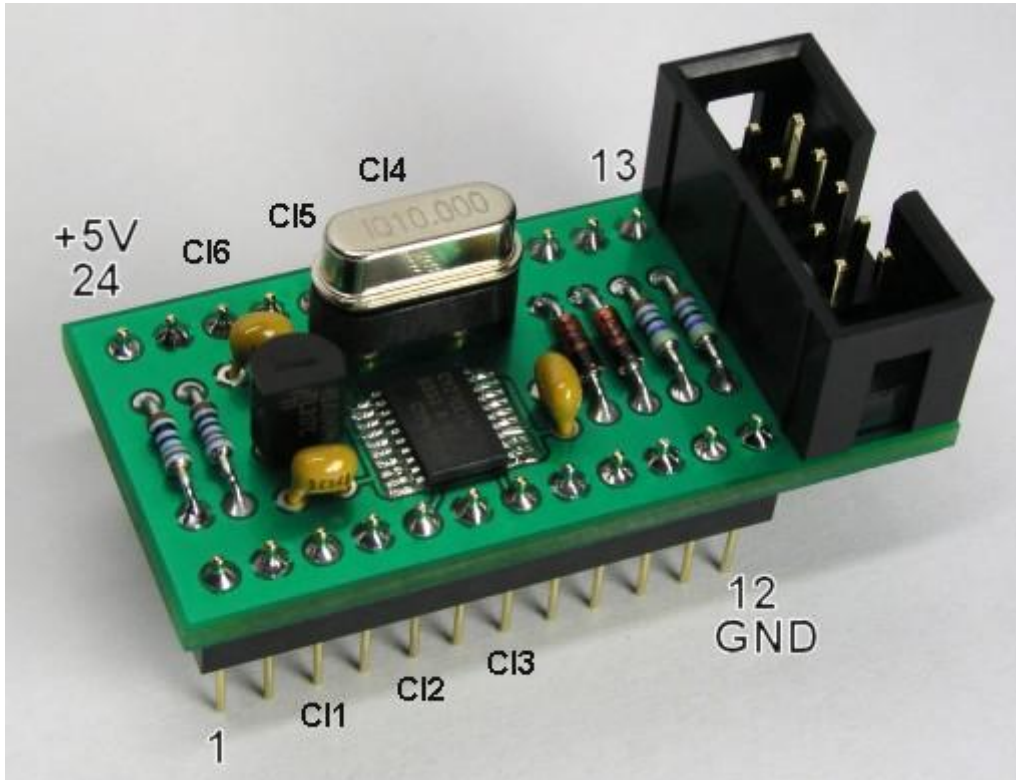# Programmable oscillator 1 ... 100 MHz

Quartz crystals or quartz oscillators are often needed in the electronics laboratory. Often the required frequency is currently not available. A quartz oscillator delivering 1 MHz today will help with 5.55 MHz tomorrow and perhaps 100 MHz the day after tomorrow.

This programmable crystal oscillator based on the CY27EE16 was introduced in **Elektor** 2/2005. The board and the completely assembled module is available from **AK MODUL-BUS** . The module uses a pluggable quartz and a clock generator CY27EE16 with I²C interface. For programming, the serial interface is used on the PC.
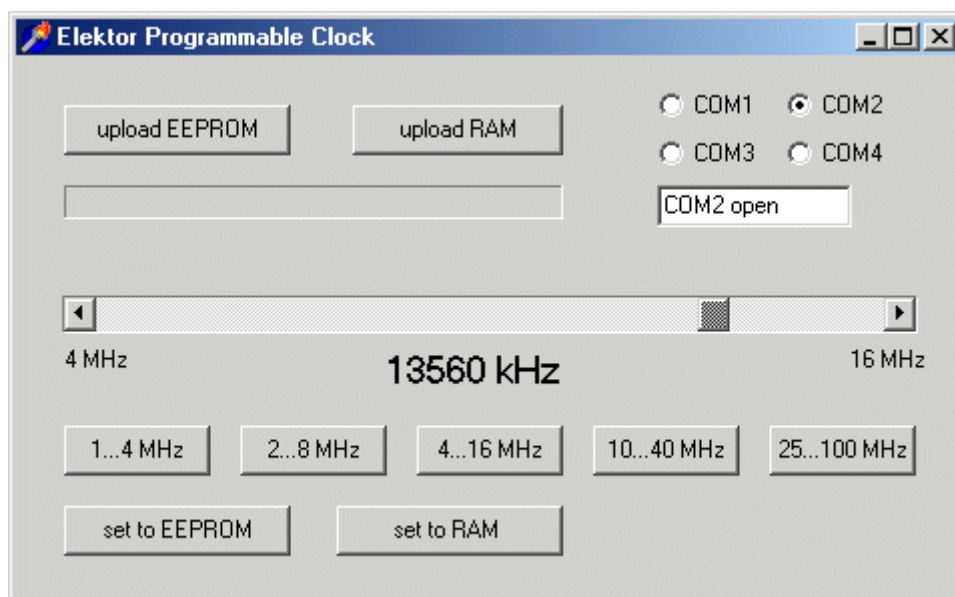

The program Clock.exe transmits settings either in the EEPROM or in the RAM of the block. Some sample files are included. You determine which frequency should be at which output. Normally, only one clock signal is output. The examples use clock output 5 (Cl5). For example, if the file

CLK5_6_55MHz.bin has been transferred to the EEPROM, a frequency of 6.55 MHz will appear here after each power on. Each frequency newly created with Clock.exe will appear at output 5. The program assumes a crystal frequency of 10 MHz.

Download Clock.exe with example files (clock.zip 186 KB)

For example, Clock.exe uses a 5 kHz raster in the 2 ... 8 MHz range. The CY27EE16 has an internal PLL oscillator in the range of 100 MHz to 400 MHz and a programmable disadvantage. If more than one output frequency is required, or if special frequencies are needed that are not within the specified range, Cypress' extensive CyberClocks.exe program must be used. Often you will then use a quartz other than 10 MHz.
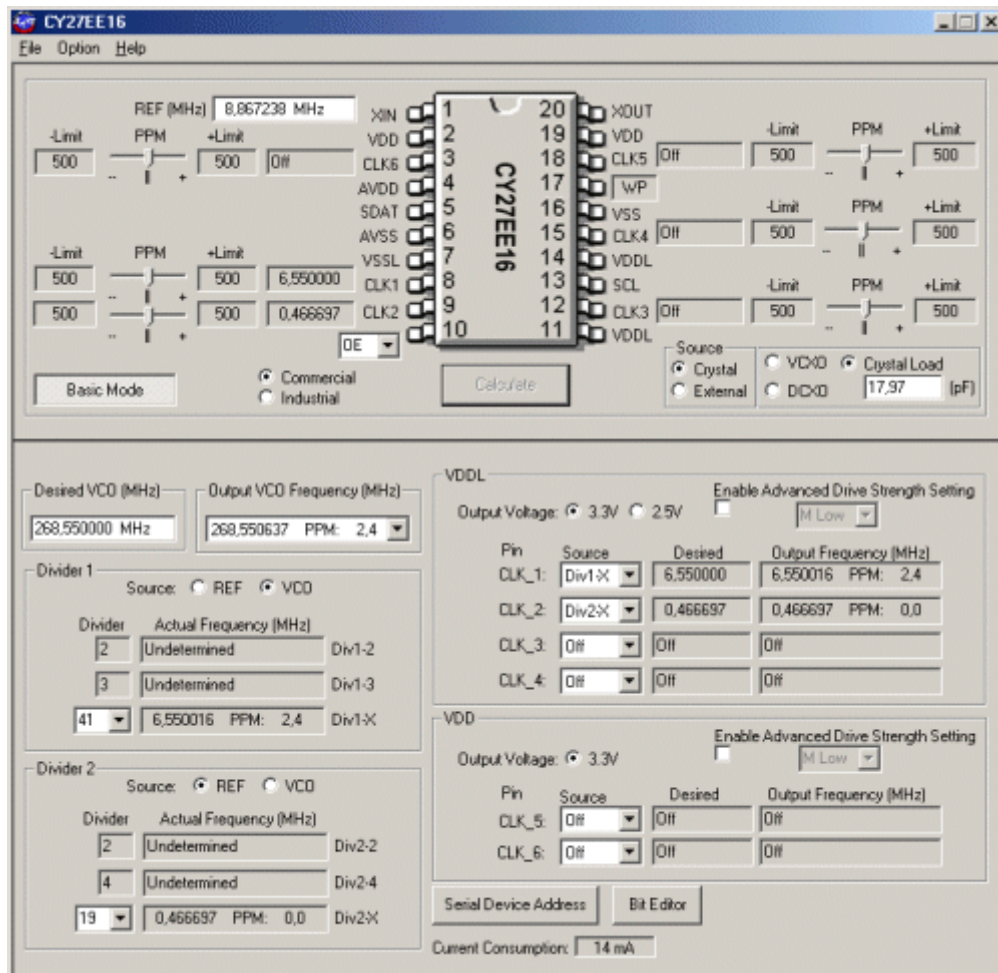
Output frequencies can be whole parts of the set PLL frequency or whole parts of the crystal frequency. This results in certain restrictions. In individual cases, however, up to 6 output frequencies can be generated simultaneously. You can also perform a fine adjustment on the adjustable capacity on the quartz.

Download Cyberclock.exe
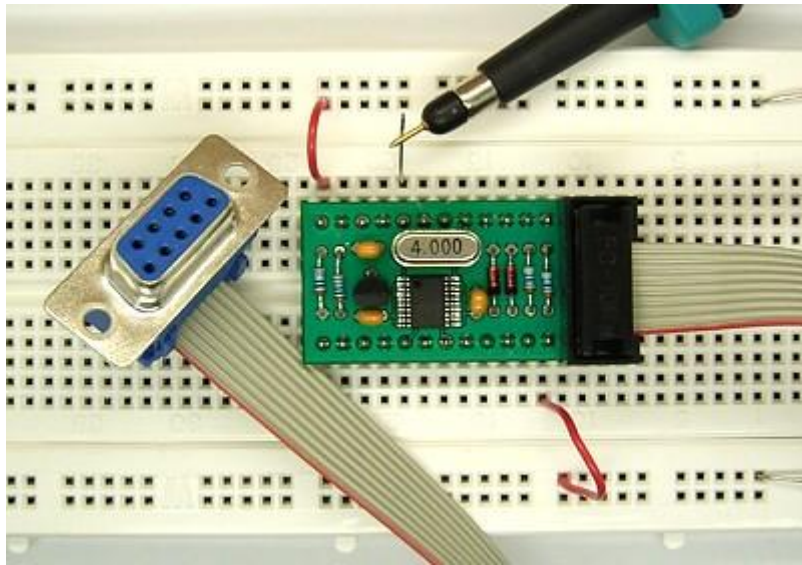
Once a programmed frequency changes in the same ratio, if you subsequently use a different quartz. In this way, at 4 MHz instead of 10 MHz, the range has been reduced in tests to 400 kHz. The IC then works outside the specifications with a PLL frequency from 40 MHz, presumably with a little more phase noise, which is likely to be tolerable for many applications.

Typical applications of the oscillator are adjustable clock generators for microcontrollers or measuring devices as well as applications in high-frequency technology. Amongst others the use as an oscillator in DRM receivers was tested.