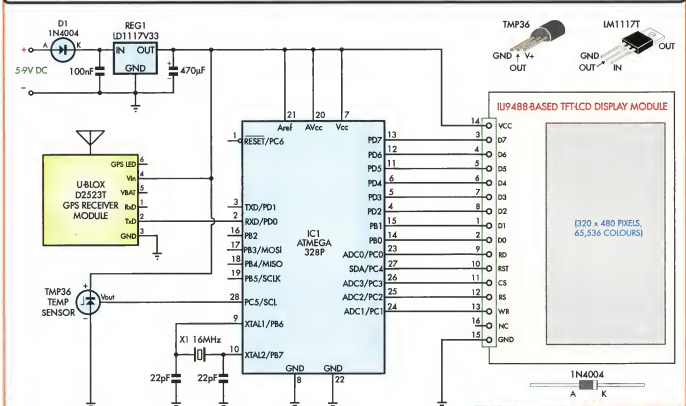
CIRCUIT NOTEBOOK

Interesting circuit ideas which we have checked but not built and tested. Contributions will be paid for at standard rates. All submissions should include full name, address & phone number.



Arduino-based Analog & Digital LCD Clock

This project bears some similarity to the Micromite Touchscreen Super Clock published in the July 2016 issue. However, instead of the Micromite, it uses an ATmega328P processor, the same chip used in the Arduino Uno and the software was developed using the Arduino integrated development environment (IDE). It uses a somewhat larger LCD than the Super Clock, nearly four inches diagonal compared to the 2.8-inch screen in the Super Clock.

The circuit is quite simple and besides the microcontroller and TFT LCD module, comprises a GPS receiver for accurate timekeeping, temperature sensor (so the clock can display ambient temperature), crystal and load capacitors for the micro's own clock and a simple linear power supply with a 3.3V low-dropout regulator, input and output capacitors and a reverse polarity protection diode.

The LCD has a 480 x 320 pixel resolution and costs around $US8 on Ali Express – see www.aliexpress.com/item/Free-shipping-LCD-module-TFT-3-95-inch-TFT-LCD-screen-for-Arduino-MEGA2560-Board/32648492743.html

The prototype is shown in the adjacent photo and as you can see, it has a digital time and date read-out in the upper-right corner of the screen, with the temperature below (in °C) and an analog clock display with second hand filling the left-hand side of the screen. You can see a short video of the clock in operation at www.siliconchip.com.au/Videos/Arduino-based+Analog+and+Digital+Clock

The TMP36 temperature sensor has an output voltage proportional to temperature and this is read using IC1's internal ADC, via pin 28 which is also ADC input #5. GPS data is received in RS-232 TTL format at the RXD pin (pin 2).

The LCD is driven using an 8-bit parallel interface, along with the RD (read), WR (write), RS (register select), CS (chip select) and RST (reset) control pins. The software makes use of the MCUFRIEND Arduino LCD library and AdaFruit graphics library, which are both included in the software download package.

Most of the complexity of this design is hidden in the software (*arduino_half_square_clock_with_design.ino*) which is available for download from the SILICON CHIP website, so if you are interested in the details of how it works, you can read through the sketch. Even if you aren't interested in building this clock, the code can also serve as a good example of how to drive this type of display from an Arduino and also how to receive data from a GPS module.

Somnath Bera,
Vindhyanagar, India. ($75)