



October 2006

Issue #10

This newsletter is sent out to all who have called in on the AWA net and who have email facility, and those who have paid for mail envelopes, with the hopes that it will encourage you to call in again and help to keep the AWA net alive and well.

Should you not want to receive any further publications of this newsletter, drop me a note and I will take you off the mailing list. Should you prefer to receive a hard copy via snail mail, please send an SASE for the period you would like to receive these and I will process for you.

Happenings:

The end of the year is rapidly approaching and this also means its time to elect a President for 2007. What we would like to see is nominations by you the readers and listeners for this most prestigious position in the AWA. Let us have your nominations by email and we will post them on the Saturday net, which will give you all a chance to ponder over them and then make a decision.

It would be good if we could have our new President elected by the end of November, with a small committee, to assist him.

The positions available are:

- President
- Technical Advisor
- Public Relations
- Net Controller
- Newsletter Editor

In this modern electronic day and age, distance is not a problem. So if you want to nominate someone who call's in on a regular basis and you feel could handle the task of President, even if they live in Cairo, they are only a PTT, or an email away.

ZS0AWA/CW.



The CW net continues along with very little activity over the past month probably due to band conditions. Regulars have been Barrie ZS6AJY, Ben ZS5SIB and Ian ZS5IAN. Band conditions continue to plague us, but we still keep the air waves warm with a bit of RF on Saturday afternoons at 14:00 SAST. The net is run at 12 wpm and so should meet the needs of all interested in CW. 7020 is the frequency.

AM Net:

AM call in at 09:15 on Saturday morning has been abandoned until some improvement happens in the bands. With conditions being the way they are and also having the 40/80 relay, we have decided it would be better this way.

The AM group on Wednesday evenings has been plagued with similar problems although not as consistent on 80m. The band goes out sometimes before the net even has a chance to get going, and then opens up again after a short while. There have been some fairly good contacts on 80m AM during the month.

The following stations have called in on the AM net on Wednesday evenings: ZS5RK, ZS5DR, ZS2AB, ZS6AVM, ZS6ALL, ZR6DNS, ZS6BOX, ZS6AW, ZS6RAD, 3DA0BD and yours truly ZS6ADY

Please come up and join us if you have the time and the inclination. 19:30 Wednesday evenings on 3615.

SSB Net:

The 40/80m relay is up and working and certainly makes for calling in on frequency a lot easier. Div 5&6 have been operating on 80 with a relay on to 40 and then Div 1,2 & Z22 coming in on 40 being relayed to 80m. I am sure you will all agree that it makes life a lot easier and seems to keep Om Willem happy running the net this way. At least he is able to hear all stations now.

I am sure you will all agree with me that Willem has done an outstanding job as net controller for the AWA so far and we all appreciate his efforts.

We appeal to all of you, when calling in on 40m, should you not be able to hear the control station, please try 80m if you are able to. Otherwise we have people doubling and it really does make life difficult.

Promotions:

Things have quietened down now and perhaps this may be a good time to talk about having a swap meet somewhere, with workshops on refurbishing some of the old rigs, flea market for the hard to find bits and pieces, as well as rigs that have been gathering dust, and a chance to destroy some of the ozone by burning some meat on the fire and talking nonsense and propagation.

Seeing as no one came up with any suggestions, what about Saturday 04 November.

Would be interested to hear any response to this suggestion.

Amateur Radio and the Rise of SSB

The hams who were first to get on the air with single sideband created a revolution in Amateur Radio. Along the way, sideband would even affect the course of the Cold War.

The cover of the January 1948 issue of *QST* was, well, different. An oscilloscope was pictured, and though it was a piece of equipment few hams owned or were familiar with at the time, that wasn't what made the cover so unusual. Rather, it was the strange-looking modulated wave envelope displayed on its CRT screen. Or actually, only one side of the modulated wave envelope. Normally symmetrical about one axis, the envelope was missing one entire half. What was this all about?

Inside the issue, there was no "On The Cover" to explain the picture. Rather, there were an editorial and three articles all devoted to introducing hams to the arcane subject of "s.s.s.c."—single-sideband, suppressed carrier. The articles also discussed the messy state of the ham bands, clogged as they were with frequency-hogging AM signals often interfering with one another. "In the usual present-day snarl of 'phone interference," *QST* editorialized, "we have the piercing shrieks of heterodynes." It went so far as to predict boldly that "everything points to s.s.s.c. becoming the accepted amateur method in the near future." The three articles that appeared in the issue laid the groundwork for the transformation of Amateur Radio that was to come over the next quarter-century. For most hams, the strange-looking oscilloscope pattern on the cover was to be their first introduction to what would eventually come to be simply called "sideband" or "SSB."

Enormous Impact

If there has been a technical advancement that distinguished ham radio over the past half-century, it would have to be single sideband. The move from AM to SSB would be as controversial in its time as the move from spark to CW had been in the 1920s. Sideband's impact has been enormous

and the changes it has created in Amateur Radio far-reaching. It is ubiquitous today, a standard feature on virtually every commercially produced piece of amateur equipment. And it isn't simply useful for voice communication; sideband technology is employed in computer modems, and vestigial sideband (VSB) has been developed for use in digital television.

The existence of sidebands as distinct from a carrier was first determined mathematically in 1914. A year later, John R. Carson, an engineer working for AT&T, invented sideband technology for use in long distance telephone carrier circuits as a means of increasing the number of calls that could be transmitted simultaneously. Carson's invention, which involved the use of filters to remove a carrier and one sideband while passing the other through, was patented in England that same year, but court litigation held up his US patent until 1923. In January of that year, the first experimental one-way transatlantic single sideband transmissions were made from Long Island, New York, to London, England. In 1927 a regular two-way transatlantic low-frequency radiotelephone circuit using sideband technology opened for commercial use at a cost of \$75 for a three-minute call (that's about \$760 in today's money!).

It wouldn't take hams long to take note of this new technology. A series of three articles on sideband by Robert Moore, W6DEI, appeared in the *Amateur Radio* magazine *R/9* in 1933 and 1934, and *QST* Technical Editor James Lamb, W1CEI, published the magazine's first article on the subject, "Background for Single-Sideband 'Phone" in October 1935. An editorial introduction to his article noted that by "action of the 1933 A.R.R.L. Board Meeting, the technical staff of *QST* was in-



structed to investigate the feasibility of single-side-band carrierless 'phone transmission on amateur frequencies." Some sideband experimentation was carried out in the mid-1930s by a small group of hams,¹ but it was hampered by technological limitations of equipment at the time. World War II changed all of that, making enormous advances in radio technology. After hostilities ended and Amateur Radio resumed, there was no longer any technological reason for sideband to stay on the sidelines and a very pressing need for a communications mode that would occupy less bandwidth than did AM and so free up space on ham frequencies. Sideband was exactly what the doctor ordered, and a concerted push by the ARRL would effectively

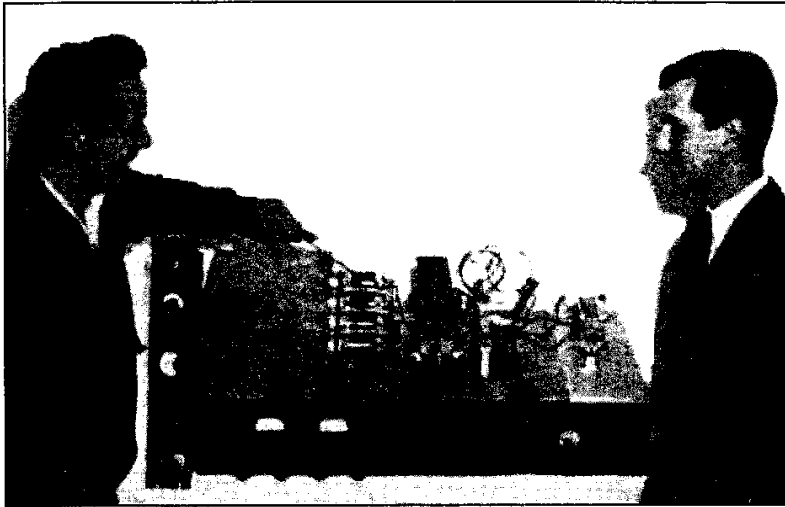


Figure 1—This photo, from the February 1948 issue of *QST*, was captioned: "Although full technical information on the single-sideband suppressed-carrier transmitter at W6YX is not available at this time, this photograph shows Dave Thomson, W6VQB, pointing out the final amplifier to Robert D. Smith, W6QUW, president of the Stanford Radio Club... The transmitter was designed by Oswald G. Villard, Jr, W6QYT, of the electrical engineering faculty at Stanford University."

spread the word, altering the course of ham radio.

W6QYT at Stanford

It was experimental sideband work begun in 1947 on the 75 and 20 meter bands at W6YX, the Stanford Radio Club at Stanford University in California² that inspired the series of January 1948 articles in *QST*. In the issue, Assistant Technical Editor Byron Goodman, W1DX, described this new mode of communicating in "What Is Single-Sideband Telephony?" In addition, Oswald Villard, W6QYT, of Stanford, explained the results of his club's test transmissions and informed hams how to go about tuning in these new signals ("it is very desirable to use the minimum r.f. gain setting when the b.f.o. is used for demodulation," he would write, advice repeated through many issues of *QST* for hams unaccustomed to tuning in these strange-sounding signals). Finally, Art Nichols, W0TQK, detailed the sideband rig he built to communicate with W6YX in "A Single-Sideband Transmitter for Amateur Operation." A follow-up Stray the following month showed a photo of the Stanford station. See Figure 1.

The following month, a full-page advertisement by the National Company in *QST* extolled the possibilities of duplex sideband. By April, *QST* Technical Editor George Grammer, W1DF, was able to prognosticate:

It may not be too much of an exaggeration to say that our present-day 'phone methods will be just as obsolete, a few years from now, as spark was a few years after c.w. got its start. "Old-fashioned 'phone" will eventually be something that

can be tolerated only where there is plenty of room for it.³

In July of the same year, Byron Goodman's column "On the Air with Single Sideband" debuted in *QST*, keeping hams informed of the increased sideband activity in the United States and around the world. The same issue also featured a full-page ad for tetrodes from Eitel-McCullough specifically aimed at sideband enthusiasts. See Figure 2. It was a sign that the radio industry was beginning to see the potential of a market in equipment for amateur sideband use.

Another sure sign of sideband's potential could be gauged by letters to the editor in *QST*. In October 1948, a writer decried "single-sideband gibberish," and accused the magazine of "trying to shove it down the throats of the ham fraternity." But more hams than not were open to the possibilities that sideband offered, realizing that it offered a solution to the very real problems that plagued the ham bands. "I personally have had no experience as yet with single sideband," wrote a Canadian ham in the December issue, "but anything that may relieve the overcrowded conditions of our bands today and make for QRM-free QSOs, I'm all for it."

Filter vs Phasing

The next year, "On the Air With Single Sideband" was discussing the merits of generating sideband signals with filter versus phasing systems. The former involved sharp filters and multiple frequency conversions, sophisticated technical requirements that many hams felt they couldn't achieve. But phasing systems, which used a 90° phase difference in two signals to balance one out while augmenting and

passing the other through, offered a simpler solution to getting a sideband rig on the air. Ralph V. L. Hartley of Western Electric, best known to hams for his invention of the Hartley oscillator circuit back in 1915, had patented a phasing SSB system in 1928, but Don Norgaard, W2KUJ, would pioneer its use in "A New Approach to Single Sideband" in the June 1948 *QST*. By April of 1950, the magazine would report that hams using phasing methods outnumbered those using filter 2 to 1.

Manufacturers began taking more notice. In the June 1950 *QST*, a full page ad from the Collins Radio Company claimed its 75A-1 receiver to be the "SSSC Receiver of the Year," and in January 1951, the magazine announced a commercially produced amateur sideband transmitter, the "SSB Jr.," new from Eldico. See Figure 3.

By April 1953 *QST* had reported a tally of over 300 US sideband stations active, and the first two-way 75 meter sideband transatlantic QSO. In November 1956, *QST* reported the first sideband awards for WAC and WAS (there were 48 states then). The first sideband DXCC had been accomplished a year earlier.

The Military Takes Note

In the mid-1950s, hams and amateur sideband actually had a hand in altering the course of the Cold War. General Curtis LeMay, W6EZV, was Commander of the Strategic Air Command (SAC), charged with deterrence of the Soviet nuclear threat. See Figure 4. New jet aircraft then being introduced were resulting in the elimination of in-flight radio operators and SAC was planning on the use of AM voice equipment in the cockpit. LeMay became aware of the successes of amateur SSB work, and in 1956 undertook two flights, one to Okinawa and the other to Greenland, during which SSB was put to the test using Amateur Radio gear and hams themselves. Two of the hams invited to operate on those flights were Art Collins, W0CXX, of Collins Radio, and Leo Meyerson, W0GFQ, of World Radio Labs. SSB far outperformed the conventional AM communications systems then in use by the military. In 1957, it was formally adopted by SAC for use in its (then) new B-52 bombers,⁴ the same year that General Francis "Butch" Griswold, K0DWC, of SAC would give the keynote address on the subject at the ARRL National Convention in Chicago.

Writing in the January 1953 *QST*, Byron Goodman would report that "Art Collins, W0CXX at Cedar Rapids, Iowa, is making a lot of the a.m. diehards think 'maybe there's something to this single-sideband stuff after all.'" Indeed he was. In addition to his personal involvement in helping SAC decide on SSB for its communications systems, his company, Collins Radio, would end up making arguably the largest single contribution to amateur use of SSB when, in 1955, it all but abandoned production of AM gear and threw its considerable re-

FOR **S.S.S.C.***
HERE'S TOP PERFORMANCE



*SINGLE SIDEBAND SUPPRESSED CARRIER

THE TREND . . . is definitely toward single-sideband operation. Advantages are obvious. Elimination of a continuously running carrier saves power and reduces interference. In fact, a signal is put on the air only when something is said.

HOWEVER . . . it does present some problems. To reproduce voice and music the equipment must handle high peaks of power even though the average power is very low. Unlike conventional AM service, where the modulation level must be held down so that the high peaks will not exceed available carrier, single-sideband modulation levels because of the absence of carrier are unrestricted by peaks and in general are limited only by the average power an r-f amplifier can produce.

TUBES . . . which can handle high peak powers in excess of normal ratings are a natural for single-sideband work.

EIMAC TETRODES ARE THE ANSWER

REMEMBER . . . the universal use of Eimac tubes in radar? They were specified because of their ability to handle high peak power. Now, this ability enables them to take the lesser requirements of single-sideband service in stride. Eimac tet-

rodes handle high peaks because of their inherent ability to take momentary overloads, their reserve supply of emission, and freedom from internal insulators.

IT IS FAR EASIER . . . to produce a single-sideband signal at a low power level. Here again Eimac tetrodes fill the bill. Because of their high power-gain, this valuable low-power signal can be built up from the modulator to high power in a single amplifier stage.

IN ADDITION . . . the single-sideband driver must "see" a constant load resistance, and Eimac tetrodes with their low driving-power requirement mean a minimum of swamping action. It is even possible to run up the screen voltage until no grid current is drawn and no changing load is presented to the driver.

DATA AVAILABLE

PICTURED . . . above is the popular 4-65A tetra-
rode. A new complete data sheet on it has been prepared. You will find SSSC ratings and suggestions in it . . . write today. Other Eimac tetrodes suited to SSSC application include 4X150A, 4-125A, 4-250A, 4-400A and the 4-1000A.

EITEL-McCULLOUGH, INC.
199 San Mateo Avenue
San Bruno, California

EXPORT AGENTS: Peter & Henner-301 Clay St.-San Francisco, Calif.

FOLLOW THE LEADER TO
Eimac
TUBES
The Power for R-F

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PRINTED IN U.S.A.
REGISTERED TRADE
MARK, N. Y.

Figure 2—This full-page ad for Eimac tubes, published in the July 1948 issue of *QST*, touts the advantages of SSSC.

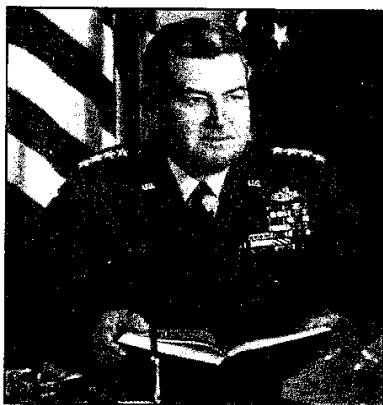


Figure 4—This photo of General Curtis LeMay, then K3JUY/K4RFA, from the July 1961 issue of *QST*, announced his nomination as chief of staff of the US Air Force. During the mid '50s, Gen LeMay had converted Strategic Air Command communications from AM to SSB, based on his ham experience with the newer mode.

sources behind development of sideband gear, having prepared the way with a series of full-page "Engineering Notes" that appeared in *QST* in late 1954. In May of 1957 Collins would make history with the launch of the KWM-1 transceiver, "the first mobile transceiver," the advertisement in *QST* read, "and the first to offer SSB." A review of the rig in the April 1958 issue would be positively glowing:

It is the writer's opinion that the KWM-1 may well mark the end of one era and the beginning of another. This unit is more than another piece of ham gear; it could be a way of life (in Amateur Radio).⁵

Byron Goodman's column "On the Air With Single Sideband" was discontinued after March 1954 and the ARRL's handbook, "Single Sideband for the Radio Amateur," made its first appearance in December of the same year. SSB had made a secure place for itself within Amateur Radio. Change, however, didn't come easily or quickly for a few hams. The disagreement between AM diehards who disparaged the "Donald Duck" sounds of SSB,

and those who disdained the frequency-hogging of "ancient modulation" would continue well past mid-century. As late as 1963, a letter to *QST* urging the ARRL to "get on the ball and ask FCC to give the a.m. boys six months to go s.s.b.,"⁶ resulted in an outpouring of mail in support of the "a.m. boys." In the end, the issue would finally only be overshadowed by another controversy: the regulatory changes of incentive licensing.

Sideband had won the day.

Notes

- ¹Correspondence from Members," *QST*, Feb 1948, p 64.
- ²As if its role in the sideband revolution wasn't enough, Stanford University would later be at the forefront of another technological revolution—the computer—and instrumental in the development of nearby "Silicon Valley." Oswald Villard himself was a pioneer in early meteor scatter investigations.
- ³Technical Topics," *QST*, Apr 1948, p 29.
- ⁴Charles A. Keene, "Once Again, a Ham Operator in Command," *QST*, May 1997, p 43.
- ⁵"Recent Equipment," *QST*, Apr 1958, p 23.
- ⁶Correspondence from Members," *QST*, Jan 1963, p 87.

Articles 1-3

Simple • Complete • Amazingly Effective!



ELDICO'S SINGLE SIDEBAND XMTR-XCTR

The Eldico SSB Jr. is patterned after the amazingly effective unit developed by Don Swartzard, W2KJL, and described in the November-December 1950 (2-B) Ham News. It is available in either kit form or completely wired and tested.

Everyone can now enjoy all the benefits of single sideband transmission. Tremendous efficiencies of low power QRM minimized or eliminated entirely; QSB has less effect . . . complete phone contacts with 7-c.w. reliability.

Eldico's SSB Jr. is a complete 7-tube 5-watt single sideband transmitter. Tube complement consists of 12AU7 combination speech amplifier-modulator; 12AX7 twin-diode amplifier; 6AG7 beam; 12AT7 tone-speech pre-amplifier; 6BE6 bias; 5Y3G rectifier.

Each kit comes complete with all parts, punched chassis, cabinet, tubes, power supply components and full instructions for assembly and operation. Radio phone-shift network covers fully assembled and tested, eliminating necessity for elaborate test equipment. Low difficult to construct and adjust than many conventional transmitters . . . practical SSB at amazingly low cost is now a reality. The Eldico SSB Jr. may be used as a transmitter, or a driver for high-power linear amplifier, or in conjunction with a v.f.o. The transmitter provides flexible, sideband suppression by using a simplified phasing method which becomes of Eldico's laboratory assembled phase-shift network, requires only standard components and no special technical skills. A groundplane is included as an integral part of the Eldico SSB Jr. kit to enable the use of any low-level microphone such as crystal or dynamic.

SSB Jr. complete kit with instructions . . . \$39.95
SSB Jr. Wired and tested . . . \$99.95

Signal Distinction
ELDICO
OF NEW YORK
INCORPORATED

1000 DUNSTON AVENUE, DUNSTON, L. I., NEW YORK 11762

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Figure 3—This ad, for Eldico, features the company's new 7-tube, 5-W sideband rig. "Everyone can now enjoy all the benefits of single sideband transmission," the ad proclaims.

Restoration News:

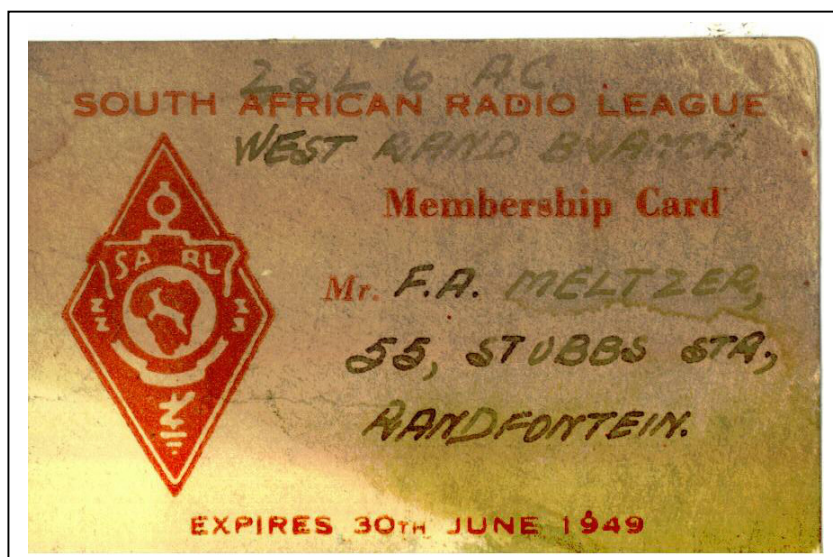
The list of valves that we purchased for the AWA will be circulated to all on the mailing list, within the next week or 2. I opted not to send it out with this newsletter so as to keep the size down. John ZS2J has also sent me a list of valves that he has in stock to add to our list. Should you have any valves you want to donate to the AWA, let me know and we will make arrangements to collect them and add them to the growing list.

Hint from Danny:

Hint on limiting drift from older valve-type VFO's. Replace all caps with silver mica and put a small laptop computer fan near VFO tube. DC voltage can be obtained from filament lead and rectified by a 1N4001 etc. Adjust speed of fan with series resistor to blow a gentle low speed breeze over tube. I use it in my Swan 350 that was prone to drifting and it works fine now

Shack News:

Alan, ZS6BIK, sent me this picture of an old SARL Membership card that he found inside a Hammurlund HQ120 that has been donated to the AWA.



Swap Column:

Any swaps or items for sale in the antique line ? Let me have the details and we will advertise it here.

There is an online swap shop on the website of the Highway Amateur Radio Club for ALL amateurs and interested parties to use - it is not restricted to members only. We have been invited to make use of this facility too. Should you want to, use the link to the HARC at the end of the page to take you to their website.

If you would like to forward this newsletter to any other interested parties, please feel free to do so. Print it out and put in on your club notice board, or give it to someone interested in valve radios. If you know of any who report in on the net but don't have email, print it out and give them a copy.

Net days and times:

Saturday 08:30 SSB net - frequency – 7070Mhz

Saturday 09:15 AM net – frequency 7070Mhz

Saturday 14:00 CW net – frequency 7020Mhz

Wednesday 19:30 AM net – frequency 3615 (-5 for QRM)

This, and past copies of the AWA Newsletter can be downloaded from <http://members.harc.org.za/newsletters/AWA/>. Our thanks to the Highway Amateur Radio Club in Durban (<http://www.harc.org.za>) for providing this service to our members and other interested parties.

Thanks for the bandwidth.

DE ZS6ADY FOR ZS0AWA

Not exactly antique, but how's this for a serious mobile unit.

