

The Jersey Broadcaster

NEWSLETTER OF THE NEW JERSEY ANTIQUE RADIO CLUB

May 2005

Volume 11 Issue 5



MEETING/ ACTIVITY NOTES

Reported by Marv Beeferman

With no *Broadcaster* mailing in April, we have a little catching up to do. If you received a "Last Issue" sticker on your mailing, we haven't received your 2005 dues by April 28th and you will be dropped from membership. If you sent in your dues after the 28th, we'll reinstate you for May. But remember, our next meeting will be held on May 6th to accommodate those members attending the Kutztown swapmeet.

Previous NJARC meetings included a vintage radio troubleshooting talk by Al Klase, a video tour of Major Armstrong's Alpine Tower, some nice mini-auctions and the announcement of our Broadcast Band DX contest winners. March and April events included another successful swapmeet in Hazlet, a radio display at the Trenton Computer Faire and an open-house Repair Clinic at the Sarnoff Library. We followed these on Kodachrome and they'll be included in this month's *Broadcaster*. Our March meeting's show-and-tell also caught the camera's eye and here's what it saw:

- Ray Chase's CRV-46152 airship (blimp) radio/direction finder from the late 30s. Ray used this dynamotor-powered unit in our recent DX contest.
- Rick Skoba's RCA VOM dynamic demonstrator kit found at a garage sale.
- Dave Sica's 1954 RCA 77-DX ribbon microphone which he still uses professionally.
- Alex Magoun's 1921 UV204 GE triode.
- Sal Brisindi's electronic clock constructed from RCA numitron tubes.
- Ed Ledner's RCA Radiola "antenna" lamp.

MEETING NOTICE

NOTE - DATE CHANGE

The next meeting of the New Jersey Antique Radio Club will take place on Friday, May 6th, at the David Sarnoff Library in Princeton, NJ. Contact President Phil Vourtsis (732-446-2427) for directions. The date change is for this month only to accommodate members attending the Kutztown swapmeet. Dave Sica has organized a video with several RCA promo films on record pressing (1946), hi-fidelity (1956) and stereophonic sound (1957). We'll also try to get an update from Ray Chase on a historical radio recently donated to InfoAge.

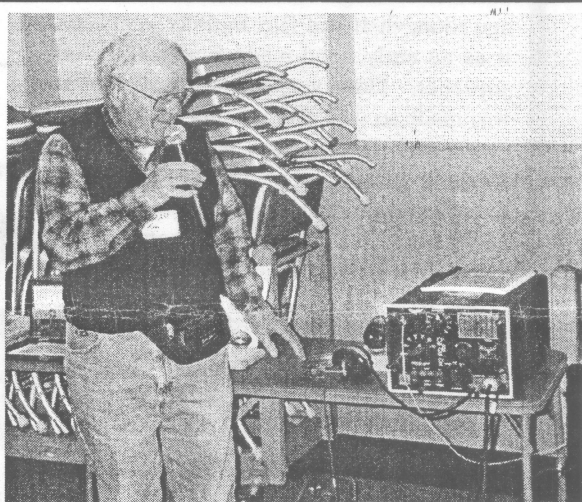
- Phil Vourtsis' 1951 experimental 45 RPM acetate recording ("In a Monastery Garden") and examples of Orthophonic record players illustrating the single-speed/multi-speed transition.

RCA. Rob said that his grandfather picked this job because it involved rotating through various RCA labs (finally stopping at TV research) and a 5-day work week.

- Marsha and Jerry Simkin's rare 1937 recording (which was played by Daren Hoffman for the club's enjoyment) of a David Sarnoff eulogy following Marconi's death which also included excerpts from Marconi discussing his original research.
- Marv Beeferman's RCA advertising tapestry.

Ray Chase reports that the club's radio history display is up and running at the IEEE History Center. Ray was instrumental at pulling it all together on very short notice and Mary Ann Hoffmann, the center's Archival Services Manager, is delighted with it:

"On behalf of the IEEE History Center, I wish to heartily thank you and the New Jersey Antique Radio Club for providing the IEEE Operations Center in Piscataway with a magnificent exhibit on the History of Radio. Special recognition must go to Ray Chase, who went above and beyond the call of duty in rounding up the artifacts and installing it in our Piscataway facility."
"The very positive comments from the



Ray Chase discusses his CRV-46152 "airship" receiver during our March show-and-tell. See page 3 for a closeup.

- Aaron Hunter's toy RCA service truck (1948-50). Aaron noted that he owns a 1949 truck that his dad purchased in 1953 that had the RCA service truck logo on its side.
- Rob Flory's 1930s "Student Engineering Course" certificate that his grandfather earned while working for \$30 a week at

THE JERSEY BROADCASTER is the newsletter of the New Jersey Antique Radio Club (NJARC) which is dedicated to preserving the history and enhancing the knowledge of radio and related disciplines. Dues are \$20 per year and meetings are held the second Friday of each month.

The Editor or NJARC is not liable for any other use of the contents of this publication.

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IEEE staff attests to the success of the Exhibit. I cordially invite you and the members of the Club to come to Piscataway to view it. Kindly note that, due to security reasons, I will need advance notice. You can also view the Wheeler Washington receiver."

The center had a "bring your child to work" day on April 28th and a good amount of traffic was expected (including the 800 permanent employees!). An Amateur Ham Radio talk will also be featured and the exhibit will be incorporated into part of the talk. Ray said that he was interrupted many times during setup by people with positive comments.

The display of some 40 radios and tubes, parts and documentation is housed in four display cases. Also included is a historic superhet radio. Many thanks to members who contributed to the display: Marv Beeferman, Joe Bontrovo, Ray Chase, John Dilks and Rob Flory. Several other members volunteered items but space was limited.

The Wheeler Washington receiver that Mary Ann Hoffman refers to has been donated to InfoAge. It was found on a storage room shelf and Ray initially identified it as an early hand-made 8-tube (201As) superhet. However, Ray noticed that it was made so well that it could have been a prototype. A few days later, Mary Ann found a book in her library by Alden Wheeler about the Hazeltine Company and in the book is a picture of the same radio, referred to as the "Washington Receiver." It turns out that Wheeler invented AVC while he worked for Hazeltine (Ray says that "I always thought it was Hazeltine himself") while he was in Washington. The historic radio that was used to develop AVC is now a part of InfoAge.

The club was also successful in setting up a display at the Trenton Computer Faire at the former Trenton State College. Phil Vourtsis, Dave Sica and Al Klase should be congratulated for working under very difficult circumstances. Organizer Erik Wendt had the following comment:

"...the guys put on a FANTASTIC display at Trenton. They received accolades from many people and had a lot of interesting items to show. Even though they competed with a very loud vendor, their music was far more interesting."

As a follow-up to Richard Lee's article on the Alpine Tower in the March *Broadcaster*, a commemorative FM broadcast will recall the event. Seventy years after Major Armstrong demonstrated wide-band FM for the first time in public, you can hear it again at 42.8 MHz or on-line. Steve Hemphill, owner of Solid Electronics Laboratories, and Charles Sackermann Jr., CEO of the company that owns the Alpine Tower, plan the broadcast from the site on June 11-12. They said they have an STA from the FCC to conduct the broadcast under experimental call sign WA2XMN.

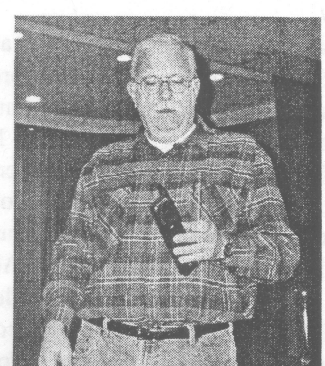
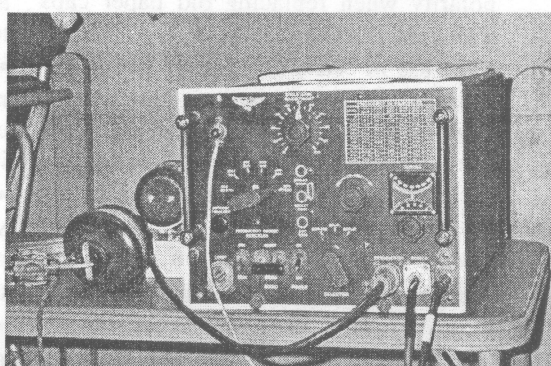
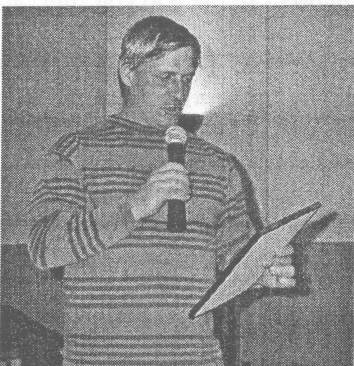
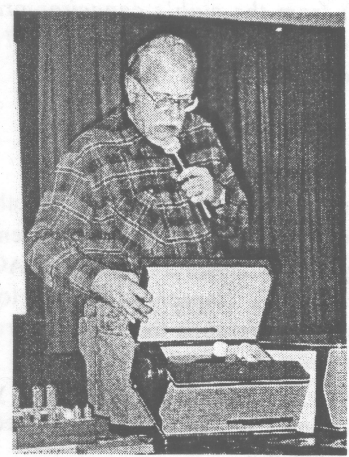
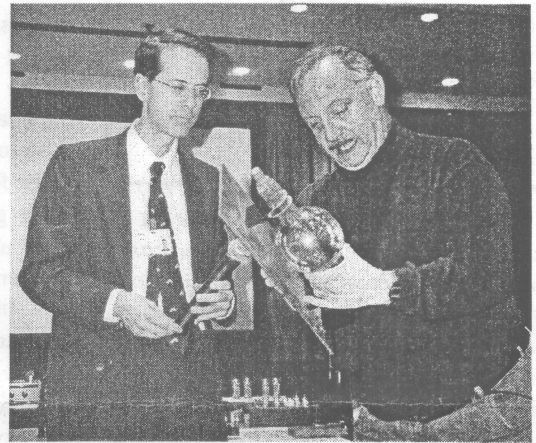
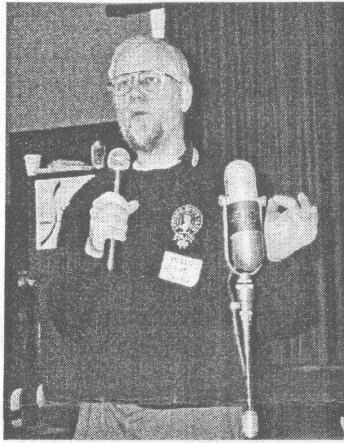
The program material includes a dramatic production of "Empire of the Air" based on the book by Tom Lewis which traced Armstrong's dealings with RCA. Also planned are excerpts from a 1941 test broadcast between stations of the original New England Yankee Network, featuring recordings of Armstrong, Paul deMars, the Yankee Network Chief Engineer and others. The planners said they'll also rebroadcast the final signoff of Major Armstrong's pioneer FM station W2XMN/KE2XCC, which went dark in 1954 after Armstrong's death.

TRENTON COMPUTER FAIRE



More photos on page 7

SHOW-AND-TELL



CAPACITOR BASICS

Edited by
Marv Beeferman

From Dave and Babylyn Cantelon of Ontario, Canada (justradios@yahoo.com) comes one of the most useful non-technical guides to capacitor basics I have yet to come across. It offers tips on choosing and installing them in tube radios and both new and advanced restorers should find something useful. If you can't find what you want from the club's capacitor program, Dave and Babylyn also offer a full line of replacements.

BASICS

- Your vintage tube radio needs both direct current (DC) and alternating current (AC) to operate. Capacitors act to pass AC while blocking DC. Capacitors are used to block, pass, filter and tune the various currents in your radio.
- Don't let terminology confuse you - "Condenser" is just an old-fashioned name for "capacitor."
- Capacitors have a capacitance value and a voltage rating. The capacitance value is the measure of how much electric charge a capacitor can store. The voltage rating is the maximum voltage the capacitor can handle without breaking down.
- An old tube radio uses 4 types of capacitors: variable (tuning), mica, paper and electrolytic (filter). When you restore an antique radio, you will replace the paper and electrolytic capacitors. In general, mica capacitors do not require replacement unless troubleshooting indicates that one is faulty.
- In radio service literature, paper and electrolytic capacitors are usually expressed in terms of "microfarads." Abbreviations for microfarads include mfd, MFD, MF, UF and uF. Mica capacitors have lower capacitance values than paper and electrolytic capacitors and are expressed in terms of micromicrofarads (or picofarads). Abbreviations for micromicrofarads include mmfd, MMFD, MMF, PF and pF. A picofarad is one-millionth of a microfarad. For example:

A mica capacitor valued at 500 mmfd (pF) would be equal to 0.0005 mfd (uF).

- When reading schematics and buying capacitors, you sometimes have to be able to convert uF to pF or vice versa. For convenience, you may want to paste a conversion chart (found in most basic electronics texts) to your workbench. One such chart can be found at justradios@yahoo.com.
- As a general rule, capacitors less than 0.001 uF are probably mica. If they are between 0.001 uF and 1.0 uF, they are more likely paper and more than 1 uF points to electrolytics.
- Size wise, the electrolytics are usually the largest capacitors and most basic tube radios have 2 or 3 of them. Original electrolytics are typically the size of a roll of quarters or larger. In the older AC sets, they are usually encased in aluminum and mounted on top of the chassis. With the lightweight AC/DC sets of the late 40s and early 50s, they are quite often under the chassis and may have a cardboard case.
- Original paper capacitors will likely be in a brown paper tubular case that is often coated with wax. They are usually 1 to 1-1/2" long and 1/4 to 1/2" in diameter.
- Mica capacitors come in different sizes and shapes, but most are square or rectangular and brown in color with colored dots (sort of like dominos).
- Capacitors have either radial leads or axial leads. With radial leads, both leads exit from the same end of the capacitor. With axial leads, there is a lead at each end. Both types are equally good - just be sure the capacitors you order have long leads.
- On schematic diagrams, the flat side of the capacitor symbol is the positive (+) side and the curved side is the negative (-) side. The positive end must be kept at the higher electrical potential (more positive voltage). Modern film capacitors are non-polar, so you don't have to worry about polarity when replacing old paper caps with new film capacitors.
- The use of "New Old Stock" (NOS) capacitors, in most cases, is not recommended and should be used at your own risk. As paper and electrolytic capacitors age, their capacitance values drift, they dry out and become leaky.
- Don't waste your money on audiophile, computer grade or tantalum capacitors. Sure, they are good capacitors but your old tube radio does not have the electronic circuitry to take advantage of these expensive

versions. The only difference that you might notice is in your wallet.

- Plastic/polyester film capacitors are now used in place of paper capacitors because of their smaller size, lower cost and superior performance. There are many variations of plastic/polyester capacitors. Good types include metalized polyester, metalized polypropylene, metal-foil polypropylene and mylar. (Mylar is the trade name of the synthetic film registered by duPont).
- At higher frequencies, polypropylene is more stable than polyester, so for film capacitors under 0.001 mfd, you may want to use polypropylene.
- To "recap" a typical 5-tube radio, you will need a couple of electrolytic capacitors and about a dozen film capacitors. Total cost for these parts should be from \$10 to \$12.

NON-ELECTROLYTIC CAPACITOR TIPS

- When replacing old paper/wax capacitors, you can't go wrong using film capacitors that have a higher voltage rating than the paper ones you are replacing. For example, if you are replacing a paper capacitor rated at 400 volts, you can use a 630 volt film capacitor (but not a 200 volt capacitor). A film capacitor with a higher voltage rating will give your tube radio better reliability and longer life.
- Why were tube radios manufactured with 200, 400 and 600 volt paper capacitors if 600 volt could have been used for all the capacitors? Two reasons...cost and size. Capacitors used to be expensive so if a manufacturer could use lower voltage capacitors in a circuit, it could cut production costs. Also, the higher the voltage the larger the paper capacitor, so it was easier to install a lower voltage paper capacitor. Today, film capacitors are inexpensive and compact - so use 630 volt film capacitors and you can't go wrong.
- Schematics and parts lists sometimes do not specify the working voltage of non-electrolytics. To be safe, use a film capacitor rated at 630 volts.
- Don't let "molded" paper capacitors fool you. They are just paper capacitors in plastic cases and are just as unreliable as the wax-coated ones.
- Modern non-electrolytic capacitors are non-polar. This means that you don't have to worry about which end to connect when

replacing old with new.

- Although non-polar, old paper capacitors had black bands at one end. The black band indicated which end of the paper capacitor had some metal foil (which acted as a shield). The end with the metal foil was connected to ground (or a lower voltage) and its purpose was to make the capacitor last longer.

- When replacing, keep in mind that capacitance values are "easy to please." The uF value does not need to be exactly the same. For example, a 0.05 uF capacitor can be replaced with a 0.047; a 0.002 with a 0.0022. If you maintain an equal or higher working voltage, a difference of +/- 10% will keep you well within the radio's factory specifications.

ELECTROLYTIC CAPACITOR TIPS

- Electrolytic capacitors are often referred to as "filter capacitors." They help convert (filter) AC power into the DC voltage required by the radio tubes.

- Electrolytics are the largest capacitors in the radio. On older sets, they are usually encased in aluminum (can type) and mounted on top of the chassis. On later sets, you will find them under the chassis.

- To save on space and cost, multiple section electrolytics were used. These are simply two, three or four capacitors in the same case. You will notice just one ground connection (black wire) which all the capacitors in the case share. These multi-section caps can be replaced with single electrolytics; modern electrolytics are compact and will easily fit under the chassis. You can leave the old can type capacitors on the chassis to maintain the radio's original appearance - just remember to disconnect them.

- In most cases, tube radio hum is the result of bad filter capacitors. If your radio hums, turn it off and don't use it until the filter caps can be replaced. Bad electrolytics are not only bad on the ears; they are hard on tubes, transformers and other radio parts. Capacitors are cheap...tubes and other parts can be expensive and hard to find.

- Ideally, an electrolytic should be operated at a voltage between 1/3 and 3/4 of its maximum working voltage. This is enough to keep the electrolyte from drying out while allowing some margin of safety for unexpected voltage surges. Never replace an

electrolytic with one that has a lower voltage rating.

- As with paper capacitors, the capacitance of an electrolytic is "easy to please" and exact replacements are not necessary. For example, 33 uF will replace 30 uF and 22 uF will replace 20 uF. If you can't find a close replacement, it is better to go with a higher uF value than a lower value.

- The old rule of thumb is not to use a replacement value that is 80% higher or 20% lower than the original uF value. If you replace an electrolytic with one that is too high, DC voltages will be higher than called for and tubes and other parts will wear out faster. Too low a value will introduce hum.

- Warning! Installing an electrolytic with its polarity reversed will not only prevent the radio from working but the capacitor could explode.

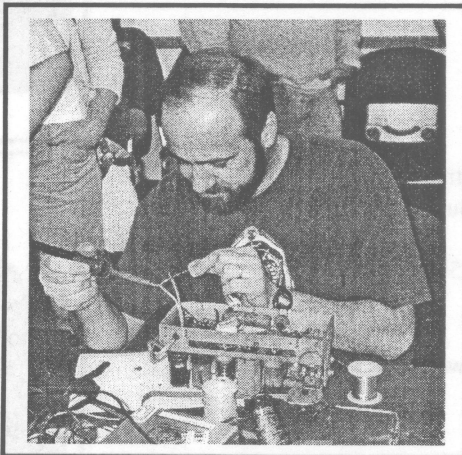
- As a general rule, AC radios (with power transformers) can use 450 volt electrolytics while lightweight AC/DC radios can use 160 volt electrolytics as filters. However, there are always exceptions so refer to the schematic when making these changes.

- Avoid purchasing New Old Stock (NOS) electrolytics - they have a limited shelf life.

- To maximize shelf life, store your electrolytics at a temperature of 40-95 degrees F and less than 75% humidity.

- Once a month, let your restored radio "sing" for a half-hour or so. This will prevent the electrolytics from drying out.

INSTALLATION TIPS



- Replace all paper and electrolytic capacitors. DO NOT replace mica capacitors - they rarely go bad and replacing them may

affect the radio's ability to tune properly. Replacing mica capacitors will do more harm than good - only replace them if you know they are bad (which is rare).

- Similarly, ceramic capacitors rarely go bad. Do not replace them unless you are sure they need it.

- Some radios use line-filter capacitors which connect across the power line and/or connect from the power line to ground. When replacing these capacitors, you should try to use special AC rated safety capacitors. These special capacitors will improve the safety, performance and reliability of your radio and may be covered in a future *Broadcaster* article.

- Get a schematic (and parts list) before starting your recap job. It is often impossible to read the values on original capacitors. Also, if the radio was repaired at some time in the past, there is a good chance that someone threw in the wrong size capacitor just to get the radio working. Without a schematic, you're just guessing.

- Snipping the leads of a capacitor to be replaced often offers the ability to check resistor values at the same time and prevents false readings.

- Heat shrink (spaghetti) placed on capacitor leads will help prevent dangerous shorts.

- If you have the test equipment, it's always a good idea to check a capacitor before installing it. Although rare, once in a while, a new capacitor will be defective or not in specification.

- Sometimes, all capacitor values may not be readily available. Capacitors connected in parallel (side-by-side) are additive - two 100 uF/450 volt capacitors connected in parallel will provide a 200 uF capacitor rated at 450 volts.

- Similarly, higher voltage ratings and lower capacitance values can be obtained by connecting capacitors in series (end-to-end). For example, two 100 uF/450 volt capacitors connected in series will result in 50 uF at 900 volts.

- Remember to always work safely. The high voltages stored in large capacitors can kill! If a radio has been turned on in recent weeks, some of the capacitors (especially the electrolytics) may still be holding a deadly charge. Capacitors can be easily discharged by bridging them with a high wattage, 1000 ohm resistor via insulated clips and leads.

2005 BCB DX Contest

Compiled by Tom Provost
MDS=Most Distant Station

Category A- Crystal Sets

No entries

Category B-Primitive Receivers (1 and 2 tube plus power supply)

No entries

Category C- 1920s Battery Sets (homebrew also)

Winner-George Shields 5,354 pts.
1923 Leutz Model C w/ W.E. 10 D speaker
using full size superhet type loop antenna
MDS: 750 WSB Atlanta, 717 mi.

Category D- Other tube radios sold for home entertainment

Winner-Rich Mueller 10,403 pts
1940 Stromberg Carlson 540 using 70 ft. longwire
MDS: 530 RVC Turks and Caicos Is. 1309 miles

Tom Provost 8,997 pts.
935 Montgomery Ward Airline 62-185 w/HB loop
MDS: 530 RVC Turks and Caicos Is. 1309 mi.

Marty Friedman 7,571 pts.
1936 RCA 86K7 console 175 longwire
MDS: 530 RVC Turks and Caicos Is. 1309 mi.

Walt Heskes 5,993 pts.
Hallicrafters S-72 built-in loop antenna
MDS: 530 RVC Turks and Caicos Is. 1309 mi.

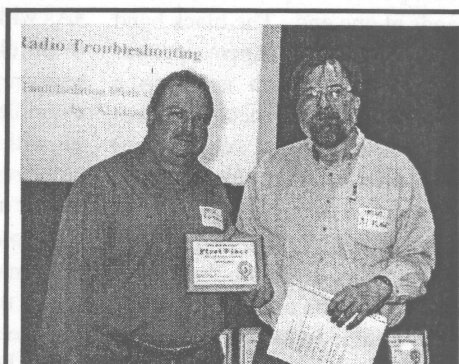
Winner-Gerald Dowgin 4,476 pts. (first time entrant)
Zenith 6S238 chairside w/longwire
MDS: 750 WSB Atlanta 717 mi.

Category E-Amateur, commercial and military type communications receivers

Winner-Bill Riches 9,791 pts. (first time entrant)
Collins R725 (R390A with a R390 IF module) loop
and 75 meter dipole
MDS: 1120 WMSW Hatillo, Puerto Rico 1,564 mi

Ray Chase 3,291pts.(first time entrant)
BC 344D military receiver using 75 ft. longwire
MDS: 720 WGN Chicago 708 mi.

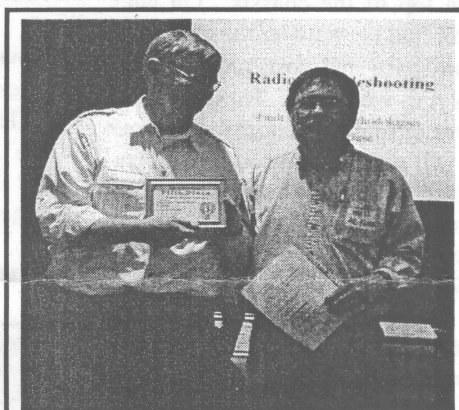
Ray Chase 2,408 pts. (first time entrant)
DZ-2A CRV-46152 Airship receiver using 75 ft. longwire
MDS: 1070 CBA Moncton, NB, Canada 631 mi.



Rich Mueller



Marty Friedman



Jerry Dowgin



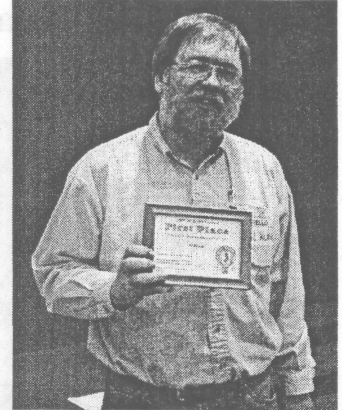
Tom Provost

Marty Drift 1,808 pts.
Collins 51 J using unspecified antenna
MDS: WBIL 580 Tuskegee, Al. 834 mi.

Category F Transistor radios introduced before 1970

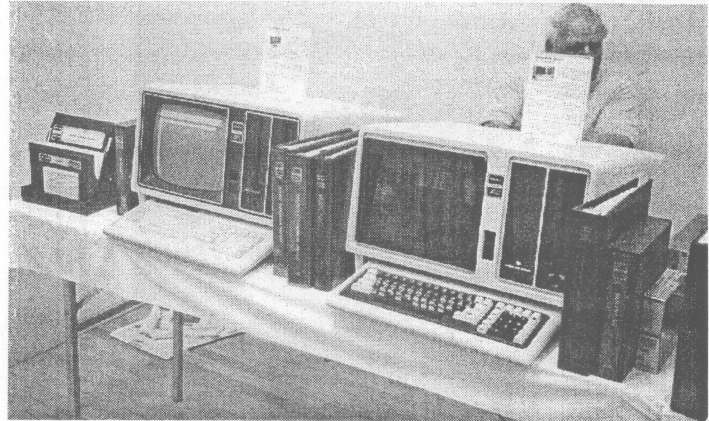
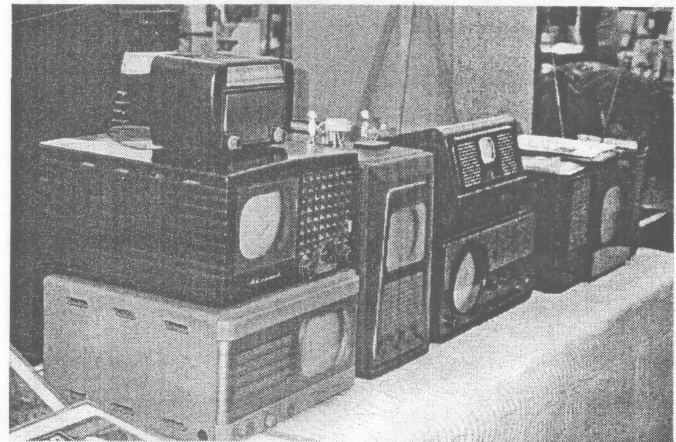
Winner-Al Klase 12,507 pts.
Philco T-9 multi-band using built-in loop
MDS: 555 ZIZ St. Kitts and Nevis Is. 1726 mi.

Frank Feczko 7,186 pts.
1961 GE P840B using built-in loop w/Select-A-Tenna
MDS: 530 RVC Turks and Caicos Is. 1309 mi.

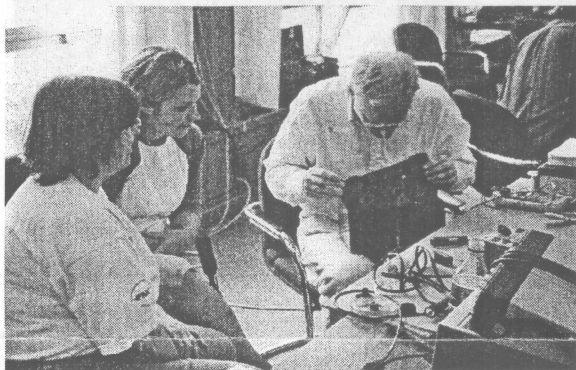
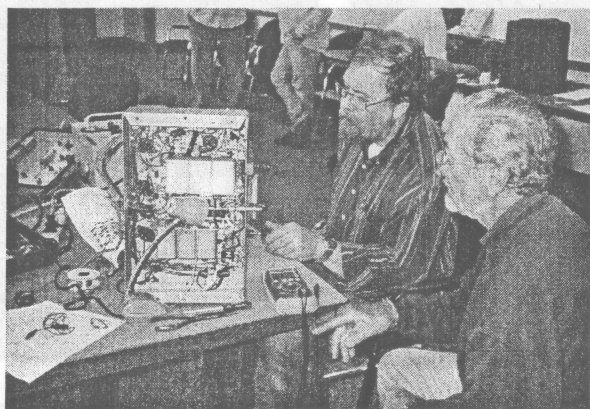


Ray Chase and Al Klase

Trenton Computer Faire (con't)

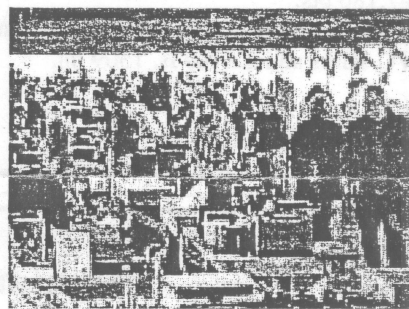


Sarnoff Repair Clinic



Room was at a premium this month...well have more repair clinic and swapmeet photos in the June issue which will also include our usual "For Sale" page.

Kutztown Antique Radio Meet

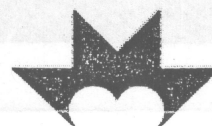


May 13th & 14th, 2005
Sept. 16th & 17th, 2005

Starts at 7am Saturday
(Dealer Setup Friday At Noon)

Buyers welcome both days!!

Audio & Ham Welcome
(Non-Computer Show)
Afternoon Auction by DVHRC
Free Admission & Parking



RENNINGERS

Antique & Farmers Markets

740 Noble Street
Kutztown, PA

Kutztown is located between Allentown & Reading, PA on Rt. 222
From Main St. take Noble St. for 1 mile to Renningers

2nd Pavilion (Rain or Shine)
For more information call
570-385-0104