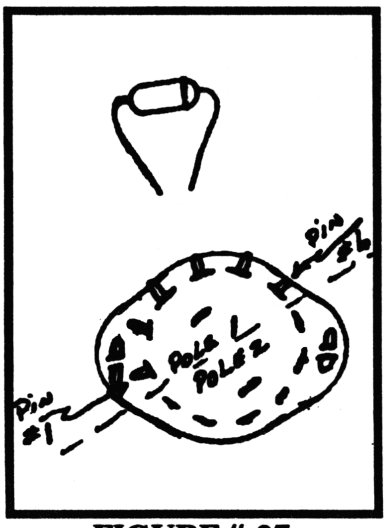


FIGURE# 27

Last month we had an article on how to increase the receiver gain on units by decreasing the self-biasing on the amplifier. Of course the opposite is also true. You can decrease the gain of an amplifier by increasing the self-biasing. Why I feel that this is worth mentioning is that I've received a couple of calls this month were technicians were having trouble with the TC-DX kit when they capacitively couple them as we suggested last month. You will notice this high pitched squeal as you bring L-7, 8, and 9 to their peak and remove your tuning tool. This means that your mixer/amp, is picking up enough feed-back to put it into oscillation.The Fix: Increase the size of the mixer/amp's self-biasing resistor from 100 ohms to 470 ohms. If this is not enough, make it 680 ohms. In the case of the Cobra 148GTL, 2000GTL and the Grant, this resistor is R-52. In the Washington R-44 and the Cobra 140 & 142, R-43.

This is a feature we will attempt each month if it is favorly accepted. After viewing and studying this article we would like your opinion.

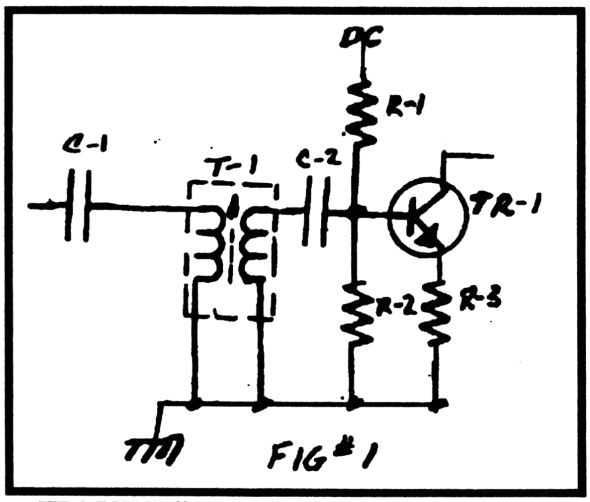
Call 1 (800) CARD-KIT.

The Circuit Of The Month

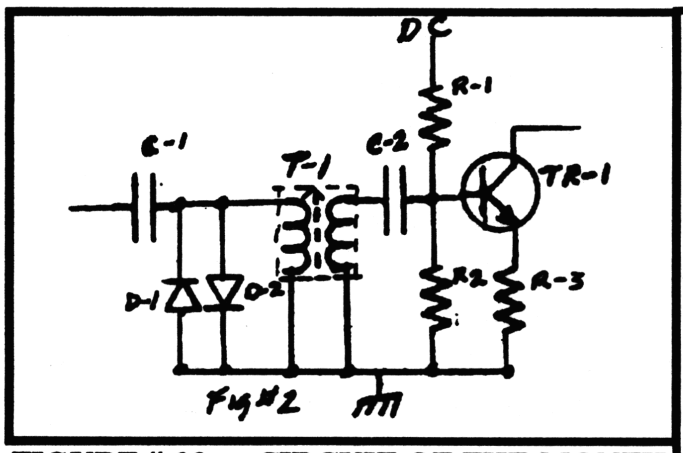
It is only fitting that we start with the lesser written about section of a unit, (the receiver) and where else should we start except the beginning or input circuit.

In its simplest form, the first amplifier stage's input could consist of a small coupling capacitor C-1, a tuneable RF tank of the proper frequency (27mhz.) T-1, another capacitor C-2 to couple the RF signal on to the control biasing voltage divider network for the RF amplifier (see fig. #1). This is fine except there are other things to be considered.First, what size should C-1 be? Well, it has to be small because its source is the 50 ohm impedance matching pad, that has to match the impedance of the coax and antenna. It cannot be a heavy load on that source even when the tunable tank shows a small load. You will find they will range from as large as 47pf, down to as small as 2 or 3 pfIn this circuit, what would happen if a large signal were to strike the antenna? It would cause heavy conduction in the RF amplifier and if it continued for a length of time, it would over heat the transistor, causing damage. We must protect against this. So, we put in two back-to-back

diodes (fig. #2) D-1 & D-2. Generally these will be Germanium diodes because who needs a signal level more than .2 volts peak to peak. This limits how large the capacitor C-1 can be because if it takes more than the forward current rating of these diodes to charge and discharge the voltage change on this capacitor, they will blow. However, the capacitor must be large enough so the current caused by minority carriers will not change the charge or load on the capacitor. This means the reverse resistance of the diode and the size of the capacitor must present more than 5 time constants to the 27mhz signal. How does all this benefit you? Well, if you have a unit that keeps blowing diodes and RF amps, check the size of C-1. If it is something like 35pf you might try changing it to a smaller size, say 22pf. Now, one other thing that we want to consider in a RF amplifier. We want to hear distant signals and close signals. You can't make them all the same amplitude but you can amplify the more distant ones, more and the close ones, less. The circuit we use to do this is called automatic-gain-control, (AGC). If we can detect and change this gain at an audio rate, we call it fast AGC, (FAGC). This of course only works on the small section of the RF amp band width to which we are tuned at that time. If someone generates a large signal within the amplifier's band-pass but not on the channel to which we are tuned, it will saturate the amplifier and drown out the weaker signals. This is why your needle will drop down when you are hit with a strong signal that is on another channel. Now back to FAGC see fig. #3.Looking at the 455khz amplifier output and splitting it on the zero line, you can see we have identical intelligence riding on the peaks of both halves. If we want negative FAGC, we rectify and filter the negative half. In this case the positive half is rectified and sent to the audio amplifier.In fig.#4 we have taken this same type of amplifier stage and added manual gain. (Or RF gain) This is accomplished by paralleling the self biasing resistor R-3 with a manual controlled pot VR-1, but it must be limited to prevent damage to TR-1. So, in series with the variable resistor we add R-4.All of these types of controls of the input and gain are called conventional methods. In the past decade, however more and more of the units are being manufactured using non-conventional methods. They take the FAGC, RF gain, the protection diodes, and sometimes

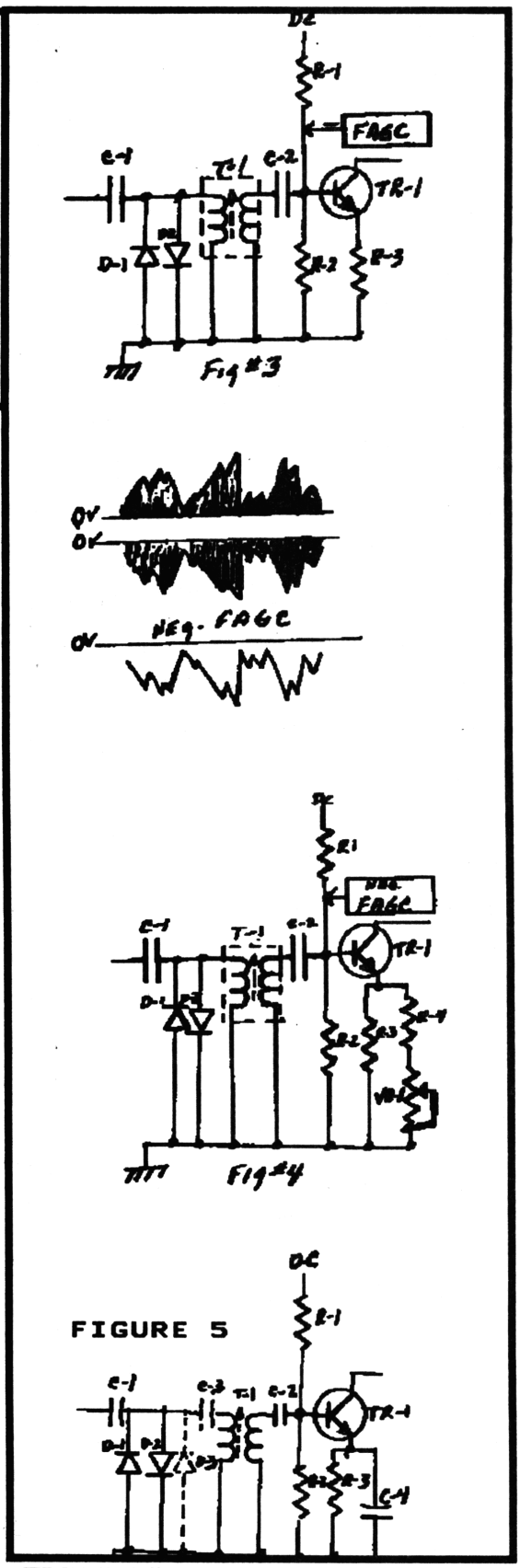


FIGURE# 28.....CIRCUIT OF THE MONTH



FIGURE# 29.....CIRCUIT OF THE MONTH

even the TX/RX switching and combine them into one control circuit. This combined circuit is placed between the input capacitor C-1 and the input tunable tank T-1.Looking at fig.#2 again, if we add a third diode D-3 in parallel with D-1, there would be very little change in the load caused by the circuit. If we add another capacitor C-3 in series with C-1 (and we made it 500 times larger) there would be no relative effect on the circuit. If we put a 1meg resistor in the circuit instead of D-3, there would be no relative change, but if we made it a variable 1meg resistor it would depend on its setting as to how much loading effect it would have on the circuit. Also because of the coupling of C-3, when the resistance got small enough to cause allot of current flow, it would become a load on T-1. This would have the effect of lowering and broadening its bell curve.this brings us to the reason for this discussion. Never try to tune the 1st. Rf tank on a non-conventional unit, with more than 1 or 2 "s" units of signal, and always have the RF gain control fully cw (on). How to test the

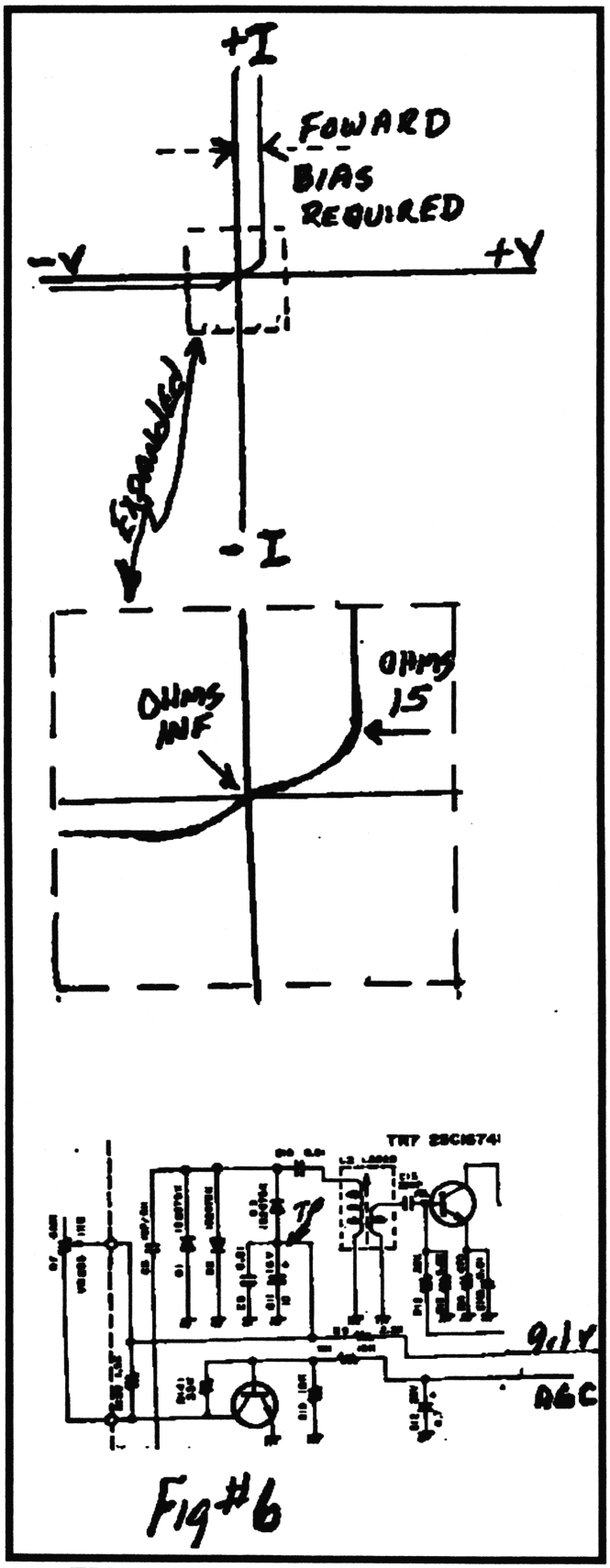


FIGURE# 30.....CIRCUIT OF THE

non-conventional input circuit. Connect a scope to the anode of the diode we have numbered D-3. Set your scope on dc input and .5v/per cm. With no input to the unit the dc level should only be about .1v. Now rotate the RF gain control ccw and watch it climb to near 1v. Now set your RF gain all the way cw, put an antenna on the input and as you receive stronger and weaker signals, watch the voltage rise and fall between these same limits.this can also be accomplished with a meter that has 20k ohms/per volt input but not quite as effectively.Fig. #6 is an actual input circuit, clipped from a Cobra 29LTD schematic. Note the point to test these voltages mentioned above.

THE 29 IS BACK

We were able to confirm with Dynascan, Cobra div., the rumor that they would soon be reactivating the supplying of Cobra 29LTDs. However, the spokesman for Cobra stated that they would be calling it the Cobra-29LTD Classic. He stated too that the packaging or packing box would carry a picture of a semi-truck in recognition that the American truck-drivers were the prime mover in their decision to reintroduce them. A firm date was not given as to their availability.



FIGURE# 31.....CIRCUIT OF THE MONTH