# CB to 10

## —part X: Realistic's Mini 23

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The CB boom is just about over. The suppliers are trying to unload warehouses full of new 23-channel CB radios at any price the market will pay. In many instances, the CB antenna will cost more than the radio — amazing but true.

I was in the local Radio Shack store and noticed that the new Realistic Mini 23 CB radio was selling for $29.95. This had to be a bargain, as this radio normally sold for $109.95. I thought this radio would be an excellent candidate for converting to ten meter AM, and, at that price, I could butcher the radio all I wanted to and still not feel bad about it. Let me say at this point that, although I think I made a good buy for the amount of electronics I was getting, I have found out that there are better deals to be had. The used CB market is virtually nonexistent and an enterprising ham can find a broken CB rig for $5.00 or less. At these prices, it will be hard to go wrong when purchasing a CB rig for conversion to ten meters.

With new two meter rigs costing $200.00 and more and new CB rigs selling for one tenth of that amount, it should not be long before ten meter AM is just as popular as two meter FM. All that is needed is a little coordination to keep everyone on the same frequency.

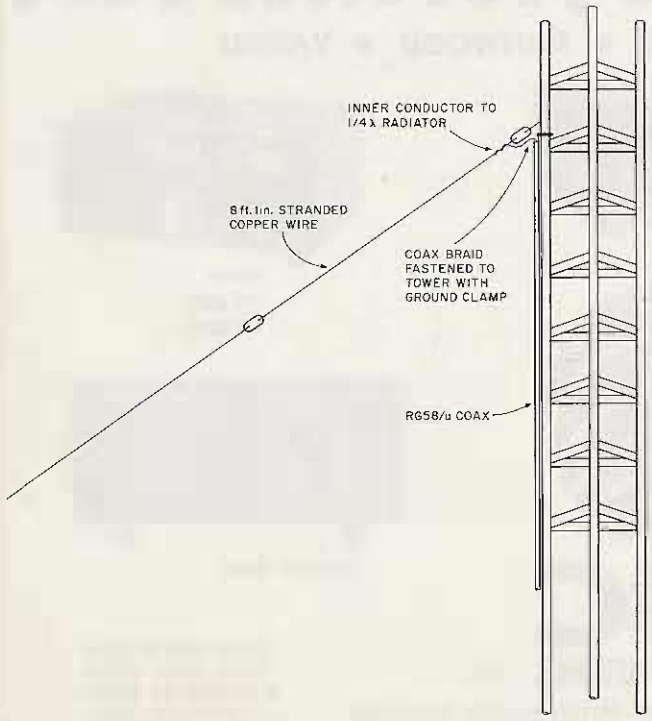


*Fig. 1.*

### Frequency Conversion

Upon investigating the schematic of the Mini 23, I noticed that the frequency scheme for obtaining 23 channels was simply heterodyning any one of six master oscillator crystals against any one of eight local oscillator crystals to obtain the desired frequency. The local oscillator crystals range from 10.150 MHz to 10.180 MHz and 10.595 MHz to 10.635 MHz in 10 kHz steps. The master oscillator frequencies range from 37.600 MHz to 37.850 MHz in 50 kHz steps. In order to come up with a workable plan and in order to purchase the fewest number of crystals, I decided to change the frequency of the master oscillator by 2.035 MHz. This puts channel 1 on 29.000 MHz. This is a nice round number, and it seems that the higher frequencies formerly were used for AM operation. This is accomplished very easily by changing the crystals as shown in Table 1. The new crystals can be purchased from International and other manufacturers for around $4.95 each. This puts the rig on frequency in the ten meter band.

### Transmitter Alignment

The transmitter section is peaked up using a VTVM and a wattmeter and dummy load. The probe of the VTVM is connected to the base of Q12, and the oscillator is peaked for maximum output by adjusting T10, T11, and T12 for maximum voltage on the VTVM.

The driver is peaked by connecting the VTVM probe to the base of Q14. Once again, key the mike and then adjust T13 for maximum voltage, and next adjust T14 for maximum voltage on the VTVM. This peaks up the driver section. At this point, some rf output should appear on the wattmeter.

Tune the final by adjusting T15 and T16 for four Watts output on the wattmeter. Do not try to tune the final for maximum output on the wattmeter. The transistor will put out more than seven Watts but, in order to do so, will pull excessive collector current, and the transistor will not hold up to this abuse. The final transistor will open. Take my advice and tune for no more than four Watts out. I know because I learned the hard way and now am using a replacement final transistor.

### Receiver Alignment

The receiver can be aligned by using a signal source such as your regular station transmitter tuned to 29.000 MHz and fed into a dummy load or any other suitable weak signal source, such as a nearby ham transmitting on 29.000 MHz. The Mini 23 does not have an S-meter, so I connected the VTVM probe to diode D3, which is the AM detector. It then becomes a simple matter to tune T2, T3, T4, T5, and T6 for maximum voltage on the VTVM. This completes the conversion, and the rig is now ready to go on ten meters.

### Antennas

For mobile use, I took a used base-loaded mobile CB antenna and simply started

trimming the whip until I reached an swr of 2:1 while operating on ten meters. On the whip I was using, I took a little more than two and a half inches off. This will vary with different types of mobile antennas, of course, and a good method is to insert the swr bridge in line and trim until a good match is obtained. The frequency change of 2 MHz or so should work out okay with most mobile whips that are base loaded.

For a base station setup, any existing ten meter antenna could be used, even a trimmed down CB ground plane. I wanted an independent rig and did not want to tie up my ten meter beam with the little rig, so an extra ten meter antenna was a must. I finally decided on the sloper-type antenna shown in Fig. 1. This antenna is easy to install, is small, is cheap to build, and is vertically polarized for working mobiles. The sloper should be cut for the middle of the group of frequencies you are using. In my case, it worked out to be eight feet and one inch for just a little below 29.000 MHz. The inner conductor of the coax feedline is attached to the quarter wavelength radiator, and the braid of the coax is clamped to the tower leg using a ground clamp. This system works quite well and cuts the length of the sloper in half.

## Results

The ten meter AM rigs compare very favorably with the two meter rigs. The cost is drastically lower, but range seems to be about as good. Mobile-to-mobile coverage is about three miles, and mobile-to-base coverage is six to seven miles. With base station-to-base station contacts running four Watts output and sloper antennas up forty feet at both ends of the path, consistent ground wave coverage of better than 20 miles is maintained. Indeed, it seems that ground wave on this band is about equal to line-of-sight paths on two meters. This is a great club project to bring all those members back together on some common ground. It is also a good project for a couple of guys who just want a little privacy to discuss the stock market or whatever. For under $60.00, this is a good way to keep ten meters alive. See you on ten AM. ■

| Crystal | From | To |
|---|---|---|
| X1 | 37.600 MHz | 39.635 MHz |
| X2 | 37.650 MHz | 39.685 MHz |
| X3 | 37.700 MHz | 39.735 MHz |
| X4 | 37.750 MHz | 39.785 MHz |
| X5 | 37.800 MHz | 39.835 MHz |
| X6 | 37.850 MHz | 39.855 MHz |

*Table 1.*

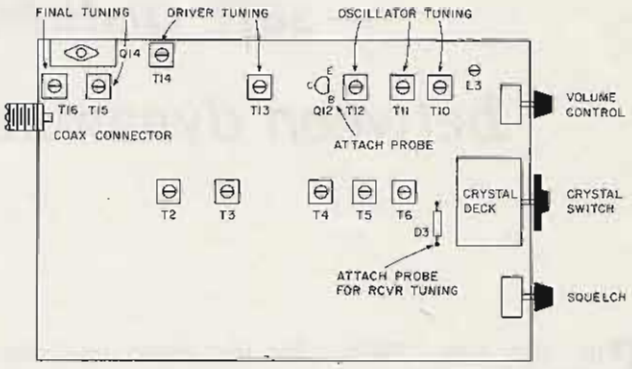


*Fig. 2. Realistic Mini 23, bottom view.*