Some early history and brief details of the Introduction of Amateur SSB in South Australia

By Rob Gurr VK5RG

Amateur SSB was not always from "Black Boxes". There was a need for great technical effort and ingenuity, to establish an SSB station in the years immediately prior to WW2.

In 1933 Robert Moors W6DEI described his SSB transmitter in the Magazine "R9" and by 1934 there were up to 5 other stations operating on the mode, in the USA.

Pre WW2, the predominant telephony mode was AM, using the best techniques and components available at the time. Methods of modulation included high level plate and screen modulation, and less efficient control grid, screen grid and cathode modulation.

During the war, most radiotelephony equipment manufactured for the services used AM, and when Amateurs were allowed to return to the air following the armistice, heaps of this equipment became available to them, thus promoting the continued use of AM as the major mode.

Prior to the war, SSB became attractive to International Telephone operators, and in the mid 1940s, reception of this mode became a challenge to Amateur experimenters. Some countries using 3kHz inversion techniques for privacy on their AM transmissions, used the same equipment on their SSB signals. With a suitable BFO injection, the amateurs were able to demodulate the now reverse sideband, and the original privacy was lost.

This was the beginning of an Amateur understanding of the use of SSB

In 1947, W6YX commenced Amateur transmissions on 14MHz, and as a result, many amateurs became interested in the mode, when it became obvious that it was practicable to copy these transmissions on an ordinary CW communications receiver. An early difficulty was the receiver 'drift' due to both receiver and transmitter oscillator drift.

In 1947, an article in QST about the 'Clapp Oscillator', drew the attention to a much improved method of obtaining a more stable Variable Frequency Oscillator, and associated techniques such as VFO shielding and heat control were evolving.

In 1954 the ARRL compounded all the articles on SSB that had been printed in QST over the previous years, into a publication called "Single Sideband for the Radio Amateur".

In Adelaide, one day in 1947, in company with John Millard VK5FC, and Bill Rice VK5BP, we were traveling to a Field Day at Clare, SA as guests of John Lamprey VK5JL, in his parent' motor car. The prominent conversation between John and Bill, which we all enjoyed and learned from, was the new mode SSB that was appearing on the Amateur bands.

With this learned information from these two academics, it was no wonder I immediately caught on to the need for SSB in the Amateur service.

The benefits of SSB over AM have been written many times over the years, however two main issues have been the saving of heavy components particularly power and modulation transformers, and the reduction of bandwidth of the signal, with the useful components of the speech being concentrated in one sideband only. Using the same power supply components, a higher level of output was available from the same output tubes.

I spent a number of years in between 1947 and 1962 at various locations throughout Australia and its Territories, and found some brief periods to indulge in the construction of many items appropriate to SSB. I gave one of the first presentations on the subject to the WIA SA Division in about 1954, resulting in a number of other members commencing early construction of various items for that mode.

In this post war period, components to build a filter type SSB generator, were limited. An inductance/capacity filter on 50kHz with a bandwidth of 3kHz might be constructed by amateurs with access to good test equipment, or alternatively the purchase of FT241crystals, to make a simple lattice crystal filter on frequencies close to 455kHz.
I was lucky enough to be given a set of FT241 crystals, by a visiting Melbourne amateur, who had successfully constructed a transmitter using a filter made from these crystals. This was the subject of the first presentation to the WIA in Adelaide.

The filter method of SSB generation was kept alive by Arie Bless VK2AVA, who packaged a large number of H/F crystal Lattice filters, using disposals FT243 crystals, usually in the 5MHz range. The filters were basic, but the best that amateur technology had reached, in their day. Many Australian SSB enthusiasts, commenced their experiments using these filters..

Shortly after my success with the filter method, a visiting friend Don Pollard, VK2ASW, introduced me to the alternative method of SSB generation, the phasing method. This had been a more difficult home construction method, requiring close tolerance resistor and capacitor values in an Audio Phase Shift Network. An American firm, Barker and Williamson (B&W) , was marketing a suitable network made up in a small metal case with an octal base, that contained the essential components for such a network. Don and Stan Bourke VK2EL, had made a similar network of their own design, and were supplying it to their friends as the "ASWEL" phase shift network.

The American General Electric CO. published in their regular "GE Ham News" for Nov-Dec 1950 newsletter, details of a phasing type generator, called the "SSB Junior". This
unit generated SSB on 9 MHz.
Shortly afterwards, an article in QST March 1956, by Tony Vitale, W2EWL used this sideband generation scheme, and built into a wartime "Command BC458 Transmitter chassis. The generation frequency was 9 MHz and the VFO being on 5 to 5.5MHz, enabled outputs, with appropriate coil selection, on both 3.5MHz and 14 MHz.

The 9MHz signal generated was on lower sideband, and with the VFO operating higher in frequency than the generator, the output on 14MHz was upper sideband. This method of two band operation became very popular throughout the world, and is believed to be the reason why today, it is standard for Amateurs to transmit LSB below 9 MHz and USB above.

This is in contrast with the ITU/CCIR commercial standard of all SSB transmissions on all frequencies being USB. Commercial allocations are also made as the frequency of the center of the emission, whereas Amateurs determine their frequency as the frequency of the suppressed carrier.

I was able to build one of these W2EWL exciters during 1956, and when commencing a four year term in Papua New Guinea in 1958, I took this transmitter with me, and made a number of contacts with it. As some of my amateur friends in Australia were not yet established on SSB, or even convinced of the mode, I built another AM transmitter to keep contact with them.

One friend Reg Galle VK5QR, became very interested in the mode, and by coaching on the air, I helped him to construct a similar W2EWL rig, He became one of the earlier experimenters using the SSB mode, and later after purchasing Collins equipment for High Frequency work, moved his interests in SSB up to the Microwave bands.

Before Reg passed away, last year, he gave me the old W2EWL rig, he had built under my guidance, 50 years previously. It is here somewhere, but I can't find it!

Amateurs in Australia were quick to use the new SSB (at that time with a title of Single Sideband Suppressed Carrier SSBSC). Interstate stations began appearing on the 14MHz band on frequencies above 14.300 MHz. on a network mainly for the exchange of ideas, techniques and testing. I remember
one early participant was Noel Southwell VK2ZF, and a number of others around Australia. In Adelaide a few experimenters appeared, but it was not until the availability of commercial equipment, that the mode caught on here.

"Amateur Radio" printed a few articles, from interstate contributors, and Bud Pouncett VK2AQJ, Phil Williams VK5NN and others undertook to publish a monthly column in the WIA magazine. Hans Ruckert VK2AOU provided a number of constructional articles over many years, and "Electronics Australia" also published some useful articles on the construction of receivers and transmitters.

In Adelaide, Phil Williams and I sponsored a local WIA "Workshop" at my home, where tests and suggestions were made on partially constructed projects.

To encourage the use of SSB on VHF, Bob Murphy and I constructed a 6 Metre phasing exciter, with a 5B/254M output valve at 20Watts output, to loan to interested amateurs. As a result a number of both phasing and crystal exciters, and complete transmitters were constructed in South Australia.

With the initial availability of Collins mechanical Filters, and later complete transceivers, home construction of such equipment was much reduced. Fred Vale from Melbourne imported large numbers of Japanese transceivers, initially without power supplies, which made the price more suitable.

Social acceptability

From the day of the initial transmission of an SSB signal, there became a misunderstanding about the acceptability of the mode on the bands of the day. When received on an AM receiver usually of at least 6 kHz IF bandwidth, the SSB sounded very wide. The fact that the AVC system was 'pumping' also contributed, as without a long delay, the receiver remained at full sensitivity continuously, contributing to the apparent distortion.

Nick names such as "Duck Talk" became common, however eventually the Amateur fraternity at large accepted the new techniques.

One local, VK5PS, Warwick 'Pansy' Parsons (SK), author of a weekly column in the Advertiser, and a monthly column in "Amateur Radio" observed the new mode to be totally wrong. He made humorous remarks in his columns, that may have swayed potential users, to delay their participation. In his retirement from the AM Broadcasting industry, he was frequently heard on SSB! Never too late to take up a more modern technique.

SSB transmissions commenced about the same time as TV Broadcasting in Australia. The potential for interference from Amateurs was greatly reduced, considering the improved efficiency and shielding that operators were now addressing. Amateur interference to TV from harmonic transmission was also reduced, and except for overdriven linear amplifiers, has continued to be minimal with SSB.

I was on a WIA TVI Committee, with a number of other local members, including a TV design engineer, and we had been able to promote better amateur construction and shielding techniques, before TV Broadcasting commence in Adelaide.

Future Developments

The change from basic Amplitude Modulation techniques has become accepted by the Amateur community after 60 years. Boat anchor and AM nets provide a great arena for the preservation of our interest in these older techniques.

Another main change is on our doorstep, with the development of Software Defined Radios, where the power of the PC and associated software, is replacing a number of our previously stable concepts of transmission and receiving techniques. SDR is here now, and is growing in its popularity, with the advantages it can offer.

Even hobbyist Radio Astronomers are already using these receivers to assist them in receiving the signals from distant constellations. The SDR transceivers are available commercially at prices comparable with standard transceivers.

However, we do not have to move on with our technology, but for Amateurs interested in advanced techniques, this is the field to keep your eye on.