest: The noise level in the university environment is something to behold. We couldn't put a really good groundplane under the vertical for optimum performance and, worst of all, there was a football game scheduled for the stadium on the Saturday of each 160 contest! It was only a post-season game, but we were still required to remove all additional antennas from the top of the stadium by 7:00 A.M. on Saturday.

The thought of pulling down the kitoon and dipoles and storing them away for the remainder of Saturday for the 1975 contest started a search for a better location. (Have you ever tried to hide a 12-foot dirigible from 20,000 football fans, while it is still inflated? Not an easy job!)

We looked first at several facilities in or near the university complex. The antenna lab looked promising for antenna supports (two 80-foot towers space a little more than a half-wave at 160 meters), but the towers were aligned wrong for coverage and it was close to several roads and homes (still not a quiet location). The next prospect was a field formerly used for some optical (laser) research. There was a lack of antenna supports and shelter for our purposes.

The old saying goes something like "You usually find what you need in your own back yard," and we finally realized it. OSU has several resources available to those who know how to approach them. Two of the resources we found were W8ERD and W8JK.

JK to the Rescue

John Kraus, W8JK, needs no introduction — the JK array was named for him, he invented the helical antenna and literally wrote the book, *ANTENNAS*, used by most colleges for antenna

courses. Currently, he is the director of the OSU Radio Observatory near Delaware, Ohio, which he designed.

Bob Dixon, W8ERD, is also familiar to many. He is a former W8LT member and advisor, EC of the Central Ohio AREC, and father of the kitoon. He has also produced, for W8LT Field Day, a twenty-meter corner reflector supported from a firetower. He is a very active and innovative person, who happens to also be the vice director of the Radio Observatory.

We obviously had an "in", so we looked at what was available. The radio telescope at OSU is not a dish, but rather a flat three-acre aluminum groundplane with two reflectors. One of the reflectors is flat and tiltable, and it directs radio signals to the other reflector, which is parabolic. The signal is then focused and enters the "focus room" through a horn. The focus room contains parametric amplifiers, filters, receivers, various accessories, and a small computer for analysis of data. All in all, a very impressive setup.

What attracted us initially was the ground plane — three acres of aluminum foil over a concrete base. The idea of placing our kitoon-supported 5/8-wave vertical over a "perfect" groundplane was very pleasing. Further research revealed that the site was ideal in other ways — it was selected and maintained as a quiet radio location. Additionally, the location was exceptionally high for the central Ohio area. There was plenty of room for Beverage receiving antennas which we had been itching to try out. There was warm shelter with electricity and a refrigerator to maintain operator morale. Things were nearly perfect.

All we had to do was somehow get them to shut down the operation of the telescope for a few days and allow us to use the site. W8ERD liked the idea, but

insisted that we must contact W8JK; so we did. He was generally agreeable to letting use the site, under certain conditions — we must go out to the observatory before the contest and perform some tasks for the privilege of using the facility. We jumped at the chance.

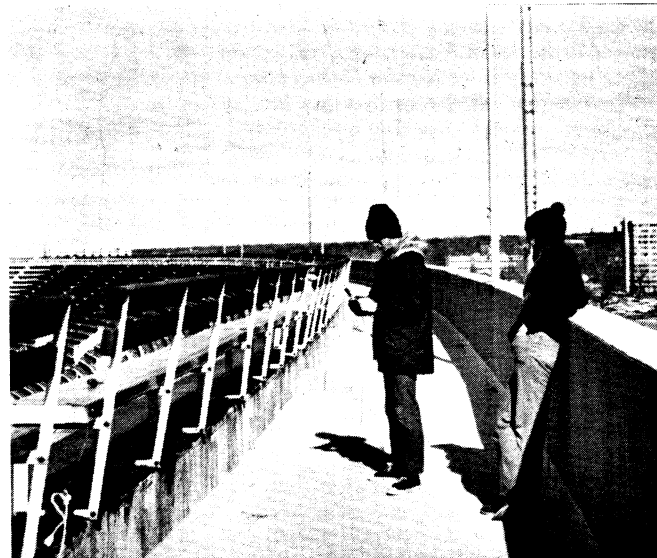
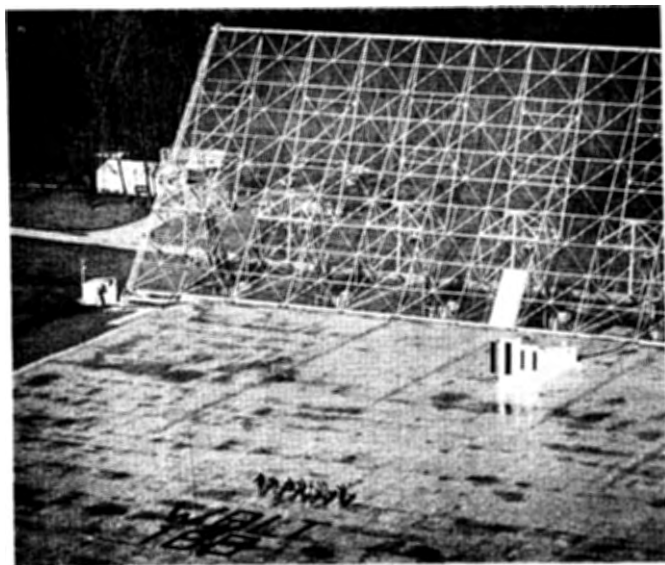
After two days of raking leaves, edging sidewalks, rearranging storage, recovering lost and/or stored objects and relocating them, replacing light fixtures, and hauling trash, we finally got the final approval. The contest was ours.

It was decided to link to the groundplane inductively, and it was estimated how much aluminum foil would be required to get sufficient coupling to the groundplane. We finally decided that about 250 feet of aluminum foil, held down by nearly 100 bricks and boards, would do the job. The vertical was mounted directly in the center of the groundplane, and the antenna tuner was grounded to the aluminum foil. It was a windy day and the kitoon was not staying perpendicular to the groundplane, but it was not enough skew to hinder its performance. It tuned well, and heard very well.

Other antennas included a dipole at about 80 feet (supported at one end by the flat reflector of the telescope) and Beverage receiving antennas to the northeast, south, southwest and west. The fact that we were leaving our 500-foot longwire at the stadium caused some concern over the alternatives if something failed, but there was no way to bring it along. Besides, this wasn't Field Day — nothing was going to fail!

The Contest

Our statistics, like those of most of the regular participants of the 160 test, have been increasing at a steady rate, usually around a 30-percent increase in score each year. This year we were



shooting for 40 percent. Our contest committee, which consists of those people interested in contesting, is WA1LKU/WB8OSC, WB8JXS, WB8SWM and WB8IBZ. All of them were regularly into any available contest, and all had been improving steadily. Traditionally, we also attract some alumni for the 160 test — W8ERD and WA8VNP came out for this one. A stop-in visitor, WA1LAK, helped get the station set up. WN8TXE helped log and checksheet, as usual. WB8INY spotted, climbed and supervised. Dan Babcock executed our aerial photography.

The station setup went a bit slow, with a lack of available manpower on Friday morning, and the station was just barely set up before the beginning of the contest. The station was LT's C-Line, WA1LKU's newly modified SB220, W8ERD's FT-101 for spotting, and several accessories including an Accu-Memory, 100 dB step attenuator, pre-selector, etc. The attenuator was used to cut down some of the cross modulation and overload caused by the large amount of 160-meter rf coming out of Ohio during the contest. The SB220, partially filled with parts from the old BC610, glided along at 1000 watts during the day, and accounted for several daytime contacts that may not have been possible without it.

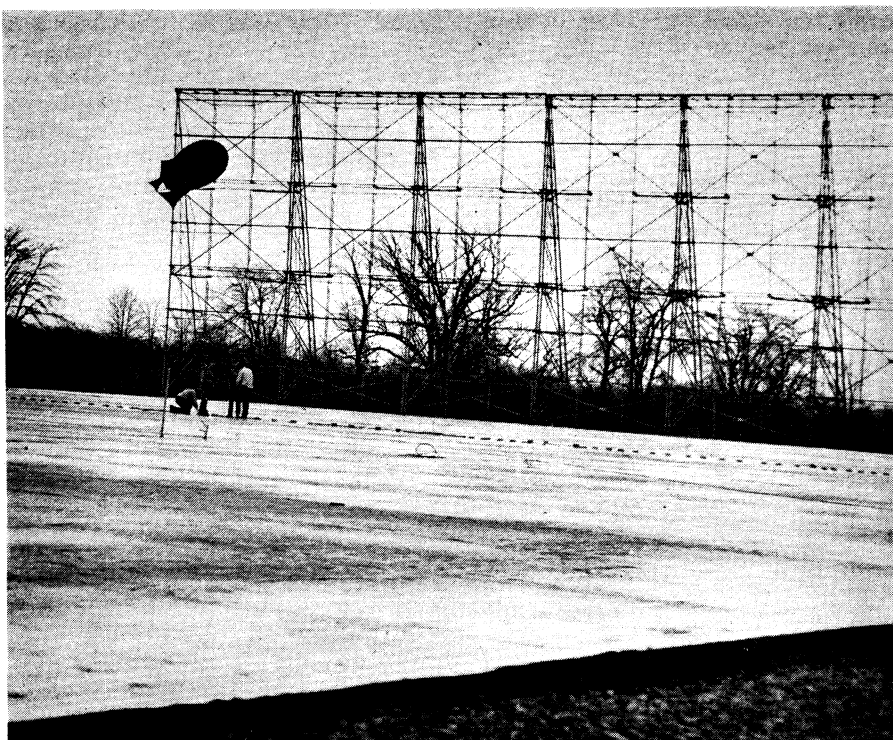
W8ERD started off, and operated for a couple of hours. The rest of the operators/staff attended to finishing up the Beverages and spotting. As the evening progressed, the card playing portion of the Annual 160-Meter Contest and Euchre Playing Convention was started, and kept the operators/staff busy when they weren't operating/staffing.

Conditions the first night were very poor, with storms moving into the area and generally noisy conditions, but we managed to work a few DX stations with the 5/8 wave. Contacts were coming faster than in previous years, however, and we were still looking for a greater than 30-percent improvement. It began to rain late Friday night and the noise level continued to rise. As the sun dawned on Saturday, the rain slowed and the wind picked up. An investigation of the kitoon indicated that the helium had been leaking out, that the surface was soaked with rain, and that it was flying at about a 50-degree angle to the ground. It was still working well, however, and we decided to wait at least until the sun made contacts nearly non-existent to fix it.

Disaster

The wind shifted and was coming from the north now.

John, WB8INY, saw it first. The kitoon had careened into the parabolic reflector in the shifting wind, breaking



off one of its stabilizing fins. It was looping wildly behind the reflector; the vertical caught in the metalwork of the structure. A tree placed, of course, in the path of the kitoon's wild flight, was taking cheap shots at the silk-covered rubber blimp.

The response was immediate. Everyone grabbed his coat and slopped through the mud and grass to the reflector 500 feet away. As we got close, the vertical broke, allowing the kitoon to loop away into the briar patches to the south of the telescope. We chased.

It was raining again and the temperature had dropped to nearly freezing as we fought honey locust trees and wild blackberries for possession of our beloved kitoon. Pitifully looping in the driving wind, the kitoon was making a valiant effort to pull out of its death-dive, but eventually lost out when the antenna wire caught in a tree, forcing the kitoon to lodge in a honey locust tree.

We managed to pull it out and returned to the station, where WA8VNP had continued operating on the dipole, and we did an autopsy on the kitoon. The outer skin, graphite-coated silk, was amazingly undamaged, and we had renewed hope at the prospect of resurrecting it before evening. We opened the gas vent and pulled out the inner rubber gas bag — in several pieces. The kitoon was dead. (We could just hear K8KAS, WA8IJI and W8LRL chuckling.)

Obviously, with our groundplane undamaged, we had to come up with an

alternative vertical to mount on the thing. Recently, the Central Ohio AREC Planning Committee (including W8ERD, WB8IBZ, WB8JXS, and WA1LKU just incidently) had been discussing the possible use of 160 meters as a link frequency for some of our activities. In preparation for this, W8ERD had purchased a military antenna that we could put to use for the contest. He drove home and got it, and we erected it on the groundplane.

The short antenna had a top hat and was about 30-feet high, obviously a trade-down from the 5/8-wave vertical of the night before. Additionally, the antenna tuner would arch violently if we tried to run much more than 150 watts into the short vertical. We didn't have time to rebuild the antenna tuner, so some modifications were made and we used the dipole for the rest of the day.

The short vertical definitely did not perform as well as we had hoped, but it seemed to get out fairly well. Conditions the second night were much better than those of the first, and yet we heard no DX well enough to work it. Our multiplier count at the end of the contest was a decrease over the year before, and yet we ended up with a 12-percent score increase over 1974.

If anyone knows a source of kitoon(s), please, please, please let us know about it. They were apparently used as antenna supports for rubber rafts by either the Navy or Air Force. We got ours at the Dayton Hamvention.

We'll return next year, although we

aren't sure where we will be operating from yet. See you on 160.

Sixth Annual 160-Meter Contest

Scores are listed by country within each continent, by province within Canada, and by section within each U.S. call area. The highest single-operator station in each ARRL section and in each country receives a certificate. The highest multiple-operator station in each section and country receives a certificate if there are three or more such entrants or, if, in the opinion of the Awards Committee, the entrant displays excep-

tional effort. Read the score listings as follows: Call, score, QSOs, multiplier, hours of operation. Asterisks denote Hq. staff members, who are not eligible for awards when operating their own station or that of another staff member.

Soapbox

Sounded like the 40-meter Novice band. — WA4WCG. Conditions very poor but if I had worked all I heard I would have been quite satisfied. — EI9J. It didn't seem that there were as many signals as I was led to believe would be on. I don't think I missed more than a half dozen that I heard and I couldn't make 250



K3BSY, pictured here, teamed with W3IWT for Atlantic Division-leading multi-operator score. John is also known occasionally as FY7AK.

DX

Austria
OE5KE 108- 9- 6-
Czechoslovakia
OK1ATP 936- 26-18-
OK2BUV 603- 13- 9-
OK2BGJ 76- 5- 4- 2
OK1HA5 72- 6- 6-
OK2PGU 2- 1- 1-
French St. Martin
FG9CGV/FS(WA3HRV, W3ADT, K4GKD, oprs.) 616- 22-14- 3

Ireland
EI9J 408- 17-12-
Japan
JA7NI 84- 7- 6- 2
Montserrat
VP2MIR(W7IR, opr.) 2350- 47-25-
Panama
HP3XWB(KZ5s AA, BB) 6825- 83-39-
Peru
OA8V 736- 23-16-
VE

Maritime
VE1AXT(+VE1BCZ) 20,160-195-48-30
Quebec
VE2BPT(VE2BTQ, opr.) 22,560-237-47-
VE2JA 13,590-151-45-
VE2OJ(multi-op) 17,664-189-46-24
Ontario
VE3ECP 26,100-261-50-
VE3EB 5620- 70-33-17
VE3HC(multi-op) 31,164-294-53-28
Saskatchewan
VE5DX 41,412-303-68-
Alberta
CY6CGS 6438- 87-37- 7
British Columbia
VE7UZ 20,976-184-57-
VE7AZG 1806- 43-21-

U.S.A.
1
Connecticut
WA1STN* 13,949-187-37- 5
W1CER* 11,628-150-38- 8
W1F8Y* 11,288-163-34- 6
WA3JUSU/1* 5670- 81-35- 3
K1LGM 5280- 88-30- 6
W1QV 4700- 94-25- 5
WA3NAF/1 3640- 70-26- 5
WB2NOM/1* 3456- 64-27- 3
W1UAD 3024- 56-26- 6
W1VZ 1640- 41-20- 4
WA1KOC 704- 22-16- 2
W1AW(WA3JUSU, opr.) 336- 14-12- 1
WA1TXZ/1(+WA1S ODX, FDV) 32,312-281-56-22
Eastern Massachusetts
W1BB/1 16,984- 95-44-12
W1FJJ 16,650-225-37-
K1AGB 16,640-160-52-
W1GDB 11,022-167-33-
W1PL 6789-102-31-
W1FZY 4410-105-21-
W1GVN 1672- 44-19- 5
WA1RL1 1672- 38-22- 4
W1DDC 810- 27-15- 6
W1MX(multi-op) 57,597-360-73-29
Maine
K1RQE 23,816-202-52-12
WA1ICG 9000-125-36- 7
W1NMMW 320- 16-10-
New Hampshire
W6MZW/1 23,598-198-57-

W1GJE 20,944-238-44-
K2SIL/1 9240-110-42-
W1HDI 8296-122-34-14
W1FZ 3872- 59-32-
W1LLNH 936- 26-18-
Rhode Island
K1LPA/1 34,614-316-54-26
Vermont
K1IHK 6032-116-26- 6
Western Massachusetts
K1PBW 101,136-515-84-33
K1RQF 18,960-237-40-16
W1EBW 5440- 85-32-
2

Eastern New York
W2DXL 64,584-420-72
W2LWI 23,358-224-51
WA2EAH/2 19,008-210-44- 9
K2DW 14,940-206-36-23
W2DW 6496-100-32-
WB2STZ 90- 9- 5- 1
WA2SPL(+WB2OEJ) 90,320-531-80-
N.Y.C.-L.I.
W2KTU 21,120-220-48-24
K2PHF 4480- 80-28-11
W2FVS 4300- 85-23-
W2HAE 2530- 55-23-
Northern New Jersey
WA2SRQ 68,068-412-77-24
WA2UOQ 41,340-306-65-13
WB2RJJ 19,292-179-53- 8
WB2URJ 18,952-206-46-22
W2HUC 15,372-180-42-15
WB2RKK 12,398-143-43-
W2WQ 8712-132-33-
WA2TWS 1716- 39-22- 8
K2LR 1200- 30-20-
W2MPP 360- 18-10-
Southern New Jersey
K2JOC/2 21,728-185-56-11
K2BWR 21,456-224-51
W2PAU 7548-111-34-
W2BP 1139- 20-17- 5
Western New York
K2KTK 44,667-350-63-18
W2FHU 28,404-263-54-19
K2FJ/2 25,104-260-48-24
K2KIR 21,949-232-47- 9
WB2QKF 14,480-181-40-30
WB2ABD 3596- 58-31- 3
W2YIK 2916- 54-27- 5

3
Delaware
W3GL 15,160-188-40- 7
Eastern Pennsylvania
W3GM(W3JSX, opr.) 85,092-466-84-28
W3FRY(K3DZB, opr.) 37,980-312-60-13
W3HUS 30,628-293-52-20
W3AXX 14,960-187-40-16
K3EF 14,350-175-41- 6
W3BGN 12,320-176-35-
W3AJS 9768-132-37-19
Maryland-D.C.
W3IN 89,343-517-81-30
W9SZR/3 61,408-386-76-24
W3CDZ 26,432-233-56-19
K3DI 21,264-218-40-16
W1NXX/3 14,398-155-46-13
W3USS(WA1FEO, opr.) 9472-128-37- 8
W3MNE 4212- 81-26-17
Western Pennsylvania
WA3WIK(WA3SZX, opr.) 59,892-448-62-29
W3CDZ 26,432-233-56-19
W3UHP 17,289-118-51-
W3ZUH 12,584-188-44- 9
W3SDN 2254- 49-23- 4
K3BSY(+W3IWT) 22,090-235-47-17
4

Alabama
K4GTQ 14,896-152-49-26
W8FAW/4 9512-116-41- 4
Georgia
K4DJC 57,256-415-68-24
K4QMQ 56,280-396-70-30
WAAMP 12,272-118-52-14
WB4RUA 12,144-125-48- 5
K4KZP 12,012-143-42-
W4WRY 2324- 37-28-
K4BAI 2160- 45-24-
Kentucky
K4FU 38,052-302-63-18
North Carolina
WB4VUP 41,160-366-56-26
W4TMR 37,620-330-57-29
WANQA 3584- 64-28-
Northern Florida
K4YFQ 13,724-143-47-
WA4WCG 10,291-124-41-16
W4QN 2160- 45-24-
South Carolina
K4CYU 36,661-296-61-25
K4II 21,168-196-54-10
W4YJS 672- 24-14- 6
Southern Florida
W4DQS 20,300-197-50-13
W4MAN 1782- 36-22-
W4GUU 1760- 40-22-11
W4OZF(+K4ADZ) 53,200-335-76-
Tennessee
K4PUZ 77,996-521-74-26
W4LH 23,052-226-51-15
W4FCJ 4620- 66-35- 7
Virginia
K4PQL 32,946-320-51
W4WSF 28,652-271-52-15
K4JM 14,142-171-41- 5
W4KFC 7400-100-37-
K4JWD 7004-103-34-
W4ZM 2600- 50-26- 2
K4FTO 2156- 49-22-
W4KMS 1680- 42-20-
W4LGM 928- 29-16- 2
W4PRO(multi-op) 65,310-454-70-
5

Arkansas
WA5RTG 54,531-366-73-
W5KL 9592-109-44- 4
Louisiana
W5WMM 48,555-372-65-24
W5YMX 144- 9- 8- 3
Mississippi
K5AEU 25,500-211-60-
W5PWW 15,822-145-54-23
W5NMG/5 6120- 85-36-
W5GWD 3660- 61-30-
W5SHVY 850- 25-17-
New Mexico
W5DO 15,092-148-49-
W5UTV 7000-100-35-16
W5MVA 2300- 46-25-14
Northern Texas
W5USM 33,165-246-67-
K5JVF 24,384-186-84-22
W5ASKY 12,432-128-48-25
W5CKM/5 12,240-136-45-18
K5QNY 12,012-143-42-10
W5FX 4550- 65-35-10
W5ASRT(+W5BLS) 39,508-289-68-25
Oklahoma
W5QAP 12,408-132-47-12
K5QNM(+W5JFR) 6068- 82-37-12
Southern Texas
K5DEG 28,426-227-61-17
W5RPJ 21,452-148-48-20
W5QF 1432- 51-21-12
K5LZJ 1463- 37-19- 9
W5KA(multi-op) 9555-121-39-11
6

East Bay
K6HII 34,432-269-64-25
W6AJJ 22,568-197-56-24
Los Angeles
W5RTQ/6 24,339-200-57-16
W6DQX 4814- 83-29- 4
W6GVCZ 4568- 78-28-10
W6ZVC 3744- 78-24- 5
Orange
W6ANN 29,890-245-62-27
W6FNI 17,934-183-49-
Santa Barbara
W6JU 4048- 92-22-12
W6LBP 1980- 55-18- 6
W6TYR 840- 30-14-11
Santa Clara Valley
K6STI 19,900-199-50-31
W6GUZA 14,490-156-46-
W6BXQ 1558- 41-19-
K6SLQ 500- 25-10- 2
San Diego
W6BLZ 1908- 53-18- 6
K6JEN/6 1316- 47-14-
San Francisco
W6KQG 34,224-276-62-
W6ZT 15,300-153-50-27
W6RQZ 360- 20- 9-
San Joaquin Valley
W6GWQ/6 16,116-158-51-15
W6WRS 2268- 54-21- 7
K6TG 1632- 48-17- 7
Sacramento Valley
W6ZGM 28,458-222-62-
W6NKR 9600-100-48- 8
W6VD 9374-109-43-17
Hawaii
KH6CHC 9588- 97-47-
KH6JJ 8740- 92-46-
7

Arizona
W7TB 22,387-176-61-18
W7YU 7820-115-34-
Idaho
K7NHV 16,744-161-52- 7
W7IWU 520- 20-13- 2
Montana
K7LTV 12,324-117-52-
K7CPC 2058- 49-21- 5
W7YB 816- 34-12- 2
W7MKB 832- 26-16-
Oregon
W87AEF 29,000-250-58-30
W87PEZ 13,112-149-44-16
W7IMF 4690- 75-27-11
W87IHN 2976- 62-24-10
W7LT 1632- 51-16- 7
UTAH
W87AOA 13,275-143-45-10
Washington
K7IDX 23,744-212-56-
W7DGT(WA7ILC) 19,926-183-54-25
W87OFH 18,865-170-55-25
K3MNT/7 7380- 90-41- 8
K7UWT 1376- 43-16-
Wyoming
W7JAL 3102- 47-33-14
W7TO 2754- 51-27- 7
8

Michigan
W8TBZ 21,828-214-51-16
K8HWW 17,760-185-48-14
W8KAZ 4690- 75-27-11
W3GN/8 12,408-141-44-
W8WMM/8 952- 34-14-
K8HLR(+W8AJN) 56,060-430-66-28
W8UM/8(multi-op) 49,164-357-68-
W8SXX/8(multi-op) 42,120-324-65-
W8YY(multi-op) 21,840-182-60-17
W8TDY(multi-op) 18,060-210-43-
W8MAI/8(multi-op) 15,360-160-48-
Ohio
K8CCV/8 76,228-488-76-30
K8HKB 55,334-364-73-31
W8DB 46,498-344-67-22
W8BYWX 29,309-275-53-21
W8BX 20,800-200-52- 6
K8CVJ 14,490-161-45- 8
W8EX 8352-116-36-4-
W8ANT 7000-100-35- 7
W8AJI(multi-op) 83,360-506-80-38
W8LT/8(multi-op) 59,061-431-69-40
W8YEE(+W8BUKX) 52,353-418-63-
W8ZDF(+W8NRIJ) 25,676-262-49-
W8EDU(multi-op) 15,092-154-49- 4
West Virginia
W8LR 90,470-97-83-31
W8GIO 32,900-329-50-
9

Illinois
W89RFN 63,261-441-71-
W9YH(WB9NPB, opr.) 40,300-325-62-
W9YYG 30,660-254-60-14
W9ABA 26,448-232-57-18
W9CH 21,624-212-51-22
K9UKM 18,492-201-46-
W9WVB 12,956-158-41-12
W9OH 12,600-150-42-
W9AC 10,648-121-44-
W9REC 10,200-100-51-
K9AKC 6600-110-30-14
K9JLU 5508- 81-34- 5
K9LWR 4860- 81-30- 9
W9IE 4814- 83-29-10
W9GSB 3944- 68-20-12
W9HAD 3720- 62-30- 2
W9DED 2208- 48-29-
K9KEP 986- 29-17-
Indiana
WA9BWW 71,188-466-74-28
WB9QCP 46,116-366-63-36
K9YVO 41,276-296-68-
W9LT 25,096-267-47-17
K9UWA 18,391-172-53- 7
W9SFR 8854-115-38- 7
W9EI 1184- 37-16- 6
W9E(+W9NJD) 28,438-241-59-26
Wisconsin
WA9MCC/9 81,822-515-78-
WB9AVN 25,758-237-54-18
K9DAF 23,820-197-60-
W9BIL 22,971-200-57-
K9REE 3190- 55-29-
W9ERW 306- 17- 9- 4
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Colorado
W9DK(K9ZCM, opr.) 60,492-414-71-
WB9DJY 51,940-362-70-31
W9PHF 26,784-216-62-23
WA2WMT/8 20,414-173-59-14
W9MS(multi-op) 46,789-328-71-
Iowa
W9NFI 27,909-217-63-17
W9DII 7828-103-38-
W9IS/8(multi-op) 37,332-306-61-42
WB9FHH(multi-op) 30,439-248-61-
Kansas
W9PSF/8 8272- 94-44- 8
W9IUB/8(+W9LZN) 31,992-258-62-19
Minnesota
W9HWF 35,490-273-65-18
W9RHI 2116- 46-23- 5
W9H 1584- 36-22- 3
W9PAN 330- 15-11- 1
W9PAW(multi-op) 60,060-429-70-29
K9JIP(+K9JIL) 35,712-279-64-
K9JUS/8(multi-op) 30,120-251-60-36
Missouri
W9FBQ 13,872-136-51- 5
W9GK 13,244-154-43-18
W9NVZ 6800-100-34- 7
W9BY 2064- 43-24- 5
Nebraska
W9AIH 60,912-413-72-18
WA3BGN/8 1064- 28-29- 3
W9DYK 1044- 29-18- 3
North Dakota
W9ZTL 25,010-205-61-18
South Dakota
WA9CPX 18,974-179-53-
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