The Signal

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Michael Collins
CCA Banquet Guest Speaker

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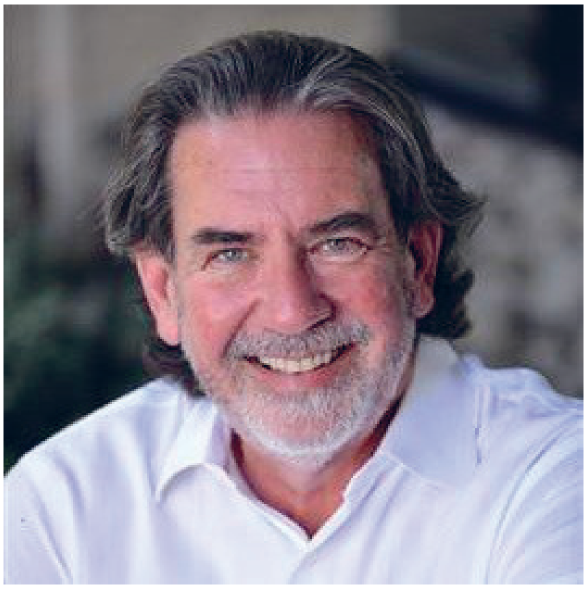
Collins Collectors Association



From the President's Desk…

The second quarter for the Collins Collectors is all about Dayton. In a separate column I will discuss the details of the activity at the booth, flea market, and banquet – but I will report that this was a special Dayton with Michael Collins in attendance and as a speaker at our Friday night Banquet. We had all looked forward to this as a special night and we were not disappointed! Thanks to Jim Stitzinger – WA3CEX, our Vice President for a job well done!

This was also a different Dayton for me as I brought my bride Paula for the first time. Now she is NOT technical and NOT a ham, but does listen to me discuss Collins and the CCA with practiced attention.

She does enjoy a road trip so we set off early for a relaxed three-day drive from the Dallas area to Ohio. Normally I do this thousand-mile journey in one day - more like a forced march than anything else (ask anyone that has ridden with me). We did enjoy driving through Arkansas, Tennessee, and Kentucky. Seems the farther you get from Texas the prettier the scenery gets. On the way, I tried to prepare her for the sights and sounds of Dayton, but nothing can prepare anyone for the sheer vastness of it all – both indoor and the flea market. I could tell that she was going to enjoy the road trip but ready to endure the 3 days of Dayton – she would WAY rather be at the beach or in the mountains! She had visions of having to spend 3 days with old engineer types sporting plastic pocket protectors - discussing radio in obscure technical details using words she could not begin to understand. When I talked about looking forward to seeing my CCA buddies there was just a blank stare.

I have to give her great kudos for helping out in the booth and being the lead sales person to unload hats and T-Shirts that we have had in stock for years. Her tireless work of keeping us all organized was VERY helpful. But the real reason I bring this up is that on the way home she would bring up over and over how much she enjoyed meeting this and that person. How interesting they were and how much she enjoyed talking with them. She also talked about the banquet program and expressed her real appreciation for the talk by Michael and the AACLA video – which she thought was of great interest – even from someone who is not a huge Collins fan. Unfortunately, she did NOT think that the 150 foot Luso Tower with a MonstIR Yagi would look good in our back yard – Oh Well….

So if you have not made the trip to Dayton and think you have all the radios that you will ever need or want (I actually have not met anyone who could honestly say they have all the radios they want) – come and meet the people you hear on the nets and read their posts on the reflector. It will be a memorable experience!

One last humorous Dayton note….seems that on Saturday morning a van arrived in front of Hara Arena and a group of protestors poured out carrying signs and picketing in front of the Hamvention. Their signs talked of animal cruelty and the senseless killing of hogs for meat – and Ham! They carried on for over an hour until some of the Dayton officials came out and explained that a HamFest has nothing to do with meat packing but rather a gathering of Amateur Radio Operators. They sheepishly got back in the van and left --- True Story!!!

73,
Scott Kerr – KE1RR
President

Scan to see more about the CCA

The Signal Magazine

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Issue Number Eighty Two - 2nd Quarter

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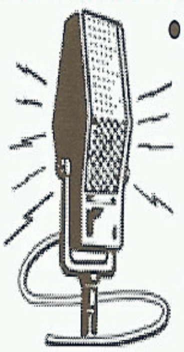

- Sunday 14.263 mHz at 2000Z
- Tuesday 3805 kHz at 8pm CST
- Thursday 3805 kHz at 8pm CST
- Friday (West Coast) 3895 kHz at 10pm CST
- Sunday 10m AM 29.050 mHz

The Signal Magazine

The Collins Collectors Association
P.O. Box 1269
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From the Editor

This quarter you will find the issue loaded with information and pictures of our annual Dayton gathering – see the Dayton Report. The pictures are in several groups – Booth, Flea Market, and Banquet. As you can see, lots of booth traffic and a large turnout for the Banquet.

We are also featuring two technical articles on topics that have been discussed recently on the reflector. One is by Bob Jefferis, KF6BC, summarizing his study on balanced modulator diodes. I know that there are a lot of opinions on this topic but he puts some real test data, study, and experience out there to go along with his opinions – thanks Bob for sharing with us! The other technical article is again by The Signal's technical editor, Don Jackson – W5QN, on detectors. I love reading Don's writings since he has the unique ability to teach technical details in a language that is very understandable. We are all fortunate to have Don on the Signal team!

Next quarter, Don and I will team up and get out a follow-up article done on the 75S Line receivers implementation of SB2. This was the subject of last quarter's technical article. The problem with the implementation is the sheer number of 75S-3B and C changes in manufacturing and the lack of documentation on those changes. I looked at my 75S-3C and started in on the SB2 – but the copy of the manual that I had looked nothing like the way my S3C was wired. Don and I will try and give you some step by step instructions on 75S-1, 2, 3 and 3B/C SB2 implementation.

Our "In The Shack" is Tony Sokol - Net Control and someone who is always willing to help out the CCA. Join us on any Tuesday or Thursday night on 3805 kHz to hear Tony's excellent signal!

We have a few people who have expressed interest in joining the Signal Staff but we are still looking for someone who wants to lead the way and be the Editor in Chief. If you have an interest, shoot me an email!

Editor in Chief,

Scott – KE1RR

SSB and the Product Detector

By Don Jackson, W5QN

Most of us are aware that the introduction of the "Product Detector" resulted in greatly improved audio when receiving SSB or CW signals, as opposed to the audio produced by the standard "Envelope Detector" that was used for many years in receivers designed to receive AM signals. Why is this? First, let's look at the operation of the Envelope Detector (ED). Figure 1 is the block diagram of the final IF and detection circuitry of the final stages of a typical vintage AM receiver.

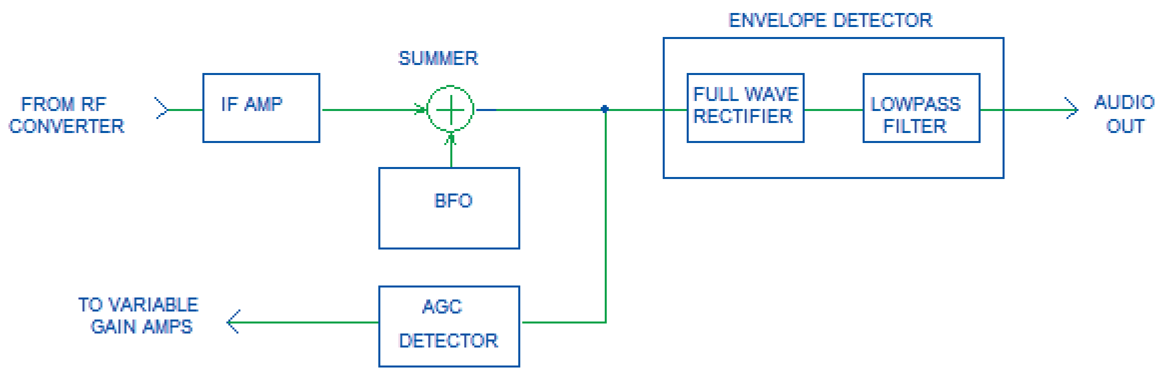


Figure 1 – AM Receiver with Envelope Detector

The Envelope Detector

In this design, a Beat Frequency Oscillator is summed with the final IF signal in order to receive SSB or CW. The sum of these two signals is input to the ED, which consists of a rectifier circuit (envelope detectors always have a diode of some sort), followed by a lowpass filter that attenuates all signals but the desired audio. The first thing to note is that simply summing the IF and BFO does not create any new frequencies. At the input to the ED, there is only Fif and Fbfo present. However, if you look at the sum of these two signals on an oscilloscope, you will see something that looks like AM. What you see is the well-known "beat note" that results from instantaneous addition of the Fif and Fbfo sine waves. However, if we simply passed this signal through an ideal audio lowpass filter, the output would be nothing since no audio spectral component exists in the sum of Fif and Fbfo. To produce an audio component, the sum is first rectified, a non-linear operation that creates the audio output. Next, an audio lowpass filter strips off all the spectral components except the desired audio. This seems ok, so why does the audio sound so lousy, and why do we have to diddle with the RF gain of the receiver to make it sound decent?

Let's consider the case in which Fif is 500kHz and Fbfo is 501kHz. We have an ideal ED consisting of a rectifier and audio lowpass filter. We will vary the voltage ratio of Fif to Fbfo, while observing the distortion levels of the 1000 Hz audio output. A system simulation program, SystemView, was used to generate data for the following figures. Figures 2 and 3 are what you would see at the ED output using an oscilloscope with Fif to Fbfo voltage ratios of .1:1 and 1:1 respectively.

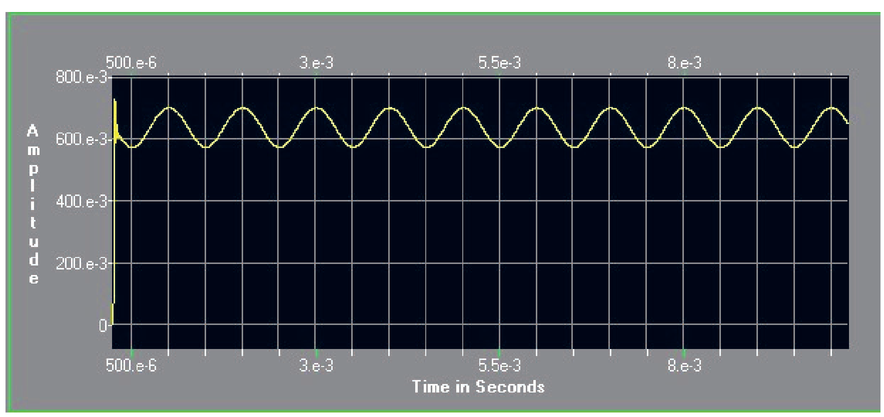


Figure 2 – Envelope Detector Output with .1:1 IF/BFO Ratio

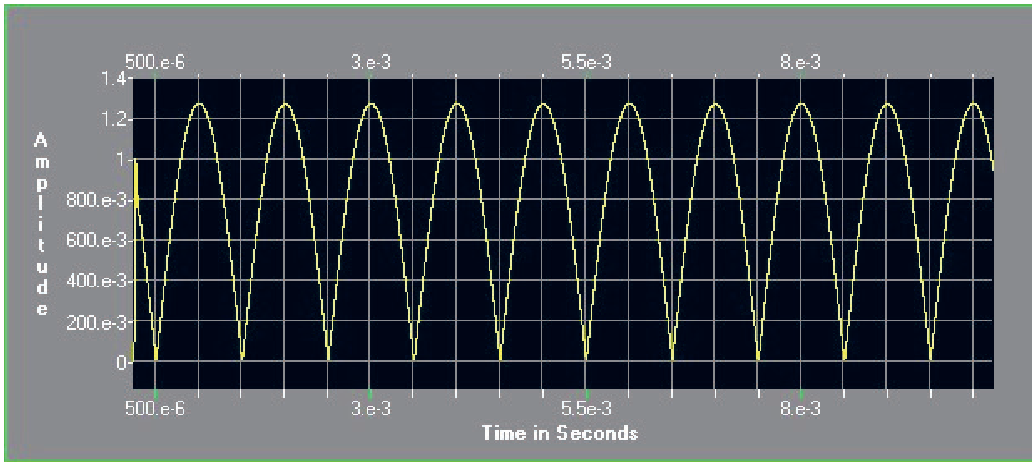


Figure 3 – Envelope Detector Output with 1:1 IF/BFO Ratio

The waveform of Figure 2, with the IF voltage of a tenth of the BFO voltage, the distortion doesn't look bad. There is a considerable DC voltage component at the output, but this is easily taken out by an audio transformer or capacitive coupling. The waveform of Figure 3, in which the IF and BFO voltages are identical, is highly distorted.

Figure 4 shows the ED voltage output of 1kHz fundamental tone, as a function of Fif input voltage, with the BFO voltage fixed at 1 Volt. If the ED produced a linear transfer function, this graph should be a straight line with constant slope, as shown by the "blue" line. Clearly that is not the case.

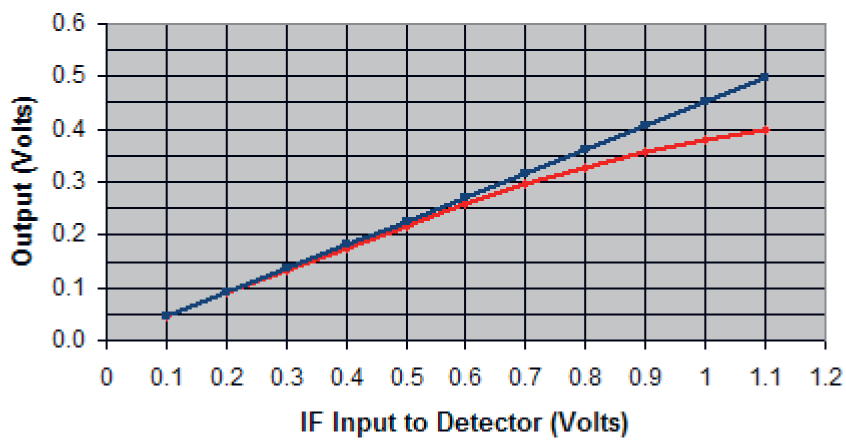


Figure 4 – Envelope Detector Input vs. Output Voltage w/BFO at 1V

Figure 5 shows the harmonic distortion of the 1kHz ED output as a function of the voltage ratio of Fif and Fbfo. As you can see, low distortion is only obtained when Fif is of much lower amplitude than Fbfo.

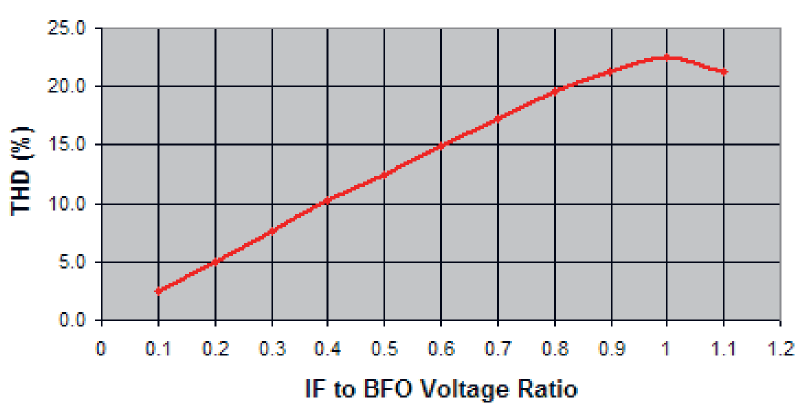


Figure 5 – Envelope Detector THD vs. IF/BFO Voltage Ratio

There is a second major problem with the ED that most users of vintage AM receivers will recall. It has to do with BFO injection into the final IF stage, where the automatic gain control (AGC) detection circuitry is located. Considering that the amplitude of Fif needs to be at least 20dB below that of Fbfo for acceptable distortion levels, the BFO amplitude will dominate input to the AGC detector, making the AGC essentially useless. This was a huge problem with use of a BFO and ED. The usual solution was to turn off the AGC, and adjust the RF gain manually to achieve an acceptable audio output signal.

The Product Detector

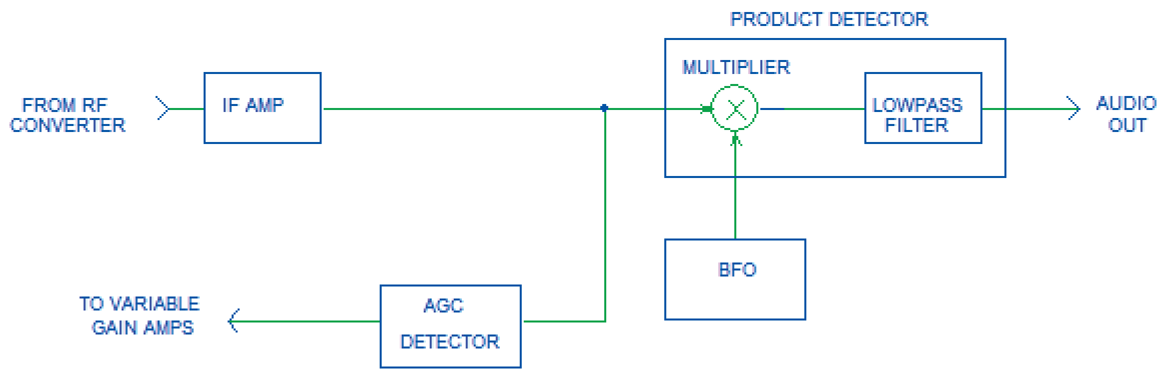


Figure 6 – Modern Receiver with Product Detector

Figure 6 shows a modern receiver using a Product Detector (PD). The PD is, as its name implies, a multiplier followed by a low-pass filter. As such, it multiplies Fif and Fbfo, ideally producing two (and only two) outputs: Fif+Fbfo and Fif-Fbfo. Many of you will recognize these two frequencies to be the same as those at the output of an ideal "mixer" circuit in the RF and IF stages of a superheterodyne receiver. The reason is that a mixer and a PD perform the same mathematical function. The math function can be written in the form of the trigonometric identity:

$$\sin A * \cos B = .5*[\sin(A+B) + \sin(A-B)]$$

Ideal multiplication of two sinusoidal waves results in two new sine waves, one at the sum and the other at the difference of the two input frequencies. Note that the output does not contain either of the original input frequencies. This is exactly what is desired for a "balanced modulator" that creates USB and LSB signals while suppressing the carrier in a SSB transmitter. It is interesting to note that a mixer, product detector and balanced modulator are all circuits that multiply two input signals. The multiplication need not be perfect. In practice, the design of the circuit is tailored to the application and the frequencies involved, thus the different names for the circuits.

Figures 7 and 8 are the oscilloscope waveforms of the P.D. output for .1:1 and 1:1 voltage ratios of Fif and Fbfo. Note that these waveforms appear undistorted.

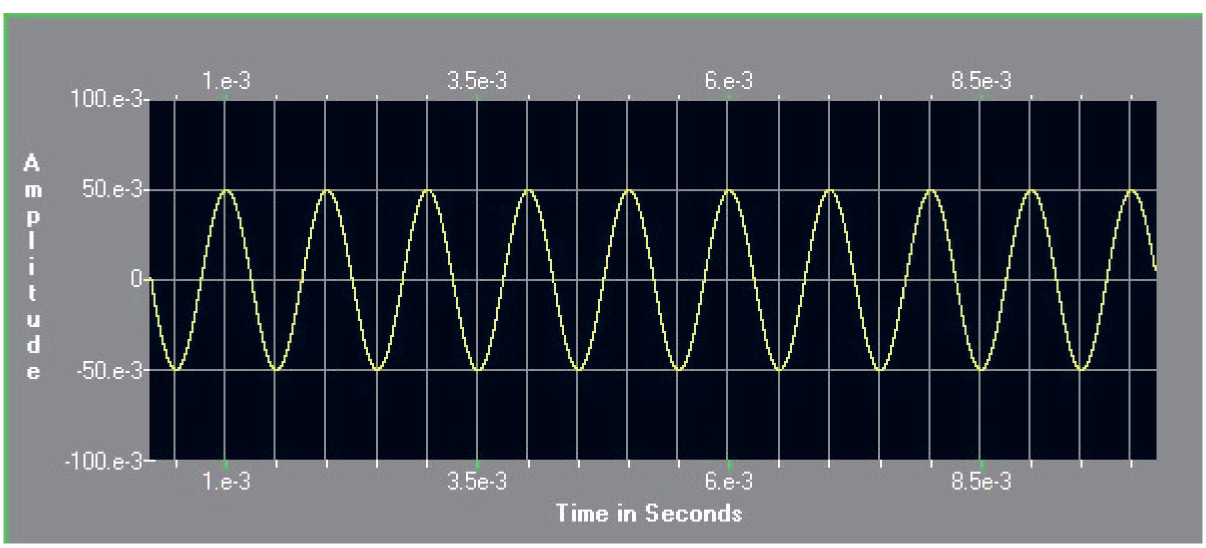


Figure 7 – Product Detector Output with .1V IF input and 1.V BFO

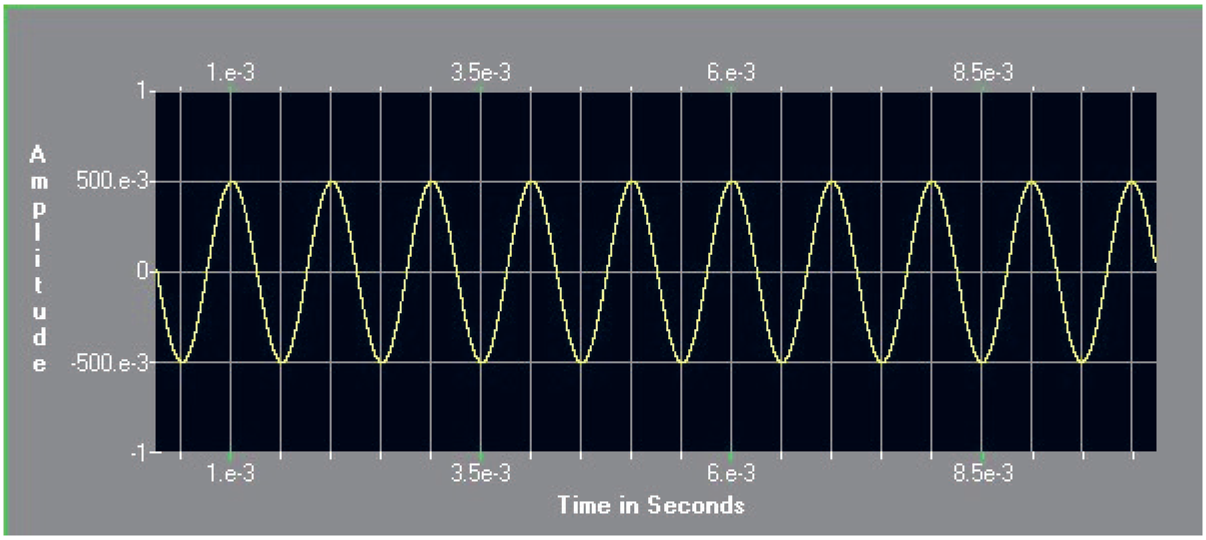


Figure 8 – Product Detector Output with 1.V IF input and 1.V BFO

The PD outputs of Figures 7 and 8 show identical waveforms except for the scale. A .1V(pk) IF input results in an output of 50mV(pk), and a 1.V(pk) IF input results in an output of 500mV(pk). This is exactly in accordance with the trigonometric identity for the multiplication of two sinusoidal waveforms, and indicates a linear transfer function. There is no distortion introduced by the product detector. Even if the IF voltage were greater than the BFO voltage, the detector is still linear. Another advantage is that an ideal PD does not introduce a DC voltage at its output.

As further demonstration of PD linearity, Figure 9 shows the PD voltage output of the 1kHz fundamental tone, as a function of Fif to Fbfo voltage ratio. The graph in this case is a perfectly straight line with constant slope, indicating that the PD is a linear device.

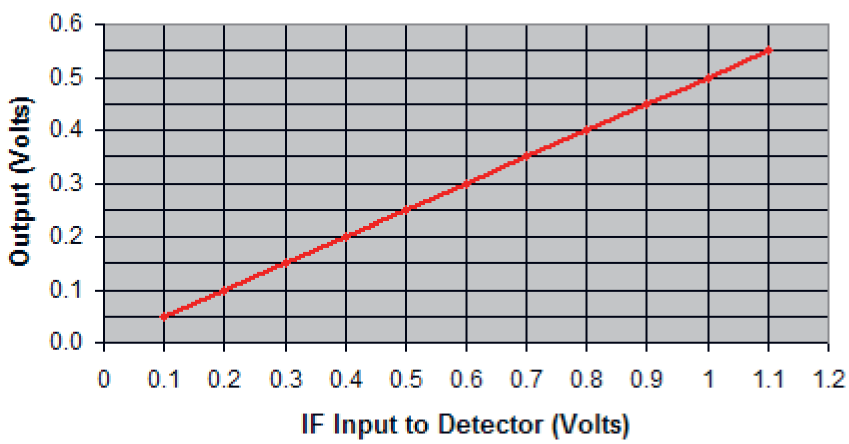


Figure 9 – Product Detector Input vs. Output Voltage w/BFO at 1V

What about the AGC problem? The PD solves this problem as well because the BFO signal is not summed directly with the IF signal, where it will impact the AGC detector. With a PD, the BFO signal is sufficiently isolated from the IF path that there is no interference with AGC operation. Sufficient isolation generally means that the BFO leakage to the IF output is below the AGC threshold.

Conclusions

The product detector is a huge improvement over the envelope detector for the reception of SSB and CW. First, the PD is a linear detector, while the ED depends on non-linear rectification to produce an audio signal. Second, the PD isolates the BFO from the IF signal, allowing proper operation of the receiver AGC function. Mixers, product detectors and balanced modulators are all specialized variants of a multiplier. They all depend on multiplication to produce outputs containing the sum and difference frequencies of the two input signals. Of course, these simulations assume ideal ED and PD circuitry, which is obviously not realized in practice. Nevertheless, the advantages of the PD concept are clear.

Cheers,
Don, W5QN

Selection Criteria for S-Line Modulator Diodes

Bob Jefferis, KF6BC

Introduction

The question of modulator diode specifications and matching requirements appears in CCA reflector posts occasionally. I have not been able to find specific original specifications for the epoxy encapsulated matched diode "quads" employed by Collins in 32S-3 and KWM-2 transmitters when they abandoned discrete Germanium diodes. Since original quad packs are in short supply and ridiculously priced today, this note is intended to provide some guidance on suitable replacements and a little insight into carrier suppression (CS) optimization. These suggestions are based in part on literature research and bench measurements, but rely heavily on circuit simulation. My simulation tool is "LTSpice IV" from the Linear Technology Corp. Time constraints and personal bias against single source proprietary devices limited my study to JEDEC registered small signal, high speed Silicon PN junction (SPN) and Schottky Barrier (SB) diode alternatives that are still in production and seem to be popular choices like 1N4454, 1N4148, and 1N5711. Germanium diodes were discounted due to increasingly poor availability and performance degradation often found in aged new old stock (NOS) pieces.

The original diode forward voltage mismatch (ΔVf) limit was probably 10 mV over the forward current (Id) range 1≤ Id ≤ 10 mA. Although Collins might have changed the limit specification as time progressed, my study showed that 10 mV is a sensible conservative ΔVf limit. Although SB diodes do provide slightly better performance, I did not find a compelling reason to prefer them over SPN diodes in this application.

Operating Conditions and ΔVf Limit Drivers

There are five versions of 32S-3 modulators. Collins Instruction Book dates indicate that Figure 1 is the production configuration installed from some date prior to 15SEP64 to some time after 15JAN68. R142 first appeared in the 5th edition manual (15JAN68). Space does not allow full discussion of modulator operation. Briefly, it is a double sideband suppressed carrier modulator that is doubly balanced. The circular or repeating cathode-to-anode connection of CR1-CR4 is why it is often called a "ring" modulator. The diodes serve as switches to connect voltages e1(t) and e2(t) to the primary winding of output IF transformer T2 and the termination network. Connection polarity is reversed on each half-cycle of the periodic carrier signal (BFO). During positive half cycles CR4 and CR1 are forward biased while CR2 and CR3 are reverse biased. During negative swings, CR3 and CR2 are on, and the other pair is off. If constants K2 and K3 are equal and pertinent diode characteristics are perfectly matched then T2 primary current will be proportional to e1-e2 = K1*A. The BFO terms cancel out and no carrier energy is transferred to the secondary of T2. CS depends strongly on symmetry and the degree to which all modulator components are balanced, not just the diodes.

The CS specification for 32S-3 and KWM-2 transmitters at the RF output port is 50 dB, minimum, relative to 100 Watt output power. The mechanical IF filter is relied upon to provide at least 20 dB of CS at 453.65 kHz (USB mode) and 456.35 kHz (LSB mode). So the modulator must provide at least 30 dB. Before addressing the ΔVf question, I wanted to understand how all imbalance factors might influence a ΔVf limit and why the allowable values of C12 range from 0-130 pf. This large range cannot be explained by unit-to-unit stray reactance variation alone. Throughout the following discussion ordered number pairs in curly braces represent simulation results in dB for SPN and SB diodes in that order {SPN,SB}.

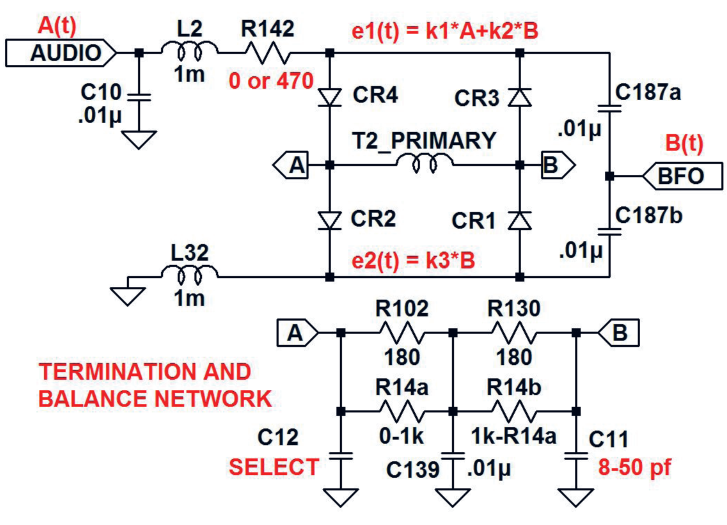


Figure 1 - 32S-3 Modulator

Aside from unavoidable stray reactance and the diodes, there are four notable sources of modulator imbalance. Table 1 lists worst case CS degradation these can create before balancing. Lets's refer to Figure 1, a 32S-3 schematic, and start with the BFO signal. When R142=0 Ω, all component pairs and diodes are perfectly matched, and B(t) is a pure sine wave with source impedance Z ≈ 0 Ω the model's baseline CS={98, 96}at the control grid of V3.

Figure 2 shows a real 32S-3 BFO waveform at the plate of V2B. There is obvious distortion. Spectrum analysis showed that total harmonic distortion is 21% in this example. Simulating this up to the 4th harmonic and adding actual BFO source impedance, CS drops dramatically because the BFO distortion creates asymmetric on/off switching waveform profiles of voltages and currents throughout the modulator.

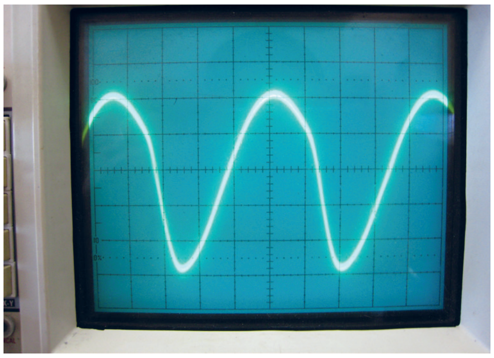


Figure 2 - BFO Waveform
(2V/div vertical, .5 µsec/div horiz.)

C187 is a dual section class 2 ceramic. One might assume that C187a and C187b are closely matched but this is not the case. Collins manuals list section capacitance as 0.01 µf with a "GMV" tolerance (guaranteed minimum value). U.S. National Stock Number records list the room temperature tolerance of each section at -0, +100%. I have three NOS spares on hand and was surprised to find that section mismatch ranged from 11-39%.

L2 and L32 have a ± 5% inductance tolerance and addition of R142 is an asymmetric change.

Potentiometer R14, trim capacitor C11, and test select capacitor C12 provide an effective but indirect imbalance correction scheme. That is, the design only addresses aggregate imbalance. It cannot accomplish complete compensation of individual degradation factors or diode parameter mismatches. One exception is the ±10% tolerance of R102 and R130. For practical purposes, R14 settings required for optimum balance fully compensate this potential 20% mismatch. It is not a CS limiting factor.

Initial simulation runs did not reveal trends pointing to a simple deterministic method of CS prediction as a function of imbalance factors as I had hoped for. CS is not directly related to individual imbalance sources and degradation factors are seldom additive because many mismatch combinations are partially complimentary. For example, when combined in worst case fashion, the degradations listed in Table 1 yield CS={25, 19} before balancing and CS={38, 39} after balancing with perfectly matched diodes. After balancing there is still a CS margin to accommodate some level of ΔVf related degradation.

This exercise did explain the large C12 range. Several trial cases required C12 values in the range of 50-60 pf and 5-10 pf in order to keep C11 centered in its adjustment range.

Table 2 summarizes diode operating conditions and modulator characteristics under normal operating conditions. CR1-CR4 are not stressed in any way. This is a low power, low voltage application and I have not found a reason to be concerned about startup, shutdown, or operation related transient energy.

Table 1 - CS Limiting Factors

Source	Worst Mismatch	CS Degradation
BFO Distortion	--	{38, 25}
L2, L32	10%	{18, 20}
C187a,b	100%	{36, 46}
Add R142	--	{10, 18}

Table 2 - Modulator Characteristics

Diode Current Id	7.4 mA peak 1.3 mA average
Diode peak reverse voltage	750 mV, SPN types 620 mV, SB types
Diode PWR dissipation	5.2 mW peak 900 µW average
Audio input Z, average	(100+R142)+j0, SPN (150+R142)+j0, SB
BFO input Z, average	180+j0, SPN 148+j0, SB
Conversion Loss	8 dB, R142=0 15 dB, R142=470
BFO - Audio Isolation	38 dB
Audio - IF Isolation	> 75 dB

Diode Mismatch and Fair Comparisons

Collins used a proprietary specification to purchase the benchmark diode sets on a competitive basis. This explains why quads installed through S-line and KWM-2 production life bear different manufacturer part numbers like FA4000, FA4092, FR496, CA6987, and MQ5032 from various sources like Hughes, Raytheon, Microsemiconductor, and Fairchild. A 1978 Fairchild Semiconductor data sheet for their "FA Series" pair, quad, and bridge assemblies is no help. If Collins had purchased a standard matching option, the maximum ΔVf could have been 3, 5, 10, 15, or 20 mV over Id ranges of 10µA to 1 mA or, 1 mA to 10 mA.

I have four spare CA6987 and five MQ5032 modules representing three manufacturers. These came from military surplus sources in original packaging that explicitly references Collins drawing number 353-3271-000. So, to settle the question, Vf vs. Id (V-I) data were acquired for all 36 diodes in the spare quads with the setup shown in Figure 3. A digital current meter and 20-turn instrument grade rheostat was placed in series with a 1.5V "C" battery and the diode under test. Vf was measured directly at diode leads close to the epoxy package at nine Id values in the range 0.1 to 5 mA with a high precision DMM. 5 mA was chosen as the upper limit because it is the nominal peak Id in the modulator. These data clearly show that the ΔVf limit applied to these diode sets must have been 10 mV for $1 \le Id \le 10$ mA. I don't know if CA6987 and MQ5032 quads contain the same base diode type, but V-I curve differences are small enough to consider them the same. A CA6987 SPICE model was extracted from this data to represent SPN diodes in most simulations because it is a bona fide replacement and remarkably similar to 1N4148 and 1N4454 alternatives.

The next step was a purchase of sixteen Fairchild 1N4454 SPN diodes from Newark Electronics and sixteen STMicroelectronics 1N5711 SB diodes from Mouser Electronics. In both cases, packing documentation indicates that the diodes are supposed to represent the same production lot. I performed V-I measurements on both groups. Maximum ΔVf of the 1N4454 sample is 6 mV for $1 \le Id \le 5$ mA . Excellent. Maximum ΔVf of the 1N5711 sample is 23 mV. Whoa!

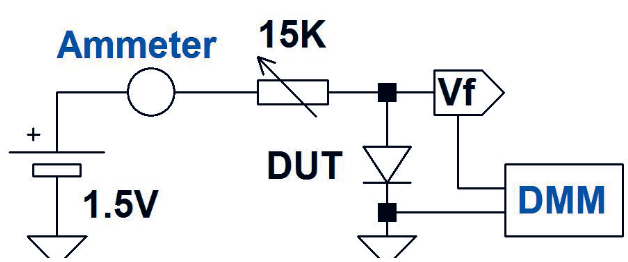


Figure 3 - Vf Measurement Setup

Comparing SPN and SB diode performance is a little tricky because ΔVf of any diode set varies systematically with Id, generally increasing with increasing current. Over the range $1 \le Id \le 5$ mA ΔVf increases by a factor of 1.2 with the SPN diodes I looked at. ΔVf of the 1N5711 increases by a factor of 3.5. This larger increase is related to "guard rings" manufacturers use to increase reverse breakdown ratings of SB diodes. Ratings greater than about 20V usually means a guard ring is present. However, a larger ΔVf change with Id will be typical of all SB diodes. I first applied a 10 mV limit to both diode types at 2 mA which is close to the average Id. CA6987 CS numbers were 10 dB higher than the 1N5711. Applying the 10 mV limit at Id=5ma resulted in comparable CS numbers. Therefore, ΔVf should be checked near maximum operating Id when selecting SB diodes or, a lower limit can be used for testing at lower currents.

Zero bias diode capacitance and capacitance mismatch is not critical in this circuit. For example, if rated maximum capacitance is as high as 5 pf I found that an extreme and unrealistic 2.5 pf spread in the set only reduces CS by 12 dB before balance adjustment.

The number of possible imbalance situations is endless, so I resorted to educated guess combination trials to search for cases that push or exceed the CS specification. After examining trends with a number of combinations, I decided to finish by looking at 48 permutations of two arbitrary, but suspicious scenarios: L2, L32 mismatched 5%; C147a, C147b mismatched 40%; R142 present; diodes mismatched relative to the average or baseline models by [-4, 0, 2, 4] and [-10, 0, 2, 10] mV @ Id=5 mA. Balance adjustment of the worst cases produced CS={35, 40} for the 8 mV Vf spread and CS={28, 33} for the 20 mV spread. A 20 mV spread is definitely too large for SPN diodes. The 1N5711 is 5 dB better in both cases but very marginal with a 20 mV spread. This outcome is satisfying in the sense that simulations support the 10 mV ΔVf limit implied by real CA6987 and MQ5032 data.

Conclusion and Parting Comments

Table 3 lists the salient specifications I would apply to diode selection. There is a wide variety of suitable replacements available. SB diodes can provide better CS if the listed matching limits are met but the advantage will not be huge.

Table 3 - Diode Requirements	
Parameter	Rating
Repetitive Reverse Voltage	10 V, min
Breakdown voltage	20 V, min.
Reverse leakage current	200 nA max. @ Vr ≤ 10V, @ 25° C
Total device dissipation	100 mW, min.
Diode capacitance	4 pf, max.
Maximum ΔVf, SPN types	10 mV, Id=1 mA
Maximum ΔVf, SB types w/guard ring	10 mV, Id=5 mA or, 3 mV, Id=1 mA
Maximum ΔVf, SB types w/o guard ring	10 mV, Id=5 mA or, 5 mV, ID=1 mA

My limited purchase samples raised a warning flag. Whether you choose discrete diodes in DO-53 packages or a proprietary integrated quad ring product, don't assume that you can buy just four new discrete parts or one integrated package with assurance of adequate Vf matching. Lacking data and reliable information from manufacturers, I will not try to recommend a minimum purchase quantity. Out of sixteen 1N4454s purchased I got four good sets, but the sixteen 1N5711s only yielded three acceptable sets. Caveat emptor.

KWM-2 modulator evolution was very similar to that of 32S-3 modulators but I do not know which product was the horse or the cart. Regardless, Tables 2 and 3 should be applicable to KWM-2 modulators.

Together, the modulator and mechanical filter should deliver CS numbers between 50 and 70 dB at the RF output port depending on how component tolerances stack up in a particular unit. Any modulator component change may trigger the need for a new C12 value. Be prepared with an assortment of appropriate mica capacitors as listed in 32S-3 and KWM-2 manuals. If C12 is right, the modulator seems to be working properly, and 50 dB CS cannot be obtained in both USB and LSB modes, look for a mechanical filter skirt symmetry problem at the carrier frequencies.

I am not a proponent of unnecessary modifications. Having said that, if you decide to tackle remedial modulator repair and really want to get serious about CS, here are two easy update suggestions. Replace C187 with a matched pair of class 1 C0G ceramics, e.g., Murata P/N RDE5C1H103J1K1H03B. Matching need not be closer than about ±5%. Of course, if C187 a and b are already well matched this is a waste of time. Next, I am pretty well convinced that R142 was added to reduce audio distortion produced by cathode follower V2A. The imbalance that R142 adds can be mitigated without side effects by replacing L2 and L32 with 2.2 mh chokes like API Delevan P/N 2500-44J. I have not confirmed this, but intend to try it the next time I work on a modulator.

Finally, I want to thank Don Jackson (W5QN) for his valuable editing and content suggestions.

- Bob Jefferis, KF6BC

In the Collins Shack

Receiving my Novice call of WN9JXN in September of 1954, I soon advanced to the General class level. Later on I progressed to Advanced and eventually Extra which I hold today. I took these back in the days when you had to travel to downtown Chicago and sit in front of a stone faced FCC examiner. This was a rather unnerving experience for a 13-year old to say the least.

After receiving my BS in Industrial Education I taught Drafting and Electronics at the High School level where I met my wife Linda of 49 years and counting. Linda has embraced my love of ham radio all of these years for which I feel very blessed. A short time later we attended the University of Wisconsin – Stout campus where I completed a graduate degree in Audio Visual Communications. During this time, I acquired my first Collins station consisting of a 32S-1 and a 75S-1 which I actually operated during grad school. Actually, I have operated consistently even as an undergrad since I first acquired my license.

Today after pursuing several careers in television production and field service management I operate a small calibration business for contamination control equipment. I am still very active on the ham bands after more than 60 years. I enjoy my time with my son Brian W9SRK, daughter Stacey, my wife Linda, and our 5 wonderful grand children.

Ham radio has been a tremendous influence on my life as have the many friends I have made through the CCA.

Tony Sokol, W9JXN

In the Collins Shack

DAYTON BOOTH REPORT

Again this year, we retained the double booth in the East Wing of Hara Arena which gives us the room to have literature/ sales items and also have a lounge area for CCA members to sit and relax. Later in the afternoon, after everyone has walked the flea market, the lounge area has become a popular gathering place to show off the latest purchases.

Floyd Soo, W8RO, and his team of Bryan, Bob, Charlie, Rick and Tony turned out, as usual, for the Booth setup and tear-down. All of them also helped man the booth for the hundreds of members and other Collins fans who seem to have a never ending stream of questions for all things Collins related. Also a special thanks to my bride for her help at the booth. We also had a large number of new memberships and renewals this year. Our membership chairman, Jerry Kessler, N4JL, had us well organized with a printout of all the relevant membership data so we could quickly determine the membership status of anyone who had a question about their renewal status. Our Treasurer, Jim Green – WB3DJU, was there from the start to the finish for setup and making sure we kept all the finances straight along with Tony Sokol's envelope system. Thanks to all for their hard work!

There was a lot of S Line gear out in the Flea Market and LOTS of 75A-4's! I bet I saw at least 15 nice 75A-4's. I did not hear of anyone who found something rare or unusual. I know that there are some guys thinning their herds of equipment but prices seem to be up a little and enough buyers are around to keep the market alive and well. Most of the new members who are showing up are much younger, which is an exciting trend!

Jim Stitzinger and I are already talking about some radical fun changes for the booth for next years' Dayton – Stay tuned!

- Scott KE1RR

Collins Collectors Association

DAYTON BANQUET REPORT

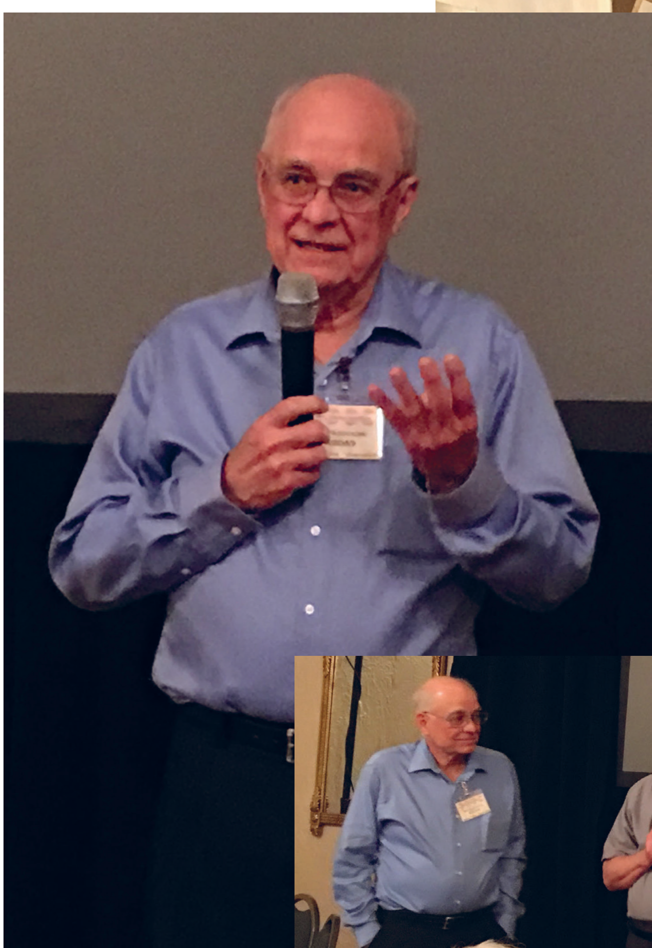
This year's 22nd Annual CCA Banquet at Dayton was just a wonderful experience! We are thankful to all who attended! Michael Collins brought some amazing insight into his father and the special company he founded. We even learned of the artistic talents of Michael's mother, Mary, which she used to create the famous winged emblem! We were thrilled to see the new documentary released by the AWA and the AACLA. For all of us who never met Mr. Collins, it was just great to meet his first born son! We were fortunate to be able to ask questions of AACLA board members including Lawrence Robinson and Rod Blocksome. The video of the Michael's presentation will be posted on the CCA website soon! The documentary can be purchased on the AWA website.

We also announced the new Wikipedia article on Arthur A. Collins that was just posted on the web. It is a fascinating read! I was privileged to help with this article.

We had a new venue at the Miami Valley Gulf Club and 100 attended. The meal was great and well received! We will be going back to this venue for years to come! Many thanks to all who helped make it a great event. Special thanks to Scott and Paula Kerr, Floyd Soo, Rich Sperling, Rod and Elizabeth Blocksome, and all of you who attended! Even Michael came early to help with the banquet set up!

See you all next year!

Jim Stitzinger, WA3CEX
Dayton events Chair
VP, CCA



Other Great Photos from Dayton...


W9JXN

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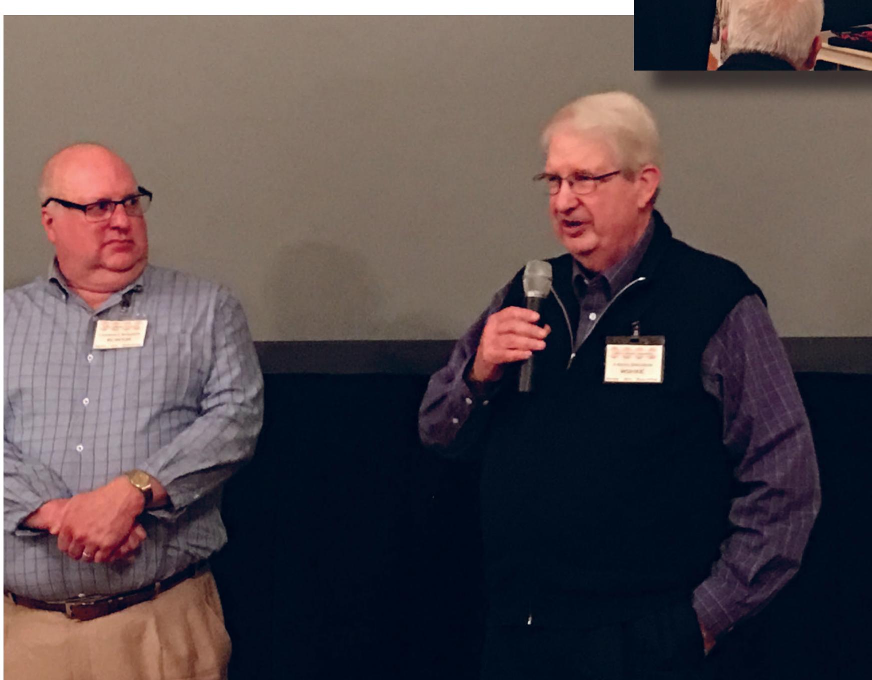
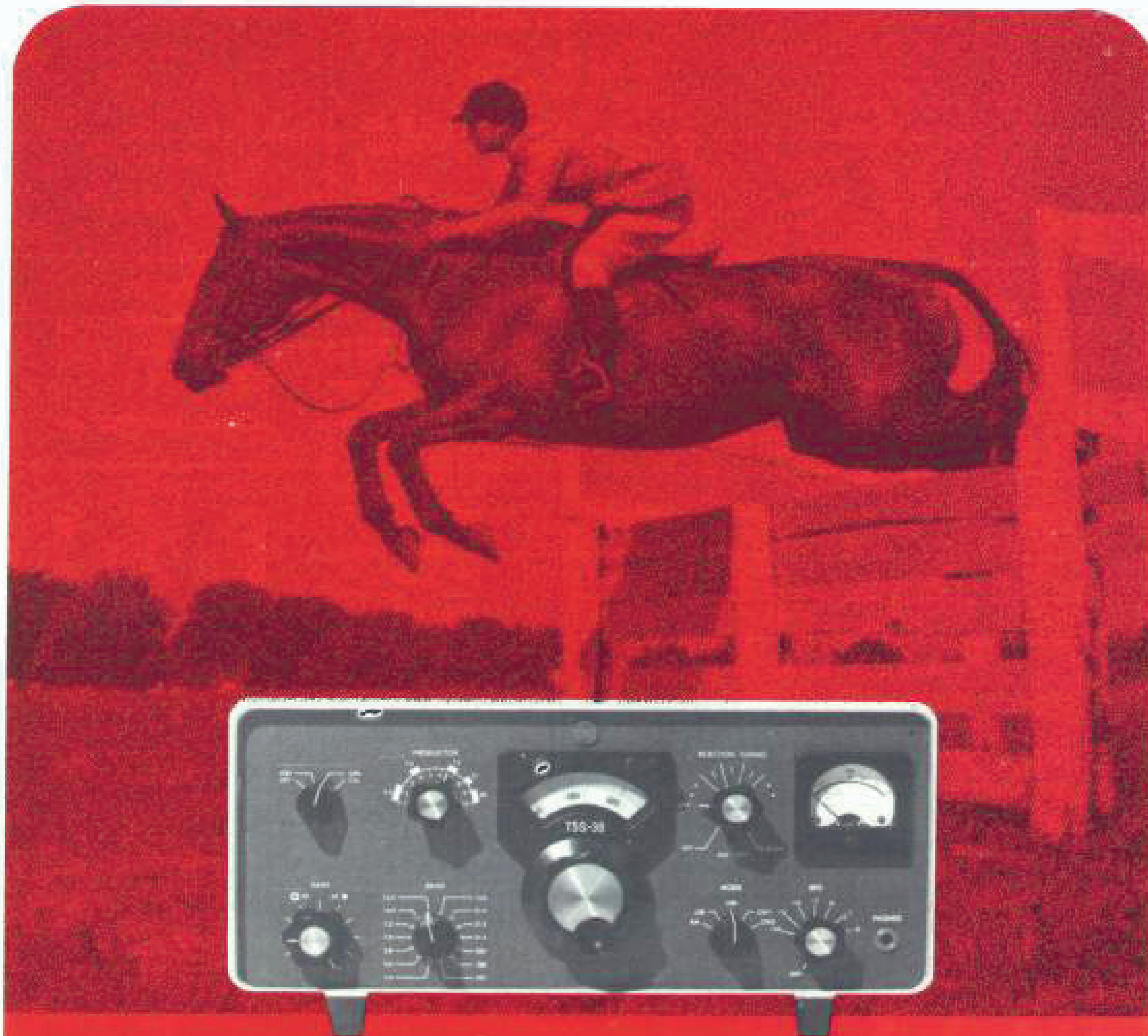
BIG

The Collins Collectors Association





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