Antique Wireless Association of Southern Africa Newsletter

224 March 2025

Collins KW-1

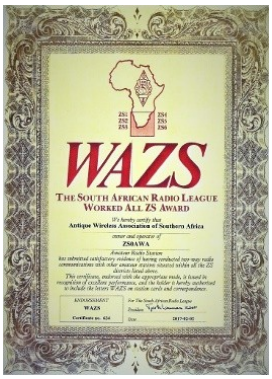
The Collins KW-1 amateur transmitter is a vfo-controlled, bandswitching, gang-tuned, high-power am and cw transmitter. Provision is made for external frequency - shift keying. Power amplifier input is 1000 watts on the 80, 40, 20, 15, 11 and 10 meter bands, and 500 watts on the 160 meter band. Other features include TVI reduction, cw muting for a 75A receiver, a cw sidetone oscillator, a blower, door interlock switches, fuses and an overload relay.

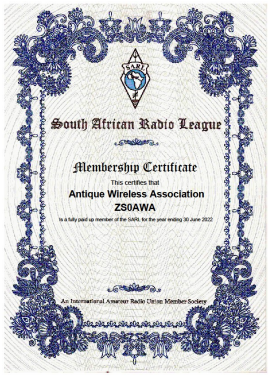
Exciter tuning is ganged to one control. With the exception of the power amplifier output circuit, the entire rf section is tuned by the frequency selector control. The accurately calibrated exciter tuning dial indicates the exact frequency in kilocycles for each of seven amateur bands. Only the scale for the band in use is visible.

A stable, hermetically - sealed oscillator is followed by buffer and multiplier stages; the oscillator and multiplier stages are permeability tuned by powdered - iron cores. The rf driver stage is tuned by a variable air capacitor. The final amplifier plate-tank circuit is tuned by a variable vacuum - capacitor. The pi-L output circuit is designed to work into an unbalanced resistive load of 52 ohms with maximum standing wave ratio of 2.5 to 1.

Either crystal or high impedance dynamic microphones may be used. A 600-ohm phone patch is incorporated in the speech amplifier. Increased sideband power without over-modulation is made possible by a speech clipper followed by low-level low-pass and high-level low pass filters. The push-pull 810 modulator tubes fully modulate the 1000-watt input to the power amplifier.

The KW-1 transmitter is self-contained in a heavy gauge cabinet 28 inches wide, 18 inches deep and 66-1/2 inches high. All that is needed to place the transmitter in operation is a 52-ohm antenna system, a power source, and a microphone or a telegraph key.





Inside this issue:

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Chris's Musings

A recent Saturday morning AWA net had an enthusiastic discussion on antenna measurement equipment.

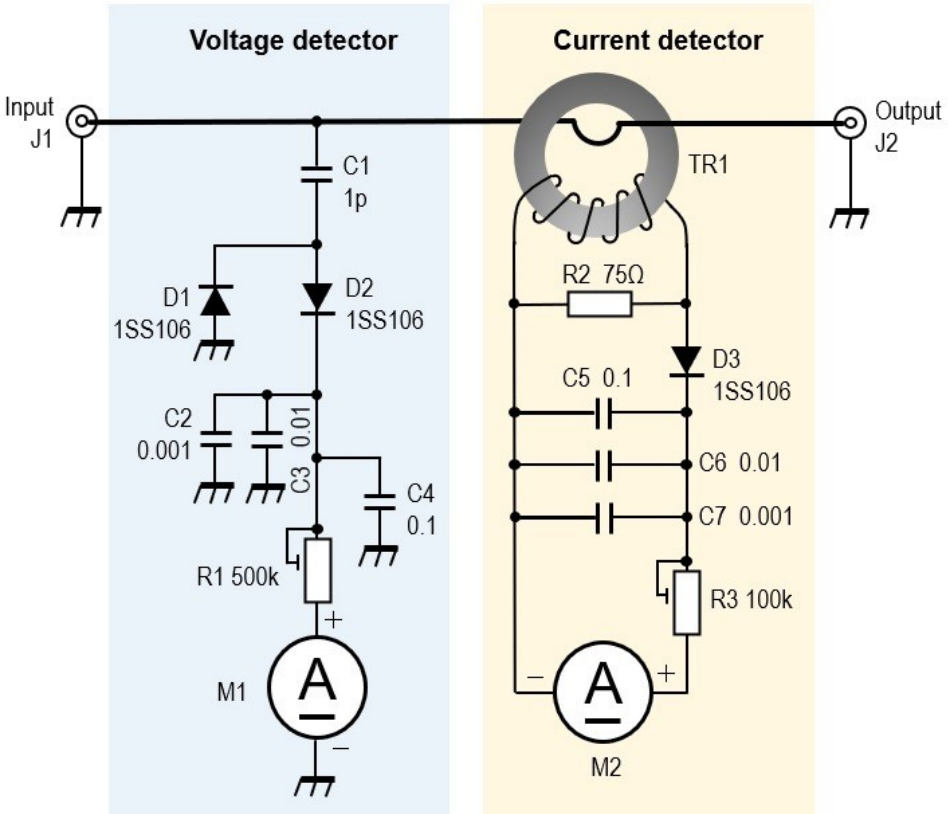
Among other things, RF Ammeters, dip meters, directional power meters and vector network analysers. You can see that the instruments ranged from the very early days of wireless to the modern day.

Before the advent of SWR metres the only way to measure the amount of power one was transmitting, was to measure the current delivered to the antenna or by the 'input power' of the transmitter final when properly loaded. While these principles may seem 'old hat' they are in fact the same basic underlying principles of even the most modern methods.

So, those who think that we can just ignore the past, you are missing out on a whole world of interesting science. You may not be able to lay your hands on a thermocouple RF ammeter, but there are plenty of articles on how to build an RF ammeter using modern current probes and the latest circuitry, including Arduino or other micro controllers.

How about trying your hand at building a modern RF ammeter and use it to experiment with antennas. After all, antennas are one aspect of amateur radio that is as old as wireless itself and yet offers, even the inexperienced among us, the joy of experimenting.

73 de: Chris Turner, ZS6GM



Reflections:

Isn't it amazing how tiny gremlins sneak in to equipment in the shack whenever you do something or move something around.

My radio's have all been working fine up until I decided to re-route some coax in the shack. This meant I had to move my mixer in order to get to where I wanted to be. In itself, this was no big deal and the work was carried out without any problems.

Then I was bragging to the guys on 2m simplex how I had raised the J pole to the top of my tower and now I had such good reception from all directions.

Then it happened. Rad sent me a text message saying "I hate to burst your bubble, but you have a nasty hum on your signal".

I couldn't believe it. My signal has always been good without any problems. Then someone else confirmed it.

This of course was a bit disconcerting, and I started to imagine all kinds of reasons for it. Power supply, mains hum, something going wrong in the Tx section of the rig.

Then next thing, I had no audio on the radio. It would Tx, I could see that on the power meter, and it was receiving, I could see that on the S meter. But there was no audio. Was this the nasty gremlin that was causing the hum that had now raised it's nasty head ?

Then I was working on HF, and one of the stations on the net said I had a nasty hum on my signal. What were the chances ?

That was when I knew it must be coming from the mixer, because it was common to both radio's.

Through the process of elimination, I found that the hum was coming from one of the channels on the mixer and further investigation led me to find one little strand of unsoldered wire on a connection had come out and was making contact with the second wire of the input from the mic. That wire had been waiting at least 5 years to show itself and when I moved the mixer to re-route the cables, it did just that.

Oh, and the deaf VHF rig, well that was repaired by a good friend who found a burnt resistor on the supply voltage to the audio amp. Once replaced, the audio is as good as ever..

But how do these things all fall in to place ? As I said, probably 5 years ago, maybe more, when I soldered those wires in to place, and I know my soldering is not great, there was that ne little strand of wire, that did not get any solder on to hold it in place. And now after all that time, it suddenly takes some movement to get it to pop out of the hole on the board, and touch the wire next to it.

It's as though these things were destined to happen ?

Now I am not a superstitious person at all and don't believe much in "chance", but what are the odds that this problem was put in place all those years ago.

I have done some pretty dumb things in my time when it comes to fixing radio's, and those of my friends who have sorted out my mess can bear witness to that, but this was something completely out of it.

Anyway, I now have a nice clean signal on both VHF and HF, and a non deaf VHF rig and all is well again in my world of radio.

It's taken just over six months to get my station back up and running to where it was before I left for the NC, but at least it is back and up to speed. Hopefully, this will be the last move and rebuild of my station, I don't think I would be able to handle another one.

I now understand why it is that so many people give up radio when moving to retirement villages. I think that the prospect of trying to get it all sorted out again just becomes too much.

To those who have managed it, with a bit of help from their friends, I admire your tenacity. But then I suppose once ham radio is in the blood, not much can get it out.

I have often thought of how nice it would be to have a few remote stations scattered around, where the retirees could log in a nd still work the odd bit of Dx or listen in to nets, but that too is a bit beyond us.

I consider myself one of the grateful few who is still able to work from my own station and enjoy the niceties of Amateur Radio from the confines of my own shack.

Best 73

Andy ZS6ADY

Speaker and Fabric Restoration

Loudspeaker

If the cone of the loudspeaker itself is damaged or coming away from the frame, it can be repaired with a contact adhesive such as Thixofix or EvoStick. These adhesives dry to a flexible rubbery consistency. Both products are messy and give off fumes, so take appropriate precautions. If it is badly damaged you will probably need a replacement.

If the cone is distorted, so that the speech coil is scraping against the magnet, you may be able to cobble a "repair" by lodging a wad of tissue between the cone and the frame at a suitable point. This is hardly an ideal solution but it may be the best option if a suitable replacement speaker is not available, or as a temporary measure while you are waiting for a replacement to arrive.

I have also heard that spraying a small amount of aerosol lacquer onto the cone has the effect of tightening it, so by selective spraying it is possible correct a distorted cone in this manner. I have not tried this yet, but will do when the opportunity arises.

Leon Crampin offers the following useful suggestion:

> *Post 1945 Celestian loudspeakers nearly always have a broken glued joint on the cone suspension just next to the moving coil. Repair this with sparingly applied PVA glue, but use a DC power supply to move the cone out about 3 mm to apply the glue, then reverse the connections to preload the joint whilst the glue sets. Check the centering before you leave it to harden.*

Speaker Fabric

It is impossible to clean dirty speaker fabric. If it becomes damp the adhesive fixing it to the baffle board softens and the fabric shrinks. I have tried several methods of cleaning it, including car upholstery cleaning products, with no success. If anyone knows a good method of cleaning the speaker fabric, please let me know and I will share it with other visitors!

Normally all you can do is brush it carefully with a soft paintbrush to remove the worst of the dust. Sometimes the shape of the speaker can be seen in the fabric as a dirty shadow, which cannot be removed.

You are very unlikely to be able to obtain an exact replacement fabric since it is no longer manufactured. S.W.Chaplin carries stocks of more modern fabrics and some reproductions, that will act as reasonable replacements in some cases.

The new fabric can be fixed in place with a spray carpet adhesive such as Gripperrods Spray Adhesive. Spray a thin layer on the baffle board only and stretch the fabric across it. Without specialist equipment, you will be unable to stretch it as tight as the original. Place a piece of wood over the top and hold the lot together for a couple of hours, with clamps, bricks or heavy transformers.

A recent visitor, Manfred Mornhinweg, wrote the following in response to my comments:-

> *You seem to have more trouble than necessary with speaker grille cloth. I usually wash it in almost cold water, using fairly strong detergent. It is really the only way to get it back to look good. And it is impressive HOW good it looks after the washing!*
>
> *It is true that it can shrink. But you can reduce the shrinking to a minimum by using cold water, and by stretching the cloth slightly while wet, and drying it slowly in that stretched position.*

Even if it ends up somewhat smaller, it usually is still big enough to cover all cut-outs of the cabinet. If there is too little margin left, I fix it to a thin backing cloth, cut to the correct side.

This allows me to restore my radios much better than by leaving the dirty cloth there, or by replacing the cloth.

I have not tried Manfred's suggestion yet, but will do when I next encounter this problem. There is nothing to lose, if one was planning to fit a replacement cloth anyway. Another visitor, Gary Tempest, has tried it, and confirms that it works fine:-

I tried that method (posted on your site) of cleaning speaker cloth - i.e.: liquid detergent and almost cold water. It worked just great.

I did not even take the material off the backing plywood board. First a good vacuum. Then, after testing an out of sight corner first, I used the detergent and water sparingly. The adhesive did soften above and below the speaker cut-out. However, I placed a strip of clean material over these followed by two pieces G-clamped wood. After tightening the clamps slightly, I pushed them outwards to stretch the cloth back into position. Finally, I tighten up the clamps and left it to dry. The adhesive has fixed the cloth again, which is clean and tight, with no obvious 'speaker hole'. Thanks.

An alternative suggestion from Chris Roberts:

After reading your tips on cleaning speaker cloth, I tried neat Ammonia (hold you nose!) applied using an old toothbrush, with the grill inverted so that the liquid did not run into the speaker itself. This cleaning method also worked well on Bakelite knobs etc.

This worked very well, and did not leave any residue. My set was Bakelite, I have not checked for the effect of the Ammonia on wooden sets though.

I would recommend removing the speaker and cloth from the cabinet before attempting this. Otherwise, the risk of the ammonia getting where it should not and causing some damage is too great for my liking! Also good ventilation is essential.

Yet another suggestion, this one is from Ranulph Poole:

I don't mind slightly battered wood, but one thing that does look bad is the circle of dirt you get on the loudspeaker cloth. For some reason, the loudspeaker aperture seems to attract dust. The cloth is often of a plastic material (Tygan?) and responds well to being cleaned with washing-up liquid. Obviously, the baffle needs to be taken out from the cabinet and the speaker removed, but the cloth can be left on the baffle.

Finally (for now) John Perata said:

Use Woolite or similar cold water wool product for cleaning grill cloths. Drying rapidly with forced hot air will retain or re-establish original tension.

(Reproduced from the UK Vintage Radio Repair and Restoration Web site)

When Good SWR Goes Bad

Steve Ford, WB8IMY

Hams seem to be obsessed with *standing wave ratio*, or *SWR*. Listening to some amateurs, you may gather the impression that the SWR at your station must be a flat 1:1, or "one to one." Even a smidge more is cause for deep concern. And don't even speak of SWRs above 2:1.

But let's take a deep breath. Is SWR evil, regardless of the value? Are there truly "good" or "bad" SWRs? The honest answer is, "it depends."

Before we can confront evil, we must first understand it. Look at Figure 1 and imagine a bucket filled with water. In the center of the bucket, there's a tiny motor that vibrates at a fixed rate. Let's say it oscillates back and forth at a rate of 60 times per second.

When you switch the motor on, you will see little waves moving away from the center. As the waves reach the sides of the bucket they bounce back toward the center. Of course, the motor is still vibrating, creating new waves all the time, and these will collide with the waves returning from sides of the bucket.

As the waves merge, they add or subtract from each other, and something strange occurs. The waves are still flowing back and forth within the bucket, but now it suddenly looks as though they are frozen in place. We call these *standing waves*. What appears "frozen" is the amplitude variation due to constructive and destructive interference between the two waves.

Replace the motor with a transceiver and imagine the sides of the bucket have transformed into an antenna system (see Figure 2). The transceiver generates radio frequency (RF) energy, which moves in *forward waves* along the feed line (such as a coaxial cable) until they reach the antenna. Some of the energy is radiated away, but a portion of it is reflected down the feed line like the waves of water bouncing off the sides of the bucket. These *reflected waves* mix with the forward waves and, once again, the result is standing waves in the feed line.

There are devices that can measure the ratio of the maximum amplitude of a standing wave to its minimum amplitude. That's the *standing wave ratio* and it indicates whether there is an impedance mismatch between the transceiver and the antenna system. The higher the ratio, the greater the mismatch. Some of these measurement devices are built into transceivers or antenna tuners, while others are separate meters.

So now that you know what SWR is, there remains an unanswered question: What does it mean for you?

Neither Good Nor Evil

First the good news: There is no such thing as an inherently good or bad SWR. An SWR can only be considered good or bad according to how it affects your station.

An amateur's obsession with SWR rests on a foundation of truth. A high SWR (above 2:1 or 3:1) can cause large voltages to develop in the output circuitries of transceivers, amplifiers, or antenna tuners, especially when you are operating at power levels of 100 W and up. These voltages can harm your equipment.

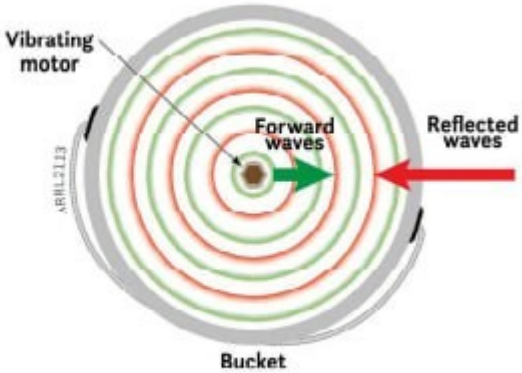


Figure 1: Imagine staring into a bucket filled with water. In the center of the bucket, we've placed a tiny motor that vibrates at a fixed rate. When you switch the motor on, you will see little waves moving away from the center. As the waves reach the sides of the bucket they bounce back toward the center. Of course, the motor is still vibrating, creating new waves all the time, and these will collide with the waves returning from sides of the bucket. As the waves merge, they add or subtract from each other and create *standing waves*.

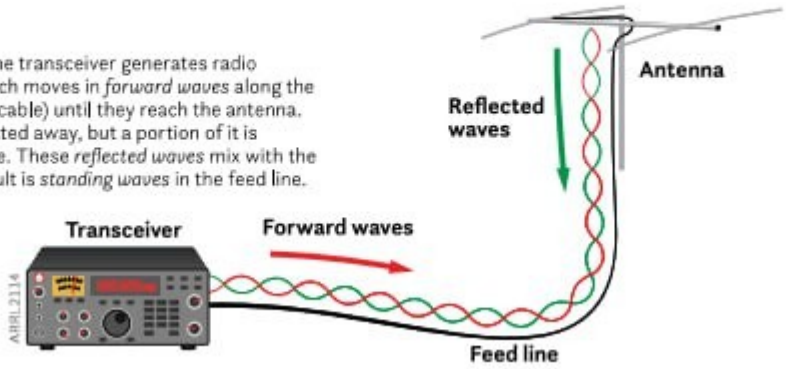


Figure 2: In this example, the transceiver generates radio frequency (RF) energy, which moves in *forward waves* along the feed line (such as a coaxial cable) until they reach the antenna. Some of the energy is radiated away, but a portion of it is reflected down the feed line. These *reflected waves* mix with the forward waves and the result is *standing waves* in the feed line.

Modern transceivers often include special circuits that detect high SWRs and automatically reduce the output power to safe levels. These circuits can be rather conservative, however, which means they will cause power reductions in the presence of even a mediocre SWR of about 1.5:1. The philosophy is that it is better to be safe than sorry, but it can drive some amateurs to worry about SWR excessively.

Another way in which an elevated SWR can become problematic is *feed line loss*. Higher SWRs cause more energy to dissipate in the form of heat between the radio and the antenna. This effect becomes especially pronounced at higher frequencies such as VHF and UHF.

However, SWR losses can be mitigated by using high-quality, low-loss cables, and by keeping the cables as short as reasonably possible. At HF frequencies, you'll often find hams using a type of feed line known as *windowed ladder line* because its losses can be exceedingly low, regardless of the SWR. In fact, once upon a time amateurs used this type of feed line exclusively and, as a result, they didn't worry very much about SWR at all.

SWR: Bottom-Line Bullet Points

✱ It is always a good idea to be aware of your SWR. If your HF transceiver lacks an SWR meter, invest in an external meter. You'll find SWR meters in antenna tuners as well.

Many VHF/UHF radios include SWR metering. Those that don't will still offer some sort of power output indicator. If you notice that the radio has reduced its output, that's a sure sign that the SWR on the feed line has become unacceptably high.

✱ If you are operating at HF frequencies and using low-loss coaxial cable or windowed line, and if you are using an antenna tuner to match the output of your transceiver to your antenna system, the only SWR that should concern you is the one between the antenna tuner and your radio. (If the tuner includes an SWR meter, that is exactly what it is showing you.) The SWR needs to be low enough to avoid triggering the transceiver's protection functions. Anything below about 1.5:1 will do. Some transceivers are even more generous and won't begin penalizing you until the SWR exceeds 2:1.

✱ If you are operating at HF frequencies and you don't have an antenna tuner to match the transceiver to the antenna system, you'll still need to adjust the antenna until the SWR is 1.5:1 or less. Don't obsess over this value, though. If your transceiver generates the output you desire at an SWR of 1.5:1 or even 2:1, don't waste time trying to reduce the SWR to a flat 1:1.

✱ At VHF or UHF frequencies, you're not likely to have an antenna tuner in the line between the antenna system and your transceiver. Once again, you will need to adjust your antenna to get the SWR at the radio down to 1.5:1 or less to keep your radio at full output and to minimize SWR loss in your feed line.

✱ Speaking of feed lines, purchase the lowest-loss cables you can afford. (Cable losses are rated in decibels per 100 feet at various frequencies — the lower these numbers, the better.) Your investment will pay dividends by keeping any SWR losses as low as possible, especially at VHF and UHF.

✱ Beware of bargain transceivers or amplifiers that lack SWR protection circuitry. For example, even a 60 W amplifier without SWR protection can suffer severe damage if the SWR rises above 1.5:1. You'll often see warnings about elevated SWR included with sales descriptions of imported amplifiers. To keep costs down, the manufacturers may not have added such protections, so *you're* responsible for keeping the SWR in check!

Above: A dedicated external SWR/power meter.
Right: Windowed ladder line has extremely low RF loss, even when the SWR is quite high. [DX Engineering photos]

-Input power: 1–5W
-Output power: 40–60W
-Working frequency: 3-21Mhz
-Working Voltage: 12V-13.8V

Package Included:
-1 x Main Unit
-1 x Power Cable

Note: Before use, you need to use a NanoVna or similar tools to measure the antenna to 50Ω. The standing wave should be less than 1.5, otherwise the power amplifier tube will be burned due to the mismatch of the output!

In this real-life example, the text in red warns that even a modest SWR can damage this 60 W amplifier, likely because the design lacks SWR protection circuitry. The mistranslated warning references potential harm to the "tube," but it actually means "transistor."

The world is at your fingertips with Collins ....

Snap on the filaments, settle yourself at the controls, and enjoy a most satisfying world tour—by radio. Listen to the musical CQ from Latin America, the cheerful hello from Canada. Hear the eagerness in the voice of the American operating portable from Casablanca or Tinian. Maybe you're searching the DX bands for the G4—or was it an HB9—that you used to work every Saturday. Or perhaps your next door neighbor wants to send a message to his aunt in Phoenix.

Sharpen up the incoming signal you've selected on the Collins 75A receiver. You have a crystal filter that you can adjust with ease. The r-f gain control does not affect the pitch of a cw note. And the receiver is so stable that line voltage fluctuations—or the slam of a door—will not require frantic retuning to find the signal again.

Even under adverse conditions your reception will be better with the 75A.

Then switch the Collins 30K transmitter to the Operate position and you're on the air. Use either fone or cw. You can change frequency quickly if you desire. The permeability tuned oscillator (PTO) controlled exciter—the Collins 310A—sits right on the operating desk. Both transmitter and exciter are bandswitching. The 30K transmitter has a speech clipper in the audio circuit to keep the modulation at a high level. Notice how it helps your signal, particularly in QRM or QRN.

The world is truly at your fingertips when you're using Collins equipment. Write for illustrated bulletins describing Collins ham gear.

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Electronic Keyers & Keyer Paddles

With the invention of the vacuum tube, and later the transistor, it naturally followed that clever designers would invent electronic devices to simplify the generation of Morse Code so that CW operators could send code with even less wrist motion than required to operate a bug. Hence, the electronic keyer was born.

The first commercial electronic vacuum tube keyer was the Mon-Key, sold by the Electric Eye Company of Danville, Illinois starting around 1948. The Mon-Key, like all electronic keyers, automatically produced Morse dots when the keying lever was moved to the right, and Morse dashes when the lever was moved to the left. As with all the early keyer designs, the keying lever was integrated into the keyer unit, often with the paddles protruding from the front of the cabinet. Two knobs controlled the speed of the Morse code and the volume.

Most of these early keyers were kind of clunky to operate because they didn't have the best quality keying levers, but this was not something the operator could control. In addition, the Mon-Key was actually sort of a dangerous instrument to operate, as 120V AC was present on the metal keying lever itself, so if you removed the plastic cover from the keying lever assembly, you could get a nasty shock if you accidentally touched the lever !

Towards the end of the 1950's, people were starting to design the mechanical keying mechanism and the electronic keyer separately. One of the most popular stand-alone keyers was designed by W9TO (The TO Keyer), and was mass-produced by Hallicrafters Radio Co. The mechanical mechanism became known as a Keyer Paddle. This separation allowed for the development of many interesting keyer paddle designs, which continue to this day. Some of the first keyer paddles included the El Key, the Nikey, and the famous W8FYO paddle.

There were 2 types of keyer designs, Non-Iambic and Iambic. A Non-Iambic keyer uses a paddle with a single lever, which is moved to the right or left, depending on whether the operator wants to make dots or dashes. All of the early electronic keyer designs used Non-Iambic operation.

An Iambic keyer uses a paddle with 2 levers, the right one controls dashes and the left controls dots. What gives the Iambic keyer its name is that if you squeeze the left and right paddles together, the keyer produces an alternating string of dots and dashes, which gives the Iambic keyer a huge advantage when sending Morse characters such as "C", "K", or "R". Thus, Iambic keyers are the easiest to operate since they require the smallest amount of hand movements.

The first Iambic keyer paddle to appear on the market was The Nikey, designed by Nicholas Lefor, W2BIQ. The Nikey was first advertised in 1962 and made by Lefor Industries of New Canaan, Connecticut.

With the invention of transistors and microprocessors, the next step in keyer design was the memory keyer. Many keyers made today have the ability to store short Morse code messages which can be re-played at the touch of a button. This is a great thing for amateur radio contest operators, who can use this feature to automatically send out repetitive messages such as callsigns and the other short exchanges of information that are sent during contests.

Today, there are some really nice keyer paddles being made by master craftsmen such as Pietro Begali, Alberto Frattini, Mike March, and others. You can see examples of their amazing work in the photos below. Many of these paddles are available for purchase, but be forewarned.....quality comes at a price !

Heathkit HD1410

Katsumi EK150

Brown Brothers CTL Paddle & Straight Key Set. 1964-1974

The Vibrokeyer. Vibroplex Co. New York, 1960-Present

Heathkit TO Valve Keyer

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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.

Get your backdated issues at http://www.awasa.org.za/index.php/newsletters

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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

ZS100SARL

ZS100SARL special call sign to celebrate the 100th anniversary of the SARL. This call sign will be used on SSB, CW, FT8, RTTY throughout the year.

If you are wanting to get a special QSL, look out for the call and log it on QRZ.com or the SARLQSL Service.