



# HARMONICS

1916

South Jersey Radio Association

2014



## Program That

These program articles are dedicated to our current Program Guru Kathy - KM2KME. You have done and are doing (and sure hope you will continue to do) a 59 (599) job as Program Person. As Historian I know what it is like to have to come up with something new and exciting each month and there are times that not only is the well running dry, but someone took the water carrying bucket or the rope to hoist that bucket broke. For your reading pleasure I went into that back room. Yes, there are black holes and dark matter and dark energy. They, along with other phenomena, exist in that back room.

Here are some of the programs and speakers that SJRA obtained during the 1950s.

### Part 1, The Years 1950 and 1951

#### 1950

**February**, Bill Price gives a talk on his experience with Direction Finders

**March**, Weather and its Effect on Short Wave Propagation presented by Theodore Gibson, W2NCV, Television Engineer at the Philco Corporation.

**April**, The Problem of Coupling R.F. Circuits to the Antenna presented by George Grammer, W1FD, who was a member of SJRA during his college days and is currently the Technical Editor of QST.

**May**, Words, Waves, and Music. A demonstration of the issues of light and radio waves in communications presented by Michael E. McCabe. Mr. McCabe had been with New Jersey Bell for 22 years.

**June**, An update on the Latest at ARRL by Brad Martin, the Atlantic Division Director.

**July**, What happened on Field Day 1948 or 1950 at Pine Hill. Movies over the past few years. Field Day never ceases to be a beloved topic and movies of SJRAers in action educate and amuse all.

**August**, White Elephant Sale

**October**, Albert E. "Doc" Hayes Jr., W2BFY, of CQ was the speaker.

**November**, Phil Catona, W2JAV, a member of SJRA, showing the equipment that he developed for amateur teletype service. Another teletype installation at the QTH of W2PAU, Brownie, completing the circuit.

*(Brownie certainly contributed much to SJRA in his 60 plus years with our club. He is one of my SJRA Heroes.)*

#### 1951

**January**, Electro Mechanical Filters presented by John Beckerich, an SJRA member

**February**, Larry LeKashman, W2IOP, former editor of CQ Magazine and editor of RCA Ham Times was the speaker.

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## SOUTH JERSEY RADIO ASSOCIATION

HARMONICS is published monthly and is the official news letter of the South Jersey Radio Association. The SJRA was established on June 16, 1916 and has been meeting continuously since its inception. The club has been affiliated with the American Radio Relay League since 1920.

The SJRA meets each month on the fourth Wednesday, January through September; and usually the third Wednesday, October, November and December; in one of the Meeting Room of the Gibson House at 525 East Main Street, Marlton, NJ 08053. Visitors are always welcome at our general meetings. **"Our Meetings are Smoke Free"**

SJRA operates the K2AA Repeater (145.290 - PL 91.5) located in Medford, NJ and the K2UK Repeaters (146.865 and 442.350 - PL 131.8) located in Pine Hill, NJ. The repeaters are open for use without restriction to all licensed amateur operators.

There are currently over 100 SJRA members active in most all aspects of amateur radio. Membership is by application and is subject to the approval of the Board of Directors. Club dues are currently \$30/yr. for memberships, \$22.50/yr for retired-person membership (62 plus 1 yr membership), and \$15/yr. for additional family members and student membership. Membership information is available on the K2AA Repeater or from Mary Von Lintig, KV2M, 856-772-6475

EMAIL: [sjra at sjra dot org](mailto:sjra@sjra.org) SJRA's web page [www.sjra.org](http://www.sjra.org)  
 Mark O'Brien, K2AX, is the SJRA/ARRL VUCC card checker  
 Joe Fisher, KC2TN, is the SJRA/ARRL WAS card checker

\*\*\*\*\*  
 ★ **Harmonics** is now available on the WEB in pdf format at: ★  
 ★ <http://www.sjra.org> ★  
 ★ **South Jersey ARRL Section News** is available on the WEB at: ★  
 ★ <http://www.arrl.org/sections/?sect=SNJ> ★  
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### Officers

**President:** Ken Botterbrodt, K2WB  
**Vice Pres.:** Jon Mac Millan, W2MC  
**Treasurer:** Ray Golley, N3RG  
**Rec. Sec:** Lou Priestley, N2HQL  
**Cor. .Sec:** Dennis Cioffi, AC2FO

### Directors:

Kathy Edwards, KM2KME  
 Rich VonLintig, KV2R  
 Debbie Pullaro, W9QWN  
 Ira Weinstein, W2IRA  
 Mary VonLintig, KV2M  
 Jim Vecchiola, KR2T  
 Al Witner, N3AVT

### Committees:

**Historian:** Mary VonLintig, KV2M  
**Membership:** Mary VonLintig, KV2M  
**Field Day:** Ken Botterbrodt, K2WB  
**Contests:** Jon Mac Millan, W2MC  
**Repeater:** Joe Fisher, KC2TN  
**Programs:** Kathy Edwards, KM2KME  
**H&W:** Kathy Edwards, KM2KME  
**Awards:** Lou Priestley, N2HQL  
**Hospitality:** Jean Priestley, KA2YKN  
**Nets:** John Fogleboch, WY2J  
**Publicity:** Debbie Pullaro, W9QWN  
**Picnic:** Debbie Pullaro, W9QWN  
**Ways & Means:** Ray Golley, N3RG  
**Property:** Jon Mac Millan, W2MC

### Harmonics Staff:

**Publisher/Editor:** Ted Groke, W2TAG  
 or Don Beaulieu, WA2DUE  
**Circulation:** Mary VonLintig, KV2M;  
 Jim Vecchiola, KR2T

### LOCAL WEEKLY NETS

Monday	K2AA, Medford	145.290 @ 8PM
Thursday	Various Locations	28.405 @ 8PM

### Harmonics Deadline

Articles submitted for the next HARMONICS will be accepted until Monday, March 10, 2014. Email: [ted.w2tag at gmail dot com](mailto:ted.w2tag@gmail.com)

**SWAP SHOP** - For Sale/Wanted ads are free of charge and are accepted for Amateur Radio related items only. While ads are not restricted to SJRA members, there is only limited space available and members have priority for listings. No items will be accepted for inclusion in the Swap Shop from commercial vendors or traders. All ads must be submitted at least three weeks prior to the scheduled SJRA general meeting date.

**GENERAL ADVERTISING** - Limited commercial advertising is accepted on a space available basis. Annual advertising rates range from \$25/yr (Min 1/8 page) to \$200/yr (Full Page). Information is available from Ken Botterbrodt, K2WB.

## Meeting Minutes

### Minutes of General Meeting of Jan 22, 2014

The meeting was opened at 1930 by Jon W2MC, at the Gibson house in Marlton, New Jersey. We saluted the American flag and announced that the estate sale would not be held due to snow blocking access to the equipment.

The minutes were approved as printed in Harmonics on a motion by N2HQL/KR2T. There was no Treasurers report and there were no new members proposed. Historian, Mary, KV2M, stated she had leftover T-shirts for sale. She presented a list of attendance at a ham Fest in 1931. Health and Welfare no report. Programs no report. Dennis, AC2FO, reported no correspondence. VE Team reported ten tested and nine passed, they expect between 10 and 30 people at the January 23 special session.

The Web Team reported the calendar is up and the website is still moving to its new server. Repeaters are working and the timers have been adjusted for the increased net time. Club stuff by Joe, KC2TN, orders have finally arrived the embroidery machine was broken and was awaiting service. Field day 2014 will be June 28 and 29th. There was no Old Business. Richard, KV2R, reported he had the remaining parts from Mario. There being no further business we adjourned on a motion by KR2T/WB2EOD. Following refreshments there was no program and we had a get to know each other session.

### Minutes of Board Meeting of Feb 5, 2014

All board members were present except Ken, K2WB, and Debbie, W9QWN. The meeting was opened at 1931 at the Gibson house in Marlton. Minutes were approved as printed motion by N2HQL/AC2FO. The Treasurer reported and the report was accepted motion by KR2T/KV2R. Ray, N3RG, requested a list of unpaid members be placed on the website.

The web report by Ira, W2IRA: the website has migrated but he has not pulled the trigger on the move. It will be moved over the weekend. There was discussion regarding an online directory in the members only section.

Proposed members by Mary, KV2M: Brian Gross KD2FJX; David M DiMartino III, KD2DQF; Scott Pycik, KD2EQP; and Christian Pycik, KD2FHA. Motion to accept by N3RG/N3AVT, motion passed.

Mary, KV2M, as Historian, presented a letter to the ARRL in response to their looking for active clubs. Kathy, KM2KME, reported health and welfare up to date with cards etc., no known illnesses. Programs: February - White Elephant (and delayed Estate) auction; March - Ray, N3RG on making your own antennas; April and May - Field Day/Storm Robotics, interchangeable depending on Storm's schedule. Al, N3AVT, reported his friend K3EHM as a silent key. Corresponding Sec. Dennis, AC2FO, reported on emails from Ken, K2WB, and on supplying CQ

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## HAM TECH

Vol 5 No. 2 by John - WY2J

wy2j at arrl dot net

### DIGITAL SIGNAL PROCESSING

#### Part 2 of 4:

#### Filter Sizing and Characterization

**Introduction** - Last month we introduced Digital Signal Processing (DSP) with overviews on the conversion of IF analog signals to digital format, baseband processing, the mathematics of complex numbers and fundamental filter types including the basic structure of Finite Impulse Response (FIR) digital filters. Most of these topics will be expanded on in this and the following two parts of this HAM TECH series on DSP filtering. This part of the series will expand on the coverage of the FIR filter including time aperture sizing and its relationship to bandwidth and calculation of the filters minimum length as a function of its major characteristics. We will show how the high sampling rate of an A/D converter directly encoding a carrier based signal can be reduced before filtering. Part 3 of the series next month will explore the Fast Fourier Transform that allows economically practical real time multiple filters for applications such as spectrum analyzers.

**Time Bandwidth Ambiguity** - This is a fundamental law of physics derived from Heisenberg's uncertainty principle. It basically says that resolution in the frequency dimension is inversely proportional to the observation time. Or you can say that to build a very narrowband filter your input signal must be present for a long time. In the analog world this is called the charging time of the filter. In the DSP world this time aperture and the minimum achievable bandwidth is determined by the length in units of

time of the shift register memory depicted in Figure 1 of last month's HAM TECH. The approximate relationship between time and bandwidth is given in Equation 1 below for an amplitude modulated signal such as a dot or dash of CW, AM or SSB.

$$\text{Equation 1: } T_{\text{sec}} = 1 / BW_{\text{Hz}} \quad \text{or} \\ T_{\text{sec}} \times BW_{\text{Hz}} = 1$$

This is an absolute minimum aperture time and may be much larger for practical filters.

It is not valid for FM or PM signals where the time bandwidth product can be made much larger than one.

**FIR Filter Sizing** - The length of the shift register memory as depicted in Figure 1 of last month's HAM TECH is determined by a number of factors and it does have a major impact on the size and complexity of the digital filter. These factors are the Sample Rate; the Transition Bandwidth between cut-off and design stop band rejection; pass band ripple; and stop band rejection. Equation 2 below is a useful approximation in calculating the length in terms of the number of stages or taps.

$$\text{Equation 2: } L = \text{Number of Taps.}$$

$$L = 1 - ((10 \log(R \times SB) - 15) / 14(F_T / F_S))$$

The following numeric example will demonstrate a realistic low pass filter.

$$\text{Cutoff frequency } (F_C) = 3 \text{ KHz}$$

$$\text{Stop band (SB) start frequency} = 4 \text{ KHz}$$

$$\text{Transition Frequency } (F_T) = F_{SB} - F_C = 1 \text{ KHz}$$

$$\text{PB ripple } R_{dB} = 0.1 \text{ dB}$$

$$R = 10^{0.1/20} = 1.0116$$

$$\text{SB Atten.} = -60 \text{ dB}$$

$$SB = 10^{-60/20} = 0.001$$

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*(Ham Tech from page 4)*

Sample rate ( $F_s$ )=10 KHz

$$L=1-((10\log(1.0116\times 0.001)-15)/14(1/10))$$

$$L=1-(-29.9-15)/1.4=33 \text{ taps}$$

This is a practical number of taps for a simple single chip DSP but because the sample rate is only 10 KHz it requires a very narrow anti-aliasing filter ahead of it limiting its usefulness in SDR systems. Aliasing is the property of sampled data systems where frequency components higher than half the sample rate fold over in to the desired signal space between  $\pm F_s / 2$  causing interference and loss of S/N. We can solve this aliasing problem in a SDR type receiver by raising the sample rate to at least 2.5 times the highest frequency in the IF pass band. Let's assume we want to encode the entire 80 meter band or 0.5 MHz with an IF center frequency of 4.75 MHz so our highest signal frequency is 5.0 MHz and our A/D converter must sample and encode at 12.5 MHz or 12,500 KHz. If we pass this data stream directly into our FIR filter example the shift register length would have to be:

$$L=1-((10\log(1.0116\times 0.001)-15)/14(1/12,500))$$

$$L=1-(-29.9-15)/0.0011 = 41,727 \text{ stages}$$

**Decimation** - The sample rate does not have to be any greater than 1.25 MHz in this example because the 0.5 MHz analog IF filter determines how rapidly the signal information in the sidebands can change. The A/D must still run at 12.5 MHz to capture all the carrier plus sideband frequencies present in the analog drive signal. If a digital mixer with a 4.75 MHz LO is inserted in the 12.5 MHz sample stream to remove the carrier and this is followed with a simple digital anti-aliasing filter the sample rate can be reduced by a factor of 10 to 1.25 MHz with

no losses. This process is known as decimation and we achieve it by throwing away 9 out of every 10 samplers. This cuts the length of our FIR filter down to 4,173 stages and the number of real multiplies are 16,692, large but within the range of today's high speed multiplier accumulator (MAC) co-processors.

Finishing the Receiver - If we want to make an SSB or AM receiver out of the processing functions described so far we have to add a few things.

First, tuning of the 3 KHz bandwidth digital FIR filter across the 500 KHz band requires either a conventional frequency synthesizer driving the front end analog mixer or a digital tuning method with a tunable DDS driving the complex multiplier in the I and Q data stream preceding the decimation process. The DDS has a center frequency of 4.75 MHz and covers the  $\pm 250$  KHz band with resolution sufficient to include the SSB RIT function. In this case the analog mixer is still required but the LO can be a crystal oscillator with one frequency per band.

Second, we need some form of demodulation process which will be mode dependent. The complex number I and Q output of the FIR filter is analogous to an IF signal with a carrier and two sidebands except that the carrier is at zero frequency and the sideband space here is  $-3$  to  $+3$  KHz. For AM we want to form an envelope detector which collapses the two sidebands on top of each other. For this we square both I and Q, add them and take the square root which gives us a perfect linear detector. Or we can use one of several approximation algorithms, which avoids the difficult square root process.

*(Continued on page 7)*



## Monthly Puzzle

**Don – WA2DUE, wa2due at arrl dot net**

### Last months problems were:

A test of 15 math problems is given. The first question is worth 5 points and the subsequent questions are worth 3 points more the previous question. What is the maximum score that can be earned?

Solution: The maximum score that could be obtained is to solve all fifteen of the problems. So we are looking for the sum of the series  $5 + 8 + 11 + \dots$  for fifteen terms Subtracting 5 from each term we now get fourteen terms starting with  $3 + 6 + 9 + \dots$  Factoring out 3 from each term we now have a series starting with  $1 + 2 + 3 + \dots$  for fourteen terms the sum of this series is 14 times 15 divided by two and is equal to 105. Multiplying by 3 and adding 75 for the 15 fives we subtracted at the start we get the answer for a total of 390 points. It is much easier to solve if you have a computer with a spreadsheet program.

What value of capacitance is required to create a resonate circuit at 21.2 MHz if you have an inductor of 2 microhenries?

Solution: A circuit is in resonance when the inductive and capacitive reactances are equal. inductive reactance is  $2\pi fL$  and capacitive reactance is  $1/(2\pi fC)$ . Equating these two terms and solving for  $C = 1/(4\pi^2 f^2 L)$  the answer becomes 28.2 picofarads.

Thanks to Mary, KV2M and Fred, W2EKB for submitting solutions to these problems.

**For this month let us pose these puzzles:**

What is the bandwidth of a series-

*(Continued on page 10)*

*(Ham Tech from page 5)*

Third, for SSB and CW we have to separate the LSB and USB frequency space by inserting a constant +90 or -90 degree phase shift across the filter bandwidth in either the I or Q path, then add them together. This process is identical to the old phasing system of SSB generation and demodulation popular in the 1950 to 60 time frame except the difficult to accurately build analog differential 90 degree phase shift network is done very precisely with an all pass Hilbert Transform implemented on an FIR filter. You just have to pick the right filter coefficients.

**Filter Coefficients** - There are three FIR filters in this example SDR SSB receiver. They are the 3 KHz final selectivity filter, the decimation filter and the Hilbert Transform filter and all of them require filter coefficients to perform their functions. Calculation of these coefficients is beyond the scope of this series of HAM TECH articles, however algorithms exist for all of them and many software routines are available. Some are closed form solutions, which execute rapidly and others are iterative calculations like that for the classical equal ripple Tchebyshev filter that requires extensive run time and are usually calculated and stored in look up tables.

Next month, we take an in depth look at the Fast Fourier transform and its role in forming real time banks of multiple filters for spectrum analyzers and other real time filtering applications.

**List Your "For Sale" Ham Stuff in the  
SJRA Harmonics**

**Email Ted, W2TAG, with your listing,  
ted.w2tag at gmail dot com**

## Ham Cram: Good for amateur radio or no?

Dan, KB6NU, *cwgeek at kb6nu dot com*

I've been teaching one-day Tech classes, often referred to as "ham cram" classes for several years now. As a result, a couple hundred people now have amateur radio licenses. I'm proud of that, but sometimes a doubt or two creeps in. The doubts come from whether or not I'm teaching the students enough.

I also sometimes think about whether or not, my No-Nonsense study guides ([www.kb6nu.com/tech-manual](http://www.kb6nu.com/tech-manual)) should have more technical content. Recently on my blog ([www.kb6nu.com](http://www.kb6nu.com)), I've been posting sections of the next edition of my No-Nonsense, Technician Class License Study Guide. One comment reads,

"Oh my, now I see why my beloved USA is falling behind in math/technology/university on the world stage. Lack of rigor brings down real world knowledge and this sad trend plagues our country at every level. Your book helps students pass the exam but not learn proper physics."

The commenter is right about my study guides not trying to teach students about math or physics. There are many other books out there that do that. I disagree, though, that my study guides and my one-day classes are part of a "sad trend."

For one thing, an amateur radio license is not a degree in electrical engineering. Not only that, the Technician Class license is the very first rung on the amateur radio ladder. So, the question is how much knowledge should we require of someone just starting out in our hobby/service?

Secondly, I always stress that an amateur radio license is really a license to learn,

and getting a Tech license is only the first step in a lifelong learning journey. I've been a ham a long time, and I'm constantly learning new things. And, I'm learning them because I have an amateur radio license. Without the privileges that my license gives me, I wouldn't be able to do the things I'm doing to learn them.

I sometimes regret that I can't teach people more during my one-day classes, but when you get right down to it, there's only so much you can expect. I know that a lot of my students have gone on to get General Class and Extra Class licenses and have turned in to great amateur radio operators. Presumably, they've learned a lot in the process.

Having said all that, I'm curious as to what you think about this? Are ham cram classes good for amateur radio? If not, what else should we be doing to help people get involved and enjoy amateur radio?

•••••

*When he's not teaching class, Dan, KB6NU enjoys working CW on the HF bands and building kits. For more information about his operating activities and his "No-Nonsense" series of amateur radio license study guides, go to: [KB6NU.Com](http://KB6NU.Com) or email: *cwgeek at kb6nu dot com*.*

### SJRA Announcement

Anyone willing to present a presentation at one of our club meetings or if you have a great idea for a speaker/topic, please contact Kathy Edwards, KM2KME, by sending an email to: *katiemae513 at gmail dot com*.

## President's Message

Ken – K2WB

If the snow or freezing rain damages your antennas, wait for better weather to repair. No reason to be a hero, there are no awards or prizes in getting hurt. Please be careful and think safety at all times.

Check on neighbors, friends and the elderly during inclement and cold weather. Especially with a winter that has changed the record books.

This month is our annual White Elephant sale; this is a good time to donate some of the treasure that has been sitting around not being used for years. The meeting is one of the most entertaining ones to see. Bring some stuff, some money and have fun. We promise not to tell your spouse on what treasures that may follow you home (your secret is safe with us).

We are looking for help with some of the aspects of the operation of the club, membership, programs and Harmonics Editorial Staff to be specific. I urge you to share your talents with the club. If you are interested in helping contact me or any Board Member.

Field Day will be here 135 days, now is a good time to start planning. Contact me if you have any questions or would like to help.

The SJRA would like to congratulate the following on their recent accomplishments. Session date: 01/23/2014

Timothy Brown  
26 Pershing Ave  
Ewing, NJ 08618  
Earned a General License

Daniel J Anderson  
2381 Richards Ave.

Hammonton, NJ 08037

Earned a Tech License

Peter B. Brown  
26 Pershing Ave  
Ewing, NJ 08618

Earned a Tech License

Julio C. Arroyo  
26 Quaker St.

Marlton, NJ 08053

Earned a Tech License

John J. Bean  
736 Blossom Rd  
Warminster, PA 18974

Earned a General License

Benjamin E. Katt  
217 Cedar Street  
Moorestown, NJ 08057

Earned a Tech License

Mark Fiori  
104 White Birch DR.  
Cinnaminson, NJ 08077

Earned a Tech License

Beena M. Daniel  
213 Central Ave  
Voorhees, NJ 08043

Earned a Tech License

Michael D. Cooper  
37 S. Locust Ave  
Marlton, Nj 08053

Earned a Tech License

Aishwarya R. Chacko  
213 Central Ave.  
Voorhees, NJ 08043

Earned a Tech License

Spencer D. McKeon  
5030 Crosswicks Hamilto Sq.Rd.  
Yardville, NJ 08620

Earned a Tech License

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*(Program That from page 1)*

**April**, Electrical Measurements for Air presented by Robert Grubmeyer, W2PJT, a member of the staff at the Franklin Institute.

**May**, Electrical Midgets presented by S. Davis Paige of New Jersey Bell.

**June**, The Board of Directors Meeting of the ARRL presented by Brad Martin, W3QV.

**July**, K2AA on Location. Field Days and a color film by the DuPont Company.

**October**, A Descriptive talk on RCA Electron Microscope presented by Sam Zollers, W2EWN, then secretary of SJRA

**November**, Commercial Radio Operating by Gordon Kressel, W2BQ.

*Gordon Kressel lives on in the QTHs of all who have received the Gordon Kressel Award.*

These outstanding programs took place over sixty years ago. The topics and speakers must have held their audience captive. Maybe I can find some device that can travel faster than the speed of light and go back to those 1950 SJRA years and hear what our forefathers had to say. I am sure that they would be astounded if they could see how far SJRA came in those 60 plus years.

73 to all and I am History,  
Mary, KV2M

*(Monthly Puzzle from page 7)*

resonant circuit with a Q of 50 at a frequency of 14 megahertz?

Several years ago at the clubs annual "White Elephant" sale, three radios were sold for a total of \$325. The second radio cost twice as much as the first and the third radio cost \$50 less than the second. What was the cost of each?

Please submit solutions and/or comments to wa2due at arrl dot net.

*(Meeting Minutes from page 3)*

magazine with information regarding SJRA meetings. VE Team reported testing 30 people in January.

Repeaters by Joe, KC2TN, reports all three repeaters operating well. He noted receipt of a letter from the ARCC recording dues. He still has to change trustees on the repeater, there was some discussion regarding club call signs on repeaters and a limit of one call per club. There were discussions regarding linking repeaters etc.. There is some concern over possible loss of site when Rick Connor retires. There was discussion regarding the 10 M nets, which were designed to allow technicians to use HF and the difficulty of hearing everyone on the net.

Adjourn motion by N3RG/AC2FO.

Lou, N2HQL, Recording Sec.

*(Presidents Message from page 9)*

John M. Perkins III  
15 N. Lakeside Dr. W.  
Medford, NJ 08055  
Earned a General License  
Leonard M. Warren  
108 Mohawk Trail

Shamong, NJ 08088  
Earned a Tech License  
Dylan L. Renaud  
102 Cobblestone Drive  
Mount Laurel, NJ 08054  
Earned a Tech License

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Spring Jacket is \$44 (S,M,L,XL), Fall Jacket is \$55 (S,M,L,XL),  
 Shirts are \$27 (S,M,L,XL), Hats are \$25 (one size fits all)  
 Name and Call Sign embroidery included....Larger sizes slightly more!  
 Email Joe, KC2TN, with orders or additional info: [kc2tn at comcast dot net](mailto:kc2tn@comcast.net)

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Luke D. Renaud  
 102 Cobblestone Drive  
 Mount Laurel, NJ 08054  
 Earned a Tech License  
 Quinton Z. Renaud  
 102 Cobblestone Drive  
 Mount Laurel, NJ 08054  
 Earned a Tech License

Charles Romano  
 103 Woodthrush Trail West  
 Medford, NJ 08055  
 Earned a Tech License  
 Jared Randall  
 1013 Eldridge Ave.  
 W. Collingswood, NJ 08107  
 Earned a Tech License

	Tech	General	Extra
YTD	51	11	7

The SJRA sponsors *FREE* Amateur Radio FCC License testing on the second Wednesday of each month. The location is: 443 Commerce Lane, Suite 5, West Berlin, NJ 08091. Registration is at 7:00 PM and testing begins at 7:30PM. Walk-ins are accepted.

VE team members can be reached at [VE@SJRA.org](mailto:VE@SJRA.org). A calendar and more information can be found on the SJRA web site.

## February Meeting: *Forth Wednesday*

February 26, 2014

The meeting commences promptly at 7:30PM in the first floor Meeting Room of the Gibson House on Main Street, Marlton, NJ 08053. Guests are always welcome.

### Program For February:

Our program for February is the annual "White Elephant Auction" and the delayed by weather "Estate Auction" featuring many items from the estate of John Mac Kenzie, KA2QNV-SK. Also a good time to clean out the shack! Bring your *treasures* to auction off, then, take home new *treasures*! Come and have a good time! The White Elephant Auction benefits SJRA. Next month Ray Golley presents "How to Roll your own Antenna."

### February 2014 Health and Welfare:

Happy Birthday to those celebrating in February: 4 - Ted Groke, W2TAG; 11 - Donna O'Brien, W2DOB; 12 - Noah Weinstein, KC2YAT; 13 - Jack Imhof, N2VW; 15 - Al Witner, N3AVT; 16 - Riley Stoneking, N2RAS; 16- Amber O'Brien; KD2BOO; 19- MacKenzie O'Brien, KD2BMV; and 22 - Shawn MacDonald, K2SMD. Any reports for Health and Welfare can be made to Kathy Edwards, KM2KME, by sending me an email to: katie-mae513 at gmail dot com.

Kathy Edwards, KM2KME

**First Class Mail**

South Jersey Radio Association  
PO Box 1026  
Haddonfield, NJ 08033

