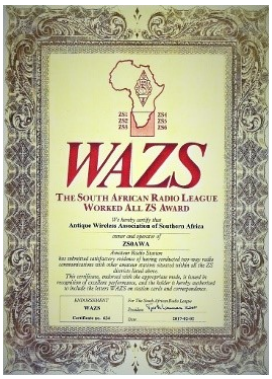
Antique Wireless Association of Southern Africa

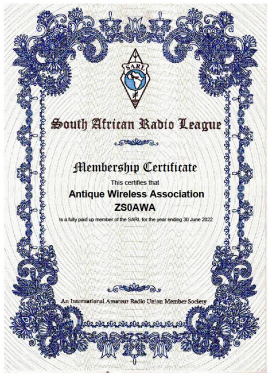
217 August 2024

Heathkit Comanche MR-1

Manufactured 1959 to 1962 and specially designed for rugged mobile use, the Heathkit "Comanche" brings you all the features you've ever wanted in a mobile receiver...superb styling, operating convenience, rugged construction, and lasting quality. Its modern 8-tube superheterodyne circuit features a crystal-lattice type filer and product detector for excellent sensitivity, selectivity and stability. The "Comanche" receives AM, CW, and SSB on 80 through 10 meters. A 30-1 gear driven spring-loaded tuning assembly and rotating slide-rule tuning dial assures smooth, easy station selection. Panel controls are provided for BFO tuning, RF gain, AF gain-on/off, CW-SSB-AM mode selector, noise limiter, AVC, main tuning, bandswitch, and antenna trimmer.

Circuit design includes an RF stage, converter, 2 IF stages, 2 detectors, noise limiter, 2 audio stages and a voltage regulator. The MR-1, with steel chassis and compartmental construction, is braced to withstand mobile vibrations and shock for long life and reliable communications with lasting quality. A versatile performer, the MT-1 can be used with the Heathkit HP-10 mobile power supply for operation on 12 V DC car battery or can be converted in a matter of minutes to fixed-station operation using the Heathkit HP-20 AC power supply.





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Reflections:

I was reminded the other day of my first move from the Northern Cape to the metropolis of Johannesburg, well Benoni to be exact. This was in November 1990 after I had taken a new job from the diamond mines to come and work in Johannesburg. We moved in to a rented house in one of the suburbs, close to town, close to the highway which I had to travel on every day to get to work. Too close in fact. From the only traffic which we ever heard being the train on the Sishen to Kimberley line maybe twice a week to hearing traffic continuously along the N12 highway. It would stop at around one o clock in the morning and then start again at five past one.

I had not opportunity to set up a station in the rented home and went without a fix for three months until we found a house in the back end of Benoni to move to. It seems to me that every move one makes is almost as stressful as the last one, even if you are still living out of boxes.

But we survived another move and it was not too long before I had an antenna up and the HT37 with SX100 plugged in to the G5RV and started making my first contacts. I had applied for a div 6 call sign when I first landed in Benoni and by this time had it. In those days there was no getting on the internet and apply for a new call and have it within a few hours, it was all carrier pigeon and horses. Well it felt like it then anyway.

One of my big regrets from those days was having lost my ZS4 logbook somewhere along the road with a few more moves in between.

On the 28th April 1991, I made five QSO's with my new call sign. Tony, ZS6BUI was the first in my new logbook. Then came Derrick ZS6AWU, Sid ZS6GQ, Phillip ZS4PH and Munro ZS6IN. The ice had been broken and my long wait was finally over.

I kind of feel the same now, but the wait will not be as long, being a lot wiser, well that's what the grey hair is supposed to be for, and being a lot more radio wise, I should be able to get the station up and running in about 2 weeks. So by the time this Newsletter goes out, I should be on air.

Looking back at my logbook, there are not many calls signs that I still hear today, but within the second month I had my first QSO with Mickey ZS5QB on 5 May 1991 and Rad ZS6RAD on 30 May 1991, whose call signs have appeared in my log book on a regular basis since then.

In those days the AM MF net was still very strong and I would call in to Phillip, Munro and a few others regularly. The bands were also pretty good in those days and many DX stations were worked in the evenings on 20m.

Having had a 9 month break, it's good to get back on the ZS6 call sign again and I'm looking forward to renewing many contacts again both on CW and SSB.

I think it's kind of fitting that my last few QSO's from the NC were all CW contacts, the last being Ed ZS6UT, who has been faithfully calling in ever Saturday afternoon for the AWA CW net. Conditions have been terrible, but we would always make a plan to have a short chat on CW either on 20 or 30m if conditions on 40 were not good.

Looking forward to meeting up with many of you on air again and renewing some old acquaintances.

73

DE Andy ZS6ADY

Coronal Mass Ejection (CME) **Wikipedia**

Instruments

On 1 November 1994, NASA launched the *Wind* spacecraft as a solar wind monitor to orbit Earth's L_1 Lagrange point as the interplanetary component of the Global Geospace Science (GGS) Program within the International Solar Terrestrial Physics (ISTP) program. The spacecraft is a spin axis-stabilized satellite that carries eight instruments measuring solar wind particles from thermal to greater than MeV energies, electromagnetic radiation from DC to 13 MHz radio waves, and gamma-rays.

On 25 October 2006, NASA launched STEREO, two near-identical spacecraft which, from widely separated points in their orbits, are able to produce the first stereoscopic images of CMEs and other solar activity measurements. The spacecraft orbit the Sun at distances similar to that of Earth, with one slightly ahead of Earth and the other trailing. Their separation gradually increased so that after four years they were almost diametrically opposite each other in orbit.

Neutralising Valve / Tube Power Amplifiers

Chris Turner, ZS6GM

When talking about Power Amplifiers, we refer to not only external linear amplifiers but to the driver and output stages of valve and hybrid transmitters and transceivers. Common cathode amplifiers having high gain usually require neutralisation.

Why the need for neutralising?

Neutralisation is the process of counteracting or "neutralising" the effect of inter-electrode capacitance in tubes or indeed solid -state devices. The requirement for any amplifier is to remain unconditionally stable under normal operating conditions. In other words, it should not suffer from instability or parasitic oscillation due to the feedback via the inter-electrode capacitances.

A properly neutralised amplifier should fulfil two conditions;
Inter-electrode capacitance between input and output circuits be cancelled, and
The inductance of the screen grid, cathode assemblies and wires be completely cancelled.
The cancellation of these common impedances between input and output will generally prevent oscillation or instability.

Neutralising is achieved by feeding a small portion of the output back to the input at 180 degrees out of phase, thus cancelling the inter-electrode capacitance.

Grounded Grid amplifiers do not usually require neutralisation but in some cases may require the cancellation of internal lead inductance in tubes such as 811A, 572B and similar. However, nearly all Common Cathode, grid driven amplifiers require neutralisation.

How To Identify Neutralising Problems

If the maximum power output does not coincide with the dip (minimum) in plate current, it is a sure sign that the amplifier is not properly neutralised. Another indication is when the output power or plate current fluctuates when the grid tuning or plate tuning controls are varied. When peaking or tuning grid or plate controls, the power output should change smoothly. Another indication is if using SSB, the plate current or output 'hangs' during syllables or speech lows.

The Correct Way to Tune Up

The correct way to tune up a transmitter, is to tune grid, plate and loading for maximum output whilst ensuring that the maximum plate and grid current remain within the manufacturer's specifications at full power output. Provided the amplifier is properly neutralised, the maximum power output condition should coincide with the dip in plate current, and the correct grid current. This condition provides maximum efficiency too!

Neutralising A Transmitter

There are several methods used to neutralise a transmitter power output stage but only two reliable methods. The second being the preferred. Adjustment of the neutralising capacitor should always be done using a non-metallic tuning tool or wand and with PA covers and shields in place.
Hot method - Adjusting neutralising so that the maximum power output coincides with a dip in plate current.

1. Connect an in-line power meter between the radio and a dummy load,
2. Tune up the radio according to the operating instructions on the 10 metre band (28.5 MHz).
3. Key the radio in the CW mode and reduce the output power to 70% of the maximum output power,
4. Vary the plate tuning control and if necessary, incrementally adjust the neutralising capacitor so that the peak output power coincides with the dip in plate current.

Cold neutralising – This requires the PA to be disabled by removing the filament supply or removing the screen grid (or HT and screen) supply voltage. Some radios which have accessory sockets for external transverters make it easy. Yaesu models have a multi-way connector which when pulled disconnects the PA filament voltage. Kenwood has a switch which removes the screen supply to the PA. If your radio does not offer this, then you will need to identify and disconnect either the filament or screen voltage to the PA to make the adjustments.

1. Connect a dummy load to the transmitter and tune up according to the manufacturer's instructions on 10 metres (28.5MHz).
2. Disconnect the PA filament or screen supplying,
3. Connect an RF probe or suitable oscilloscope to the antenna connector across the dummy load,
4. Key the transmitter in CW mode whilst observing the RF voltage on the antenna connector.

5. Adjust the neutralising capacitor for minimum RF on the antenna connector. Adjust the drive/grid controls, and PA tuning for maximum RF and then again adjust the neutralising capacitor for minimum RF. Repeat this process until no further reduction is achieved.
6. Restore the filament / screen voltage and tune up as per the instructions. Ensure that the plate dip tunes smoothly and that maximum RF output coincides with the dip in plate current.

WARNING: Be careful of the high voltages present and avoid using any metallic tools when the radio is powered up particularly in the PA compartment.

Once a transmitter has been correctly neutralised it should not require any adjustment or touching up unless the tubes are replaced. Neutralising does not change or drift with age.

It is important that when replacing tubes, to make sure that they come from the same manufacturer. Different manufacturers of tubes result in the internal architecture being different and therefore they require different neutralisation conditions. If mixing tubes, it may be impossible to properly neutralise the transmitter.

If the PA is not properly neutralised then it could oscillate spuriously at or near the operating frequency or the intermodulation distortion could be higher causing interference or splatter to adjacent users.

Transistor Radio Alignment and Adjustment

MW/LW alignment

With transistor sets it is very unlikely that the alignment will change by itself. If you think the set needs realignment, ask yourself why. If someone has been fiddling with the adjustments, this is a good reason. In practice this is less common on transistor sets because the adjustments are too small for the average bodger to get a terminal screwdriver into. If components have been replaced with the same types, this should not cause enough variation to require realignment. If components have been replaces with similar parts this may cause enough variation to require the alignment of the stage in question to require slight adjustment, but it would be better to obtain the correct replacement part if possible.

The service data for the set will generally contain alignment instructions, and these should be followed if the required equipment is available. If a signal generator and output level indicator are not available, it is often possible to adjust the alignment on broadcast stations, as long as it isn't too far out to begin with. Some people may object to this idea, but it really isn't that difficult or dreadful if it's done carefully.

Tune the set to a station on MW that is fairly weak but still clearly audible. Music is generally better when adjusting for maximum volume by ear, so find a distant station of the "Classic Gold" variety or something similar. Carefully adjust each of the IF transformer cores, starting at the mixer-oscillator and working forward, for maximum volume. Only adjust each core once then move forward. Don't go back round and do them all a second time.

Now tune to a known station near the low frequency or high wavelength end of MW (such as Five Live on 693kHz or 433 metres), and check it is at the right position on the band (bearing in mind the likely scale accuracy of the set). If it is not correct, make sure the tuning mechanism is working correctly and that the pointer or whatever is moving properly from one end of the band to the other. Also make sure it's going the right way - highest wavelength or lowest frequency when the tuning capacitor is fully closed. If the station is a little way out, adjust the oscillator core to bring it into line. You'll probably need to adjust the oscillator a bit then the tuning a bit, as you move the station back to where it should be. If the station is some way away from where it's supposed to be, you won't get it in by alignment - there must be something else wrong.

Now tune to a known station near the high frequency or low wavelength end of MW (such as Virgin on 1215kHz or 247 metres), and check it's in the right place. If not, adjust the trimmer capacitor on the oscillator section of the tuning capacitor to move it back. Now recheck the first station again. You may have to readjust each of them two or three times.

Having got the stations in the right place we need to peak the RF alignment. Tune to a weak station at around 1500kHz or 200 metres, and adjust the trimmer capacitor on the RF section of the tuning capacitor for maximum volume. Tune to a weak station at the other end of the band and adjust the position of the MW coil on the ferrite rod aerial for maximum volume.

Switch to LW and tune in Radio 4 at 198kHz or 1508 metres. Adjust any trimmers and cores that are only used on LW for maximum volume. Also move the LW coil on the ferrite rod for maximum volume.

With all these adjustments, if anything is sealed assume it's correct. The only reason for an adjustment to be out is if someone has been at it. If there's no evidence of this, leave it alone.

Often the only adjustment needed is the IF alignment. It is rare to find that the RF and oscillator are out of alignment, even when the bodger has been at it.

Many Far-Eastern sets from the 60s and early 70s benefit from slight readjustment of the final IF to make the set sound less shrill. These sets normally have coloured cores - the final IF is the black one. Remove the wax and try adjusting it a little bit each way. About a quarter-turn is all that's normally needed, and the set will sound significantly better for it. Melt the wax with a soldering iron to reseal the core. Don't adjust anything else - that's as good as it gets!

Output stage bias adjustment

With many sets the bias of the output stage is fixed and no adjustment is provided. If adjustment is provided, it is normally only necessary to adjust it if the output transistors have been replaced, or if someone has been fiddling. The service data will normally detail the procedure and state the current. If not, assume 5mA.

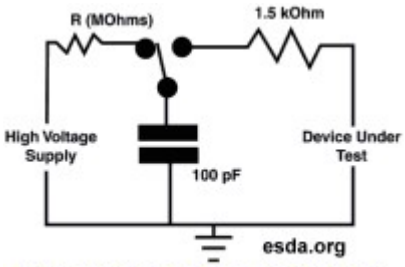
The procedure normally calls for a link to be removed from the PCB and the meter on a DC mA range to be connected in its place. The relevant control is then adjusted to give the correct current reading.

We can save ourselves a bit of messing around by connecting the meter in series with the battery instead of disconnecting the link. Adjust the variable resistor for minimum current. At this position the output stage will be drawing zero or virtually zero current, and the meter will be showing the current drawn by the rest of the set. Add the required bias current onto this (or add 5mA if the actual figure isn't known), and adjust the control to give this value on the meter. Leave it for a few minutes to stabilise then check and readjust again if needed. The adjustment is quite sensitive, and the current will rise rapidly as it is operated, so be careful.

If the set sounds distorted at low volumes when the bias current is set to 5mA, then maybe it needs a bit more. Try increasing it to about 7.5mA. If it's still a bit distorted, try 10mA. Don't go any higher - get the service data or find out the correct value.

Mac's Service Shop: Electrostatics at Work

February 1973 Popular Electronics



Human Body Model (HBM) Circuit

Anyone who has lived in an area where the humidity gets so low that getting an electrostatic discharge jolt when touching a doorknob or or other isolated metallic object, will appreciate Mac McGregor's discussion with Barney. Appropriately, it appeared in a February issue of *Popular Electronics* magazine, the setting being Mac's Service Shop's Midwestern location - a prime environment for receiving the annoying zaps. It is a timeless subject for anyone routinely subject to exposed high voltages of any sort - some being more dangerous than others. Most RF Cafe visitors already know that technically, it is the amount of electric current through the body that determines severity of electric shock, not the voltage. However, we also know that voltage does play a role because a certain voltage, per Ohm's law, is needed to induce a commensurate current. The body's resistance is determined primarily by perspiration (salt and water) and the path between contact points (e.g., across adjacent skin areas or hand-to-hand via the heart). MIL-STD-883 and JEDEC have decided that the proper Human Body Model (HBM) for testing semiconductor survivability when subject to high voltages is 1.5 kΩ. I could not find out how that value was determined.

By John T. Frye, W9EGV, KHD4167

The sparkling cold winter morning lifted the heart but numbed the fingers as Barney sprinted quickly over the squeaking snow from his car to the service shop. There he found Mac, his employer, seated at a service bench bearing some strangely assorted paraphernalia: a red-handled tooth brush, a ten-inch-long glass rod, one square of rough brown woolen cloth and another of pink silk, a couple of coat hanger wire stands shaped like bridge lamps and carrying-pea-sized little white balls suspended by silken threads from the ends of their horizontal arms, and a gaily decorated round tin candy container.

"Okay, I give up," Barney said after a puzzled examination of these objects. "What the heck are you doing?"

"In the parlance of the day, I'm trying to 'get it all together,' " Mac answered with a teasing grin. "I'm going back to where our line of work really started when Thales of Miletus, about 600 BC, observed that a piece of rubbed amber, called "elektron" in Greek, attracted bits of matter. All the millions of uses for electricity and electronics in our modern civilization can be traced back to that casual observation of electrostatic, or triboelectric, charge. Deciding a review of basic electrostatic principles would not hurt me, I got some books from the library, made those little balls from pith gouged out of the center of branches lopped off trees of paradise, or stink trees, growing in my back yard, made the simple leaf electroscope contained in that candy tin with chewing gum wrapper foil, invoked the spirit of Ben Franklin, and started experimenting, trying to explain everything I saw happen in terms of what I know about electron theory. Never before did I get so much thought-provoking pleasure from such simple home-made apparatus."

"Aw, I did all that stuff in high school physics," Barney scoffed. "Electrostatic experiments are interesting but of little practical value except to explain how lightning rods work."

"How easy it is to be so cocksure - and so wrong - when you are young!" Mac marveled. "Did you learn that, on a clear bright winter day such as this, the downward electrostatic charge in the atmosphere may carry up to 500 volts per vertical meter?"

"Don't believe it," Barney answered promptly. "That would mean there would be almost 1,000 volts from my head to feet. That would electrocute me."

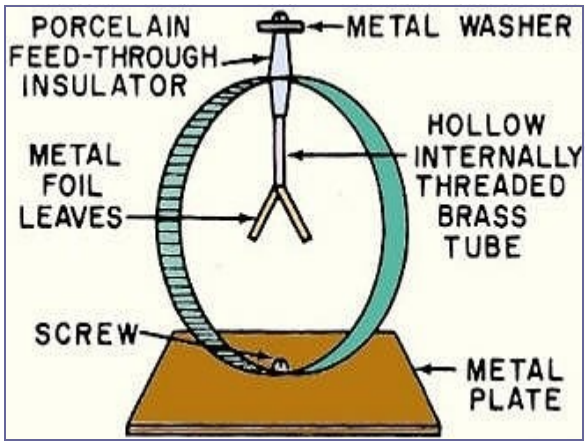
"Not so. You constitute a grounded conductor, and your skin is an equipotential surface that warps the electric field and makes you unaware of it, even when a thundercloud moves overhead and reverses the field polarity and increases the potential up to 10,000 volts/meter."

"That's when the lightning strikes," Barney interrupted.

"It's not that simple. You need 300 times that voltage, or 30,000 volts/cm, to break down the resistance of air. Actually a 'leader' stroke develops stepwise inside the cloud and comes to ground; then there is a main upstroke along the ionized path of the leader containing tens of thousands of amperes. By the way, did they tell you about earthquake-lightning in your physics class?"

"Nope. We didn't believe in compounding catastrophes."

"Nature apparently does. Flashes of light in the sky often accompany earthquakes. During the Japanese quake of 1930 some 1,500 such flashes were recorded. That quake area is characterized by quartz-rich lava, and it has been suggested that, with the right kind of crystalline order and the right kind of seismic waves, millions of volts of electrostatic energy might be generated by the earth's movement of the rock formation through the piezoelectric effect - the same effect that produces the weak voltage across the output of a crystal phono cartridge when the stylus vibrates in the record groove. Perhaps if any quartz-bearing areas can be found along the San Andreas fault, stations for continuous monitoring of the atmospheric electric field can be set up and their recordings correlated with ground tremors. If these coincide, this might lead to an earthquake early warning system."



The leaf electroscope is made from a 5" in diameter round candy tin with the bottom cut out. A small porcelain feed-through insulator goes through a hole in one side of the can, and a brass tube with internal threading is screwed onto the bottom end of the insulator. The bottom end of this small-diameter tube is split, and two leaves of foil 1/4" by 2" have their ends clamped in the split. I used thin metal foil from chewing gum, and beat it even thinner. Gold leaf, obtainable from a sign painter, would have been better. Plastic wrap is stretched over both ends of the can to allow the leaves to be seen while protecting them from air currents. A brass ball could well replace the metal washer on top of the insulator. When a charge is placed on the washer, either by contact with a charged object or by induction, like charges on the leaves cause them to spread apart. They then collapse when the charge is subsequently taken away.

"You still haven't shown me that electrostatic electricity is practical."

Practical Applications. Before answering, Mac rubbed the toothbrush handle with the woolen cloth and then held the handle near one of the pith balls. The ball was attracted to the handle and clung to it for a few seconds and then leaped violently away and swung over to a metal meter panel and clung to it.

"That should suggest one very practical use: a precipitator for removing air-polluting fly ash and other liquid and solid particles from flue gases," he said. "All we need do is put an electrostatic charge on the particles, such as I put on the pith ball, and subject them to a field so they will move toward and cling to an oppositely charged or neutral surface. In practice, this can be done by running a thin wire, carrying a negative potential of 100,000 volts, down the center of a cylindrical duct 20 cm in diameter. The charge produces an average radial field strength of 10,000 volts/cm, but the field strength is much less near the duct wall and much more near the wire. In fact, in the immediate vicinity of the wire it is far above the 30,000 volts/cm I mentioned as being necessary for breaking down the resistance of air. This results in a corona discharge, or zone of ionization, around the wire. Electrons surging off the wire attach themselves to oxygen molecules of the air, converting them into negative ions that are repelled by the wire so they move outward toward the grounded duct wall in a veritable ionic current.

"If a flue gas loaded with waste particles flows up the duct with a velocity of less than ten feet a second, the ionic current charges the particles and makes them move across the gas stream by the billions to collect on the walls of the duct. If the particles are dry, the duct is rapped so the ash falls downward and is collected in a hopper. Liquid particles simply run down the duct walls. Industrial precipitators operate on a negative corona, while home air cleaners use a positive corona. It's estimated such devices trap more than twenty million tons of fly ash a year. I'd call that a practical use."

"So maybe there is one practical use," Barney admitted.

"There's much more. The principle of corona discharge is also used to separate granular mixtures in which the two kinds of particles differ in conductivity so one might be called a conductor and the other an insulator. Remember conductivity is always a relative term. In one form, the mixture comes down from a hopper and spreads out in a thin layer on top of a grounded rotating drum. The drum passes under a wire generating a corona discharge. Ions flood through the mixture to the drum. They pass through the conducting particles to the drum and there is no adhesion; so these particles simply fall off into bin #1 as the drum turns. The charges of ions that strike the insulating particles coat the particle surfaces with a charge that pins them to the metal drum while it moves past bin #1, and they are scraped off in bin #2. This kind of separator is used exten-

sively to separate iron ore, but it is also used to remove rodent excreta from rice, extract garlic seeds from wheat, and to separate nut meats from shells.

"In the handling of continuously moving sheets of paper or film, one surface of which is coated with a sticky substance, the 'web' can be pinned to the surface of a single roller to supply tension by charging the outer surface with ions supplied by a corona discharge.

"Still another important use of the corona discharge is electrocoating, a process used to apply various coatings such as wet paint, grit particles, dry powders, and even short fibers. A spray gun equipped with a corona point emits a fine mist of paint particles that gather the field lines to themselves and attract ions from the corona, thus acquiring a charge. The charged particles are so strongly attracted to the grounded target that they actually curl around it and coat the sides and back surface. It's estimated the saving in paint alone from electrocoating amounts to $50 million a year.

"Flocking is a variation of electrocoating. If you want a velvet wall, you first paint it with conductive aluminum paint to which an adhesive is applied. Then you fill a hopper with short fibers and shake it in front of the wall. As the fibers fall out they are charged from a set of corona points mounted on the hopper, and three things happen: (1) the fibers are driven toward the wall by the Coulomb force of repulsion of like charges, (2) the mutual repulsion of like charges on the fibers keeps them apart, and (3) the fibers align themselves with the lines of force so they arrive end-on at the adhesive, permitting more than 200,000 fibers per square inch to be applied. This process is used to make artificial suede, cover the interior of instrument cases, or put pile on carpeting. A similar process is used in the $200 million a year business of coated abrasives, such as sandpaper and emery paper."

"Okay! I'm convinced. Electrostatic electricity is more than a toy," Barney conceded.

"There's more," Mac said relentlessly. "Let's talk about the dry-copy imaging process known as xerography. The operation of a Xerox machine depends on the fact that a selenium-covered plate can be charged by a corona discharge, and then the charge can be removed by exposure to light. In actual operation a selenium-coated drum is charged in the dark from a corona, and then an image of the page to be copied is focused on the drum. The charge is removed in the light areas but retained in the dark areas. Next a 'toner,' a mixture of black dust and tiny glass spheres, is spread over the image. The opposite-charged glass and dust stick together until the mixture reaches the image; then the glass is repelled and the dust clings to the dark areas.

"Now paper that has been charged is spread over the image on the drum and attracts the toner to itself. Finally this paper moves through a rapid-heating stage that fuses the toner to itself and makes a permanent copy. This is a simplified explanation, of course, but I'm sure that you will get the idea."

"By the way, where did you learn all this stuff anyway?"
"From various books and magazine articles. One of the best sources was the work of A.D. Moore, professor emeritus of electrical engineering at the University of Michigan. Two of his books are Electrostatics and Invention, Discovery and Creativity. He was working on another that may be published by this time called Electrostatics and its Applications. In an article in the March, 1972, issue of Scientific American he points out that Ben Franklin invented the first electric motor, an electrostatic motor; and he goes on to say interest in this type of motor has been revived recently, chiefly by Oleg Jefimenko of West Virginia University. One of his corona motors about five inches long developed a tenth of a horsepower. Recently he put up a wire by balloon and ran one of his motors by energy from the atmosphere's electric field."

"That does it!" Barney exclaimed. "I'm going home tonight and dig out my physics books. How about borrowing those playthings - excuse me, that apparatus - of yours?
"Con mucho gusto," Mac replied, grinning. "That was the whole idea. You'll have fun, and, as a bonus, I'll guarantee it will be much easier to understand solid-state electronics after you've reviewed your electrostatic electricity."

HT-4B

HERE is that high-powered rig you have always wanted to own . . . one that you can depend upon for peak operating efficiency. Hallicrafters have built into the HT-4B the resultant experience from years of engineering research.

Model HT-4B delivers a carrier output of 325 watts on phone and 450 watts on CW. The preamplifier supplied with the transmitter can be mounted conveniently at the operating position, controlling volume, keying and standby . . . once adjusted to any band the rig may be operated remotely.

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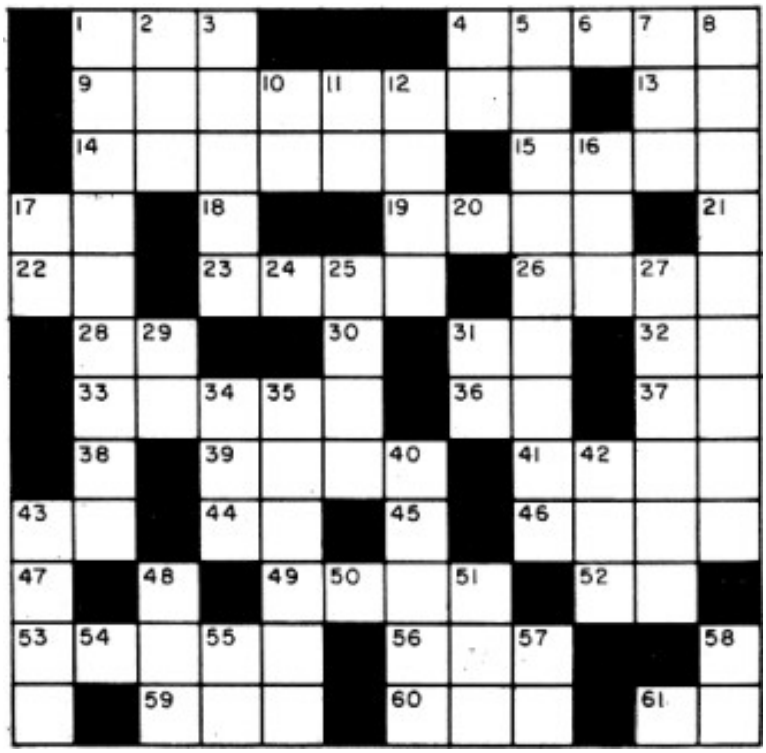

Across

1. Variable resistor.
4. Light amplifier.
9. A wirewound #1 Across.
13. Old English.
14. One volt across one ohm =.
15. Weight (pl.).
17. 1/(2πfC).
18. Current.
19. Sly glance.
21. "J" scan pattern.
22. All the inductance in the circuit (schematic notation).
23. Unit of force.
26. Rare gas.
28. Formula for "E."
30. Chemical symbol.
31. G_m x r_p.
32. Egyptian sun god.
33. We must, before we walk.
36. Organization for reformed drinkers.
37. Crystal cut.
38. First letter.
39. Every actor needs one.
41. Carry (colloq.).
43. 2πfL.
44. Gas in auto exhaust.
45. Velocity (abbr.).
46. Women.
47. Schematic notation.
48. E/R.
49. 60 cps, for instance (abbr.).
52. Preposition.
53. Tube element.
56. Popular import from Puerto Rico.
58. It appears in Ohm's Law.
59. Used in digital computers.
60. Not me.
61. Its frequency is lower than r.f.

Down

1. Opposite of theoretical.
2. Unit of resistance.
3. Lukewarm.
4. California city (fam.).
5. Reduce.
6. Meter often found in ham rigs.
7. Period of time.
8. Vibrates at natural frequency.
10. English digraph.
11. Parts list abbreviation.
12. British for video.
16. Metal in its natural state.
17. Inductive reactance.
20. It designates voltage.
24. Vertical axis.
25. Tune current for this in a parallel resonant circuit.
27. Speaks eloquently.
29. Means of transportation (abbr.).
31. Small current.
34. Part of a circle.
35. It handles the low frequencies.
40. All inclusive.
42. Eggs.
43. Has a very short wavelength.
48. Charged particle.
50. E/I = .
51. Which (Lat.).
54. Unknown in a formula, indicating a specific quantity.
55. Accomplish.
57. Amplification factor.
58. Heterodyned frequency (abbr.).

CONTACT US:

WA/Telegram +27824484368
email: andyzs6ady@vodamail.co.za
www.awasa.org.za

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Antique Wireless Association of Southern Africa

Mission Statement

Our aim is to facilitate, generate and maintain an interest in the location, acquisition, repair and use of yesterdays radio's and associated equipment. To encourage all like minded amateurs to do the same thus ensuring the maintenance and preservation of our amateur heritage.

Membership of this group is free and by association. Join by logging in to our website.

Notices:

Net Times and Frequencies (SAST):
Saturday 07:00 (05:00 UTC) —Western Cape SSB Net —7.140; Every afternoon during the week from 17:00—7.140
Saturday 08:30 (06:30 UTC)— National SSB Net— 7.125;
Echolink—ZS0AWA-L; ZS6STN-R
Sandton repeater—145.700
Kempton Park Repeater—145.6625
Relay on 10.125 and 14.135 (Try all and see what suits you)
Saturday 14:00 (12:00 UTC)— CW Net—7025; 14:20 10.115/14125

AWASA Telegram group:

Should you want to get on the AWA Telegram group where a lot of technical discussion takes place, send a message to Andy ZS6ADY asking to be placed on the group. This is a no-Nonsense group, only for AWA business. You must download the Telegram App first. …..+27824484368

Suffering from Interference ?

Jaap Lourens ZS6SAI is offering his services to amateurs around Gauteng who experience interference. Contact him on 082 086 2496. You can listen to his history on the AWA website from the net of 03 August 2024. Go to the website and look under "Latest News" to find the link.

For Disposal:

This Wadley XCR30, was in working condition when last used.

Contact: Brian Duckitt 073 195 1524