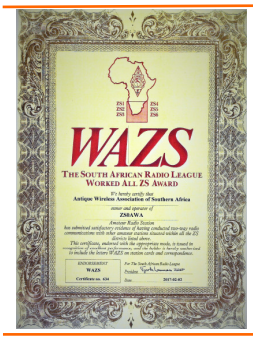
Newsletter

133

Aug 2017

A Member of the SARL



Inside this issue:

AWA Committee:

* President—Jacques ZS6JPS
* Vice President and-Western Cape—John ZS1WJ
* Technical Advisor—Rad ZS6RAD
* Secretary/PRO—Andy ZS6ADY
* KZN—Don ZS5DR
* Historian—Richard F4WCD (ZS6TF)
* Member—Ted ZS6TED

Reflections:

Last month I bemoaned the fact that people had already given up trying to operate in these poor conditions. This last weekend I decided to take part in the SARL HF contest and what a pleasant surprise it was to work so many stations.

I must admit, I felt that we here in Div6 were probably stymied because the most operators were probably from Div 6 and we could not hear each other. The rest of the divisions though could hear us.

To hear some of the operators reaching 70 to 80 contacts during this "quiet" time of the bands, was absolutely amazing.

I personally had contacts with all of the divisions on 40 and had my first ever Lesotho contact thanks to Dennis who operated from there.

I am not here to brag about my contacts, as I got thoroughly whipped by many other stations, but it was great to hear so many stations on air.

My point, the bands are still quite workable. There were times when some were quite low, but then other areas were open.

I quite enjoyed myself and managed 40 contacts on 40m and 80m. Most of them, new contacts.

I'm not saying that we all have to get involved in contests now, but I really wonder why we have such a poor turnout for the AWA SSB net on a Saturday morning ?

40m works well for the more distant stations, and the 80m relay has proved to be quite effective for the local stations, being quite readable to KZN.

The bands are really not that bad, if you want to communicate.

The last time band conditions were this bad, we had similar numbers coming up on frequencies, and then we did not have access to Echolink and the Sandton 2m repeater. These two additions have made a major impact on our ability to increase our coverage, but are very poorly utilised at the moment.

At the moment, Rad runs the net on 40m and relays on to the Sandton 2m repeater. Echolink connects to the repeater and allows access via the internet. The 80m relay is taken from the Echolink connection. At present there is no relay from 80m back on to the Echolink system, but we are looking in to this.

Come along and join us on one of these links and get back on the net.

Best 73

DE Andy ZS6ADY

WIKIPEDIA

Electrical Telegraph

The Atlantic Telegraph Company was formed in London in 1856 to undertake to construct a commercial telegraph cable across the Atlantic Ocean. It was successfully completed on 18 July 1866 by the ship SS *Great Eastern*, captained by Sir James Anderson after many mishaps along the away. Earlier transatlantic submarine cables installations were attempted in 1857, 1858 and 1865. The 1857 cable only operated intermittently for a few days or weeks before it failed. The study of underwater telegraph cables accelerated interest in mathematical analysis of very long transmission lines. The telegraph lines from Britain to India were connected in 1870 (those several companies combined to form the *Eastern Telegraph Company* in 1872).

Australia was first linked to the rest of the world in October 1872 by a submarine telegraph cable at Darwin. This brought news reportage from the rest of the world. The telegraph across the Pacific was completed in 1902, finally encircling the world.

From the 1850s until well into the 20th century, British submarine cable systems dominated the world system. This was set out as a formal strategic goal, which became known as the All Red Line. In 1896, there were thirty cable laying ships in the world and twenty-four of them were owned by British companies. In 1892, British companies owned and operated two-thirds of the world's cables and by 1923, their share was still 42.7 percent. During World War I, Britain's telegraph communications were almost completely uninterrupted, while it was able to quickly cut Germany's cables worldwide.

HF Happenings:

The SARL Premier HF Contest in August

August sees the running of the South African Radio League's premier contest - the SARL HF Contest. The contest is held over three Sundays from 13:00 to 16:30 UTC on each day. On Sunday 6 August, the HF Phone contest will be run, on Sunday 20 August the HF Digital contest and on Sunday 27 August, the HF CW Contest. Each contest takes place on the 20, 40 and 80 meter bands.

You can participate as a single operator single band station, a single operator all band station, a multi operator single band station or a multi operator all band. Individual competitors and club stations are encouraged to compete. In each contest, the exchange is a RS or RST report and a consecutive serial number starting at 001.

Logs must be submitted in ADIF, Cabrillo or MS Excel format and labelled "your call sign HF Phone or HF Digital or HF CW," by 13 August for the Phone contest, 27 August for the digital contest and 3 September for the CW contest. Logs must be sent to zs4bfn@mweb.co.za

There are three trophies for the phone contest and two trophies each for the digital and CW contests. There are four trophies covering all three contests, two of these trophies go to the youth and YLs participat-ing and there is a trophy for the Club with the best participation.

Get all the information on page 34 of the 2017 SARL Blue Book.

New IOTA Website

"IOTA Ltd.'s IT Group has worked tirelessly on the development of the new IOTA administration software and the new IOTA website", Jo-han, PA3EXX, reported on 23 July. "One of the significant developments was the implementation of paperless QSLing through QSO matching via Club Log. This part has been available to the IOTA community on the ex-isting IOTA system since July 2016. The process of adding operations that are valid for IOTA has been on-going, resulting in very large number of credits being given.
We are targeting the launch of the new IT system for early Sep-tember. Software developers should be aware that this may affect any application using data from www.rsgbiota.org since this website will be taken offline. Please contact us at info@iota-world.org if your soft-ware uses data from www.rsgbiota.org and you want to have access to this kind of data in the future".

New book of short stories highlights 'Magic of Ham Radio'

A new book by writer Don Keith, N4KC, employs short fictional stories to demonstrate what the author calls the 'magic' still inherent in the century-old hobby of Amateur (or 'Ham') Radio.

"Some claim that our hobby is old-fashioned when compared to cell phones and social media," Keith says. "That is not true. Amateur Radio is amid a resurgence and offers more excitement than ever to anyone interested in technology, communications, competition, public service, experimentation or just plain having fun."

Keith says he has written these stories to more powerfully demonstrate various aspects of the hobby, any of which might attract attention from newcomers if they were aware of how dynamic and diverse Ham Radio is today. He even went to great lengths in the book's title to emphasize the fun aspects. The book is officially titled "DIAL DANCING: Tales of the fascinating, fabulous, frequency-hopping, wavelength-walking, power punching, ionosphere-scorching, ditting and dahing, digital dancing and glorious globe-spanning wide and wonderful world of amateur radio."

Among the stories are a tale of a new licensee making a first contact with a rather interesting operator on a distant island, learning he is a part of a historical event. Another story is about a relatively new female Ham operator who takes on a bold challenge from a crotchety old-timer. Yet another tells the story of an African- American Amateur who has concerns when he learns about discrimination experienced on the airwaves by early black Ham operators.

August

5 to 12 – IARU Region 1 YOTA Summer Camp, Gilwell Park, UK
6 – SARL HF Phone Contest
9 – National Women's Day; SARL YL Sprint
11 to 13 - Klein Karoo Klassique, Oudsthoorn
19 and 20 - International Lighthouse and Lightship Weekend
20 – SARL HF Digital Contest
24 - Closing date for September Radio ZS
25 and 26 - Hantam Vleisfees, Calvinia
27 - SARL HF CW Contest
31 Aug to 3 Sept - Gariep Kunstefees, Kimberley

September

2 - West Rand Flea Market
3 - National Day of Prayer for the Deaf
2 and 3 - IARU Region 1 and RSGB SSB Field Day
4 - Settlers Day
6 - National Secretary's Day
9 and 10 – SARL National Field Day
16 – October RAE Registration closes
16 and 17 - All Africa All Mode Contest; SARL VHF/UHF Contest
16 to 23 IARU Region 1 General Conference, Germany
21/21 Rosh Hashana
22 – Spring Equinox; Islamic New Year
22 to 24 – 4 Peaks Challenge
23 and 24 – CQ RTTY Contest
23 Sept to 1 Oct Magoebaskloof and Hae-nertsburg Spring festival
24 – Heritage Day
25 – Public Holiday; closing date for Octo-ber Radio ZS articles
29 – All schools close
30 - Yom Kippur
30 Sept to 2 Oct Hermanus Whale Festival

“Many prospective Hams still don’t know about how well our hobby ties in with their other interests,” Keith notes. “Or how diversified our membership is nowadays. It can be as technical as someone wants, or can require very little technical knowledge or interest. That is what I hope to show in these stories. Some are funny. Some are heart-tugging. I hope all are entertaining.”

Further information at http://www.donkeith.com/hamradio/amateur-radio

African DX

Lesotho, 7P. Dennis, 7P8DG, will be active from the Trading Post Lodge at Roma (Grid KG30UN) for the SARL HF Phone Contest. QSL via ZS4BS.

Lesotho, 7P. Quintus, ZS2KU, and Vaughan, ZS2VR, will be active as 7P8QM and 7P8VRR, respectively, from the Sani Stone Lodge (WW Loc. KG40PK) in the Sani Pass region between 18 and 21 August. Activity will be on 40, 20 and 15 metres. QSL via their home callsigns. ZS2KU has applied for a 7P8QM LoTW account.

Rwanda, 9X. Alan, KE4TA, reports, "I have just received my call sign, 9X0TA) information from the RURA. I am still awaiting shipment of my permanent operating station, but with any luck I will be QRO in the next two weeks. QSL Manager is N4GNR. Radio will be Yaesu FT-991, antenna will be a Hexbeam on a push up tower. I will be here for a total of three years, so plenty of time to work 9X. I will be active primarily be on 20 and 17 metres, but I will attempt an 80 m loop antenna as well. If it works, I will be able to work 80 and 40 as well. Noise levels here are extremely high. Please do not be offended if I'm not answering your call, I likely cannot hear you."

Burkina Faso, XT2. Harald, DF2WO, will once again be active as XT2AW from Burkina Faso between 28 September and 30 October. Activity will be holiday style on 40 to 10 metres using CW, SSB and the Digital modes. He states that he works mostly on the Digital modes (PSK31, JT65 and RTTY) and slow CW. Equipment is a FT-450D into a home-made HEX BEAM and a dipole for 40 meters. QSL via M0OXO, direct or OQRS www.m0oxo.com/oqrs/.

African Islands

IOTA frequencies
CW: 28 040 24 920 21 040 18 098 14 040 10 114 7 030 3 530 kHz
SSB: 28 560 28 460 24 950 21 260 18 128 14 260 7 055 3 760 kHz
Robben Island, ZS. The team of Jan, ZS1VDV, Paul, ZS1V, Andre, ZS1AN, Johan, ZS1A, Pierre, ZS6A, and Oleg, ZS1ANF, will be operating as ZS9V from Robben Island (IOTA AF-064) from 9 August until sometime on Sunday 13 August. This is the weekend BEFORE the International Lighthouse and Lightship weekend!
In addition to the stations the team had last year (SSB station on 10, 15, 20 and SSB station on 40 and 80), this year they will also have a CW station operating on the high bands. Details of the CW operating bands and possible digital modes and bands will be announced closer to the time. Further information on the DXpedition will be published on www.zs9v.org.za as it becomes available.

Replacing valve rectifiers with silicon diodes – what you need to know!

John Fielding ZS5JF

Introduction

Our older *boat anchor* radios were built in the time when modern solid-state rectifiers either hadn't been invented or a little later when they were in their infancy. If the equipment were made prior to solid-state rectifiers then the high voltage supplies would be fed by valve rectifiers. In fact this is still a good method, especially if you wish to preserve our heritage. The fad of pulling out the old rectifiers and replacing with modern silicon diodes is not always as simple as it seems!

The older valve rectifiers

Most of the older equipment will utilise dual rectifier diodes, that is a single glass envelope in which there are two diodes with a common cathode. These come in two distinct types, the directly heated cathode and the indirectly heated cathode. Depending on which type were selected changes the way the circuitry is wired and it impacts on the mains transformer design. Let us look at the variants to see the differences.

Indirectly heated cathode types

In this type the cathode is electrically insulated from the heating filament (aka heaters) and the breakdown voltage of the heater winding on the transformer is less critical. Very often it means that only a single heater winding is required, and it can feed all the valves in the equipment, if they are compatible in voltage. Very often a 6.3V or a 12.6V centre tapped (to obtain two 6.3V outputs) secondary winding is chosen and all the valves/tubes are wired in series/parallel across this one winding. This method simplifies the wiring and lowers the cost of the mains transformer. Figure 1 shows a typical arrangement.

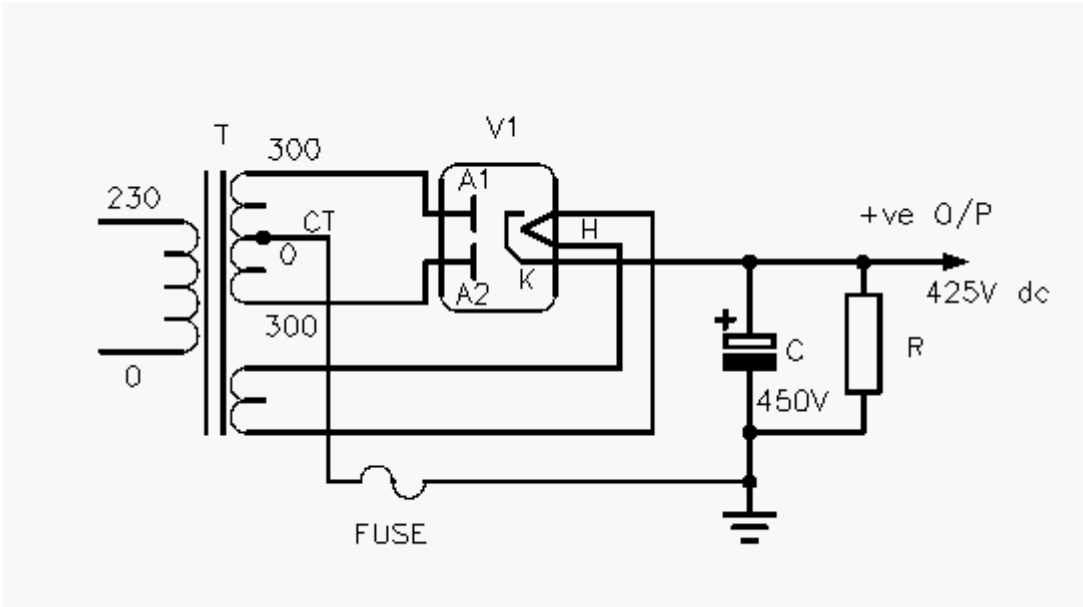


Figure 1 Indirectly heated rectifier circuit

Directly heated cathode.

In this method it allows a wider choice of heater voltage, also a wider choice of rectifier valves, and the designer is not forced to have compatible heater voltages. This does however mean that a separate winding is needed just for the rectifier valve. Often a 5V heater rectifier is chosen and the other valves can be either 12.6V or 6.3V heaters. Many of the common smaller valves are made with two 6.3V heaters connected in series, for example the 12AT7/12AU7/12AX7 series, and the use of 6.3V or 12.6V is easy to arrange. Some types are also made in both 6.3V and 12.6V versions, for example the 6SA7 and the 12SA7 are electrically the same valve but have different heater voltages.

In the directly heated rectifier valve the heater is also the cathode so the heater winding floats at the potential of the high voltage dc output, and requires an isolated winding, not used by any other valve. There are two choices when constructing a directly heated cathode rectifier, the right way and the wrong way! Figure 2 shows the wrong way, although electrically it works.

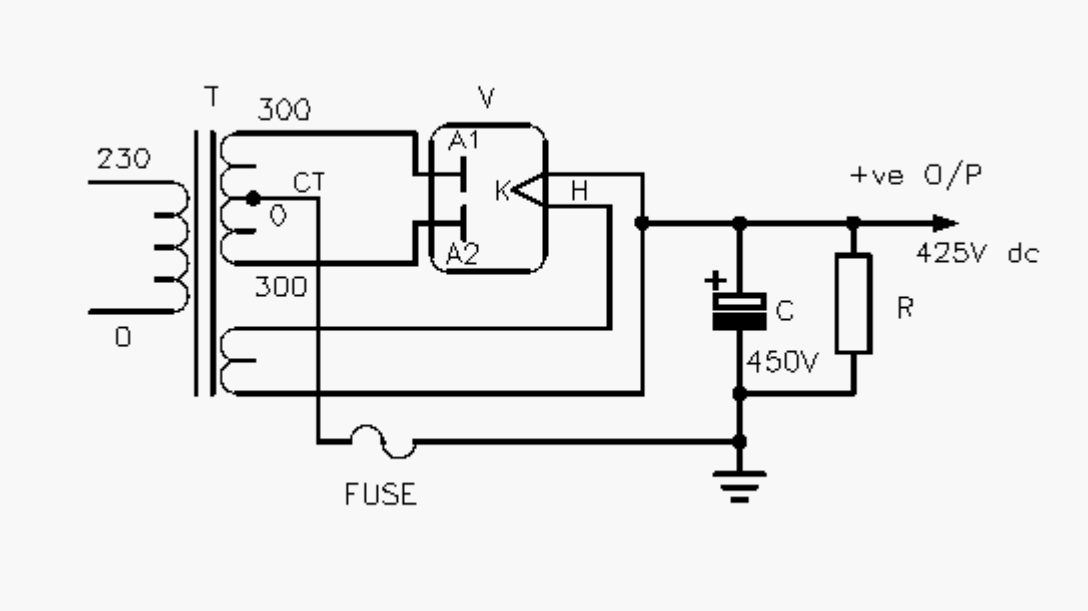


Figure 2 Directly heated rectifier circuit

The problem is two fold. Firstly, the secondary winding supplying the heater needs to have adequate breakdown insulation, so it doesn't flash over to ground. The second problem is a bit more subtle.

The heater is the cathode and the way Figure 2 is arranged means that the ac heater voltage on the cathode tends to modulate the dc output voltage. This causes a hum to appear on the supposedly smooth dc voltage. To correct this a better method is shown in Figure 3.

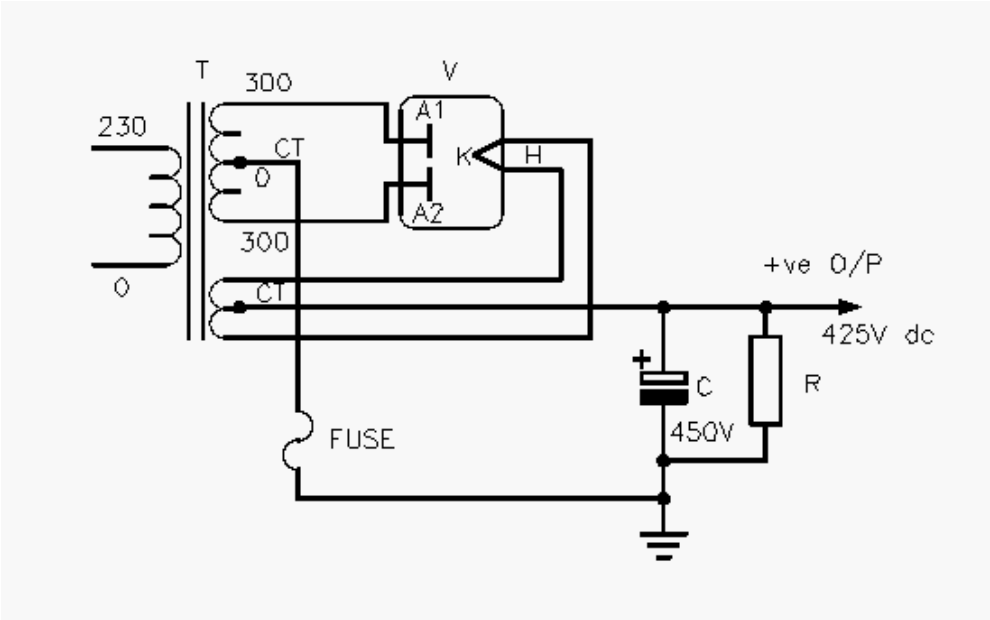
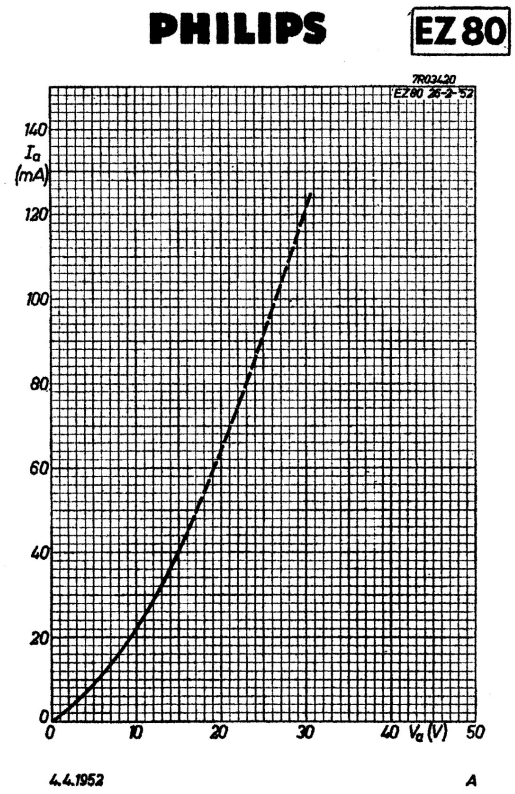


Figure 3 Preferred method of feeding the heater supply

The heater secondary winding now has a centre tap added. This arrangement means that no ac hum is induced onto the dc output voltage. It does however increase the cost of the transformer.

Valve rectifier forward voltage



Typical forward voltage drop of the EZ80 rectifier valve

A valve rectifier is different to a silicon diode, apart from requiring a heater supply; it also has a significant voltage drop across the anode-cathode region. A typical silicon high voltage diode, such as a 1N4007, has a forward voltage drop of about 1V worst case. Valve rectifiers are much higher in voltage drop. Figure 4 shows a typical rectifier valve, the EZ80, but most others have similar forward voltage drop.

If you examine Figure 4 you will see that as the output current increases so does the forward voltage drop. At 20mA output current it has a forward voltage drop of 10V, this is equivalent to a series resistance of 500W. What this means is that until the applied ac input signal exceeds 10V peak no significant output current can flow, this is equivalent to a rms voltage of about 7V. So valve rectifiers are not really suited for low voltage applications when large currents are required. At the maximum rated output current of 120mA the valve series resistance has fallen to 250W.

The series resistance does two things, it acts as an additional smoothing section, forming a RC low pass filter with the smoothing capacitor, so reducing the amplitude of the ripple voltage on the dc supply. Often this means that a lower value capacitor can be used to obtain the low ripple voltage the equipment requires.

The inherent series resistance also acts as a current limiting mechanism, as the output current rises the dc voltage falls slightly. It can limit the current to safe values in the event of a partial short circuit across the output.

Although a 30V drop might seem excessive it needs to be viewed against the dc output voltage. If the rectified dc voltage is 450V then 30V represents a small percentage, 6.66% in fact. If however the dc output is much lower then it starts to become more significant. If the dc output is 150V then it is 20%. Some of the dual rectifier valves have lower forward voltage drops; the correct one should be selected to suit the application.

Those darn compensating turns

In order to compensate for the rectifier forward voltage drop, the transformer design is tweaked to add a few extra turns on the secondary winding, called *compensating turns*. Transformers made back in the days when only valve rectifiers were available have to be viewed differently. In old manufacturer's catalogues and data sheets the secondary voltage would be presented assuming a valve rectifier. Another way would be to state the dc output voltage when rectified and smoothed. If today we measure an old transformer secondary voltage we find it is quite a bit higher than expected, even under its rated load current. This is the *compensating turn's factor* coming into play. One should never assume the voltage marked as being gospel!

The other factor to be aware of is how transformers are rated. The standard method is to specify the ac secondary voltage at the rated output current. Typically the secondary voltage will drop by some percentage between no load and full load. An average percentage drop is somewhere between 5 and 15%, depending on how well the transformer is wound. This means that off load the secondary voltage is quite a bit higher than the stated voltage. This is known as the *Regulation Factor*.

In high voltage silicon diode rectifiers the forward voltage drop is normally so small that we can often ignore it. But when low voltages are used then we need to consider the effect they have. If we needed to rectify a 6V secondary winding then off load the smoothed dc output voltage would be about 8.5V dc. Under a heavy current load the diode forward voltage drop can rise to as much as 1.5V per diode. In a bi-phase rectifier the output voltage may be only 7V at full load as there is a 1.5V drop across the rectifier diode. In a bridge rectifier there are two diodes connected in series, so the voltage drop is doubled, it can be as high as 4V lost. Our assumed 8.5V dc output hence takes a big dive down to as low as 4.5V at full load. To correct this we need to increase the secondary voltage to compensate. This means our off load voltage is now quite a bit higher than the wanted 8.5V, but falls to 8.5V on full load. This is just the rectifier voltage drop and the transformer regulation factor will aggravate the problem if the percentage is high.

Hence, we need to fit some form of voltage regulator after the rectifier to hold the dc output constant.

This is a major problem when silicon diodes are fitted as replacements in high voltage rectifier applications. It often means we have to change the primary taps to lower the high voltage, but this impacts on the heater voltage for the remaining valves. Under running a heater is liable to lead to a shorter life. Also a reduced heater voltage on the rest of the valves causes lower emission and a possible loss of gain or sensitivity.

If the primary winding has sufficient taps to set the high voltage to the correct value then it is essential to then check that the other valves heater voltage is within the recommended 2.5% tolerance. If the primary doesn't have sufficient taps then you will need to insert a suitable dropper resistor in series with the primary to lower the voltage the correct amount. The best method would be to take some turns off the high voltage secondary, but that entails major surgery!

The other thing worth appreciating about valve rectifiers is that they provide a simple method of limiting the start-up current when the equipment is first switched on. Until the rectifier valve heater is up to working temperature very little output voltage exists. It gracefully rises over a period of several seconds as the other valves heaters are getting up to temperature. It is a very gentle start to operation - and preferable to coming on with a bang!

The silicon diode retrofitted equipment – the gotchas!

It should now be obvious that when replacing the older rectifier valves with modern silicon diodes we need to consider the ramifications this bring about. Firstly, we have thrown away the gentle starting; the high voltage now rises almost instantly when switched on. It also has removed the inherent current limiting action, so a momentary short across the output has more possibility of doing some damage.

If the valves are replaced with silicon diodes then it is imperative to fit suitable series resistors to limit the peak current into the smoothing capacitor. The other thing to be aware of is that the off load and on load voltage is going to be higher. This may or may not be a problem with the voltage rating of the smoothing capacitors fitted. If we simply replace the diodes without also replacing the smoothing capacitors then it is false economy. There is every chance the electrolytic capacitors will let go with the added punishment.

If you have never had an electrolytic explode, then imagine a champagne cork and the damage it can do to surrounding components. T
lyte inside an aluminium electrolytic capacitor is *caustic potash* (potassium hydroxide) which is an aggressive chemical that will eat its w
metal quickly. The paper - aluminium foil inside gets everywhere if a big electrolytic capacitor has a bad day!

Today electrolytic capacitors are much better than those of forty or more years ago; they are also much smaller! Not only can they operate at much higher ripple current; they can also withstand much higher temperatures.

If you compare a 100mF of 450V rating of 30 years ago and what is available today you will be surprised at the difference. Looking at old data books, it would be 1-1/2-inch diameter can (38mm) and about 2-1/2 to 3-inches in height (50mm to 75mm) and rated at a safe case temperature of not more than +60° Celsius.

Today the equivalent capacitor is rated at +85° Celsius, and +105° Celsius are commonly available, and the size is 22mm diameter by 30 to 35mm in height. The older types had limited ripple current ratings, typically not more than about 500mA. Today the norm is for at least 1A and some of the +105 Celsius types can handle 1.4A at maximum temperature.

Some restorers of older equipment utilise the old capacitor can to house the modern types, so they look original, but have upgraded internals. Fitting a 22mm can into a 38mm chassis clamp would need adapter spacers to be made and it just looks so wrong when you pop the hood to look inside!

Southern African Antique Wireless Association

P.O. Box 12320, Benoryn, 1504

Website: www.awasa.org.za

Email: info@awasa.org.za

26 July 2017

Att: Eddie Taylor, ZR6AD

Good day Eddie,

I am writing on behalf of the Antique Wireless Association of Southern Africa to express our deepest thanks for your kind donations.

We have arranged delivery of the 3 transceivers (listed below) and related to the NARC radio room at the SARL headquarters. They have expressed their gratitude, and you should receive a letter of thanks from them in due course. These items will assist greatly in getting the shack operational, for youngsters and visitors alike.

The remainder of items, including the vintage homebuilt computer with keyboard, monitor and power supply, a very interesting modem, and also the numerous books, will be handed over to the SAIEE museum. As mentioned, I wish to extend an invitation to you for a tour at the museum – it would be my pleasure to show you around.

Transceivers to NARC:
Icom IC-451E UHF transceiver
Yaesu FT-480R VHF transceiver
Icom IC-730 HF transceiver

Kind regards,

Jacques Scholtz, ZS6JPS
(AWASA President)
jscholtzp@gmail.com

v

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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: www.awasa.org.za

Notices:

Net Times and Frequencies (SAST):
Saturday 06:00 (04:00 UTC) —AM Net—3620
Saturday 07:00 (05:00 UTC) —Western Cape SSB Net— 3630
Saturday 07:30 (05:00 UTC) —KZN SSB Net—3615
Saturday 08:30 (06:30 UTC)— National SSB Net— 7140; (Echolink, connect to Sandton repeater ZS6STN-R)
Experimental relay on 3620 for those having difficulty with local skip conditions.
Saturday 14:00 (12:00 UTC)— CW Net—7020; (3550 after 15 min if band conditions not good on 40)
Wednesday 19:00 (17:00 UTC) — AM Net—3620, band conditions permitting.

WANTED:

I am looking for a knowledgeable repairer for my family's old Philips FM De Luxe radio, preferably in the Cape. Currently, the on/off button is not working. I do not know what else may need repairing..
Thanks in advance for advice.

Kind regards

Sally Arnold

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