RF

ORANGE COUNTY AMATEUR RADIO CLUB, INC.

VOL. LX NO. 12 **P.O. BOX 3454, TUSTIN, CA 92781** **December 2019**

The Prez Sez.....
By Dan KI6X

The end of another year is here... We had a great club dinner early this month. Congratulations to Tim Goeppinger, N6GP, as winner of "The Good of the Club" award. This goes to any member that went above and beyond in support of the club. Tim, being an Officer, had to go beyond that duty too. He stepped up and helped me with questions regarding being President, co-leading the By-laws update with Nicholas, AF6CF, and led the big Field Day effort along with many other things in front of and behind the scenes he has done during the year.

At the dinner we also really enjoyed the Great Alaska Earthquake discussion from Chip, K7JA, and then Gordon West's, WB6NOA, talk about being on the air and reporting the earthquake to the Coast Guard who were wondering what had happened when their contacts went away. We had a little projector issue so there should be some photos elsewhere in the "RF" and Google can also be your friend on the Internet.

Please read through this newsletter for more information on the club goings on. Pay attention to the information regarding the Club Auction, which is coming very soon at our January (next) meeting.

I really appreciated the 2019 Board members. We had a lot of decisions to make and everyone stepped up to help with keeping the club chugging along. I know the 2020 Board will be just as productive; an outstanding group of folks that are working for your club. Let any of us know of anything you need, want, suggest, can think of, etc.

I personally want to thank all the members and visitors, for another great year. I learn something new at every meeting whether from the presentation or from talking to attendees and enjoy seeing the excitement. I am honored to be able to be President for another year and hope it goes as well as 2019…

Dan, KI6X, President

NEXT MEETING
Friday, January 17, 2020
@ Red Cross, Santa Ana

OCARC Radio Auction
Seller Setup and Viewing - 6PM
Auction - 7:00 PM
(See Page 3 for details)

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2019 Club Appointments:

W6ZE Club License Trustee:
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(714) 573-2965
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(West Orange Co.)
(562) 404-1112
N6QQ@msn.com

Submit articles:
editors@w6ze.org

Monthly Events:

General Meeting time & location:
Held third Friday of the month
(NO MTG in December)
At 7:00 PM held at:
American Red Cross
600 Parkcenter Drive
Santa Ana, CA
(Near Tustin Ave. & 4th St.)

Club Breakfast (Board Mtg):
Held the First Saturday*
of the month at 8am
Marie Callender's Restaurant
307 E. Katella Ave
Orange, CA 92867
*Unless otherwise advised

Club Nets (Listen for W6ZE):
10M: 28.375 ± MHz SSB
Wed- 7:30 PM - 8:30 PM
Bob AF6C, Net Control
Alt: Corey, KE6YHX, Net Control

2M: 146.55 MHz Simplex FM
Wed- 8:30 PM - 9:00 PM
Corey, KE6YHX, Net Control

75M 3.883 MHz LSB
Wed ~9:15 PM
Follows right after end of 2M Net
Corey, KE6YHX, Net Control

OCARC 2020 DUES

Membership period is:
1 January to 31 December

Individual New or Renewal:	$30.
Family New or Renewal:	$45.
Teen New or Renewal:	$15.

New Member Dues are *prorated quarterly* and **includes a badge**:
Additional Badges:[1] $ 3.
Use one of our interactive online forms to calculate current prices, join the club and/or order badges:

Online Forms / Dues & Badges

[1] $3. plus mailing costs if applicable
Dues are subject to change without notice

ORANGE COUNTY AMATEUR RADIO CLUB

AUCTION

Buy Used (& New)
RADIO & ELECTRONIC GEAR and ACCESSORIES.
Bring your gear* to sell.

DATE:

January 17th, 2020

7:00PM Auction starts promply
6:00PM Registration and equipment check-in
at the American Red Cross
"George M. Chitty' Bldg."
600 Parkcenter Drive, Santa Ana, CA

**** SPECIAL NOTE: Radio and Electronic Gear ONLY***

The room will *open at 6:00 PM* to allow registration, set-up and viewing.
Buyers and sellers are welcome provided they follow established guidelines:

1. **Only Ham radio or electronic equipment / items will be allowed.**
2. You must register prior to or at the auction site the day of the auction when doors open.
3. Sellers should number each item in their lot. A tag should indicate the minimum bid they expect.
4. Only 3 items from a Sellers lot will be auctioned during each turn and then the auctioneer will move on to the next lot. Once the other lots lot have been offered the auctioneer will start the second round of auctioning with the next 3 items in Lots.
5. Auction bidding will take place as follows:
   (a) $0.00-to-$5.00 bidding will take place in $0.50 increments.
   (b) Over-$5.00-to-$50.00 bidding will take place in $1.00 increments.
   (c) Over-$50.00-to-$100.00 bidding will take place in $5.00 increments.
   (d) Over-$100.00 bidding will be in $10.00 increments.
6. Rules 4 and 5 may be changed at the auctioneer's discretion to expedite the auction.
7. Payments for purchased items are due at the end of the auction and shall be by cash or check with the appropriate ID. No two-party checks or credit cards are allowed. Disbursements to the Sellers will be by OCARC check only.
8. **ALL Sellers will be charged 10% of the selling price for items sold by OCARC.** A special table will be set up for items donated to the OCARC and proceeds from the sale of donated items will go into OCARC operational funds.

by Tom W6ETC

AUCTION ADDITIONAL INFO

NEW THIS YEAR:

- Create a list of your items and a brief description. This will be used for the Auctioneer and if you get the info in by the December newsletter some of your items might be included in an auction advertisement in the RF. You may send your list (no description needed for this) to the President or Vice-President as listed on page 2. They will get to the newsletter editor.

- Remember buyers go first in line, then sellers.

- Sellers, if you prefer we send you your money instead of having to wait in line. Please bring an SASE (Self-addressed & stamped envelope).

A PARTIAL LIST AUCTION ITEMS

- Ten-Tec "Jupiter" HF rig 100 W
- Ten-Tec 708 Desktop Microphone
- Johnson Match-Box antenna tuner
- SONY FM-AM Stereo Receiver Model STR-DE595 - left speaker channels not working.
- Pioneer PD-7030 Front-Loading CD Player - malfunctioning.
- Large Black Plastic Printer Cartridge NEW (laser printer?), unknown make and model.
- Assorted Electronic Parts and Components including many untested High-Voltage Capacitors.
- Sprague Mike-O-Meter Model M-2 Dual Motor Capacitor Tester Sprague Products Company North Adams, Mass., U.S.A. -untested.
- LDG AT-100Proll Auto-Tuner Antenna tuner
- MFJ 969 Antenna tuner
- 30M shortened-vertical-dipole (home-designed, 12-ft length designed to radiate Omni)
- MAHA universal battery charger
- 144/440 MHz whip antenna for Baofeng and Wouxun handhelds - 15.6 inch model NA-771 with SMA connector
- ICOM SM20 mic

- A complete portable analog amateur television station less camera etc. built by WA6PFA Elmer Thomas. This has been used on FD for many years. It's all built into a fancy aluminum box
- A portable amateur TV transmitter. Built by WA6PFA
- Power supply 12V & 5 -18 volts adjustable. Built by WA6PFA
- Magellan GPS 315
- Magellan GPS Explorist 300
- Heathkit uMATIC Memory Keyer, model SA-5010
- J.W. Miller Automatic Antenna Tuner, model AT 2500
- Robot Specialty Mode RTTY Terminal, model 800
- LED samples Kit of few hundred LED colors & types, by Stanley
- Electro-Voice model 619 dynamic microphone
- Archer Coax Switch
- Knight microphone audio compressor, model C-577
- Kenwood UHF commercial transceiver setup on the UHF repeater ham band, model TK-8150. Output power is 45 watts
- Kenwood UHF commercial transceiver setup on the UHF repeater ham band, model TK-8150. This unit includes the Remote Mount Kit.
- Heathkit model VL-1180 VHF amplifier
- Hewlett Packard 204C Oscillator
- Intronics 'The Pocket Programmer 2
- Tech-Tools ER3 EPROM Emulator

2019 CHRISTMAS DINNER PHOTOS

Our Fearless Leader – Dan (KI6X)

Our Party Coordinators – Jim (AF6H) & RON (W6WG)

2019 CHRISTMAS DINNER PHOTOS

The Mystery Gift – Even Bob (AF6C), doesn't know what it is!

Chip (K7JA) & JANE (KL7MF) & GORDO (WB6NOA)

2019 CHRISTMAS DINNER PHOTOS

FOLKS EATING & TALKING - HAVING A GOOD TIME!

THE 2019 GOOD OF THE CLUB AWARD

Congratulations to Tim Goeppinger (N6GP)

Tim N6GP was awarded the 2018 Good-Of-The-Club Award by President Dan KI6X for his enthusiasm and energy working on club projects. The **"Good of the Club Award"** is presented annually to the OCARC club member who has made the most significant contribution to the club for the year. In 1997, this annual award was then dedicated to the memory of Kei Yamachika - W6NGO, for his year-after-year contributions in support of our club's activities.

THE 2020 ELECTED OCARC BOARD OF DIRECTORS

VOTED IN AT THE NOVEMBER 11, 2019 GENERAL MEETING:

PRESIDENT – Dan Violette (KI6X)

VICE PRESIDENT – Tim Millard (N6TMT)

SECRETARY – Ken Konechy (W6HHC)

TREASURER – Greg Bohning (W6ATB)

ACTIVITIES – Jim Schultz, (AF6N)

MEMBERSHIP – Corey Miller (KE6YHX)

PUBLICITY/PUBLIC RELATIONS Vijay Anand (KM6IZO)

TECHNICAL – Bob Eckweiler AF6C

DIRECTOR AT LARGE (2) – Tim Goeppinger (N6GP) & Ron Mudry (W6WG)

THANK YOU TO THE 2019 BOARD OF DIRECTORS

ORANGE COUNTY AMATEUR RADIO CLUB

President
Dan Violette KI6X
Vice President
Tim Millard N6TMT
Secretary
Ken Konechy W6HHC
Treasurer
Greg Bohning W6ATB
Activities
Ron Mudry W6WG
Membership
Corey Miller KE6YHX
Public Relations
Vijay Anand KM6IZO
Technical
Bob Eckweiler AF6C
Director at Large
Nicholas Haban AF6CF
Director at Large
Tim Goeppinger N6GP

by Tom W6ETC

"2020 Winter Field Day"

January 25th and 26th 2020
(Contest period Saturday 1900 UTC to Sunday 1900 UTC)

Come join the team for the OCARC 2020 WINTER FIELD DAY The event will be held at the Ocean View School District site located at 17200 Pinehurst Lane in Huntington Beach.

Multiple operating positions with bands and modes for everyone.

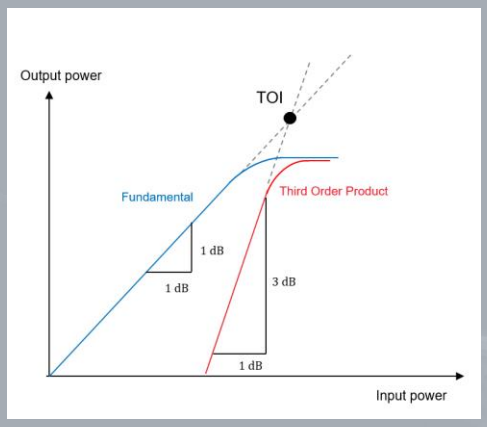
Bands: 160m, 80m, 40m, 20m, 15m, 10m, 6m, 2m plus UHF and ..... VHF bands

Modes: SSB, CW, and Digital modes, Satellite

If you plan on coming or think you may be interested and need more information please contact Ron W6WG@W6ZE.ORG

UNDERSTANDING THIRD ORDER INTERCEPT

Understanding Third Order Intercept Measurements

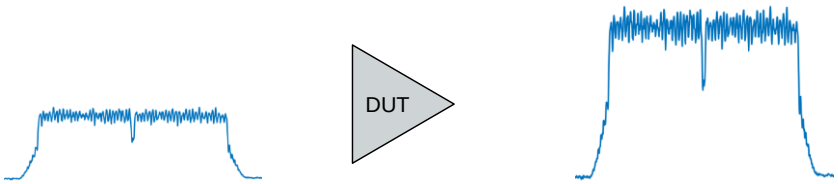


Paul Denisowski, Product Management Engineer

ROHDE&SCHWARZ

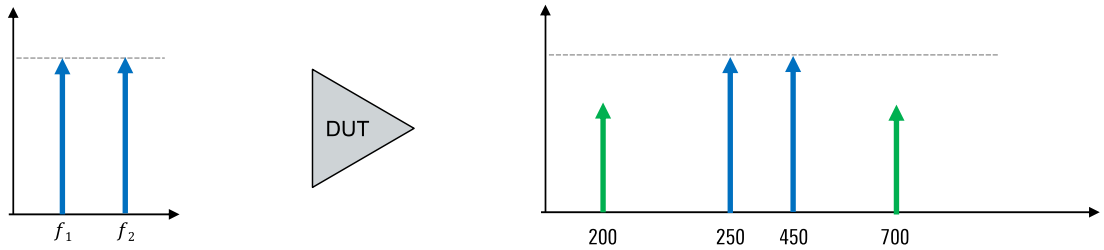
What is linearity?

- **Linearity** : the output of a device is directly proportional to its input.
- Devices are typically linear only over a certain input power range.
- Operating in the non-linear region can create distortion in the form of **harmonics** and **intermodulation products**.



About intermodulation products

- Intermodulaton occurs when two (or more) signals **mix** in a non-linear device.
- Mixing produces new signals at the **sum** and **difference** of their two frequencies.
- Example:
  - input frequencies f_1 = 250 MHz and f_2 = 450 MHz
  - output frequencies $f_2 + f_1$ = 700 MHz and $f_2 - f_1$ = 200 MHz



ROHDE&SCHWARZ Understanding Third Order Intercept 4

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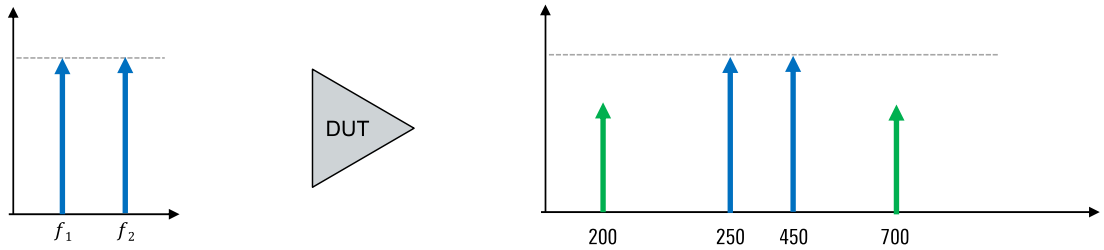


ROHDE&SCHWARZ Understanding Third Order Intercept 4

Higher order products

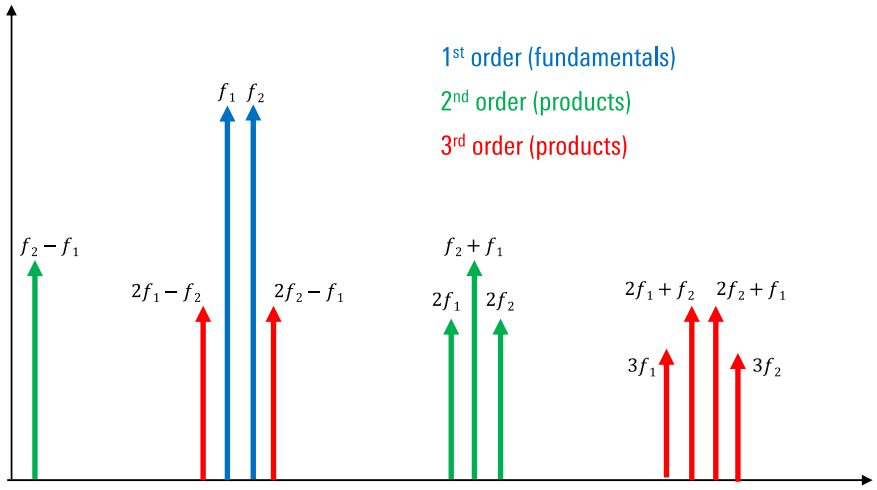
- Tones f_1 and f_2 can mix with each other
- They can also mix with each other's harmonics, such as $2f_1$ and $2f_2$.
- Additional products will be created at:

$$2f_1 + f_2 \qquad 2f_1 - f_2 \qquad 2f_2 + f_1 \qquad 2f_2 - f_1 \qquad \ldots$$

- The **order** of harmonics and intermodulation is the sum of their (unsigned) coefficients:
  - $2f_1$ is **second** order (2)
  - $f_1 + f_2$ is also **second** order (1 + 1)
  - $3f_1$ is **third** order (3)
  - $2f_2 - f_1$ and $2f_2 + f_1$ are both **third** order (2 + 1)

ROHDE&SCHWARZ Understanding Third Order Intercept 5

Harmonics and intermodulation products

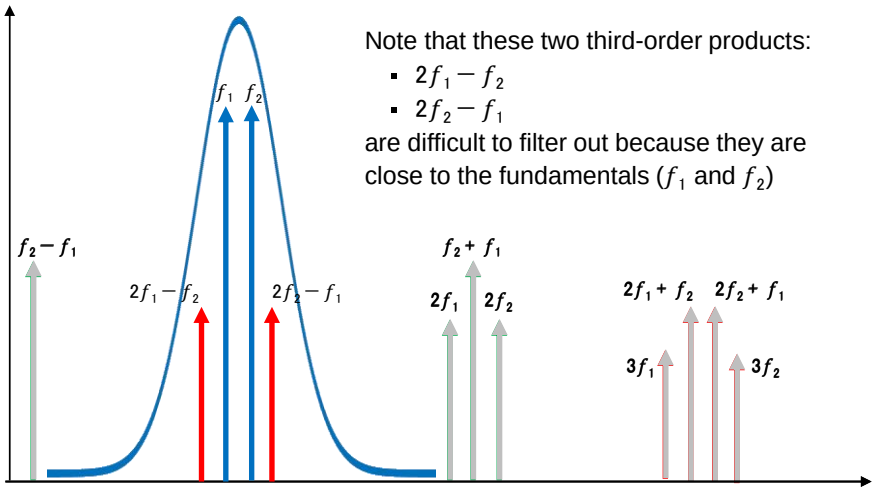


ROHDE&SCHWARZ Understanding Third Order Intercept 6

Problems with products

- Harmonic and intermodulation products are undesired signals.
  - Create leakage into adjacent channels, noise or distortion, etc.
- Undesired intermodulation is often referred to as **intermodulation distortion** (**IMD**).
- Some products are easy to deal with:
  - Higher order harmonics have very low amplitudes and can usually be ignored.
  - Higher-frequency products often fall outside of amplifier bandwidths, filter passbands, etc.
- The typical way of dealing with troublesome products is through filtering, but this becomes difficult when the products are very close in frequency to the desired (fundamental) signals.

Filtering products



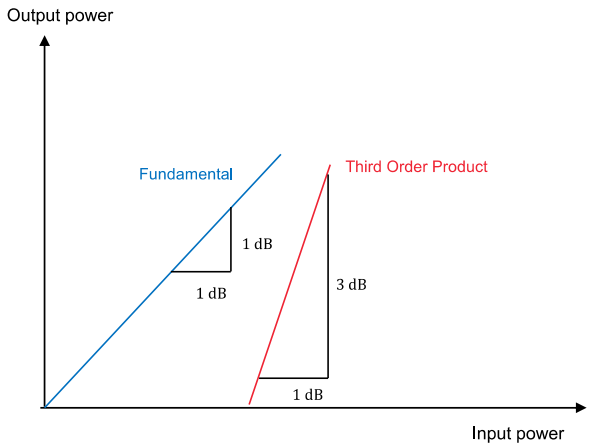
Note that these two third-order products:

- $2f_1 - f_2$
- $2f_2 - f_1$

are difficult to filter out because they are close to the fundamentals (f_1 and f_2)

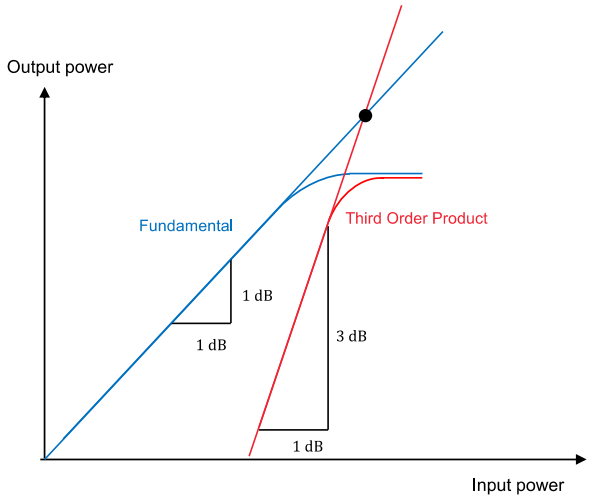
Plotting amplitude

- Besides the filtering issue, third-order intermodulation products present an additional complication.



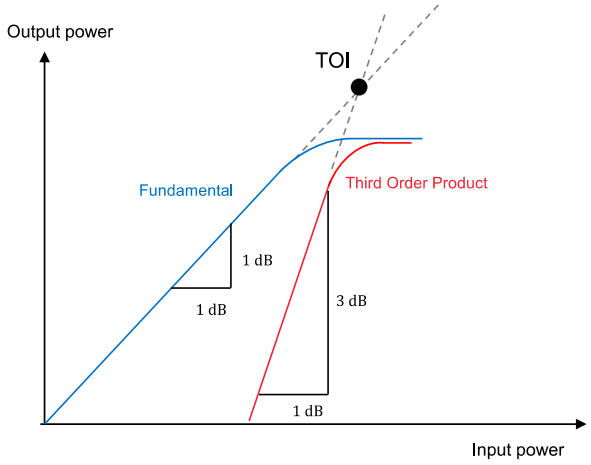
Compression

- It would appear these two gain lines would meet at some point
- At a certain input power, the output power no longer increases linearly with the input power.
- Note that the gain lines begin to curve or flatten out as the device goes into **compression**.



Third order intercept

- However, if we extend the two lines, we can calculate the point at which they would meet.
- This is the **third order intercept (TOI) point**.
- The third order intercept is a theoretical value that we **calculate** based on **measured** values.
- Strictly speaking, we cannot "measure" TOI directly
- But many people refer to TOI as a "measurement."

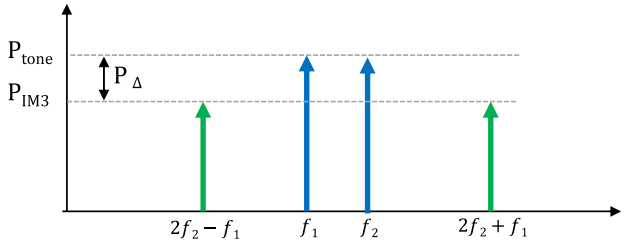


What is TOI used for?

- Third order intercept is the most common measure of device linearity.
- The higher the TOI, the better the linearity and the lower the level of intermodulation distortion.
- Note that in many specifications / data sheets, TOI is referred to as **IP3**.

Basic TOI test methodology

- TOI is measured by sending two signals into the device under test (DUT).
- These signals (“tones”) are usually closely spaced CW signals with equal amplitude.
- At the analyzer, the levels of these two fundamental signals (P_{tone}) and their adjacent third-order intermodulation products (P_{IM3}) are measured.
- Third order intercept is then calculated from these level values.



$$TOI = Ptone + \frac{P_{\Delta}}{2}$$

OCARC
General Meeting Minutes
2019-11-15

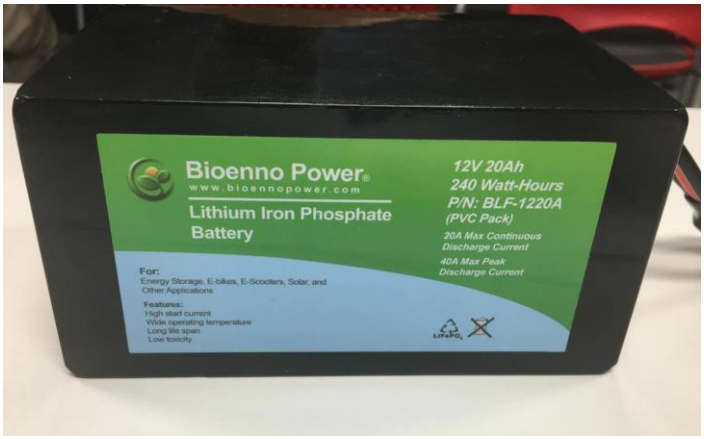
The OCARC General Meeting was held at the Red Cross Complex in Santa Ana on November 15th 2019. There were a total of 27 members and visitors and our speaker in attendance. There was a quorum of officers, with all directors present.

November Program:

Tim N6TMT introduced the presenter for the evening, Kevin Zanjani (KI6DHQ) from Bioenno batteries. Kevin KI6DHQ explained that LiFePO4 batteries (Lithium-Iron-Phosphate) are very useful for hams because they can be recharged 2000 times. Kevin compared several battery technologies:

- LiFePO4 2,000 recharge cycles
- Lithium-ion 500 recharge cycles
- NiCad 400 recharge cycles
- Lead-acid 300 recharge cycles

Kevin Zanjani KI6DHQ stands in front of an array of Bioenno products



Typical Bioenno LiFePO4 rechargeable battery. This one rated at 12V and 12 Amp-Hrs

Election of OCARC Officers and Directors:

After a short break the meeting reconvened to cover club business. The first item of business was the 2020 Board Officer elections. Secretary Ken W6HHC and Election Chair Tim N6TMT conducted the elections. Each of the following officers and directors (except Directors-at-Large) were duly elected by a show-of-hands vote to serve during the 2020 term. The two Directors-at-Large positions were elected by a secret ballot).

The elected 2020 OCARC Board of Directors will consist of:

President	**– Dan Violette, KI6X**	**Membership**	**– Corey Miller, KE6YHX**
Vice-President	**– Tim Millard, N6TMT**	**Public Relations**	**– Vijay Anand, KM6IZO**
Secretary	**– Ken Konechy, W6HHC**	**Technical**	**– Bob Eckweiler, AF6C**
Treasurer	**– Greg Bohning, W6ATB**	**Director at Large**	**– Tim Goeppinger, N6GP**
Activities	**– Jim Schultz, AF6N**	**Director at Large**	**– Ron Mudry, W6WG**

Other Business

- **Auction Plans**
- **Christmas Dinner** – Ron W6WG explained that tickets for the Christmas Party could be ordered via PayPal from the club website.
- **Winter Field Day** – Ron W6WG also reminded members that Winter Field Day (WFD) would be held for 2020 on January 25th and 26th. Set-up would occur on Friday, Jan 24.
- **ELMER** – New member Clay N6CDB is just getting back into Ham Radio and asked two questions about using a DH-7200 rig:
    1. How to set up the rig to hit a local repeater on Saddleback Peak
    2. What is going on when he spots a CW station in the "waterfall" that is drifting badly…should he "chase" the frequency, etc.

Submitted by: Ken, W6HHC OCARC Secretary

Upcoming Activities

DECEMBER 2019

- **RAC Canada Winter Contest:** 0000 UTC Saturday Dec.29 through 2359 UTC Saturday Dec. 28.
- **ARRL Rookie Roundup, CW:** 1800Z to 2359Z Sunday Dec. 22.
- **RAC Winter Contest:** 0000Z to 2359Z Sunday Dec. 28.

JANUARY 2020

- **Straight Key Night:** 0000Z – 2359Z January 1
- **ARRL RTTY Roundup:** 1800Z Saturday January 4 to 2400Z Sunday January 5.
- **ARRL Kids Day:** 1800Z – 2359Z Sat. January 4
- ****North American QSO Party / CW:** 1800Z Saturday January 11 to 0600Z Sun. January 12.
- ***ARRL January VHF Contest:** 1900 UTC Saturday Jan 18 to 0359 UTC Mon. January 20.
- ****North American QSO Party / SSB:** 1800Z Saturday January 18 to 0600Z Sun. January 19.
- ***CQ 160 Meter Contest/ CW:** 2200Z Saturday 25 Friday to 2159Z Sunday January 27.
- ***Winter Field Day:** 1700Z Sat. Jan. 26 to 1700Z Sun. January 27.

***Indicates club entries are accepted**
**** Indicates team entries are accepted**

Repeating Activities:

- **Phone Fray:** Every Tuesday night at 0230Z to 0300Z.
- **CWops Mini-CWT:** Every Wednesday at 1300 to1400 UTC, 1900-2000 UTD and Thursday 0300-0400 UTC.
- **SKCC:** Weekend Sprintathon (Straight Key CW) on the first weekend of the month after the 6TH of the month. 1200 Sat. to 2359Z Sunday.
- **SKCC:** Sprint (Straight Key CW) 0000Z to 0200Z on the 4th Tuesday night (USA) of the month.

Send an email to *Ron W6WG, w6wg@w6ze.org to have your favorite activity or your recent RadioActivity listed in next month's column.*

73, Ron W6WG

Note: When submitting logs for ARRL Contests indicate your club affiliation as "Orange County ARC"

BRING YOUR BEST AMATEUR RADIO QUESTIONS TO THE NEXT

OCARC

MEMBERSHIP MEETING!

WATCH FOR FUTURE ANNOUNCEMENTS

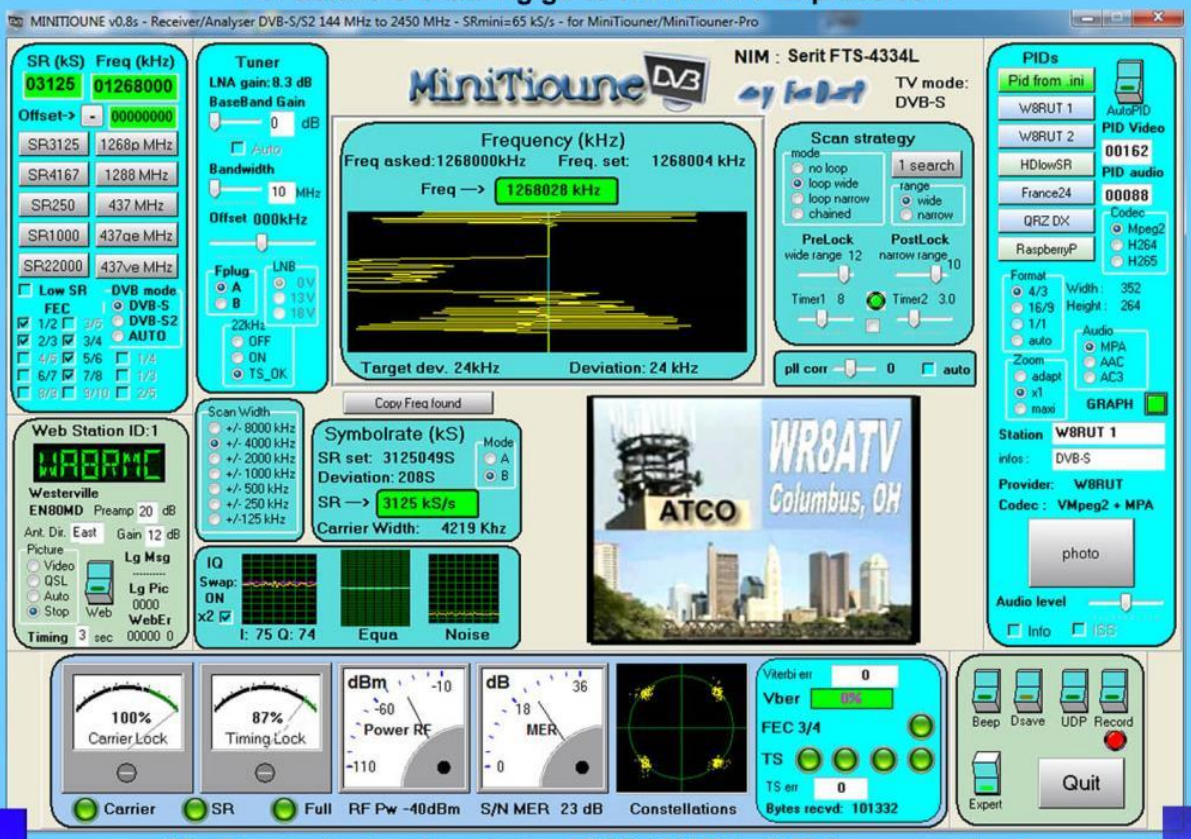
MiniTiouner-Express

Digital Amateur Television DVB-S/S2 Receiver / Analyzer

Available at DATV-Express.com

- Operates with Windows PC using free MiniTioune software from Jean-Pierre F6DZP
- Smaller than a stack of 2 decks of cards (picture above is full size)
- Two independent simultaneous RF inputs with internal preamps
- High sensitivity -100dBm @1288MHz – at 1/2 FEC
- Fully assembled/tested in aluminum enclosure
- Covers 144-2420MHz (ideal for Space Station DATV reception)
- Symbol rates from 75 KSymb/s to >20 MSymbols/sec
- Uses external 8-24VDC supply or +5V from USB-3 port (with small modification)
- Real time signal modulation constellation & dBm signal strength display
- Price: US $75 + shipping – order with PayPal

For details & ordering go to www.DATV-Express.com



(MiniTioune display above is the ATCO 1268MHz DVB-S repeater signal at WA8RMC QTH 15 miles away).