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CB to 10

-- part VII: convert a TRC-11

A lot of hams have been talking about converting CB rigs for 10 meter use. I've even seen band plans for use with converted synthesized rigs which retain the same spacing as the CB channels. If you would like to avoid the work needed to convert a synthesized rig, but still want to join the group on 10 AM, try Radio Shack's Realistic TRC-11. It is a six-channel rig, which requires very little effort to be put on 10.

Like most of us who have to watch our pennies, I like to be able to justify buying a new rig. The justification I needed grew out of the results of our first Red Cross simulated emergency test of 1977. Our drill went well, but, during the debriefing, it became apparent that, in a real emergency, our dependence on 2 meter FM simplex channels might lead to problems. We sent three field teams out. Each team used a separate simplex frequency, either 46, 52, or 94, for their own communications. The field control stations also used our 146.37/97 repeater for relay to Red Cross headquarters.

Our later discussions pointed out that we should avoid 94, because it is a repeater frequency and mutual interference could arise. 52 is a nationally recognized frequency and could be crowded. 46 is set aside by the Ohio Area Repeater Council for statewide emergency use. All the frequencies we used had a potential for severe interference in the case of a real emergency, so we talked about possible alternate frequencies. 10 meter AM with a converted CB rig seemed like a natural.

Crystals

The TRC-11 is a crystal-controlled rig and uses separate crystals for transmit and receive. The transmitter uses fundamental frequency crystals. To transmit on 29.3 MHz, get one cut for 29.3.

The receiver is single conversion with a 455 kHz intermediate frequency. The receive crystal frequency is 455 kHz less than the frequency to be received. To receive on 29.3 MHz, get a crystal cut for 28.845 MHz.

I ordered my set of crystals from International Crystal Mfg. Co., 10 N. Lee, Oklahoma City, Oklahoma 73102. They cost $7.90 each. It may be possible to get them for less elsewhere, but, in two separately mailed orders, the crystals have been received within two weeks, so the service was worth any extra cost. Their catalog number for transmit crystals for the TRC-11 is 820308. For receive it is 8203097. Specify catalog number and crystal frequency when ordering. I suggest sending a check when you order – it will save time on processing your order, and International pays the shipping if you do.

Adjusting the Crystal Oscillators

Don't! That's right, you don't need to do a thing to the oscillator circuits. They are broadband enough that they take off with no problems at 10 meters. Before I received my crystals, I wanted to see if I would need to work on the oscillators. The only crystal I had was a spare for my Heathkit SB-301 heterodyning chain, and it was at 29.895, which is above the 10 meter band. I did want to check it out, so I jumpered the crystal into the circuit and tried it into a dummy antenna. It worked with no trouble, so I was sure it would work in the band as well.

Tuning for Output Power

Tuning up for maximum output power on 10 meters is very simple. Before I retuned for 10, I wanted to check how much I was getting on CB channel 9, which comes with the rig. Before retuning, channel 9 had 3 Watts, and 29.3 MHz had about a quarter of a Watt. After retuning for 29.3 MHz, I had 3 Watts there and 1.5 on channel 9.

To peak the TRC-11 for 10 meters, simply adjust the settings of coils L5 and L6 for maximum output, as measured on a wattmeter. All coils are plainly marked on the printed circuit board. L5 and L6 are very near the coaxial connector, towards the left rear side of the unit.

That's all the work you need to do to get the TRC-11 going on 10 meters. Simple, isn't it? Although I have not tried it, I believe the Realistic TRC-9A should convert just as easily as the TRC-11. The TRC-9A is listed as the three-channel, economy version of the TRC-11. It uses the same crystals, and the schematics are nearly identical.

Antennas

As I mentioned earlier, my major use for this rig is as an alternate frequency for emergency use. I did not want to put a permanent antenna on my car, so I tried Radio Shack's magnetic mount CB antenna, model 21-940, and found that it, too, is very simple to convert for 10 meter use.

The swr is adjusted by decreasing the length of the whip, using the cut-and-try method. I physically shortened the length of the whip to about 73 cm. On my unit, minimum swr was obtained with 66.3 cm of the whip extending above the top of the collar where the setscrew is located. I was able to get the swr down to 1.2/1.

Results

During our second Red Cross drill, Ted White WA8WQC and I tried identical mobile setups using the TRC-11 and model 21-940 antenna. Our results indicated nearly 100 percent usability over a 5-mile path with several hills and numerous buildings. Line-of-sight paths yielded good results at nearly double this distance.

The only problem we encountered was caused by the fact that I have a rather soft microphone voice. Using my usual voice gave poor results, because I was not driving the modulator circuit hard enough. With a little self-control, I find it is easy enough to speak a little louder and closer to the mike to overcome this problem.

If you are looking for a CB rig that is easy to convert for use on 10 meters, and don't want or need to convert a 23-channel synthesized rig, I suggest trying the Realistic TRC-11.

No matter what type of rig you convert to 10, the model 21-940 magnetic antenna from Radio Shack is easily converted to fill your need for an antenna.

With such an easy way of getting on 10 meters AM with a converted CB rig available to you, you no longer have an excuse to miss the action. See you on 10! ■

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Battery Backup for Digital Clocks

-- don't miss a second

With the addition of a crystal timebase to my digital clock, it began to keep time very accurately – to about a second a month. Unfortunately, my house seems to have more than its share of short power interruptions and blown fuses. An accurate clock is of no great use if it must be reset every few days. Power line independence is a necessity for electronic digital clocks.

None of the ideas on battery power for clocks could be adapted to mine without cutting the foil on the printed circuit board in at least a couple of spots. Since I seem always to manage to slit my thumb along with the circuit board, I like to avoid this approach if at all possible.

The circuit in Fig. 1 should work for just about all clocks, without *any* modification to their circuitry. It amounts to connecting a battery in series with a resistor across the output of the clock supply.

R1 serves two purposes. First, it limits the charging current supplied to the battery while the clock is plugged in. Second, when power fails, it limits the discharge current to about 5 mA. This causes the clock LEDs to extinguish, and the clock runs with no readout, consuming very little power.

Depending on the clock, a different value for R1 may be needed. A little experimentation will determine an appropriate value. Closing S1 will allow the readouts to function on battery power, but the battery won't last long this way, so I used a momentary contact push-button.

Battery life seems to be very long in this circuit. After several months of "field testing," the battery tests as good as new. The trickle charge current it draws seems to do no harm.

Upon power failure, my timebase slows down from 3579545 Hz to 3579515 Hz. This is a change of about 10 parts per million and is equivalent to about 5 minutes per year, or less than one second per day. Most failures last a few minutes or a few hours at most, so this drift is not really any problem. Regulating the voltage at the timebase could eliminate even this drift.

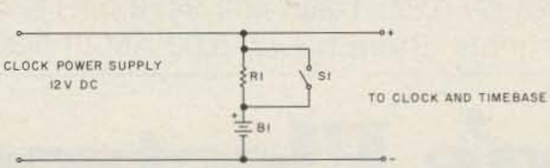

Fig. 1. R1 – 2k Ohm, see text; B1 – small 9 V battery; S1 – momentary contact switch.

This kind of project is my favorite – it uses only three parts, total cost could not exceed two dollars, it requires no "mods" to existing equipment, it gives real improvement, and it can't fail to work! There is something awfully nice about pulling the plug on your digital clock, plugging it in again and seeing it still displaying the correct time. ■