

# CB to 10

## —part XI: Hy-Gain's PLL rigs

**A**lmost every late-model CB rig on the market is capable of operating on 10 with excellent sensitivity and output. No model requires very extensive changes to modify. I picked an inexpensive and easily converted rig for my first research run and achieved some rather gratifying results. A little fancy telephone work got me in touch with Charlie Conners KØNG in Nebraska, who I knew had spent many hours in design work on PLL circuits. As it turned out, Charlie has done extensive work on 10 meter conversions, and, without his advice and knowledge, my conversion could have been very painful the first time.

The Hy-Range model 681A,<sup>1</sup> which I chose for conversion, can be modified in about an hour and performs well (better than manufacturer's specs). Is it phase locked loop? You bet — it only requires the purchase of one crystal instead of two, four, or possibly six on some rigs, and the receiver sensitivity is right on with a little realignment. No circuit changes are necessary, and there is no compromise on sensitivity.

Do I have you interested? Get out your alignment tool, VTVM, and signal generator

(necessary equipment), and set aside one hour of your day's schedule.

Finding your way inside should be no problem. Locate X101 and replace it with a new crystal which is determined by the formula:  $(N/2) + 9.510$  MHz, where  $N = \text{kHz}$  above CB channel 1 (26.965) that you wish to operate.

For example, suppose we move up exactly 2 MHz to 28.965 for channel 1. Then,  $28.965 - 26.965 = 2000$  kHz;  $2000/2 = 1000$  kHz or 1 MHz;  $1000 \text{ kHz} + 9.510 = 10.510$  MHz for new crystal frequency.

With the new crystal installed, set the channel selector to channel 1, attach a VTVM to TP8 on the PC board (junction of R114 and R115), and adjust T101 for 1.5 V dc  $\pm .1$  volt. This step is critical and must be done carefully, as it allows the vco to operate within "capture" range of the PLL circuitry. This accomplished, loosely couple an accurate signal source to the antenna jack, flick the channel selector to channel 11, and carefully peak T104, T105, T106, L112, and L115 for maximum receive sensitivity.

Next, attach a power meter and dummy load to the output and key up the trans-

mitter. Watch the power meter and tune T102, T103, L103, L104, L106, L109, and L110 for maximum power output. If the power output exceeds 4 Watts at this point, readjust L110 counterclockwise until it is 4 Watts or less. This last step will assure an output free of spurious radiation. Also, remember that these adjustments are interactive and should be gone over more than once for peak performance.

And there you are! It's a first class 10 meter rig in anybody's book — in about an hour.

Now you need an antenna for the little jewel. There is one CB antenna on the market that will operate "as is" on 10 with less than 2-to-1 swr through a full megahertz. The M400 "Starduster" made by Antenna Specialists is a natural, the only modification necessary being to change the coax connector from the CB rig to the 10 meter rig. But, for the ham who's got to have everything just right, slip the capacitance hat off the top radiator, prune the radiator to 96" and the three radials to 98", and you have a fine vertical antenna which will

show unity gain with a good dipole.

A mobile antenna presents little more difficulty than a simple retuning. Most commercially produced mobile CB antennas fall into three categories, and all can be modified successfully with very little effort. Quarter-wave whips are simply pruned to resonance with an swr meter in the line. Center- and top-loaded antennas usually have an adjustable metal whip which requires a slight shortening.

Helically wound antennas may be carefully shortened and rescaled against the weather. There's nothing really difficult about the conversion, and most can be accomplished in 30 minutes or so.

By this point, you should have under \$100 and about an hour and a half worth of time invested in a slick 10 meter station. ■

### Reference

1. Hy-Gain model 682 uses the same conversion. Models 2680, 2681, 2682, and 2683 require a different crystal formula:  $\text{Crystal X101} = N/3 + 11.80666$  MHz, but tune-up is exactly the same. Service manuals (very comprehensive) are available from: Hy-Gain Electronics, 4900 Superior St., Lincoln, Nebraska 68504, for \$5 each.