GROUND Wave

Published by Singapore Amateur Radio Transmitting Society (SARTS)
March 2003 Issue.
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A FREE PUBLICATION TO MEMBERS OF SARTS

MITA (P) 265/08/2002

SINGAPORE AMATEUR RADIO TRANSMITTING SOCIETY

SARTS

Editorial

In this issue of the Ground Wave we will turn the clock back some forty years and read a report on what happened towards the end of the sixties. It is through the good offices of Joseph Seah 9V1NQ and Frank Aw 9V1OK as well as a few other hams we are able to present an informative and interesting article on SARTS first President. Members would appreciate the amount of time taken, the feedbacks from our older Singapore hams as well as the time spent in looking up certain facts in the old SARTS files. What a challenge it was and may I take this opportunity to say a big THANK YOU to our friends. We should be proud to say that SARTS has indeed come a long, long way and its nice to know that we do have history.

All of you are aware that we have relocated our monthly meeting place to SAFRA in Toa Payoh since the beginning of this year.
The feed back I had from members is most encouraging. The meeting room is large and spacious, but the air-conditioner could be set slightly higher to prevent freezing.
To burn off calories, one need to take a slow walk of perhaps not more than 15 minute from the Toa Payoh MRT/Bus Terminal to SAFRA.

Due to the outbreak of SARS, we took the necessary precaution by skipping the April meeting. What followed at night was a 2m QSO amongst our local hams.
It was interesting and some members suggested that we should have an 8 pm 2m sked on the Bukit Tinggi Repeater at least once a week. Most of the members would have finished their dinner by then and instead of watching the google box, they could spend sometime on 2m.
Well, I have put forward this suggestion and it is up to members to 'get the ball rolling'.
May I suggest a Friday evening to begin with as it is almost the week-end.

A view of the main entrance of the building..

Some people love listening to old evergreen songs or even classical music on our local FM radio station.
In this issue we have an article on a 60 year old communication receiver the Hallicrafters Model S-20R - an old frail lady that underwent a dramatic cosmetic change and performance tweaking, something worth reading, perhaps!

Best 73's
Ian 9V1WD
E-mail: ian9v1wd@singnet.com.sg

Our first President the jumping giraffe

by Joseph Seah, 9V1NQ

Hearing a strange language and meeting the person behind the microphone adds up to one exciting hobby..... Ham Radio.

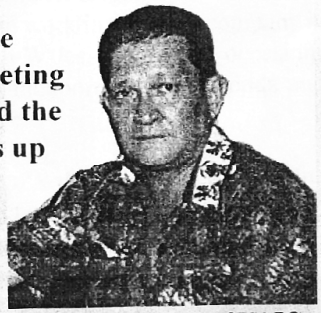


Photo 9V1OK

Livin J. de Souza, 9V1JG

After World War II I was a keen SWL. I had tuned in to the 40 metre band on several evenings and I could hear friendly and often jovial conversation interspersed with what I thought was in a strange Q language and with phrases I could not understand. Apparently each had their own callsign. Curiosity goaded me and my two friends to trace and eventually be introduced to a chubby, friendly and unassuming gentleman, Livin J. de Souza whose residence was about eight kilometres from mine. That was in 1958 when he jokingly said, "I am Livinsky the Jumping Giraffe you heard on air" as his callsign then was VS1JG. This first meeting was the beginning of over ten years of pleasant association with a man who had introduced to me the interesting and fascinating world of amateur radio. After a leisurely look at his "strange" antenna (ZL Special) and the bulky electronic equipment he was using he explained to us in a lucid manner what his hobby was all about and what it involved. Little did I know that years later he was to be the first President of the Singapore Amateur Transmitting Society (~~S.A.R.T.S.~~).

Before we met Livin(and his brother, Kenneth VS1CZ) was working in the Teleprinting Section of Cable and Wireless Co. Ltd., a company looking after various forms of cable and radio communication to and from Singapore. It was during this period that he had obtained his amateur radio (ham) operator's licence and was a member of the Malaysian Amateur Radio Transmitters Society (M.A.R.T.S.) with its headquarters in Kuala Lumpur. The Malaysian and Singaporean hams were members of the same society then. It was obvious to me that Livin enjoyed his hobby during his leisure hours. He made many friends with his genial disposition within and outside the ham community. He was resolute and clear thinking and was always ready to encourage and give a helping hand. These qualities held him in good stead.

In early 1969 there was a move by the Singapore group to form a separate radio society and on 28 August of that year the Singapore Amateur Radio Transmitting Society (S.A.R.T.S.) was registered with Livin as pro-tem Chairman. In January 1970 he was elected S.A.R.T.S. President together with a management Council of six members:

John Marshall Hern	9V1PB	Vice-President
Cyril Neubronner	9V1CN	Hon. Secretary
Kok Leng Chong	9V1OF	Treasurer
Lim Tong Yong	9V1LG	Member
Joseph Seah	9V1NQ	Member
Frank S. C. Aw	9V1OK	Member

There was less than 30 licensed Singaporean ham operators then and Livin felt that there was a need not only to enlarge membership but also to promote publicity on the different facets of amateur radio as not many outside knew what the hobby was all about. He decided to work hand in glove with other members in these directions. During his tenure of office talks and demonstrations were arranged and a member of local magazines wrote on the experiences of radio hams around the world. He actively participated and assisted in the activities of the Singapore Scout Amateur Radio Club and its radio station, 9V1SJ, operated from the Scout headquarters in Clemenceau Avenue. S.A.R.T.S. members erected the Club's rotating yagi antenna which was quite a landmark in that busy part of the city - good publicity for the only amateur radio club station in Singapore then. At the 13th Jamboree-on-the-air held in October 1970 local television gave good coverage to the event. I am sure Livin felt grateful as I recall the touching moment when he held the microphone to guide a blind scout to send greetings to other Jamboree-

on-the-air stations around the world. At weekends the Society assisted the club by conducting morse and radio theory classes for their Scout Communicator Proficiency Badge. In all it augurs well for a fledgling Society.

Livin and his wife Marie migrated to Australia in the spring of 1972 to work in the same company in Sydney, New South Wales. On several occasions he came back to Singapore to visit friends and relatives.

In October 1978 my wife and I visited Livin and Marie at their residence in Gladesville, a suburb of Sydney. He did not look well and shortly afterwards he suffered serious ill-health. He and his wife paid a final visit in 1981 to friends and relatives in Singapore. Not long after his return to Sydney he died when he was in his middle fifties and Marie joined him in the same year. As I look back over the years that I knew him I must say that he was never found wanting in keeping up the spirit of amateur radio or in abiding by the radio amateurs's code. He gave much so that others may share his joy. No doubt the many hams who knew him will agree.

Recalling the early, exciting and difficult days of S.A.R.T.S. under his leadership I am reminded of a poet who once wrote of his friend:

A smile on his face he wakes up in the morning,

Greets the day with reverence and what it can bring,

See before him once again life's ultimate aim

And share without reward his joy, all in the game.

When day is done and a dream amongst other dreams is won

Happy shall he be when we say,
"Thank you, a job well done."

Ed: My first exposure to amateur radio was in the late sixties. I was a Secondary student then and active in the Boy Scouts movement at St. Patrick's School, East Coast Road.

Picture from L to R: Livin, Lim, Frank, Paul & Joe

There was an invitation to Scouts and Guides to attend a week-end activity at the Boy Scouts Headquarters at Sand's House in Clemenceau Avenue. Ham radio was something new to me and with a fire burning inside it made me eager to know what was in the offing. I was stunned when I heard voices coming from speakers and the dits and dahs echoing from an adjacant room.

Later that evening the Commissioner himself told us we could get a communicator's badge patch if we came for morse lessons and pass the test.

The very first time I handled a microphone and talked to a VK ham was at Sand's House and it was Livin who guided me through the transmission. The radio was really big and bulky, the HRO. I will long remember Livin and his wife Marie riding on a Lamberetta scooter.

Job week at the Istana - The First President of Singapore, Encik Yusof bin Ishak and the First Lady Puan Noor Aishah look on as we get the job done. - Ian 9V1WD (center).

a factory visit

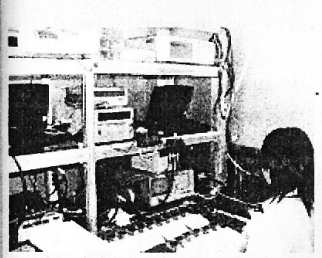
A pool of engineers, technicians and skill workers manufacture transceivers small to fit into the palm of your hand.

Text and Photos by Ian 9V1WD

Mr. Wada, Ryohei 9V1WR
Managing Director

Giving a technical explanation to Shimazu San

A part of the assembly line



Frequency measuring Station

Earlier part of this year (2003), Taka Shimazu San 9V1DJ, Mr. Koichi Makidai, General Manager of Toppan Electronics Co (S) Pte Ltd and Ian paid a visit to **Kenwood Electronics Technologies (S) Pte Ltd** in Ang Mo Kio Street 63. We were greeted by Mr. Wada, Ryohei the factory's Managing Director.

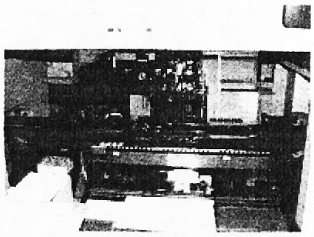
Mr Wada took us on an hour long factory visit which was indeed very interesting and educational. There were many high 'tech' machines on the clean and glossy production floor.

We learnt that the factory had down sized and had moved a number of it's production lines to Bintan island. This move was to streamline costs and maximise profit but at the same time maintaining full manufacturing quality assurance.

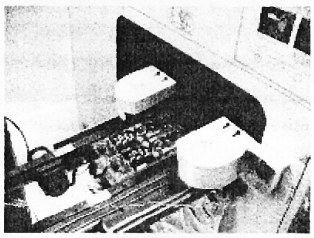
At the time of visit, the factory was producing hand-helds and mobile rigs.

Mr. Wada was able to answer all of our questions and at times he took the trouble of explaining in detail certain technical aspects of the production process.

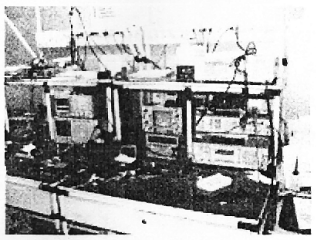
From the robust machine assembly line to the gentle fingers of the sweet ladies, the manufacturing process continued. At the packing line the final test is done and quality is assured prior to shipping.



Auto Component Insertion Machine



Auto Flow Soldering Machine



Some of the Test equipment inside an RF shield room.

Calibrating and Testing

An Interview with Taka K. Shimazu JA3KAB / KE6QO / 9V1DJ

He worked in Singapore for a couple of years and enjoyed radio hamming. Just before returning to Japan, Taka San granted Ground Wave an interview.

At the tender age of 13, Taka San found interest in Amateur Radio whilst being a student in Junior High School. It was in 1965 that he obtained his Japanese Amateur Radio Licence and callsign JA3KAB.

Enquired if he built any ham equipment, he was quick to say that he built transmitters, receivers, keyers as well as converters and VFOs' which he bought in kit form in Nippongashi, Tokyo Japan.

He will long remember his first radio QSO with a VK amateur station.

Talking about building projects, Taka told me that he has a big range of tools and parts which he has in Japan. In Singapore, he buys his electronic parts from Sim Lim Tower.

Taka went through lots of difficulties trying to secure a local 9V1 callsign and attributed some of the problems to installation of antennas as well as the strict ruling from his building management. Having overcome all these obstacles, he was finally given the Singapore call 9V1DJ.

He was happy to operate the 50MHz band as well as the other amateur HF frequencies. At times there were pile ups from the Europeans, States side and even from his native country Japan. There was no telling when band activity was opened, but when it did, there were lots of entries into his log book.

Above is a picture of Taka's shack in Osaka Japan, taken 20 years ago. More than half of his gear is hand made.
By the way, the little girl is his daughter who has grown into a pretty YL and will be graduating from college.
Talking about entries into his logbook, Taka was proud to say that he had made 5,000 contacts over the last 3 years whilst stationed in Singapore.
He returned to Japan in early March this year and gave us his idea of how we could curtail the decrease in the number of local radio hams.
"Excitment" was the key word and in his view the society should present some ideas towards creating simple projects to stir the interest of members. We could look into the building of simple antennas and organise outdoor activities; anything that would lure the interest of our young people to pick and stay in this hobby would be challenging. Perhaps then they could choose between radio hamming and the internet. Thank you Taka San.

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A sixty year old classic communication radio receiver

Hallicrafters Model S-20R Communications Receiver (1939)

by Philip I. Nelson

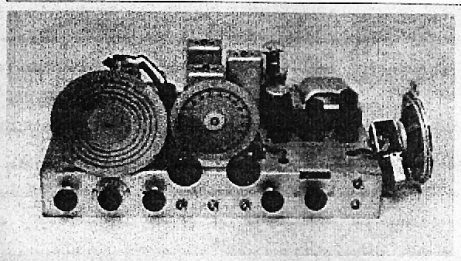
The Hallicrafters S-20R "Sky Champion" was made from 1939-1941 and sold in the United States for US$49.50, putting it in middle of the company's prewar radio lineup. The entry-level Hallicrafters set for 1939 was the model S-19 "Sky Buddy," selling for US$29.50. Higher priced prewar models included the SX-24 "Skyrider Defiant" at US$69.50 and the SX-25 "Super Defiant" at US$94.50

Model S-20R was the first in a long-lived product line. Hallicrafters repackaged essentially the same radio, with minor updates, as models S-40 (1946-1995), S-85 (1955-1959), and S-108 (1959-1961).

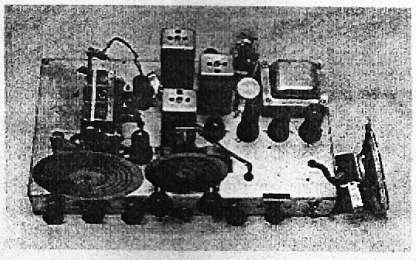
This is a four-band receiver, covering all of the frequencies from 540 Khz to 44 Mhz. In addition to bandspread tuning, it features AVC (automatic volume control), ANL (automatic noise limiter), BFO (beat frequency oscillator), a three-position tone control, and a headphone. This was a pretty full-featured receiver for the price. The higher-priced SX models added only a few nice-but-not-necessary features: variable selectivity, a crystal filter, calibrated band spread, and a built-in S-meter.

As the following tube lineup shows, the S-20R has an RF amplifier and two stages of IF amplification.

Tube	Type	Function
V1	6SK7	RF amplifier
V2	6K8	Mixer, oscillator
V3	6SK7	1st IF amplifier
V4	6SK7	2nd IF amplifier
V5	6SQ7	2nd detector, AVC, 1st audio
V6	6F6G	2nd audio amplifier
V7	6H6	Automatic noise limiter
V8	6J5GT	Beat frequency oscillator
V9	80	Rectifier



Photos showing the chassis.



The plastic dials on this radio were originally white with black lettering. Over time, the white plastic turns amber from exposure to light, becoming darker in areas that were exposed longest.

Electronic Restoration

Restoring the electronics began in a routine manner, but this radio had some problems that were not immediately apparent.

Before powering up the radio, I removed the chassis from the cabinet, cleaned it thoroughly, and checked each of the tubes. Then I connected an antenna and fired it up, using an autotransformer ("variac") to slowly increase the supply voltage. The radio played well during this short initial test, with reasonable

sensitivity on the shortwave bands and good tone on the standard broadcast band.

The next phase involved replacing all of the old paper and electrolytic capacitors in the set ("recapping").

About midway through the recapping process, the primary electrolytic capacitor in the power supply blew out with a vengeance. I normally give the radio a brief test under power after each capacitor replacement, as a doublecheck against wiring mistakes. When the filter capacitor gave up the ghost, the radio suddenly started emitting a *very* loud hum that drowned out all reception.

After replacing the filter capacitors, the radio began to play normally again. By the time I had replaced the last paper capacitor, however, it had developed a loud, intermittent crackle.

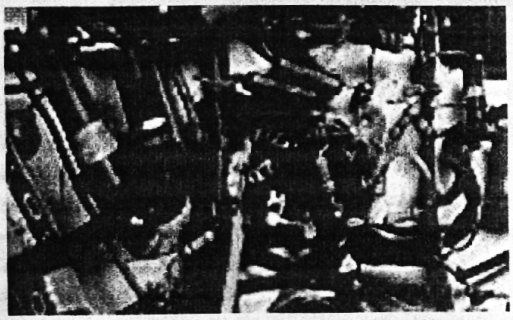
The crackle was not affected at all by the volume control. That is, the explosive noise was equally loud whether the volume was turned down or up. This clue suggested that the problem lay somewhere downstream of the volume control, which narrowed the number of places to look. In this radio, the 6SQ7 tube provides the first stage of audio amplification, as well as AVC, and the 6F6 tube serves as the final audio amplifier. The problem must have been located in those tubes' circuits.

Seeking advice from the rec.antiques.radio+phono newsgroup, I got some great tips for troubleshooting noise problems in general. Bill Turner suggested a simple test for this particular case: pull out the 6SQ7 and 6F6 tubes one at a time and note the results.

With the 6SQ7 tube out of the set, the radio's signal disappeared but the crackle continued unchanged. With the 6SQ7 back in place but the 6F6 tube removed, nothing could be heard. This test indicated that the problem must be in the 6SQ7's circuitry. (Again, the 6SQ7 serves as the first audio amplifier as well as the AVC control.)

In the course of troubleshooting the crackle, I had already replaced all of the small components around the 6SQ7 and 6F6 tubes, resoldered all of their connections, and thoroughly cleaned their tube sockets and neighboring circuitry. That seemed to leave only one villain—the 6SQ7 tube socket itself. Although sockets tend to be very reliable, it is possible for voltage to arc between two pins of the socket. This can occur where dirt between pins offers an initial path. Once arcing starts to occur, carbon is built up along the path, creating a condition that slowly grows worse.

The most practical cure for an arcing socket is to replace it with a new one. The photo below shows the 6SQ7's circuitry before the replacement.



Fortunately, the 6SQ7 is located in an uncluttered part of the chassis, making removal a straightforward job. The socket is attached by two rivets which go through the chassis. After removing all components from the socket, I drilled off the expanded bottom of each rivet. This allowed me to remove the socket from underneath.

If you need to drill out socket rivets, it's a good idea to keep a small magnet and vacuum cleaner nearby and clean up the metal dust as you work. Loose metal filings can cause some very nasty problems if they work their way inside a radio's electromechanical components.

The rivets did not simply fall out of the chassis after their bottoms were drilled off. My not-very-sharp drill bit had slightly expanded the rivet shafts where they met the chassis underside, causing them to stick securely. Cautious tapping with a metal punch from underneath didn't budge them a bit. To work them loose, I turned the chassis over and used a Dremel Moto-Tool with cutting disc to form a slot in each rivet head. The slots allowed me to turn the rivets with a screwdriver. Turning loosened the rivets enough that I was able to carefully wedge a knife blade between each head and the chassis top. Gently working a thin screwdriver blade into the gap between rivet head and chassis, I was finally able to remove these tiny but stubborn bits of metal from the holes.

That sounds like a lot of hassle, and it was. In hindsight, it would have been simpler to use a drill bit exactly the same diameter as the rivet shaft and drill it out completely in the first place. I didn't happen to have a drill bit that size, however, and my method eventually did the job.

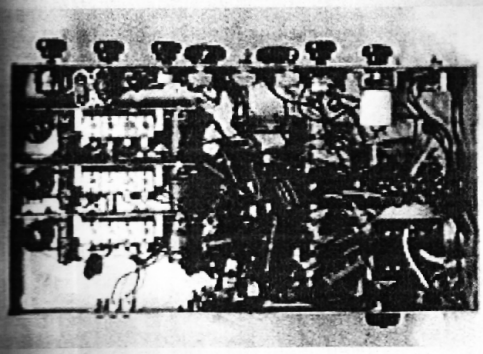
I installed the new socket using a stainless steel screw and locking nut, with "star" locking washers on both sides of the chassis. When replacing a socket, you should tighten the mounting screws very well, to prevent any problems with intermittent ground connections in the future.

There are two large brown resistors R31 and R32 which form part of the radio's power supply.

R32 failed dramatically, overheating and starting to smoke. I quickly powered the radio down and disconnected that resistor. I also checked R31 and discovered that its value was far out of spec. The schematic specifies 10K for this resistor, but its value had drifted upward to 30K. I replaced both resistors with good ones from my stock of spares, using higher-wattage units for an extra margin of safety.

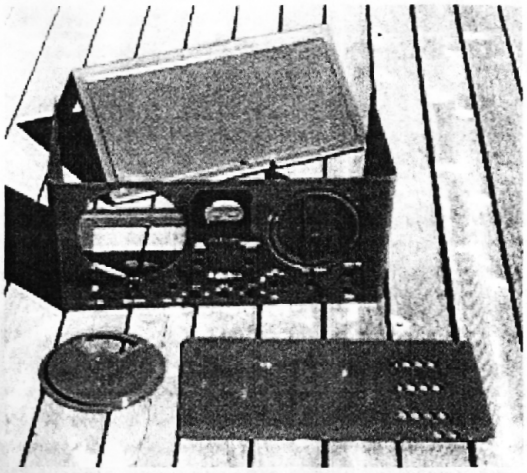
After those replacements, the radio played with no crackle. The operating voltages also tested correctly throughout the set, indicating a healthy power supply.

The last step was to align the radio using my signal generator and multimeter. Photo below shows the chassis underside after restoration.



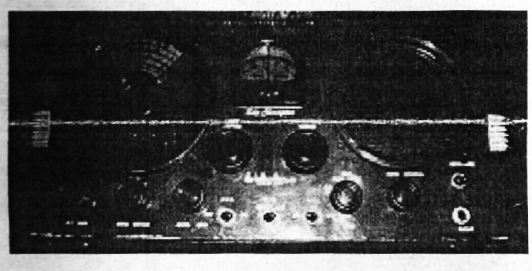
Cabinet Restoration

Phil spent a lot of time, patience and hardwork getting the right colour for the dials and cabinet and carefully sand papening all chipped and scratched areas. The paint job was preserved with varnish.



Assembly and Alignment

With the chassis finally back in its restored cabinet, I was able to finish aligning the receiver, making sure that the dials tracked correctly against the hairlines in the plastic dial windows.



Final Thoughts

This radio presents a good case study in how a "working" radio may actually need a lot of restoration. Yes, it played reasonably well when I brought it home. But virtually all of its small paper capacitors were leaky. One of its electrolytic capacitors failed dramatically after roughly one hour of play. Two critical power-supply resistors were defective. And several other small components around the 6SQ7 and 6F6 tubes were bad enough to merit replacement.

The lesson is simple. An unrestored antique radio may seem to play very well—and many do—but it's only a matter of time before some tired component fails. When that happens, you may be facing worse problems than if you had performed a routine overhaul in the first place.