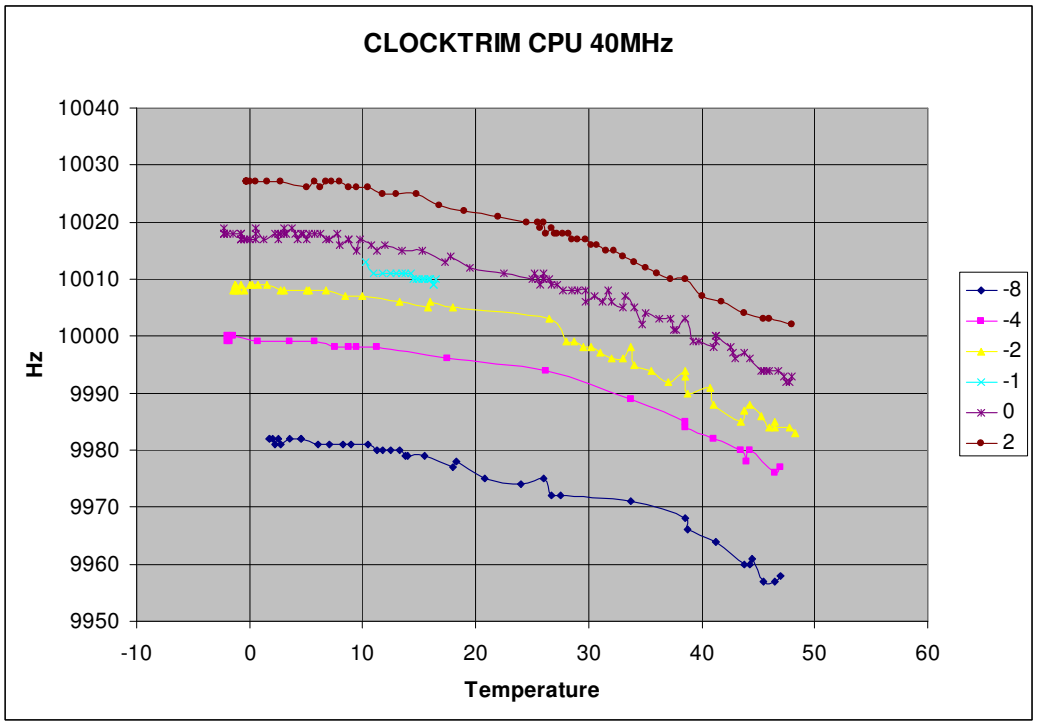
Testing the frequency stability of the MX170 chip running MMBasic.

By Tassyjim www.c-com.com.au/MMedit.htm

The test equipment consists of an old 12V car cooler/warmer. It can cover the temperature range of zero to 48 °C.

There is a Micromite in the cooler with a DS18B20 recording the temperature.
I set a PWM of 10kHz and vary the temperature for various CLOCKTRIM settings.
There is a maximite outside the cooler and it measures the frequency of the PWM.
I also have a frequency meter in line and so far the maximite and frequency meter have agreed.

It takes about 2 -3 hours to do a full temperature run for each CLOCKTRIM setting.

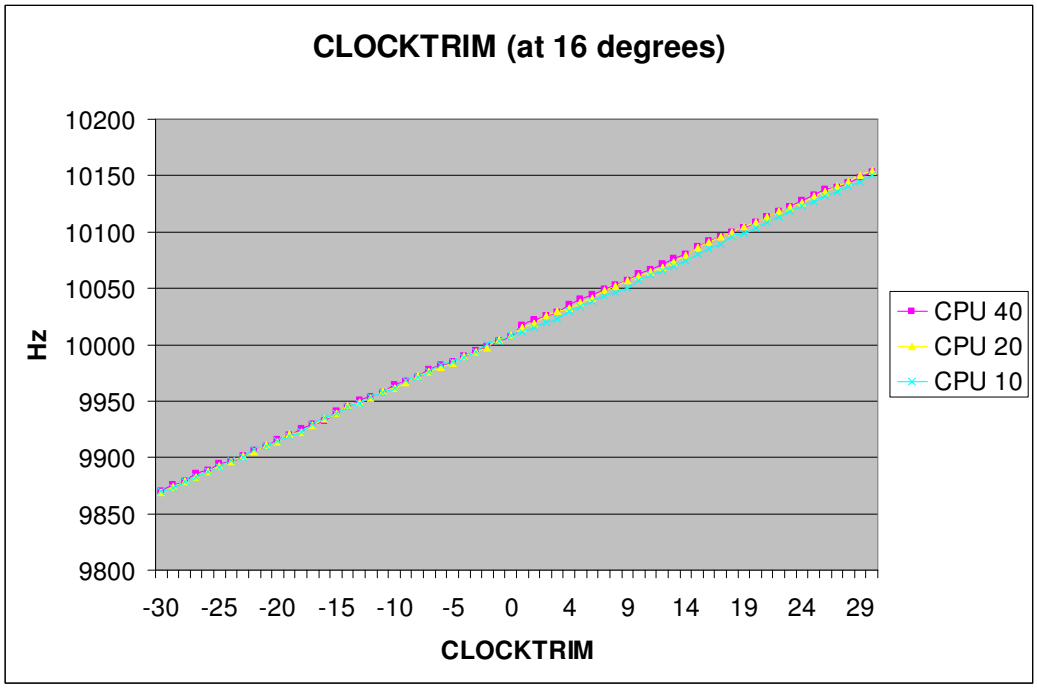


The first chart shows the stability of a PWM output set at a nominal 10kHz over the range of zero to 48 °C
The test was run for a number of OPTION CLOCKTRIM settings

Below about 20 °C the frequency was very stable. Above 30 °C, the frequency changes considerably with temperature.

Over the full range tested, the frequency change was sill less than 0.3% for any CLOCKTRIM setting.

The second chart covers CLOCKTRIM settings from -30 to +30 for three different CPU speed settings.



At the higher CLOCKTRIM settings, the CPU speed does have a slight effect.
A change to the CLOCKTRIM setting of one results in a change in frequency of 4Hz

Conclusion.
For ambient temperatures from zero to +20 °C, a CLOCKTRIM setting of -3 or -4 will improve accuracy considerably. At higher temperatures, the change due to temperature variations would make finding a suitable CLOCKTRIM setting difficult.

Over the full range tested, the frequency change was sill less than 0.3% for any CLOCKTRIM setting.

The frequency stability is more than adequate for most uses but a true RTC is needed for accurate time control.