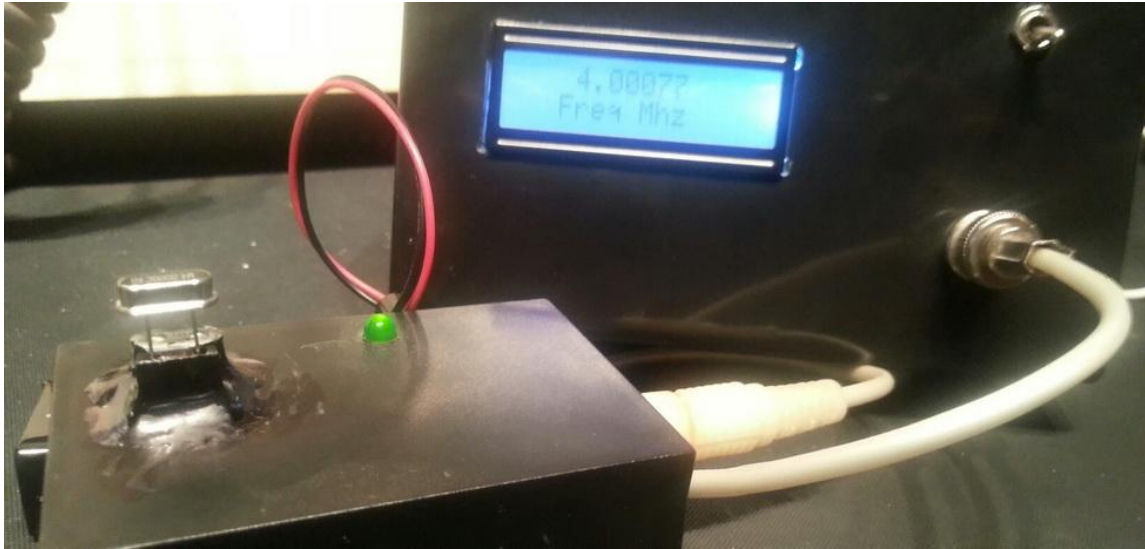


Crystal Checker for the Radio Shack

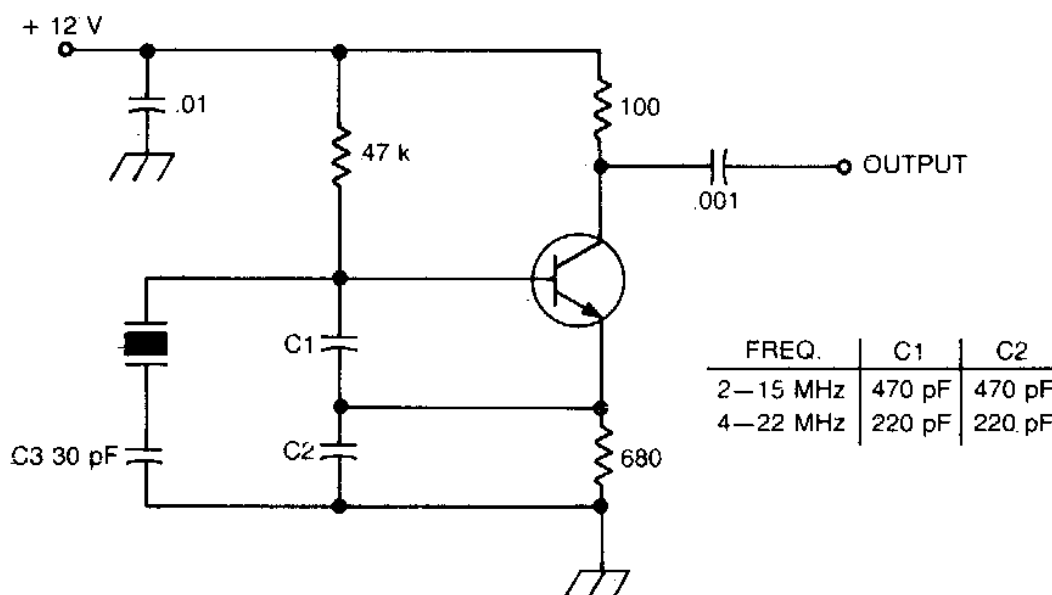
By Kevin Mc Donald ZS6KMD



I am sure we all have a heap of old crystals in a box in our shack, some from suspect origins some from various projects we never got around to building and some just found their own way in there. Maybe they were once odd socks that became crystals. Anyhow, to get back on topic, I guess what is most needed is a way to check if these things still resonate, if they are good or bad... The answer is quite simple and inexpensive...

Let's build a crystal checker. One that has an output for a frequency counter, with plug-in sockets for various sizes and that covers a wide frequency range. As we all know, it would be near impossible to cover all frequencies in one device, but we could cover most if we remember that even on VHF and UHF the crystals are cut using fundamentals and overtones. Without getting too technical for this project all we need to know is that the crystal under test still resonates and is able to drive the input to our frequency meter.

The design used here is a simple Colpitts Oscillator which in theory uses a gain device such as a FET or Bipolar Junction Transistor with its output connected to its input in a feedback loop with a parallel tuned circuit which functions as a bandpass filter to set the frequency of oscillation.



Using the values for the 4-22MHz option in the diagram above I have found pretty accurate readings to within the specified ratings for most crystals under test. My test oscillator actually runs up to just over 30MHz and is used quite often as a reference oscillator and not just to test crystals. An important fact to remember here is that in effect,

what you are about to build is in essence a micro transmitter so care should be taken to ensure that all leads are kept short and that you do not connect it to an antenna as it will transmit on the frequency of oscillation albeit a few milliwatts.

The design can be built on a piece of perfboard, but using veroboard is not suggested as the capacitive coupling of the tracks may affect the frequency and stability of the oscillator.

Operation is simple, plug in the crystal to be checked, connect to the frequency meter and apply power to the crystal checker... If the crystal is good, it will oscillate and you will get a reading to within a few hertz of the crystal specification. Changing C3 for a small trimmer cap would allow for the frequency to be adjusted to the exact desired frequency; however this is not required for our purposes here.

Well there you have it, a neat little piece of test equipment.

Happy Building – 73 de Kevin ZS6KMD