Greetings All!

Firstly, I would like to wish everyone and their families a happy and prosperous 2002. Also, I would like to thank our past President and board for an excellent year; we all appreciated their guidance, direction, time and efforts. As our sights turn upon the coming year I hope I can fill the “size twelves” I’ve been left to fill. It is my observation that our club has been one of the fortunate few to have remained solvent with increased membership and to have maintained an overall interest in the art of Amateur Radio. It is my goal to continue in the footsteps of my predecessors and to nurture the Club in a positive direction.

This coming year, with the grace of the board, I would like to see some old club traditions revived as well as maybe start a few of our own. It is my belief that the strong traditions of our club, i.e. the "not-so-DX-peditions", B2V, field day, etc... form the foundation that our club is built on. However, it is because of the expertise from within that we are able to continue.

At this time I would like to thank all those who have advised me, given me direction over the years, and have shown their confidence in me by electing me their President.

Sincerely,
Cory, KE6WIU

December Meeting Minutes:

The Orange County Amateur Radio Club held its annual Christmas dinner on Sunday December16th at Mimi’s Café in Fountain Valley. Thirty-four people attended the event and shared good food and company. Once again Mimi’s provided an enjoyable atmosphere and good service.

Bob Buss - KD6BWH, as outgoing Pres, acted as emcee and introduced the new Board of Directors:

President: Cory Terando KE6WIU
Vice Pres: Lowell Burnett KQ6JD
Secretary: Matt McKenzie K6LNX
Treasurer: Al Toering N6TEZ
Activities: Phil Andersen N7PA
Membership: Chris Winter W6KFW
Publicity: Frank Smith WA6VKZ
Technical: Larry Beilin K6VDP
Members-at-Large: Bob Buss KD6BWH

- see Dec Minutes cont’d on Pg 7 --
2002 Board of Directors:

President:
Cory Terando, KE6WIU
(714) 894-3817
corymuzk@yahoo.com

Vice President:
Lowell Burnett, KQ6JD
(714) 997-0999
LBur729028@aol.com

Secretary:
Matt McKenzie, K6LNX
(714) 546-2228
k6lnx@qsl.net

Treasurer:
Al Toering, N6TEZ
(714) 667-2768
n6tez@earthlink.net

Membership:
Chris Winter, W6KFW
(714) 543-6943
cwinter727@aol.com

Activities:
Phil Andersen, N7PA
(949) 492-1900
n7pa@arrl.net

Publicity:
Frank Smith, WA6VKZ
(909) 763-0907
wa6vkz@msn.com

2002 Club Appointments:

W6ZE Club License Trustee:
Bob Eckweiler, AF6C
(714) 639-5074
af6c@arrl.net

Club Historian:
Bob Evans, WB6IXN
(714) 543-9111
bobev@netzero.net

RF Editor:
Ken Konechy, W6HHC
(714) 744-0217
kkonechy@pacbell.net

WEB Master:
Ken Konechy, W6HHC
(714) 744-0217
kkonechy@pacbell.net

ARRL Assistant Director:
Ken Konechy, W6HHC
(714) 744-0217
kkonechy@pacbell.net

ARRL Awards Appointees:
Larry Beilin, K6VDP
(714) 557-7217
k6vdp@aol.com

Art Dillon, KE6WOX
(714) 997-2078

OCCARO Delegate:
Bob Buss, KD6BWH
(714) 534-2995
kd6bwh@aol.com

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.
A HISTORY of OCARC PRESIDENTS

by
Ken - W6HHC

with great assistance from our Club Historian, Bob - WB6IXN

YEAR

2002 KE6WIU Cory Terando
2001 KD6BWH Bob Buss
2000 K6LDC Larry Hoffman
1999 WA6VPP Bud Barkhurst
1998 KD6BWH Bob Buss
1997 WA6VKZ Frank Smith
1996 AF6C Bob Eckweiler
1995 N6XTJ Jim Roberts
1994 KJ6ZH Chris Breller
1993 KC6TAM Jane Breller
1992 WA6VKZ Frank Smith
1991 W6HHC Ken Konechy
1990 KJ6ZH Chris Breller
1989 WA6VKZ Frank Smith
1988 W6HHC Ken Konechy
1987 N6JSV Jim Talcott
1986 WA6VKZ Frank Smith
1985 AF6C Bob Eckweiler
1984 KA6IMP Chris Breller
1983 W6IBR Al Watts
1982 KA6HNY Robin Hoff
1981 WA6VKZ Frank Smith
1980 WA6FOW Ernie Prichard
1979 WB6IHZ Terry Mathers
1978 WA6LFF Jim Kingsbury
1977 WA6WZO Fried Heyn
1976 WB6PEX Martin Raymond
1975 WA6LHB Art Sheldon
1974 W6HHC Ken Konechy
1973 WB6QNU Bob Eckweiler
1972 WA6FIT Ron Cade
1971 WB6CQR Billy Hall
1970 WB6UDC Jack Hollander
1969 WA6ROF Jerry VerDuft
1968 W6COJ Dave Hollander
1967 WB6GPK Jim Hill
1966 WA6YWJ Jack Shaw
1965 K6KTX Rolland Miller
1964 W6WRJ Ralph Alex Alexander
1963 W6DEY Roy Maxson
1962 K6LJA Ted Glick
1961 K6IQ Roy Morriss
1960 K6TXS Charles (Ed) Edwards
1959 W6BVI Ken Kesel
1958 W6BVI Ken Kesel
1957 - CLUB DISBANDED!!
1956 W6HIL Bob Swenson
1955 W6BVI Ken Kesel
1954 W6UPP Marinus Conway
1953 Probably only informal meetings, no officers?
1952 W6QZQ Horace Bates
1951 W6LDJ Sam (Mac) McNeal
1950 Probably only informal meetings, no officers?
1949 W6CGF Chuck Lunder
1948 W6BWO Dale Bose
1947 W6ALO Tommy Genges
1946 W6DEY Roy Maxson
1945 W6DEY Roy Maxson
1944 - ALL OFF TO WAR!!
1943 - ALL OFF TO WAR!!
1942 W6BN Roy Cumpston
1941 W6BAM Shelley Trotter
1940 W6KLU Harold Christensen
1939 Probably only informal meetings, no officers?
1938 W6NSA Les Gates
1938 W6ADT Noral Evans
1937 W6LYN Noral Evans
(Also reissued W6ADT)
1936 W6LYN Noral Evans
(Also reissued W6ADT)
1935 - CLUB DISBANDED!!
1934 W6GO Earl Moore
1933 W6GO Earl Moore

OCARC Minutes of the Board Meeting January 5th 2002

The January Board meeting was held after the club breakfast on January 5th. The meeting was called to order at 8:41 AM. There were 16 members present, with 7 board members in attendance.

Board members present were:
President Cory- KE6WIU,
VP Lowell-KG6JD, Secretary Matt-K6LNX, Treasurer Al- N6TEZ,
Membership Chris- W6KFW,
Member-at-Large Larry- K6LDC, and
Technical Larry-K6VDP.

No correspondence from Secretary Matt - K6LNX. Secretary Matt-K6LNX and Treasurer Al- N6TEZ were given the keys for the OCARC P.O. Box.

Treasurer's report:
The 2001 Audit was successful. Preparations for change over are complete, and all materials transferred to new 2002 treasurer, including going to the bank after the meeting with 2002 President,

- see Board Minutes cont'd on Pg 8 -
### 2001 Financial Report

**Orange County Amateur Radio Club**

#### Beginning Balance Statement - Jan 01, 2001

<table>
<thead>
<tr>
<th>Account</th>
<th>Amount</th>
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<tbody>
<tr>
<td>Cash Box</td>
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<tr>
<td>Checking Account</td>
<td>$1,595.44</td>
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<td><strong>Beginning Balance:</strong></td>
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**APPROVED 30-Dec-2001:**

**INCOME**

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
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</thead>
<tbody>
<tr>
<td>ARRL Convention Inc</td>
<td>$400.00</td>
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<tr>
<td>ARRL Income</td>
<td>$266.00</td>
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<tr>
<td>Auction In</td>
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<tr>
<td>Badge Income</td>
<td>$60.00</td>
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<tr>
<td>Coffee Mug profit</td>
<td>$6.00</td>
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<tr>
<td>Donation - W6NGO Trust Fund</td>
<td>$450.00</td>
</tr>
<tr>
<td>Donations - FD</td>
<td>$120.56</td>
</tr>
<tr>
<td>Dues, Family</td>
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<tr>
<td>Dues, Membership</td>
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<tr>
<td>Raffle Reg Income</td>
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<tr>
<td>Raffle Special Income</td>
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<tr>
<td>Refreshments Income</td>
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<tr>
<td>Refund from FD Advance</td>
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<td><strong>TOTAL INCOME</strong></td>
<td><strong>$2,992.11</strong></td>
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**EXPENSES**

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<tr>
<td>ARRL Expense</td>
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<td>Donation - OC Fair</td>
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<td>Field Day Food</td>
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<td>Program Splt Exp</td>
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<td>Refund paid</td>
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<td>RF Postage Expense</td>
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<td>World Radio</td>
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<td><strong>TOTAL EXPENSES</strong></td>
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**TOTAL NET INCOME**

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#### Ending Balance Statement - Dec 31, 2001

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**Bob Eckweiler - AF6C**

**Elmer Thomas - WA6PFA**

**Bud Barkhurst - WA6VPP**
Tech Talk #13
An Introduction to Digital Communications

By Ken Konechy W6HHC

(This is the first part of a Tech Talk series to overview the field of Digital Communications.)

This introduction starts out like good story for a long winter night. Once upon a time (last summer) I took an on-line class over the Internet from UCI on CDMA Digital Communications. Where CDMA (Code Division - Multiple Access) is the communications technology that is used in modern cell phones. Now, I have been a HAM for over 40 years...and I thought I knew a lot about RF Communications (I'll call it old-fashioned "analog" communications). Well this course "blew my socks off"!!

I couldn't believe all the accomplishments that can be achieved if you use digital communications theory and digital techniques!!! For example: you can place 50 stations on the same frequency (25 pairs of CDMA communicating stations) and they will NOT significantly interfere with each other!

I can clearly see how digital communications will become more important to Ham Radio in the future. (Note: see page 28 of the January 2002 issue of QST for another introduction to Digital Voice Communications.)

The DigiComm Concepts
First, let me list some of the main building blocks of Digital communications so you get a feeling on what we will cover over the entire series. And then I will cover them month-by-month in the Technical Talk Series.

1) 1's and O's
Digital communications differs from your old "analog" RF communica
tions in that you are not sending monotones (Morse Code) nor are you sending speech tones over the RF. What is transmitted is a series of 1's and 0's. A stream of 1's and 0's is called digital information or digital communications.

2) Analog-to-Digital Conversion
When you speak into a mike, your output is analog voltage. So, right away we need to have circuitry to convert analog signals into digital signals (a stream of 1's and 0's).

3) Voice Compression
I will talk about this more in a later article in the series, but when you convert voice into 1's and 0's it becomes a bandwidth-hog. Voice compression was invented to reduce human voice back to a reasonable bandwidth.

4) Multiple Access Techniques
There are several different techniques to share frequencies with many stations. Later in this first article I will describe 3 different Multiple Access technologies including Spread Spectrum.

5) Signal-to-Noise Improvements
There are two basic approaches to increasing the number of stations on the same frequency. This approach deals with improving the signal to noise ratio. Later in the series I'll explain how Shannon's Theorem is a handy way to deal with tradeoffs.

6) ORTHOGINAL Signals.
This is the other basic approach to increasing the number of signals on the same frequency. Two (or more) orthogonal signals don't interfere with each very much. I will talk about code division using WALSH NUMBERS and PSUEDO-RANDOM NUMBERS to make signals orthogonal to each other. This is the "Code Division" part of CDMA. Code division acts like a digital filter. It involves a lot of math, but I think I can explain the concepts in a simple way.

7) Dealing with Fading Propagation
Cell phones run low power and have to work in a terrible environment. They have to deal with multiple signals bouncing off buildings and also when a car moves--the motion changes the phase of the received signal. I'll describe the techniques used by cell phones.

8) Digital Receivers
Well, if a transmitter is not transmitting analog any more, then you can not tune in sidebands in order to recover streams of 1's and 0's. Digital transmitters and digital receivers are designed to work with modulation technologies like FSK (Frequency Shift Keying), PSK (Phase Shift keying), and QPSK (Quad Phase Shift Keying). Just like your modem or Packet-Radio TNC.

Multiple Access Techniques
In the remainder of this Tech Talk article, I'll describe three different multiple-access technologies:

(a) FDMA (Freq Division - Multiple Access)
(b) TDMA (Time Division - Multiple Access),
(c) CDMA (Code Division - Multiple Access)

(a) Freq Division - Multiple Access
FDMA was the first approach tried in old cell phones (known today as analog cell phone technology and sometimes called G1 cell phones for Generation One).

The basic concept of FDMA is to use different frequencies for different stations to avoid adjacent interference. Figure 1 on page 6 shows a "cell" layout for cell phone FDMA operation.

-- see Tech Talk cont'd on Pg 6 --
Figure 1 - The Frequency “re-use” pattern used in FDMA.

The concept is that you assign a different FREQUENCY to each station operating in a physical “cell”. Each frequency is assigned a different letter in Fig 1. You can see how the nearest other station using Freq ‘A’ (the one on the right) is located several miles away from the Freq ‘A’ station on the left and therefore its signal strength is much weaker than the station transmitting on Freq A cell on the left. Any Freq ‘B’ or Freq ‘C’ (etc) station will not interfere with stations on Freq ‘A’. FDMA is designed to work with “line-of-sight” communications and not with ionosphere propagation type of signals.

In a way, this is somewhat like how Hams operate on 2 Meters. When stations that are close to each other are on the same frequency, they interfere. Two stations won’t interfere if (1) they are close, but on different frequencies or (2) they are on the same frequency, but are not close to each other.

Figure 2 looks at the three dimensions of Multiple Access for FDMA technology. These three dimensions are Frequency, Time, and Power-level.

Figure 2 - The Three Dimensions of FDMA

In Fig 2, the gold color can be thought of as one unique frequency, perhaps Freq ‘A’. The blue can be a second unique frequency like Freq ‘B’, etc.

As it turns out, FDMA technology has the least amount of efficiency for sharing frequency spectrum (that is: the most amount of interference). In addition it is very difficult to move "cell frequencies" around since they have "adjacency rules" that can not be violated.

(b) Time Division - Multiple Access

TDMA technology evolved from FDMA and was used in the next generation of cell phones, called G2. The basic concept of TDMA is that several users share the same frequency channel at different times. Essentially three users take turns using the channel in time-slots that are about 20 milliseconds long. During that 20 msec slot, only one user owns it, then he gives it up so that another user can grab a time-slot.

Figure 3 looks at the three dimensions of TDMA technology. In Figure 3 the colors (1) pink, (2) purple, and (3) gold represents three different users sharing time-slots on the first channel.

TDMA represents about a 200% improvement over FDMA (that is: more users) mainly because TDMA is starting to digitize the voice into 1s and 0s and take advantage of digital technologies.

(c) Code Division - Multiple Access

Like many other important inventions, digital communications and specifically Spread-Spectrum technology was developed in a war-time environment. Spread-spectrum was devised to both (1) make it harder for the enemy to hear (intercept) the communications and (2) improve the probability for communications to survive enemy jamming.

CDMA technology evolved after TDMA and was used in the next generation of Cell phones, called G2.5 (that is: Generation 2 and a half). The basic concept is to use Orthogonal Coding to allow you to transmit many, many signals at the same time on the same frequency....and then be able to separate out the individual signals in order to reliably receive them. This really is spread-spectrum...every signal is everywhere!

Figure 4 - The Three Dimensions of CDMA

The colors light blue, green and dark blue in Fig 3 represent three other users sharing time-slots on the second channel frequency.

-- see TechTalk cont’d on Pg 7 --
How does CDMA do that? Well, CDMA introduces directional antennas within cells, expands spread-spectrum, and also we need to study how Orthogonal Codes work as digital filters in a future Tech Talk session. I will say that CDMA can usually pack about 50 stations talking simultaneous (25 communicating pairs) in each cell shown in Fig 1.

The next article in the TechTalk Digital Communications series will review Analog-to-Digital converters and how to turn your mike output into a digital stream of 1s and 0s.

December Minutes
(continued from page 1)

Bob KD6BWH also presented the "2001 W6NGO Good of the Club Award" to Bob Eckweiler - AF6C, for his contributions as newsletter editor, net control operator, and FD Team Captain. Since AF6C also prints the award each year for the club, Bob Buss had to be clever and AF6C never knew he had won until the presentation!

Outgoing V.P. Cory - KE6WIU then presented Bob Buss with the 2001 Presidential plaque FOR A JOB WELL DONE and Bob turned the gavel over to CORY to rein as the 2002 club President.

Submitted by Bob - AF6C

Wednesday Nets

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

<table>
<thead>
<tr>
<th>Call Sign</th>
<th>Call Sign</th>
</tr>
</thead>
<tbody>
<tr>
<td>KD6BWH</td>
<td>AF6C</td>
</tr>
<tr>
<td>K6CCD</td>
<td>NG7D</td>
</tr>
<tr>
<td>W6HHC</td>
<td>KQ6JD</td>
</tr>
<tr>
<td>W6KFW</td>
<td>WA5IMI</td>
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<td>K6VDP</td>
<td>KE6WOX</td>
</tr>
<tr>
<td>N5YRJ</td>
<td>KE6YZW</td>
</tr>
</tbody>
</table>

Check WB6IXN's Net News page on: http://www.w6ze.com
Minutes of the Board Meeting  
(cont’d from page 4)

VP, Treasurer, and 2001 Treasurer to sign the legal signature cards.

Membership:
All records for membership were transferred to the new 2002 membership officer.

Technical: Nothing to report.

Old Business:
Tustin Police Department will be in 2002 Baker to Vegas race, still no word on whether they will utilize OCARC, awaiting more info which should be available by January general meeting. Possibility of OCARC doing backbone for Baker to Vegas race discussed but this is a tremendous responsibility.

New Business:
Discussion about purchasing a laminator for OCARC to be able to laminate member badges on our own. Bob AF6C is looking into details. Motion made by Larry K6LDC, seconded by Lowell KQ6JD to purchase laminator for up to $50 plus tax. The motion passed unanimously.

Good of the Club:
Discussion that visitors and guests should be acknowledged before the program speaker begins, to make them feel more welcome. Possibility of starting Mr. RF program again.

Cory would like more club unity, more of a family atmosphere. As part of this, Cory brought up possibility of having a “nightcap” after the general meetings at the El Ranchito restaurant, on 1st Street between Golden Circle Dr. and Tustin Ave. in Santa Ana. Details will be announced at January general meeting.

A point was made to start giving out Membership Packet to new members, which might include a club sticker, membership card, temporary visitor's badge sticker for their first meeting, most recent RF newsletter, and copy of club bylaws. Cory will check the bylaws to see if they mention what the contents of a Membership Packet should include. If bylaws do not mention Membership Packet then the details will be discussed at subsequent meetings.

Motion to adjourn by Lowell, seconded by Cory. Meeting adjourned at 9:04 AM.

Respectfully submitted,
Matt K6LNX

ORANGE COUNTY AMATEUR RADIO CLUB, INC
P.O. BOX 3454
TUSTIN, CA  92781-3454

First Class Mail
Time Dated Material. Please Expedite!!

January 2002 - RF  Page 8