



HARMONICS

1916

South Jersey Radio Association

2014



Program That – Part 4

The Years 1956 and 1957

The South Jersey Radio Association has now entered her fourth decade and is still going strong. Strength comes from unity and as a club, we are truly united in the wonderful hobby of amateur radio. We celebrate advances and mourn together when one of our members becomes a Silent Key. This strength with unity has carried us through the first 40 years and will continue to do so always.

1956

January: Movie of the Philmont Radio Club during and following Hurricane Diane

February: Ed Braddock, W2BAY, President of SJRA in 1932, representing the National Company speaks on the NC300 along with its VHF Converters.

March: A demonstration on Artificial Resuscitation by Gurdon H. Williams, W2IQ, an Electrical Engineer at RCA and also a film on Artificial Resuscitation from the Red Cross.

April: A talk and slides on 'Electronic Diplomacy in South Asia, presented by Joe Mullen of the Public Relations Department, RCA Administration Group.

October: Albert Costella of the Automotive Equipment and Service Company of Philadelphia discusses and demonstrates power generating equipment for Mobile services.

1957

January: This month's program featured Mort Eisenberg, W3DYL, of RCA's Defense Electronic Products Division of Camden speaking about 'Visualizing VSWR and application of transmission lines.'

February: Joseph Robb, Tony Avallone, and Frank Lester from the Hammarlund Manufacturing Company will bring an HQ-150 and HQ-100.

March: 'Radio Propagation Study Project during the IGY (International Geophysical Year)' presented by Mason P. Southworth, W1VLH, of the ARRL.

Yikes. I remember the IGY just like it was yesterday. When did all those 50 plus years get added on to my age?

April: Don Lundgren of the RCA Frequency Determining Engineering Department will give a talk on mechanical filters.

May: Danny Weil of "YASME" FAME speaks about his travels 'alone' in his yacht 'YASME' to rare places throughout the world and then to disaster

June: Gilbert L. Crossley, director of the Atlantic Division of ARRL gives a talk on the Recent ARRL Directors Meeting.

July: The topic of 'What takes place on the broadcast bands from 550 KCS to 1600 KCS' will be presented by Joseph T. Lippincott.

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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
 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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President: Ken Botterbrodt, K2WB
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Harmonics Staff:

Publisher/Editor: Ted Groke, W2TAG
Alternate Editor: **Vacant (Please Volunteer)**
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, July 7, 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 5/28/14

The meeting opened at 1940 by Jon, W2MC, with a flag salute. We turned the meeting over to Jim Hessler who introduced this years robot "Fonzie", Ed, from Mechanical, Tom from drawing and Joe (our very own) from software. We announced that the "club" half of the 50/50 would go to the storm. It was won by Jim Hessler of Storm. We then broke for refreshments.

The business portion of the meeting began at 2055. Minutes of the April meeting were approved as printed, motion by N2HQL/KR2T. The treasurers report was read from an e-mail, 104 members, Insurance was [paid, as well as the State and Federal tax exemption forms filed. Accepted, Motion by N3AVT/KR2T.

New members, presented by Jim, KR2T: Whit; KB2ZTL, John, NZ2H. He also read a letter from JA9AA.

For the Historian, Jim showed a picture, Brownie was running the projector.

Programs: June - Field Day, July, Field day wrap.

Harmonics - Still need an assistant editor. June issue will be late as Ted will be out of town. He noted that he can't upload to the website as no "bucket" exists.

VE - 91 Applicants either upgraded or got new licenses since we started.

Nets- Light participation (by WY2J)

Repeater- need tower climber to fix antenna problems.

Club stuff - Joe, KC2TN, always taking orders.

100th anniversary will occur June 16th, 2016- we still need to activate a crew.

New Business- Jim, N2UAS needs help for a summer camp for science, technology, engineering & math (S.T.E.M.)

Adjourn at 2130

Minutes of Board Meeting 6/4/14

Meeting opened at 1930 by Ken, K2WB, by Webex. All were present except Ray, N3RG, Ira, W2IRA, Deb, W9QWN. Minutes of the previous meeting were approved as printed N2HQL/W2MC.

No new member apps.

Historian - Officer list from 1948.

Harmonics deadline - as usual.

Repeater (K2UK) - Several possible new sites were discussed.

June VHF and FD approaching rapidly. No hospitality at Field day yet.

Club stuff - no present orders, need to order a bunch of Navy Blue Hats.

We need volunteers - Programs; Rich Lawn has volunteered. Need H&W chair.

Field Day - we have all band captains except VHF.

100th Anniversary - We have 297.00 collected so far.

An election for director will be held at the next meeting. We need to get more members involved.

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HAM TECH

Vol 5 No. 6 by John - WY2J

wy2j at arrl dot net

Widely Used Digital Text Modes

Part 2 of 4: PSK-31 and its Cousins

Introduction - Last month we explored the 50 year old RTTY mode which was based on 75 year old wired TTY technology. This month we review the major technical shortcomings of RTTY in ham applications and dig into a relatively recent mode PSK-31 that was designed to fix those issues. We will also look briefly at a couple of what I call PSK-31 cousins, PSK-63, PSK-125 and QPSK-31

Short Comings of RTTY - There are four limitations of RTTY listed as follows.

1. A relatively high S/N ratio is required to maintain a reasonably low probability of error.

2. Lack of robustness in the Start/Stop pulse method of character framing and the Letters/Numbers shifting in a noisy environment.

3. Character set limited to 55 with no lower case letters as compared to 127 for a full ASCII keyboard.

4. Relatively wide 300 to 500 Hz spectrum for a limited 50 to 60 wpm information rate due to the FSK modulation.

Strategy behind PSK-31 - Peter Martinez, G3PLX, developed PSK-31 in the late 1990's as a conversational mode like RTTY with no long signal processing delays but without the shortcomings listed above. He recognized that the ancient 5 bit baudot coding of RTTY along with the FSK modulation were the source of the RTTY limitations. He developed a new coding table, shown in Figure 1 below that he called "Varicode" be-

cause unlike the baudot code where every character used 5 bits the varicode length varied according to the frequency of character use just like Morse. A space takes 1 bit, a lower case "e" 2 bits, a lower case "o" and "t" 3 bits while an infrequently used upper case "Z" takes 10 bits. The code is shown in Figure 1 below.

ASCII*	Varicode	ASCII*	Varicode	ASCII*	Varicode
0 (NUL)	1010101011	/	110101111	j	111111011
1 (SOH)	1011010101	0	10110111	^	101011111
2 (STX)	1011101101	1	10111011	~	101011011
3 (ETX)	110101111	2	11101101	~	101101111
4 (EOT)	1011101011	3	11111111	A	1011
5 (ENQ)	1101011111	4	101110111	B	1011111
6 (ACK)	1011101111	5	101011011	C	101111
7 (BEL)	101111101	6	101101011	D	101101
8 (BS)	101111111	7	110101101	e	11
9 (HT)	11101111	8	110101011	f	111101
10 (LF)	11101	9	110110111	g	101101
11 (VT)	111010111	.	11110101	h	101011
12 (FF)	101101101	:	11011101	i	1101
13 (CR)	11111	<	11110101	j	111101011
14 (SO)	1101110101	=	1010101	k	10111111
15 (SI)	111010101	>	111010111	l	11011
16 (DLE)	101110111	?	101010111	m	111011
17 (DC1)	1011110101	@	101011101	n	1111
18 (DC2)	111010101	A	1111101	o	111
19 (DC3)	111010111	B	11101011	p	111111
20 (DC4)	1101011011	C	10101101	q	110111111
21 (NAK)	1101101011	D	10110101	r	10101
22 (SYN)	1101101101	E	1110111	s	10111
23 (ETB)	1101010111	F	11011011	t	101
24 (CAN)	1101111011	G	11111001	u	110111
25 (EM)	110111101	H	101010101	v	1111011
26 (SUB)	1110110111	I	1111111	w	1101011
27 (ESC)	1101010101	J	11111101	x	11011111
28 (FS)	1101011101	K	10111101	y	1011101
29 (GS)	1110111011	L	11010111	z	111010101
30 (RS)	1011111011	M	10111011	{	101011011
31 (US)	1101111111	N	11011101		11011011
32 (SP)	1	O	10101011]	1010110101
!	111111111	P	11010101	~	101101111
"	101011111	Q	11101101	127	1110110101
#	111110101	R	10101111		
\$	111011011	S	1101111		
%	1011010101	T	1101101		
&	1010111011	U	101010111		
'	101111111	V	110110101		
(11111011	W	101011101		
)	11110111	X	101110101		
*	101101111	Y	101111011		
+	111011111	Z	1010101101		
,	1110101	[11110111		
-	110101	\	11101111		
.	1010111]	11101111		

*ASCII characters 0 through 32 are control codes. Their abbreviations are shown here in parentheses. For the meanings of the abbreviations, refer to any recent ARRL Handbook.

Figure 1, Varicode used in PSK -31 and QPSK-31 (Note the typo in the lower case a, b, c and d)

The code has a self clocking feature when used with Phase Shift Keyed modulation or PSK. Note that every character starts and stops with a logical one and that no more than a single consecutive logical zero exists in the code bit patterns. This allows a double logical zero to be inserted between characters to frame and identify the variable length code of each character. This double

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(Ham Tech from page 4)

zero works like the start and stop bits of RTTY but is much more robust based on measurements of both systems for maintaining synchronization. If the PSK-31 has long pauses between characters the double zero pattern continues keeping the clocks of the sending and receiving stations in sync. The varicode has solved limitations 2 and 3 as listed in the RTTY short comings above. Solving limitations 1 and 4 requires a change to the modulation.

Phase Shift Keyed Modulation - A logical 0 produce a 180 degree phase shift and a logical 1 an un-shifted carrier. This modulation can yield a very narrow spectrum when keyed with a very low rate signal like the 31.25 bits/sec of PSK-31 if the horrible key click problem of the modulation process can be solved. The key clicks are caused by reversing the polarity of the transmitted signal in a very short time interval. It is actually twice as bad as on/off keyed Morse. Like limiting the rise and fall time of dots and dashes in Morse to solve the click problem, a cosine filter is used with the BPSK modulator to ensure that the phase reversal occurs at instantaneous zero power. This process requires a matched filter with a near rectangular response and twice the 31.25 bps or 63 Hz be inserted in the BPSK receive path. The spectrum of the PSK-31 signal is shown overlaid with the spectrum of a 200 Hz shift RTTY signal in Figure 2.

The roughly 350 Hz bandwidth of the FSK spectrum has 5.6 times the noise power of a 63 Hz bandwidth for PSK-31 giving the latter a 7.5 dB higher S/N than RTTY FSK. But BPSK modulation will have a lower error rate than FSK for the same C/N or E/N0 ratio as shown in Figure 3. For equal error probability say 10⁻⁴ as used last month for the RTTY FSK model, BPSK using a differen-

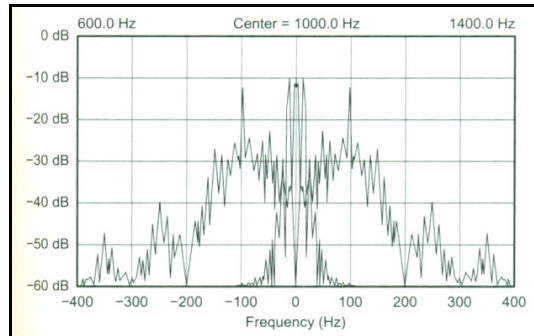


Figure 2, Spectrum of 200 Hz shift RTTY FSK overlaid with 31.25 Hz PSK-31.

tial detector will require 3.0 dB less signal as shown in Figure 3. The total advantage of PSK-31 over RTTY is 7.5 + 3.0 = 10.5 dB. Thus a 5 watt PSK-31 signal is equivalent to a 55 watt RTTY one. PSK-31 has a big sensitivity advantage over RTTY.

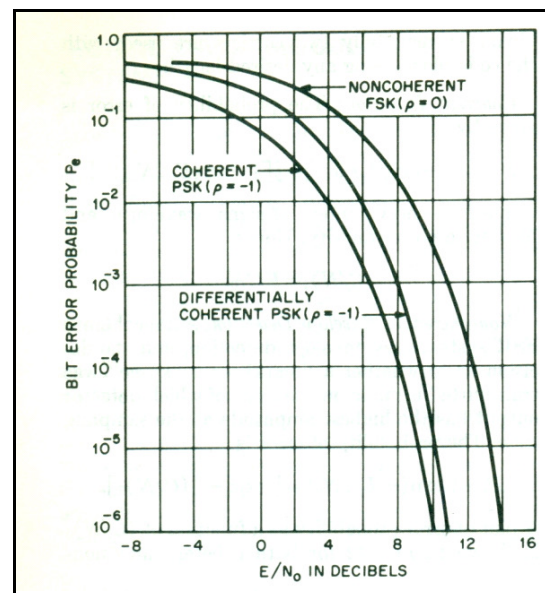


Figure 3, Bit Error Probability vs E/N0 or C/N

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SJRA CW/RTTY/PSK31 Experts - Prepare to Shine!

Now is the time to start honing your CW/RTTY/PSK31 skills and equipment in anticipation of the annual W1AW Field Day Bulletin. A perfect copy of the W1AW Field Day message is a must for any card-carrying CW or RTTY/PSK31 expert, and you can receive a round of applause for presenting the genuine article to Bonus Points chairman KV2R prior to July 10.

Of course you must copy the message as transmitted by ARRL via W1AW on Friday, Saturday, or Sunday June 27-29. The CW version will be transmitted at 8pm and 11pm EDT on Friday, 10am and 8pm on Saturday, and 10am on Sunday. Digital (RTTY and PSK31) are transmitted at 9pm on Friday and Saturday and at 12 pm on Sunday. All transmissions will be on the standard W1AW frequencies (see www.arrl.org/files/file/Field-Day/2014/2014%20w1a1%20sked.pdf).

Data rate is 18 wpm for CW. 2-160 m.

For those less elite operators who only can do phone, the message can also be recorded and then transcribed from the transmissions on the phone frequencies.

Good luck copying the message! See you on Field.

Rich KV2R

(Meeting Minutes from page 3)

W2FGY tower needs to come down.
Need a crew to lower it.

New Business - Rice School Demo on June 13th.

Adjourn @ 2050

Monthly Puzzle

Don – WA2DUE, *wa2due at arrl dot net*

A 200 foot communications tower has 4 guy wires from the top and 4 others from the 100 foot level. Each pair of guy wires (the top and middle) are fixed to the same anchor. All four anchors are the same distance to the foot of the tower. The guys from the top make an angle of 58 degrees with the ground. How many feet of guys are being used to support this tower?

Solution: Using the Law of Sines we first find the length of the longer guys. $(\sin 58)/200 = (\sin 90)/(\text{length})$ which works out to be 235.84 feet. Using the Pythagorean theorem we find the distance of the anchors to the base of the tower. $235.84^2 - 200^2 = 15618.47$. The square root of which is 124.97 feet. Again, using the Pythagorean theorem we determine the length of the shorter guys and find it to be 160.06 feet. Adding these two lengths and multiplying by 4 we get the answer of 1583.6 feet.

A park occupies a triangular area that faces two streets that meet at an angle of 85 degrees. The sides facing the streets are each 60 feet in length. If you wanted to install flower plants every six inches around the perimeter, how many plants would you need?

Solution: Since this is a isosceles triangle the value of the other two angles is $(180 - 85)/2 = 47.5$ degrees. Using the Law of Sines we find the length of the third side $60/(\sin 47.5) = (\text{unknown side})/(\sin 85)$ which resolves to 81.07 feet. Adding 120 (which is the sum of the length of the other two sides) to this we get a total of

(Continued on page 10)

Not a State Possessions

Part 7 - Kingman Reef

The nine possessions of the United States are Howland Island, Baker Island, Jarvis Island, Navassa Island, Johnston Island (Atoll), Midway Atolls, Palmyra Atoll, Wake Islands, and Kingman Reef.

Kingman Reef is the final in the series 'Possessions of the United States.'

Kingman Reef is a largely submerged triangle shaped reef located in the North Pacific Ocean about half way between the Hawaiian Islands and American Samoa. It is the northernmost of the Northern Line Islands. Kingman Reef encloses a lagoon about 270 feet deep. The total area within the outer rim of the reef is 29 square miles. The reef is made up of coral and limestone and the highest point is less than five feet above sea level and that is awash most of the time making it a maritime hazard. Kingman Reef has been referred to as Danger Reef, Caldew Reef, Maria Shoal and Crane Shoal.

The reef was discovered by American Captain Edmund Fanning of the ship Betsey on 14 June (Flag Day) 1798. Captain W. E. Kingman described the reef on 29 November 1853. It was claimed by the United States under the Guano Islands Act of 1856. Kingman Reef was formally annexed to the United States by Lorrin A. Thurston on 10 May 1922. In 1934 it was a naval reservation. Between 1937 and 1938 the lagoon was used for commercial purposes for seaplanes flying between Hawaii and American Samoa.

Here are some interesting things about Kingman Reef.

It is about 1.7 times the size of the Mall in Washington DC.

There are no ports or harbors - offshore anchorage only.

The time zone is UTC - 11.

There are giant clams and sea turtles and 130 species of stony coral. This does not sound like a very friendly place.

Kingman Reef is used as a nesting site for brown boobies.

Kingman Reef is the smallest DXCC entity.

It is IOTA OC-096.

Some of the call signs for Kingman Reef are AH5K, K5K, KH5K, and WH5K.

Kingman Reef concludes the Possessions of the United States. Stay tuned for Compacts of Free Association and more.

73 from the State of New Jersey, the QTH of SJRA, the oldest continually operating amateur radio club in the United States and the best.

Mary, KV2M

President's Message

Ken - K2WB

Field Day is one of those club events that helps bring club members together. This common goal of success has been a tradition with the SJRA from the beginning of Field Day in 1933.

One of the best part of Field Day is the friendships that grow and the exchange of ideas or techniques. I look forward to seeing everyone at Savich Farm at Field Day.

There are a couple of vacancies on the Board of Directors. If you are interested have a friend nominate you from the floor during the June Meeting (note if you are going to nominate someone ask them first to save any embarrassment).

The SJRA would like to congratulate the following on their recent achievements:

Michael DiMario, KD2DNS
 23 Badger Drive
 Skillman, NJ 08558
 Upgraded to General

Blake Vandegrift, KD2FQQ
 317 Hawkin Road
 Southampton, NJ 08088
 Upgraded to General

Mitchell Aldrich, KD2GNQ
 64 Burnt House Road
 Indian Mills, NJ 08088
 Upgraded to General

Lester Whinna
 59 Pelham Drive
 West Deptford, NJ 08051
 Earned his Technician

Harry Kingsmill, KD2GNO
 76 Mishemokwa Trail
 Medford Lakes, NJ 08055
 Upgraded to General

	Tech	General	Extra
YTD	62	23	11

DXCC COUNTRY/ENTITY REPORT

According to the AR-Cluster Network for the week of Sunday, 8th-June, through Sunday, 15th-June there were 215 countries active. Countries available: 3A, 3B8, 3B9, 3D2, 3DA, 3W, 4J, 4L, 4O, 4S, 4U1I, 4W, 4X, 5A, 5B, 5H, 5N, 5R, 5T, 5W, 5Z, 6Y, 7Q, 7X, 8P, 9A, 9G, 9H, 9J, 9K, 9M2, 9M6, 9N, 9Q, 9V, 9Y, A4, A5, A6, A7, A9, AP, BV, BY, C3, C5, C6, CE, CE0Y, CE9, CM, CN, CP, CT, CT3, CU, CX, D2, D4, DL, DU, E5/s, E7, EA, EA6, EA8, EA9, EI, EK, EL, EP, ER, ES, ET, EU, EX, EY, EZ, F, FG, FH, FK, FM, FO, FR, FS, FY, G, GD, GI, GJ, GM, GU, GW, HA, HB, HB0, HC, HH, HI, HK, HK0/a, HL, HP, HR, HS, HV, HZ, I, IS, J2, J3, J6, J8, JA, JD/o, JT, JW, JY, K, KG4, KH0, KH2, KH6, KL, KP2, KP4, LA, LU, LX, LY, LZ, OA, OD, OE, OH, OK, OM, ON, OX, OY, OZ, P2, P4, PA, PJ2, PJ4, PY, PZ, S0, S2, S5, SM, SP, ST, SU, SV, SV5, SV9, T32, T7, T8, TA, TF, TG, TI, TJ, TK, TR, TY, TZ, UA, UA2, UA9, UK, UN, UR, V3, V4, V5, V6, V7, V8, VE, VK, VK9L, VP2E, VP2V, VP8, VR, VU, XE, XW, YA, YB, YI, YK, YL, YN, YO, YS, YU, YV, Z2, Z3, Z8, ZA, ZB, ZC4, ZD7, ZD8, ZF, ZL, ZP, ZS

GCARC Hamfest

We just firmed up the date for our 2014 Hamfest. It will be held Sunday, September 14 at the 4-H Fairgrounds in Mullica Hill, NJ. Cory, WA3UVV, is our hamfest contact person. Thanks. 73,

Tom, KE2ES
 Hamfest Chairperson
www.w2mmd.org

Congratulations to SJRA Member:

Christian A Pycik, KD2FHA
 409 Monroe Ave
 Edgewater Park, NJ
 Recently Upgraded to General

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

Email Ted, W2TAG, with your listing, [ted.w2tag at gmail dot com](mailto:ted.w2tag@gmail.com)

A Thank You Note From Japan

When Jim - KR2T checked our post office box during May 2014 there was a letter all the way from across the Pacific Ocean from one of our SJRA members, Eii-chi Emma - JA9AA. This is what our most distant DX member had to say:

"Dear OM, Thank you for receiving your Harmonics for a long time. I am now 83 years old and losing interest in Ham radio. Your Bulletin has a long history, so reading it is very fascinating. Please tell the members of the club., 73

Kiichi Emma, JA9AA"

Thank you JA9AA, Kiichi Emma for taking the time to write this letter. It really means much when people let us know that they enjoy reading Harmonics.

I, Mary VonLintig - KV2M lived in Japan from 1953 to 1957 when I was a child. I still have many fond and beautiful memories of Japan and the wonderful Japanese people.

(Monthly Puzzle from page 7)

201.7 feet for the perimeter of the part. Using two plants for each foot would require 403 of them.

This month's puzzles are as follows:

What is the amplitude of the sine wave whose equation is $(1/5)y = 5(\sin 20)$?

A foundation for a back yard deck requires concrete pilings 14 inches in diameter each 30 inches in length. If 11 pilings are needed, how many cubic yards of concrete must be ordered to meet the job?

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

(Ham Tech from page 5)

PSK-63 and PSK-125 - These are double and quadruple speed versions of PSK-31 that accommodate 100 and 200 wpm transmissions respectively. They also have spectrums 2 and 4 times that of PSK-31 which might be an advantage in over the pole HF where the ionosphere's Doppler shift degrades the signal of the very narrow bandwidth of PSK-31. PSK-31 is still the most widely used of the variants.

Error Correction - PSK-31 like RTTY contains no error correction. This is consistent with other Ham modes like Morse keyed CW and SSB voice. Missing or in error pieces of transmissions are repeated and this works well. The PSK-31 inventor resisted error correction because it requires redundant data transmission that can increase the bandwidth and lowers the S/N of the signal. Later versions of the mode included what is known as QPSK-31 which has two transmission channels to accommodate the redundancy without increasing the bandwidth, but has a 3 dB S/N penalty. The modulation is 00/1800 on channel one and 900/2700 on channel two. A convolution encoder is used on transmit and a Viterbi decoder on receive to correct a limited number of errors. Both processes are beyond the mathematical scope of Ham Tech articles to explain. The mode is used on the air but PSK-31 remains the most popular.

Next Month - We dive into the ultra low S/N non-conversational JT-65HF mode that you can find at 14.076 and 21.076 MHz even when the bands are dead to other modes.



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

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.

June Meeting:**Fourth Wednesday, June 25, 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 June:**Field Day Kick-Off****June 2014 Health and Welfare:**

SJRA member Dan Damiano, KC2ELC - SK., June 8, 2014.

First Class Mail

South Jersey Radio Association
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Haddonfield, NJ 08033

