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**OCRACES
Online Meeting
on Zoom:
Monday,
January 4, 2021,
at 7:30 PM**



Newsletter of the County of Orange Radio Amateur Civil Emergency Service

Captain's Corner

by RACES Captain Ken Bourne, W6HK, Chief Radio Officer

Close-in Dynamic Range

According to Wikipedia, *dynamic range* is the ratio between the largest and smallest values that a certain quantity can assume. It is often used in the context of signals, like sound and light. But what is *close-in dynamic range*, and why are some hams eager to pay an “arm and a leg” for a transceiver that has a receiver with a close-in (narrow-spaced) dynamic range rating that is superior to other transceivers?

When choosing which new transceiver to purchase, many hams will first check the receiver test data on the Sherwood Engineering website at <http://www.sherweng.com/table.html> to see which radio is at or near the top of the list. The list is sorted by third-order dynamic range narrow spaced or ARRL RMDR (reciprocal mixing dynamic range if phase noise limited).

In the description of its IC-7610 SDR/direct-sampling transceiver, Icom provides a clear explanation of RMDR. Reciprocal mixing occurs when a strong out-of-band interferer mixes with the phase noise of the receiver's local oscillator to “throw” noise into the detection passband. RMDR is a receiver measurement, defined as the difference in the amount of power, in dB, by an interfering signal required to raise the receiver's noise output by 3 dB, and the receiver's noise floor (MDS). The higher the RMDR, the less impact a strong signal will have over the receiver's capability of hearing a weak signal. In simpler terms, the higher the RMDR specification, the better the receiver's ability to “hear” weak sig-

nals with a “loud” station 2 kHz away (based on a 2-kHz specification).

Bob Sherwood states that spurious free dynamic range measures how the radio can handle strong undesired signals at the same time as a weak desired signal, without overload. When a radio overloads, it generates spurious signals.

Sherwood defines dynamic range as the level in dB when two strong test signals make distortion in the radio equal to the noise floor. The radio thus can handle that range of signals before the strong signals just start to overload the radio.

Dynamic range was originally tested at 20-kHz spacing. As multiple-conversion radios became popular, 20-kHz testing was inadequate, especially considering that strong interference is often much closer than 20 kHz. Consequently, Sherwood began testing at 2-kHz spacing. He was testing a Drake R-4C receiver at that time. The 20-kHz dynamic range was over 80 dB, but the 2-kHz dynamic range was less than 60 dB. The roofing filter of the R-4C was 8 kHz wide, and many signals in a CW contest overloaded the receiver. He installed a 600-Hz roofing filter and the problem went away, with the 2-kHz dynamic range equal to that of the 20-kHz dynamic range.

After modifying his R-4C, Sherwood noted that manufacturers were beginning to notice the advantage of down conversion to improve close-in dynamic range. Ten-Tec introduced its Orion transceiver, with a 9 MHz first IF (instead of 40 to 70 MHz) and offered a narrow CW roofing filter like he

Captain's Corner *Continued from page 1*

had added to the Drake receiver. Later the Elecraft K3 came along, followed by Yaesu and Kenwood with down-conversion radios with a low-frequency first IF. (We notice the dynamic range advantages in the Elecraft K3 that is in the HF station at the Orange County EOC RACES Room.)

When choosing a new HF transceiver based on close-in dynamic range, Sherwood says you want a number of at least 70 dB for SSB and at least 80 dB for CW. Better yet, with a 10-dB safety factor, 80 dB would be nice for SSB and 90 dB for CW.

The latest SDR/direct-sampling transceivers do not have down conversion (or any conversion) as in a transceiver with a superheterodyne receiver. An SDR offers features not available in a superheterodyne radio, but close-in dynamic range is not quite as good. Consequently, some manufacturers offer a hybrid transceiver that is a combination of SDR and superheterodyne, or has an optional superheterodyne receiver module. For example, the new Elecraft K4 SDR transceiver will be offered in various versions—the basic K4 with wide-range dual receive, the K4D with diversity receive, and the K4HD with a dual superhet module for exceptional dynamic range.

I am sometimes asked if you can hear any difference in an SDR transceiver after adding a superhet module. In most circumstances, you won't hear a difference. It's what you *don't* want to hear that makes the difference! If you have a neighbor ham with a strong signal on a nearby frequency, you might notice him (in the wrong way!) if you are using an SDR-only transceiver. But if you have a down-conversion superhet receiver with superior dynamic range, you might be able to copy a weak signal in the presence of your neighbor's nearby strong signal. The same goes for crowded band conditions such as competitive Field Day, contesting, and DXpedition chasing. In the Elecraft K4HD, each superhet receive section includes two crystal filters (one SSB/data bandwidth, one CW bandwidth). The superhet's 8-MHz IF has excellent dynamic range, so additional crystal filters are not required.

The Elecraft K3 (strictly a superhet, not an SDR radio), which we have at the EOC, is near the top of the Sherwood chart in narrow-spaced dynamic range, at 107 dB with a 200-Hz, 5-pole filter, or 104 dB with a 400-Hz, 8-pole filter. The newer K3S has 106 dB narrow-spaced dynamic range with either filter. Sherwood has not yet measured the K4 or K4HD.

Above the K3S on the Sherwood chart is the FlexRadio FLEX-6700, with a third-order dynamic range at 2 kHz spacing of 108 dB. Tests were made in 2014 with 20 dB preamp on, and 99 dB with preamp off. Otherwise,

dynamic range is independent of signal spacing. Tests in 2017 of a second 6700, and by the ARRL of a FLEX-6500, no longer measured a dynamic-range increase with the preamp on. Sherwood says the 108 dB value is no longer valid. 2 kHz dynamic range is 99 dB, same as the FLEX-6600M. FlexRadio claims 115 dB 2-kHz RMDR for the FLEX-6600M SDR. As with any radio, Sherwood advises to use a preamp only if it improves copy, and usually only on 15 meters and up.

At the top of the Sherwood Engineering list is the Yaesu FTdx101D, with a 2-kHz narrow-spaced (third-order intermodulation) dynamic range of 110 dB. Yaesu claims the RMDR reaches 123 dB or more. The narrow-band SDR receiver removes strong out-of-band signals by using a superheterodyne method, with narrow-band roofing filters. The first IF is 9 MHz, and a low-noise-figure dual-gate MOSFET, D-quad double balanced mixer (DBM) with excellent intermodulation characteristics is implemented in the mixer section. Narrow-band SDR configuration makes it possible to use the narrow-bandwidth crystal roofing filters that have a sharp shape factor. The wanted signals within the passband are converted to digital by a high-resolution 18-bit A/D converter and sent to a field-programmable gate array (FPGA) for signal processing. The direct-sampling SDR driving the real-time spectrum display with its large dynamic range enables the weakest signal to be observed on the display when it appears, and the narrow-band SDR enables that signal to be selected, filtered, and then decoded. The carrier-to-noise ratio (C/N) of the local-oscillator signal injected into the first mixer is an important factor in improving multi-signal receiver characteristics. The local circuit of the FTdx101 series uses a 400-MHz high-resolution direct digital synthesizer (HRDDS). This circuit configuration is different from a general phase-locked loop (PLL) that generates a local signal, and by creating a local signal by directly dividing from a high frequency of 400 MHz, the theoretical PLL lockup time becomes zero, and C/N deterioration by the lockup time does not occur. The significant improvement of the C/N characteristic by directly dividing the frequency contributes dramatically to reduce the noise in the entire receiver stage, and so improves the blocking dynamic range (BDR) close-in performance. The phase-noise characteristic of the local signal is -150 dBc/Hz or less at 2 kHz separation.

Blocking dynamic range (BDR) indicates how well the receiver handles strong nearby signals before desensitization occurs. BDR is referenced to the minimum detectable signal (MDS) and is the value of an input signal that causes the gain to drop 1 dB.

DSW and IC-705 at January 4th Zoom Meeting

OCSD Emergency Communications Coordinator Peter Jimenez, KI6UTE, will provide information on Disaster Service Worker (DSW) coverage at the next OCRACES meeting on Zoom on Monday, January 4, 2021, at 7:30 PM. He will also discuss upcoming changes in the RACES program, including a push for all members to become OCSD Professional Services Responders if they are not already PSRs or sworn Reserve Deputies. All OCRACES members would be sworn in for DSW coverage if they were PSRs. They would also be given a Reserve Tracker account for logging their hours. After taking three Criminal Justice Information Services courses and reading and signing the Electronics Communications Policy, OCRACES members as PSRs would have access to the network computers in the EOC RACES Room.

Under this new policy, an OCRACES applicant might go through the following process:

1. Attend PSR orientation
2. Start background check
3. Submit PSR application
4. Submit RACES application
5. Attend three OCRACES meetings
6. Complete background
7. Obtain PSR uniform
8. Complete DSW swear-in
9. Get Reserve Tracker account
10. Become OCRACES member

Peter will also announce that the June 2020 edition of the *Official RACES Guidebook* (“Yellow Book”) is finally off the press and available for pickup by OCRACES members and by a Chief Radio Officer or representative from each City RACES unit or MOU at the OCSD Technology Customer Service desk area, 840 N. Eckhoff Street, in Orange (north end of the building).

Also at this January 4th Zoom meeting at 7:30 PM, Tony Scalpi, N2VAJ, will talk about his exciting new Icom IC-705 all-band/all-mode portable SDR transceiver. This new transceiver is gaining in popularity. Randy Benicky, N6PRL, is another OCRACES member who recently purchased it. Several members of the San Bernardino Microwave Society are finding the IC-705 to be an excellent IF for their microwave transverters, especially for portable or field setups.

The meeting ID and password will be sent to the ocsd-races.groups.io mailing list for OCRACES members and city RACES and MOU officers, members, and coordinators. A separate mailing will go to OCRACES applicants and some who have not yet joined the mailing list. To join the list, go to <https://ocsd-races.groups.io/g/main> and click “+Apply for Membership in This Group.”

Joe Selikov, KB6EID, will once again be the Zoom meeting host. For security reasons, please use the latest version of Zoom, which currently is 5.4.7.

Nancee Graff, N6ZRB, Silent Key

With extremely deep sadness we report that Nancee Graff, N6ZRB, passed away on Monday morning, December 21, 2020, of complications from COVID-19.

Nancee had been a very dedicated and loyal member of County of Orange RACES for many years, until after she and her husband Jim Dorris, KC6RFC (also a dedicated and valued OCRACES member), moved to Jurupa Valley near Riverside.

Nancee and Jim used to participate in the aggressive OCRACES T-hunts that were held in the 1990s. Nancee was a member before Jim and brought him aboard. She met Jim on the 2-meter Catalina repeater in 1991. He upgraded to General in 1992 so he could stay in contact with Nancee during her DXpedition to the Caribbean. They married in 1994.

Nancee participated in most OCRACES exercises such as City/County RACES & MOU drills and Field Day, and activations such as primary election communications support. She helped to promote OCRACES at such events as the OC Fire Watch Open House at OCFA Headquarters and at the Orange County Fair ham radio booth. She hardly ever missed an OCRACES meeting.

We extend our sincere condolences to Jim and value his continued friendship to OCRACES members, as we treasure our fond memories of Nancee and the work she did for the success of our RACES unit.



Nancee Graff, N6ZRB.

COVID-19 Affects Ham Shopping

HRO and other ham radio stores are trying hard to service their customers during the pandemic, despite having to lock their doors and staying safe. Janet Margelli, KL7MF, and her sales crew at HRO in Anaheim provide curbside pickup outside their locked store and strive to service RACES members and all hams in Orange County. We look forward to when we can finally return to the “Candy Store” and view the many transceivers on display or pick up a much needed accessory in a hurry. Meanwhile, visit Ham Radio Outlet online at <https://www.hamradio.com>.

Ham radio retailer Universal Radio, headquartered in Worthington, Ohio, closed its store on November 30, 2020, although all existing orders will be filled, and the Universal Radio website at <https://www.universal-radio.com> will remain open to sell off “remaining stock, publications, and some select products.” Owners Fred Osterman, N8EKU, and Barbara Osterman, KC8VWI, are retiring. “I am very fortunate to have been in the radio business for over 50 years, 13 at RadioShack and 37 at Universal Radio,” Fred Osterman said in a message of gratitude to its patrons. “We have met many wonderful people along the journey who have supported me personally as well as Universal Radio. It has been a privilege to have a continuous career in the fascinating field of radio since 1969.” The new mailing address for Universal Radio is 752 N State St. Unit 222, Westerville, OH 43082, telephone (614) 866-4267. (This is not a storefront.)

RadioShack is back as an online retailer of electronics (<https://www.radioshack.com>), offering some parts in its inventory that largely consists of radios, batteries, telephone gear, drones, computer accessories, and even cameras. The iconic company was recently purchased from General Wireless by Retail Ecommerce Ventures (REV). No plans are in place to reopen RadioShack-owned stores, although some 400 brick-and-mortar outlets not affiliated with REV are operated by franchisees. REV, which specializes in online retail, has previously revamped the Internet presence of such bankrupt businesses as Pier 1 Imports and Dressbarn, according to a news release. During its heyday, RadioShack had some 8,000 retail outlets and once offered some amateur radio equipment, including some popular handheld transceivers and a 10-meter transceiver. RadioShack came out of its second bankruptcy in January 2018 with 400 dealers, an online retail presence, and a distribution center.

Storm Spotting and Amateur Radio

The third edition of *Storm Spotting and Amateur Radio* is now available from ARRL. Storm spotting gives amateur radio operators another way to use their skills as communicators. In an average year, the US experiences more than 10,000 severe thunderstorms, 5,000 floods, and more than 1,000 tornadoes, often causing hundreds of injuries and deaths, as well as billions of dollars in damages. During these weather events, thousands of ham volunteers provide real-time information to partners like emergency management and forecasters at the National Weather Service. The information they get from hams helps them issue weather watches, warnings, and advisories. Storm Spotting and Amateur Radio can help you become one of those volunteers, providing ground-truth information when it is needed most.

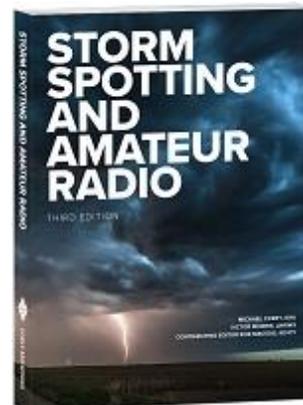
Featured Topics:

- Safety
- Equipment and Resources
- Training
- Meteorology
- Hurricanes
- Storm Spotter Activation

New in this Edition:

- Lessons learned and response reports from the 2017 hurricane season
- Apps and social media resources
- New SKYWARN training requirements
- Expanded information on digital voice modes such as DMR, D-STAR, and Yaesu Fusion.

The third edition of *Storm Spotting and Amateur Radio* is available from the ARRL Store or your ARRL Dealer. ARRL Item no. 1410, ISBN: 978-1-62595-135-9, \$22.95 retail, special ARRL Member Price \$19.95.) Call 860-594-0355 or, toll-free in the US, 888-277-5289. Also available in Amazon Kindle format.



New: RigExpert Stick Pro

The new RigExpert Stick Pro compact and lightweight antenna and cable analyzer generates its own 0.1-mW signal to measure and report data on SWR, return loss, complex impedance, magnitude, and phase angle. It can measure antenna systems, cables, filters, and more, across the frequency range of 100 kHz through 600 MHz, with a 100-point adjustable sweep width as narrow as 10 kHz. Frequency entry is with 1-kHz resolution. Every amateur band in the range is a pre-programmed selection or manually select any center frequency with any sweep width to be analyzed.

It provides measurement for 25, 50, 75, 100, 150, 200, 300, 450, and 600-ohm systems. SWR measurement range is 1 to 100 in numerical modes and 1 to 10 in chart modes. R and X range is 0...2000, -2000...2000.

Display modes include SWR, return loss, R, X, Z, L, C, magnitude, and phase angle at a single frequency, 100-point graphical SWR chart, Multé mode to check your multiband antenna properly, cable tools (velocity factor and cable length measurer, stub tuner, cable loss chart, cable impedance chart), and TDR (time domain reflectometer).

RF output through an N-type connector is a square signal, 0.1 to 600 MHz. Output power is -10 dBm (at 50-ohm load).

Power is provided by one 3.7 volt, 2800 mAh Li-Ion battery, type 18650. When the analyzer is connected to a PC or DC adapter with a USB socket, it takes power from these sources.

Interface is a 200×200 pixel color TFT display, 2×3 keys on the waterproof keypad, English menus and help screens, and USB connection to a personal computer. Bluetooth is v.4.2 BLE single-mode, Class B.

The RigExpert Stick Pro is available from HRO at \$399.95.



RigExpert
Stick Pro.

Online Ham Radio University: January 9th

With COVID-19 restrictions precluding an in-person gathering, the 22nd annual Ham Radio University (HRU) educational conference will be held as a virtual event on Saturday, January 9, 2021, from 8 AM to 4 PM EST (1300 – 2100 UTC) as a GoToWebinar online video conference.

Individual registration is now open for HRU's 14 informational presentations covering a broad range of amateur radio activities. Topics include amateur radio emergency communications; the basics of HF operating; communicating through amateur radio Earth satellites; remote station operating over the internet; software defined radios; HF and UHF digital communications; and using Raspberry Pi computers in amateur radio.

HRU 2021 will also serve as the online convention of the ARRL NYC-Long Island Section. Participation in HRU 2021 will be free, with a suggested donation of \$5. Advance registration is required for each presentation.

Details on the informational presentations may be found at <http://www.hamradiouniversity.org/forums>.



FCC Posts Email Address Reminder

The FCC is encouraging users of the Universal Licensing Service (ULS) to have an email address on file with the FCC.

“Applicants are strongly encouraged to provide an email address on their license application (s), which will trigger the electronic issuance of an official copy of their license(s) to the email provided upon application grant. Per the timing specified in Rulemaking FCC 20-126, the FCC will no longer print, and licensees will no longer be able to request, hard copy license authorizations sent by mail.”

The FCC has not yet established the date by which an email address will be required on all applications. ARRL VEC already has begun including email addresses on FCC applications for as many applicants as possible.



CA Notify Provides COVID-19 Exposure Alerts

You can add your cellphone to California's exposure notification system to get COVID-19 exposure alerts and to protect those around you. Once you activate CA Notify, it does all the work. All you do is keep your Bluetooth on. You will only receive alerts if you were in close contact with someone who tests positive for COVID-19. Your privacy is protected as your identity is not known and your location is not tracked.

Imagine that two people have Exposure Notifications turned on. If they come within six feet of each other for 15 minutes or more within a day, their phones will exchange keys (randomly generated, anonymous numbers) that log that close interaction.

If one person later tests positive for COVID-19 and agrees to share that information with CA Notify, then the other will receive an alert that they have been exposed. That notification will include instructions on who to contact and what to do next.

CA Notify does not gather your name, your contact information, your location or movements, or the identity of the people you meet.

iPhone users can enable CA Notify in their device's settings:

1. Update your iOS to version 12.5 or later (14.3 is the latest)
2. Go into Settings
3. Scroll down to Exposure Notifications
4. Select United States> California

Android users can download CA Notify on the Google Play Store.

How does CA Notify work?

CA Notify uses Bluetooth Low Energy (BLE) technology to exchange random codes with the phones of others who have opted in without revealing any information about the users. If another CA Notify user you've been near in the last two weeks tests positive for COVID-19 and adds their unique, anonymous verification code to the app, you'll get an anonymous notification that you have potentially been exposed. You will be referred to COVID-19 resources so you can quickly get the testing and care you need to prevent exposing others in your community.

How is my privacy protected?

The system never collects or shares any location data or personal information with Google, Apple, California Health and Human Services (CHHS), or other users. Participation is entirely voluntary. Users can opt in or out at any time. CA Notify is designed to protect user privacy and security—it does not collect device location to detect exposures and does not share your identity to other users. The random keys are exchanged using Bluetooth and are not linked to your identity or location. The keys will change every 15 minutes to protect you.

The identifiers exchanged with other phones and the keys shared with the system when you are positive are randomly generated numbers that don't contain any personally identifiable information. The identifiers exchanged with other phones are stored securely on your phone by the operating system in a way that no other software application can access them, nor do they ever leave the phone.

How quickly will I be notified if I have been exposed?

You will be notified once the COVID positive individual authorizes Exposure Notifications to send out an alert. How quickly you receive the notification will depend on when that person received a positive result and how quickly they consented to activate notifications. You can be notified of any exposure that happened within the last 14 days.

How does the system know if I have COVID-19?

Your positive test result will only result in Exposure Notifications if you consent to notify others. Even then, your personal information is not collected, stored, or shared by the exposure notification system.

If I test positive, will my identify be shared with others?

No. If you test positive, you will receive a verification code from the California Department of Public Health that allows you to activate the notification process. The code allows your phone to transmit your random keys to other CA Notify users. When you choose to activate this function, any phones that you were within 6 feet of for 15 minutes or more during your infectious period can receive a notice of a possible exposure. The notification will tell the other users the date of their exposure, but does not include information about location, time, or identity.

How long does CA Notify take to inform other users?

An exposure notification will be sent to your phone after your phone detects an exposure event based on a key/token match with someone who has reported positive in CA Notify. It takes less than a day to be notified if someone you've been exposed to submits their positive result in CA Notify. You can be notified of any exposure that happened within the last 14 days.

What happens when I get a notification?

If your phone has exchanged the randomly generated keys with the phone of someone who has reported a positive diagnosis, you will receive notification of possible exposure. This notification will include instructions on self-isolation and testing.

How will I receive a verification code if I test positive?

You will receive the code via text message from CDPH. The text from CDPH will come from 1-855-976-8462.

January 2021

Sun	Mon	Tue	Wed	Thu	Fri	Sat
					1 Happy New Year!	2 Weekly 60 m ACS Net
3	4 Weekly 2 m ACS Net & OCRACES Zoom Meeting	5	6	7	8	9 Southwest ACS Leadership Meeting Online
10	11 Weekly 2 m ACS Net	12	13	14	15 Orange County Amateur Radio Club Meeting--Zoom	16 Weekly 60 m ACS Net
17	18 Weekly 2 m ACS Net	19	20	21	22	23 Weekly 60 m ACS Net
24	25 ACS Net on 4 Bands	26	27	28	29	30 Weekly 60 m ACS Net
31						

Upcoming Events:

- **January 1:** New Year's Day
- **January 4:** OCRACES Meeting on Zoom, 1930 hours
- **January 9:** Southwest ACS Leadership Meeting Online, 1000 hours
- **January 15:** Orange County Amateur Radio Club Meeting on Zoom, 1900 hours



<https://ocraces.org>



Mission Statement

County of Orange RACES has made a commitment to provide all Public Safety departments in Orange County with the most efficient response possible to supplement emergency/disaster and routine Public Safety communications events and activities. We will provide the highest level of service using Amateur and Public Safety radio resources coupled with technology, teamwork, safety, and excellence. We will do so in an efficient, professional, and courteous manner, accepting accountability for all actions. We dedicate ourselves to working in partnership with the Public Safety community to professionally excel in the ability to provide emergency communications resources and services.

County of Orange RACES Frequencies

60 m: 5371.5 kHz USB (dial) (Channel 4) (OC ACS Net—Saturdays, 1000 hours)
 40 m: 7250 kHz LSB
 10 m: 29.640 MHz output, 29.540 MHz input, 107.2 Hz PL (out of service)
 6 m: 52.620 MHz output, 52.120 MHz input, 103.5 Hz PL
 2 m: 146.895 MHz output, 146.295 MHz input, 136.5 Hz PL*
 2 m: 146.595 MHz simplex
 1.25 m: 223.760 MHz output, 222.160 MHz input, 110.9 Hz PL
 70 cm: 446.000 MHz simplex
 70 cm: 448.320 MHz output, 443.320 MHz input, 141.3 Hz PL (private)
 70 cm: 449.100 MHz output, 444.100 MHz input, 110.9 Hz PL (private)
 70 cm: 449.180 MHz output, 444.180 MHz input, 107.2 Hz PL (private)
 70 cm: 449.680 MHz output, 444.680 MHz input, 131.8 Hz PL (private)
 23 cm: 1287.650 MHz, 1287.675 MHz, 1287.700 MHz, 1287.725 MHz, 1287.750 MHz, and 1287.775 MHz outputs, -12 MHz inputs, 88.5 Hz PL
 *Primary Net—Mondays, 1900 hours

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 Serving
 Orange County”**

**Visit Our Web Site
<https://ocraces.org>
 It's Where It's @!**

Questions or Comments?
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Meet Your County of Orange RACES Members!

Officers →



Ken Bourne W6HK Scott Byington KC6MMF Jack Barth AB6VC Ernest Fierheller KG6LXT Bob McFadden KK6CUS Tom Tracey KC6FIC



Randy Benicky N6PRL Ray Grimes N8RG Lee Kaser KK6VIV Walter Kroy KC6HAM Martin La Rocque N6NTH Don Mikami N6ELD Fran Needham KJ6UJS



Harvey Packard KM6BV Tony Scalpi N2VAJ Joe Selikov KB6EID Robert Stoffel KD6DAQ Ken Tucker WF6F Tom Wright KJ6SPE

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