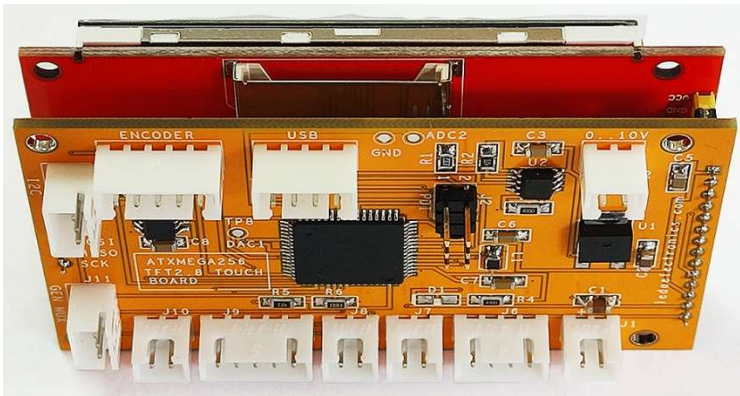
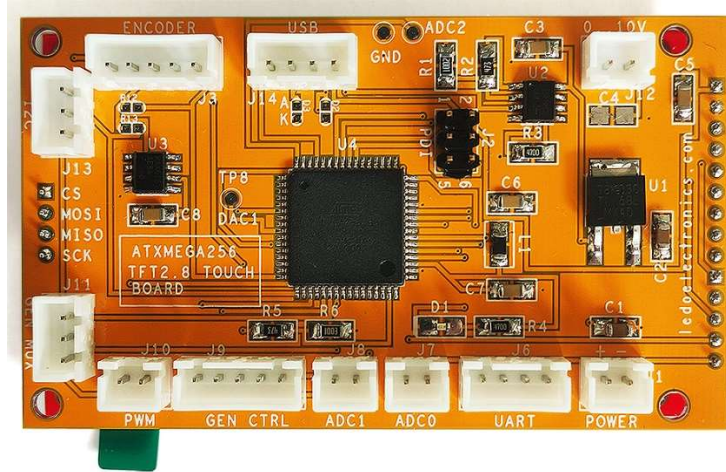


XMEGA256 TFT2.8 TOUCH BOARD



Hardware

- Control system based on the Xmega256a3u
- Flash: 256 KB RAM: 16 KB, EEPROM 4 KB, etc.
- 2.8 "320x240 color TFT screen with integrated ILI9341 controller
- Resistive touch screen with AD7843 controller
- Three 12-bit analog inputs, 0... 2.048V, 0... 10V, 4-20 mA
- One 12-bit 0... 10V analog output
- 17 digital inputs / outputs of 3.3V
- Rotary encoder connector
- USB Device 2.0 communication
- UART communication
- I2C communication

- **SPI communication**
- **Socket for SD Card**
- **It does not need a programmer. Resident bootloader allows programming with USB cable**
- **PDI connector for in system programming**
- **Supply voltage 12V (from 9V to 15V DC)**
- **Maximum consumption current 90 mA**
- **Compact design. 100mm x 80mm**

Software

- **Several C and C ++ sample programs with separate classes for handling each of the Hardware modules.**
- **All projects compiled with the free Atmel Studio 7 IDE**
- **Graphic library for representation of characters and images on the Display with great simplicity.**
- **Geometric graphic library (Lines, Triangles, Rectangles, Pixels, etc.).**
- **It can be programmed with Atmel Flip (without programmer), or with any Atmel Studio compatible programmer.**

Applications

- **Temperature control (Incubators, Refrigerators).**
- **Real-time data recording.**
- **Timers.**
- **Automatic pumping.**
- **Automatic irrigation.**
- **Automation control.**
- **Sequencer.**
- **Ventilation system.**
- **Dosage.**
- **Generator of waves of different shapes, up to a frequency of 20 kHz.**
- **Remote display / keyboard.**
- **Remote sensor.**
- **PWM control.**
- **PID control.**
- **Pulse counter**
- **Training kit for students**
- **Etc.**

The plate has been designed to guarantee high flexibility and comfort in use. It has the necessary elements for the implementation of small control systems that require the measurement of unipolar analog magnitudes. It has a 12-bit analog-digital converter of up to 1 Msp/s, with a highly stable external reference source $V_{ref} = 2.048V$. The ADC has three channels enabled, with dedicated connectors. The third channel has a voltage divider, to adapt to the levels required by the application.

The SPI and I2C buses and the UART interface allow the expansion of the system, using any of the Ledoelectronics expansion modules or any standard module; They can be configured in Master or Slave mode.

The presence of a color graphic display with a resolution of 320x240, with a built-in touch screen, increases the versatility of the board. The libraries supplied with the module make the difficult part simple, and allow the representation of characters, images and figures through simple commands such as drawBitmap (..), printChar (..), printString (...), drawLine (..), drawRect (..), drawCircle (..), etc.

Using a Windows application, images can be transferred from a PC to the board's SD Card via the Usb bus.

Electronic diagrams of the Xmega256 Tft2.8 Touch module

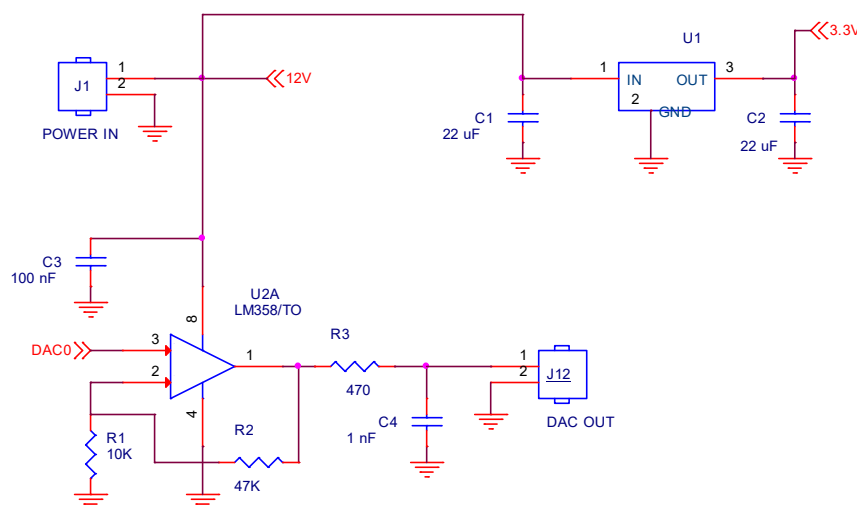


Fig.1. Power and Analog Output.

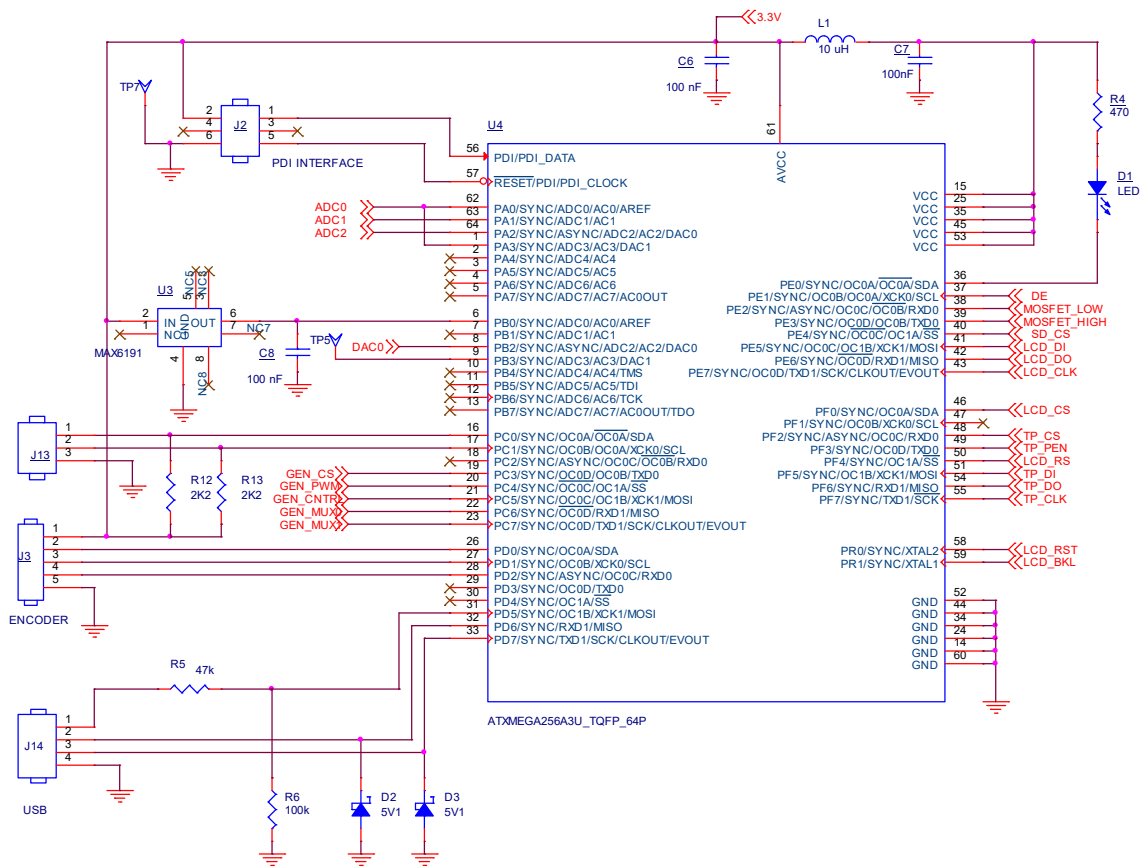
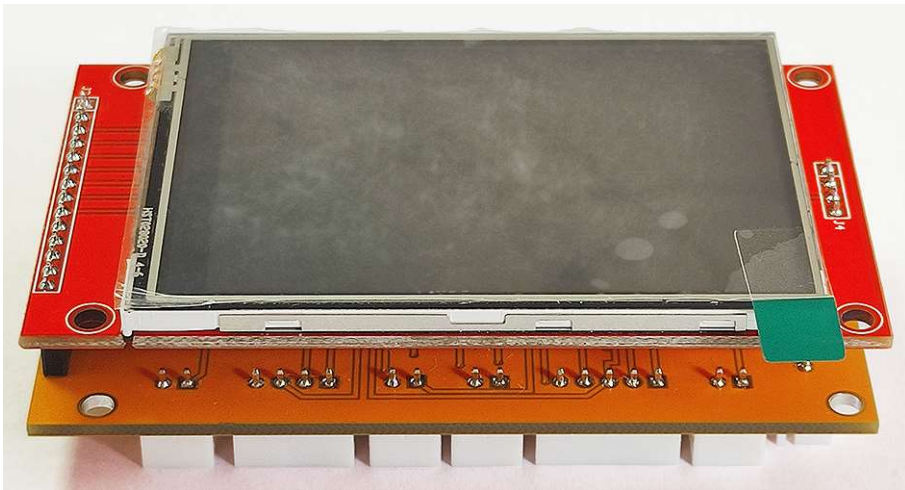


Fig.2. CPU

Programming

The project can be compiled in any of the commonly used IDE: Atmel Studio, IAR Compiler, Codevision AVR etc.

The application can be transferred to the microcontroller in two ways:

1. Without the need to use any external programmer, through Atmel Flip. To do this, the board is put into bootloader mode by short-circuiting pins 4 and 5 of the J3 (Encoder) connector during startup. In this case, only a USB cable is required between the PC and the motherboard.
2. Using any Atmel programmer, such as Atmel_ICE, or AVRISP-MKii. For this, the module has the PDI interface.

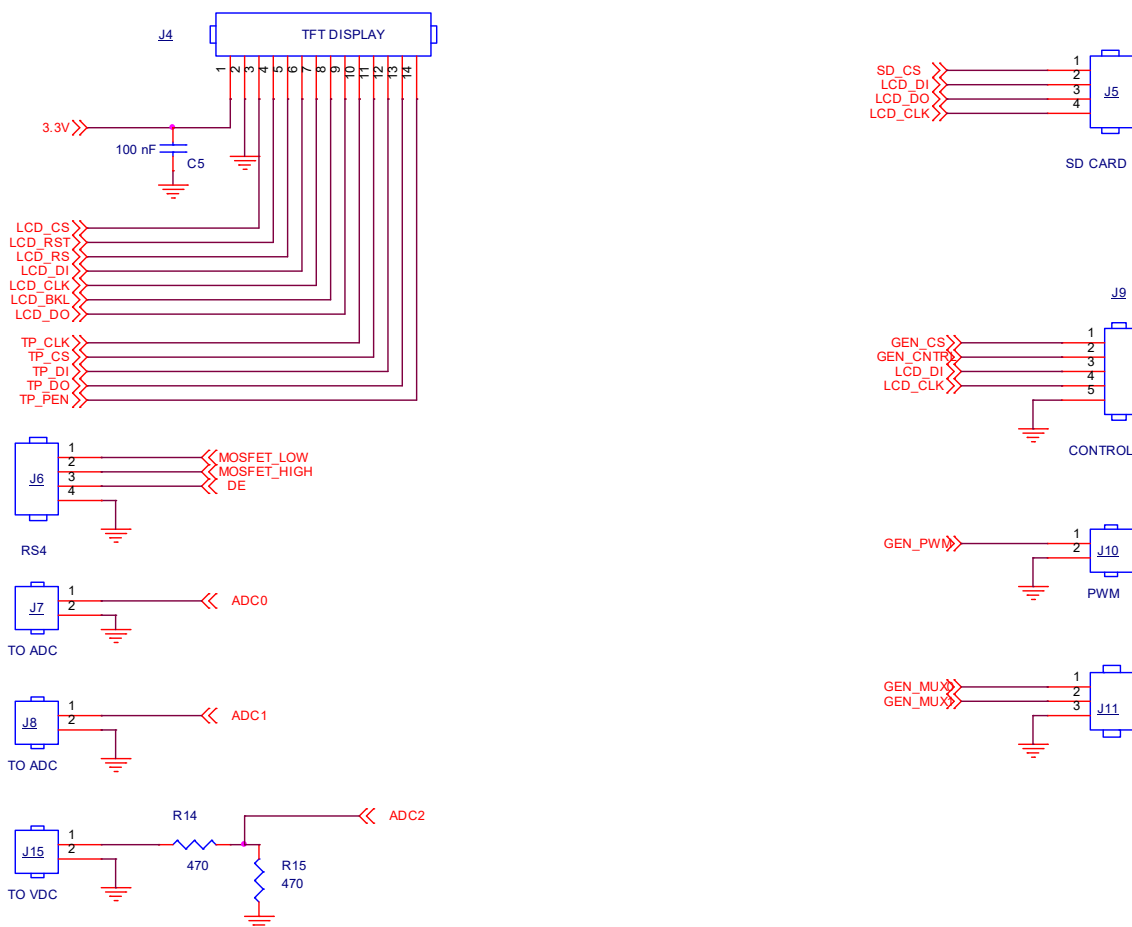


Fig.3. Conectors.

Accesorios

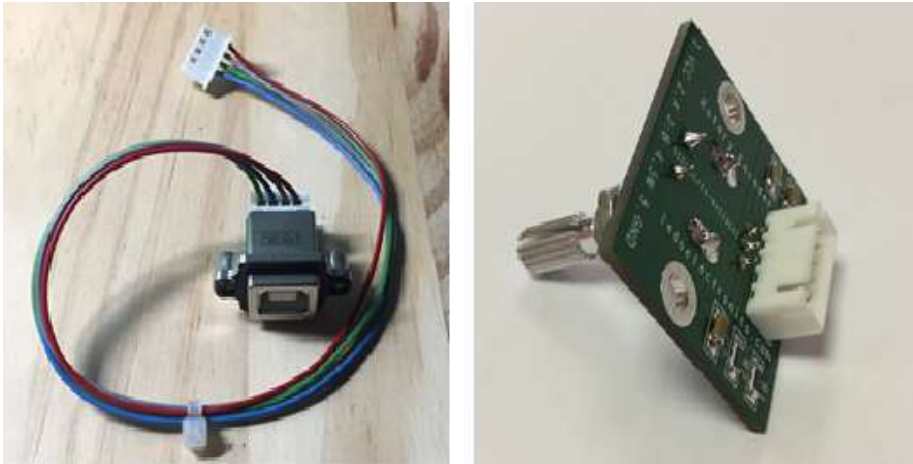


Fig.4. USB connector and rotary encoder, manufactured by Ledoelectronics.

Limitations

Without a doubt, this module is one of the most attractive on the market, due to its quality / price ratio, resources, connectivity, power and versatility. Its weak point is the refresh rate of the screen. It is controlled by the SPI serial bus at 8 MHz. Each pixel requires about 20 uS. This is not a problem, to update variables, and small areas of the display, but a change of its 76800 pixels takes about two seconds.

For more dynamic graphics applications, we recommend one of the two Ledoelectronics modules, with a 32-bit ARM processor. The **SAM TFT3.5 TOUCH**, or **SAM TFT4.0 TOUCH**.

These boards are very similar to the Xmega256 Tft2.8 Touch, in terms of resources, but its processor is much more powerful, and the display is controlled by a 16/18-bit parallel bus. The SAM TFT4.0 TOUCH has a resolution of 800x480, and also has CAN Bus.

