

The Jersey Broadcaster

NEWSLETTER OF THE NEW JERSEY ANTIQUE RADIO CLUB

May 1998

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MEETING/ ACTIVITY NOTES

Reported by Marv Beeferman

A late start did not suppress the turnout at April's meeting and members were awarded with an excellent talk by Ray Chase on collecting radio postcards and examples from his extensive collection. In my case, matzoh ball soup, chopped liver and tales from the Exodus won out but I plan to view the video prepared by Phil Vourtsis. In addition, Ray's excellent handout which accompanied the talk will be published in next month's issue of the *Broadcaster*.

Plans for our joint picnic/swapmeet with the Delaware Valley Historic Radio Club (DVHRC) in Clinton, New Jersey have been finalized and President Jim Whartenby and his wife Ruth will be handling arrangements. The date is Saturday, June 20th and for \$20 a person (\$30 for a family) you will be entitled to an all-you-can-eat lunch and a fleamarket space. The rain-or-shine picnic/swapmeet will be open to not only NJARC/DVHRC members and their families but the general public as well. I attended last year's gathering and guarantee that you will thoroughly enjoy the relaxed setting of this event. A map will be provided in the May *Broadcaster*. One word of warning...we must get a head count for the caterer so reservations (and payment) must be made in advance. Please send your check to:

Marv Beeferman
2265 Emerald Park Drive
Forked River, N.J. 08731

Hats off to Marsha Simkin, our new membership secretary, whose diligence and persistence have resulted in an 85% renewal ratio. I am told this is an excellent number for a club of our size and type. Members still showing a "1/98" on their



MEETING NOTICE

The next meeting of the NJARC will take place on Friday, May 8th, at 7:30 PM in the Grace Lutheran Church, corner of Route 33 and Main Street in Freehold. Contact Marv Beeferman at 609-693-9430 or Jim Whartenby at 732-271-7701 for directions. This will be an important meeting; nominations will be taken for our next slate of officers (with the election in June) and Ludwell Sibley will provide a presentation on collecting telephone and telegraph insulators. Note that the meeting will take place at the usual time of 7:30. A show-and-tell session is planned for the June meeting so now is a good time to start thinking about an interesting contribution.

mailing label will be dropped from the club roles on June 30.

This month's *Broadcaster* offers an exclusive and excellent article by member George Shields on the restoration of a British TV22 television. Also included is the second installment of the wireless/Titanic series. For those true history buffs, I noticed that the *New York Times* is offering a 32-page keepsake of the highlights of its initial week of coverage of the event printed on newspaper stock. Unlike the *New York Evening Sun*, The Times was able to piece together the real facts of the tragedy and report that the liner had actually sunk. In relation to this month's *Broadcaster* installment, the keepsake includes the firsthand account of the sinking from Harold Bride, surviving wireless operator of the *Titanic*, as well as a definitive rescue report from Harold Thomas Cotter, wireless operator of the *Carpentia* - both stories exclusive to The Times. To order by mail, enclose a check or money order in the amount of \$24.12, \$19.12 (cute play on dates) plus \$5 shipping and handling, payable to the New York Times and mail to: The New York Times Titanic Offer, P.O. Box 176, Orangeburg, N.Y., 10962 (six weeks delivery). Copies can also be ordered by credit card by calling 1-800-659-6598.

That's it for this month. I look forward to seeing you at the next meeting with enthusiastic support for our new officer nominees.

INFORMATION AGE UPDATE

By Marv Beeferman

The Information Age web site (<http://www.infoage.org>), forerunner of an anticipated learning center at the former Marconi Hotel at Camp Evans, is beginning to take shape. One recent addition is an article on a presentation to Lee Davenport and Ivan Getting (known as the brain trust of the MIT Radiation Laboratory's SCR-584 microwave gun-laying radar) with plaques of remembrance for their contributions to radar sciences. The pair was asked to return to the birthplace of the U.S. Army Signal Corps long-wave radar, Fort Hancock, for filming of the BBC "Science at War" series. The site also contains a link to information on Robert Buder's book "The Invention that Changed the World" which tells the story of the pioneering work of these two men. A second addition provides background on Project Diana where a series of radar signals were bounced off the moon via a modified SCR-271 and bedspring radar antenna.

Also included on the site are the goals of the learning center which are reproduced below to provide some focus on where NJARC might fit in:

THE JERSEY BROADCASTER, published a minimum of ten times each year, 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 with special emphasis on contributions made by the state of New Jersey. Dues are \$15 per year and meetings are held the second Friday of each month at the Grace Lutheran Church, corner of Route 33 and Main Street in Freehold N.J.

Submissions are welcome in typewritten or diskette (5-1/4" or 3-1/2") form with formats in ASCII, WordPerfect, Word, etc. Photos in high contrast black and white are appreciated but color photos are acceptable. The Editor or NJARC is not liable for any buying and selling transactions or for any other use of the contents of this publication.

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Our Mission: We want people, especially kids, to feel the excitement of the sciences we enjoy hidden in the devices we use every single day. It is our hope that when people feel this excitement they will develop an appreciation, find inspiration and practice emulation of the scientists who have come before them.

Our Goal: Develop a center where every student in Monmouth County will enjoy the history and technology which New Jersey can boast through the efforts of the member organizations and voluntary efforts of real staff and virtual staff.

A Center with FOCUS and SYNERGY: The center will house a number of non-profit organizations whose mission is information technology education. The center will also foster participation of for-profit corporations whose expertise is information technology. This concentration of currently dispersed organizations will develop a synergy resulting in benefits to all organizations few could avail themselves individually. The visitors to the center will benefit from the dynamic and evolving atmosphere created by this concentration of information technology experts and up-to-date exhibits.

TITANIC AND THE MARCONI CONNECTION

By Marv Beeferman

The following is a continuation of last month's theme of wireless and the Titanic...Ed.

On Sunday, April 14th, 1912, one of the greatest peacetime marine disasters in history occurred when the *Titanic* struck an iceberg while on her maiden voyage from Southampton to New York and sank within three hours. Unknown to many, however, is the master-stroke of fate or fortune that prevented Guglielmo Mar-

coni and his family from being participants in the tragedy.

In September of that same year, while Marconi was driving from Spezia, Italy to Genoa, another car took a hairpin curve too fast and went out of control, hitting Marconi's vehicle. He lost his right eye in the accident (for a few weeks he remained without any sight in both eyes) but, during the recovery, experienced a renaissance in his relationship with his wife. To maintain this domestic peace, a country place was rented in Southampton which included an eighteenth-century, three-story tower. As described by Degna Marconi, his daughter:

"The tower stood on the lawn above the water's edge and my mother climbed up it with me on the morning of April 10, 1912, to watch the *Titanic* sail by. I was only three and a half years old and yet I still recall how tight she held my hand and I sensed that she was sad. When I was older I knew why. She wished she was on board.

She and Father were invited by the White Star Line to be guests on the maiden voyage of the *Titanic* but their plans went awry. Father switched his passage to the *Lusitania*, which departed three days earlier, because he had a mountain of paperwork to clear away and knew that the public stenographer on the *Lusitania* was quick and competent. His own Mr. Magrini was hopeless on shipboard; he was seasick from shore to shore. (Marconi's trip to the U.S. at this time was in connection with the takeover by the American Marconi Company of the United Wireless Telegraph Company....Ed) Mother expected to follow on the *Titanic* and Father, his correspondence dispatched, planned to meet her in New York for a short vacation.

Then Giulio (Marconi's son...Ed) spoiled everything by coming down with one of those alarming baby fevers which may be a prelude to anything or nothing. She cabled that she had to postpone her trip and settled down to watch over her youngest and to face another of those endless separations that so disrupted her marriage.

Together we waved at the ship, huge and resplendent in the spring sunlight, and dozens of handkerchiefs and scarves

were waved back at us. As the *Titanic* passed from our view and over the calm water we slowly descended the steps. It was a long way down."

Marconi docked in New York just in time to hear that a wireless message had been received at Cape Race which might indicate a disaster at sea. At this point, total confusion and pandemonium ensued. From the first word that the *Titanic* was in trouble, both land stations and amateurs jammed the airways. By the afternoon of April 15th, the New York *Evening Sun* ran a banner headline: ALL SAVED FROM TITANIC AFTER COLLISION.

The paper reported that all of *Titanic's* passengers had been transferred to the *Carpathia* and the *Parisian*, that she was being towed to Halifax by the *Virginian* of the Allan Line and that there was no doubt that the *Titanic* would reach port. Later, Marconi would defend himself from a public that thought it had been duped, with a show of temper altogether foreign to his ordinary public demeanor:

"Good gracious, hasn't wireless done enough in this instance to free it from complaints? If you can prove that one of our operators either sent or gave out that message, I'll take my hat off to you. It is you journalists who are responsible for the confused and unreliable rumors about the *Titanic*, not wireless."

Unfortunately, the immediate result of the *Sun's* misinformation caused a rise in Marconi stock from 55 to 225 and nasty rumors began to emerge after the real story unfolded. It was alleged that false wireless messages were sent to influence a depressed salvage market and stock market. Other messages were alleged to have been sent with Marconi's authority to the *Carpathia* to ensure that the Marconi Company kept a monopoly of the news stories which the wireless operators could give to the press. Later, Marconi would deny that he had authorized these messages when they were produced in a Court of Inquiry.

As the *Carpathia's* gangplank went down at New York's Pier 54 on a rainy, Thursday night and with police clearing

the way, Marconi was one of the first to go aboard to interview the wireless operators; Thomas Cottam of the *Carpathia* and Harold Bride, *Titanic's* second wireless officer. John George Phillips, the first officer, had been lost. The story that Bride and Cottam brought to Marconi was finely detailed in his daughter's book, *My Father Marconi*:

Aboard the *Titanic* on the night of May 14, Jack Phillip's duty with the earphones should have gone on until two the next morning but it had been a long, exhausting day and Bride, who was sleeping



on the other side of the wireless cabin - the bunks separated from the office by a green curtain - had decided to get up and relieve him earlier. Not long before, Phillips had been warned of icebergs by the *Californian*, a ship in the vicinity. Warnings of ice had been coming in since five in the afternoon and the lookout was on alert for it. Now, tired and anxious to get clear of the dozens of frivolous and foolish messages that were making it impossible to finish his serious business (receiving routine news from Cape Race) he replied testily: *Shut up, shut up! I am busy; I am working Cape Race.* When at last that was over, he went to bed. A minute after Bride put on the earphones,

Captain Smith stuck his head in the wireless cabin door to tell the men that the ship had struck an iceberg. They were to stand by while an inspection was made to see "what it has done to us" but were to send no message until he told them to.

The captain was back in a few minutes, commanding: "Send the call for assistance."

Harold Thomas Cottam, aboard the *Carpathia*, took down the first message: *Come at once, we've struck a berg. It's CQD, OM. CQD-Come Quick, Danger.*

Harold Bride remembered, as Phillips pounded out the CQDs (. / _ . / _ .), that the old distress signal was being replaced with the far easier-to-send letters SOS (... / _ _ / ...) and suggested that Phillips use them. "It may," he said with a grin, "be your last chance to send it." It was also the first time that signal was ever put on the air...

At 1:45 Phillips wirelessly Cottam of the *Carpathia*: *Come as quickly as possible, OM; engine room filling up to the boilers.* At half-past twelve the decks were awash, the power was failing and Captain Smith came into the wireless cabin to tell the officers they had done all they could do. It was time to abandon their posts and look out for themselves.

Phillips continued to send, in spite of fading power (by now, the storage batteries had been hooked up...Ed). The *Carpathia* noted: "Signals very blurred and end abruptly." In the *Titanic* wireless cabin Bride strapped Jack Phillip's lifebelt around his body and draped his overcoat over his shoulders. He could not get Phillip's arms into it because Phillip's hands were busy. Bride tried to get him into his shoes but this proved awkward and Phillips said: "Look outside and see if there are any boats left. I may not need them."

A few minutes after two o'clock the *Virginian* heard two V's - the last call that was picked up. Aboard the *Titanic* there was water in the wireless room now and the spark of the wireless was dead. Bride and Phillips started out together with Jack Phillips heading aft. The last time Bride ever saw Phillips was outside the deck

house. Alone, Harold Bride went over the side. The *Titanic* was sinking "like a duck that goes down for a dive," he said afterward, and he swam crazily to avoid being pulled down by the suction. He somehow managed to get underneath one of the collapsible lifeboats that had overturned and here he stayed until so many people piled up on it he was forced out and onto it, too.

Bride was the one man alive on that ocean who knew which ships were on the way and would save them if only they could stay adrift and alive till rescue came. The temperature of the water was below 32 degrees,

At dawn, the *Carpathia* came through the icy sea. Bride and the other men were taken off their incredibly frail vessel - air had escaped and it settled deeper and deeper during the night - by a sturdier lifeboat. At 8:20 in the morning, after Bride was hauled aboard the *Carpathia*, he passed out.

Investigations into the *Titanic* disaster showed that while wireless telegraphy in itself had emerged before the world as an invaluable means of saving lives at sea, the overall system left much to be desired. However, as a result of an International Conference on Safety of Life at Sea, held in London in 1914, many improvements were implemented including compulsory wireless installations, minimum range requirements (the *Carpathia* could not reach shore with its weak signal), emergency equipment with an independent power supply and a continuous watch system.

Marconi had commented on the idea of the continuous watch at inquiries immediately following the sinking and offered two suggestions. One was to give a member of the crew sufficient instruction to enable him to recognize an emergency call and to place him on listening watch whenever the wireless operator was off duty so that he could raise the alarm. The second possibility was based on experiments that Marconi had already carried out. This was to devise an apparatus which would automatically ring an alarm bell whenever a distress call was received on an unattended receiver. This "auto-alarm system" eventually came to be approved and adopted, but not until the end of World War I. Marconi also speculated on the idea of a radio direction finder where "the operator tunes in the

wireless lighthouse at his right and then the one at his left and where the two bearing lines cross that is his exact location."

The initial attacks on wireless and its founder quickly subsided. Indeed, it was said that the *Titanic* survivors marched en masse to Marconi's hotel and gave him a gold medal. He was cheered at the New York Electrical Society when invited to speak, Edison sent him a telegram of congratulations and Michael Pupin summed up the general attitude by saying "If we must call our aerial waves by some name let us not call them Hertzian waves but Marconi waves. They are his."

REFERENCES:

- Degna Marconi, *My Father Marconi*
 W.J. Baker, *A History of the Marconi Company*
 W.P. Jolly, *Marconi*
 Thorn L. Mayes, *Wireless Communication in the United States* (Cover illustration)

RESTORATION AND CONVERSION OF A BUSH TV22 TELEVISION

By George B. Shields, Jr.

I recently had the opportunity to obtain a Bush model TV22 British television. It's brown Bakelite cabinet, compact size and distinctive styling have made it a favorite amongst our European collecting colleagues. The 17 tube super-heterodyne chassis sports two easily removable lightweight chassis boards, vertically stacked one atop another, a transformerless power supply and Mullard tubes throughout. Circuitry includes 2 stages of video IF, and two stages of non-intercarrier audio IF. The CRT is a 9-inch Mullard utilizing magnetic deflection and focus, and a non-tinted faceplate. Anode (ultor) rating is 8,000 volts, producing a bright, crisp picture. Although initially intended as a display set only, I couldn't resist the lure of trying to make it operate on our North American television standards. So, in February, I set about to restore and convert this highly prized icon from the early days of British TV.

As with any vintage television or radio receiver, the usual procedures of replacing all the filter and paper capacitors, checking resistors and replacing those more than 20% off spec and replacing uninsulated and frayed wiring needed to be done. A set of NIB Mullard tubes enclosed with the set ensured that no difficulties would be encountered with weak or intermittent tubes. However, as I begin studying the schematics and drawing up plans to make the necessary conversions, I began to realize just what kind of a task I set myself. Indeed, several British television collectors warned me of the difficulties I may encounter, and a few ventured that it couldn't be done! Anyone who knows me will realize that to tell me "it can't be done" is only waving a red flag before a bull ...

Power conversion was simple: since the television was designed to operate on the British voltage standards of 225 volts, I obtained a heavy duty power converter which supplied the proper voltage. The less simple, but equally obvious issues to be addressed centered around the differences in operating standards. The set was designed to operate on the original BBC standards adopted in 1936: 405 lines of resolution, 25 frames per second, positive video detection and AM sound with sound carrier placed at the low end of the channel. By contrast, our North American (NTSC) television system operates at 525 lines of resolution, 30 frames per second, negative video detection, and FM sound with the sound carrier placed at the high end of the channel. Each issue had to be addressed individually and thoroughly resolved before proceeding to the next.

The first issue I attacked was the problem of video detection. Detection polarity determines whether the video composite signal comprising the picture information as well as the sync pulses will be positive or negative as fed forward to their respective circuits. If the output is of the wrong polarity, the picture will be highly unstable as well as negative in appearance. The British originally chose positive detection because it was found in certain operating conditions it would minimize interference. Most other countries, however, opted for negative detection polarity,

and by the early 1960's the British, too, had switched to negative. The video detector circuit is a simple diode so I reversed the polarity by simply reversing the connections between the grid and plate of the video detector tube. Since the output of the preceding IF tube was coupled through a .01mF capacitor, excessive voltage to the grid was not a problem and no other modifications were needed.

Next, I decided to tackle the problem of frame speed. Since the difference in frame rate is only 5 frames per second, I guessed that there would be sufficient range in the vertical hold control to simply adjust it upwards until the vertical hold locked back into sync. A quick twist of the dial and voila! the vertical frame locked right in. Now, if the horizontal line rate could only have been so simple ...

Horizontal frequency is the key to the subject of lines of resolution. Electrical energy builds up on the oscillator plate until the plate reaches a point of saturation. At that point, called the cutoff, the plate ceases to take on energy and the stored energy discharges rapidly. Obviously, the greater the energy stored at the plate cutoff, the greater will be the EMF developed during the process of sudden discharge. Viewed on an oscilloscope, this waveform appears as a "sawtooth" and is the energy, amplified and fed to a set of deflection coils located around the CRT neck which controls the sweep of the electron beam across the face of the CRT. Like vertical sweep, horizontal sweep is a line / time based function: the faster the sweep operates, the more lines of resolution which can be scanned in the fixed period of time.

The problem is, the adjustment is far greater for horizontal sweep than it is for vertical sweep. The oscillation rate for 405 lines / 25 frames per second is 10.125 kilohertz and to get the set to operate at 525 lines / 30 frames, the horizontal sweep oscillation would have to be increased to 15.750 kilohertz--over 50% faster. Since the horizontal oscillator is designed to be a free running oscillator, I reasoned that I

could bring it up to the necessary frequency by reducing the capacity of the horizontal control circuit, since it is the primary function of this circuit to regulate the speed of the horizontal oscillator. Reducing capacitor and resistor component value by 40% - 50% would do the trick nicely--but not so fast: since the primary electromotive force used to develop the anode voltage for the CRT is taken from the horizontal sweep output, and since the increase in frequency shortens the available time to develop this EMF (shorter time means less buildup of charge) resulting in a lower horizontal output voltage (lower peak means lower EMF during

integral part of the oscillator circuit, it was necessary to "re-tune" the secondary circuits so that the transformer primary and secondary elements remained in peak resonance, thereby preventing a drop in anode voltage. This proved to be the trickiest part of the project, since a serious miscalculation could overstress the flyback transformer, causing it to burn out! I replaced all of the trimming capacitors associated with both primary and secondary flyback windings with the ratings 40% below original spec. The result was only a marginal drop in anode voltage with no additional strain on the flyback or horizontal output components.



The author describes major restoration points at the March meeting

field breakdown), anode voltage would drop, resulting in a dim, poorly focused picture. The entire flyback system needed to be altered to compensate for this drop in primary voltage!

To complicate matters further, the TV22 developed horizontal oscillation not within a typical self contained one tube oscillator circuit such as, for example, a Hartley circuit, but between the oscillator tube plate and horizontal amplifier tube grid - coupled through a special primary winding in the flyback transformer. Because the flyback transformer acted as an

As this point, I was receiving a bright, clear, sharp stable picture. On to the audio! In converting the Bush TV's audio two problems were presented: 1) the audio section was an amplitude modulation receiver designed to receive AM sound carrier, while our NTSC broadcast standards call for the audio to be transmitted in frequency modulation (FM) carrier; and 2) the audio section was tuned to receive the sound signal at a different spot on the channel band than is transmitted on our broadcast signals.

The first order of business was returning the two intermediate frequency stages so that the receiver would be tuned to the upper edge of the channel band, where our audio carrier is located. I had hoped that there would be enough range in the IF coils so that I could retune them simply by turning the iron core slugs in or out; however, there wasn't enough range. After careful study of the design of the IF coils, I elected to carefully removing one revolution of the coil winding from each of the coils, thereby reducing their overall capacity and raising their tunable frequency. This was just enough to bring them into range of our sound carrier and I made final adjustments with the iron core slugs.

Although initially contemplating the possibility of rebuilding the audio section as an FM system, replacing the AM detector with an FM ratio detector circuit, I de-

cided to leave it as an AM system. Why? It is actually possible for an AM radio to receive an FM signal through a technique called "slope detection." When very carefully set, the AM receiver will pick off only a portion of the slope of the FM sound carrier wave which mimics the amplitude variations caused to the carrier by the audio signal. In other words, this very narrow portion of the FM radio wave displays AM properties which can be amplified and detected by an AM detector. In practice, it is tricky to tune, but with a deft hand can be done quite well! By adjusting the audio IF band width, I was able to maximize the signal response and produce a strong clear signal which could be detected and amplified. Audio output is rich and clear--one would never know they were listening to AM sound! The audio section is so stable in operation, that readjustment of the tuning or IF stages is unnecessary, and rich clear sound comes forth every time the receiver is switched on!

The last issue to be considered was one of station tuning. In the very early days of British television, only one station was active in any particular area in Great Britain. This was before the days of BBC1 and BBC2, ITN or even Channel Four. The BBC ruled supreme and saw it quite adequate to provide only one television channel for people to watch. There were 5 channels throughout England and Scotland, each transmitting the same national programs. When you bought your new set, you tuned it to the one BBC channel which was active in your area and left it, never again retuning your set unless you moved to another part of the country. So in essence, the Bush TV22 is a one-channel television, the channel selector being a small non-descript continuous tuning knob on the back of the set! Since the original BBC "band 1 VHF" frequencies were different than our current North American VHF frequencies, I looked at both their original frequency assignments as well as our own and determined that the original BBC channel 4 corresponded to our current channel 3. By carefully adjusting the continuous tuner on the back of the set, I successfully tuned the television to our channel 3 and connected the set to a video cassette recorder with digital tuner. Now the plucky little one-channel set is fully cable

ready and effortlessly surfing all 73 channels on our cable service! It certainly beats manually retuning between four lower VHF stations ...

The techniques used to convert this British television set can be equally applied to convert any television set to operate on our NTSC standards--even a pre-war set. Below is a listing of actual component value modifications used in the conversion of my Bush TV22. If anyone wishes additional information, they may contact me at (908) 281-6142 or by E-mail at: 74546.1657@compuserve.com.

CAUTION!: This always bears repeating: very high voltages are present in television receivers. In the case of the Bush TV22, the high voltage developed for the picture tube is 8,000 volts. These conversions will require you to modify some of the circuitry used in producing

these very high voltages, so special safety precautions must be followed: NEVER touch any of these components while the set is plugged in. DO NOT attempt to measure the high voltages in these circuits at any time. Allow several moments after unplugging the set before touching any high voltage components--it will take this long for the voltages to dissipate to a safe level. Always keep one hand behind your back or in your lap when touching high voltage components and make sure you are wearing well insulated shoes, too! When resoldering high voltage connections, make sure that your solder joints are smooth and even to prevent the chance of high voltage arcing. Finally, double check your wire routing to prevent the chance of accidental short circuits. Remember: the responsibility for your safety is yours alone!

LINE VOLTAGE CONVERSION (AC Mains) 117VAC to 225VAC

Heavy duty (200 watts) voltage converter available at:

Green Brook Electronics
US Route 22
Green Brook, NJ

No other internal adjustments are needed. However, if set is designed for variable voltage operation, check that adjustment taps are set for 225 volts. The Bush TV22 is designed for variable voltage operation, so a safety check of this adjustment is advisable!

FRAME CONVERSION (vertical sweep)

No circuit changes necessary. Adjust the vertical hold until vertical hold locks into sync.

LINE CONVERSION (horizontal sweep)

ORIGINAL BUSH SPECS

405 lines scanned (interlaced)
Horizontal hold fixed resistor: 68Kohms
Horizontal hold fixed capacitor: 300pF
Flyback secondary trimmer cap: 470pF
Width control coil trimmer cap: 0.1mF

NTSC MODIFICATION SPEC

525 lines scanned (interlaced)
Replace with 39Kohms
Replace with 100pF
Replace with 250pF
Replace with 0.05mF

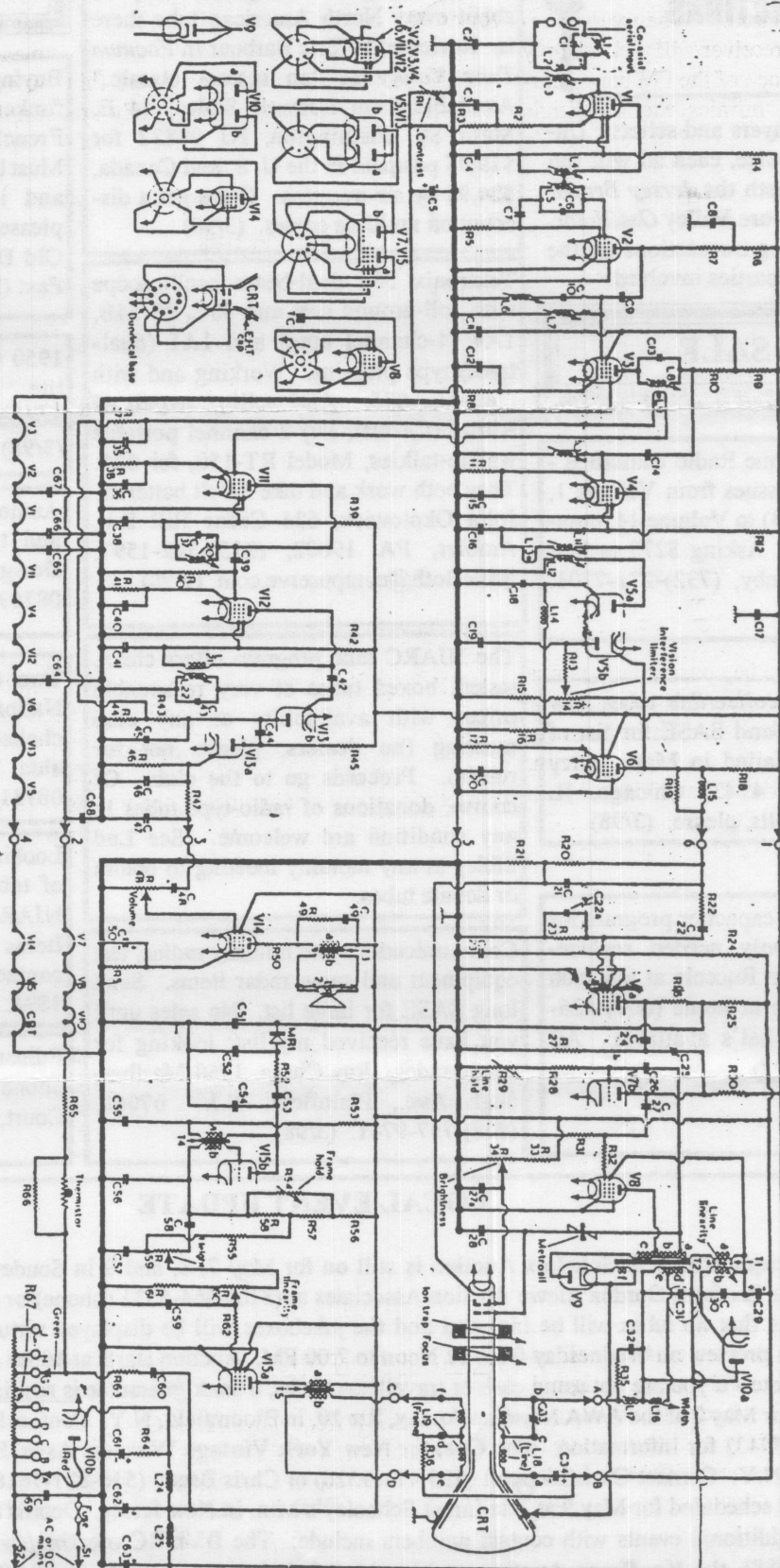
AUDIO IF CONVERSION

Audio IF frequency: 41.5MC
IF coil windings: 5
IF coil trimmer cap: 0.005pF

Adjust IF frequency to: 46.6MC
Remove one turn to 4 windings
Remove trimmer cap

Use iron core slugs to fine tune IF's to correct frequency.

BUSH model TV22
Circuit diagram



CONNECTIONS

Free exposure for buyers and sellers! Unless requested otherwise, each ad will run for two months in both the *Jersey Broadcaster* and the *Delaware Valley Oscillator*. All buying and selling transactions are the responsibility of the parties involved.

FOR SALE

Back issues of *Antique Radio Classified* - as a lot only. 154 issues from Volume 1, number 5 (Dec. 1984) to Volume 14, number 9 (Sept. 1997). Asking \$275 or best offer. Jim Whartenby, (732)-271-7701. (2/98)

Next list of *highly collectible* tubes now being assembled. Send SASE for list of duplicates, to be mailed in May. Jerry Vanicek, PO Box 4743, Chicago, IL 60680. No phone calls, please. (3/98)

Check out NJARC's capacitor program for those most commonly needed replacements. Contact John Ruccolo at any club meeting or call him at home (609)-426-4568 to find out what's available. All proceeds go to the club.

The ever-handly reference *Tube Lore* gives 186 pages of insightful scoop on about every North American tube there is. Reviewed by Eric Barbour in *Vacuum Tube Valley* as "an instant classic." Available from Ludwell Sibley, 44 E. Main St., Flemington, NJ 08822 for \$19.95 postpaid in the U. S. and Canada, \$24.95 by air overseas. Clubs get a discount on multiple copies. (3/98)

Tektronix 556 dual-beam oscilloscope with roll-around cart and 53C, 53/54B, 1A4 (4-channel amp) and 1A1 (dual-trace) type plug-ins. Working and with manuals. \$75. Also selling a pair of Ritron (Carmel, IN) 2-channel portable walkie-talkies, Model RT-150, for \$25. They both work and take 9-volt batteries. John Okolowicz, 624 Cedar Hill Rd., Ambler, PA 19002, (215)-542-1597, grillecloth@compuserve.com. (3/98)

The NJARC tube program offers clean, tested, boxed tubes at very reasonable prices with availability at any club meeting (no dealers, please...not for resale). Proceeds go to the club. Of course, donations of radio-type tubes in any condition are welcome. See Lud Sibley at any monthly meeting to obtain or donate tubes.

Communications and military radios, test equipment and some radar items. Send long SASE for large list. No sales until you have received my list; looking for some trades. Ray Chase, 1350 Marlborough Ave., Plainfield, N.J. 07060. (908)-757-9741. (3/98)

WANTED

Buying European Radios! Grundig, Telefunken, Saba, Normende, Blaupunkt, French Radios, Polish Goplana, etc. Must be in mint or close to mint condition and in working order. No junkers, please! Richard Brill, P.O. Box 5367, Old Bridge, N.J. 08857 (732)-607-0299 Fax: (908)-679-8524) rgbent@aol.com

1950 Coca-Cola cooler radio, red bakelite. Tony Molettiere, 105 Main St., Souderton, PA 18964, (215)-723-7459 (3/98)

Audio transformers-one for a Crosley 51 and two for an Amrad S522. Jerry Dowgin, 1481 Newark Ave., Whiting NJ, 08759. (908)-350-6259 (2/98)

Two coil forms, B & W 3018; three National R-50 (or similar) 2.5-mh r.f. chokes. Marv Beeferman, 2265 Emerald Park Drive, Forked River, NJ, 08731. (609)-693-9430. (2/98)

Looking for the individual who left a box of tubes and various magazines at the NJARC Armory swapmeet in February. Items will be at next club meeting or contact Ludwell Sibley at (908)-782-4894. (3/98)

Edison Model 10 (or equivalent) dictaphone cylinders. Tony Trope, 33 Jackson Court, Fordes, NJ, 08863 (3/98)

LOCAL EVENT UPDATE

The **Molettiere Antique Radio & Jukebox Auction** is still on for May 7, 8, and 9 in Souderton, PA. You may obtain a color brochure by phone or fax from Gordon Riewe Auction Associates at (810)-664-5331 (phone) or (810)-664-5291 (fax). Latest input from Scoop Sibley is that no tubes will be included and the jukeboxes will be displayed virtually (video tape only) and sold on Saturday. There is a preview on Wednesday from 12 Noon to 7:00 PM. Auction starts at 10:00 AM each day with previews at 8:00 AM. One word of note - if you are not using cash or travellers checks, a bank guarantee is required for personal checks. The **AWA Spring Meet** is set for May 2 at the AWA Museum Annex, Rte 20, in Bloomfield, N.Y. Contact Ed Gable (716)-392-3088 or Lauren Peckham (607)-739-5443 for information. The **Greater New York Vintage Wireless Assn. Swapmeet** takes place on May 3 in Lake Ronkonkoma, N.Y. Contact Chris Lieppert (516)-471-9526 or Chris Bacon (516)-821-7618 for details. The **AWA Northern New Jersey Meet** is scheduled for May 9 at The Inn at Schooley's Mtn. in New Jersey. Details are provided by Lauren Peckham at (607)-739-5443. Additional events with contact numbers include: The **DVHRC meeting/swapmeet/auction** on May 12 (Mike Koste, (215)-646-6488), the **Kauffman Auction** on May 16 (Mark Jones, (717)-286-0052), the **Tri-State Antique Radio Club Swapmeet** on May 19 (Bob Masterson, (914)-353-3151), the **Central Penn. Radio Collectors Club Outdoor Swap Meet and Show** on May 23 (Frank Hagenbuch, (717)-326-0932) and **MAARC's "RADIOACTIVITY 98"** in Laurel MD on June 11-13 (Brian Belanger, (301)-258-0708).