AWA Newsletter

91

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Affiliated to the SARL

Antique Wireless Association of Southern Africa

Inside this issue:

AWA Committee:

* President—Richard ZS6TF
* Technical Advisor—Rad ZS6RAD
* Secretary/PRO—Andy ZS6ADY
* Western Cape—John ZS1WJ

Reflections:

What is it that keeps bringing us back to our radio's to talk to people ?

Sometimes we are abused, belittled, shocked into reality, told our equipment is outdated and defunct. Ridiculed because we are slightly off frequency because we don't have digital readouts. Because we are not running 9+ signal strength there is something wrong with your antenna or your output.

Other times we are praised for the quality of audio, the clean strong signal, the fact you are running analogue but are still spot on frequency. Your Old boat anchor must have taken a lot of work to get it into operating condition.

Sometimes I feel like I'm living in a looney tunes with a bunch of psycho's for friends !

But then, friends they are.

No matter what we say, we can never seem to put the other guy off. There is always a reason for whatever it is that is happening. No matter what it is, we will always make some improvement somewhere and then come back for a second round.

I have never known people who change things on such a regular basis.

If someone is told they are not running 9+ while the guy next door is, then we tear down our antenna's and relocate them, cut them spot on frequency, move them up by three metres and put open feeder line on.

Wow, I got a whole extra S point out of that !

We are suckers for punishment, all a bunch of masochists. We so enjoy what we do, that it does not matter how much punishment we have to take to do something for our beloved radio's, we will do it. Is this not the greatest hobby around ?

Psychologists would probably have another name for us, but I cant imagine what it would be.

I so enjoy the banter, the chats, the ragchews, the short QSO's. The CW contacts the AM sessions, the digital modes and so many others that are associated with what we do.

It just makes it so worthwhile, that I am not surprised that our cars wheels fall off, the washing machines leak water, and the tumble dryers don't tumble anymore.

Who could think of a better way to spend your time ?

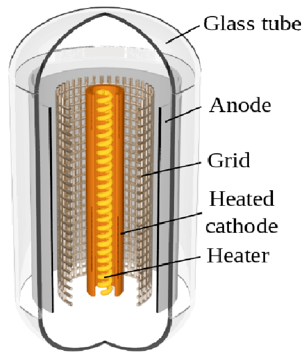
Best 73

DE Andy ZS6ADY

WIKIPEDIA

Low Power Triodes:

Low power triodes have a concentric construction *(see drawing right)*, with the grid and plate as circular or oval cylinders surrounding the cathode. The cathode is a narrow metal tube down the center. Inside it is the filament, consisting of a narrow strip of high resistance nichrome wire, which heats the cathode red-hot (800 - 1000 °C). The cathode is coated with a mixture of alkaline earth oxides such as calcium and thorium oxide which reduces its work function so it produces more electrons. The grid is constructed of a helix or screen of thin wires surrounding the cathode. The plate is a cylinder of sheet metal surrounding the grid. It is blackened to radiate heat and is often equipped with heat-radiating fins. The electrons travel in a radial direction, from the cathode through the grid wires to the plate. The elements are held in position by mica or ceramic insulators and are supported by stiff wires attached to the base, where the electrodes are brought out to connecting pins. The glass envelope is evacuated to a high vacuum, about 10^{-9} atm. A "getter", a small amount of shiny barium metal evaporated onto the inside of the glass, helps maintain the vacuum by absorbing gas released in the tube over time.



Structure of a modern low-power triode vacuum tube. The glass and outer electrodes are shown partly cut away to reveal the construction

CW Net:

Another month has gone by and still the keys of the AWA CW net keep pounding along. The faithful who have decide that CW is still a very valid mode of communication and keep it alive here in SA.

Now we know there are many more CW operators who say they cannot go at 12 or 13 wpm. "Its just too slow". Well thankfully there is a group who still potter along at 12-13 wpm because it has brought a few back in to CW again.

We probably haven't had the desired effect we had hoped to after all these years, but let me tell you, those of us who do it, really enjoy it.

It would seem that the net attracts a few who like to use straight keys, but then there are those who use paddles and bugs.

We have extended an invitation many times to those of you who are wanting to get back in to doing CW. Some have joined but then left again, while others have stuck around.

Of course it would be great to get a few more of you ardent , would be CW'ers back again to come and join us and see if you can still do it.

The net is run on Saturday afternoons from 14:00 SAST and all are welcome to come and join us on 7020.Tehne remember the SARL CW contest this coming Sunday 25th Aug from 15:00 SAST.

It promises to have a good few contesters on frequency and includes 80, 40 and 20m.

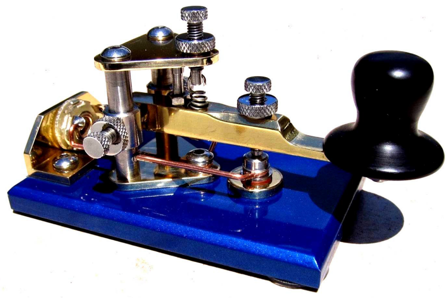
If you are interested in seeing how many CW contacts you can make in this contest, then do yourself a favour and get your keys, paddles bugs out and dust them off for a good afternoon of fun.

I say fun, because you are allowed to enjoy contests. They don't have to be all that serious and you can get on frequency just to give away a few points to the serious contesters.

I would not like to put it as a challenge to anyone, but maybe we could have a contest within a contest. How many points can you get in this contest as an AWA member ?

Let us know how well you do.

DE ZS0AWA/CW …-.-



SSB activity:

Before we say anything, how many of you remembered the change in frequency of the SSB net from 7070 to 7140 ?

Everyone is talking about the activity of the sun and how it is affecting propagation these days.

Double headers, lowest peaks and all these kind of things happening, making life that more difficult to get enough people coming up on frequency.

Do remember though, the bands are still working quite well and most stations still manage a good Q5 readability, even if signals strengths are not S9. It seems to me we have forgotten what it is like to be able to read lower strength signals and if someone is not coming in S9 or more, then we have difficulty in reading them.

There is of course the problem these days that more and more people are being plagued by local noise being generated from electric fences, ADSL modems, DSTV modems etc. But then lets also remember, there are many ways of solving these problems.

Way too often we make the mistake of realising that as radio hams, we have the information and the technology to solve many of these problems that hinder our communications.

So, if you have interference problems plaguing your reception of good signals, ask, search, read about all the ways available to solve the problem.

There are many well experienced in ways of sorting out these minor irritations.

Looking forward to hearing more of you on the SSB net. Remember the new frequency.

Yaesu FT200

AM:

The AM nets continue unhindered on Saturday mornings and Wednesday evenings. Surprisingly, the band has been fairly good and stable on a Wednesday evening, making for a good evening being had by those there.

As summer approaches, the sun will start to rise a lot earlier in the mornings and the band will open a lot earlier, which also means more time to play AM than before.

The net is still well attended by those willing to raise themselves from a well deserved sleep in a warm bed and the quality of transmissions on AM is very often of broadcast quality. The band, when it opens up, gives a good account of itself and stations from Durban and Gauteng are all heard with good results.

Unfortunately, at the moment, the band still goes out fairly early, but we are looking forward to the earlier mornings and the longer operating periods.

Of course the predictions mentioned earlier for sunspots and double peaks and all those kinds of things also apply as much to AM. It does make life more interesting not knowing what the band is going to do and how the mode and rigs are going to perform. What a pleasure when you find out they all work fine

Rigs being used on the net vary from those with low power outputs to those running in to linears and some of the more fortunate higher powered standard rigs that are out there.

No matter what rig you are using, the opportunity is there for you to join the net and get involved in using one of the oldest modes available to a radio ham. Not quite as old as CW, but then the next best.

Take a dip, try out your skills and see if you can get it right.

Central Electronics 100V

MICROPHONES

In order to speak to larger groups of people, there was a desire to increase the volume of the spoken word. The earliest known device to achieve this dates to 600 BC with the invention of masks with specially designed mouth openings that acoustically augmented the voice in amphitheaters. In 1665, the English physicist Robert Hooke was the first to experiment with a medium other than air with the invention of the "lovers' telephone" made of stretched wire with a cup attached at each end. In 1874, Ernst von Siemens described the "dynamic" or "moving-coil" transducer, though the first result of this invention was not the microphone, but its adaptation in 1920 to make a loudspeaker. During the mid-19th century a number of inventors came up with devices that led to the invention of the first practical electrical telephone patented by Alexander Graham Bell in 1876.
Inventors Emile Berliner and Thomas Edison were inspired to improve this and both went on to design and build the first carbon microphone (then called transmitter) in mid-1877, within a month of each other. After a long legal dispute, Edison was awarded the patent.

Modern development

Jack Brown interviews Humphrey Bogart and Lauren Bacall for broadcast to troops overseas during World War II.
Edison continued to refine the carbon microphone, which was employed at the first ever radio broadcast, a performance at the New York Metropolitan Opera House in 1910. In 1916, C. Wente of Bell Labs developed the next breakthrough with the first condenser microphone.
In 1923 the first practical moving coil microphone was built. "The Marconi Skykes" or "magnetophon", developed by Captain H. J. Round, was the standard for BBC studios in London. This was improved in 1930 by Blumlein and Holman who released the HB1A and was the best standard of the day.
In the same year, the ribbon microphone was introduced, another electromagnetic type, believed to have been developed by Harry F. Olson, who essentially reverse-engineered a ribbon speaker. Over the years these microphones were developed by several companies, most notably RCA that made large advancements in pattern control, to give the microphone directionality. With television and film technology booming there was demand for high fidelity microphones and greater directionality. Electro-Voice responded with their Academy Award-winning shotgun microphone in 1963.
During the second half of 20th century development advanced quickly with the Shure Brothers bringing out the SM58 and SM57. Digital was pioneered by Milab in 1999 with the DM-1001. The latest research developments include the use of fibre optics, lasers and interferometers.

Components

The sensitive transducer element of a microphone is called its *element* or *capsule.* A complete microphone also includes a housing, some means of bringing the signal from the element to other equipment, and often an electronic circuit to adapt the output of the capsule to the equipment being driven. A wireless microphone contains a radio transmitter.

Varieties

Microphones are referred to by their transducer principle, such as condenser, dynamic, etc., and by their directional characteristics. Sometimes other characteristics such as diaphragm size, intended use or orientation of the principal sound input to the principal axis (end- or side-address) of the microphone are used to describe the microphone.

Condenser microphone

Inside the Oktava 319 condenser microphone

The **condenser microphone**, invented at Bell Labs in 1916 by E. C. Wente is also called a **capacitor microphone** or **electrostatic microphone**—capacitors were historically called condensers. Here, the diaphragm acts as one plate of a capacitor, and the vibrations produce changes in the distance between the plates. There are two types, depending on the method of extracting the audio signal from the transducer: DC-biased microphones, and radio frequency (RF) or high frequency (HF) condenser microphones. With a **DC-biased microphone**, the plates are biased with a fixed charge (*Q*). The voltage maintained across the capacitor plates changes with the vibrations in the air, according to the capacitance equation ($C = \frac{Q}{V}$), where Q = charge in coulombs, C = capacitance in farads and V = potential difference in volts. The capacitance of the plates is inversely proportional to the distance between them for a parallel-plate capacitor. (See capacitance for details.) The assembly of fixed and movable plates is called an "element" or "capsule".
A nearly constant charge is maintained on the capacitor. As the capacitance changes, the charge across the capacitor does change very slightly, but at audible frequencies it is sensibly constant. The capacitance of the capsule (around 5 to 100 pF) and the value of the bias resistor (100 MΩ to tens of GΩ) form a filter that is high-pass for the audio signal, and low-pass for the bias voltage. Note that the time constant of an RC circuit equals the product of the resistance and capacitance.
Within the time-frame of the capacitance change (as much as 50 ms at 20 Hz audio signal), the

charge is practically constant and the voltage across the capacitor changes instantaneously to reflect the change in capacitance. The voltage across the capacitor varies above and below the bias voltage. The voltage difference between the bias and the capacitor is seen across the series resistor. The voltage across the resistor is amplified for performance or recording. In most cases, the electronics in the microphone itself contribute no voltage gain as the voltage differential is quite significant, up to several volts for high sound levels. Since this is a very high impedance circuit, current gain only is usually needed, with the voltage remaining constant.

RF condenser microphones use a comparatively low RF voltage, generated by a low-noise oscillator. The signal from the oscillator may either be amplitude modulated by the capacitance changes produced by the sound waves moving the capsule diaphragm, or the capsule may be part of a resonant circuit that modulates the frequency of the oscillator signal. Demodulation yields a low-noise audio frequency signal with a very low source impedance. The absence of a high bias voltage permits the use of a diaphragm with looser tension, which may be used to achieve wider frequency response due to higher compliance. The RF biasing process results in a lower electrical impedance capsule, a useful by-product of which is that RF condenser microphones can be operated in damp weather conditions that could create problems in DC-biased microphones with contaminated insulating surfaces. The Sennheiser "MKH" series of microphones use the RF biasing technique.

AKG C451B small-diaphragm condenser microphone

Condenser microphones span the range from telephone transmitters through inexpensive karaoke microphones to high-fidelity recording microphones. They generally produce a high-quality audio signal and are now the popular choice in laboratory and recording studio applications. The inherent suitability of this technology is due to the very small mass that must be moved by the incident sound wave, unlike other microphone types that require the sound wave to do more work. They require a power source, provided either via microphone inputs on equipment as phantom power or from a small battery. Power is necessary for establishing the capacitor plate voltage, and is also needed to power the microphone electronics (impedance conversion in the case of electret and DC-polarized microphones, demodulation or detection in the case of RF/HF microphones). Condenser microphones are also available with two diaphragms that can be electrically connected to provide a range of polar patterns (see below), such as cardioid, omnidirectional, and figure-eight. It is also possible to vary the pattern continuously with some microphones, for example the Røde NT2000 or CAD M179.

Electret condenser microphone

First patent on foil electret microphone by G. M. Sessler et al. (pages 1 to 3)
An electret microphone is a type of capacitor microphone invented by Gerhard Sessler and Jim West at Bell laboratories in 1962.[14] The externally applied charge described above under condenser microphones is replaced by a permanent charge in an electret material. An electret is a ferroelectric material that has been permanently electrically charged or *polarized*. The name comes from *electr*ostatic and magn*et*; a static charge is embedded in an electret by alignment of the static charges in the material, much the way a magnet is made by aligning the magnetic domains in a piece of iron.
Due to their good performance and ease of manufacture, hence low cost, the vast majority of microphones made today are electret microphones; a semiconductor manufacturer[15] estimates annual production at over one billion units. Nearly all cell-phone, computer, PDA and headset microphones are electret types. They are used in many applications, from high-quality recording and lavalier use to built-in microphones in small sound recording devices and telephones. Though electret microphones were once considered low quality, the best ones can now rival traditional condenser microphones in every respect and can even offer the long-term stability and ultra-flat response needed for a measurement microphone. Unlike other capacitor microphones, they require no polarizing voltage, but often contain an integrated preamplifier that does require power (often incorrectly called polarizing power or bias). This preamplifier is frequently phantom powered in sound reinforcement and studio applications. Monophonic microphones designed for personal computer (PC) use, sometimes called multimedia microphones, use a 3.5 mm plug as usually used, without power, for stereo; the ring, instead of carrying the signal for a second channel, carries power via a resistor from (normally) a 5 V supply in the computer. Stereophonic microphones use the same connector; there is no obvious way to determine which standard is used by equipment and microphones.
Only the best electret microphones rival good DC-polarized units in terms of noise level and quality; electret microphones lend themselves to inexpensive mass-production, while inherently expensive non-electret condenser microphones are made to higher quality.

Dynamic microphone

Patti Smith singing into a Shure SM58 (dynamic cardioid type) microphone

Dynamic microphones work via electromagnetic induction. They are robust, relatively inexpensive and resistant to moisture. This, coupled with their potentially high gain before feedback, makes them ideal for on-stage use.
Moving-coil microphones use the same dynamic principle as in a loudspeaker, only reversed. A small movable induction coil, positioned in the magnetic field of a permanent magnet, is attached to the diaphragm. When sound enters through the windscreen of the microphone, the sound wave moves the diaphragm. When the diaphragm vibrates, the coil moves in the magnetic field, producing a varying current in the coil through electromagnetic induction. A single dynamic membrane does not respond linearly to all audio frequencies. Some microphones for this reason utilize multiple mem-

branes for the different parts of the audio spectrum and then combine the resulting signals. Combining the multiple signals correctly is difficult and designs that do this are rare and tend to be expensive. There are on the other hand several designs that are more specifically aimed towards isolated parts of the audio spectrum. The AKG D 112, for example, is designed for bass response rather than treble.[16] In audio engineering several kinds of microphones are often used at the same time to get the best result.

Ribbon microphone

Edmund Lowe using a ribbon microphone

Ribbon microphones use a thin, usually corrugated metal ribbon suspended in a magnetic field. The ribbon is electrically connected to the microphone's output, and its vibration within the magnetic field generates the electrical signal. Ribbon microphones are similar to moving coil microphones in the sense that both produce sound by means of magnetic induction. Basic ribbon microphones detect sound in a bi-directional (also called figure-eight, as in the diagram below) pattern because the ribbon, which is open to sound both front and back, responds to the pressure gradient rather than the sound pressure. Though the symmetrical front and rear pickup can be a nuisance in normal stereo recording, the high side rejection can be used to advantage by positioning a ribbon microphone horizontally, for example above cymbals, so that the rear lobe picks up only sound from the cymbals. Crossed figure 8, or Blumlein pair, stereo recording is gaining in popularity, and the figure 8 response of a ribbon microphone is ideal for that application.

Other directional patterns are produced by enclosing one side of the ribbon in an acoustic trap or baffle, allowing sound to reach only one side. The classic RCA Type 77-DX microphone has several externally adjustable positions of the internal baffle, allowing the selection of several response patterns ranging from "Figure-8" to "Unidirectional". Such older ribbon microphones, some of which still provide high quality sound reproduction, were once valued for this reason, but a good low-frequency response could only be obtained when the ribbon was suspended very loosely, which made them relatively fragile. Modern ribbon materials, including new nanomaterials[17] have now been introduced that eliminate those concerns, and even improve the effective dynamic range of ribbon microphones at low frequencies. Protective wind screens can reduce the danger of damaging a vintage ribbon, and also reduce plosive artifacts in the recording. Properly designed wind screens produce negligible treble attenuation. In common with other classes of dynamic microphone, ribbon microphones don't require phantom power; in fact, this voltage can damage some older ribbon microphones. Some new modern ribbon microphone designs incorporate a preamplifier and, therefore, do require phantom power, and circuits of modern passive ribbon microphones, *i.e.*, those without the aforementioned preamplifier, are specifically designed to resist damage to the ribbon and transformer by phantom power. Also there are new ribbon materials available that are immune to wind blasts and phantom power.

Carbon microphone

A carbon microphone, also known as a carbon button microphone (or sometimes just a button microphone), use a capsule or button containing carbon granules pressed between two metal plates like the Berliner and Edison microphones. A voltage is applied across the metal plates, causing a small current to flow through the carbon. One of the plates, the diaphragm, vibrates in sympathy with incident sound waves, applying a varying pressure to the carbon. The changing pressure deforms the granules, causing the contact area between each pair of adjacent granules to change, and this causes the electrical resistance of the mass of granules to change. The changes in resistance cause a corresponding change in the current flowing through the microphone, producing the electrical signal. Carbon microphones were once commonly used in telephones; they have extremely low-quality sound reproduction and a very limited frequency response range, but are very robust devices. The Boudet microphone, which used relatively large carbon balls, was similar to the granule carbon button microphones.

Unlike other microphone types, the carbon microphone can also be used as a type of amplifier, using a small amount of sound energy to control a larger amount of electrical energy. Carbon microphones found use as early telephone repeaters, making long distance phone calls possible in the era before vacuum tubes. These repeaters worked by mechanically coupling a magnetic telephone receiver to a carbon microphone: the faint signal from the receiver was transferred to the microphone, with a resulting stronger electrical signal to send down the line. One illustration of this amplifier effect was the oscillation caused by feedback, resulting in an audible squeal from the old "candlestick" telephone if its earphone was placed near the carbon microphone.

Piezoelectric microphone

A **crystal microphone** or **piezo microphone** uses the phenomenon of piezoelectricity—the ability of some materials to produce a voltage when subjected to pressure—to convert vibrations into an electrical signal. An example of this is potassium sodium tartrate, which is a piezoelectric crystal that works as a transducer, both as a microphone and as a slimline loudspeaker component. Crystal microphones were once commonly supplied with vacuum tube (valve) equipment, such as domestic tape recorders. Their high output impedance matched the high input impedance (typically about 10 megohms) of the vacuum tube input stage well. They were difficult to match to early transistor equipment, and were quickly supplanted by dynamic microphones for a time, and later small electret condenser devices. The high impedance of the crystal microphone made it very susceptible to handling noise, both from the microphone itself and from the connecting cable.
Piezoelectric transducers are often used as contact microphones to amplify sound from acoustic musical instruments, to sense drum hits, for triggering electronic samples, and to record sound in challenging environments, such as underwater under high pressure. Saddle-mounted pickups on acoustic guitars are generally piezoelectric devices that contact the strings passing over

the saddle. This type of microphone is different from magnetic coil pickups commonly visible on typical electric guitars, which use magnetic induction, rather than mechanical coupling, to pick up vibration.

Fiber optic microphone

A fiber optic microphone converts acoustic waves into electrical signals by sensing changes in light intensity, instead of sensing changes in capacitance or magnetic fields as with conventional microphones.

During operation, light from a laser source travels through an optical fiber to illuminate the surface of a reflective diaphragm. Sound vibrations of the diaphragm modulate the intensity of light reflecting off the diaphragm in a specific direction. The modulated light is then transmitted over a second optical fiber to a photo detector, which transforms the intensity-modulated light into analog or digital audio for transmission or recording. Fiber optic microphones possess high dynamic and frequency range, similar to the best high fidelity conventional microphones.

Fiber optic microphones do not react to or influence any electrical, magnetic, electrostatic or radioactive fields (this is called EMI/RFI immunity). The fiber optic microphone design is therefore ideal for use in areas where conventional microphones are ineffective or dangerous, such as inside industrial turbines or in magnetic resonance imaging (MRI) equipment environments.

Fiber optic microphones are robust, resistant to environmental changes in heat and moisture, and can be produced for any directionality or impedance matching. The distance between the microphone's light source and its photo detector may be up to several kilometers without need for any preamplifier or other electrical device, making fiber optic microphones suitable for industrial and surveillance acoustic monitoring.

Fiber optic microphones are used in very specific application areas such as for infrasound monitoring and noise-canceling. They have proven especially useful in medical applications, such as allowing radiologists, staff and patients within the powerful and noisy magnetic field to converse normally, inside the MRI suites as well as in remote control rooms.[21]) Other uses include industrial equipment monitoring and sensing, audio calibration and measurement, high-fidelity recording and law enforcement.

Laser microphone

Laser microphones are often portrayed in movies as spy gadgets, because they can be used to pick up sound at a distance from the microphone equipment. A laser beam is aimed at the surface of a window or other plane surface that is affected by sound. The vibrations of this surface change the angle at which the beam is reflected, and the motion of the laser spot from the returning beam is detected and converted to an audio signal.

In a more robust and expensive implementation, the returned light is split and fed to an interferometer, which detects movement of the surface by changes in the optical path length of the reflected beam. The former implementation is a tabletop experiment; the latter requires an extremely stable laser and precise optics.

A new type of laser microphone is a device that uses a laser beam and smoke or vapor to detect sound vibrations in free air. On 25 August 2009, U.S. patent 7,580,533 issued for a Particulate Flow Detection Microphone based on a laser-photocell pair with a moving stream of smoke or vapor in the laser beam's path. Sound pressure waves cause disturbances in the smoke that in turn cause variations in the amount of laser light reaching the photo detector. A prototype of the device was demonstrated at the 127th Audio Engineering Society convention in New York City from 9 through 12 October 2009.

Liquid microphone

Early microphones did not produce intelligible speech, until Alexander Graham Bell made improvements including a variable-resistance microphone/transmitter. Bell's liquid transmitter consisted of a metal cup filled with water with a small amount of sulfuric acid added. A sound wave caused the diaphragm to move, forcing a needle to move up and down in the water. The electrical resistance between the wire and the cup was then inversely proportional to the size of the water meniscus around the submerged needle. Elisha Gray filed a caveat for a version using a brass rod instead of the needle. Other minor variations and improvements were made to the liquid microphone by Majoranna, Chambers, Vanni, Sykes, and Elisha Gray, and one version was patented by Reginald Fessenden in 1903. These were the first working microphones, but they were not practical for commercial

(Continued at bottom of page 8)

application. The famous first phone conversation between Bell and Watson took place using a liquid microphone.

MEMS microphone

The MEMS (MicroElectrical-Mechanical System) microphone is also called a microphone chip or silicon microphone. The pressure-sensitive diaphragm is etched directly into a silicon chip by MEMS techniques, and is usually accompanied with integrated preamplifier. Most MEMS microphones are variants of the condenser microphone design. Often MEMS microphones have built in analog-to-digital converter (ADC) circuits on the same CMOS chip making the chip a digital microphone and so more readily integrated with modern digital products. Major manufacturers producing MEMS silicon microphones are Wolfson Microelectronics (WM7xxx), Analog Devices, Akustica (AKU200x), Infineon (SMM310 product), Knowles Electronics, Memstech (MSMx), NXP Semiconductors, Sonion MEMS, AAC Acoustic Technologies, and Omron.

(Continued in the Next Newsletter. From an article in Wikipedia)

President's Corner

LONGWAVES by Richard ZS6TF

Very few commercial radios sold into South Africa in the antique era were equipped with a longwave band whereas most European market radios could not be sold without it. What constitutes longwaves does not fit into a definition and its meaning varies across the world but it broadly comprises the broadcast stations falling into the frequency range 150 to 375kHz.

Within ITU region 1 there are stations broadcasting from locations in 25 countries from the far north-west of Europe in Iceland, down to North Africa in Morocco and Algeria. Eastwards the band is used as far away as Georgia, Jordan and Azerbaijan, using 17 different carrier frequencies of exact multiples of 9 kHz ranging from 153 to 279 kHz, except for two stations in Germany on 177kHz and 183kHz.

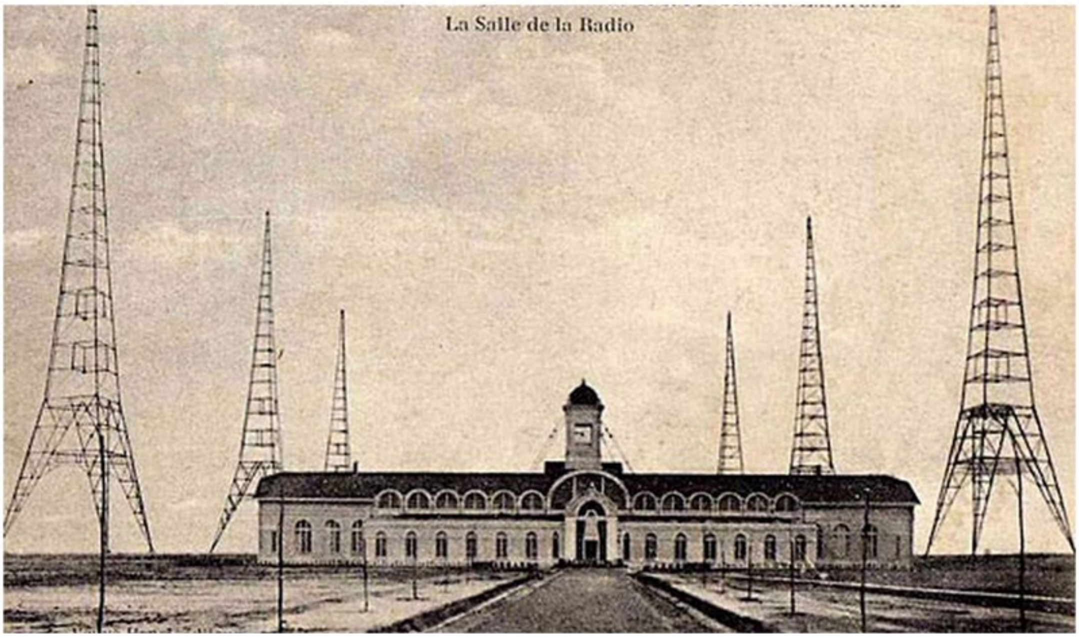
All of these stations need exceptionally tall masts and run very high power. The highest built was the 646.38 metres high Konstantynów tower near Warsaw designed to function as a half wavelength vertical on its operating frequency of 225 to 227kHz. Running two 1000kW transmitters, the base insulator was 2 metres high to withstand the 120kV mast potential to ground. Construction was started in July 1970, and what was then the tallest structure in the world was completed on 18th May 1974.The station entered regular service on 22nd July 1974 until the mast collapsed during guy rope replacement on 8th August 1991.

Of course the Russians had to have the most powerful transmitter in the world, Radio Rossii with 2500kW fed into an Omnidirectional circular antenna, with 1 central mast 275metres high and 5 ring masts, which commenced service in December 1990.

Probably the best known longwave station is Droitwich to which the BBC long wave service was transferred in 1934 from Daventry having originated at the Marconi Works at Chelmsford. The site has huge deposits of salt underground which helped provide an excellent earth enhancing the range of the ground wave signal.

With 500kW on 198kHz into a T-aerial on 2 guyed steel lattice masts insulated against ground with a height of 213 metres, the station radiates Radio 4 reliably as far as the Mediterranean covering all the UK including 90,000 homes in Britain where VHF FM does not penetrate, and reaching a million expatriate Britons in Europe. Best known for its arcane broadcast of the shipping forecast four times a day, the station also beams maximum demand switching signals to the electricity meters of the nation. The station, which probably survived budget cuts because of its operations being outsourced faces two future threats, namely the roll-out of Digital Audio Broadcasting (DAB) propelled by politicians and the water cooled valves used in pairs in the transmitter are so rare that there are fewer than 10 in the world, having a life of between 1 and 10 years.

The least known station is surely the La-Fayette station at La Croix d'Hins, 30 km west of Bordeaux France. It was commissioned as a joint USA-French military venture for trans-Atlantic telegraphy services in 1920 with 8 towers 250m high, second only to the Eiffel tower at the time. In the mid-1920s, the station housed additional transmitters to provide longwave services to Algeria, Morocco, Tunisia and Portugal. Around 1926, the station began broadcasting a daily digest of news and music as "Radio Bordeaux-Lafayette"



The Germans used it during the war for U-boat communication and propaganda until 1944, when it was largely destroyed by them retreating from the Allied forces in France. One final surviving pylon was demolished on November 21st 1953. Today, to the passer-by there is nothing to suggest that a station of this magnitude ever existed on this 4.8 sq km site except a small monument at the entrance to the staff quarters building which is now a horse riding stable, and one of the concrete tower bases (each tower had 4) is visible on Google earth due to the pattern of foliage growth around it.

Longwave transmitting stations are capital intensive, but receivers and aerials are cheap and simple and must be “lowest cost per listener”. I can receive radio 4 reliably in SW France at a range of 800km from Droitwich on a1960’s battery powered Philips portable with a ferrite rod antenna.

The geographic centre of South Africa is 2 km east of Douglas in the Northern Cape at an altitude of 1037 metres. The nearby Vaal river could provide good earthing conditions and it is only 992 km to the furthest point on the northern border. Imagine a single transmitter covering the whole country bringing radio to the people and enabling Eskom to control non-essential load at source instead of rolling blackouts.

I am puzzled as to why this part of our radio heritage has passed South Africa and the southern hemisphere by.

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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.

Notices:

AWA Nets and times:

Saturday Morning AM Net—06:00 3615
Saturday Morning SSB Net—08:30 7070 (7140 from 03 Aug)
Saturday Afternoon CW Net—14:00 7020
Wednesday Evening AM Net—19:00 3615

You don't have to be running valve sets to join us.

AWA 10th Birthday.

For those of you who have been with us from the beginning, you may just remember that it was in March 2003 that the first meeting on air of the AWA of Southern Africa was took place.

Now it is 10 years later and we are celebrating 10 years of being on the air and many various activities that take place on air. In celebration of this, we have designed a special QSL card.

In order for you to get this celebratory QSL card, you need to contact ZS0AWA during one of the QSO parties, or activity days that take place during the year. That would be the CW activity day on the 3rd and 4th of February. The AWA QSO party on AM and SSB on the 11th and 12th May and the QSO party on the 12th and 13th October. Should you have a QSO with ZS0AWA on any of these dates, send us a QSL with a SASE and we will send you the QSL Card.

ON THE BACK PAGE IS AN INVENTORY OF ITEMS THAT HAVE BEEN DONATED TO THE AWA.
SHOULD YOU BE INTERESTED IN ANY OF THESE ITEMS, PLEASE SEND AN EMAIL OR SMS TO ANDY ZS6ADY STATING YOUR BID FOR THE ITEM.

ITEMS WILL BE DISPOSED OF TO THE HIGHEST BID FOR EACH LISTED.

THESE ARE AT PRESENT IN DURBAN WITH DON ZS5DR AND ANY ITEMS TO BE TRANSPORTED WILL BE FOR THE PURCHASERS COST/RESPONSIBILITY.

IT IS NOT KNOWN WHAT THE OPERATIONAL ABILITY OF ANY OF THESE ITEMS IS. PHOTOS ARE AVAILABLE.

AN INVENTORY OF HAM RADIO EQUIPMENT FOR DISPOSAL

Receivers:

1. Hammerlund HQ 129-X
2. Hammerlund HQ 170 (with speaker (model with clock))
3. Halicrafters SX-28
4. National NC45/50
5.National HRO-5T and power supply (220 vac) with coil packs (9) in their original WOODEN boxes
6. Trio Model 9R-59
7. Trio Model 9R-59 DS
8. Eddystone 770R
9. Hammerlund HQ-180
10. Hammerlund SQ 129-X

Transmitters HF
1. Geloso G222-TR
2. Cat Craft HF CW transmitter (what this ?)

Transmitter/Receiver
1. Collins TCS 12 transmitter & receiver & tuning coil microphone, 12/24vdc – 225/440vds dynamotor and cables – (no manual)
2. Yaesu FR-100-B receiver – FL-100-B transmitter (matched pair)

Miscellaneous Equipment
1. Precision Signal Generator - Series E-200-C
2. Jrio Signal Generator – Model SG-2
3. Hewlett Packard 606b Signal Generator
4. Griffin Signal Generator Model A
5.Akai reel-to-reel tape recorder Model 4000DS Mk II
6. Akai reel-to-reel tape recorder Model GX 4000D
7. Akai reel-to-reel tape recorder Model 3000D
8. Philips reel-to-reel tape recorder Model?? (valves) (two)(EL354)
9. Echostar Legende Satellite decoder analog
10. Phillips Valve model reel to reel recorders (x2)

Test Equipment:
1 RCA Vacuum Tube Voltmeter
2 Tech Vacuum Voltmeter Model PV-58
3 Lewtronic V.T.V.M. Vacuum Voltmeter
4 Baldwin SR-4 Strain Indicator Type Mb (instructions inside lid)
5 Philips GM 5655/02 oscilloscope
6 Simpson Mirrorscope Model 476
7 Wireless World solid state multimeter model 7/70 PL.J 3/73 (no manual)
8 Tech Valve Tube Voltmeter Model TE-65 (with original probe)
9 Barker & Williamson Model 600 dip meter

Homebrew test equipment:
1 GDO Calibrator
2 Speech Processor
3 Quick, Henri Inductance Checker
4 Microvolter ?
5 Nicad Charger 40 mA
6 Semi – Sweeper ?
7 Impedance Bridge
8 4-Channel Mixer
9 On-Charge Cell Tester