



HARMONICS

1916

South Jersey Radio Association

2014



Program That – Part 5

The Years 1958 and 1959

This closes out the Fabulous Fifties. It was during the year 1954 while living in Japan that I first learned the excitement of using a telescope. The very first thing I observed was sunspots. I then learned how to locate and focus on various planets and stars and could not wait until night finally arrived so I could point that telescope toward the heavens. Here are more of the 'Stars' of the 1950's.

1958

January

W2UA presents slides and a talk on a Ham tour through Europe

March

Charles Wright, W2GOK, a member of the RCA broadcast design engineering group speaks about frequency measuring techniques as applied by the Hams

April

Dr. Frank Dudley, PhD, an authority on nuclear devices who also participated as a government advisor in the atom bomb tests in the Pacific will be this speaker for this interesting participation

May

'Plans and Programming' relating to the DEW Line Project will be presented by Major Mellor

I (KV2M) very clearly remember the DEW Line. I was in Junior High at the time and the entire school was brought to the auditorium and shown a movie about it. I was afraid that Russia could bomb us but was also less scared since the United States had a way of warning us about this danger

June

'New Adventures in Electronics' by Cyril N. Hoyler. Mr. Hoyler will highlight some of the recent research at the RCA Laboratories in the field of solid state physics, television, and acoustics

July

Phil Catona, W2JAV, discusses and shows his HB transistor power supply

November

Past Presidents Night. Tales told by SJRA's past presidents

1959

January

Past Presidents Night - continued from November 1958

February

D. Ridgely Bolgrano, W3SCR, gives a talk on Radio Reception of Man Made Satellites

March

Captain W. A. Smith - SC, USN - W3AN Great Lakes Naval Training Station

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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

SJRA VE Team: ve@sjra.org is the SJRA/ARRL VUCC card checker

Joe Fisher, KC2TN, is the SJRA/ARRL WAS card checker

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:

Roy Herman, WB2EOD
 Rich VonLintig, KV2R
 Rick Lawn, W2JAZ
 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: Rick Lawn, W2JAZ
H&W: Roy Herman, WB2EOD; and Dara Herman, KC2THQ
Awards: Rick Stoneking, W2RDS
Hospitality: Jean Priestley, KA2YKN
Nets: John Fogleboch, WY2J
Publicity: **Vacant (Please Volunteer)**
Picnic: **Vacant (Please Volunteer)**
Ways & Means: Ray Golley, N3RG
Property: Jon Mac Millan, W2MC
Web Site: Ira Weinstein, W2IRA

Harmonics Staff:

Publisher/Editor: Ted Groke, W2TAG
Alternate Editor: **Vacant (Please Volunteer)**
Circulation: Mary VonLintig, KV2M;
 Jim Vecchiola, KR2T

 ★ **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> ★

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, September 8, 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 7/23/2014

The meeting was held at the Gibson house in Marlton, NJ., beginning at 1940. It was chaired by Ken, K2WB, who welcomed all attendees. Minutes of the June meeting were approved as printed in Harmonics, motion N2HQL/W2MC.

Ray, N3RG, gave the treasurers report, highlighted by 105 total paid members. The report was approved, motion by KR2T/WB2EOD.

No new members were introduced. As Historian, Mary, KV2M, showed a list of Life & Honorary members dating from the mid 1960's.

Programs- new chairperson, W2JAZ was introduced and will have a program in August based on interests of club members to aid in his search for speakers.

Nets- by WY2J- 2M still running, repeater working OK; 10M is on hiatus until October 2nd.

Contests: Sept 13-14, Fall VHF/UHF QSO party; Oct 4-5, NJ QSO Party; Oct 18-19, JOTA.

WB2EOD and KC2THQ volunteered to take over Health & Welfare. Website is now fully transferred to a commercial host and fully functioning. We still need a volunteer for publicity. The club property is stored at the QTH of W2MC, including the W2FGY tower.

Field day- will be discussed as to-nights program. Ken is ready to activate a committee for the 100th anniversary celebrations.

Old business- Election of 2 directors- ballots passed out, voting commenced.

No new business.

Good of the Club: Question- who has used repeater lately- several hands were raised. Question by WY2J- when will the .29 repeater antenna be replaced- still in discussion. Ken stated that he and Joe, KC2TN have checked several new sites for the K2UK repeaters. The search goes on.

Recess at 2005.

Election results- Roy, WB2EOD and Rick, W2JAZ are the new directors.

Minutes of Board Meeting 8/6/2014

Meeting held in the conference room at the Gibson House. All were present except : W2JAZ, N3AVT, N3RG, AC2FO, and W2IRA. Len, KD2FMV, was present as a guest. New board members were welcomed.

Minutes approved as printed, N2HQL/WB2EOD.

Len, KD2FMV, gave an Audit report. Our books are in order, up to June. He made several suggestions: A periodic financial statement should be made, The K2UK funds should be kept as a separate line item, probably as a separate column on the spreadsheet and separately reported, so as to not count it as part of club monies .A separate account with several signatures was suggested as a possibility.

(Continued on page 10)

HAM TECH

Vol 5 No. 8 by John - WY2J

wy2j at arrl dot net

Widely Used Digital Text Modes

Part 4 of 5: MFSK-16

Introduction - This series has been increased from 4 to 5 parts to allow for adequate coverage of a widely used modulation technique in two modern text modes, MFSK-16 and DominoEX. Both make use of coherent multiple tone FSK (MFSK) modulation to significantly improve error performance on HF circuits that incur doppler shift and multi-path in the ionosphere. MFSK-16 will be treated in this issue of HAM TECH and DominoEX in next month's edition. Both modes are conversational but MFSK-16 has very long signal processing delays which make it less useful for the rapid turnaround desired for contests. MFSK-16 is used by the ARRL for transmitting their bulletins on W1AW where freedom from errors is highly desirable. The MFSK modulation with 64 tones is used in the JT-65HF mode discussed last month, for the same reason.

A Little History - As stated in an earlier HAM TECH article RTTY using electromechanical TTY machines replaced hand keyed Morse in the commercial, military and other government agencies following WW-2. The poor sensitivity of RTTY could be fixed in these applications with higher transmitter power but the high error rates caused by multipath and Doppler shift in the ionosphere needed attention. It was discovered that if the number of frequencies used to transmit the 5 bit 2 tone RTTY signal was increased the error rate decreased. MFSK exploited this approach using only analog techniques as digital error correction had not been invented. Modes named Piccolo and Coquelet (Rooster) appeared in the British

and French government agencies, early MFSK systems. In the 1990's Murray Greenman ZL1BPU of New Zealand picked up this early MFSK technology, added modern day keyboard Varicode, Convolution Error Correction, an Interleaver that scrambles the data stream to help eliminate burst errors, the Gray or binary reflective code and Matched Filter modulation / demodulation. He did the system engineering and wrote a detailed specification for his new mode that was to fix as many ionosphere caused problems as possible with sensitivity approaching PSK-31. He called the mode MFSK-16 where the 16 implies 16 sequential tones with spacing of 15.625 Hz. He shipped his specification to a number of software designers and Nino Porcino IZ8BLY of Italy produced the first Windows sound card software that he called Stream. Murray and Nino put it on the air in 2000 where frequent reliable QSOs between Italy and New Zealand were conducted over the years on 17 and 20 meters running 25 watts into dipole antennas.

The Tones in MFSK-16 - There are 16 sequential tones, one every 64 ms with spacing in steps of 15.625 Hz the reciprocal of 64 ms. The phase angle of all tones is exactly the same at the time of transition from one frequency to another. This produces a spectrum free of key clicks as shown in Figure 1.

Each tone is 15.625 Hz wide at the 4 dB down point and 31.25 Hz between its nulls. This places nulls of the other tones at the peak of any one tone. This minimizes interference between each tone and minimizes inter symbol interference in the code, a very clean form of modulation.

(Continued on page 5)

(Ham Tech from page 4)

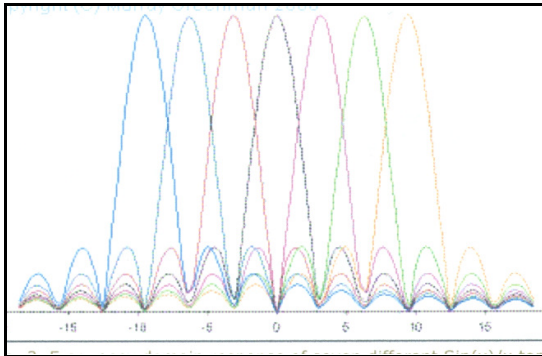


Figure 1. Spectrum of 7 MFSK Tones

The Keyboard Varicode - MFSK-16 uses a varicode similar to but not identical to the one used in PSK-31. It is slightly more efficient because it does not have as many restrictions on code structure as PSK-31. The bit rate for the varicode output is 32 ms/bit similar to PSK-31.

Convolution Encoders - A pair of 6th order convolution encoders are employed which outputs a pair of bits (dibits) at a rate of one per 32 ms. Two consecutive dibits are combined to form a 4 bit nibble (half a byte) every 64 ms. These nibbles are passed on to an Interleaver which scrambles the data over nearly 2 seconds of time thus avoiding having a character totally imbedded in a fade or noise burst.

The IZ8BLY Interleaver - Figure 2 shows the read in and read out order of the interleaver.

Each 4 bit nibble is read out along the diagonal, 0, 5, 10, 15, 8, 13, etc. The output of this Interleaver is sent to a second concatenated Interleaver resulting in an equivalent 123 bit data stream. This takes 1.968 seconds to complete.

Gray Coding and Modulation - The output of the Interleaver process is converted from binary coding format to Gray also known as reflective binary because Gray is more tolerant of a single bit error. A 16 point FFT and D/A converter follows to convert the data stream to the 16 frequencies of the MFSK-16 transmitted signal.

The Demodulation Process - Once the received MFSK-16 signal is converted to digits and time aligned a FFT filter bank acts as a matched filter with an effective filter bandwidth of approximately 4 Hz. The filtered signal must then go through a de-interleaved process, another 1.968 seconds of delay, and then a Viterbi Convolution Decoder to correct errors. Unlike many error corrected modes the correction cannot be

0	1	2	3
4	5	6	7
8	9	10	11
12	13	14	15
16	17	18	19
20	21	22	23
24	25	26	27
28	29	30	31
32	33	34	35
36	37	38	39
40	41	42	43
44	45	46	47
48	49	50	51

Figure 2. The IZ8BLY Interleaver

(Program That - Part 5 from page 1)

(ex KG6AGO) speaks on the subject of Guam and Pacific Experiences.

April

'Impedance Marching of Equipment to Antenna Using Radio Frequency Sweep Techniques' presented by Kenneth Simmonds, W3UB. He will also demonstrate utilizing a 20 inch oscilloscope.

May

Amory H Waite, W2ZK, gives an interesting and informative talk - 'Operation Deep Freeze with Amateur Radio' While with Admiral Byrd in 1934 he operated the first inland base station in the Antarctic 'KFY.'

June

Einar C. Johnson (ex - W9FVV), US Naval Air Development Center, Johnsville, PA will give a talk on Parametric Amplifiers.

July

This month's speaker will be Robert G. Wilson, Jr. about DX operations.

August

White Elephant Sale.

September

'The Evolution of Beamed Power Arrays' presented by Mike Ercolino, W2BDS. Mike holds several antenna patents including the famous 'Conical V Beam.'

October

David S. Linz, W3RVS, program for October is DSB vs. SSB, Safety in Mobil Operation, and Theory of Trap Antennas.

November

The final program of the Fabulous Fifties - 'Introduction to Junction Transistors' presented by R N. Hurst, K2GGE ,of RCA.

Those RCA people sure did get around and I (KV2M) still like their dog, Nipper.

When we came back from Japan to the United States in 1957, we moved to a very small town called Hi-Nella - population 52. Our next door neighbor happened to be a ham by the name of Ed Bartells. He had an antenna that seemed to reach the clouds. Perhaps it was written in those stars that I first observed as a child and moving next door to an avid amateur radio operator in 1957 that destined me to get that amateur radio license 40 years later in the year 1997. Carol, K2BL, and Jim, KR2T, completed that plan when I proudly became a Tech Plus in February 1997.

73 To all and I am History.
Mary, KV2M

Items for Sale

50 Foot Free Standing Tower (not heavy duty). Tower is on the ground in two pieces that bolt together at the 30 foot level. \$100.

Four Element Tri-Band 20-15-10 M Beam Antenna (two elements on each band). \$25.

All proceeds from the sale of these two items will be donated to SJRA.

Items for Free

Two Cushcraft 2M Ringo Antennas

If you don't want both antennas the first person to come and get one will have pick of the two. :-)

Contact Ted, W2TAG
Tabernacle, NJ
ted.w2tag at gmail dot com
(609)268-8460

(Ham Tech from page 5)

turned off since synchronization is buried in the correction process.

Performance and Limitations - The weak signal performance is nearly as good as PSK-31 and when multipath or Doppler shift dominates the HF path it is far superior to RTTY or PSK-31. It even works on 80 meters. The signal spectrum is only 316 Hz wide similar to RTTY. It will support a 42 wpm typing rate but it takes about 4 seconds from a key stroke at the transmitting station until the character arrives at the receiving screen, definitely far from QSK.

The biggest and most frustrating problem is trying to tune in a signal. You must tune for the AFC to lock on the lowest tone frequency during a typing idle period. This means getting to within 4 to 5 Hz of the lowest tone when the operator takes a rest and hopefully the S/N is high enough to see it on the waterfall display. Tuning in W1AW where your author knew their exact frequency was easy but trying to answer a random CQ was maddening. The higher sensitivity mode MFSK-8 which only supports 25 wpm typing is included in the Stream software but is twice as difficult to tune in. Your author gave up and went back to PSK-31.

Next Month - We finish up this five part series on text modes with a look at Murray, ZL1BPU, Greenman's solution to the tuning problem and the long signal processing delays of MFSK-16. It's called DominoEX.



Monthly Puzzle

Don - WA2DUE, wa2due at arrl dot net

Reviewing last months puzzles:

The hexadecimal number 3F7 is divided by the hexadecimal number 23. Express the dividend as a number to the base 10.

Answer: The dividend is 3F7, which is equal to $3 \times 16^2 + 15 \times 16 + 7 = 1015$ decimal. By the way the quotient is $3F7/23 = 1015/35 = 29$ in decimal notation.

Find the roots of the equation $5X^2 + 20X = 105$.

Answer: We first subtract 105 from both sides of the equation and get $5X^2 + 20X - 105 = 0$. Then we simplify the equation by dividing by 5 and we end up with $X^2 + 4X - 21 = 0$. The coefficients are $a = 1$; $b = 4$; and $c = -21$. Substituting these values in the formula for solving quadratic equations $X = (-b \pm \sqrt{b^2 - 4ac})/2a$ we obtain the roots +3 and -7.

For August lets keep cool working the following:

As I write this column I am approaching my 90th birthday. Roughly, how many miles has planet earth traveled in its elliptical journey around the sun during that time?

One of the birthday presents I received was a most unusual clock. This clock had on its face not numerals but mathematical symbols such as 3! for the numeral six. Can you figure out what position on the clock these symbols were located: $1/(\cos 60)$? Or $5(\csc(\pi/6))$? Or $4P_2$? Or $-e^{i\pi}$?

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

ARRL support for clubs could use some improvement

Dan, KB6NU, cwgeek at kb6nu dot com

Often, when you hear ARRL officials speak, they extol the virtues of amateur radio clubs, saying things like, "Clubs are the lifeblood of amateur radio." For example, Dale Williams, WA8EFK, in response to my e-mail congratulating him on his appointment as the new ARRL Great Lakes Division director, said that his "plans are to push to keep things local, club-related, and bottom-up driven."

Of course, that kind of set me off. When it comes to club support, the ARRL is more talk than action.

One example of this lack of support is that there hasn't been an issue of the ARRL Club News newsletter for years. Even so, if you log into the ARRL website and look at your e-mail subscriptions page, you'll see that it says that it's supposed to be a monthly newsletter.

I'll also note that the ARRL CEO Harold Kramer, WJ1B, left this particular newsletter off the list of available newsletters in his June QST column. I don't know who at HQ is responsible for producing this newsletter, but the fact that there hasn't been one for so long speaks volumes to me.

Another example is the club commission program. Under this program, clubs get a \$15 commission when they sign up a new member. That's not bad, but the commission falls to only \$2 for renewing members. According to a former treasurer of ARROW, my club here in Ann Arbor, MI, \$2 just wasn't enough to make it worth his while to process renewals.

To be fair, it's not all bad news. The ARRL website does have a page with infor-

mation on how to set up and run an active club (<http://www.arrl.org/affiliated-club-resources>). The ARRL also has a club liability insurance program is a decent deal for clubs, but that program probably doesn't require much effort on the ARRL's part. The ARRL is also supposed to refer new hams to clubs, but I'm not sure exactly how they do that, and I don't think ARROW's gained any new members from this recently.

Let me ask you. Is your club getting the support it needs from the ARRL? If so, I'd like to hear about what you think they're doing right. If not, I'd like to know what you think they should be doing to help your club.

•••••
When he's not writing this column for club newsletters, Dan, KB6NU enjoys working CW on the HF bands and teaching ham radio classes. For more information about his operating activities and his "No-Nonsense" series of amateur radio license study guides, go to KB6NU.Com or e-mail cwgeek at kb6nu dot com.

GCARC Hamfest

Sunday, September 14 at the 4-H Fairgrounds in Mullica Hill, NJ.

Contact:
Cory, WA3UVV, Hamfest Contact Person.

Tom, KE2ES, Hamfest Chairperson

Web Site: www.w2mmd.org

The SJRA congratulates the following on their recent achievements:

Dan Murray
 14 Muirfield Ct.
 Medford, NJ 08055
 Passed his Technician Exam

Harris Brodie
 215 Curwen Rd.
 Bryn Mawr, PA 19010
 Passed his Technician Exam
 Total new or upgrades to date: 101

	Tech	General	Extra
YTD	65	24	12

President's Message

Ken – K2WB

The summer is going to be over well before we know it. Field Day 2014 is over and good memory. Some of us are already we are looking forward to Field Day 2015.

As the summer draws to a close, you should look carefully at your antenna farm and it may be time to start planning on any improvements or repairs that could be done while the weather is still pretty good.

While working on your projects always think of safety and get assistance for big jobs. Use the right tool for the right job and never climb a tower without the spotters and ground help.

Bring a friend to a meeting, SJRA meetings are a great night out, we even offer great programs to keep you entertained. Let Ted W2TAG know if you can join us for dinner at Tarantella's restaurant the following the group to the meeting at the Gibson house in Marlton. Also, we are still having a membership drive and you can earn a

(Continued on page 10)

Silent Key Notice for Jeffrey I. Matheson, KB2TSV

The Burlington County RACES Team is saddened to announce the passing of Jeffrey I. (Jeff) Matheson, Chief RACES Radio Officer (Radio Amateur Civil Emergency Service - the FCC regulated modern day version of "Civil Defense"). Everyone who knows Jeff is aware of his unselfish willingness to serve and his cheerful spirit. The Burlington County Emergency Services Community has lost a truly valuable member today!

Our county has relied upon Jeff in numerous mission critical roles throughout the years. He was employed by the Burlington County Office of Emergency Management from 1977 to present day (37 years). A leader in the "Radio Shop", Jeff had also served on the Burlington County Chiefs Radio Liaison Committee during the rollout of the present day \$30 Million Emergency Radio System used by the Central Public Safety Access Point (the 911 center).

Jeff also served since 1999 as Engineer for Burlington County College owned WBZC 88.9FM broadcasting from Pemberton, NJ. In the past, Jeff worked with The Walt Disney Company, Express Broadcast Services, Metro News Network and Shadow Traffic Network Philadelphia.

Wanted

Alternate Editor for SJRA Harmonics. This position does not require previous publication experience (only a computer with internet access) as **I will teach you all you need to know.**
Email: ted.w2tag at gmail dot com

(Meeting Minutes from page 3)

New Members by Mary, KV2M: Harry Kingsmill, KINGY - sponsored by Mary/Roy- he was accepted.

Ken will investigate a new badge option since Bruce, W2BE, can no longer make them. Several options were discussed, no decision made as to final design. As historian, Mary, KV2M, presented some undated field day items.

Programs- August : AC2FO on LOTW; Sept- Consignment Auction.

Web Team- E-mail forwarding is dropped, A line item on the budget will be created to cover costs.

New sites for K2UK are being investigated and analyzed for costs of moving.

K2AA antenna- "spare to be put up for sale and a new one purchased- will be brought up for discussion at August general meeting.

Website- there will be a webex session to train people on how to update the site. Rick, W2RDS, and Ira, W2IRA, will update the awards section on the site.

100th Anniversary- \$417.49 in donations so far. We still need a Publicity and Picnic Chairperson.

Contests- VHF- Aug -13-14; Oct- NJ QSO.

No old business

New business- Christmas party planning to start at Sept board meeting. We will try to put special event team back together, we missed a great chance to show off at the National Night Out celebration in Marlton.

Adjourn at 2110.

Lou, N2HQL

(Presidents Message from page 9)

free one year membership, contact Mary KV2M for details. We have 109 members and growing... Let's see if we can get to 200!

If you have any ideas or projects that you would like to see the club get involved with, contact any board member or club officer.

This month we welcomed two new members to the Board of Directors Roy WB2EOD and Rich W2JAZ. They will fulfill the last year of this current term of office.

Lastly, there are number of members of the club who can no longer make it to the meetings for various reasons. In particular there are two members who would really appreciate a lift from the Mt. Holly / Lumberton area. Let me know if you can help.

Enjoy the rest of the summer and I hope to see you on the air soon

SJRA Members August Birthdays

- 3 - Debbie Pullaro, W9QWN
- 7- Michael Flaherty, KC2PST
- 18- Ricky Stoneking, W2RDS
- 27 - Lou Priestley, N2HQL
- 28 - Jim Higgins, KC2SZ

Health and Welfare Co-chairpersons,
Roy, WB2EOD and Dara, KC2THQ

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

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

SJRA Jackets, Shirts, Hats

Order NOW - Next order going in soon!



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*

August Meeting:

Fourth Wednesday, August 27, 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 August:

Dennis, AC2FO, on the ARRL 'Log Book of the World (LOTW)'

Amateur Radio FCC License Testing

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. A calendar and more information can be found on the SJRA web site.

First Class Mail

South Jersey Radio Association
PO Box 1026
Haddonfield, NJ 08033

