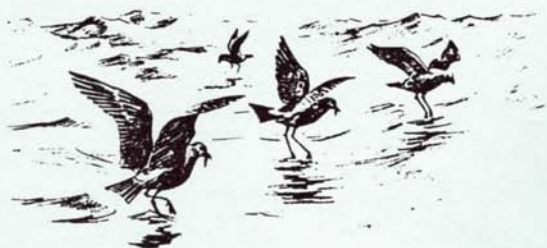


JUNE 2 • 3 • 4, 1989

# SEA PAC

## **HAM CONVENTION**

**Seaside Convention Center  
Seaside, Oregon**



Presented By

**OREGON TUALATIN VALLEY AMATEUR RADIO CLUB**  
an ARRL Special Service Club





# THE FUTURE OF AMATEUR COMMUNICATIONS

ICOM's pacesetter IC-781 combines futuristic designs and features of truly legendary proportions to create "The New Frontier." Whether DX'ing, contesting, pioneering new interests or enjoying unquestionable top-of-the-line performance, the IC-781 is indeed today's standard of excellence!

**MULTI-FUNCTION FIVE INCH CRT.** Displays frequencies, modes, memory contents, operating notes, RIT, two menu screens, plus a panoramic view of all signals in a selected range. Even displays data modes like RTTY, AMTOR and PACKET!

**UNIQUE SPECTRUM SCOPE.** Continuously indicates all signal activities and DX pileups with your operating frequency in the center.

**DUAL WIDTH NOISE BLANKER.** Includes MCF filter plus level and width controls to eliminate pulse and woodpecker noise with minimum adjacent-signal interference.

**DUAL WATCH.** Simultaneously receives two frequencies in the same band!

**DX RATED!** 150 watts of exceptionally clean RF output. Easily drives big amplifiers to maximum power.

**TWIN PASSBAND TUNING** with separate controls for second and third IF stages! Increases selectivity and narrows bandwidth.

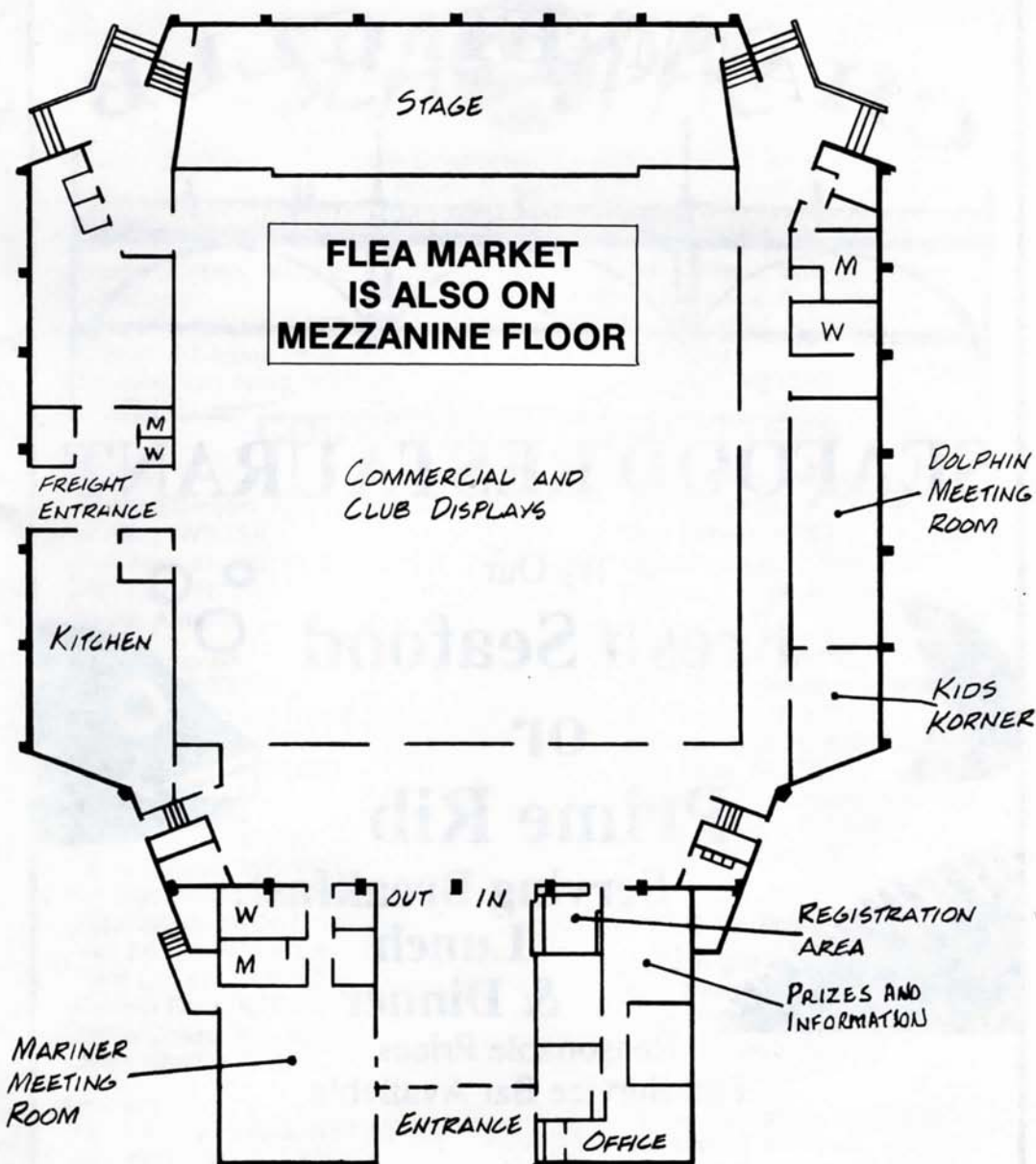
**A TOTAL COMMUNICATIONS SYSTEM!** Includes built-in 100% duty AC supply, high speed automatic antenna tuner, iambic keyer, semi-automatic or full QSK CW break-in to 60 wpm, Audio Peaking Filter (APF), RF speech processor, multiscanning, 105dB dynamic range, all-band/all-mode receiver and much more!

**ICOM DEPENDABILITY.** The phenomenal IC-781 is built for action and backed with the most extensive warranty in the industry.

**ICOM**  
First in Communications

ICOM America, Inc., 2380-116th Ave. N.E., Bellevue, WA 98004  
Customer Service Hotline (206) 454-7619  
3150 Premier Drive, Suite 126, Irving, TX 75063  
1777 Phoenix Parkway, Suite 201, Atlanta, GA 30349  
ICOM CANADA, A Division of ICOM America, Inc.,  
3071 - #5 Road, Unit 9, Richmond, B.C. V6X 2T4 Canada

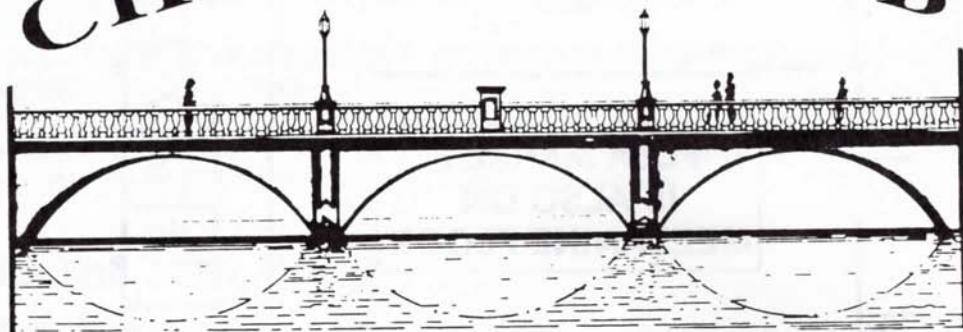
All stated specifications are subject to change without notice or obligation. All ICOM radios significantly exceed FCC regulations limiting spurious emissions. 781289



FOR CONVENTION  
INFORMATION AND  
ANNOUNCEMENTS,  
LISTEN ON:  
146.52 (Simplex)  
145.45 (-600 KHz)



# CHANNEL CLUB



## SEAFOOD RESTAURANT

Try Our

**Fresh Seafood**

or

**Prime Rib**

**Serving Breakfast,  
Lunch  
& Dinner**

Reasonable Prices  
Full Service Bar Available

**OPEN FOR BREAKFAST  
EVERY DAY AT 8AM**

521 Broadway • Downtown Seaside  
For Reservations Call 738-8618

## **Ladies' Programs**

**Saturday, June 3**

**9:30 a.m., Huntley Inn Meeting Room #125**

Ladies' Hospitality Suite—Coffee, Treats and Friends, old and new.

**10:00 a.m., Huntley Inn Meeting Room #125**

**Tips For Your Dilemmas With Medicare and Insurance Claims**, presented by Peggy Till, KB7FZL. Question and Answer Session (come prepared with questions and writing materials).

**11:30 - 2:30 p.m., Ladies Luncheon & Program - Shilo Inn Dolphin # 2 & 3**

*Featuring:* Grace Cornutt and Barbara Olson, presenting

### **CONTEMPO FASHIONS - JEWELRY & SCARVES**

Jewelry purchases and orders can be made all day long in the Ladies Hospitality Suite.

**3:30 p.m., Huntley Inn Meeting Room # 125**

**Handwriting Analysis**, presented by Hazel Billings. Hazel is a Scientific Graphic Analyst with 20 years experience.

**All Day Saturday: Ladies' Treasure Hunt**, Sponsored by the Seaside Chamber of Commerce

**Sunday, June 4**

**9:30 a.m., Huntley Inn Meeting Room # 125**

Ladies Hospitality Suite—Coffee, Treats and Friends

### **Prizes Furnished By:**

Sharon Ormiston  
Baseline Drug

# Welcome to SeaPac!



*Remember—*  
P.R.S. Features Fine Equipment From...



**KENWOOD**



...Super Antennas From...

**cushcraft**



...And Many Terrific Accessories!

— Consignments Welcome

— Trades? You Bet!

Stop By

Balloons For The Kids!

**AND — Have A Great Convention!**

**PORTLAND RADIO SUPPLY**

1234 S.W. Stark Street • Portland, Oregon 97205

Telephone: (503) 228-8647

## **SPECIAL EVENTS**

### **WILD WEST CASINO NIGHT**

**Friday, 7:30 p.m.:** Social Casino Night at the Seaside Elks Lodge. An evening of fun and exciting "No Stakes" gambling. Test your ability at Blackjack, Roulette and Craps. Snacks and no host bar also available.

### **VE TESTING**

**Saturday, 9:00 a.m.:** Our Savior Lutheran Church. Right across the street from the Convention Center. Pre-registered only at this session.

**Saturday, 1:00 p.m.:** Same Location. Walk-ins, as space is available. Fee for either session is \$4.75 payable to ARRL/VEC. Be sure to bring your original license, a photocopy of your license and a completed FCC Form 610.

### **LADIES' LUNCHEON**

**Saturday, 11:30 a.m.** Shilo Inn Dolphin Rooms 2 & 3. Cost is \$7.00. Due to limited space, this luncheon may be sold out.

### **QCWA LUNCHEON**

**Saturday, 12:00 Noon:** Shilo Inn Whale Rooms 1 & 2. Cost is \$7.00. Due to limited space, this luncheon may be sold out.

### **ORRC MEETING**

**Saturday, 1:00 p.m.:** Town Center Mall (Broadway & Edgewood), Upstairs Meeting Room.

### **BANQUET**

**Saturday, 7:00 p.m.:** Convention Center Main Floor. Doors open at 6:45. Featuring: E. E. Van Valkenberg, Chief Communicator on Air Force One and the Honorable Greg Milnes, W7AGQ, Master of Ceremonies. Due to limited seating this function is sold out.

### **NO-HOST BREAKFAST**

**Sunday, 7:30 a.m.:** Convention Center Main Floor. This is a sit-down, catered meal. Cost is \$5.00. Latecomers may not be served, as the room must be cleared by 8:45.

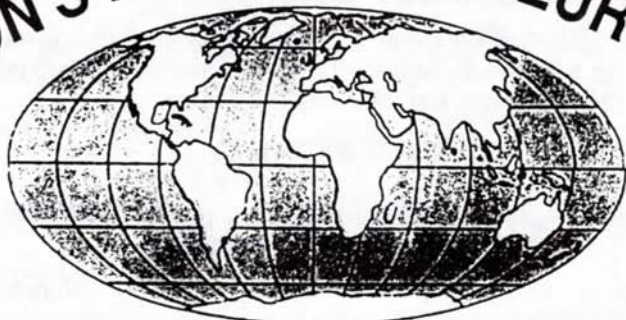
### **KIDS, KRAYONS AND KARTOONS**

**Saturday 9:00 a.m. - 4:30 p.m. • Sunday 9:30 a.m. - 12:00 Noon.**  
Supervised entertainment for children at the Kids Korner (Sea Mist Meeting Room).

*We apologize, but the food catering services do not offer a child's portion for any of the meal functions.*



# OREGON'S NEWEST AMATEUR STORE



## ORLANDO'S ELECTRONICS

34533 Highway 99E - Tangent, Oregon 97389  
(503) 926-9773

**ICOM**  
**KENWOOD**  
**YAESU**

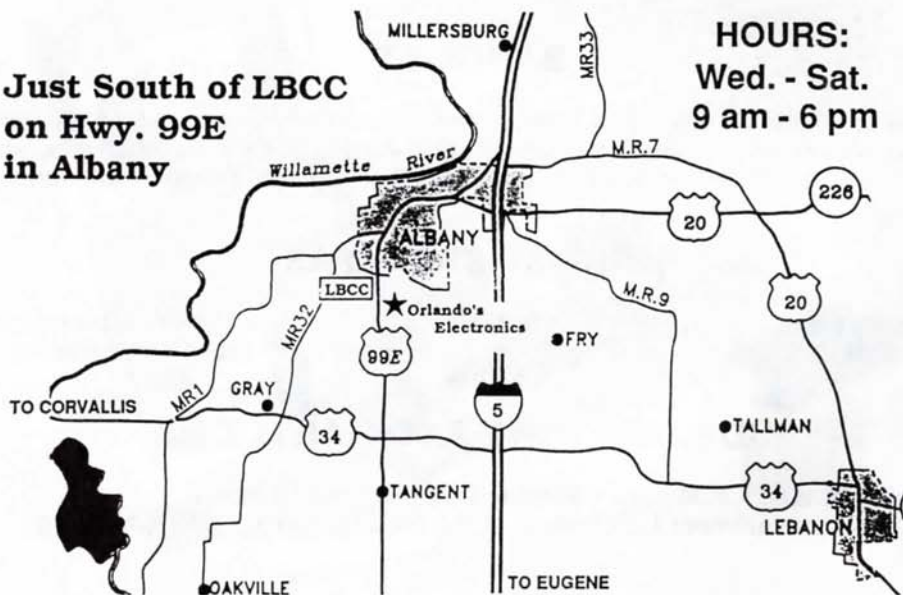
### HAM FAIR SALE

Salem 2/18/1989  
Puyallup 3/11/1989  
Seaside 6/2, 3, 4/1989  
Tacoma 8/19, 20/1989



Just South of LBCC  
on Hwy. 99E  
in Albany

**HOURS:**  
Wed. - Sat.  
9 am - 6 pm



*We appreciate your business, thanks! Dave KB7CTK*



QSO  
PARTIES  
CW-SSB



7  
SCHOLARSHIPS  
EACH YEAR

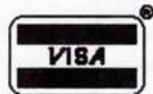
Preserves and Promotes Amateur Radio  
CW and SSB Nets

*You Owe Yourself The Privilege  
Of QCWA Affiliation*

GOT A QUESTION?  
Visit Our Booth!

## PORTLAND COMPUTER ACCESSORIES

2135-A SE 6th AVE • PORTLAND, OR 97214 • (503) 232-6324



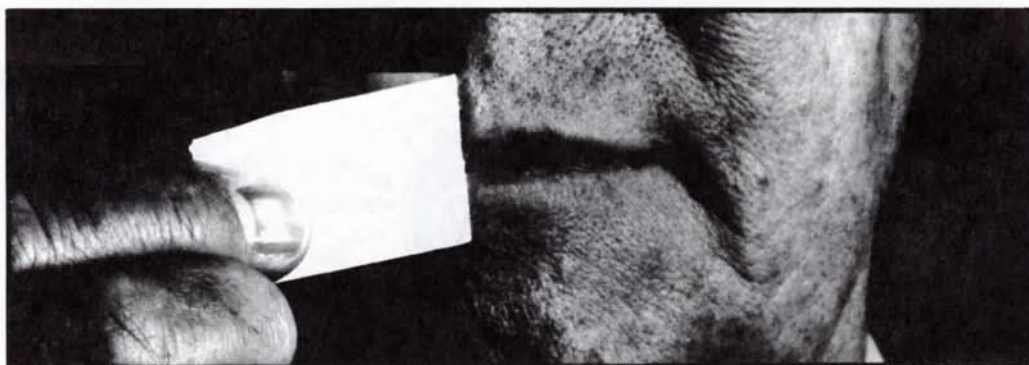
**SUPPLIERS OF QUALITY  
COMPUTER-RELATED ACCESSORIES**

PRINTER CABLES  
MODEM CABLES  
MONITOR/KEYBOARD CABLES  
NUL MODEM CABLES  
GENDER CHANGERS  
SWITCH BOXES  
CROSSOVER BOXES  
POWER CENTERS  
SURGE PROTECTORS  
PRINTER STANDS

MONITOR STANDS  
MONITOR MOVERS  
CPU STANDS  
GENIUS MOUSE  
GENIUS SCANNER  
OCR SOFTWARE  
MOUSE PADS  
MOUSE COVERS  
JOYSTICKS  
GAME CARDS

AVERY LABELS  
PRINTER RIBBONS  
KEYBOARD TEMPLATES  
DUST COVERS  
COMPUTER BATTERIES  
COMPUTER TOOLKIT  
KEYBOARD DRAWERS  
GLARE SCREEN  
DISK STORAGE BOXES  
OTHER ACCESSORIES

***Come visit us at the Exhibit Hall and stock up on our many Spring  
Specials. Take a catalog home with you. We invite you to come see us  
at our new Portland warehouse and showroom.***



# Now that you can speak, talk to Larsen.

Novice Enhancement opens up a whole new way for novices to communicate. To make the most of it, talk to Larsen Electronics.

We'll tell you how Larsen antennas can greatly improve your powers of communication. We'll also explain how Larsen 220 and 1296 MHz antennas are designed to give you the best performance.

Talk to your Larsen amateur dealer today, and see if Larsen performance doesn't speak for itself.



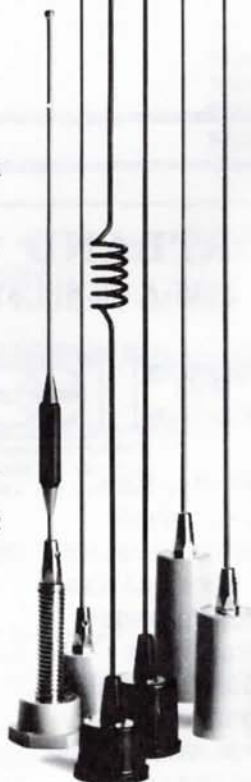
## Larsen Antennas

The Amateur's Professional™

See your favorite amateur dealer or write for a free amateur catalog.

IN USA: Larsen Electronics, Inc., 11611 N.E. 50th Ave., P.O. Box 1799, Vancouver, WA 98668. 206-573-2722.

IN CANADA: Canadian Larsen Electronics, Ltd., 149 West 6th Avenue, Vancouver, B.C. V5Y 1K3. 604-872-8517.





## Speaker Topic Information

**Amateur Radio and Astronomy.** Sandy Mikalow, K7OOZ, will outline the use of radio (remote) control of an astronomical telescope and digital imaging equipment. Using these techniques and equipment astronomical images can be made remotely from the home of a radio amateur. He will discuss equipment, technique, and operation. He will also show some very interesting astronomical scenes.

**Integration of RACES/ARES into Government.** Jan Smith, KB6WJZ, is an administrative assistant in the Office of Emergency Services for Ventura County, California. She will speak on "The Integration of RACES/ARES into Government." She will share ideas to begin and maintain relationships between radio volunteers and government.

**DXing: Beginning and Intermediate.** The Hon. Greg Milnes, W7AGQ, will speak on beginning and intermediate "DXing." Greg is an experienced and resourceful DX chaser.

**QRP Field Day.** Roy Lewallen, W7EL, will share his "QRP Field Day" secrets on antennas, power sources, operating techniques and many other related topics. "Back-packable" gear will be emphasized, but there will be plenty of good tips for QRP field day operators. Roy has been licensed since 1957 and has made electronics his career. He has also published technical articles in *QST* and other ARRL publications.

**Operation of a QSL Bureau.** James (Jim) Boland, W7GUR, is a member of the Willamette Valley DX Club. He is currently chairman of the District 7 QSL Bureau. He will discuss the operation of the Bureau.

**ARES Forum.** Bob Dorman, KV7F, Oregon's recently-appointed Section Emergency Coordinator, will lead a panel of three others on Amateur Radio Emergency Service (ARES). This is for Emergency Coordinators and Assistant Emergency Coordinators or those wanting to hold these positions.

**Coaxial Cable and Feedline Hardware.** Dave Phemister, WB7ESV, will speak to the topic of "Coax Wars—Don't Fight 'em!" He will shed some light on the mysteries of many of the popular types of feedlines. He will provide helpful tips on the types of coax to select for the frequencies and weather conditions encountered and the proper use of connectors and other feedline hardware.

**The Latest on Packet Communications.** Doug McMurdo, W7XI, will give a seminar on advanced packet radio communication. This will include the latest happenings in the Northwest.

**AMSAT.** Joseph (Joe) Holman, KA7LDN. Joe will speak on AMSAT, the amateur communications satellite organization.

**Useful Homebrew Projects.** Dr. Al Chandler, K6RFK, will share his expertise in the area of useful home brew projects for the radio amateur. He has a professional background in digital and analog circuits. He is also an experienced speaker.

*Continued*



**Getting the Most for Your Service Dollar.** Mark Allen is the service director for ICOM North America.

**Digital Communication Modes.** Ernie Austin, W7AXJ, will present a video entitled "What are Those Crazy Sounding Signals Saying?," followed by a question and answer period. Topics include computer generated and decoded slow and high speed CW, RTTY (radio teletype), AMTOR, ASCII, and packet modes. Ernie has been licensed since 1922 and worked in communications until 1970.

**Antennas, Etc.** Kenneth G. Kopp, K0PP, who was until recently ARRL Section Manager for Montana, will speak on an antenna related topic.

**Antennas from Junk and Stuff.** Mark Walker, W7CLU, will cover the general topic of low cost HF and VHF antenna construction. Grow your own antenna farm on a budget. Technical level spans NOVICE class through EXTRA class. Currently Mark is president of Amateur Radio Relay Group, a large local (Western Oregon) repeater organization. He is able to impart information and enthusiasm to new and old hams alike!

**Fast-Scan TV Equipment and Operation.** Charles (Chuck) W. Northcutt, W7SRZ, will give a seminar on fast scan TV (FSTV). He will discuss equipment, techniques and operation.

**Basic SWR.** Ken Glanzer, K7GCO, tackles one of those very useful, but often misunderstood, RF measurement techniques namely "Basic SWR." Attend this session and impress your friends with your sizable, newfound knowledge on the topic. Ken has made numerous technical contributions in the area of amateur radio antennas and continues sharing his experience via articles and presentations.

**Homebrew Projects with Components Acquired at Flea Markets.** Jeff Damm, WA7MLH, who is an electrical engineer and is employed as a microwave circuit designer, has had 15 years of experience building homebrew equipment. He will talk on dos and don'ts of initiating and completing a home brew project. His specialty is doing a project using materials picked up at (radio amateur) flea markets!

**SHF Operation.** Tom Hill, WA3RMX, will give a seminar on operation in the 47 GHz band. He, with others, holds a new world distance record for that frequency.

**Fast Scan TV Spectrum Management.** John White, K7RUN, will give a seminar on spectrum management of fast scan TV (FSTV).

**A Primer on Packet Radio.** Mike Dunlop, K7YMU, will discuss "An Introduction to Non-Wire Digital Communications Systems," (A primer on digital packet). This is a different perspective on packet radio.

**Project Organization for Amateur Radio Clubs.** Russ Dedrickson, WA3FBU, will speak on (amateur radio) clubs' project organization. His seminar has been developed to provide guidance for club project/program managers in the development of definition, purpose, resources, methodology, execution, and evaluation of club programs and projects.

## **Banquet Speaker:**

### **Earl E. Van Valkenberg, CMSgt., USAF (Ret.)**

Chief Master Sergeant Earl E. Van Valkenberg has lived in the Northwest since 1942, and he currently makes his home in Vancouver, Washington. Van is recently retired after 37 years and 3 months of military service. His career in the military included enlistments in both the Navy and the Air Force and spanned a wide range of times and places, starting with nine months' service at the end of World War II. He also served 18 months in Korea in 1951 and 1952, the Santo Domingo uprising, and 27 months in Viet Nam between 1964 and 1966. His last duty assignment was on Air Force One, the Flying White House, as Chief Communicator. From this duty station, his call sign was AF40, Aeronautical Mobile.

As Chief Communicator, Van was responsible for all communications to and from Air Force One. This included such duties as ensuring that the President had at least one clear secure channel at all times, regardless of location or conditions. He flew with all of the U.S. Presidents, starting with Richard Nixon. He also flew with Vice Presidents, Secretaries of State, Cabinet officers, Congressmen, other heads of state and celebrities such as Bob Hope. His flights have taken him all over the world, including the People's Republic of China and the Soviet Union.

Van will discuss how he came to be Chief Communicator, his duties and experiences on Air Force One, and other 'behind the scenes' White House activities. Ample time will be available for questions. During his previous talks at other events, he's never had to not answer a question because of classification restrictions.



---

Although he is retired, Van has continued to consult with the designers and engineers preparing the new Boeing 747 Air Force One airplanes. His practical experience has resulted in several communications system design changes. His varied hobbies are as interesting as his military career. He is a sky diver, and he has made over 2041 free-falls. Nine of these have been from 40,000 feet. He has participated with the HALO Skydiving Team. His other interests include roller skating, water and snow skiing.

---



# SEA•PAC 1989 Schedule

**Friday,  
June 2  
P.M. 7:30**

## SEASIDE ELKS LODGE

### Wild West Casino Night

An evening of fun, "No Stakes" Gambling, snacks, excitement and prizes.

## CONVENTION CENTER

### Mariner Room

### Dolphin Room

**9:30  
Saturday,  
June 3  
A.M. 11:00**

**Amateur Radio & Astronomy**  
Sandy Mikalow, K700Z

**QRP Field Day**  
Roy Lewallen, W7EL

**Operation of a QSL Bureau**  
Jim Boland, W7GUR

**12:00 Lunch Break**

**1:00  
Saturday,  
June 3  
P.M. 2:30**

**Latest on Packet Communication**  
Doug McMurdo, W7XI

**Useful Homebrew Projects**  
Dr. Alan Chandler, K6RFK

**Antennas from Junk & Stuff**  
Mark Walker, W7CLU

**AMSAT**  
Joe Holman, KA7LDN

**Getting the Most for Your Service Dollar**  
Mark Allen, ICOM

**4:30 Exhibits Close. Banquet room opens at 6:45; Banquet at 7:00**

**9:30  
Sunday,  
June 4  
A.M. 11:00**

**Home Brew Projects with Components  
Acquired at Flea Markets**  
Jeff Damm, WA7MLH

**Project Organization for Amateur Radio Clubs**  
Russ Dedrickson, WA3FBU

**SHF Operation**  
Tom Hill, WA3RMX

**1:00 Grand Awards, Main Exhibit Room. Convention Closes, 2:00 P.M.**



# of Seminars and Activities

**Registration:** Friday, 11:00 a.m.-8:00 p.m.  
Saturday 8:00 a.m.-4:30 p.m.  
Sunday 8:30 a.m.-Noon

**Exhibits & Flea Market:** Saturday 9:00 a.m.-4:30 p.m. Sunday 9:30 a.m.-1:30 p.m.

**Kids, Krayons & Kartoons:** Saturday 9:00 a.m.-4:30 p.m.  
Sunday 9:30 a.m. - Noon

**Our Savior  
Lutheran Church**

*(See Special Events  
page for details.)*

## SHILO INN

### Whale 3

### Dolphin 1

**Integration of RACES/ARES into Government**  
Jan Smith, KB6WJZ

**DXing: Beginning and Intermediate**  
Hon. Greg Milnes, W7AGQ

**A Forum on ARES**  
Bob Dorman, KV7F

**Coaxial Cable & Feedline Hardware**  
Dave Phemister, WB7ESV

**9:00 VE Exams.** Pre-registered only.

**QCWA Luncheon: Whale #1 & 2; Ladies Luncheon: Shilo Inn Dolphin #2 & 3**

**Digital Communication Modes**  
Ernie Austin, W7AXJ

**Antennas, Etc.**  
Ken Kopp, K0PP

**Fast Scan TV Equipment and Operation**  
Chuck Northcutt, W7SRZ

**Basic SWR**  
Ken Glanzer, K7GCO

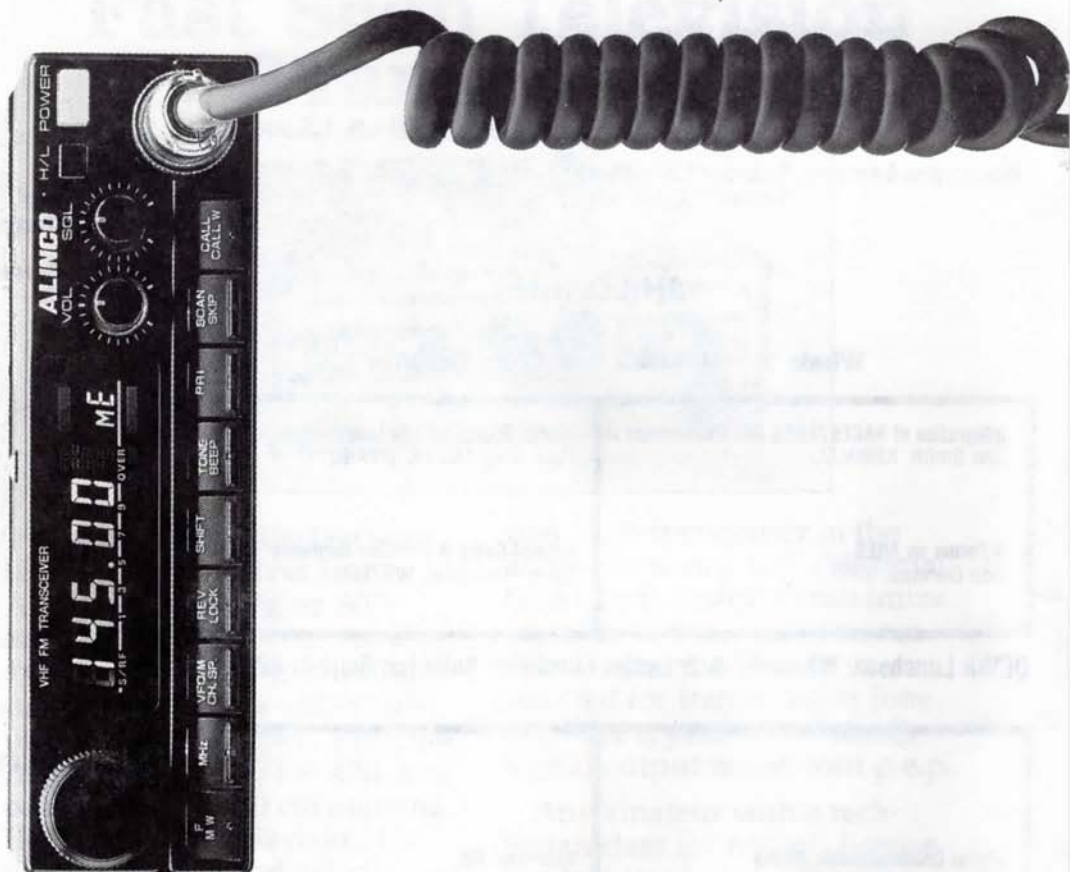
**1:00 VE Exams** Walk-ins as space allows

**1:00 ORRC Meeting.**  
Town Center Mall (upstairs)

**Fast Scan TV Spectrum Management**  
John White, K7RUN

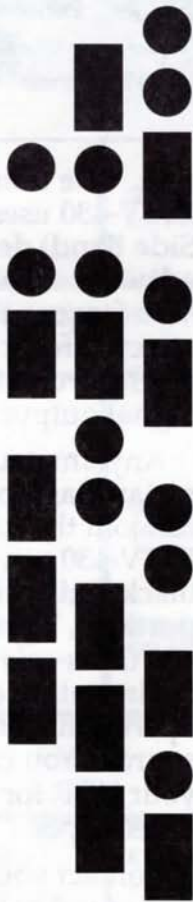
**A Primer on Packet Radio**  
Mike Dunlop, K7YMU

**7:30 No-Host Breakfast**  
Convention Center





Cord not actual size



### ONE OF A KIND.

No other mobile two meter transceiver delivers like the DR-110T from Alinco.

Perhaps because it gives you a carload of features without putting a dent in your budget.

This little powerhouse has 45 watts. It also has 14 memories with standard

encode/decode subaudible tones. The DR-110T is CAP and MARS modifiable\* and comes with all the other features you'd expect to find on a complete mobile unit.

What's more, only Alinco offers a two year limited warranty.

So if you're looking for high performance in a mobile rig,

turn into your nearest Alinco dealer.

And hit the road with the DR-110T. The most impressive two meter on four wheels.

Call (213) 618-8616 for your nearest local dealer.



\*Permit required

# ALINCO

20705 South Western Ave., Ste. 104, Torrance, CA 90501



# FSTV-430

## Fast Scan Television Transceiver



The new FSTV-430 fast scan television transceiver from AEA makes getting on ATV easy and inexpensive. Almost any video camera (including camcorders with a video output jack) can be used. Plug the camera into the FSTV-430, and connect to your 70 cm antenna. Use a standard television for displaying received signals, and you're on the air. Of course, using an amplifier will add range to your signal.

AEA engineering standards of high performance are evident in this new transceiver. The FSTV-430 has a sensitive UHF GaAsfet preamp with a crystal controlled, or variable tuning, downconverter and IF filter. Output is available on channel 3 or 4 for signal recep-

tion. The transmitter in the FSTV-430 uses a VSB (Vestigial Side Band) design to minimize adjacent channel interference. Two frequencies can be selected for transmission (one 434 Mhz crystal is included). Signal output is one watt p.e.p..

Any amateur with a technician class (or higher) license can join the fun of ATV. The FSTV-430 can transmit in either black and white or color. The portable, lightweight FSTV-430 transceiver can be used for in station or on the go operation from any 12 VDC source. You can even connect your VCR for transmission of video tapes.

Contact your local AEA dealer today for more information about the AEA FSTV-430.

**Advanced Electronic Applications, Inc.**

P.O.Box C-2160  
Lynnwood, Washington 98036 USA  
206-775-7373

## Exhibitors

Portland Computer Accessories, Portland, OR  
Smiley Antenna Co. Inc. El Cajon, CA  
EPO Software, Vancouver, WA  
Advanced Electronic Applications, Lynnwood, WA  
Amateur Radio Supply, Seattle, WA  
Amateur Radio School, Fullerton, CA  
Antenna Systems Inc. Tigard, OR  
C-COM, Seattle, WA  
Curley's Engraving, Portland, OR  
H. Stewart Designs, Oregon City, OR  
Hats For Hams, Pomona, CA  
IC Systems Northwest, Salem, OR  
ICOM of America, Bellevue, WA  
Portland Amateur Radio Club, Portland, OR  
Judy's Jewelry, Springfield, OR  
Multi-Band Antennas, Canoga Park, CA  
N7CTY Ham Programs, Cornelius, OR  
Nuts & Volts, Placentia, CA  
Orlando's Electronics, Tangent, OR  
Portland Radio Supply, Portland, OR  
Quarter Century Wireless Assn. Eugene, OR  
R&J Fail Enterprises, Riverside, CA  
The DX Magazine, Fulton, CA  
U.S. Army MARS, Portland, OR  
Young Ladies Radio League, Portland, OR  
American Radio Relay League, Newington, CT  
City Of Roses 10-10 International, Portland, OR  
Reno Radio, Reno, NV  
Larsen Electronics, Vancouver, WA  
Oregon Tualatin Valley Amateur Radio Club, Beaverton, OR  
Mr. Nicad, Sauk City, WI  
Alinco Electronics, Torrance, CA  
AMSAT, Seattle, WA  
Celwave/Rohn, West Linn, OR  
Gene Hansen Co., Corrales, NM  
William M. Nye Company, Bellevue, WA  
St. Helens Electronics, St. Helens, OR  
RLD Research, McCloud, CA  
Value Software, Portland, OR  
Falcon Communications, Newport, CA  
Sunset Empire Amateur Radio Club, Astoria, OR

**NOTE:** Due to publication deadlines, we apologize if any of our exhibitors are not included in the above listing.



**Ham has joined the  
Nationwide Team**



**HAM RADIO OUTLET**  
LARGEST HAM OUTLET

**LARGEST HAM OUTLET IN THE WORLD**

**NOW**

9

## STORE BUYING POWER



**US**  
**TOWER**  
CORPORATION

# KENWOOD

concepts

**ALL MAJOR BRAND  
ACCESSORIES**

icom

**BULLETIN**

**BULLETIN** ege has  
joined the  
**HAM RADIO OUTLET  
NATIONWIDE TEAM**

**NOW LOCATED IN**  
**SALEM, NH**  
**WOODBIDGE, VA**

**GEOCHRON**  
GLOBAL  
TIME  
INDICATOR

...America's Best!

**TEN-TEC**



**Cushcraft**  
CORPORATION

**Advanced  
Electronic  
Applications**

YAESU



## All Major Brands in Stock Now!

**ANAHEIM, CA 92801**  
2620 W. La Palma  
(714) 761-3033, (213) 860-2040  
Between Disneyland &  
Knotts Berry Farm

**ATLANTA, GA 30340**  
6071 Buford Hwy.  
(404) 263-0700  
Larry, Mgr. WD4AGW  
Doraville, 1 mi. north of I-285

**BURLINGAME, CA 94010**  
999 Howard Ave.  
(415) 342-5757  
George, Mgr. WB6DSV  
5 miles south on 101 from SFO

**OAKLAND, CA 94606**  
2210 Livingston St.  
(415) 534-5757  
Rich, Mgr. WAGWYB  
IS-880 at 23rd Ave. Ramp

**PHOENIX, AZ 85015**  
1702 W. Camelback Rd.  
(602) 242-3515  
Bob K7RDH, Gary WB7SLY, Mgr.  
East of Hwy. 17

**SALEM, NH 03079**  
224 N. Broadway  
(603) 898-3750 1-800-444-0047  
Curtis, Mgr. WB4KZL  
28 miles north of Boston exit 1 I-95

**SAN DIEGO, CA 92123**  
5375 Kearny Villa Rd.  
(619) 560-4900  
Tom, Mgr. KM6K  
Hwy. 163 & Claremont Mesa Blvd

**WOODBIDGE, VA 22191**  
14803 Build America Drive  
(703) 643-1063 1-800-444-4799  
John, Mgr. WB4GJZ  
Exit 54, I-95 South to US RT 1

**VAN NUYS, CA 91411**  
6265 Sepulveda Blvd.  
(818) 988-2212  
Al. Mgr. KBYRA  
San Diego Fwy. at Victory Blvd

**FREE SHIPMENT**  
Most items over \$100  
UPS surface

**CALL TOLL FREE**  
IN CALIFORNIA CALL STORE NEAREST YOU

**MID-WEST/WEST**  
ANAHEIM, 9 to 5:30 PST  
**1-800-854-6040**

**SOUTHEAST**  
ATLANTA, 9 to 5:30 EST  
**1-800-444-7927**

**MID-ATLANTIC**  
WOODBIDGE, 9 to 5:30 EST  
**1.800.444.4799**

**NEW ENGLAND**  
SALEM, 9 to 5:30 EST  
**1-800-444-0047**



Toll free including Hawaii. Phone Hrs: 7:00 am to 5:30 p.m. Pacific Time. California, Arizona and Georgia customers call or visit nearest store. California, Arizona, Georgia and Virginia residents please add sales tax. Prices, specifications, descriptions subject to change without notice.



# PRIZE DRAWING INFORMATION

## **GRAND PRIZE DRAWING**

*Need Not Be Present To Win*

ICOM IC-735 HF Txcvr.  
KENWOOD TM-221A 2m. Mobile  
AEA 10 METER Handy DX Talkie  
AEA PAKRATT PK-232 TNC  
ICOM u2-AT 2m. HT  
**KENWOOD TH25-AT 2m. HT**  
LARSEN Mobile Antenna of your Choice  
(2 Awarded)

## **SPECIAL "IRS" PRIZES**

*(all 3 awarded)*

ASTRON RS20 Power Supply  
BEARCAT BC 50XL Scanner  
FLUKE 77 Multimeter

## **BANQUET PRIZE**

**Maximum Wind Speed and Direction Indicator**

(6 Inch Brass Meter, 5 Year Warranty & Mounting Hardware)

## **Hourly Drawings**

Winning numbers will be posted on the stage as well as in the lobby. The numbers will remain posted for two hours to enable those of you attending seminars the time to see if luck is with you. Prizes not claimed after two hours will be redrawn later. Winners, please collect your prizes in the Prize Room. The hourly prizes are donated at no cost to the convention. Please, express your personal thank you to the commercial exhibitors as you visit their booths.

## **Special "IRS" Prizes**

*"I Registered Speedy"*

The "IRS" prizes are a courtesy in appreciation to those who have registered by April 15, 1989. Quite a large amount of money is required, early on, to pay the advertising printing and postage costs. Early registrants are benefactors to any event of this kind and a reward is fitting. Good luck to those who can say "I Registered Speedy."

## **Banquet Prize**

These prizes are available to those who attend and pay for the dinner. The drawing is a special incentive provided by the convention. It is a fitting finale to an entertaining evening.

## **Grand Prize Drawing**

You need not be present to win! If you are a winner, your prize will be shipped to you. We will attempt to keep the drawing time to one hour. These prizes are purchased at or below cost, from the dealers and manufacturers. We take this opportunity to express our appreciation.

# **GOOD LUCK TO YOU ALL!!**

## **Contributors**

E. E. Van Valkenberg, Banquet Speaker  
Jim Walsh, W7LVN, QCWA Secretary  
Doc McLendon, W7GWC  
Randy Stimson, KZ7T, Oregon Section Mgr.  
Greg Milnes, W7AGQ, Banquet M.C.  
BS Typo-Graphics, Portland  
Canyon Printing, Beaverton  
Seaside School District, Seaside  
Seaside Safeway, Seaside  
Seaside Elks Lodge, Seaside  
Seaside Chamber of Commerce, Seaside  
Arnie Schumacher, Graphic Artist, Logo Design  
Ron Mayer, K7BT, Printing

## **Seminar Speakers**

Mark Allen, ICOM  
Ernie Austin, W7AXJ  
James Boland, W7GUR  
Dr. Alan Chandler, K6RFK  
Jeff Damm, WA7MLH  
Russ Dedrickson, WA3FBU  
Bob Dorman, KV7F  
Mike Dunlop, K7YMU  
Ken Glanzer, K7GCO  
Tom Hill, WA3RMX  
Joseph Holman, KA7LDN  
Ken Kopp, K0PP  
Roy Lewallen, W7EL  
Doug McMurdo, W7XI  
Sandy Mikalow, K7OOZ  
The Hon. Greg Milnes, W7AGQ  
Charles Northcutt, W7SRZ  
Dave Phemister, WB7ESV  
Jan Smith, KB6WJZ  
Mark Walker, W7CLU

John White K7RUN

## REGISTRATION BADGES

Since all committee members are required to register, we also ask that everyone in attendance be registered. Please wear your registration badge while in the convention center. By doing so, you can help us avoid embarrassing situations at the entrance. Lost or forgotten badges are a source of grief to us and, worse, to you. We would like to see no problems and, quite surely, neither would you. Thanks in advance, for your cooperation!

## WHO'S IN CHARGE?

If you have a question or a problem, look for one of the SEA•PAC committee members wearing the bright yellow SEA•PAC buttons. Remember, we are all volunteers. So, be patient with us and we will be glad to help you.

## PRIZE DONORS

Amateur Radio Supply  
B&B Instruments  
Curley's Engraving  
EPO Software  
H. Stewart Designs  
Hats For Hams  
Judy's Jewelry  
Larsen Electronics  
Multi-Band Antennas  
N7CTY Ham Programs  
Orlando's Electronics  
Portland Computer Accessories  
Portland Radio Supply  
R&J Fail Enterprises  
Smiley Antenna  
The DX Magazine  
Wes Allen, K7WWG  
World Radio

## THANK YOU TO ALL WHO DONATED PRIZES!!!

**NOTE:** All registrants, including convention sponsors, are eligible for prize drawings and/or contest awards.

**NOTE:** Due to publication deadlines, we apologize if there are any prize donors not included in the above listing.





## Lewis & Clark Trail Run Public Service At Its Best!

AL7V  
HK3JAL  
K1IIF  
K7CKK  
K7CLL  
K7MGD  
K7RAO  
K7ZLN  
KA6INC  
KA7ADO  
KA7CKH  
KA7CRN

KA7CRO  
KA7EGW  
KA7FAJ  
KA7GJT  
KA7IAY  
KA7ICV  
KA7ILY  
KA7JNU  
KA7KAX  
KA7KGL  
KA7KUG  
KA7KZJ  
KA7LCB  
KA7LJQ  
KA7RMR  
KA7SLA  
KA7TIA  
KA7TJG  
KA7VHL  
KA7WXY

KA7YTH  
KA7ZXD  
KB7ATN  
KB7AYY  
KB7AZZ  
KB7BAA  
KB7BAB  
KB7CJU  
KB7ETA  
KB7FIA  
KB7FMR  
KB7FTD  
KB7FUL  
KB7WA  
KD7EH  
KE7JA  
KE7PB  
KF7AO  
KF7RM  
KN7L

KU7M  
N3EG  
N4JLF  
N7CEN  
N7CLQ  
N7DWD  
N7ELK  
N7GIG  
N7GQB  
N7GSJ  
N7GWD  
N7HGX  
N7HHU  
N7HXS  
N7HXT  
N7IPM  
N7JHN  
N7JQD  
N7KGA  
N7KGY

N7KXX  
N7LDZ  
N7MDB  
NB7M  
NK7E  
NM7N  
NO7L  
NU7C  
NU7D  
W1PRT  
W7ACC  
W7BGH  
W7CCV  
W7CHI  
W7DLB  
W7FHW  
W7FMJ  
W7GYH  
W7GZN  
W7HDT

W7JHK  
W7LKR  
W7OBR  
WA5ZAY  
WA7CBX  
WA7CGO  
WA7E  
WA7HWD  
WA7TFQ  
WA7WEZ  
WA7YRC  
WA7ZMR  
WB5AVH  
WB7DTM  
WB7DTO  
WB7FFQ  
WB7NAU  
WB7NDY  
WB7PEI  
WB7QEU  
WB7SOF  
WB7UEU  
W17R  
WM7G

*From all of the Runners,  
Thank You!!!!*

### DO NOT READ THIS:

Unless you really want a small, potent two-element beam with lots of rejection where needed.

### DO NOT BUY THE II-DX ANTENNA!!

if you are the sort that chickens out readily. Unless, that is, you are willing and able to follow detailed, assembly/tuning instructions.

### AND DON'T TRY TO TUNE THE II-DX ANTENNA!!!

the way you would a yagi or quad beam.

The II-DX is a whole new ballgame. Two full-wave-loop elements, close-spaced and reshaped like -- well, reshaped! Broad-banded and needing no radials, no ground, no transformer balun (A choke coil or 1:1 current balun is necessary to cancel antenna currents on the line).

The II-DX demands adherence to a whole new set of tuning concepts and procedures, and rewards those who adhere in proportion to their performance.

### IT'S NOT FOR EVERYONE!

Here are some examples of what we're saying:

- \* Eight tuning adjustment points, plus radiator length, on each element.
- \* Coupling distance between end loops also adjusts, and must be correct!
- \* Dimensions (horizontal polarization): length about  $1/4 \lambda$ , width about  $1/8 \lambda$ , depth about  $1/10 \lambda$ , turning radius  $3/20 \lambda$ . Compact!
- \* Gamma match permits direct feed with 50-ohm coax.
- \* Gain equal to a 2-element quad.
- \* Rejection about 20 dB in each of two nulls about  $130^\circ$  back of heading.
- \* F/B ratio about 12 dB.
- \* Usable 2:1 SWR bandwidth, about 4% of "F".

You can see those results if you're willing and able to do your part. If you think you would be, see us at SEA-PAC, or write to:

H. STEWART DESIGNS, P.O. Box 643, OREGON CITY, OR 97045

# MAIL ORDER

**Save Money**

**JUN'S**

**ELECTRONICS**

**1-800-882-1343**



**KENWOOD**

**(213) 390-8003**

**3919 Sepulveda Blvd.  
Culver City, CA 90230**

# 1927-1989 HENRY RADIO... 62 years of dedication to the best of amateur equipment... still a leader in amateur radio

There are a lot of good reasons. We know that we have provided the kind of equipment and service that thousands of amateurs have come to expect. They keep coming back. We'll do our best to see to it that they, and you, have every reason for coming back.

- \*A large inventory of fine equipment from the world's leading manufacturers.
- \*A knowledgeable staff dedicated to amateur radio.
- \*A complete line of accessories.
- \*A well stocked repair shop staffed by experienced technicians.
- \*We take trade-ins and sell used equipment.
- \*Generous discounts on cash purchases.
- \*We carry our own financing.

Some of the names we stock include:

HENRY • TEMPO • KENWOOD • ICOM • YAESU • ADVANCED  
RECEIVER RESEARCH • AEA • ALINCO • AMECO • AMPHENOL •  
ANTRONIC • AOR • ARRL • ASTRON • B&W • BEARCAT • BECKMAN •  
BENCHER • BIRD • BUTTERNUT • CES • CENTURIAN • COMM SPEC •  
CONNECT SYSTEMS • CREATE • CUSHCRAFT • DAIWA • DIGIMAX •  
DOWKEY • EIMAC • FANON • GRUNDIG • HAL • HEIL • HUSTLER •  
HY GAIN • KANTRONICS • LANDWEHR • LARSEN • MFJ • MICRO  
CONTROL SPECIALTIES • MIRAGE/KLM • NYE • PALOMAR • PIPO •  
SANGHAN • SIMPSON • SONY • SWITCHCRAFT • TECHNICAL BOOKS  
• TRAC • TRIEX • TRIPPLITE • TUBES • TX/RX • UNADILLA  
• VIBROPLEX • WIRE/COAX

## Henry Radio

Toll free order number: (800) 877-7979  
TELEX: 67-3625(Henradio) FAX (213) 826-7790  
2050 S. BUNDY DR. LOS ANGELES, CA 90025





## THINGS TO SEE & DO

**Astor Column,** Astoria

**Columbia Lightship.** Moored at the Coast Guard Pier at the foot of 16th, Astoria

**Maritime Museum.** 17th & Marine Dr., Astoria

**Fort Astoria.** 15th & Exchange, Astoria.

**Astoria Bridge.** A part of Hwy. 101. Joins Washington & Oregon.

**Battery Russell,** Fort Stevens State Park

**Peter Iredale,** Fort Stevens State Park

**Fort Clatsop.** Tour replica of Fort, museum, movie and ranger demonstration.

**Salt Cairn.** Lewis & Clark Way, Seaside

**Seaside Aquarium.** 2nd Ave. & Promenade, Seaside.

**Turnaround.** End of Lewis & Clark Trail, Broadway & Promenade, Seaside

**Restored Merry-go-round.** Town Center Mall, Seaside.

**Tillamook Rock Lighthouse.** Island off Tillamook Head, Best viewed from the point at Ecola State Park, Cannon Beach.

**Haystack Rock.** Third largest monolith, Cannon Beach

**Ecola State Park.** Beautiful 'postcard' ocean view, Cannon Beach

**Oswald West State Park & Short Sand Beach.** Hwy. 101 South.

**Nehalem Winery.** Hwy 101 South.

**Tillamook Cheese Factory,** Tillamook

**Tillamook Museum,** Tillamook

*For more things to do and see in the area and current community activities, visit the Seaside Chamber of Commerce Information Center at 7 North Roosevelt Street (on the corner of Hwy. 101 & Broadway).*

# **Amateur Radio School KB6MT**

## **Video / Audio**

### **Video Education Theory Courses**

**Novice Video :**

**Technician Video :**

**General Video :**

**All courses consist of  
2 each 2hour VHS  
video cassettes and  
one C90 audio  
cassette and manual.**

**For the theory portion of  
your test, a picture really  
is worth a thousand words**

**Very inexpensive courses,  
see us at the  
Amateur Radio School  
KB6MT booth !.**

**Audio Education  
Theory Courses  
Learn Your Theory  
while jogging or driving !**

**Novice Theory  
Technician Theory  
General Theory  
Advanced Theory  
Extra Theory  
These courses consist  
of 5 each C90 audio  
cassettes and manual.  
Learn very detailed  
theory behind every  
question and answer on  
your test.**

**High Speed Code.  
Novice to Extra with  
ONE course. !!!  
Learn Code in your car  
driving to and from work.**



*Co-Chairmen:*

Randy Stimson, KZ7T  
Jim Schaeffer, KB7ADH

*Treasurer:*

Susan Benson, N7EPE

*Registration:*

Lorna Campbell, KA7RFD

*Seminars & Ladies Program:*

Hanford Van Ness, KE7BB

*Prizes & Exhibit Setup:*

Ken Gilbert, WR7D

*Flea Market & Security:*

Mark Cattell, N7CRQ

*Consultant:*

Al Berg, WB7SIC

## CONVENTION COMMITTEES

*Exhibitors*

Randy Stimson, KZ7T  
Al Berg, WB7SIC  
Phil Weaver, KB7DLZ  
Ken Hart, N7JAS  
Bobbi Antons

*Ladies' Program*

Peggy Till, KB7FLZ  
Bobbie Mohr, KB7DME  
Katy Lapay, N7GCL  
Pat Griffiths, KA7UFG

*Exhibitor Set-Up*

Wes Allen, K7WWG  
Dave Nelson, WB7REC  
George Dover, WA7CUJ  
Mike Boyd, N7DKQ  
Neil McKie, WA6KLA  
Kent Cooper, KA7YFY  
Darwin Durr, K7PSD  
Arnie Chase, WA7CRI  
John Koenig, NB7W

*Seminars*

Hanford Van Ness, KE7BB  
Jim Bernklau, W7JOI  
Bill Winton, N7GRO  
Stan Griffiths, W7NI

*Security*

Mark Cattell, N7CRQ

*VE Testing*

Randy Cobb, WN7W

*Banquet MC*

Greg Milnes, W7AGQ

*Printing & Advertising*

Jim Schaeffer, KB7ADH  
Ron Mayer, K7BT  
Bradley Beach, KA7JLD  
H. Lea T. Ball, AL7W

*Prizes*

Ken Gilbert, WR7D  
Rick Schouweiler, KA5OLH  
Ed Franson, KA7TCX  
Steven Stewart, WA7ZCL  
Ray Kato, NO7X  
Leonard Thompson, KA7IOB  
Wally Boleen, KC7TB  
Jim Graffy, AE7W

*Signs*

Bud Butterfield, KC7PS

*Casino Night*

Ray Deeth, K7VDQ  
Don Branda N7DDK  
Wally Boleen, KC7TB

*Registration*

Lorna Campbell, KA7RFD  
Val Cattell, N7JWA  
Jeff Freedman, K7JF  
Maria-Elena Gilbert  
Val Roehl, KA7QEV  
Joan Schouweiler, N7LMK  
Sam Senior, N7KJN  
Ron Troudt, K7TGD  
Rose Troudt

*Flea Market*

Jack Smithson, KA7HOJ



# **The Oregon Tualatin Valley Amateur Radio Club**

would like to take this opportunity to thank the many hard working individuals who have helped make SEA•PAC a success.

A special thanks to all of the clubs in the Pacific Northwest that were of great help in advertising the convention.

We are deeply grateful to our many exhibitors for showing us their products. Without them, this would not have been a successful convention.

*See You Next Year!!!!*

**73 & 88's**

Jim Schaeffer, KB7ADH

Randy Stimson, KZ7T

***Have A Safe Trip Home!***

---

*Tillamook Emergency Amateur Radio Service (TEARS)  
Presents:*

## **1989 Tillamook County Amateur Radio Swap Meet**

Saturday, September 23, 9:00 a.m.- 3:00 p.m.

Exhibitors set-up 7:00 - 9:00 a.m.

Tillamook County Fairgrounds, Tillamook, Oregon.

This is a benefit for the Tillamook County Emergency Operations Center.

Admission \$2.00 at the door. Swap tables \$3.50.

Free Parking and Grand Prize.

Food, Drinks and Overnight Parking also available.

Talk-in 147.220 (+600 kHz.) Mt. Hebo Repeater.

For information, contact N7DVF, Bill Collins (503) 842-6564 or 842-6235.

# OUR COMPLETE LINE OF PORTABLE POWER TOOLS.



When you're talking Yaesu handhelds, power takes on many meanings.

Like maximum RF output. Sophisticated microprocessor control. Deceptively simple operation. Even cost savings—as most accessories are interchangeable throughout the line.

Added up, it's no wonder amateurs choose Yaesu HTs more than any others.

## FT-470. DUAL-BAND OPERATION PERFECTED.

2 meter and 430-450 MHz. 42 memories. Simultaneous receive of both bands. Dual VFOs each band. PL encode/decode. Paging feature. DTMF autodialer (10 memories, 15 digits each). Auto repeater shift. Scanning features. Auto power-off. Battery saver. Extended receive. Audible command verification. Keypad and rotary-dial frequency entry. Battery packs available from 2.3 to 5 watts. More.

## FT-411 SERIES. MAXIMUM SINGLEBAND PERFORMANCE.

2-meter FT-411 and 440-MHz FT-811. 49 memories. Dual VFOs. PL encode/decode.

DTMF autodialer (10 memories, 15 digits each). Auto repeater shift. Scanning features. Auto power-off. Battery saver. Extended receive. Audible command verification. Keypad and rotary-dial frequency entry. Many battery packs available, from 2.3 to 5 watts. More.



## FT-23R SERIES. SMALL, SMART, RUGGED.

2-meter FT-23R, 220-MHz FT-33R, and 440-MHz FT-73R. 10 memories (7 store odd splits). Memory scan at 2 frequencies per second. High/low power switch. LCD power output and "S"-meter display. Many PL features. Auto-battery saver. Aluminum-alloy case. Water-resistant seals. Many battery packs available, from 2 to 5 watts. More.

Want more information? Call **(800) 999-2070** toll-free. Or ask your dealer about Yaesu's FT-470, FT-411 and FT-23R Series handhelds. The power in handheld performance.



**YAESU USA** 17210 Edwards Road, Cerritos, CA 90701 (213) 404-2700. **REPAIR SERVICE:** (213) 404-4884. **PARTS:** (213) 404-4847

# YAESU

Prices and specifications subject to change without notice. PL is a registered trademark of Motorola, Inc. Specifications guaranteed only within amateur bands.



# KENWOOD

...pacesetter in Amateur Radio

All New  
Compact  
HF!

## “DX-citing!”

### TS-440S Compact high performance HF transceiver with general coverage receiver

**Kenwood's advanced digital know-how brings Amateurs world-wide “big-rig” performance in a compact package. We call it “Digital DX-citement”—that special feeling you get every time you turn the power on!**

- **Covers All Amateur bands**  
General coverage receiver tunes from 100 kHz—30 MHz. Easily modified for HF MARS operation.
- **Direct keyboard entry of frequency**
- **All modes built-in** USB, LSB, CW, AM, FM, and AFSK. Mode selection is verified in Morse Code.
- **Built-in automatic antenna tuner (optional)**  
Covers 80-10 meters.
- **VS-1 voice synthesizer (optional)**
- **Adjustable dial torque**

- **Superior receiver dynamic range**  
Kenwood DynaMix™ high sensitivity direct mixing system ensures true 102 dB receiver dynamic range. (500 Hz bandwidth on 20 m)
- **100% duty cycle transmitter**  
RF input power is rated at 200 W PEP on SSB, 200 W DC on CW, AFSK, FM, and 110 W DC AM. (PS-50 power supply required for continuous duty.)

- **100 memory channels**  
Frequency and mode may be stored in 10 groups of 10 channels each. Split frequencies may be stored in 10 channels for repeater operation.
- **TU-8 CTCSS unit (optional)**
- **Superb interference reduction**  
IF shift, tuneable notch filter, noise blanker, all-mode squelch, RF attenuator, RIT/XIT.
- **MC-43S UP/DOWN mic. included**
- **Computer interface port**
- **5 IF filter functions**
- **Dual SSB IF filtering**  
A built-in SSB filter is standard. When an optional SSB filter (YK-88S or YK-88SN) is installed, dual filtering is provided.
- **VOX, full or semi break-in CW; AMTOR compatible.**



#### Optional accessories:

- AT-440 internal auto. antenna tuner (80 m—10 m)
- AT-250 external auto. tuner (160 m—10 m)
- AT-130 compact mobile antenna tuner (160 m—10 m)
- IF-232C/IC-10 level translator and modem IC kit
- PS-50 heavy duty power supply
- PS-430/PS-30 DC power supply
- SP-430 external speaker
- MB-430 mobile mounting bracket
- YK-88C/88CN 500 Hz/270 Hz CW filters
- YK-88S-88SN 2.4 kHz/1.8 kHz SSB filters
- MC-60A/80/85 desk microphones
- MC-55 (8P) mobile microphone
- HS-4/5/6/7 headphones
- SP-41/50 mobile

- speakers
- MA-5/VP-1 HF 5 band mobile helical antenna and bumper mount
- TL-922A 2 kw PEP linear amplifier
- SM-220 station monitor (no pan display)
- VS-1 voice synthesizer

- TU-8 CTCSS tone unit
- PG-2C extra DC cable.



**Kenwood takes you from HF to OSCAR!**

## KENWOOD

KENWOOD U.S.A. CORPORATION  
2201 E. Dominguez St., Long Beach, CA 90810  
P.O. Box 22745, Long Beach, CA 90801-5745

Complete service manuals are available for all Kenwood transceivers and most accessories. Specifications and prices are subject to change without notice or obligation.