



Newsletter of the County of Orange Radio Amateur Civil Emergency Service

CRO's Nest

by Ken Bourne, W6HK, OCRACES Chief Radio Officer

Multimeters

Every ham shack, go kit, and vehicle should have a multimeter for testing, troubleshooting, and experimenting. Prices range from below \$10 to over a thousand dollars, depending on your requirements.

Harbor Freight offers a 7-function digital multimeter for only \$6.99. It tests AC voltage, DC voltage, DC current, continuity, resistors, transistors, diodes, and batteries. It has an LCD display and automatic zero adjust. But at a slightly higher price (\$8.39), Amazon offers the WeePro850L digital multimeter with the same functions, plus an audible continuity detector, backlit LCD display, overload protection, low-battery indication, data hold, and insulated rubber case with a kickstand.

Some digital multimeters also measure capacitance and frequency (not RF).

Resolution can be an important parameter, depending on your application. It's the number of significant digits on the display. For example, it might be 3½, 4½, 6½, or 7½ digits. The whole number signifies how many digits are displayed (each from 0 to 9). The fraction, if it's ½, means the most significant digit for each range can be 0 or 1. If the fraction is ¼, the most significant digit for each range is greater than 1. A 3½ digit multimeter can display three complete digits (each from 0 to 9) and one (leftmost) ½ digit. Similarly, for 4½, 6½, and 7½ digit multimeter displays, complete 0 to 9 numbers are on four, six, or seven positions, respectively, and the leftmost position displays a 0 or 1.



HoldPeak HP-770D non-contact digital multimeter features auto ranging, hFE testing, DC/AC voltage and current testing, resistance, capacitance, and temperature measurement. It has auto back-light and 40000 counts display. It is available from Amazon at \$59.99.

Resolution is also specified in counts, such as 2000, 4000, or 6000 counts. A 3½ digit multimeter would display digits from 0000 to 1999 counts. Some multimeters do not have a restriction of 0 or 1 at the leftmost digit, but rather 0, 1, 2, or 3. In this case, a four-digit multimeter would have a 4000-count display, from 0000 to 3999 counts. If the multimeter display is 20000 counts, it would display digits from 00000 to 19999 counts and would be a 4½ digit multimeter. Counts indicate what the instrument can display before it changes to the next range. For example, in a 4½ dig-

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**Next
OCRACES
Meeting**

**OC EOC
Loma Ridge**

**Monday,
August 7, 2023
at 7:30 p.m.**

CRO's Nest *Continued from page 1*

it/20000 count meter, the range would change when the display hits 20000. A 20000 count meter can read 19.999 V on the display, but when it tries to display 20 V, it will show 020.00 V instead of simply 20.00 V. When the meter moves up to the next range, one digit of resolution is lost. Counts ignore decimal points and polarity signs.

Generally, a 2000 count (3½ digit) digital multimeter has a range of 200.0 mV, 2.000 V, 20.00 V, and 200.0 V. A 6000 count multimeter has a range of 600.0 mV, 6.000 V, 60.0 V, and 600.0 V. The count refers to the limit of the highest value the instrument will display for each range. When a measured value reaches this limit, the range will move up and the resolution will be downgraded by a factor of 10; that is, the decimal place will move to the right by one spot.

The accuracy of a 3½ digit multimeter is written as 0.15% + 2 digits, which means 0.15% of the indicated

value + 2 × resolution. For example, if the multimeter reads a calibrated 1.000 V source as 1.005 V and the resolution is 0.001 V, accuracy = $(0.15\% \times 1.005) + (2 \times 0.001) = 0.0035$ V.

A multimeter that measures frequency is not a radio-frequency counter. Rather, it measures in hertz, such as for checking whether the frequency of an AC power source is at 50 Hz or 60 Hz. Using its peak-detection circuit, the meter measures the time between two consecutive waveform peaks and calculates the frequency.

The main parts of a multimeter are the display (which can be digital or analog), mode selection knob, and test ports.

Two probes plug into two of the ports. COM signifies common and is commonly connected to ground or a negative potential of a circuit or battery. The mA VΩ (or similar label) port allows measurement of current (up to 250 mA), voltage, and resistance. Most multimeters have a special 10A port for measuring large DC currents (greater than 200 mA). The ports accept a banana type connector. Alligator-clip or hook adapters are handy for longer-term tests

Except perhaps for an ultra-cheap meter, most multimeters have overload protection. If you select a voltage setting that is too low for the voltage you are trying to measure, you will simply see a display of 1 or something similar. An auto-ranging meter costs a bit more, but eliminates the need for selecting the measurement range.

A multimeter can be used for testing AC sockets in your home, but it's dangerous! Use a non-contact AC tester instead, which is available at Home Depot, Walmart, Harbor Freight, Amazon, etc.

An auto-ranging meter is also handy for measuring resistance, to avoid a 1 or 0L display if the resistance is higher than the selected range.

Measuring current requires inter-



An analog meter is preferred for observing rapidly increasing/decreasing voltage and current levels. This Gardner Bender GMT-319 multimeter (\$25.99 at Amazon) measures seven functions with 19 ranges, including DC voltage, AC voltage, DC current, on a separate jack (fused), and resistance.

rupting the circuit and placing the meter in-line. If the DC current might exceed 200 mA, move the probe from the mA VΩ port to the 10A port. If you overload the current, you will probably need to replace a blown fuse in the meter. When you are done, return the probe to the mA VΩ port so you don't accidentally connect voltage to ground through the meter, when making a voltage measurement later. Also, switch the selection knob from current to voltage or, better yet, to OFF. Be sure not to switch accidentally to a current setting when measuring voltage.

Audible continuity testing will produce a tone if there is low resistance. It's handy for testing for shorts between SMD pins or for a short from VCC to ground when testing a circuit with the power off. ★



WeePro Vpro850L 2000 count digital multimeter, available from Amazon at \$8.39, measures AC and DC voltage, DC current, continuity, and resistance, and tests transistors, diodes, and batteries. Its LCD display is backlit.

Next OCRACES Meeting: August 7 at OC EOC

The next OCRACES meeting will be on Monday, August 7, 2023, at 7:30 p.m., at the Orange County

EOC at Loma Ridge, 2044 Santiago Canyon Road, Silverado. At this meeting, Robert Stoffel, KD6DAQ,

will give a hands-on training session on operating the Sheriff Department's 800-MHz Motorola HTs. ★

The History & Heritage of OC Communications

The History & Heritage of Orange County Communications is a fascinating and well-documented book written by Robert Stoffel, KD6DAQ, on how public-safety communications started and evolved in Orange County. The book begins with the year 1934, when the County of Orange began operating its Public Safety Coordinated Communications Systems for the County and its incorporated cities. At that time, AM radio station KGHX was placed on the air with one microphone and one voice in a one-way broadcast configuration. As technology advanced, two-way communications were introduced. From the beginning, any Law agency could communicate with any other Law agency, the same being true for Fire and, later, Lifeguards and Emergency Medical Services.

“Mutual Aid” within Orange County was a natural byproduct of the radio system. Since 2001, Orange County has had the highest level of interoperability possible, with all agencies operating on the 800-MHz Countywide Coordinated Communications System (CCCS).

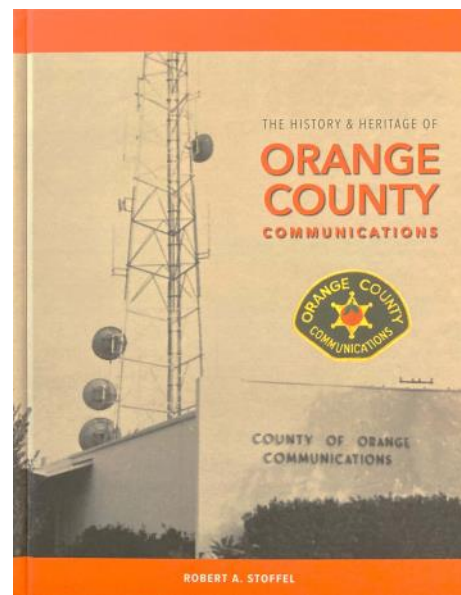
Coordinated public-safety communications have been a mainstay in Orange County since 1934. But it did-

n't just happen. In his book, Stoffel commends the many devoted Communications employees taking pride in their work, and the dynamic Communications leadership that put it all together, coupled with County-City cooperation, to maintain communications excellence over these many decades.

Amazing advancements have occurred from those early days, and this book provides a behind-the-scenes look at how it all started and how Orange County public-safety communications have evolved.

The book is loaded with historic photos of radios, consoles, antennas, systems, personnel, and events. Included is information on the evolution of RACES in Orange County.

The author, Robert Stoffel, KD6DAQ, joined the County of Orange in 1985 as an Extra-Help Communications Coordinator II at Control One. In November 1989, he was promoted to Chief of Operations, responsible for the management and operations of Control One. From July 1995 to February 2005, Robert served as the Emergency Communications Coordinator (including coordinating OCRACES) in the OCSD Communications Division. He was promoted to



Assistant Director in February 2005, and Director in May 2007 of the Communications & Technology Division, which now is the Technology Division. After 30 years of service to the County of Orange and its first responder agencies, he retired on April 1, 2016. He remains an OCRACES member and a PSR.

This beautiful 360-page hard-cover book is available for \$80 from the Orange County Sheriff's Museum & Education Center's website at <https://www.ocsheriffmuseum.com/shop>. ★

FCC Petitioned for High-Power HF Allocation

The ad hoc group “Shortwave Modernization Coalition” petitioned the Federal Communications Commission (FCC) to allow data communications on multiple bands within the HF 2-25 MHz range with up to 20 kW, including in bands immediately adjacent to spectrum allocated to the Amateur Radio Service. This group appears to represent high-speed stock trading interests. The FCC has

assigned it RM-11953. Comments were due by July 31, 2023, and reply comments by August 15. While the petitioners exclude the amateur bands, high power operations on immediately adjacent bands are proposed. ARRL—The National Association for Amateur Radio® is reviewing the petition. A copy of the petition is at: <https://www.fcc.gov/ecfs/document/1042840187330/1> (PDF). ★

U.S. Hunts Disrupting Chinese Malware

Some RACES members are reporting that their virus checkers are alerting them to possible malware infections in their software and firmware files associated with their Chinese-made radios and instruments. Should we be concerned about Chinese hackers? Is China posing a greater threat than just to our personal computers?

Well, the U.S. government is concerned, according to David E. Sanger and Julian E. Barnes, reporting in *The New York Times* on July 29, 2023. They revealed that the Biden administration is searching for malicious computer code that it believes China has hidden deep in networks controlling power grids, communications systems, and water supplies that feed military bases in the United States and worldwide, according to U.S. military, intelligence, and national security officials. The malware discovery has caused fears that Chinese hackers, possibly affiliated with the People's Liberation Army, have inserted code configured to disrupt U.S. military operations during a conflict.

One congressional official said the malware is a "ticking time bomb" that could enable China to interrupt or slow U.S. military deployments or resupply operations, by cutting off power, water, and communications to military bases. This same infrastructure attack could affect businesses and homes as well.

In late May 2023, Microsoft detected mysterious computer code in telecommunications systems in Guam, where there is a vast American air base, and elsewhere in the United States. That turned out to be a tiny example of the problem that Microsoft discovered through its networks.

During interviews over the past couple of months, more than a dozen U.S. officials and industry experts said (mostly anonymously) that the Chinese effort extends far beyond telecommunications systems and predates the May report by at least a year. They revealed that the U.S. government's effort to find and eradicate the code has been underway for quite some time. Apparently the Chinese effort is more widespread than initially realized, beyond the United States and American facilities abroad, but the full extent of the well-hidden code's presence in networks around the world is not known.

The New York Times article mentions that the discovery of the malware has initiated a series of Situation Room meetings in the White House during recent months, as senior officials from the National Security Council, the Pentagon, the Homeland Security Department, and the nation's spy agencies attempt to determine the scope of the problem and plan a response. Biden administration officials have begun to brief members of Congress, some state governors, and utility companies about the findings. They are debating whether the threat is aimed at disrupting mainly military operations, or if the Chinese also intend to disrupt civilian life in the event of a conflict. At this point, initial searches

for the malicious code are focusing first on areas with a high concentration of U.S. military bases.

The concern extends beyond just the Chinese threat to military bases, but also to threats from other sources and against other targets. Adam Hedge, acting spokesman for the National Security Council, said the administration is "working relentlessly to defend the United States from any disruptions to our critical infrastructure, including to coordinating interagency efforts to protect water systems, pipelines, rail and aviation systems, among others. The president has also mandated rigorous cybersecurity practices for the first time."

These cybersecurity practices refer to a series of executive orders, some motivated by concerns over SolarWinds, which is commercial software used widely by the U.S. government that was breached by a Russian surveillance operation, and the ransomware attack against Colonial Pipeline by Darkside, a Russian criminal group. That attack resulted in the temporary cutoff of half the gasoline, jet fuel, and diesel supplies to 17 eastern states and Washington, DC.

The U.S. government and Microsoft have attributed the recent malware attack to organizations affiliated with Beijing. China is blamed for several major hacks against U.S. agencies and infrastructure. Huawei and ZTE Telecoms, both Chinese telecommunications giants, are listed as threats by the Federal Communications Commission and future authorization of their equipment is barred. The FCC's order also affects companies including video surveillance equipment firms Hangzhou Hikvision and Dahua Technology. This causes RACES members to be wary of using Chinese-made communications or video equipment, which might be remotely hacked into from China.

Even the FBI-run InfraGard program is vulnerable to cyberattack. Their goal is to collaborate and share information about potential cyber and physical threats to the country's critical infrastructures. InfraGard includes members from utilities, financial, communications, transportation, healthcare, and nuclear energy firms. Ironically, InfraGard experienced a major breach in early December by a cybercriminal using the username "USDOD" on a hacking forum after he completed a social engineering attack by posing as a CEO of a major financial institute and gaining membership and access to the InfraGard portal. He used a script to obtain the database of over 80,000 members, and asked for \$50,000 on a hacking forum. As a result, InfraGard shut down its portal until early July, when, through a third-party vendor, it began verifying the identity of all members, who eventually could once again access the portal. InfraGard is now more secure than ever and is a source of confidential information on cyber and physical threats. RACES members are eligible to join, as being involved in the communications infrastructure. ★

Taiwan Forges Civil Defense with Ham Radio

This information was excerpted from an article by Chao Shih-hsun and James Lo that appeared on the "Focus Taiwan" website on July 30, 2023.—Editor

Amid the threat of conflict from an increasingly assertive China or even the growing risk of a major natural disaster due to the climate crisis, civil defense in Taiwan is taking on greater importance than ever before.

Taiwan has a professional military supported by young conscripts who perform mandatory military service and national reservists to defend its territory against a possible attack by China's People's Liberation Army.

If war were to break out, however, Taiwanese civilians would also likely have to contribute to the war effort, and several groups have formed to prepare people for a possible conflict either as potential combatants or emergency first responders.

That preparation can take many forms, whether learning to shoot a weapon, communicate by radio, or

develop first-aid skills.

Aside from combat readiness, open communications are equally valued by experts who have wondered how resilient Taiwan's communications would be in wartime, especially after two submarine internet cables relied upon by residents of the Taiwan-held Matsu Islands were severed earlier this year.

Hams understand the importance of communications in a war zone. Chinese Taipei Amateur Radio League Chairman Randson Huang said his league has continuously invested in studying wireless communications applications.

Huang said he and his fellow radio aficionados want to promote and expand the use of wireless communication because modern day 4G and even 5G technologies would be rendered useless if cell towers were brought down during an attack.

Even when not at war, 4G and 5G cell towers are vulnerable to events such as natural disasters, league secre-



Chinese Taipei Amateur Radio League member operates his portable station.

tary-general David Kao said.

In times of emergency, Kao said radio would be the quickest way to get updates out, as was the case with wireless stations set up during Taiwan's massive September 21, 1999, earthquake and the Typhoon Morakot disaster in 2009.

Huang revealed, however, that there remain barriers to making this a widespread pastime, including that operating wireless communications technology in Taiwan needs national certification.

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John Pilger, K6PIO, Silent Key

With great sadness we report that OCRACES Member and OCSD PSR John Pilger, K6PIO, passed away on Thursday afternoon, July 6, 2023. John became an OCRACES member on August 29, 2021. At that time he was a PSR and the Laguna Woods RACES Deputy Radio Officer.

John joined the U.S. Army in 1968 and was sent to Ft. Hood, Texas, where he joined the Public Information Office. After another year he was transferred to Germany and was assigned to the main editorial office of *The Stars & Stripes*. Then he was named Nuremberg News Bureau Chief.

After getting his honorable discharge, John became a medic on board one of Marin County's emergency ambulances.

Next was a one-year stay in Sierra Vista, Arizona, as a broadcaster on KTAN radio and Cable Channel 6, a local-access channel. He hosted three public-affairs TV shows each week, while he was also the radio station's Deputy News Director. He also became a certified paramedic.

John next became the National News Manager for Metro Networks in Baltimore. He then opened operations in

Dallas, Houston, Minneapolis, Atlanta, and Denver. He became the General Manager of Bay Area Traffic Watch, covering San Francisco and San Jose, California, and opened up new operations in Tampa and Orlando, Florida.

Five years later John became a Federal Public Affairs Officer. He was the spokesperson for the Santa Clara Valley Transportation Authority and FEMA, which sent him to Guam following Super Typhoon Paka's hit on the islands in Micronesia.

John's last 12 years before retirement were as the Communications Officer for the City of Sunnyvale, California, where he trained government staff in the fundamentals of being a Public Information Officer.

John retired in 2012. Within a year he was an active member of the Maricopa County Sheriff's Communications Posse. After three years, he moved to Laguna Woods and joined the city's RACES unit. ★



John Pilger, K6PIO.

Countywide RACES/EmComm News

“RACES/EmComm News” provides an opportunity to share information from all City & County RACES/ACS units and EmComm organizations and supportive amateur radio clubs in and near Orange County, as well as from Cal OES and federal agencies.

Please send your news to NetControl Editor Ken Bourne, W6HK, at:

kbourne.ocsd@earthlink.net



Placentia RACES

The City of Placentia has accepted Duke Walls, W6EIF, as the RACES Chief Radio Officer.

Orange County Fire Watch

Orange County Fire Watch volunteers were deployed on Tuesday, Independence Day, July 4, 2023, to the following locations:

- Irvine Regional Park
- Laguna Coast Wilderness Park
- Laguna Niguel Regional Park/Aliso and Wood Canyons Wilderness Park
- Irvine Ranch Open Space Post #5—Black Star Canyon Gate
- Carbon Canyon Regional Park

Volunteers were in the field at various locations from 1000 hours to 2200 hours.

Federal Communications Commission

The FCC has openings for qualified applicants for Field Agents in their local offices in New York, Boston, Chicago, Los Angeles, and San Francisco.

An agent would operate and understand all technical equipment typically used in the Field, including RF spectrum analyzers, field-strength meters, RF field survey meters, and radio receivers. He/she would maintain contacts with and assist other Federal agencies, foreign counterparts, and local law-enforcement organizations concerning interaction and utilization of the radio spectrum for both authorized and unauthorized activities.

He/she would Initiate Official Notices of Violation, Warnings, Notices of Apparent Liability for Forfeiture, and other orders to radio operators and licensees, to bring unsatisfactory or violative conditions to their attention as a result of monitoring, investigations, and inspections. He/she would independently initiate correspondence or other communications with complainants and radio users concerning the enforcement functions of the office and region.

The Salary is \$66,134 to \$158,432 per year, depending on qualifications and experience. The FCC is looking for degreed Electrical or Electronics Engineers with experience that includes tasks such as tests, measurements, calculations, and other similar work involving radio frequency (RF) engineering, broadcast engineering, or telecommunications engineering.

For this job posting in the FCC’s Enforce-

ment Bureau, Office of the Field Director, in Los Angeles, see <https://www.usajobs.gov/job/736547300>.

National Weather Service—San Diego

NWS Science and Operations Officer Ivory Small wrote an interesting article about the probability of more useful forecasts in the July 2023 issue of the *Coast to Cactus Weather Examiner*. She said that probabilistic forecasts have been used for year, but in a very rudimentary form. For example, the probability of receiving measurable rainfall tonight (better known as the chance of rainfall tonight), is 90%. This means that we are 90% confident that 0.01 inches or more will fall. Most NWS forecasts have traditionally been “deterministic,” meaning there is no probability modifier added to the forecast. It is, and has always been, a simple statement of the most likely weather conditions expected.

Small said it’s time to get down to business on probabilistic forecasting and the where forecast improvement aspect comes in. As for the expected amount, one can have a 90% chance of only 0.01 inch of rain tonight, and tomorrow can still have a 90% chance of rain, but 2.00 inches of rainfall can be expected. Note that the probability of rain tonight is the same as it is for tomorrow, but there is a lot more rainfall forecast for tomorrow, and a lot more impact.

Small said probabilistic forecasting is needed for separating these two. Plans are underway to add more accurate information to forecasts this way.

Up until recently, forecasts typically do not give a probabilistic rainfall amount. For example, “1-2 inches of rainfall is expected in the coastal areas” is a typical forecast. Similarly, forecasts typically do not give a probabilistic snowfall amount either. For example, “2 inches of snowfall is expected in the mountain areas” is a typical forecast, but it is not a probabilistic forecast, so it can be improved. To add skill, a probabilistic forecast is needed.

What if you want to know the best estimate on how much snowfall is expected between 10 p.m. and 4 a.m.? One of the tools that is used is the experimental 1-Dimensional (1-D) Viewer.

Other parameters such as rainfall are also available. There are efforts underway to apply probabilistic forecasting methods to other parameters to help improve the usefulness of forecasts.

August 2023

Sun	Mon	Tue	Wed	Thu	Fri	Sat
		1	2	3	4	5 Weekly 60 m ACS Net
6	7 Weekly 2 m ACS Net	8	9	10	11	12 Weekly 60 m ACS Net
13	14 Weekly 2 m ACS Net	15	16	17	18 Orange County Amateur Radio Club Meeting	19 Weekly 60 m ACS Net
20	21 Weekly 2 m ACS Net	22	23	24	25	26 Weekly 60 m ACS Net
27	28 ACS Nets on 4 Bands	29	30 Orientation for PSR Applicants	31		

Upcoming Events:

- **August 7, 1930 hours:** OCRACES monthly meeting at OC EOC, Loma Ridge
- **August 18 1900 hours:** Orange County Amateur Radio Club Meeting, American Red Cross (George M. Chitty Building), 600 Parkcenter Drive, Santa Ana
- **August 30, 1830 hours:** Orientation for PSR Applicants, Sheriff's Regional Training Academy, Tustin
- **September 9, 0900 hours:** Pre-screen for PSR Applicants, Sheriff's Regional Training Academy, Tustin



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 (down for repair)
 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)
 *Primary Net—Mondays, 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.

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It's Where It's @!

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**“W6ACS ...
Serving
Orange County”**

Meet Your County of Orange RACES Members!

Officers →



Ken Bourne
W6HK



Scott Byington
KC6MMF



Jack Barth
AB6VC



Ernest Fierheller
KG6LXT

**OCSD
RACES
Coordinator** →



Lee Kaser
KK6VIV



Heide Aguire
K3TOG



Randy Benicky
N6PRL



Eric Bowen
W6RTR



Ray Grimes
N8RG



Steve Livingston
NJ6R



Scott MacGillivray
KM6RTE



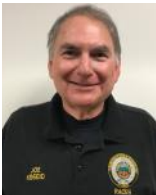
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