THE COLLINS 51S-1

AN 'S' LINE CLASSIC

David Clark

"All the major communications receiver manufacturers were in deep trouble during the second postwar decade, 1955-65...Collins lasted longer than the others because they were leaders and correctly judged the future shape of communications equipment.

"So, in 1957, as the old-line manufacturers [Hallicrafters, Hammarlund and National being the majors] made bigger and heavier receivers, Collins introduced the KWM-1, a complete 175 watt SSB transmitter and receiver, less power supply, in a package...weighing 15 pounds!

"Collins continued to push the new, small concept in 1958 when they replaced the 75A series with the 75S-1 receiver. They introduced their new 'S' line of ham equipment in November, 1958, with four page, full colour advertisements...its new long and low appearance can still be recognized in most receivers and transceivers to this day. The general coverage 'S' line receiver was the 51S-1 which was manufactured from 1959 to 1972." - Raymond S. Moore [1]

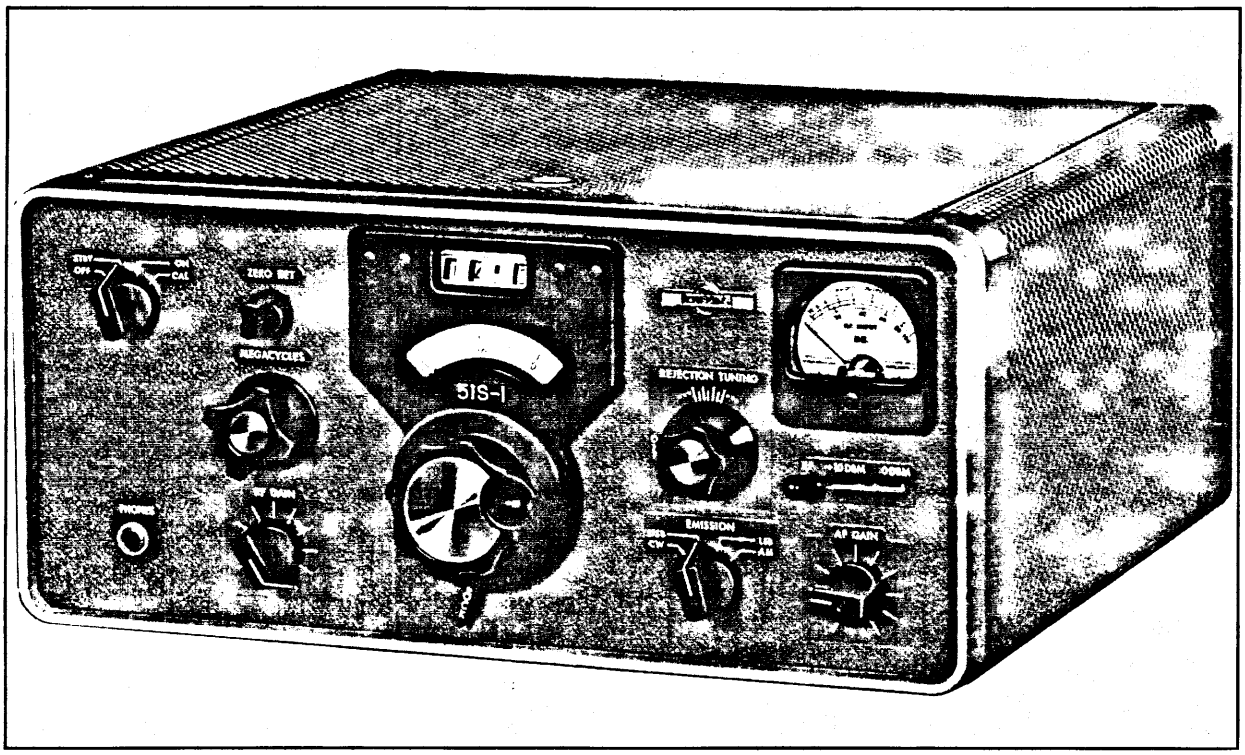

Figure 1. Illustration of the Collins 51S-1 Receiver

UNVEILING THE MYSTIQUE

Raymond Moore's research work indicates that there were two prototype designs preceding the release of the 51S-1. He notes that only one copy of a prototype model 51J-5 was ever produced. In 1957, the 51J-6 was conceived and appeared in a 1958 Collins catalogue. It seems that it was probably never produced but it did look very much like the forthcoming 51S-1. [2]

Both the 75S series and the 51S-1 were upgraded over the years and remained in production into the mid-1970's. What is the mystique that made this Collins series so desirable and enduring...or is it mystique? As one reviewer put it in 1969:

> *"There are special features in this equipment that were originally developed or pioneered by Collins for the attainment of a high order of frequency stability, calibration and readout, as well as RF and IF selectivity. These, along with soundly engineered design principles, have largely contributed to the success of much of the present-day [S-Line] equipment...The fine construction and workmanship found in the Collins gear, along with its refinements and excellent performance (as well as the cost) have instilled many to call it the Cadillac of amateur equipment. While this may be a matter of personal opinion, there does appear to be something about this equipment that makes one feel he is handling a product that bespeaks of rich quality". [3]*

As compared with the fine but more popularly-priced general coverage receivers available to hobbyists through the 1960's from manufacturers such as Hammarlund, National and Hallicrafters, very few of the vastly more expensive Collins receivers found their way into the hands of SWBC DXers. The majority were delivered to military markets and other government agencies. Although it's design was not originally mandated by military specifications as was the case for the earlier R-390 series, there are specific military designations for various versions of the 51S-1. In addition, a number of original manufacture 51S-1's were modified for the US military by another defense contractor. Limited quantities of this somewhat different-looking version appeared some years ago as surplus.

The 51S-1 was first available to the public in 1961 and sold for a hefty $1828. The 1963 selling price was already almost $2600...big bucks for any hobbyist in those days! The 51S-1 was listed for the last time in the 1979 edition of Popular Electronic's annual Communications Handbook with a "commercial class" price-tag of $4770!! By that time, Collins was no doubt selling off the remainder of the last production run from several years earlier. Raymond Moore says total production of the 51S-1 was 8,500 units. [4]

The 51S-1 was clearly designed as a top-of-the-line general coverage communications receiver. Actually, it is quite a bit more sophisticated (and expensive!) than its 'S' line amateur band brethern, the 75S-1/2/3, which appeared between 1958 and 1964.

Fifteen or twenty years ago, a used 51S-1 commanded roughly $1200. Today with the renaissance of interest in hollow state communications gear among both hams and SWL's, the 51S-1 is one of the hottest collector's items on the market. A receiver in clean condition easily fetches $700 or more. The trend indicates the price is heading back up.

A search of old North American DX bulletins uncovered only one brief user review of the 51S-1. In a submission to the April, 1972 edition of the North American Short Wave Association's FRENDX, Frank Peters explained that after some correspondence with Collins, he was able to obtain and install a 3.1 kHz mechanical filter for improved AM/ECSS reception. With that modification, Mr. Peters rated the 51S-1's performance as "fairly close" to the Hammarlund HQ-180 which he characterized as "the best DX-receiver on the market".

Apart from that submittal, a scan of the 52,000+ entry radio amateur bibliographical database ('FBTO') revealed just one minor profile of the 51S-1. [5] So, there is precious little documentation concerning the 51S-1 to be found in the hobby press.

TECHNOLOGY IN TRANSITION

The success of the Collins Radio Company through the years was due to its leadership role in developing "state of the art" equipment. The 51S-1 is evidence of this, for although it is generally classified as a tube-type receiver, it was in fact an early hybrid. In addition to its impressive lineup of 17 tubes, it also utilizes 1 germanium transistor and 20 semi-conductor diodes. Remember - this was 1959!

To put this into context, it wasn't until late 1964 that the National Radio Company released the first, all solid-state high performance general coverage receiver - the famous HRO-500. Two years later, R L Drake released its first hybrid (partially solid state) receiver called the model 2-C.

It is also interesting to note that the 51S-1 was, I believe, the first commercially produced receiver to incorporate a Q-multiplier for variable rejection tuning. It was subsequently introduced into the 75S line with the 75S-3 in 1961. Other manufacturers produced only a handful of receivers utilizing a built-in Q-multiplier, although it certainly became popular for quite some years as an outboard device.

We should not overlook the fact, however, that Collins did not abandon its pioneering accomplishments first manifest in 1946 with the introduction of the 75A series. The last of that line, the 75A-4 (1955-58) is still considered by many to have been 'the' classic tube-type amateur band receiver. It was the immediate predecessor of the 'S' Line.

Throughout the decade of the 50's and even through most of the 60's, other receiver manufacturers continued to utilize a tuned HFO (high frequency oscillator) with a crystal controlled second oscillator to achieve double conversion in an otherwise conventional superheterodyne circuit. No-so with Collins as Raymond Moore explains...

> *"This receiver [the 75A] introduced the multi-conversion fixed HFO circuit which eventually became the basis for most quality receivers well into the 1980's, until the step-tuned, fully synthesized receiver took over. In the 75A the HFO was crystal controlled and the tuning done with a permeability tuned VFO. The result was a degree of frequency stability and readout accuracy never before approached." [6]*

It is significant that the 51S-1 and its 75S brethern retained the same basic conversion scheme of their 75A ancestry.

GETTING TO KNOW THE 51S-1

Specifications from the very thorough Collins Instruction Manual are reproduced in Figure 2 below. Figure 3 on the next page is a block diagram of the 51S-1. It shows the principles of operation for this sophisticated receiver. Several tube substitutions in this diagram are indicative of later productions runs of the 51S-1, probably after 1964.

51S-1

FREQUENCY RANGE:
2-30 mc continuous coverage. Additional coverage from 0.2 to 2.0 mc for limited monitoring or laboratory use. With 55G-1 Preselector, 0.2-2.0 mc can be used for communications.

TYPE OF RECEPTION:
USB or LSB, AM, CW and RTTY.

CALIBRATION:
1 kc per dial division. Direct reading in megacycles and kilocycles. Circuit compensation for crystal finishing tolerances minimizes the need for recalibration when switching bands.

TUNING:
Frequency range, divided into linear one megacycle bands.

FREQUENCY STABILITY:
After 90 minute warm-up, frequency stability will be nominally within 100 cps per week, at normal room temperature.

SENSITIVITY:
SSB and CW — 0.6 uv for not less than 10 db carrier on-carrier off (2-30 mc); 3 uv for not less than 10 db carrier on-carrier off (0.5-2.0 mc); 4 uv for not less than 10 db carrier on-carrier off (0.2-0.5 mc). With 55G-1, 1.0 uv (0.2-2.0 mc).
AM — 3 uv for not less than 10 db S+N/N (2-30 mc); 15 uv for not less than 10 db S+N/N (0.5-2.0 mc); 20 uv for not less than 10 db S+N/N (0.2-0.5 mc). With 55G-1, 5.0 uv (0.2-2.0 mc).

SELECTIVITY:
SSB — 2.75 kc mechanical filter, 2.4 kc optional.
CW — 800 cps crystal filter, 300 cps optional.
AM — 5 kc (normal IF transformers), 6 kc with mechanical filter optional.

AGC TIME CONSTANTS:
Rise time — 0.8 millisecond.
Decay time — 0.1 second.

AGC CHARACTERISTICS:
Audio output variation less than 6 db for RF inputs from 5-50.000 uv. Not more than 3 db change in audio output with RF signals from 50.000 uv to 1 v.

REJECTION NOTCH:
Not less than 40 db.

BFO:
Supplied by 500 kc crystal.

RF INPUT:
50 ohms unbalanced.

CROSS MODULATION: (2-30 mc)

Desired Signal	Interfering Signal uv and % Removed		
	1%	2%	4%
5 uv	25,000	100,000	300,000
50 uv	50,000	150,000	800,000
500 uv	100,000	300,000	1 v

SPURIOUS RESPONSE:
Not less than 70 db (2-30 mc) except for 4.8-5.2 mc which is not less than 40 db. Image rejection is not less than 50 db (2-25 mc) and not less than 40 db (25-30 mc) measured at midband.

UNDESIRED RADIATION:
Antenna radiation is less than 500 picowatts across 50 ohms resistive (2-30 mc).

INPUT-OUTPUT METER:
Input calibrated in decibels above AGC threshold. Output level calibrated for either 0 dbm or +10 dbm.

IF OUTPUT:
500 kc; not less than 50 millivolts at 50 ohms with 5 uv RF input signal.

AUDIO OUTPUT:
4 ohms and 600 ohms unbalanced 1.0 watt, distortion less than 10%. Separate 600 ohm balanced output for connection to telephone line, distortion less than 1.2% at 0 dbm.

AUDIO FREQUENCY RESPONSE:
SSB — within 3.5 db, 350-3050 cps, line output; within 3.5 db, 350-3050 cps, local output.
AM — within 6 db, 100-2500 cps, line output; within 6 db, 200-2500 cps, local output.

AMBIENT TEMPERATURE RANGE:
0°-50° C.

AMBIENT HUMIDITY:
Up to 90%.

POWER REQUIREMENTS:
125 watts. 115 v or 230 v, 50-60 cps. 400 cps operation with reduced hum specification at full audio output. For 28 v dc operation, the internal ac supply unit is replaced by an optional dc unit.

DIMENSIONS:
Rack mounted — 19" W, 8¾" H, 15" D (48.26 cm W, 22.23 cm H, 38.10 cm D).
Cabinet mounted — 14¾" W, 7¾" H, 14" D (37.47 cm W, 19.69 cm H, 35.56 cm D).

WEIGHT:
28 lbs. (12.69 kg).

Figure 2. Specifications of the Collins 51S-1 Receiver

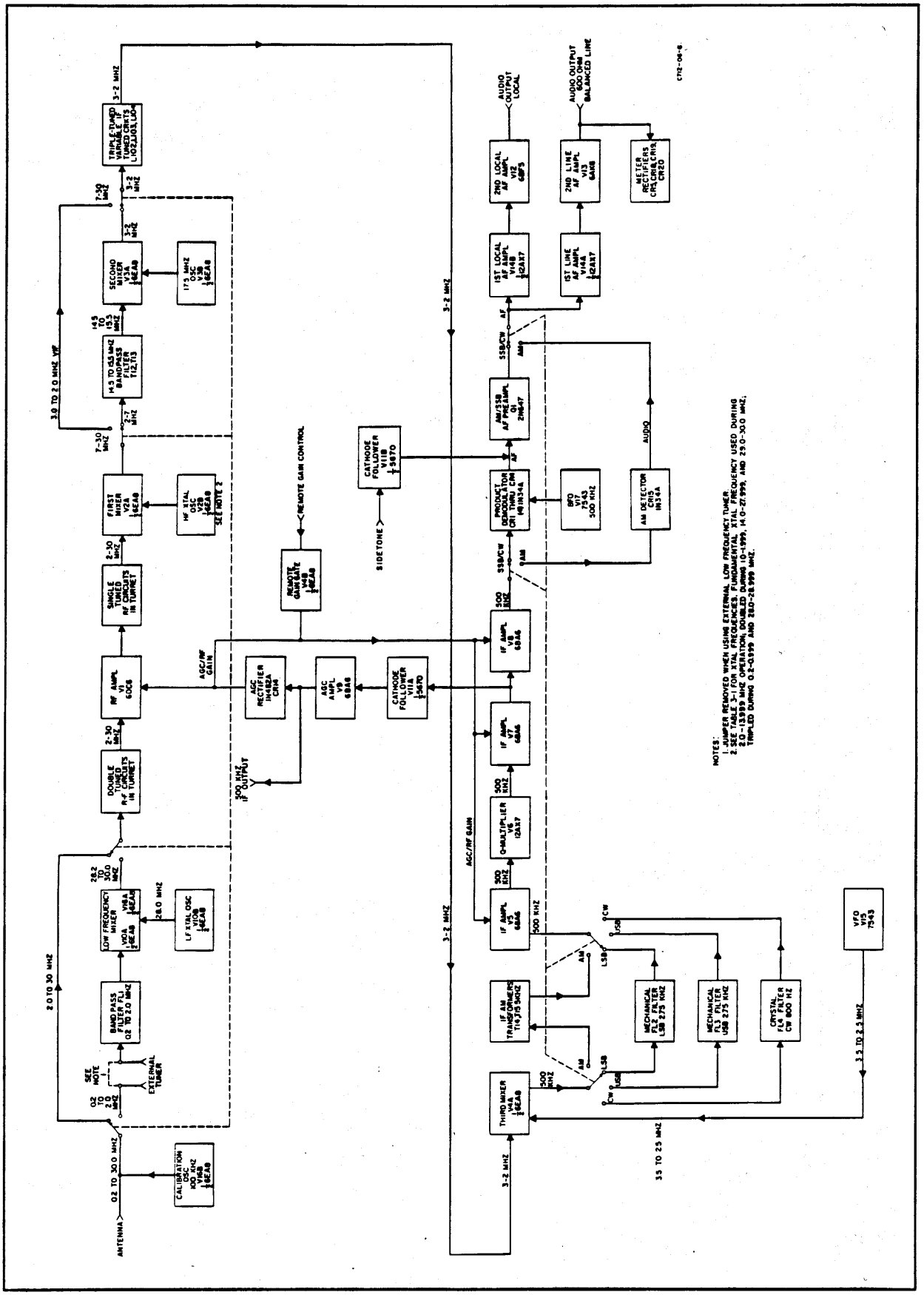

Figure 3. Block Diagram of the Collins 51S-1 Receiver

GENERAL DESCRIPTION AND FEATURES

Primary frequency coverage of the 51S-1 is 2 to 30 MHz in twenty-eight linear 1 MHz ranges. The desired range is determined by the Megacycles Selector Switch. (Refer to the Figure 1 illustration for identification of the front panel operating controls.) Direct frequency readout is provided with an odometer-type counter. The MHz Counter and the Tenth MHz (100 kHz) Counter which is ganged to the Main Tuning Control appear in the upper window. One kHz divisions (0 to 100 continuous) appear on the kHz dial window. Interpolation to within 500 Hz is possible when the Zero Set Control is used to align the hairline marker at the nearest 100 kHz point with the built-in Crystal Calibrator. A variable capacitor adjustment is accessible on the upper chassis to zero beat the calibrator to WWV. A Dial Lock slide switch is provided immediately below the main tuning knob.

A low frequency converter/bandpass filter combination is used to provide additional coverage, "for laboratory applications and broadcast monitoring" in the .2 to 2 MHz range, making for thirty ranges in all. An optional 55G-1 preselector (with built-in 4 ohm 5 x 7 inch speaker) must be connected for communications-grade performance below 2 MHz. The preselector provides for manual peaking of the signals in two switchable ranges - 200 to 600 kHz and 600 to 2000 kHz, and there is a bypass position. To date I have not be able to locate a 55G-1 and I suspect it is a mighty scare item.

The Instruction Manual specifies that "51S-1 series receivers require a good antenna with 50 ohm unbalanced feed". The RF front-end features an impedance-matching transformer and double-tuned antenna inductors to minimize spurious signal response and adjacent channel interference. As distinct from the less sophisticated 75S receivers, a preselection control (antenna trimmer) is not required since "band-to-band frequency coincidence" is achieved for each frequency range.

Image rejection characteristics are governed by the use of triple conversion for the .2 to 7 MHz bands and double conversion for the 7 to 30 MHz bands at a 500 kHz intermediate frequency. (The 75S series receivers used the more common 455 kHz IF.) As for frequency stability, the permeability tuned oscillator is claimed to limit drift to a nominal 100 Hz PER WEEK - after warmup at normal room temperatures, of course! The PTO is said to be "medium temperature-compensated", although there is no crystal oven.

The 51S-1 is capable of receiving USB/LSB, AM, CW and RTTY modes and selectivity at the output of the Third Mixer stage is governed by mode as selected with the Emission Switch. The AGC circuit is not switchable but is capable of providing automatic gain control to the RF and IF amplifiers such that AF output varies by not more than 6 db across a wide range of RF input voltages. Relative RF input levels can be observed on the high quality meter when the Meter Switch is set to 'RF'. Instructions specify that calibration should be adjusted to indicate 40 db for a 100 microvolt signal.

I think it's fair to say the 51S-1 was optimized for SSB reception. Upper and lower sideband are individually selectable with INDEPENDENT 2.75 kHz mechanical filters, so oscillator shifting is not required. Skirt-to-nose selectivity (60 to 6 db down) is unstated but probably a nominal 2 to 1, typical of Collins filters. The fast attack, slow-release time constants of the AGC seem tailored to optimize SSB reception too. An 800 Hz crystal lattice filter is provided for normal CW reception.

Standard AM selectivity is very wideband (5 kHz at -6 db; 22 kHz at -60 db), being governed solely by two coupled 500 kHz IF transformers. This is a serious limitation for AM mode DXing and even progam listening, except for strong, in-the-clear signals. It is interesting to note that the 51S-1 Instruction Manual suggests invoking the ECSS mode in circumstances of selective fading or adjacent QRM. However, for some reason Collins was never very interested in passband tuning - it would have been a welcome adjunct.

A switchable, series-type Q-multiplier between the first and second IF stages provides a bridged T-rejection notch filter centred at 500 kHz. It can be moved through the IF passband with the Rejection Tuning Control to deliver a minimum notch depth of 40 db for heterodyne rejection.

The Instruction Manual contains a special caution applicable for use of the Q-multiplier in AM mode:

> *"During AM reception with an interfering signal present, the resulting heterodyne may be tuned out by either of two settings of the Rejection Tuning Control. However, only one of the settings will allow the desired signal to be detected properly. Select the Rejection Tuning setting which yields the better intelligibility".*

In a review of the Collins 75S-3B which incorporated the same Q-multiplier circuit, Wilfred Scherer offers another useful tip:

"It should be noted that during on-the-air operation, the maximum effectiveness of the rejection notch (and sideband suppression) occurs when the RF gain is turned down, so that little or no AGC is in operation; otherwise the AGC may tend to defeat the purpose. This applies to other receivers as well". [7]

The AM mode diode detection is conventional but the Product Detector for SSB/CW modes is unique. It consists of four diodes in a diode-ring configuration. Here a 500 kHz crystal is used to inject the signal from the Beat Frequency Oscillator. The BFO is crystal controlled and not tunable. The aforementioned transistor is used in a SSB/CW preamplifier stage to provide impedance matching and gain between the output of the Product Detector and the first of the two-stage audio amplifiers. Notice that there is an identification error on the block diagram - it is labelled as an 'AM/SSB AF Preampl', whereas the circuit path correctly shows that output from the AM detector is fed directly to the audio output stages.

Two separate (two-stage) AF amplifiers are provided. The local amplifier provides 1 watt of audio output for an external speaker (either 4 or 600 ohms, unbalanced) and headphones - apparently 4 ohms although this is not specified. Plugging in headphones disables a speaker connected to the 4 ohm audio output. Rated audio frequency response is tailored to optimize voice intelligibility.

The line amplifier (600 ohms, balanced) provides a very low distortion 1 mw output, typically intended for remote monitoring devices or connection to a telephone line. As with other hollow state receivers having provision for a line output in the 500-600 ohm range, I use this to feed a tape recorder. The line AF gain, as indicated on the meter when the Meter Switch is set to the 0 or 10 DBM position, can be tailored with a set-screw adjustment located in the centre of the local AF Gain Control.

On the rear panel (see Figure 4), provision is made for a variety of external connections, most of which are mated with RCA phono plugs. Notice that there is provision for external RF gain control (by simplexing the audio output line) and an external VFO connection which allows for use of an external stabilized master oscillator for fixed channel selection purposes - these provisions would typically accomodate certain military or commercial installations. Although not mentioned in the Instruction Manual, the necessary provisions are available to "slave" two 51S-1's for diversity reception, either by frequency or by antenna spacing.

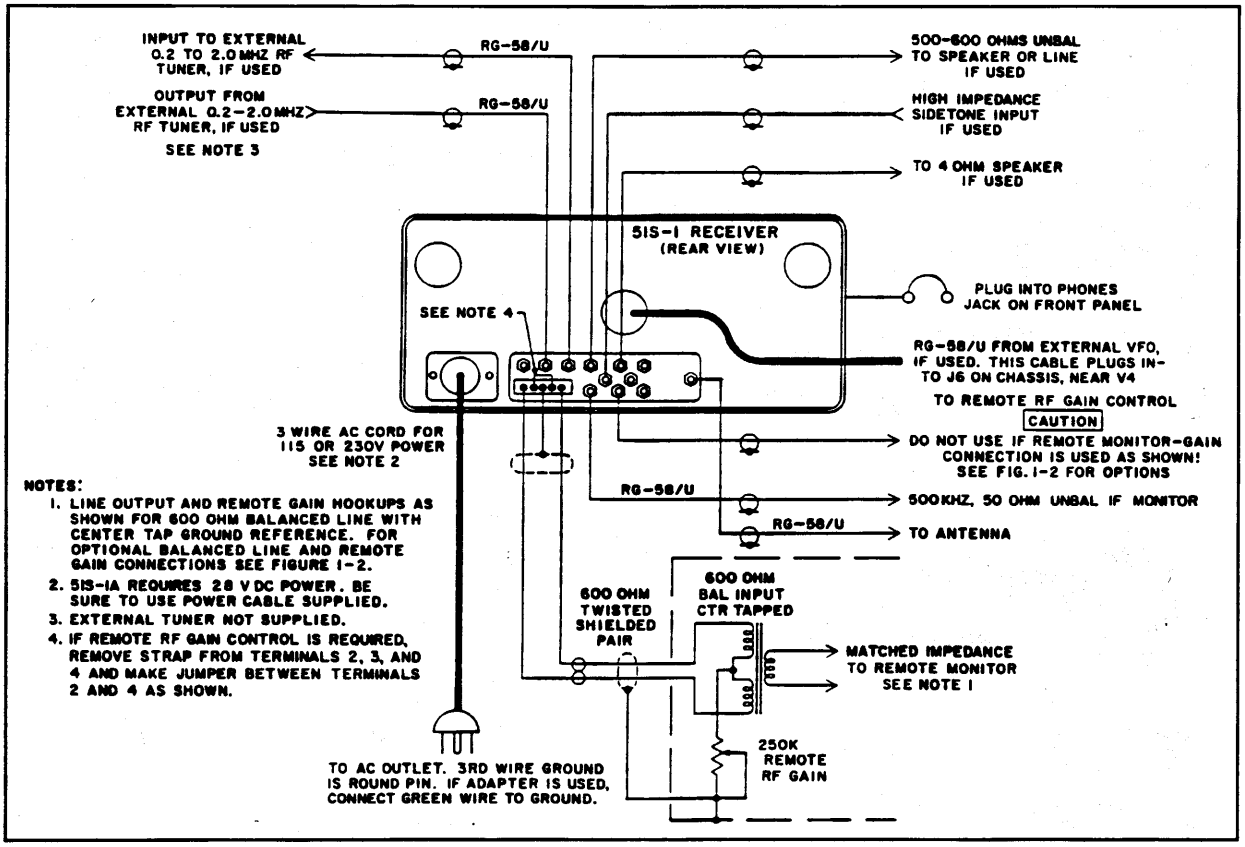

Figure 4. 51S-1 Rear Panel External Connections

The power connection to the 51S-1 is provided through a large, nine-pin connector which accomodates either 115 or 230 volts AC (28 VDC in the case of model 51S-1A). Separate colour-coded power cable kits (gray chord for 115 volts; black chord for 230 volts) were originally supplied with the receiver. Unfortunately, my second-hand receiver came without a power cable and a suitable mating plug was not to be found at any surplus dealer in Toronto. It was necessary to have a technician friend trace the power supply circuit and replace the chassis connector with a standard, three-wire AC cord for 115 volt operation. Buyer beware! Power consumption is rated at 125 watts.

OPTIONS AND ACCESSORIES

An optional rack mount was available for both the 51S-1 and the (optional) 55G-1 preselector. An optional S-Line station speaker, model 312B-3 was also available in a rack mounted version. For high vibration (mobile) applications, a base shock mounting kit was available.

Several optional IF filters were available for the 51S-1. For each of USB and LSB, the standard 2.75 kHz mechanical filters could be replaced by a 2.4 kHz bandwidth, the latter being the standard in most military configurations. Later advertising cited a 3.1 kHz mechanical as another option. A sharper (300 Hz maximum) crystal lattice filter was an option for CW. Only a 6 kHz mechanical filter was listed as an option for AM mode but this would have been highly desirable in lieu of the wideband IF transformers - unfortunately my receiver is not so-equipped.

VARIATIONS AND CONFIGURATIONS

The following table shows the information I have concerning the various commercial and military configurations of the 51S-1:

MODEL	MILITARY DESIGN'N	SSB FILTERS	RACK MOUNT	NOTES
51S-1	-	2.75	N	Standard Model
51S-1	R 1122/GR	2.40	N	
51S-1B	?	2.75	N	Military Connectors
51S-1F	R 1156/GR	2.40	Y	
51S-1F	R 1156A/GR	2.75	Y	
51S-1A	R 1430/UR	2.40	N	28 VDC
51S-1AF	?	2.40	Y	28 VDC
51S-1F	G133F	2.40	Y	LTV Modified

The G133F is a 51S-1F which was specially modified for the US Air Force by LTV Electrosystems of Greenville, Texas (now E-Systems Inc). According to the manual revisions, the G133F was supplied between 1964 and 1978. The principal modification was the addition of an "electronic package" that enabled processing by external equipment to determine the tuned frequency of the receiver and included a video output for spectrum analysis. In addition, a switch-selected AM-BFO was provided with variable frequency tuning up to 15 kHz on either side of 500 MHz. The stated purpose was to provide a means of varying the tone of CW signals being received.

Some years ago, the G133F was available from Fair Radio Sales in Lima, Ohio, in "used/checked" condition for $975. I am not aware of the quantities that were released as surplus or whether this military version is currently available.

PERFORMANCE

The greatest pleasure that I experience in using the 51S-1 comes from its obvious look and feel as a quality piece of communications gear. Everything about the way it handles feels "solid". I really do ENJOY operating the 51S-1! But quite frankly, you don't have to spend the kind of money the 51S-1 commands to get

better DXing and serious SWLing performance.

Sensitivity on the HF bands is certainly good enough, although effective sensitivity is limited somewhat by internal noise - the noise floor is not as low as I might have expected. In that respect it reminds me of the R-390A. For weak signal reception, I find that switching on the Rejection Control from its 6 o'clock 'off' position and setting it somewhere between 7 and 9 o'clock usually helps to cut down the internal noise and QRN without significantly muting the audio response. There is no noise limiter or noise blanker provided with this receiver.

The audio quality in AM mode, especially on strong, clear signals, rivals that of the better hollow state receivers. The audio response of an HQ-180 is somewhat more bassy but weak signal intelligibility with the '180' holds up very well - better than the 51S-1. Neither the 51S-1 nor the HQ-180 is as quiet as the Hammarlund SP-600 but then the SP-600 has remained virtually in a class by itself over the years, at least in my opinion.

Still, the audio clarity of the 51S-1 is definitely superior to that of a top-rated, solid state DX receiver such as the Drake R-7. I find it hard to compare the audio of most hollow state receivers, including the 51S-1, with the fine audio of the new Drake R-8. They're quite different, but who's to say which is better? The Collins audio is crisper; the R-8 audio is smooth and mellow but also very intelligible. I guess I have always be a fan of "tube" audio. Who wouldn't be, considering the disgraceful audio we've put up with from most of the solid state Japanese imports over the past ten years?

The 51S-1's rejection notch seems to sweep across the IF passband as it is moved between about 9 o'clock and 3 o'clock. Adjustment of the rejection tuning for the best balance between audio intelligibility and rejection of background QRM or noise is somewhat tricky. While it does help in cutting heterodynes and sideband splatter, the audio response is muted quite appreciably, certainly more-so than with the T-notch circuit in the HQ-180.

Apart from the Rejection Control, the only procedure requiring some finesse is tuning in SSB signals or AM signals in ECSS mode. While the Main Tuning Control is very smooth (except for the detents as it clicks over every 100 kHz), zero beating for natural audio is a bit of a chore and requires a steady hand. A tunable BFO would have been helpful here.

It is apparent that my receiver is not in tip-top shape because any tuned frequency will not hold with sufficient stability to allow unattended taping in sideband mode. Even after an extended warmup, the receiver tends to waver by about 50 cycles, more than enough to render audio reproduction of a sideband signal unacceptable. So, unfortunately I cannot confirm the vaunted stability of the receiver that is supposed to make it suitable for unattended monitoring. Elton Byington provides a better testimony. He says that stability was one of the prime reasons that a new 51S-1 was purchased for the Associated Press engineering lab in 1972. Elton recalls that the unit was rock solid - *"it would remain perfectly tuned for months of continuous use on one of AP's RTTY frequencies!"*

Notwithstanding the stock provision of independent upper and lower sideband mechanical filters, the biggest drawback with the 51S-1 is the lack of flexibility inherent in the selectivity arrangement. As noted, selectivity is governed by the mode that is currently selected. This means that the 2.75 kHz mechanicals cannot be used for AM reception and one is stuck with the wideband selectivity curve of the IF transformers - nice audio for listening to the BBC but grossly inadequate for Tropical Band DXing. I imagine the previously mentioned optional 6 kHz mechanical filter would be a vast improvement. The IF filters (apart from the transformers) are shielded within a metal can which I have not attempted to remove. I imagine that incorporation of the mechanical filter for AM mode would require some adept rewiring. The Instruction Manual provides no clues for installing the optional filter.

Even if I had the 6 kHz mechanical which would have been fine for relatively wideband audio for the stronger signals, it is obvious to me that this filter would not be satisfactory for most serious DXing applications in AM mode. Unfortunately there are no 'blank' filter slots so only the one selectivity position is available for AM mode reception.

Another limitation derives from the non-standard 500 kHz IF frequency that Collins engineers selected. IF filters for a variety of bandwidths remain commonly available for the more standard 455 kHz IF but not for other, less common intermediate frequencies. So, while I would love to install a mechanical filter of about 3.1 kHz for AM DXing, I don't believe such can be found, except perhaps by pilfering a filter out of an old "junker" Collins 51J-4 which also utilized this 500 kHz IF frequency.

While the mode-derived selectivity limits SSB/ECSS reception to only the one bandwidth, I must say that the stock 2.75 kHz filters are quite nice for ECSS reception except when tighter selectivity is required. On balance, however, the optional 2.4 kHz filters would likely be preferable for DXing purposes.

The 500 kHz IF also means that neither the MAP (Version I) nor the recently-available cascaded IF filter modules from KIWA Electronics [see James Goodwin's review in this edition of *Proceedings*] can be used with the 51S-1.

In spite of these limitations, all is not lost! There is at least one other way to enhance the performance of the 51S-1 and that is with the Hammarlund HC-10 Converter. Fortunately, the HC-10 is tunable to accomodate receiver IF's between 450 and 500 kHz. The upper boundary of the HC-10's IF range adjustment just fits with the IF of the 51S-1. The HC-10 is essentially the IF and AF stages of the HQ-180. It provides vastly improved flexibility in terms of the selectivity required for digging out those difficult DX signals. Every owner of the 51S-1 would be well-advised to invest about $150., the typical going price for a used HC-10. The required IF output for connecting the HC-10 is provided on the rear panel of the receiver.

EVOLUTION OF THE 'S' LINE

When radio hobbyists think or speak of the S-Line, what usually comes to mind is the well-known 75S series of receivers still beloved by many radio amateurs. Now we know that the general coverage 51S-1 was very much a part of that line, even though its widest application was not in the hobby market. There were other receivers that followed and, at least in terms of their nomenclature, kept the S-Line alive.

In 1970, while the 51S-1 was still in production, Collins released the 651S-1, a solid state design with electronic, digital nixie tube frequency readout. This receiver was "space-age" design in its time and was a complete departure from traditional Collins design. The $4000+ price-tag increased to five figures by 1980. It's obvious the market was almost exclusively confined to military and commercial applications. I'm not sure that it would be correct to characterize the 651S-1 as the general coverage successor to the 51S-1.

In 1982, Collins, which by this time was a subsidiary of Rockwell International, released the 451S-1. It replicated the style of the KWM-380 transceiver which came on the market in 1979. A full-page ad promoting the 451S-1 appeared on page 35 of the 1982 WRTH. An improved version of the receiver section of the KWM-380 formed the basis for the 451S-1 and in his preliminary review, Larry Magne characterized the 451S-1 as being "*intended to replace the 51S-1*". [8]

The 451S-1 sold for just less than $5000, excluding options, and featured a couple of departures from traditional Collins design: all-mode passband tuning for one, as well as provision for up to five crystal filter selectivity postions. Apparently some number of this receiver was produced but nothing more was heard of it in the hobby press and I can only surmise that the 451S-1 may be close to impossible to find in the used market.

CONCLUSION

"The 51S-1 is probably the last American-made general coverage receiver of its quality that will be available for Amateurs and SWL's for a long, long time." [9] That was the view in 1975 by the author of the only review of the 51S-1 in CQ Magazine I was able to find. In some respects he was certainly right, although it must be said there are better, and in some cases less expensive choices for the diehard DXer or the program listener. The 51S-1 would best be classified as a durable monitoring receiver.

Still, for the serious collector of classic hollow state gear, the 51S-1 has become a "must have" item. This sentiment, reflecting a strong rebirth of interest in tube-type communications receivers, is the driving force behind today's market interest.

For a long time I'd yearned for a 51S-1 and now that I've invested in it, I have no intention of letting it go. While it lacks some of the features and flexibility of better DXing receivers, the mystique - that special feeling, if you will - is rekindled every time I switch it on. The 'S' Line, perhaps especially the 51S-1, will retain a special place in the hearts and minds of hollow state fans for many more years to come.

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