



RF



ORANGE COUNTY AMATEUR RADIO CLUB, INC.

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P.O. BOX 3454, TUSTIN, CA 92861-3454

April 2002

The Prez Sez:

by Cory KE6WIU

Greetings! I'm a little short for words this month, so I thought I'd just touch on the upcoming important stuff.

There's Field Day in June, the Orange County Fair in July and the ARRL Southwestern Convention in August. To my knowledge we as a club don't need any "Volunteers" for the Convention as of yet; however, we will need OPs for Field Day and the O.C. Fair. Field Day is the 22 & 23 of June. If you are not sure what Field Day is, check out our past events on our web page or ask a club member; it's a real blast. The date(s) and details for our booth at the Fair are TBA as of this RF. The past activities at the booth have been: helping people understand Morse code, Amateur Radio as a whole, why we do what we do, and rag chewing with Old Timers that come by. Please keep this in mind when we call for volunteers; the date is usually in mid July. Well that's it from my end. So much for being "thin on words"!!

See you all at the meeting and 73's--Cory

The 2002 ARRL Southwestern Division Convention

The 2002 ARRL SW Division Convention will be coming this summer to the California Center for the Performing Arts in Escondido, California on August 16 - 18, 2002

Featured keynote speakers will be **Jim Haynie W5JBP**, President of ARRL and also **Riley Hollingsworth, K4ZDH**, head of the FCC Enforcement Bureau - Special Counsel for Amateur Radio.

Session speakers will include:

Joe Moell- KØOL on ARDF
Brent Hildebrand- KH2Z on APRS
Marvin Johnson, KE6HTS on building a tape measure beam
Harry Hodges-W6YOO DXing 101 Islands on the Air program (IOTA)

For more details, see the special convention **WEB SITE** at <http://sd2002.hamcon.net/>
The OCARC **WEB** site also has a link.

April PROGRAM:

The guest program speaker will be Bill Phinizy - K6WHP, who will provide a presentation entitled:

QRP... kits and operating

Do you live in a condo, apartment or any other space restricted place, then make sure you attend the April meeting. Bill being a victim of CC&Rs, turned the power down on his HF rig and was surprised to discover he could work stations quite far away.

Don't miss it. All members and visitors are welcome.

The next regular meeting will be:

Friday, April 19th
@ 7:30 PM

We will be meeting in Anaheim Room in the east **Red Cross** Bldg.

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**THE ORANGE COUNTY
AMATEUR RADIO CLUB,
INC.**

P.O. Box 3454, Tustin, CA 92781



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Monthly Events:

General Meeting:

Third Friday of the month
at 7:30 PM
American Red Cross
(near Tustin Ave & 4th St)
Santa Ana, CA

Club Breakfast:

First Saturday of the
month at 8:00 AM
CowGirl's Cafe, Too
2610 S. Harbor Blvd
(just south of Warner)
Santa Ana, CA

Club Nets (Listen for W6ZE):

Wednesday Evenings

28.375± MHz SSB
7:30 PM - 8:30 PM
Bob AF6C, Net Control

146.55 MHz Simplex FM
8:30 PM - 9:30 PM
Bob, WB6IXN, Net Control

VISIT OUR WEB SITE

<http://www.w6ze.org>

for up-to-the-minute club information, the latest membership rosters, special activities, back issues of RF, links to ham-related sites, vendors and manufacturers, pictures of club events and much much more.

Club Dues:

Regular Members ...\$20
Family Members* ...\$10
Teenage Members ..\$10
Club Badge**\$3

Dues run from January thru Dec and are prorated for new members.

*Additional members in the family of a regular member pay the family rate up to \$30 per family.

**There is a \$1 charge if you'd like to have your badge mailed to you.

Tech Talk #16

VoCoder Voice Coding Compression for Digital Communications by Ken Konechy - W6HHC

(This is the third part of a Tech Talk series to explore Digital Communications)

In March, I explored how to convert the analog output of your microphone into a series of 1s and 0s. This stream of 1s and 0s was created by using Analog-to-Digital Conversion (ADC) technology. But, a problem was pointed out when the 4 KHz analog signal was turned into the 64 kilo-bits-per-second "bandwidth hog", as re-stated below:

Analog Voice Bandwidth = 4 KHz
Sampling Rate = 8,000 samples/sec
Number of bits/sample = 8

Digital Data Rate = 64,000 bits/sec

64,000 bps for voice is way too inefficient to use in a wireless application. So how can the number of bits/sec be reduced for voice?? You compress the voice data stream by using voice coding (called Vo-Coder). By using voice coding, you lower the bit rate from 64 KHz to 9.6 KHz maximum. The average voice conversation will usually be less than 4.8 KHz. This is a much more efficient bandwidth for digital voice communications.

So how does a VoCoder work?? There are three main concepts that are applied:

- 1) Voice is complex
- 2) Break a voice into 20 msec frames
- 3) Synthesize the vocal cords and mouth cavity

Voice Signal is Complex

During a typical speech, there are times when you are not talking. If you are not talking there is no sense to send 9600 bps. You can then send much lower than 9600 bps.

Also, when I say a vowel in English, like "A", "E", or "O" (where my vocal cords are active) then I need a high data rate. But, when I say things like "shhhhh", my vocal cords are NOT active. I don't have to send pitch information. Therefore, I can lower the data rate.

Figure 1 shows an analog signal for typical voice segment.



Fig 1 - Analog Signal for Voice

Voice coding standards, like RATE SET ONE (from the cell phone industry), take advantage of periods of reduced speech activity.

FULL RATE – requires 9600 bps -- when voice is very complex
HALF RATE -- requires 4800 bps – when voice is semi-complex
QUARTER RATE – requires 2400 bps – when voice is simple
EIGHTH RATE – requires 1200 bps -- when voice is quiet

Break Voice into 20 msec Frames

In order to apply different activity rates, voice coding looks at the voice in 20 msec windows. Figure 2 shows how different activity rates can be used in the speech that is shown in Figure 1.

- see Tech Talk cont'd on page 4 -

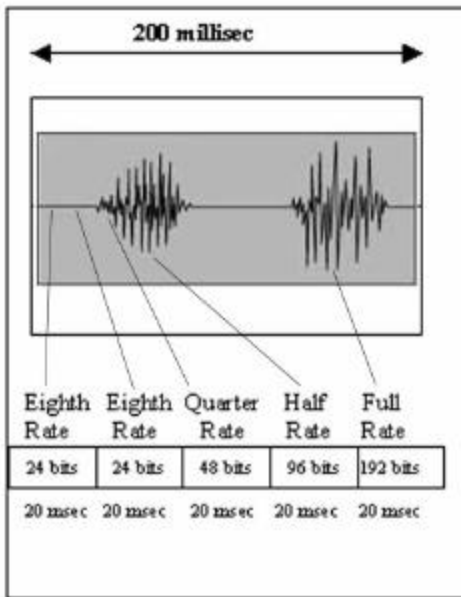


Fig 2 – Different Rates can be Used in Different Parts of Speech

In Figure 3, the data construction of VoCoder 20 msec frames is shown for RATE SET ONE.

Full Rate	172 bits	16 bit CRC	8 tail bits
Half Rate	80 bits	10 bit CRC	8 tail bits
Quarter Rate	40 bits		8 tail bits
Eighth Rate	16 bits		8 tail bits

Fig 3 - VoCoder 20 msec Frames for RATE SET ONE

Synthesize Vocal Cords and Mouth Cavity

In codings that are source dependent, such as vocoding, you can construct speech apparatus using filters, resonators, and frequency synthesizers. This approach tries to mimic (that is: model mathematically) the voice apparatus. Speech is usually a combination of “voiced” speech and “unvoiced” speech.

The “voiced” part is when the vocal cords are active...like pronouncing the vowels “AAA” “EEE”, etc. The “voiced” part can be analyzed to contain certain frequencies of certain amplitudes. Later when we reconstruct the analog sound for your receiver, tone generators will reconstruct this part of speech.

The “unvoiced” part of speech is just noise. When I say “SHHHH” or “KKKKK”, there is no vocal cord activity. A noise generator can be used to create this part of speech when we reconstruct the analog sound in the receiver.

By understanding the components of speech, speech can be coded in less data than 64,000 bits/sec. A short-hand notation is used to describe tone frequencies, amplitudes or to describe the type of noise and noise amplitude. These short-hand notations allow the speech to be described in a maximum of 9,600 bits/sec. And as discussed earlier, some parts of speech are much simpler and can be described with 2,400 bit/sec (Quarter Rate), etc.

Figure 4 shows the construction of a Full Rate 20 msec VoCoder frame. The coding describes a Linear Predictive Filter and four different pitches (where additional excitation vectors are used to describe amplitude info, etc). An additional 11 bits are used for parity checking, 16 bits for CRC error checking, and 8 bits are used to show the end of a frame (tail bits). It is this short-hand notation of speech (called voice coding) that allows the receiver to reconstruct the speech.

- see **Tech Talk** cont'd on page 5

Linear Predictive Coding Filter (40 bits)							
Pitch (10 bits)		Pitch (10 bits)		Pitch (10 bits)		Pitch (10 bits)	
vector 10 bits	vector 10	vector 10	vector 10	vector 10	vector 10	vector 10	vector 10
1 control bit		11 parity bits		16 CRC bits		8 Tail bits	

Fig 4 – 20 msec VoCoder frame for Full Rate

Figure 5 shows the construction of a Quarter Rate 20 msec VoCoder frame. Because this rate is used for simpler speech, only one pitch is described. Similar constructions are used for Half Rate frames (a little more complexity...for example it describes two pitches instead of only one pitch) and Eighth Rate frames (a little simpler complexity).

Linear Predictive Coding Filter (40 bits)	
Pitch (10 bits)	
vector (10 bits)	vector (10 bits)
8 tail bits	

Fig 5 – 20 msec VoCoder frame for Quarter Rate

Putting It All Together

I have discussed how speech can be converted to digital streams using an Analog-to-Digital Converter (ADC), then be broken into small 20 msec windows, then analyzed and then coded into information (voice coding short-hand). The receiver can take apart the voice coding frames and use the voice coding information to create tones and noise to reconstruct the voice (in the voice decoder circuit). Finally a Digital-to-Analog Converter (DAC) circuit will create the analog signal for the receiver's speaker. Figure 6 shows the encoding-then-decoding chain for digital speech communications. You can see the trail from the microphone to the RF transmitter, to the RF receiver, to the speaker.

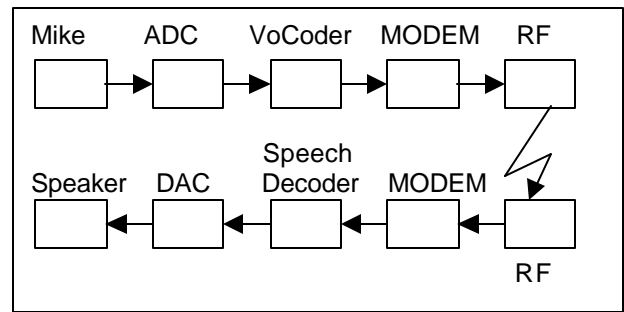


Fig 6 – Block Diagram of Simple Voice Digital Communications System

In the next Digital Communications Series article, I will look into how digital signal-to-noise techniques work.

General Meeting Minutes
15-March

The meeting was called to order at 7:30pm.

Art Goddard W6XD, ARRL S.W. Division Director gave a short presentation on the upcoming Ham convention in Escondido. Riley Hollingsworth will be at the convention, as well as ARRL President Jim Haynie, and VP Fried Heyn, among others. The convention will be August 16-18 2002.

Art also announced a new bill in the works in the US Congress to make PRB-1 extend to CC&Rs. The bill is called the Emergency Communications Act of 2002.

The speaker for the meeting was Frank Smith WA6VKZ, since John De Boer was absent on emergency call. Frank gave a presentation on cryptography. Frank discussed Pretty Good Privacy (PGP), a personal cryptography software package for Windows, which is available at www.pgpi.com. A similar software package is available for Linux, called GNU Privacy Guard (GPG), available at www.gnupg.org

-- see **March Meeting** cont'd on pg 6-

March MTG MINUTES

- Continued from pg 5 -

The business meeting was called to order 8:40pm after the break. All officers were present. A motion was made to accept the board meeting minutes as revised. The correction to March Board Meeting Minutes: Fred KF6JHA (call-sign was incorrect in the published minutes.)

VP: Upcoming speakers: April- Bill K6WHP on QRP, May- PSK31, hopefully we can get John De Boer back, August- Lowell KQ6JD, September- Ken W6HHC, November- Art Goddard speaking on the Pallau tropical island DXpedition.

Treasurer: Balance report- \$2922.89 checking, \$20 cash

Membership: 71 members on roster. Several 2001 members haven't renewed. They must renew by the end of March to stay on the club roster. The roster will be revised in April. A comment was made that club officers should renew by January each year, to provide a good example.

Activities: World Radio 1-year subscription certificates received for raffles, special raffle for HRO gift certificate still going. Mention made about changed raffle procedure, no special grand prize drawing.

Publicity, Technical, Members At Large, and Good of Club:
Nothing to report.

Old Business: Baker to Vegas-call for ops, for city of Orange especially.
Field Day- Comment made that

we should move the June General Meeting so people who are participating in Field Day will not have any conflicts. Either move to Thursday 6-20, or Friday 6-14. Announcement will be made as to when the June General meeting will be held. Cindy KC6OPI & Matt K6LNX will do publicity for Field Day this year.

New Business: New slow CW net started, Orange County Wireless Net. Speed ranges from 5-12 wpm, and the net runs Thursday nights at 7:30pm. Primary frequency is 28.110mhz. Info is on the OCARC website.

Christmas dinner will again be at Mimi's in Fountain Valley. Cory will make reservations. Tentatively set for Dec-15, 6:30pm.

Night cap after the meeting at El Ranchito in Tustin.

Meeting adjourned at 9:02pm.

Respectfully submitted,

Matt K6LNX

**Orange County
Wireless Net (OCWN)
is Newly Formed**

The Orange County Wireless Net meets Thursdays at 7:30 PM on 28.110 MHz.

This net is for you if you would like to improve your CW operating skills. We operate between 5 and 12 WPM, following a 'round-table' format.

To jump in to the OCW net, just transmit your call sign when you hear the net control station (NCS) send 'QNI' (it may be necessary to resend your call if 'pile-ups' occur).

NCS will acknowledge you by repeating your call sign.

Then, the NCS will come back to you for your info on name/pwr/antenna/city and will then place you in rotation for additional, free-form exchanges.

For further information about the Net, please go to the "WEEKLY CLUB NETS" menu on:

<http://www.w6ze.org>

This web page includes a sample net dialog, which will give you a feel for the interactions between NCS and net stations. Be sure to note how abbreviations and procedural signs are used to pass control between communicating stations.

If you have any questions, please contact Rick Clifford (OCWN's primary NCS) at:

rick.clifford@eds.com

Rick is particularly interested in characterizing the coverage from his station. If you can spare a moment in the evening (other than Thursdays), let Rick know and he will arrange with you a quick coverage test to confirm you'll be able to copy the NCS.

April Board Meeting

Minutes- 4/6/2002

Meeting called to order at 8:45am. All officers present except Larry K6LDC. A new member, Virgil Garduque - KF6KMW, was also present.

VP: Speaker for April General meeting is Bill Phinizy K6WHP speaking on QRP and kits. Hopefully we can get John De Boer to speak about Solar Power this summer.

Treasurer: Balances will be available at the General meeting.

Membership: 4 new members since last General meeting, and 43 total paid members are on the roster. We still need several old members to pay renewals.

Activities: Antenna erecting party for Steve KB1GZ later Saturday morning. Frank WA6VKZ needs someone who has a truck with a trailer hitch to help bring one of his trailers down to OC from Anza on 04-May.

Technical:
Nothing to report.

Members at Large: Baker to Vegas- more ops are needed. Anyone who is interested in helping for the race are encouraged to contact Bob KD6BWH.

Old Business: Field Day- We are looking good for getting Portola Park, Ken W6HHC will be attending a meeting with Santa Ana city officials on use of park.

New Business: Matt K6LNX men-

tioned a potential new class for ham radio at Orange Coast College. He met with the professor who once taught this class several years ago. We need around 12-15 students. Hoping to run it for Fall semester 2003. If members know of someone who would like to take a class for their Technician license and take the test, please contact Matt K6LNX.

Good of Club: New member, Virgil - KF6KMW, found out about the club through the website, and has a few friends interested in the club through the site as well.

Respectfully submitted:
Matt K6LNX

WHOis - the Activities Chairman?

by
Ken W6HHC

(This is the fourth in a series of articles to inform you about the background of the officers and leaders of the OCARC.)

The Activities Chairman for the OCARC this year is Phil Andersen - N7PA. Phil first received his HAM ticket in 1988 as N6UJD. He later used KK6QE for many years. He has been associated with OCARC since 1989 when we were meeting in the Mercury S&L building.

Phil's QTH is San Clemente. His low-band station at his home uses a Kenwood 440 and 25 ft "flagpole" antenna. He also has a 170 loop antenna strung under the eaves of the house. There are three J-poles in the attic: 6M, 2M & 440.

For mobile operations, Phil uses a Kenwood V7 with a Comet mag-

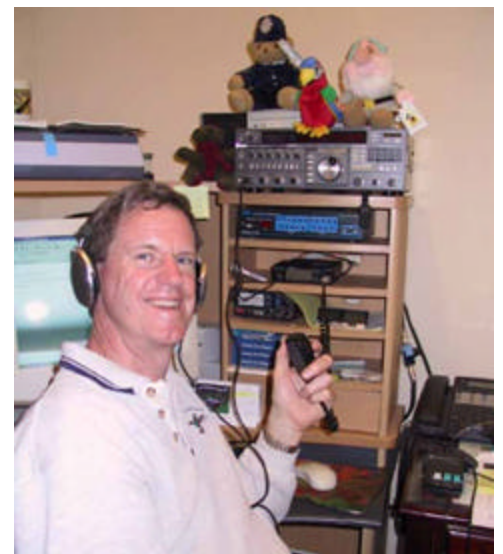
mount on 144/440. For emergencies situations, Phil also has a portable TS-50 rig for the lowbands in a bag...ready to travel with a Comet car antenna.

Phil's favorite HAM activities include OCARC Field Day, Baker-2-Vegas and conventions. Phil is oriented towards public-service activities is proud of the ARES organization he helped build with the Tustin Police.

Phil is a second-generation Californian, born in San Mateo. He does executive recruiting for Banking, CPA, and Law

His favorite non-HAM activities include: his family, shooting, photography, and both he and his wife (Phyl - K7PMA) are very active in their church.

Phil's current HAM goals are:
(1) to get his station completely set up in his new house and
(2) he is looking forward to operating at Field Day this summer.



Phil Andersen - N7PA at the Controls of his Station.

**Baker-to-Vegas
Communications
Event needs Ops !!**

April 20 & 21

Each spring, approximately 210 running teams from law enforcement agencies nation-wide participate in this 120 mile relay race through the California and Nevada Desert.

The race begins 18 miles north of Baker and proceeds north over Ibex Pass to Shoshone then on to Pahrump Nevada, up the mountains through Mountain Springs and down to Las Vegas, ending at the Rio Resort and Casino. The race

is broken up into 20 legs, varying in length from 4.8 to 7.1 miles.

As amateurs, we provide course-wide communications with FM radios, packet radios and GPS/APRS displays.

Members of OCARC are helping to provide race communications for the Police Departments of the City of Orange and the City of Garden Grove. They are looking for operators who have 2M mobile rigs or who can just act as operators.

If you can help, please call

Elmer Thomas - WA6PFA
(714) 771 2917

or

Bob Buss - KD6BWH
(714) 534-2995

Wednesday Nets

March Check-ins
(Both 10-meter & 2M nets):

KD6BWH	AF6C
K6CCD	KD6CFE
KD6FZE	KB1GZ
W6HHC	KQ6JD
WB6IXN	W6KFW
KG6KGG	K6LDC
KF6LEX	WA6OGO
W6RWY	KF6TRA
KB6TWA	K6VDP
KE6WOX	

Check WB6IXN's
Net News page on:
<http://www.w6ze.com>



Next RF Deadline: May 4th

ORANGE COUNTY AMATEUR RADIO CLUB, INC
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First Class Mail

Time Dated Material.
Please Expedite!!