February 2015 VOL XCIX, ISSUE 8

HARMONICS

1916 *South Jersey Radio Association* 2015

Auction Mania!

By Rick, W2RDS

As anyone who has been to an SJRA Estate Auction or White Elephant sale when I was also there can tell you, I have serious Auction Mania! I just cannot resist trying to acquire as many new 'treasures' as I possibly can. The estate sale at the January 2015 meeting was no different. This auction was a bit unique in that there were many 'lots' up for auction that were categorized as 'a box-of-stuff', where the exact contents were, to a lesser or greater extent, unknown ("Why, there could be anything in there!" – Ralphie Parker's father in 'A Christmas Story'). These mystery boxes actually increased my Mania. When the auction mayhem was over, and the dust had settled, I had acquired an impressive (I thought) pile of boxes. After getting all of my new treasures home and carting them down to the basement shack, I decided to take just a quick peak into one of them to see what Ham Radio Magic it held. One box became two and the next thing I knew it was nearly 2 am when I finally shut the light off in the shack and went to bed!

A few of the items I managed to acquire were ones I set my sights on while perusing the goodies before the meeting started. Sadly, I was not able to acquire every thing I wanted (Damn that K2UT!!!), but I did end up with many of them.

What is most interesting and what I wanted to share with others is what I found in the several 'boxes-of-stuff' I had little knowledge of what lie within.

I ended up with some interesting and unusual items not related to ham radio or electronics. In one of the boxes was a fairly large plastic bag and in that bag were most of the more unusual items I ended up finding, which included:

- What appears to be a 'house' game piece from a Monopoly board game (except it is yellow – does Monopoly have yellow houses?)
- A pocket 'box cutter' – this thing is cool, you can put it on your keychain and always be ready to cut open any box you come across
- Some other strange bladed instrument – I am pretty sure this is some ancient medical tool used for bloodletting or something equally gruesome.
- An unfired .45 caliber bullet – (Yikes!)
- A variety of polished stones, either loose, in small bags, or in clear plastic pill bottles– I guess the guy was also a rock hound
- A pocket slide rule - I spent ten minutes trying to remember how to use a slide rule with no luck, but still a very cool find!

(Continued on page 6)

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 it's 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 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

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

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: Rock Stoneking, W2RDS
Circulation: Mary VonLintig, KV2M; Jim Vecchiola, KR2T

LOCAL WEEKLY NETS

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

Harmonics Deadline

Articles submitted for the next Harmonics will be accepted until Monday, March 9, 2015. Email:
ted.w2tag *at* gmail *dot* 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

Board of Director's Meeting of 2/4/2015

Pres Ken Botterbrodt, K2WB, opened the meeting at 7:30 PM. All Officers/ Directors were in attendance except Jim, KR2T, Dennis, AC2FO, and Lou, N2HQL. Ray, N3RG, participated by telephone.

Minutes of the previous Board of Directors meeting were approved with one correction noted by Mary, KV2M; the meeting started at 7:30 PM, not 7:00 PM. Motion to approve was made by Mary, KV2M, seconded by Al, N3AVT.

Treasurers Report-Ray, N3RG, provided a complete breakdown of the club's finances. There was $407 in sales from January's Estate Auction, and a check was made-out to the Estate. Motion by Roy, WB2EOD, and seconded by Jim, KR2T, to approve the Treasurer's report.

Centennial Memberships-The first application for 100th Centennial Membership was received from KA8SFG. Motion from Al, N3AVT, and seconded by Rick, W2JAZ, to approve the Centennial membership.

Additional discussion included Certificates for Centennial membership and suggestions for raise awareness of the special Centennial SJRA Membership.

New Members-Mary, KV2M - Regular Membership – four new regular members were proposed and accepted:

Larry Eichel, K2NA, an Extra from Colorado (was a member in 1962 as WA2HSP in NJ for an extended stay); Ed Casey, K2MBC, an Extra from Medford; Eugene Santa Maria, Jr., KD2GFH; a Technician from Delran; Zach Dean (son of KD2ARD; no call yet) from Magnolia.

Harmonics-Pres Botterbrodt reminded all that 9 February is the deadline for Harmonics; and the Asst Editor position is still open.

Repeater-Working well.

Contests-Jon, W2MC – Upcoming contests-(Feb 21-22 ARRL International DX CW, Mar 7-8 ARRL International DX Phone, June 13-15 VHF Contest, and June 27-28 Field Day). Also-submit a contest log, even if you worked a single station; it DOES make a difference for club competition!

Historian-Mary, KV2M-Pages from the 1925 logbook of Gordon Kressel were circulated. Additional discussion concerning the SJRA Archives (about 4 filing cabinets), and scanning the documents into electronic form. Mary, KV2M, also reminded the Board that a new Historian is needed.

Awards-Rick, W2JAZ-Awards have been given out; the club is running low on SJRA award medallions; various options for new ones were discussed.

Programs-Rick, W2JAZ- Feb-White Elephant Auction; March-Sheldon, K2MEN, and Radio Control; April-Hands-on courses; May-The Storm (robotics); June/July-Field Day; August-Bob, K2UT on Arduino. Rick, W2JAZ, also reported good response concerning Elmering; several members have confirmed they are

(Continued on page 7)

HAM TECH

Vol 6 No. 2 by John - WY2J

wy2j *at* arrl *dot* net

The Vacuum Tube

Part 2 of 3: Small Signal Tubes

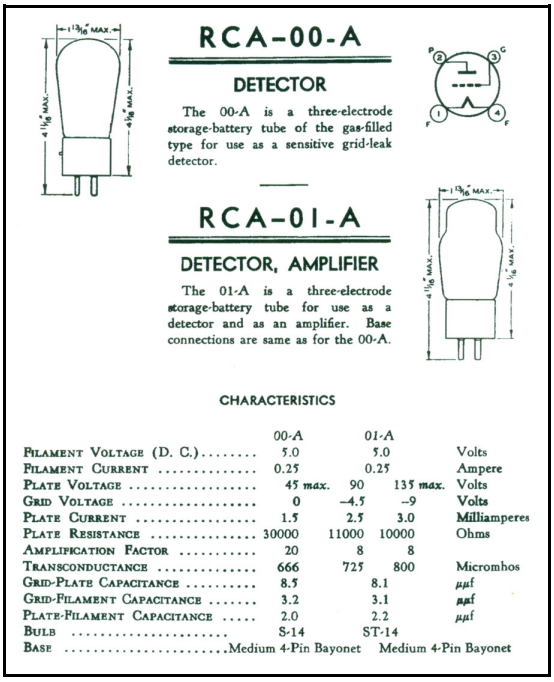
Introduction – There were a large number of vacuum tube classifications but the small signal or receiving tube class was the largest in terms of filling sockets. Next in size was the power and transmitting tube class which is the focus of next month's HAM TECH. This month we look at the small signal receiving tube, how it is characterized and its evolution from the simple triode to tetrode and then to pentode for RF and IF amplifiers and why this happened.

Small Signal Characterization – Last month's HAM TECH included the characteristic curves for a 2A3 power triode and a method on how to use these curves to design a simple large signal audio power amplifier. For RF and IF amplifiers where the signal levels are much smaller there is a simple way to do the design without the graphical method. For any given set of tube bias voltages, control grid, screen grid, suppressor grid and plate you can calculate three parameters, trans-conductance (g_m), plate resistance (r_p) and amplification factor (μ) that turn the design into simple multiplication. All three of the terms are mathematical partial derivatives but you won't need your calculus or differential equations because the tube manufacturer selects the best bias voltages and calculates the values for you. But you can only use them in the small signal case for the dc bias voltages specified. The definition of each follows.

1. Trans-conductance (g_m) is the small AC signal variation in plate current divided by the change in control grid voltage that caused it. It is in units of mhos or usually micro mhos. A mho is the reciprocal of ohms the measure of resistance.

2. Plate resistance (r_p) is the small AC variation in plate voltage divided by the change in plate current resulting from the signal. Its units are ohms.

3. Amplification factor (μ) is the small AC variation in plate voltage divided by the control grid voltage change. It has no units. $\mu = g_m r_p$. The value of μ for triodes can be as low as 4 (2A3) to upward of 200 for triodes.



RCA-00-A

DETECTOR

The 00-A is a three-electrode storage-battery tube of the gas-filled type for use as a sensitive grid-leak detector.

RCA-01-A

DETECTOR, AMPLIFIER

The 01-A is a three-electrode storage-battery tube for use as a detector and as an amplifier. Base connections are same as for the 00-A.

CHARACTERISTICS

	00-A	01-A		
Filament Voltage (D. C.)	5.0	5.0		Volts
Filament Current	0.25	0.25		Ampere
Plate Voltage	45 max.	90	135 max.	Volts
Grid Voltage	0	−4.5	−9	Volts
Plate Current	1.5	2.5	3.0	Milliamperes
Plate Resistance	30000	11000	10000	Ohms
Amplification Factor	20	8	8	
Transconductance	666	725	800	Micromhos
Grid-Plate Capacitance	8.5	8.1		μμf
Grid-Filament Capacitance	3.2	3.1		μμf
Plate-Filament Capacitance	2.0	2.2		μμf
Bulb	S-14	ST-14		
Base	Medium 4-Pin Bayonet	Medium 4-Pin Bayonet		

Figure 1, Early RCA Receiving Triodes

Early Small Signal Triodes – The market for receiving tubes was created with the start up of commercial broadcasting in 1921 when Westinghouse put KDKA 1020 KHz on the air in Pittsburgh. GE followed with WGY

(Continued on page 5)

*(**Ham Tech** from page 4)*

in Schenectady, NY and ATT/Bell Labs with WEAF in NYC. RCA had been set up in 1919 by the government with divestures of parts of GE and Westinghouse that included the GE lamp works in Harrison, NJ. RCA turned this facility into a tube factory for their new radio receiver business. Two of the earliest tubes mass produced in Harrison were the 00-A and 01-A triodes. The characteristics of both are shown in Figure. 1.

The two tubes are essentially equal but the 00-A has a small amount of argon gas added to increase the amplification factor by about 2.5:1. It was used in single tube radios where the zero biased grid acted as a signal diode detector electron coupled to the plate as an audio amplifying triode. The tube was not useful as an RF amplifier because of the argon gas. The 01-A was a true vacuum triode and was used as an RF amplifier, Armstrong regenerative detector and audio amplifier with enough power to drive a pair of head phones. A high end broadcast receiver like the Atwater Kent unit the author's grandfather purchased in 1923 used five 01-A tubes, two RF amplifiers, a regenerative detector and two transformer coupled audio amplifiers. A 6 volt storage battery powered the filaments and a 90 volt multiple dry cell battery powered the plates.

The gain of the 01-A RF amplifier stage could not exceed 8, the amplification factor and was closer to 4 to 6 (12 to 15 dB) for practical loads. The gain is the product of g_m and the parallel equivalent of the load resistance and the plate resistance $r_{p.}$ With a 10,000 ohm load in parallel with the 10,000 ohm plate resistance giving a 5,000 ohm parallel resistance which when multiplied by the 800 micro-mho trans-conductance gives a gain of 4 or 12 dB. This limited gain was a fortunate situation as the high value of the grid to plate capacitance (8.1 pf) could introduce oscillation at higher gains or higher frequencies due to feedback from plate to grid.

Tetrodes and Pentodes - The screen grid tetrode was introduced about 1927 to solve this problem. It also increased the plate resistance and amplification factor by a large amount typically to 250 K ohms and 125 for the early type 22 tube. The big improvement was in the grid to plate capacitance which went from 8.1 pf for the 01-A to 0.02 pf for the type 22. This allowed stable RF amplifiers in the HF region up to the 20 meter band with gains of about 30 dB. But the tetrode has a problem. Secondary emission electrons from the plate can be captured by the screen grid when the plate voltage swings below the screen grid positive bias voltage. This can introduce another form of instability and oscillation. By the early 1930's the third grid the suppressor was added between the screen and plate and operated at cathode voltage to repel the secondary electrons. The pentode was born and became the standard of performance for RF and IF amplifiers in commercial and ham receivers. Figure 2 gives the performance characteristics for the 6BA6 and its identical 12.6 volt heater version the 12BA6. This post

Maximum Ratings: CLASS A_1 AMPLIFIER			
PLATE VOLTAGE		300 *max*	volts
GRID-NO.2 (SCREEN-GRID) VOLTAGE		See curve page 67	
GRID-NO.2 SUPPLY VOLTAGE		300 *max*	volts
PLATE DISSIPATION		3 *max*	watts
GRID-NO.2 INPUT:			
For grid-No.2 voltages up to 150 volts		0.6 *max*	watt
For grid-No.2 voltages between 150 and 300 volts		See curve page 67	
GRID-NO.1 (CONTROL-GRID) VOLTAGE:			
Negative bias value		50 *max*	volts
Positive bias value		0 *max*	volts
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode		90 *max*	volts
Heater positive with respect to cathode		90 *max*	volts
Characteristics:			
Plate Supply Voltage	100	250	volts
Grid No.3 (Suppressor Grid)	Connected to cathode at socket		
Grid-No.2 Supply Voltage	100	100	volts
Cathode-Bias Resistor	68	68	ohms
Plate Resistance (Approx.)	0.25	1.0	megohm
Transconductance	4300	4400	μmhos
Grid-No.1 Voltage (Approx.) for transconductance of 40 μmhos	−20	−20	volts
Plate Current	10.8	11	ma
Grid-No.2 Current	4.4	4.2	ma

Figure 2, Characteristics of the 6BA6/12BA6

(Continued on page 10)

(Auction Mania** from page 1)

- A small hand magnifying glass – this little guy is tiny compared to the giant one I have.

On the radio/electronics related side some of the things I found included:

- A variety of components (ICs, crystals, diodes, transistors, coils, ferrite beads, LEDs, resistors, capacitors, etc.)
- An Archer Universal solderless breadboard with binding posts.
- A Radio Shack Universal PC board (looks just like a breadboard but is a PC board)
- Power meter – Shhhh, it's for 11m
- Heathkit Relative Field Strength Meter
- A Radio Shack 13.8V 2.5A DC Power Supply
- A coaxial relay (With a sticker on it saying it was 'accepted' in 1961)
- Enough miscellaneous panel meters to fill one of the numerous boxes I brought stuff home in.
- A Q-Stick Antenna – I initially thought it to be a homebrew 2m or possibly 2m/70cm vertical base antenna – (Sadly Q-Stick Antennas is now defunct and no info available)
- A couple of unfinished, mystery homebrew projects

I was just amazed by all the great stuff that I picked up (and I really did not spend all that much money). I hope everyone there had as much fine as I did, even if nobody took as much stuff home with them.

Now, I can't wait for the ***White Elephant*** sale at the February General Membership meeting!

With Just a WSPR

Dan, KB6NU, cwgeek *at* kb6nu *dot* com

It's really amazing what you can do with computers in amateur radio and there's been an explosion in the number of digital modes. One interesting mode that I've recently been introduced to is WSPR, which is short for Weak Signal Propagation Reporting. The protocol and the original WSPR program was written by Joe Taylor, K1JT, and is designed for sending and receiving low-power transmissions on the HF bands to test propagation paths.

I won't try to cover all the technical details here. There are several sites that cover them pretty well:

* Wikipedia: WSPR (http://en.wikipedia.org/wiki/WSPR_%28amateur_radio_software%29)

* G4ILO's Shack: WSPT - Distant Whispers (http://www.g4ilo.com/wspr.html)

I was introduced to WSPR by my friend, Joe, AC8ES. He posted a message to our club mailing list asking if anyone had a toroid core that he could buy to make a QRP balun for 10 MHz. When I asked what he was going to use it for, he said that he was making a WSPR transmitter with a Raspberry Pi and the balun was for the dipole he built for it. He said that he'd gotten roped into doing this because he'd attended a local Raspberry Pi users' group, and when he mentioned he was an amateur radio operator, they encouraged him to try this project.

How could I refuse a request like that? I have a whole kit of ferrite cores, and after some back and forth, we found a

(Continued on page 8)

Monthly Puzzle

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

Last months puzzles were the following:

A tank circuit tunes from 3508 to 4004 kilohertz. The circuit consists of a variable capacitor with a minimum of 2 and a maximum of 50 picofarads, a fixed capacitor of 156 pf and a coil, all components are connected in parallel. What is the inductance of the coil?

Answer: The resonant frequency of a tank circuit is expressed by the equation $f = 1/(2\pi(LC)^{0.5})$ which can be written as $L = 1/(4\pi^2f^2C)$. Now using the minimum capacity of 2 picofarads added to the 156 pf we have 158 pf and for the frequency of 4004 kilohertz the equation resolves into 10 microhenries.

The first term of a geometric series is 3 and the 10^{th} term is 1536. What is the seventh term?

Answer: The general equation of a geometric series is $T_n = T1R^{(n-1)}$ where T_n is the nth term and R is the common ratio. To solve this problem we must first find the common ratio. First we divide 1536 by 3 and find the quotient to be 512. Then taking the logarithm of both sides we have 2.71 = 9 log(R). Dividing both sides by 9 and then taking the antilog we find R equals 2. Therefore the 7th term equals 2 to the sixth power times 3 which is 192.

For this month try these problems:

Railroad stations A and B are 500 miles apart and connected with twin rails. Train number 512 leaves station A at 8 AM and Train 513 leaves station B at 9 AM. Both trains average speed is 75 miles per hour. At what time will they pass each

(Continued on page 10)

***(BOD Meeting Minutes** from page 3)*

willing to Elmer on different topics. More information to come.

VE Testing Report-Al, N3AVT-doing well; candidates coming from as far as Atlantic City and Landsdale PA for testing.

Web Team-Ira, W2IRA-working on web page updates this weekend (7-8 Feb).

100th Anniversary-Ken, K2WB-making good progress; fundraiser permit is in the works.

Field Day-Ken, K2WB-looking for 20M CW band captain, more demo modes

Health/Welfare Roy/Dara WB2EOD/KC2THQ-cards are out

Old Business-The Nominating Committee reported they have identified nominees for all positions; their report will be read at the March Membership Meeting. Nominations will be taken from the floor during the March and April Meetings (please be sure the nominee knows ***in advance*** and ***will accept the nomination!***); and the election held at the May Meeting. The newly-elected Officers and Board will be installed at the June Meeting.

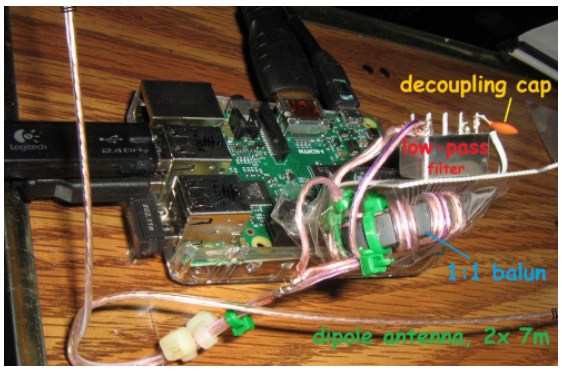
New Business-under "Nostalgia"-the latest operation on Navassa Island brings back memories of the SJRA member's DXpeditions to Navassa in 1974 and 1978. QSL Cards from that DXpedition may be at the next meeting.

Motion to Adjourn was made by Roy, WB2EOD, and seconded by Ira, W2IRA. Meeting adjourned at 2110.

Submitted – Jon MacMillan, W2MC
Vice President

Please donate a *Ham Radio Item* to this months White Elephant Auction.

***With Just A WSPR** from page 6)*



small core that he could use. The software he chose is WsprryPi (https://github.com/JamesP6000/WsprryPi). It's described a "Raspberry Pi transmitter using NTP-based frequency calibration." It uses a GPIO port to generate WSPR signals anywhere from 0 to 250 MHz. Joe said that there are several Raspberry Pi programs that run WSPR but that he chose this one because it seemed to have more features than the others.

The picture above shows Joe's setup. Since the output generates a square wave, a low-pass filter is needed to filter out the high-frequency components. As you can see, the GPIO output is fed through a 0.1uF decoupling capacitor into a Mini-Circuits 10.7 MHz low-pass filter, then to a 1:1 balun, which is connected directly to the dipole elements.

Joe says, "The antenna is just a dipole taped up to the walls of my living room and hallway." As you can see he made the balun and dipole from 24 ga speaker wire.

The performance of this setup has been kind of amazing. In one e-mail, Joe reported, "Your toroid seems to be working well. Got the balun and antenna finished and executed seven WSPR transmissions from the Raspberry Pi. The WSPR reporting website WSPRnet (http://wsprnet.org) came back with a couple dozen reception reports; typical distance is ~300+ miles, max was 593 miles." In a second e-mail, Joe writes, "Did a few more beacon transmissions and checked the WSPR signal reports again. Someone picked up my 5 mW signal from 1010 miles away in Canada."

Joe's turned into quite a WSPR fan. He's even written an Android app - WSPRnet Viewer (https://play.google.com/store/apps/details?id=com.glandorf1.joe.wsprnetviewer.app) to retrieve and displays report from www.wsprnet.org. Tapping on a specific report displays more details about it, along with a world map that shows transmitter and receiver locations.

Unfortunately, I don't have a Raspberry Pi or I'd try this as well. I do have a BeageBone Black, but there doesn't seem to be software that I can download and install as easily as the Raspberry Pi software. That being the case, this might be a good excuse to purchase one of those new, cheaper RPis.

(Editor's Note: Of course Joe Taylor, K1JT, the developer of the original WSPR program, is an Honorary Life Member of SJRA and once was the editor of the SJRA Harmonics newsletter. So, if someone in the club builds a WSPR station, I hope they consider writing a nice article for our newsletter about your experience. Ted, W2TAG)

• •

When he's not digging through his junk box or teaching amateur radio classes, KB6NU writes about amateur radio at KB6NU.Com. He has just released The CW Geek's Guide to Having Fun with Morse Code. The book is available on Amazon.Com or on KB6NU.Com.

SJRA Membership Renewal Begins January 1st, 2015.

Please consider paying your dues in a timely manner this year.

We've done our best to make it easy...

Use the SJRA website and PayPal to renew at:

http://www.sjra.org/sites/default/files/2014_Renewal.pdf or:

Bring a check payable to "SJRA" to the next meeting or:

Simply mail a check payable to "SJRA" to:

Ray Golley, Treasurer
552 Newport Rd.
Millville, NJ 08332

Thanks for your consideration.

SJRA Members Birthdays

March

24 - Ira Weinstein, W2IRA
24 - Chris Cannatella, KC2GNQ
27 – Albert Kaiser, W3LEQ
28 – Tony Canuso, N2ATB
30 – Howard Bates, KC2SNK

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

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, History 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. Also, if you can bring an elderly member to a meeting let me know.

Field Day will be here 142 days, now is a good time to start planning. Contact me if you have any questions or would like to help. Stay warm!

If you have not paid your 2015 dues, this may be the last issue of Harmonics you receive. Please send your dues check payable to "SJRA" to:

Ray Golley, Treasurer
552 Newport Road
Millville, New Jersey 08332

100th Anniversary Happenings

So far the 100th anniversary committee has had five meetings (many more to come). Just to keep everyone up to date here is where we are.

Over 35 coffee cups have been sold. There are plenty more to go. Mugs may be acquired to SJRA members by a minimum donation of $10.00. I will be bringing some coffee mugs to the General Membership Meeting on February 25th, 2015.

The first of the fund raising raffles is still in the planning stages.

I am proud to announce our first SJRA Centennial Member as being Rod, KB8SFG, from Ohio. Hopefully there will many more. Our goal would be to have at least 2 members in each of the States. At least 1 member in each of the ARRL sections, and at least 1 member in 100 countries. This will make some of radio sport events planned very exciting.

There is still a lot to do and we need your help. Please contact me if you are interested in helping with our 100th.

Ken K2WB/100

(Monthly Puzzle** from page 7)

other and at what distance each train will have traveled during that time?

A hair dryer with a resistance of 12 Ohms and a lamp whose resistance is 125 Ohms are connected in parallel to a voltage source of 125 Volts through a 1.5 Ohms resistor in series. What is the current through the lamp when the dryer is running?

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

Ham Tech** from page 5)

WW-2 tube is shown in exploded view in Figure 1 of last month's HAM TECH.

The grid to plate capacitance of this tube is 0.0035 pf maximum and the amplification factor is 4400 with 250 vdc on the plate. These tubes can provide over 40 dB of stable gain per stage in the IF amplifiers of commercial and ham receivers. The 12BA6 was used in the millions of 5 tube AM radios produced after the war.

Errata – The author of HAM TECH takes every precaution to assure the articles are error free. Still occasionally a typo escapes my aging eyes. Last month's HAM TECH was a blow out edition for errors. In the second paragraph of the Thermionic Emission topic there are 6 temperatures and they are all 10:1 too high. The editor's Publisher software caused these errors by changing the degree symbol in my Word manuscript to an extra zero. Thanks Microsoft. The other errors are due to the author miss-reading the signal swing in Figure 2 as 67 volts rather than the correct 87 volts. Thus, the voltage and power gains are 2.2 dB too high. Sorry fellows.

Next Month – We finish up this three part series on the history of the vacuum tube with coverage of transmitting and high power modulation applications.

The SJRA congratulates the following on their recent achievements:

Leonard Warren, KD2FMV
108 Mohawk Trail
Shamong, NJ 08088
Earned his General

	Tech	General	Extra	Total
To Date	74	30	14	118

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 $20 (*New Lower Price*, 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

February Meeting:

Fourth Wednesday, February 25, 2015

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:

Annual White Elephant Auction

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 ***at*** SJRA ***dot*** 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