



Welcome to SFARC, Auburn, CA

# Sierra Signals



P.O. Box 6421 Auburn, CA 95604

December 2013

<http://w6ek.org> [info@w6ek.org](mailto:info@w6ek.org)

## At The Key of SFARC:

### **PRESIDENT**

Bob Brodovsky, K6UDA  
K6UDA@att.net

### **VICE PRESIDENT**

Dave Albright, NO6NO  
no6no@pacbell.net

### **SECRETARY**

Dennis Gregory, WU6X  
wu6x@hotmail.com

### **TREASURER**

Richard Kuepper, WA6RWS  
rkuepper@surewest.net

### **DIRECTORS**

Chuck Baker, AE6LR  
Mark Graybill, W8BIT  
Donna Naylor, W6CQX

### **FIELD DAY CHAIRMAN**

Dave Albright, NO6NO

### **REPORTERS**

Satellites: Greg, K06TH  
History: Gary, KQ6RT  
Misc Radio: Fred, K6DGW  
Sunshine: Richard, WA6RWS  
rkuepper@surewest.net

### **REPEATERS**

145.430 (-0.6 MHz/PL 162.2)  
440.575 (+5.0 MHz/PL 162.2)  
223.860 (-1.6 MHz/PL 162.2)

### **CLUB NET**

Thursdays, 7:30PM, W6EK/R  
145.430

### **CLUB MEETINGS**

Second Friday of the month,  
7:30PM at the Auburn City Hall,  
1215 Lincoln Way, Auburn CA

### **CLUB BREAKFAST**

Last Sat of the month at Mel's Diner  
1730 Grass Valley Hwy, Auburn 7:30AM

### **NET CONTROL OPS**

Dave Jenkins, WB6RBE  
Gary Cunningham, KQ6RT  
Norm Medland, W6AFR  
Casey McPartland, W7IB

### **NEWSLETTER EDITOR**

Barbara Anderson, W6EVA  
916.624.1343  
anderson51@starstream.net

### **WEBMASTER & ARRL PIO:**

Carl A Schultz, WF6J



## December

## Calendar

**Saturday 14:**  
Club Christmas Party

**Wednesday 25:**  
Christmas

**Saturday 28:**  
Club Breakfast

## Inside this issue:

- *The Loading Coil*
- *Miscellaneous Radio – Coding & Ham Radio*
- *Club Christmas Party information*
- *Board & General Minutes*



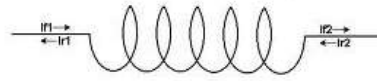
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## The Loading Coil

By Bob -K6UDA, President



It's been my pleasure serving the membership of SFARC for the past two years. Serving as president has taught me quite a bit about ham radio and ham radio operators. I know for a fact that I have gained more than the rest of you, both in knowledge of the hobby and friends that I have gained through the hobby and the club.

I suppose as I write my final presidential column for the Sierra Signals, I'm entitled to look back over our goals and achievements. Way back in January 2012, I wrote my first of now 24 monthly ramblings. My goal then was to grow the membership of SFARC. Through the work, determination and friendliness of the membership in this radio club, I think we've met and exceeded that goal with **39** new members in **2013** bringing our membership to **120 members**.

This past year has been what I would call an evolution in the club and its membership. We've moved to a large room that lends nicely to displaying of projects and presentations. It seats the entire membership. Our first meeting there was colossal. Who would have thought we would run out of parking and seating. We moved the monthly breakfast from Suzie's Cafe in Roseville (*where it had been held since 1891*) to Mels in Auburn. That little move over doubled participation at the first breakfast and has since remained very popular with the entire membership.

Field Day this year was incredible. About 80 licensed hams signed in and participated. A significant increase from the days of 15 to 20 hams showing up. **Mike N6BRP** ran a prepper food tasting tent which was a first for the club. I look forward to help him with that next year. I do believe 2013 was a record year for Field Day participation. We even had our own FD T-shirts. I hope that becomes a club tradition.

We have two new nets operating on the W6EK repeater. **Carl WF6J** hosts the elmer net and the Emergency Preparedness net now has five rotating hosts. I hope to see more activities like this in the future.

### Looking ahead

I'm not a fan of sitting back looking over what I've accomplished in life, I'd rather look forward to what I can accomplish. I've had big vision for this club and continue to have that vision. It's neat to see new hams showing up to our meetings and becoming involved with the club as I did. We need to remember that these new folks haven't built their first radio or antenna, they bought it. Soon after they key the mic for the first time, they begin to discover the limitations of HTs, rubber duckie antenna and the natural faraday cages we commonly call cars. It's my hope that the membership continues to showcase simple solutions to these basic

(Continued on page 3)



problems beginners have. Cheap little fixes turn users into experimenters. Experimenters tend to upgrade. Please bring your show & tell projects to the monthly meetings and encourage our future extra class operators.

As far as outreach, we've done an incredible job. **Carl WF6J** has put in long hard hours both on the website and in spreading the word to outside organizations and groups about ham radio and our club. **Ron KK6DHJ** has personally brought in several new members through his firearms instruction. (*who would have seen the correlation*). We took part in the Rocklin Patriots Day this year and were a huge hit with the people. I still see an opportunity in hosting a hamfest /preparedness fair.

I talked last month about the possibility of having a club contest. I'll pursue this further with the new board. How about prizes or awards for contacts on different bands, different modes, based on license class. Could be 24 hours of fun. Something like this is sure to attract others to want to play and maybe join the club.

This years election has been a major evolution from years past. Four members vied for two seats on the board. One vote decided it. I sincerely hope this grows next year, and all the seats for officers & board are contested. Keep it up. Fresh blood is what will keep our club vibrant and relevant to new hams and OM alike.

Placer County ARES is now becoming THE standard for emergency communication coordination thanks to **Chuck KG6FFK** and **Fred KF7QVB**. These guys are putting together real world training exercises to keep the ARES members at top operating performance. Thank you guys and I hope to see ARES grow in 2014 and beyond.

In our future, I see an unlimited opportunity for learning programs, mini seminars, workshops etc. that we have barely scratched the surface of. We have the facility, we have the expertise, and we have a whole new generation of hams eager to learn.

I'd like to thank the current slate of officers and directors for an incredible amount of work and dedication they put in to operating SFARC. **Dave NO6NO** is simply a powerhouse of get-r-done. He has taken on so much, so often and returns such stellar results it boggles my mind. **Richard WA6RWS** has managed the clubs money well & our bank account shows it. He also does an impeccable job managing the club repeater. **Dennis WU6X** has taken the art of secretary to an art form. **Mark W8BIT** was always the voice of reason at board meetings and I'm glad he is staying on next year. Without these guys, the club would not have functioned period. Gentlemen, keep it up next year. I also wish thank our outgoing directors, **Chuck AE6LR** and **Donna W6CQX**. They carried out their duties despite family and health issues.

**Tyghe Richardson KD6MLH** will take the helm next year. He's not a new ham but is new to the club. He brings with him a wealth of new ideas and enthusiasm for the continued growth and success of SFARC and the local community.

*I have one last rant.* The new chairman of the FCC, Tom Wheeler is no fan of amateur radio. His idea of the airwaves is to sell off every last bit of it to the highest bidder. We hams need our voices heard. Please join the **ARRL** as they are the only lobby voice amateur radio in the USA has. There are almost 1 million hams in the USA now, there needs to be 1 million members of the ARRL to protect our bandwidth.

As I take my seat at the back of the meeting room I think I'll miss writing this piece the most. Again, thanks for letting me serve as president.

Talk Hard,  
Bob K6UDA



# MISCELLANEOUS RADIO

## Coding and Ham Radio

### Block Codes

So far, we've gotten through character encodings – patterns of bits that we can assign to our system alphabet--encodings with “space” between the valid code patterns that allow us to detect if an error has occurred, and, if we create enough “space” in the character encoding, we can actually correct errors, albeit fewer corrections than detections.

CH	BIT POS							HEX
	6	5	4	3	2	1	0	
A	0	0	0	0	0	0	0	0x00
B	1	1	0	1	0	0	1	0x69
C	0	1	0	1	0	1	0	0x2A
D	1	0	0	0	0	1	1	0x43
E	1	0	0	1	1	0	1	0x4B
F	0	1	0	0	1	0	0	0x24
G	1	1	0	0	1	1	1	0x63
H	0	0	0	1	1	1	0	0x0E
I	1	1	1	0	0	0	1	0x71
J	0	0	1	1	0	0	0	0x18
K	1	0	1	1	0	1	1	0x53
L	0	1	1	0	0	1	0	0x32
M	0	1	1	1	1	0	0	0x3C
N	1	0	1	0	1	0	1	0x55
O	0	0	1	0	1	1	0	0x16
P	1	1	1	1	1	1	1	0x7F

### (7, 4, 3) Encoding

takes the next 4 bits, generates a 7-bit code word for them, and transmits them. We've now received one 8-bit ASCII character and transmitted it using 14 bits. The decoder reverses the process by taking two 7-bit blocks, decoding each into two 4-bit blocks and applying the error correction to each block, and together we have the original 8-bit ASCII character ... providing no more than one bit was in error in each 7-bit block.

There are some prices to pay for this “fire-and-forget” capability. First, for every incoming 4 bit block, we will transmit a 7-bit block. We say that the “rate” of this code is 4/7, or 0.57, slightly over one half. Secondly, since we're transmitting more bits than are coming into us, the transmit channel speed has to be higher than the speed of the bits coming in, or we have to have some way to buffer the incoming bits.<sup>2</sup>

In my example above, the incoming characters are 8-bits long and we divided them into two 4-bit blocks which seemed convenient. It is by no means necessary however. If our incoming stream of characters were 5-bit ITA2 [Baudot] codes such as from a RTTY keyboard, we still just take them 4-bits at a time, encode to 7-bits, and transmit. Incoming characters will span two code blocks, but nobody cares.

So, the (7, 4, 3) Hamming code really has nothing to do with our character encoding. We just take the incoming data stream of bits in four's, encode them and transmit. If I run out of incoming bits before I've filled another 4-bit block, I just pad it with zero bits. This is a signature characteristic of a Block Code.

Now, here's the cool part! I can encode my data stream in a (7, 4, 3) Hamming code which will automatically correct 1-bit errors in each 7-bit block. If my system alphabet is character-encoded in CCIR-476, I can detect 1-bit errors

Here's that (7, 4, 3) Hamming character encoding from last month again. It has 16 valid character codes out of a total of 128, so 112 of the possible codes are invalid ... they're the “space” referred to in the first paragraph.

I have a confession. I introduced this entire subject as “character encodings” because that's the easiest way to approach it. It's fairly intuitive that the CCIR-476 encoding leaves a lot of “space” between the valid characters, that that “space” can be used to separate valid characters from invalid [i.e. those that had a bit error in transmission], and that we can thus detect those errors.

While useful to get into the subject of digital coding, that's a very narrow view of the terrain however. In fact, the (7, 4, 3) Hamming code from last month really has nothing to do with “characters” like A-P, those were just arbitrary assignments on my part. It is simply an encoding process that takes 4-bit blocks, and transforms them into 7-bit blocks, which I send to my QSO partner. The code at the left is not really a character encoding at all, it's one of a countable infinity of Block Codes.<sup>1</sup>

While 16 valid code words [i.e. characters] might be enough for some applications ... digits 0-9, decimal point, plus, minus, start, and end of message ... we really would like to be able to create streams of ASCII [or CCIR-476] characters and somehow encode them. And, we can do that because there is nothing about the (7, 4, 3) Hamming code that involves “characters,” it is simply a transform of 4 bits into 7 to be transmitted.

So, let's create a stream of ASCII characters, each 8-bits long. My encoder takes the first 4 bits, generates a 7-bit code word, and transmits it. It then

<sup>1</sup> Albeit a member of a somewhat unique class of binary block codes.

<sup>2</sup> And be able to count on gaps in the incoming data stream to empty out the buffer.



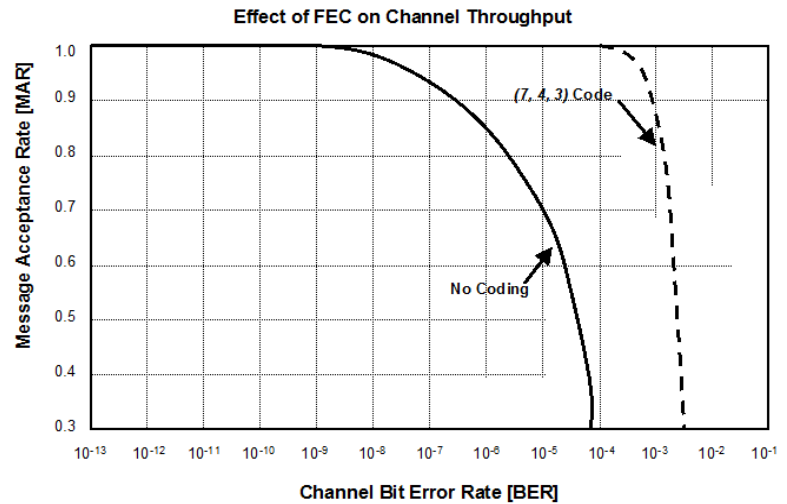


after the forward error-correction has been applied. This is a huge benefit because, unless the radio channel is really bad, most of the errors will be corrected, and those that aren't will likely be detected when the decoder reports an invalid CCIR-476 character.

This concept is called “code concatenation” by the math dudes ... I encode my characters in a code in which I can detect errors [CCIR-476, called the “source coding”], and then I encode that stream in another code [(7, 4, 3), called the “channel code] which will correct 1 error per 7-bit block. A variant of this concept is used on many space channels, particularly on spacecraft headed for far reaches of the solar system. On receipt of the message, many of the errors will have been corrected, and those that haven't been corrected will show up as invalid CCIR-476 character codes, and I know to ask for a retransmission. Well, some errors will leak through, this is a statistical process.

Intuitively, it seems pretty clear that being able to correct errors at the receiver without asking for a retransmission should be good, no? Retransmission is doubly inefficient ... the transmitter sends the same message twice, and there is the additional time for the receiver to ask for the retransmission. And, this presumes that it is possible to ask for a repeat in the first place [not possible in a broadcast channel with one transmitter and multiple receivers].

But, what can we expect quantitatively? The graph on the right came from data in one of my engineering notebooks from 1982 [the nice thing about math is that it's permanent and never becomes obsolete ☺]. It depicts the Message Acceptance Rate<sup>3</sup> against the raw bit error rate in the channel. It's for a different code than our (7, 4, 3) Hamming code, but all such graphs look the same, the coding extends the point where the MAR begins to fall with the glide angle of a brick.



Without the Forward Error Correction, as the BER increases, we begin to see an immediate and rapid decline in the MAR, because fewer and fewer messages can sneak through between the error bits [noise pulses], and eventually, it is virtually guaranteed that every message will encounter errors. The uncoded channel at that point is useless. With FEC, the MAR stays very high longer because the occasional errors are being corrected. At some value of BER, more errors begin occurring than the code can correct, and the MAR falls very rapidly to zero [i.e. nothing gets through], and again the channel becomes useless. However, it has been useful at higher channel bit error rates ... that is, in a noisier channel ... than with no coding.

Doing the encoding and decoding prior to the advent of the microprocessor required a specific hardware design for each code you might want to use, usually involving shift registers and lots of logic. When microprocessors became ubiquitous in the environment, we could actually do binary arithmetic and the hardware became standard with all of the code-specific stuff in software [or firmware].

We're finally to the point where we can build an encoder for our (7, 4, 3) Hamming code, and we'll do that next month.

73,

Fred K6DGW

<sup>3</sup> MAR is the fraction of messages received correctly after error-correction divided by the total number sent





## Club Christmas Party

Hi Everyone,

Please sign up for the Christmas Party. It is on **Saturday December 14, 2013**. Early postings on the Website list it as December 15. The correct date is December 14 Saturday.

Working through the planning, the Board thinks that Saturday would be advantageous. The traffic would be less making the drive easier. The Auburn Memorial Veterans Hall is larger for the anticipated increase in attendance and the parking is easier.

Turkey will be provided but please bring a dish to pass such as vegetables, deserts, potatoes and so on.

**To Sign Up**, go to the home page and click the link OR SEND ME AN EMAIL AT [amartin4@wavecable.com](mailto:amartin4@wavecable.com) or click the following link to go to the Website: <http://w6ek.org/xmas.html>

Thanks,  
AI  
NI2U



## BOARD OF DIRECTORS MEETING MINUTES November 8, 2013

The SFARC Board meeting for November commenced at 1800 hours at Round Table Pizza in Elm Avenue shopping center in Auburn.

**Roll Call:** President Bob Brodovsky-K6UDA and all officers and Directors were present. Also in attendance were Jim-WA8NPA, Randy-K7AGE and Toni Graybill.

### REPORTS and DISCUSSIONS

**President's Report:** Bob discussed intentions to open nominations for all officer and director positions during the meeting. He also suggested we investigate the possibility of installing a D-Star repeater at the W6EK site.

**VP/VE Report:** Dave-NO6NO made a motion to sign the lease for the Rose room for 2014, 2<sup>nd</sup> by Chuck-AE6LR; Passed. Dave reported (17) techs, (3) general and (1) extra class passed exams.

**Secretary's Report:** no report.

**Treasurer's Report:** Richard-WA6RWS reported net cash on hand at beginning of October as \$6,201.99; expenses of \$395.10; income of \$406.00 and a balance of \$6,211.99.

*(Continued on page 7)*



**Repeater Report:** Richard-WA6RWS Richard reported no current problems with the repeater and gave a status on connection of the 440 machine.

**Web/PIO Report:** Carl-WF6J asked via email for assistance with the Club website. Mark-W8BIT volunteered to assist. Carl asked for any updates to the membership form; none were offered.

#### **OTHER DISCUSSIONS:**

**Christmas Party:** Richard updated the Board on party plans. Donna-W6CQX will organize prizes. Dave-NO6NO made a motion to give (3) \$100 prizes this year, 2<sup>nd</sup> by Richard-WA6RWS; Passed. Mark-W8BIT moved to authorize Donna to spend up to \$250 on (15) gifts; 2<sup>nd</sup> by Dave-NO6NO; Passed. These decisions to be brought to the Membership for final approval.

**Other:** Chuck-AE6LR suggested booking a presentation by CalStar. Dave suggested getting Batteries-Plus to give a presentation at an upcoming meeting.

**Presentation:** Bob updated the Board on the planned D-Star presentation for the Meeting.

Meeting adjourned at 1842 hours.

## **GENERAL MEETING MINUTES**

### **November 8, 2013**



The SFARC General meeting for November commenced at 1930 hours at the Auburn City Hall Rose Room, President Bob Brodovsky-K6UDA presiding. All Officers and Directors were present. Bob led approximately 45 attendees in a Pledge of Allegiance to the flag followed by an introduction of Officers, members and guests.

#### **REPORTS:**

**Past minutes:** The minutes of the past General Meeting as posted in the Newsletter were approved as submitted on motion by Robert-W6RBL, 2<sup>nd</sup> by Dick-WB6EDR.

**President's Report:** Bob reported the planned nominations and elections of officers and directors for the meeting, and the presentation planned by himself and Randy-K7AGE.

**VP/VE Report:** Dave-NO6NO made a motion to sign the lease for the Rose room for 2014, 2<sup>nd</sup> by Chuck-AE6LR; Passed. Dave reported (17) techs, (3) general and (1) extra class passed exams.

**Treasurer's Report:** Richard-WA6RWS reported net cash on hand at beginning of October as \$6,201.09; expenses of \$395.10; income of \$406.00 and a balance of \$6,211.99.

**Secretary's Report:** Dennis-WU6X announced a Welcome Letter was available to new members and

*(Continued on page 8)*



guests, and to see him at the break.

**Sunshine Report:** no sickness or distress to report.

**Repeater Report:** Richard-WA6RWS reported the repeater was working as designed and connection of the 440 repeater to the controller was in progress. Richard also reported on his attendance of the NARCC meeting.

***OLD BUSINESS:***

**ARES:** Chuck-KG6FFK gave a brief report on ARES functions. Fred-KF7QVB gave a report on the SET during the Club picnic.

**Standing Committees:** Bob-K6UDA reminded the membership to volunteer for committees, the essence in keeping the Club running smoothly and spreading the work. Mark-W8BIT volunteered to assist WE6C on the Field Day 2014 Committee.

**Newsletter:** Richard-WA6RWS asked if everyone was getting the Newsletter as needed, and talked about distribution; he asked for articles from the membership to be sent to the Editor.

**Drawing and Refreshments:** George-KG6LSB reviewed items for the drawing; Jim-WA8NPA reviewed refreshment items.

***NEW BUSINESS:***

**Motions:** George-KG6LSB made a motion, 2<sup>nd</sup> by Mike to pay room rent for the Rose room for 1 year; Passed. Chuch-AE6LR made a motion, 2<sup>nd</sup> by Dick-WB6EDR to renew the domain name and website hosting for 2 years, or not to exceed \$300; Passed. Donna-W6CQX made a motion, 2<sup>nd</sup> by Fred-KF7QVB to have (3) prizes of \$100 each for the Christmas party; Passed. George-KG6LSB made a motion, 2<sup>nd</sup> by Jim-WA8NPA to have (15) prizes for up to \$250 cost for the Christmas party; Passed. Mike-K6BAA made a motion, 2<sup>nd</sup> by Jim-KD6BKV to pay \$400 to reserve the Veteran's Hall for the Christmas Party; Passed.

**Nominations:** Bob opened the floor for nominations. None were received for President; Ron-KK6DHJ was nominated for VP; no one for Secretary or Treasurer; Justin-K6UVK was nominated for Director.

**Elections:** Tyghe-KD6MLH was elected President for 2014; Robert-W6RBL and Jim-WA8NPA were elected as Directors. All other officers remained in office.

**General Announcements:** The Club Net meets every Thursday's at 7:30 on W6EK repeater; Board and General meetings occur on the 2nd Friday; Board is typically held at Elm Avenue Round Table Pizza in Auburn at 6pm (venue subject to change at the discretion of the Board), and General meetings at 7:30pm at Auburn City Hall. Club breakfasts are held on the last Saturday of every month at Mel's Diner in Auburn at 7:30am; the "Prepper Net" and the Elmer Net are held on opposite Wednesday nights at 7:30pm on W6EK repeater. See website ([www.W6EK.org](http://www.W6EK.org)) for more information date or venue changes.

**Presentation:** Bob-K6UDA and Randy-K7AGE gave an excellent presentation and demonstration of D-Star digital radios, software and operations capabilities.

The meeting adjourned at 2150. Submitted by Dennis – WU6X, Club Secretary









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Output Frequency	Input Frequency Offset
51-52	- 0.5 MHz
52-54	- 1.0 MHz
144.51-144.89	+ 0.6 MHz
145.11-145.49	- 0.6 MHz
146.0-146.39	+0.6 MHz
146.61-147.0	-0.6 MHz
147.0-147.39	+0.6 MHz
147.6-147.99	-0.6 MHz
223-225	- 1.6 MHz
440-445	+ 5.0 MHz
445-450	- 5.0 MHz
918-922	-12 MHz
927-928	-25 MHz



**SIERRA FOOTHILLS AMATEUR RADIO CLUB**  
P.O. Box 6421, Auburn, CA 95604

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P.O. Box 6421, Auburn, CA 95604

**2014 MEMBERSHIP APPLICATION**

Name: \_\_\_\_\_ Call: \_\_\_\_\_ Class: \_\_\_\_\_ e-mail: \_\_\_\_\_  
Address: \_\_\_\_\_ City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_  
Associate Name: \_\_\_\_\_ Call: \_\_\_\_\_ Class: \_\_\_\_\_ email: \_\_\_\_\_  
Phone: \_\_\_\_\_ Cellphone: \_\_\_\_\_ Application is: (Circle) New Renewal

**Dues / Donations:**

Membership: yearly*	\$ 22.00	Name Badge:	\$ 7.00	Yes (special name)_____
Associate: yearly*	\$ 7.00	Repeater Donation:	\$ _____	
Auto Patch Donation:	\$ _____	Newsletter Booster:	\$ _____	
Misc. Donation:	\$ _____	Christmas Donation:	\$ _____	ARRL member? (circle) Yes No
<b>TOTAL:</b>		<b>\$ _____</b>	<b>Please add \$1 if paying via PayPal</b>	

\*Prorated dues for NEW Members/Associates Only

July	\$ 20 /6	October	\$ 14/3 + following year
August	\$ 18/5	November	\$ 12/2+ following year
September	\$ 16/4	December	\$ 10/1 + following year

<b>OFFICE USE ONLY:</b>		<b>DO NOT WRITE BELOW THIS LINE</b>	
Date: _____	Treasurer: _____	Secretary: _____	Roster: _____
Payment: _____	Check Number: _____	Cash: _____	PayPal: _____