Mark Toppo's '50s phono with VM record changer

Les Davidson find; Maguire cork screw radio tuner

Ed Brady put the resistance into AC/DC radio tubes

02 | Vol-22 | 2016

NEW MEXICO RADIO COLLECTORS CLUB

Next NMRCC meeting: February 14th 2016

— Homebuilt crystal, tube, and transistor sets—

'To begin with, terminology is important when searching for a record player. eBay has done a great job in categorizing record players and turntables by differentiating between the two, and by specifying Vintage Electronics as a broad category that contains various vintage electronics components – including record players.

Music Mid-century Style

by Mark Toppo

In 1997 I was working nights and weekends at two antique malls. One in Glendale AZ that once was a Montgomery Wards (boy how things have changed). I saw things come through, but didn't buy much. I was used to yard sale prices. One day while walking to the rear of the store I saw a Voice Of Music console record player. I purchased the V-M model 566C with all the paperwork shown for $40. The original retail was $210 in 1957. It was in as new condition and fully functional. We used it for many years until moving to NM in 07. After that it saw very little use and developed the common audio hum. Now my parents were not into playing music in the home. There were no radios or phonographs in the living area of the home. My sister is 13 years older than I. She left when I was 5 for college and never came back. I have little memory of her growing up, but she left behind something that opened up a whole new world for me. It was about 1965 when I found her

(Continued on page Four)

Maguire 561DI AM Table Radio with "DNA HELIX" tuning mechanism

Typical compact 5-tube All-American superheterodyne but with rather interesting inductive tuning mechanism. The dial cord drives a pulley connected to the dial pointer disc and the end of an intertwined pair of brass rods. Spring-clipped into holes in the hexagonal-shaped sleeve are two 3/16 inch

(Continued on page Five)

The NMRCC Meeting Minutes by John Hannahs

NMRCC January 10th 2016 Meeting Minutes

Another year, another saga of radios. A new set of officers is now officially in charge of all club activity. We have a new president. Don Menning is the Man, and as we have come to learn, everything revolves around the President. We are fortunate to have Don and he will run a tight ship; He said so. John Estock is our VP. Treasurer guarding our wealth is Chuck Burch and Richard M. For Secretary we have John Hannahs. Mark Toppo and Ron Monty share the duties of Membership. These two are the ones people call with questions, phone numbers are listed on the web site. Director Richard Majestic will publish the newsletter website so long as he has input from others, including himself.
Other club Directors are Ray Trujillo, Richard Majestic and David Wilson. They will function as board members, act as stand-in when needed, and help with on-going chores.

Steve Shepard, our auctioneer, had only a few items to offer members. Included was a portable TV imported from The Philippines, a fine color video camera, and a computer controlled oscilloscope. Steve will continue as our auctioneer which includes collecting revenue and dispersing club fee and donation dollars for the club. If Steve is absent the Chuck Burch will assume auctioneer duties. John Anthes did a suburb job as last years president and keeping all the balls in the air and Richard the Majestic was recognized by the members for publishing, arguably, the best radio club newsletter on the net.

MOI (Member of Interest) When we had one big long table at our meetings each member introduced himself and said what was on his mind. This became pretty time consuming.
I would like to submit that we pick one or two members each month to present a brief backgrounder of himself. For example, I talked to Tom Boldway a retired aero engineer from
" The Boeings " in Wichita and Seattle. An ex project manager, Tom loves collectable cars like the red '86 Alpha Romero he drove to the meeting, complete with alarm system to warn him remotely if anybody is tampering with it. He likes hiking, is a ham radio op KE7PBB, and would like to find a nice Stromberg Carlson floor model.

This month's theme was devoted to Atwater Kent. Members brought AK equipment in for display or sale. No self-respecting radio enthusiast is complete without possession of that brand. Atwater was a strange bird with many of the qualities of Apple's Steve Jobs. AK products had sex and sizzle back in the 20's. What other products had gold plated sailing ship escutcheons on the cabinet and looked like high quality merchandise. A million AK radios were sold each year from 1926 to the 1929 depression. It wasn't for the specifications; those early radios were quirky, but everybody had to have one. Today on eBay you can find series 10 breadboard sets listed for up to $1,500. 100 bucks will buy one of the high production units like my series 20, oh well.
Atwater Kent, his real name, had 93 patents relating to automotive ignition components. He became a very wealthy industrialist from that start. His 32-acre factory complex still exists in Philadelphia where production ceased in 1936. He closed down engineering in 1931 and so the end was in his planning. David Wilson's AK model 275 was introduced in 1933 and is completely unlike most of the previous radios, very art-deco, compact, and completely of different design. John Anthes brought in a model 10C breadboard radio which was the alpha unit in my opinion. Back in the mid 20's radios were popular with hobbyists as Big Radio was just starting to get off the ground from crystal sets and regenerative designs. John picked this jewel up from an auction from the Ford Museum.
Mark Toppo's AK 735 was best of show as it was the most pristine and one of the last made in1935. This unit was all original and working. The only replacement was a filter capacitor.
John Estock brought in an all metal model 40 from 1927. It was said to be used in a movie which had to be a "shoot um up

NMRCC 2016 MEETINGS

FEB 14 - Homebuilt crystal, tube, and transistor sets

MAR - Mirror radios, all years

APR - Test equipment and classroom demonstration equipment- tube testers, signal generators, oscilloscopes, bridges, meters and etc

MAY - Spring Picnic

JUN - Television sets, 1946 through 1970 (anything you can carry into the conference room)

JUL - Early TV cameras, camera tubes and CRTs

AUG - Foreign Radios

SEP - Field day/radio reception contests

OCT - Fall picnic, ribeye steaks Las Cruces

NOV - Wild Card Sunday" (nifty science gizmos, novel science toys, or non- radio collection, electronics, or science related that you think will dazzle your fellow members

DEC - Holiday party – theme: Little-known radio manufacturer and rare radios

NMRCC Officers for 2016

- *Don Menning: President*
- *John Estock: Vice President*
- *Chuck Burch/RMajestic: Treasurer*
- *John Hannahs: Secretary*
- *Mark Toppo/RMonty: Membership*
- *David Wilson: Director*
- *Richard Majestic: Director*
- *Ray Trujillo: Director*
- *Richard Majestic: Newsletter Editor (President pro-tem)*

bang". It's value was the gold plated escutcheon and full set of tubes. My model 20 was accompanied by a John Hannahs designed power supply that fits inside the cabinet. The 3 stage TRF had the usual individual tuning knobs.
Owners usually created a graph that indicated the station/frequency relative to each dial setting.

~John Hannahs

Atwater Kent radio products 1924:1935 NMRCC members owned radios and speakers

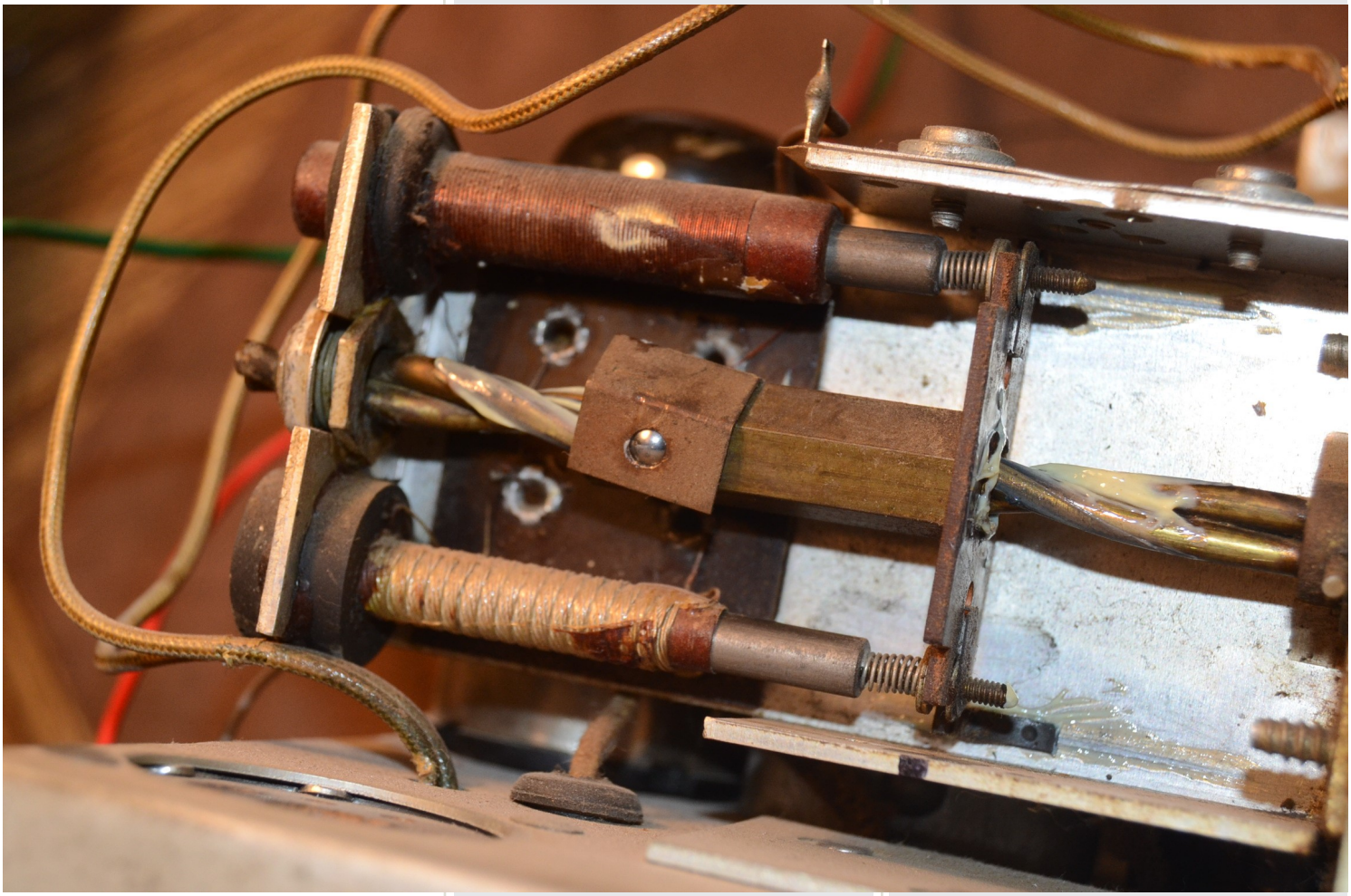
1955 V-M record player and 45 case filled. No LP'S because they were too expensive. My father had purchased 2 of these players, one for my sister and one for my grandmother a big Sinatra fan of course. At that time we lived upstairs above our bar and restaurant in a building that had once been an old 2 story home. My sister's record collection was unusual for a girl in the 50's. She did not have one Elvis record, almost all it was Doo Wop. The phono needed some repair so Dad took it to a shop and gave it back to me in working order. When the storm hit the day after Christmas I didn't want to do any wood work so I decided to give the V-M the long awaited service it needed. It had never been touched. The dealer I purchased it from said it was just buried in a back room of a Phoenix home. It originally came out of a small TV shop located on W. Touhy Ave. in Chicago. Given the music to live and love by sign it probably had been a display model. I pulled the amp and turn table, gave it a recapping and lube finishing up with a new needle. It was an afternoon job, but the results were well worth it. It has acoustic contour control as V-M called it. On the hang tag it states that this is V-M's newest contribution to audio acoustic science. Normally, in high fidelity systems, fidelity decreases as volume increases. But V-M'S exclusive Acoustic Contour Control preserves fidelity even at the highest volume levels. Well I don't know about all that, but it sounds great. I uses a Jensen 12'' woofer and 4'' tweeter. V-M used Great Britain tubes with their name as follows: EZ81/6CA4, EL84/6BQ5 (2), 12AU7 and a 6AU6.

Now Lynn and I are enjoying it again, great mid-century style and sound for not a lot of money.

~Mark Toppo

steel balls (one cannot be seen 180 degrees around the rear). These balls ride in the "trough" formed by the spiral and cause the sleeve and the attached tuning slugs to move laterally when the spiral is axially rotated. The slope of the spiral was chosen to permit a greater-than-180-degree swing of the tuning pointer, not ordinarily possible with a pointer directly attached to a typical variable capacitor shaft. Of course the same effect could be accomplished with a complex dial cord arrangement, but that would require more parts, more labor-intensive assembly, and more of a servicer's nightmare. This arrangement permits the dial numbering to be more spread out, and thus easier to read and tune.

~Les Davidson



Resistor Line Cords Revisited by Ed Brady

A few weeks ago I received an email from a good friend that was trying to restore several RCA 5X radios but was having trouble with one of them. They were all basically working but once of the radios was drawing about 200mA more current then it should. The RCA Model 5X is a compact five tube AC-DC super-heterodyne radio. There were three cabinet variants; 5X, 5X3 and 5X4. Of the three, the 5X model is my favorite.

Since my friend lives on the east coast and I in New Mexico, I could not just go visit him and help trouble shoot the set. To help him I was going to have to rely on emails and phone calls which is not the best way to trouble shoot a problem radio. Figure 2 shows the schematic for the radio. Common reasons for excessive current in a set include wiring problems, leaky capacitors, shorted speaker field coil, shorted tube elements or out of tolerance resistors. After reviewing the schematics, my top prospects for the problem included C20, C22, C23, C24, C25, R11, R12, R13, R14, and L15; circled red in the schematics. C22 is directly across the power mains. These capacitors are notorious for going bad and should always be replaced. However its leakage resistance would need to be less than 1Kohms to cause the current problem the radio is exhibiting. With a leakage resistance that low, the cap would probably fail quickly. It may be a contributor to the problem but it's not the root cause. C23 and C24 are the high voltage filter capacitors. As with C22 they are leading candidates for leakage problems, but they would need to have a leakage resistance of less than 1Kohm to cause the excess current problem the radio is exhibiting. Again needs to be checked but not root cause. L15 is the speaker field coil and is connected from the high voltage plate supply to ground. It has a 3Kohm resistance and is not likely the problem as 2/3 or more of the coil windings would need to short to cause a current increase being exhibited by the set. R14 is in series with the tube filaments and is used to drop the difference in voltage from the power mains and the series-stacked tube filament voltages. If this resistance is too small it will cause an increase in the input current. But if it were incorrectly sized to increase the set current by almost 200mA odds are one of the tube filaments would burn out as this would represent a 1.7x increase in filament current. It could be a contributor but again not the root cause. C20 is the grid coupling capacitor to the 43 tube. Just a few micro-amps of leakage current can more than double the plate current of the tube. This current can be caused by a leakage as low as a few mega-ohms so it is a highly likely candidate. Again probably not the root cause as having that much excessive current flow through the tube would cause the plate to turn red. C25, R11, R12 and R13 form the self-biasing network for all the tubes. This circuit is used to create a negative bias on the tube by placing a positive voltage on each tube's cathode. The negative grid bias is a result of biasing the cathode at a higher voltage then the grid. This circuit creates the bias by inserting a resistance in series with the cathode. Current flowing through the tube creates a voltage drop across the resistor which raises the cathode to a voltage above ground. With the grid at or near ground the resulting grid-to-cathode voltage is negative. If the value of the resistors decreases or becomes shorted, or the capacitor becomes leaky the tube's cathode bias voltage will be reduced. This will reduce the negative bias on all the tubes thus allowing more plate current to flow. Since this circuit impacts all the tubes at once they all will contribute to the excess current flow without significantly impacting any given element. In my opinion this is the likely culprit of the problem.

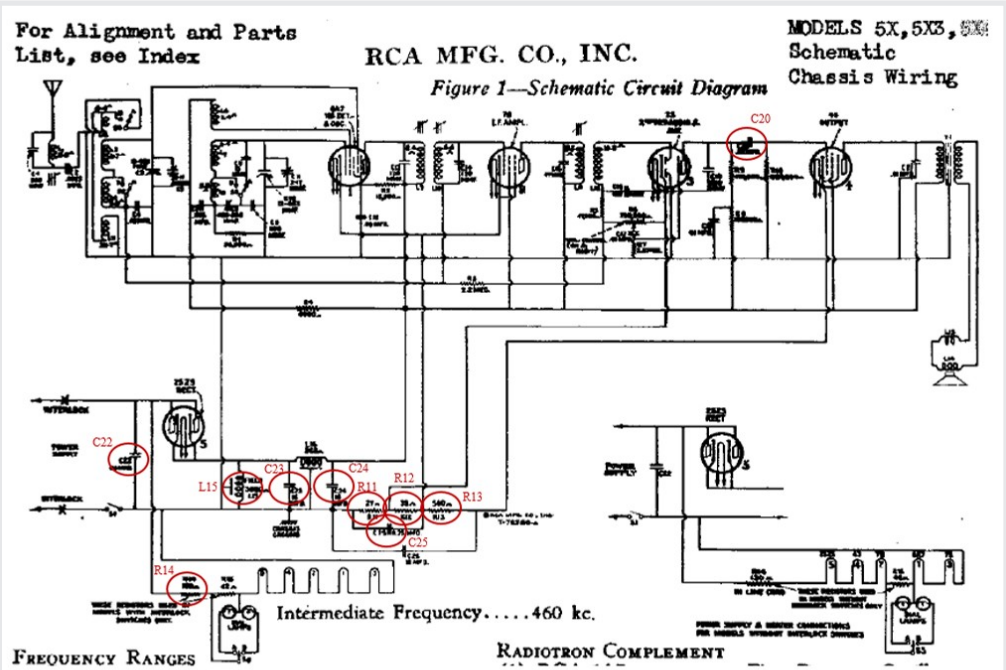


Figure 2. Radio Schematic.

I emailed my friend and told him what to check. He had already replaced all the capacitors and all the other components checked out ok. But in checking these components, he found that someone had shorted the cathode of the 6A7 and 78 tube to ground. This effectively shorts out R11 and R12 in the cathode self-biasing circuit. This changes the bias to all the tubes, decreases the negative grid voltage, and allows excess plate current to flow. With the short removed, the radio operated normally and within the current limits; as specified by the manufacturer.

But the radios still were not operating properly. Now every time he turned on one of these sets, the pilot light would burn out.

As previously mentioned, this set is an AC-DC set. AC-DC radios use a power supply design that eliminates the bulky power transformer; consequently the radios are less expensive, lighter, and smaller than comparable AC equipment. The benefit of this design is that is can operate from either DC or AC mains power. AC-DC radios connect all the tube filaments in series to match the supply voltage; a rectifier tube of the power supply converts AC mains power to the direct current required for operation. When connected to DC mains power, the rectifier tube performs no active function. Since not all of America used AC power at the time this allowed radio manufacturers to sell a single radio model. AC-DC radios became the universal standard due to its cost advantage over AC-only, and was only discontinued when vacuum tubes were replaced by low-voltage solid-state electronics.

The disadvantage to AC-DC sets is that the series filament voltages of the tubes used in the sets rarely added up to the mains power voltage. As a result a resistor had to be added to the filament string to drop this voltage difference. The resistor dropping the voltage has to dissipate considerable power and subsequently become extremely hot. There were two common solutions to this problem; ballast tube or resistive line cord. The more expensive method was to place the resistor in an electron tube style pluggable container known as a ballast tube. This "tube", though it got quite hot, was mounted above the chassis and away from most of the other components. The cheaper method was to use a resistance line cord. This cord looked like any other cloth covered AC line cord of its time, but it also contained a third conductor that was actually a resistive wire, typically nichrome, that acted as the required resistor. The advantages of the resistive line cord is that it would dissipate the generated heat outside of the radio cabinet, distributed the heat over a large area, and eliminated one more component to mount inside the radio. Alas, it had a major disadvantage. These line cords didn't last long due to the effects of heat on the rubber insulation. In fact, it is rare to find any of these cords in good shape today; even unused ones. Since frayed and defective cords of this type are very dangerous you will not find them being newly manufactured.

I asked my friend if the dial light shut resistor R15 was the correct value. The #40 pilot lamp used in this radio is only rated at 0.15A and cannot by itself supply the full load of 0.3A to the filament string. The shut resistor is sized to provide the remainder of the current and kept the dial lamp from burning out. It also serves as a current path to keep the radio operating if the dial lamp burns out due to age. At the rated voltage of the pilot lamp, 6.3V, the R15 shunt resistor caries 0.15A of the load. This current plus the current through the dial lamp supplies the 0.3A current needed by the filaments. If the resistance drifts high by 25-30 percent, the current carried by the shut will drop by an equivalent amount forcing the dial lamp to carry more of the filament load. If this current gets too high, then the dial lamp will burn out. However my friend reported that the shunt resistor was the correct value.

My next question was how he replaced the line cord and he told me he had used a diode in series with a 47 ohm resistor. I immediately knew the problem; excessive inrush current. If you have ever turned on an AC-DC radio you have seen the effects of inrush current. This phenomena is exhibited by the dial lamp burning very bright immediately after the radio is turned on and then dimming to its normal brightness after a few seconds. The change to the filament string circuit was allowing too much inrush current to flow causing the dial lamp to burn out. Luckily it was the dial lamp and not a tube filament as dial lamps are easily obtained and relatively inexpensive.

Before I discuss the root cause of the problem lets first look at the methods used to replace resistive line cords and ballast tubes. This will hopefully be useful to new radio collectors not familiar with these techniques. There are three methods commonly used to replace resistive line cords and ballasts tubes.

-Replace with an equivalent valued resistor
-Replace with a diode in series with a resistor
-Replace with an AC capacitor of appropriate value

None of these methods are ideal and have issues that must be addressed. Table 1 lists the most common dropping resistances used in AC-DC sets.

~Ed Brady

Table 1 Common Dropping Resistance Values for Tube Lineup

Total Resistance	Tube Lineup
135 Ohms	25Z5, 43, 4 (6.3 V.)
160 Ohms	25Z5, 43, 3 (6.3 V.)
180 Ohms	12Z3, 43, 4 (6.3 V.)
200 Ohms	25Z5, 43, 2 (6.3 V.)
220 Ohms	12Z5, 43, 3 (6.3 V.)
250 Ohms	12Z3, 43, 2 (6.3 V.) 25Z5, 3 (6.3V)
290 Ohms	12Z3, 3 (6.3 V.)
300 Ohms	12Z3, 3 (6.3 V.)
330 Ohms	12Z3, 2 (6.3 V.) 4 (6.3 V.)
350 Ohms	12Z3, 1 (6.3 V.) 3 (6.3 V.)
390 Ohms	2 (6.3 V.)

The current rating for all these tubes is 0.3A which requires the dropping resistor to be able to handle between 12 to 35 watts. To insure durability and long life these values should be derated by at least 10-20 percent. Replacing a ballast tube or resistance line cord with a single equivalent valued resistor is problematic in that AC-DC radios are very small and there is rarely room to mount a resistor of this size under the chassis.

Table 2 Common Dropping Resistance Values for Tube Lineup

Total Resistance	Tube Lineup
135 Ohms	25Z5, 43, 4 (6.3 V.)
160 Ohms	25Z5, 43, 3 (6.3 V.)
180 Ohms	12Z3, 43, 4 (6.3 V.)
200 Ohms	25Z5, 43, 2 (6.3 V.)
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350 Ohms	12Z3, 1 (6.3 V.) 3 (6.3 V.)
390 Ohms	2 (6.3 V.)

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FOR INFORMATION CHECK THE INTERNET
http://www.newmexicoradiocollectorsclub.com/

The New Mexico Radio Collectors Club is a non-profit organization founded in 1994 in order to enhance the enjoyment of collecting and preservation of radios for all its members.

NMRCC meets the second Sunday of the month at The Quelab at 680 Haines Ave NW , Albuquerque NM Tailgate sale at 1:00PM meetings start at 2:00 pm. Visitors Always Welcomed.

NMRCC NEWSLETTER

THIS PUBLICATION IS THE MONTHLY NEWSLETTER OF THE NEW MEXICO RADIO COLLECTORS CLUB. INPUT FROM ALL MEMBERS ARE SOLICITED AND WELCOME ON 20TH OF THE PRECEDING MONTH. RICHARD MAJESTIC PRO-TEMP NEWSLETTER EDITOR, SEND ALL SUBMISSIONS IN WORD FORMAT, PICTURES IN *.JPG FORMAT TO: RMAJESTIC@MSN.COM

USPS Stamp

Atwater Kent model 10C from 1924