THE SIGNAL

Collins Collectors Association

Issue Number Fifty Five

Third Quarter 2009

OFFICIAL JOURNAL OF THE COLLINS COLLECTORS ASSOCIATION

Join Us on the Air!

- Sunday 14.263 mHz at 2000Z
- Tuesday 3805 kHz at 8pm CST
- Thursday 3805 kHz at 8pm CST
- Friday (West Coast) 3895 kHz at 10pm CST
- Sunday 10m AM 29.050 mHz at Noon CST
- 1st Wednesday AM 3880 kHz at 8pm CST

Sunday for Technical, Buy, Sell & Swap
Tues., Thurs., Fri., & Sunday for Ragchew

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Visit the CCA Website @ www.collinsradio.org See our new features. You can also renew your membership on line via the website and new PayPal link.

In the News

- S-Line History Revealed
- Increase in Hams
- Bud, K7RMT, to turn 90—Party Oct. 24th in Wimberley

The History of S-Line Development

Per Spective Line

Part I

by Bill Carns, N7OTQ/K0CXX

Figure 1. S - Line promotional introduction postcard circa December, 1958

The idea for this article came to me one afternoon as I was riding in the car listening to my favorite country station. The syndicated music feed carried a regular feature about the circumstances that led to the writing of a particular song. It was titled: Have you ever wondered what led to the writing of a particular song?

For some reason, I thought about the S-Line and the dramatic change in physical design and styling. My mind jumped to the 50s and I found myself speculating about the conditions – market, economy, number of hams, etc. – that prevailed at the time. Over a period of weeks, the idea came and went, but it stuck with me and grew to include, not only the "why", but the who, when and where. I also came to understand that I was going to need some help – so the research and interviews began.

In the process, I spoke with Dennis

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From the Editor's Desk

by Bill Carns, N7OTQ and Co-Editor Joe Nyberg, WILJN

Another quarter has raced by here. Amazing how that happens. Time seems to be going faster, and jobs take longer, the closer that I get to finishing my shack building. The shack is starting to settle down. I am, finally, almost finished with the building and the equipment is all in place less a few key pieces yet to come out of storage. For those following this 3 year long move and building saga, I am including a picture of the 30K-5 operating position by way of an update. I am COMMITTED to getting K0CXX on the air from the new shack in Q4, 2009 (Thought I would add the year here just to be specific….Hi!)

forward to a "In the Shack" feature from Paul in the near future. And….One of these days I will give you all a full update on the K0CXX/N7OTQ shack with a rundown on the new "Comm Central Southwest".

Membership is up significantly this quarter - and over 2008 - and your CCA board has been busy working on membership benefits which we should be rolling out during the next two quarters.

This issue of the Signal has been what I would call a moving target. One of the key authors for this issue, Dave Ross, N7EPI –

Figure 2: 30K-5 Operating position in the rec room at K0CXX—Comm Central Southwest

Meanwhile, President Paul Kluwe is completing his career change and move from Michigan to Tennessee and setting up his new shack. We will look

writing about some of his military Collins gear – was in a serious car accident late in the game, but while the article was still being finished. The accident totaled his restored M-38/Trac-75 Jeep and Dave was left with some permanent eye damage. We wish him well and hope he has a speedy recovery. His valiant efforts in finishing his article are appreciated.

Dave and Scott Johnson, WA7SVJ, will be following up with more articles on the URG series of radio groups including operation and set-up of the KWT-6. In addition, Rod Blocksome has promised us an article from the horses mouth on the HF-80 series.

At the last minute, I have accelerated the completion of an article on the history and perspective of the S-Line development and hope that you all find this as interesting as I did while digging out the facts involved and talking with some of the folks involved. All kinds of good stuff started coming out and it needed documenting and I just thought you might like it.

Particular thanks go to Dennis Day and Dave Hallock (both retired Collins) who spent hours on the phone with me putting together names and a time line - and helping with the editing.

Finally, in order to get a good layout of the two main articles for this quarter, the regular ***Service Line*** feature has been omitted. It will return next quarter without fail as I know you all enjoy that.

Have a great quarter and see you on the nets or at Bud's (K7RMT) 90th Birthday party here in Wimberley.
de Bill, N7OTQ

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Editorial - - Mentoring & Demographics - - Some Traditions Shouldn't Die !

It is in all of our best interest to preserve and grow the ranks of the US amateur radio community. If we do not, we will eventually lose band privileges – and clout - when it comes to lobbying for same.

During research for the S-Line article, I became aware of the trends in ham radio. In the mid 50s there were about 160,000 hams in the U.S. Today there are about 650,000. Actually an improved ratio relative to the population growth.

There are also some encouraging trends recently. Through some of our contacts in the ARRL, I found out that during the recent several quarters, the number of hams in the US has taken a swing upwards. We need to keep that going.

I urge all of you that have some time available, and the interest in such things, to mentor potential young hams and expose them to the charms and historical perspective of long distance communication via radio, the development of tube electronics and where that history, and specifically Collins Radio, fits in the history of this country. The story of innovation and scientific progress is a very interesting one and it needs to be told.

Early in the development of radio and ham radio, the romance of the hobby lay in talking to far off lands and helping in the development of radio itself.

Now that talking with Australia is as easy as picking up your cell phone, or getting on the internet, this romance is gone. At the same time, technological development has far outpaced the average hams ability to contribute with, perhaps, the exception of computer related, and software related, digital mode enhancements.

All is not lost though. Those young people who might be enticed into coming into ham radio and that verge on becoming appliance operators, can still be wooed by the history of tube electronics. A few simple construction projects involving tubes - and relating the history of Collins (A significant player in the technology development we take for granted today) could change their direction forever. I have tried it on my Grandchildren and find open minds and wide eyes. Last month I built just a crystal set with them and the result was amazing. First question out of their mouth: Where do I plug it in? Where is the battery? When I explained how it worked, they were wide eyed. They are 7 and 11 years old. They will, I suspect, not be just appliance operators.

So, let's do all of us a favor, including the kids. Let's stimulate some imaginations out there. The fifth and sixth grade level is a prime target, but it is never too late.

Let's go mentoring. Become someone's Elmer today and let's carry on a great tradition and maybe stimulate some future engineers and scientists in the process. Focus on the history and the charm of tubes. The future is our hands! - - - -CCA - - - - -

Did You Know?

CCA Net History

Our first Net was held over 50,000 years ago when our prehistoric ancestors frequently gathered together to communicate in small groups. It is reputed, handed down in solemn folklore, that these gatherings occurred approximately every 14,263 seconds. And you thought we owned the frequency.

Just like we do today, they attempted to hold 14,263 as best as possible, but since time pieces had yet to be developed, this frequency drifted around a bit. This is the origin of net frequency drift.

After thousands of years of evolution however, not much has changed. Our nets have continued. Thus evolved the tradition of stopping wagon trains every 4 hours to communicate and take repast on our trek westward. (For those that are somewhat lost here, there are - roughly - 14,263 seconds in 4 hours.) This explains why the CCA has chosen 14,263 for our net frequency.

In the evening after our pioneer forefathers gathered together to communicate (using a frequency of every 14,263 seconds), they ***lit out*** from their camp fires at the end of their ***Net***. - Said term of "Lighting Out" originating from the expression to "Light a Shuck". Corn shucks (or stalks) were often used, dipped in the dying net campfire, as a burning torch to light the way back to

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The TSC-15 Shelter Group by Dave Ross, N7EPI

Editors Note:

Previously, Scott Johnson and Dave Ross did an article on the URC-32 and the KWT-6 commercial version. This started a series of articles, to be done by several authors, which will take us through the development and use of the family of URG-1, URG-2 (and into the HF-80 period) of military radio groups. This writing deals with the TSC-15 shelter group which can be viewed as a transition from the URC-32/KWT-6 to the URG-1 family. It is expository in nature to introduce you to the family. Future articles will deal with the use of these families. While not for the faint of heart, they make solid and reliable stations, particularly for net operation.

The TSC-15 "Communications Central" is shown here in a 1967 M-715 1 1/4 ton truck.

The TSC-15 was an outgrowth of Collins Radio Company's 'Project Birdcall'. In the mid 1950's, General Curtis LeMay felt a need for an automatically-tuned 1KW HF SSB radio to replace the 100-150 watt HF radios then current in his front-line SAC bombers. No such radio existed at the time, and Collins Radio was selected by the Air Force to develop both air-ground and point-to-point high-power HF SSB radio systems. 'Old Iron Ass' LeMay had his way with Collins Radio, and after a few years of grief & pain and wailing & gnashing of teeth in the Collins engineering departments, the ARC-58 was born.

The ARC-58 found its way into almost all B-52s & B-58s, and soon ARC-58 technology was incorporated into several other radio systems including:

- The unpressurized 18Z-3 & the pressurized 18Z-4, commercial versions of the ARC-58.
- The TRC-75, a repackaged & watertight ARC-58, intended for the back of an M38A1 or M170 Jeep.
- The KWT-6 (commercial version of URC-32), a manually tuned, 500W rackmount version, for shipboard & fixed installations.
- The TSC-15, a full-duplex version of the TRC-75, installed in a 6' x 6' x 6' radio shelter which was designed to be carried in an M37 truck.
- A full-duplex version of the TRC-75 (Australian nomenclature VRC-103A) which was built into a long wheelbase Land Rover and used by Australian Forces in Vietnam. This set incorporated a 651E-1 (an R-761/ARC-58 in a tactical case) as the full-duplex receiver.
- Other rackmount versions of the KWT-6, such as the 310F-6 exciter & 50E-6 receiver, the 310U-1 fixed-tuned exciter & 50T-1 fixed-tuned receiver, the 50E-6D dual-diversity receiver, the 1/3 height 50E-7 receiver, and the 50E-1 automatically-tuned receiver & 310F-1 automatically-tuner exciter pair.
- The cost-reduced 32RS-1, a crystal-controlled 100 W transceiver.
- The 205J-1 45 kW PA unit, the 204C-1 10 kW PA unit, and the 204F-1 2.5 kW PA unit.

The TSC-15 Shelter Group (Cont'd)

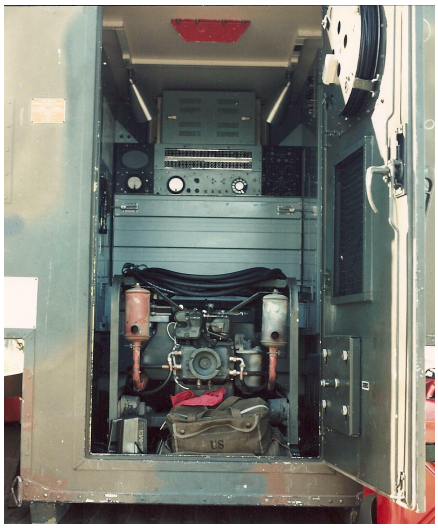
Both RCA and LaPointe Industries built some of the above radios, serving both as a second-source for Collins and also as a sole-source when Collins lost interest in these older "URG-0" radios and moved on to the URG-1 family. I own a URC-32B which was built by LaPointe and it carries a 1969 contract date. This is well into the time period where Collins was building both URG-1 and URG-2 family radios.

The unpressurized 18Z-3, the unpressurized ARC-58, the TRC-75, and the TSC-15 all used the same receiver, the R-761/ARC-58. The unpressurized airborne radios used the T-605/ARC-58, but the ground radios used a T-730/TRC-75. The only electrical difference between the two transmitters seems to be a shorting jumper on the barometric pressure sensor switch in the ground models, presumably added to prevent the radio from reacting to concussion from nearby artillery.

The TSC-15 "Communications Central" provides radiotelephone and radioteletype communications over a full-duplex HF radio link. It can operate in USB, LSB, TWIN, ISB, AME, CW, FSK, and FSK-MUX modes (TWIN mode amounts to DSB with carrier suppressed, a more common mode back in those days). Automatic switching allows the RF linear amplifier to operate Class C if transmitting a single tone signal or switch to Class A automatically if required by the mode selected. The TSC-15 shelter requires 115 VAC 400 Hz. three-phase power, which is normally supplied by a PU-454 single-cylinder diesel genset built by Libby.

A CV-976/U voice mux/demux unit allows four (bandwidth-limited) full-duplex voice channels to operate over both sidebands in ISB mode, effectively splitting each radio sideband into two voice channels. A TGA-1 radioteletype mux/demux unit allows four full-duplex teletype channels to communicate over 1 sideband, and also provides a single full-duplex 850 Hz. shift teletype channel using a full sideband. An F-508/U preselector/filter provides isolation between the local 1 kW transmitter and the full-duplex receiver.

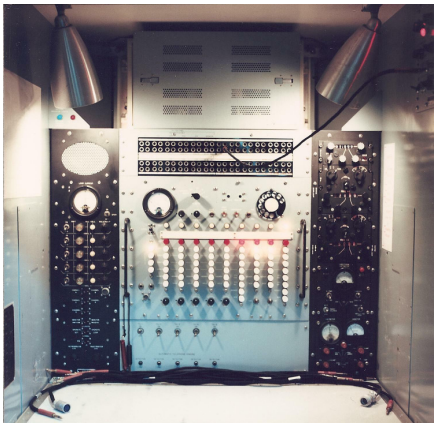
Five 2-wire or 4-wire field telephones and five 2-wire or 4-wire teleprinter machines can be connected to the TSC-15 through the signal entry panel. An SB-1248/TSC-15 cordless switchboard allows any of the five field 'phones to be connected to any other field phone, or to either sideband, or to any one of the four voice mux/demux channels, or in a 'conference call' combination. The operator can use a local TT-299B/UG (MITE) teleprinter to communicate with any one of the five local teleprinters, or any one of the five available radio teletype channels. A TS-1635/TSC-15 test box allows the operator to perform a full-duplex voice or radio teletype loopback test of the entire Communications Central, with the exception of the RF power amplifier. The TS-1635/TSC-15 is wired in parallel with the signal entry panel, and can generate test tones for the field phones, monitor audio levels from the field phones, and connect the local MITE teleprinter in place of one of the five local teleprinters.



Above is a view looking through the door of the TSC-15 shelter shows a 6 HP, 3 kW, 115 VAC 400 Hz. three-phase generator inside the shelter. A trolley and hoist arrangement (stored inside the door and not seen in this photograph) attaches to the red bracket on the ceiling of the shelter, and is used to lift the generator, roll it out of the shelter, and lower it to the ground. The operator's table is behind the generator, shown folded up and obscuring the main console. Stored on the shelter door is the full-duplex receive antenna mount and a reel of coaxial cable. (When operating full-duplex, the receive antenna must be a minimum of 150 feet from the shelter's transmit antenna.)

The TSC-15 operator's console - the black vertical panel to the left of the photo below is the C-3533/TSC-15 teletype control panel. The black vertical panel to the right carries a C-3595/U

The TSC-15 Shelter Group (Cont'd)



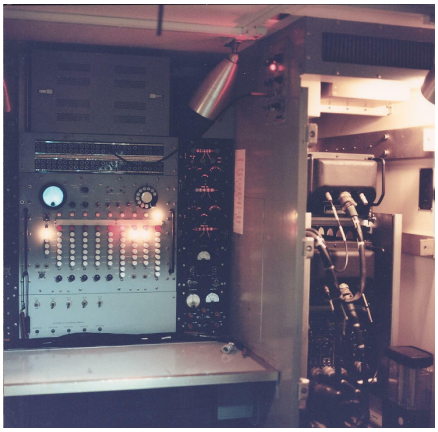
control box for the preselector, the C-3141/TRC-75 control box for the duplex receiver, the C-3141/TRC-75 control box for the simplex transceiver, the C-3532/TSC-15 radio mode selector/wattmeter box, and the C-3534/TSC-15 power supply monitor box. At the top of the main console is the C-3535/TSC -15 telephone terminal control unit, which contains the five telephone line interfaces, the five telephone line hybrid units, and four VOX amplifiers. The TA-408/TSC-15 patch cord panel lets the operator set up the Communications Central in non-standard ways, in order to accommodate equipment failures or to facilitate troubleshooting.

The SB-1248/TSC-15 switchboard can create communications circuits between the five field phone lines, the radio's four sideband voice channels, and the operator's console. The switchboard has no cords as such. Switching is accomplished by eight rotary stepping relays controlled by the rows and columns of lighted pushbutton switches. The SB-1248 can also set up conference calls between multiple local field phones and multiple radio sidebands and the local operator. The switchboard can interface with local "POTS" telephone lines, so that the TSC-15 operator can dial out and receive landline telephone calls. Additionally, the SB-1248 can interface with standard military field phone switchboards such as the SB-22. In this way the TSC-15's HF links and POTS links can be integrated with a local field phone network.

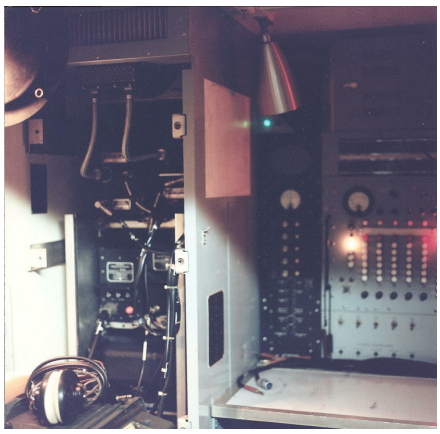
Below the switchboard is the console accessory panel, which contains four self-leveling transmitter audio amplifiers, and circuitry having to do with the Automatic Telephone Ringing feature. Once set up, Automatic Telephone Ringing allows unattended operation of the TSC-15 radio links. Ringing voltage from a local field phone will cause the TSC-15 to transmit a two-tone signal on a preassigned sideband. Upon receiving this two-tone radio signal, a remote TSC-15 will send ringing voltage to one of its own field phones, thereby establishing a connection with no operator intervention.

Unseen below the folded-down desktop are the MT-2445/TSC-15 and the MT-2446/TSC-15 amplifier assemblies, the RE-502/TSC-15 Director Relay Assembly which senses the operational mode selected by the operator and controls whether the RF PA operates in Class A or in Class C, and the PP-2868/U (regulated) and PP-2869/TSC-15 (unregulated) +28 Volt power supplies.

The TSC-15 right-hand equipment bay. At the top is the duplex receiver unit, an R-761/TRC-75.



The simplex receiver/exciter unit (also an R-761/TRC-75) is at the center, and at the bottom is the TGA-1 radioteletype mux/demux unit. Mounted above the bay is a squirrelcage blower supplying cooling air to all three devices in the bay. Also seen is the TS-1635/TSC-15 test set.



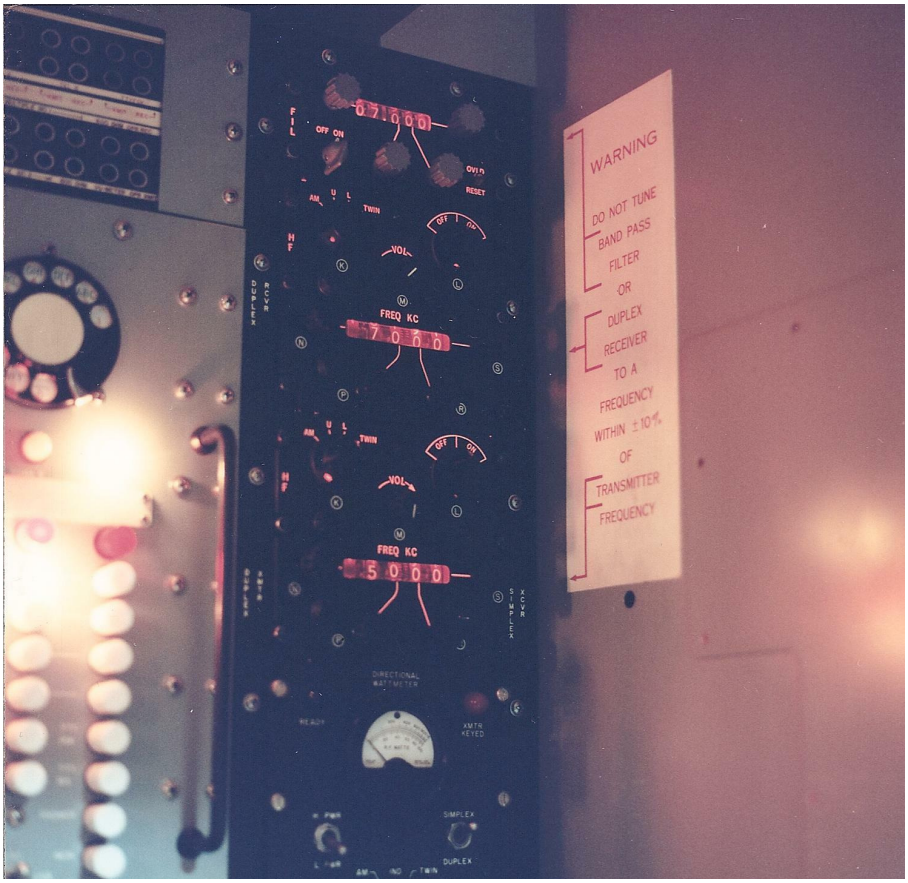
The TSC-15 left-hand equipment bay. On the bottom shelf is the T-730/TRC-75 1 KW. RF power amplifier & power supply. Above it is a shelf carrying the CV-976/U voice mux & demux unit and the F-508/U preselector filter. On the top shelf is the CU-749/TRC-75 antenna

The TSC-15 Shelter Group (Cont'd)

coupler and the C-2848/TRC-75 antenna coupler controller. Mounted above the bay is a multistage vaneaxial fan supplying cooling air to the T-730/TRC-75. The operator's TT-299B/UG (MITE) teleprinter on its shelf is visible at the lower left.

The TSC-15 "Communications Central" was in use well into the 1980s, a point where both URG-1 and URG-2 radio shelters were in mainstream use by the U.S. military.

Future installments in this series of articles will cover the radios which replaced the TSC-15, including the URG-1 family TSC-38 & TRC-115 & TRC-136, and the URG-2 family TSC-60 series of radio shelters. There will also be an article on the HF-80 system and development history. The HF-80 was used in a later version of the TSC-60 shelter as well as fixed operation.



A close-up look at the C-3595/U preselector control box, the C-3141/TRC-75 duplex receiver control box, and the C-3141/TRC-75 simplex transceiver control box. The label reads:

"WARNING DO NOT TUNE BAND PASS FILTER OR DUPLEX RECEIVER TO A FREQUENCY WITHIN +/- 10% OF TRANSMITTER FREQUENCY".

de Dave Ross, N7EPI

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Author Information: Dave Ross, N7EPI

Dave could be said to be a passionate and committed collector of things military - and he is particularly enamored with Collins gear, as we all are. He has been collecting Collins since the early '70s when at that point he was apparently quite taken by a Collins R-392 and the rest just happened.

He particularly enjoys the R-761/ARC-58 (aka 618C-3) which is a part of the PRC-38 or 618K-1. He regularly gets on the air with his TRC-75, his PRC-124 (628K-1) or a PRC-47 (618U-1).

In addition to the equipment collection, Dave has maintenance and other manuals for most of the equipment he owns as well as a small collection of related sales and marketing literature.

Dave has been a ham for 45 years and was first licensed in 1964 as WN6MDO in California.

His first station was a Heathkit Twoer with a mobile PS and then a Polycomm 62B.

He has a BSEL degree from Cal Poly and has worked in the field of electronics as a lab technician since 1981 for several major companies including Rolm, EH Research and TRW/Vidar.

He eventually started his own company – Hypertools Inc., but is now retired and restoring military vehicles and Collins gear.

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S-Line Perspective (Cont'd)

Day, a Project Lead Engineer under Gene Senti during the 60s and the Group Lead for Amateur and Military/ Commercial Radio Engineering during the 70s and 80s following Gene Senti's retirement in 1971. Dennis is now retired from Collins and living with his wife Pat in Cedar Rapids. I also was able to speak with Dave Hallock, retired Collins engineer, who was the Project Engineer on the 75S-1 during this receiver's development. He also still lives in Cedar Rapids. In addition, Rod Blocksome, currently an employee of Rockwell Collins, contributed perspective based upon his surveys of product dating and quantities which continue to provide us with a window into the past at Collins. My thanks to all of these gentleman.

So, come with me now - back to the mid 1950s, 1956 to be exact, and let's take a look inside Collins, and at the world they were living in. (N7OTQ was first licensed 1954.)

Your television is probably a big piece of furniture with a little 12 inch, or maybe a 14 inch if you are lucky, screen. The picture is black and white and they have not quite figured out the vertical role problem yet. The '55 Chevy (Sorry Dennis) rules the road. The post war housing and baby boom is in full tilt boogey, and the economy is on the rise.

Amateur ranks are still swelling due to WW II troop exposure to the magic of distant communication and the advent of the walkie talkie. In 1955 there were 135,000 hams and, by 1958, there would be 160,000. This constitutes a huge increase compared to the prewar numbers. AM rules the airwaves, but SSB has stuck its head above the wall and is coming on strong.

You can buy a great new car for less than $2000 and a nice new home will run you about $8000.

Driven by the new SSB modulation promise, and in no small part by the SAC need for long distance nuclear bomber recall, the KWS-1 and 75A-4 had been quickly developed in Collins' Green Room environment and were introduced at the beginning of 1955. Fearful of the price point (The Gold Dust Twins cost more than $3000 retail), the marketing group at Collins ginned up a fall back strategy of also introducing the 32W exciter (KWS-1 head w/o the PA and P.S. included – thus cheaper) and the KWS-1K (a KWS-1 head with the PA tubes removed – readily available surplus). You could also buy a high voltage P.S. kit. All of this "What If ?" strategy proved unnecessary as they sold all of the KWS-1s they could make in '55 and the 32W-1 and the KWS-1K fell off of the promotional radar.

By 1957, sales of KWS-1s were falling off dramatically and finally saturated at a total of 1600 units sold (less than 1% market penetration). The marketing group at Collins continued getting customer mail saying "Can't you give us a SSB station that is affordable?"

Now, when the KWS-1 and 75A-4 went into production, things at Collins pretty much echoed the war years. The company was still struggling to get back to end-of-war production rates – and income – and radios looked pretty much the way that they had since before the war - big, black, heavy and, under the influence of Art, engineering and technical excellence prevailed as the dominant design philosophy. Remember that Art Collins had kicked off the 75A-1 design with a meeting where he ordered: "Build me the best receiver that can be made and never mind the cost."

But things were changing. The engineers and marketing folks realized that, in order to tap into a bigger piece of the then burgeoning ham radio market, costs would have to come down. Not very many hams could afford to pay more for their transmitter and receiver than they paid for their new car. During 1956 and 1957, for the first time, the marketing group at Collins started running ads in QST focusing on the value of the KWS-1/75A-4. This was a definite change in perspective.

At the same time, American industry was entering a new era of "Industrial Design", the semiconductor revolution was firing up and, with the volume of electronics production going up thanks to TV and radio, the cost of components was coming down.

In the Collins Radio Amateur Radio Engineering Group, Gene Senti was still an engineering manager, but he was surrounded by solid talent, and

S-Line Perspective (Cont'd)

just as important, in the greater engineering community at Collins, a wealth of experience.

After discussions between Chuck Carney, then head of the ham radio marketing group at Collins, and Gene (as over-all S-Line Project Lead) and some of his engineers, the concept of a smaller, lighter, more cost effective SSB transmitter and receiver was born. By 1957, Gene Senti, working with Ed Andrade, had developed a general concept of the mechanical and electrical tuning and conversion scheme and, working with Ted Papajohn – design artist and draftsman - developed concept drawings and renderings of the appearance of the two units. The S-Line was in the womb – and it was being driven by cost reduction and, less concretely, by a new "marketing" strategy. It is apparent though that this strategy came as much from engineering as it did from marketing.

Where was Art in this whole equation. We do not know for sure, but the consensus is that Art was spending less and less time on the ham gear and was more excited by the new broadcast, microwave and military equipment product lines.

The S-Line emerges: As the S-Line (The S stood for Superiority and Side Band by the way) concept firmed up, block diagrams started to emerge and assignments were handed out for the tasks and models to be developed. From what we can tell, the first S-Line family consisted of the 32S-1, 516F-2, 312B-3 and 4, the 75S-1, the 30S-1 "Full Legal Power" amp and, interestingly, the 62S-1. Collins had never really been a player in the 6 and 2 meter AM band game, and obvious saw a chance to get their brand on 6 & 2 as modulation "switched to SSB". They never saw FM coming.

The KWM-2, 312B-5 (preceded briefly by the 399C-1), the DL-1, the 30L-1 and microphones would show up at later dates.

According to Dennis and Dave, Joe Vanous was delegated the 32S-1 project lead and Dave Hallock was project lead on the 75S-1 following his return from the Navy in August, 1957. Gene, then an Engineering Manager under Department Head Ken Rigoni, is purported to have done the 516F-2 himself. The new PTO design to be used was assigned to Leo Mifflin. Ed Andrade served as project lead on the 30S-1 with a large amount of consulting work on the PA RF section from Warren Bruene who was predominantly working on commercial and military higher power amplifiers at the time. Jim Boomer was assigned the project lead engineering on the 62S-1 with Jerry Vonderheide eventually taking on the collateral engineering.

Under Fred Johnson (lead mechanical engineer for Gene at the time), Eldon Burr was assigned the ME support for the S-Line, with the exception of the 30S-1 ME work, which was assigned to Ray Beason (pronounced Beeson). Final design drafting support for all of the S-Line work was apparently split between Ted Papajohn and Arnie Spielbauer with brass board and prototype construction handled by Joe Jekerle (pronounced Jaegerly). Usually 2 or 3 prototypes were built in the lab followed by 25 or 50 production line prototypes built on a pilot line.

The pilot line for the initial 25 each S-Line units was in Cedar Rapids but, by the time the KWM-2 came along, the pilot line had moved to Anamosa, Iowa.

Work by this S-Line team, headed by Gene Senti, under the group management of Ken Rigoni, was then well underway by the fall of 1957. Keep in mind that all of the collateral engineering on the previous models (including the KWS-1/75A-4 and the KWM-1) was going on at the same time. 1956 and 1957 must have been an exciting time in the Engineering Building at Collins (building 120 was occupied in 1953).

As an aside, some research was done into the evolution or development of the smaller form factor mechanical filters that appeared in the initial S-Line. Although there is not a definitive answer, it appears that the development work on these smaller filters was driven by the S-Line product line objectives and was done at the remote Newport Beach, California facility which had been relocated from the earlier Burbank location. Witness the fact that the CW filter was still a lot bigger than the SSB filter in the 75S-1. They were still working on that "miniaturized" technol-

S-Line Perspective (Cont'd)

ogy when the 75S-1 design was locked down. The lead engineer on the miniaturized filter development was Herman Hasselbech.

During the period while development, design and prototyping continued well into 1958, the pressure at Collins in the Ham Radio Products operation must have been tangible. The "Collins Products are Cost Effective" ads of 1957 were not impacting sales. The SSB competition, namely Central Electronics, Hammarlund and Hallicrafters, were coming out with SSB transmitter/Exciters that were well below the $1000 level and the Amateur Radio Product sales revenue was less than 1% of sales at Collins Radio. And, what is worse, they were missing and moving deadlines right from the beginning.

Dave Hallock related to me that there was a lot of pressure to get the 75S-1 into the pilot line and that the result was that a number of the 75S-1 pilot line units had to be scrapped as "beyond rework".

The S-Line was first "announced" (I would not call it introduced) in the February, 1958 issue of QST (See Figure 2) in their second page ad position. Actually this ad made no mention of the S-Line in total, but only announced that the 32S-1 transmitter was "*Coming that Summer*" for less than $700 ($555 for the 32S-1 and $155 for the 516F-2). With the 75A-4 selling for $700 during 1958 and the KWS-1 selling for just above $2000, their big heartburn was with the transmitter price where they were getting keen competition from the Central Electronics 100V and the Hallicrafters HT-32 which both sold for about $600 -700.

Only one month later, in the March, 1958 QST, the Collins ad was touting the new S-Line with interconnected transceiver operational capability. It said "Coming in September"…. The picture in the

Figure 2 February 1958 32S-1 ad

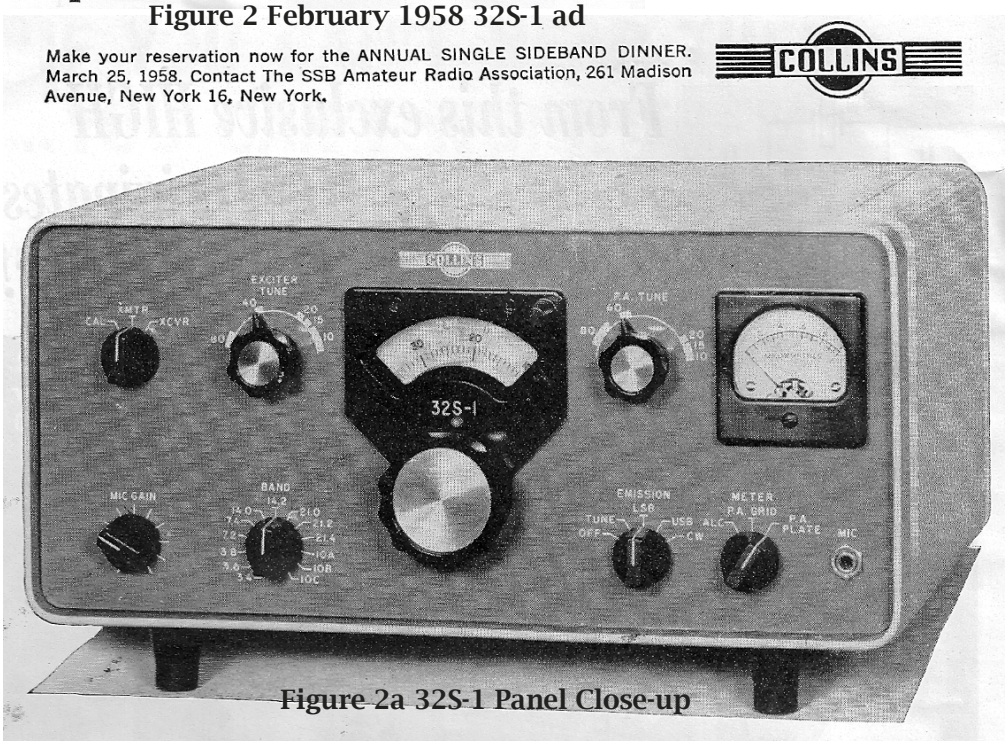

Figure 2a 32S-1 Panel Close-up

S-Line Perspective (Cont'd)

ad was again of funky wooden mock-ups of the 32S-1/75S-1 and a 312B-3 looking speaker. The transmitter/power supply was still listed as $700 and the 75S-1 was $495.

This ad made mention of the coming 62S-1 6 & 2 meter translator, but no mention of the 30S-1 yet. Interesting! The 30S-1 was obviously in the works by this time. It seems they were struggling a bit on the big amp.

Well, they missed the September date referred to in the March QST. I am more than positive that Collins' marketing group desperately wanted to have the complete S-Line offering ready to advertise for the upcoming Christmas 1958 season.

In November of 1958, they took a "pass" on their "Front of the Book" QST ad and let RCA carry the ball with an S-Line PA/6146 ad on the rear cover. They also released the S-Line to their distribution sales network and the distributors all carried S-Line ads that pictured the S-Line with the 30S-1 (coming soon – no price listed) and they had raised the price of the 32S-1 transmitter to $590 from the target $555. The 312B-4 appeared in these ads for the first time, the 75S-1 remained at $495 and any mention of the 516F-2 was mysteriously missing from most ads. When the 516F-2 reappeared in the January, 1959 advertising, it would be priced at $105, down from the original $135……and they had met their transmitter/P.S.

Figure 3. January, 1959 S-Line introduction ad appearing in the front of QST magazine. Note that there is still no script Thirty S-One on the door and the ad says "Available Soon"
Apparently the engineering group is still struggling with the 30S-1 right through the introduction

S-Line Perspective (Cont'd)

pricing target……..Barely. During November there was also the first mention of the 516E-1 mobile supply for $262.

S-Line introduction: What was significant was that the pictures were real and the S-Line was a reality. A 3 month evolving rolling introduction followed from November through January of 1959.

In January of 1959, the second page QST Collins ad was the now familiar metal desk, 75S-1/32S-1/30S-1 line drawing with no mention of 30S-1 price. In the body of the magazine, one dealer in Hawaii announced the 30S-1 price as $1470 retail. At this point, the *Thirty S-One* script was not on the power supply door in the distributor photos.

Refer to Figures 1 & 3 -Collins QST ads featuring the basic S-Line and the "Available Soon" 30S-1

So, one can say: The basic S-Line was conceived in late '56 – '57, announced and developed through 1958 and introduced during the holiday season of '58-'59.

It is interesting that, while they made their price/cost objective with the 32S-1/75S-1/P.S. combination –keeping them at just under $1200 - if you add the introduced price of the 30S-1 into the mix, the cost of a higher power 1 kW S-Line SSB station from Collins ($2660) was well above the Hallicrafters SX-101/HT-32/HT-33 1 kW station @ $1845. More notably, this was just $140 less than the slightly price reduced KWS-1/75A-4, late 1958, price of $2800.

When it all was out to dry on the line, Collins had introduced a pretty cost competitive 100 watt SSB line-up, but had gone back into "Rolls Royce" mode with their higher power offering. And Gene knew it!

There is of course, an "Art" story along the way. The design effort had, at first, conceived of a flat featureless front design of the S-Line twins' panel. This was shown in the wooden mock ups in the first announcement photos. By the time the engineering models were built, this had gotten a bit fancier with the addition of some relief detail in the stamped aluminum overlay panels. The bossed screening areas had appeared around the controls and the main area of the panel had what I can only describe as 3/8 inch squiggly worms flattened and painted over. I was lucky to see one of these E models at a swap meet in Arizona in about 1990 and it was UGLY. Art always liked to take the first E models of new amateur equipment home with him and use them for a while in his home station. After using the first S-Line units, he came back the next day with his Leica camera and told the design team that the main panel area would be changed to look like the leatherette camera body material. The art department took Art's camera and made a mould of the body design, photographed it and then did a step and repeat process to develop the wide area leatherette pattern that we see today in the S-Line panels. Art was right on!

The 30S-1, which was part of the original S-Line concept in 1957, was developed by Ed Andrade, Ray Beason and Warren Bruene and then introduced with a feature QST ad in June, 1959. Apparently the development process was as much of a booger as is the current repair of this beautiful amplifier. As late as September 1959, the dealer ads quoted delivery as "Available Soon". There was still no script *Thirty S-One* on the door in the photos. This script would not appear until April of 1960.

In July of 1960, Collins started running feature ads for the now scripted 30S-1. I can only assume that this meant that the 30S-1 was finally and really available. Three years in the making.

And, here is your "Senti" story: Following the introduction of the 30S-1, Gene became very frustrated by the lack of a competitive amplifier product for the S-Line. Over the winter of '59-'60, and in his basement working at night and on weekends, Gene developed a quad 811A, 1 kW input amplifier that he built on an old TV chassis. When he showed it to ME Arlo Meyer, Arlo thought he could fit it into an S-Line cabinet. After building 2 prototypes at home with parts purchased at the Collins surplus store, the concept was presented to Ernie Pappenfus, the Director of Development Division A for Amateur and Military Products and,

S-Line Perspective (Cont'd)

with his encouragement, the idea went on to Art. With his approval, a Green Room was immediately set up. Gene and Fred Johnson did the engineering and 6 months later, the 30L-1 emerged and went to production. Arlo came back in to finish the ME work. Several folks related to me that this project was considered so important that Leo Arthurs, then the Administrative Manager of the Amateur Radio Group, even did the parts expediting for the Green Room engineers. The 30L-1 was introduced in 1961 and went on to become the dominant production volume amplifier in the S-line offering. It was introduced at the bargain price of $520.

The KWM-2 transceiver project was driven by Project Lead Ed Andrade and the ME work was done by Eldon Burr. One has to believe that this transceiver was in Gene's mind from the onset of the S-Line work given that he had developed and put the KWM -1 into production several years earlier. The unit first appeared in QST - and was introduced to the world - in October of 1959, almost a year after the actual introduction of the S-Line twins. The introduction to the dealers must have been about a month earlier, in September, since the Sept, '59 Collins Radio SSB Amateur Equipment Price Schedule shows not only the KWM-2, but the KWM-2A as well as the 32S-2 and the 75S-2. The ad in the October QST gave no pricing and showed the new transceiver as "Coming October 15th". In November, dealer ads showed the unit as available and the pricing appeared in QST that month. The introductory price was $1095 w/o power supply or accessories - bringing it in at just about the same price as the twins. The introduction price would eventually climb to $1150 retail.

An initial build of 50 units was started, debugged and tested in the Anamosa production facility in the summer of 1959, and production of the KWM-2 was up and running. Dennis relates that when first built on the pilot line, almost none of the initial several KWM-2s worked and that a rush (read that panic) trip ensued with Gene, Dennis and Ed Andrade personally driving down from Cedar Rapids and working straight through until they did. The main problem turned out to be lead length and harness routing problems. So, if you have a KWM-2 in the 1-5 serial number range, it was personally worked on by Gene, Dennis or Ed.

Here is a tidbit! In the December issue of QST, the Collins Radio 2nd page ad showed the complete S-Line offering with a standard KWM-2 in the artwork. Toward the back of the magazine, however, is a dealer ad from Kaimuku, Hawaii which shows a picture (Not a drawing !) of a KWM-2 (narrow eyebrows and KWM-2 on the dial escutcheon) however it had the extended frequency range switching and metal frequency shift cover. The photo ad also shows the never introduced SC-301 S-Line station antenna control and the first released picture of the 312B-5. The 312B-5 also was listed in the September Collins price schedule. The guy that ran that dealership was a personal friend of Art's and he often got some special treatment including use of early units. The KWM-2A was in the offing. No Collins microphones were listed in the September Collins SSB AE Price Schedule which showed all the S-Line accessories that were available at the time.

The May 1960 QST featured the KWM-2 for "Field Day Performance" and, for the first time, the SM-1 is shown on the operator's desk in place of the usual EV 664. In the Harvey Radio Company ad for this issue, the 136B -2 Blanker for the KWM-2 appears for the first time and the price of the 30S-1 has risen to $1556 (more indication of some issues?). The 312B-5 is also advertised for the first time in QST for the bargain price of $333.00.

Enter the SM-2……In the June '60 issue of QST, the second page Collins ad features the S-Line twins, the 30S-1 amplifier (with script) and on the desk is a SM-2. Not available from dealers yet.

(1960 and Drake is really pushing their 2-A receiver for $305 with speaker and Q-multiplier. More dogs coming.)

In August, 1960, the PM-2 and its suitcase traveling companion are featured with a KWM-2 in the QST ad on page 2. The list price for the PM-2 and the carrying case (no model number is shown yet) is $250.00.

Editor's Note: *Part two of this article will follow in the Q4 issue of the Signal and will cover the 51S-1 addition, the maturation of the S-Line and the years leading up to the KWM-380*

In the Shack of Russell (Ty) Garland M.D. (KC4NWF)

This quarter's "In the Shack" is a bit different. It will not only display a great shack, but introduce you to the Mother-of-All 20V-2s.

Ty Garland has done what has to be called a "Frame Off" restoration of this venerable broadcast transmitter. While I am generally a purist and like original restorations, I have to say that this is one of the most beautiful transmitters that I have ever seen. The total restoration will be featured in a future ***Signal*** article, so I will let Ty tell you in his own words about that effort.

First, let me tell you about Ty. He received his M.D. degree from East Carolina School of Medicine in 1986 after getting a B.S. in Microbiology from Clemson.. He has been a ham since 1970 and was first licensed as WN4VUB. He had an Elmer from NASA, one K4KOD, named Chuck Frost who administered his Novice.

His first piece of Collins was a very unique 75A-2 with a light green factory front panel and a dark green escutcheon. He still has it and it is on the restoration list also. I'd keep that one original though Ty. His first station consisted of the A-2 and a Drake 2NT into an inverted Vee.

His favorite Collins gear is his S-Line which was completely gone through and restored by Dennis Brothers. He has the full line up with a 75S-3, 32S-3, 312B-4, 30L-1 (Ty did this one) and a KWM-2 with a 312B-5…..Nice! He also has a 30S-1 which he restored. In addition to the S-Line, 75A-2 and the 20V-2, he also has a 75A-4 and a R-390 which he uses with the 20V-2 on AM. In addition to the gear, he also collects books about Collins, Signals and stock certificates.

In addition to ham radio, Ty likes to target shoot, homebrew

Cont'd Pg. 15

In the Shack of Russell (Ty) Garland (Cont'd)

and work on his ZR1 Corvette. He has been married to his wife Noelle since 1979 and they have 3 children.

When he decided to get a 20V-2, he wanted to multi band it so he knew it needed to be modified. He relates that he started with two recovered transmitters and, with the help of a good friend Robert Smith, he completely stripped the best unit and then completely refinished everything and then chrome plated the beast in appropriate areas. He even re-silvered the tube socket contacts where there was any serious sign of wear.

I am going to save the details for his article on the restoration and let the pictures speak for themselves here.

Well Done Ty…..A Beauty and very nice shack !

- - - - - - - - - - - - -CCA- - - - - - - - - - - -

Above: Mod Deck
Left: RF Deck
Below: Ty and Robert

THE SIGNAL

Collins Collectors Association

From the President

I am pleased to report that there has been a surge in membership in response to the improvements in the ***Signal*** and several calls for support on the CCA collinsradio.org reflector.

The board members have been working on some nice increases in membership benefits. I think you all will be pleased.

My move is progressing well and I am about out of Michigan and getting a little settled in the new QTH in Paris, Tennessee where I am looking forward to getting back on the air, and on the net in the coming months.

October will bring many of our members together for the Caribbean cruise. Would that I could be there, but I know that it is going to be a wonderful trip and hope that everyone has a great time. Take a lot of pictures and we will look forward to a full report in the Q4 issue.

73s for now.

de Paul Kluwe, W8ZO

Mike Student, W7MS, Awarded Prestigious Eclectic Collins Station Award

This Just In – Mike Student, W7MS, has been awarded the "Eclectic Collins Station of the Quarter" award by the Collins Collectors Association for his recent check-in to the Sunday afternoon 20 meter CCA net with the following rig:

A M70 Collins dynamic broadcast microphone driving the input of a HF-380 transceiver.

The HF-380 was driving a 548U-5 (dual 3-500Zs) Collins of Canada 1 kW amplifier.

Driving a HF 8061 line flattener (Auto tuner) into a Cushcraft A3S beam.

The 548U-5 is the PA from the Collins MR-1000 HF (0.5 to 30 mHz SSB Marine Radio Set and is shown in the photo above.

The HF 8061 is the tuner or "Flattener" from the HF-80 family and rated at 1 kW.

Even though a few negative points were awarded for not having a Collins Log Periodic antenna, the award was handily earned.

We assume he will fix this antenna problem in the future.

Nice check-in Mike!
de N7OTQ

---------- CCA ----------

Did You Know?
(Cont'd from Pg. 3)

home wagon in the darkness of a moonless plain. This explains our fondness for those glowing filaments.

Today, things have changed a bit and we ***light up*** those filaments to begin a net and ***Put the shuck*** on our network of friends, but the frequency and main purpose of getting together have remained the same…… for all these years. **:-)**

----------CCA----------

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