

Gertboard



Gertboard designed by Gert Van Loo is a Raspberry Pi GPIO expansion board that can drive motors, turn LED's on and off, run sensors and a whole load of other fun stuff. Unlike other expansion boards out there this is an active add on board with a large variety of components and features for all levels of learning. There is documentation and a range of test programs which have been written in C and is available at www.element14.com/raspberrypi . The I/O headers give you access to a wide range of different control combinations between devices using the strapping area of the Gertboard and can be linked up using jumper wires.

Each pin and component on the Gertboard is clearly identified for ease of use when connecting devices together and a technical diagram can be found on the pdf documentation.

The main features of the Gertboard are:-

- 12x buffered I/O pins
- 12x Red LEDs
- 3x push buttons
- 6x open collector drivers (50v, 0.5a)
- 48v, 4a motor controller
- 28 pin ATmega controller (Arduino pins)
- 2 channel 8/10/12 bit digital to analogue convertor
- 2 channel 10bit analogue to digital convertor
- 3.3v regulator
- Comes pre-assembled
- Great flexibility for complex projects

I/O Pins

Here we have 3 Push-buttons, 12 red LED's and 12 pins which can be used as input or output ports. Each pin can be set to as an input or an output simply by using a jumper setting.

Open collector Drivers

The Gertboard uses six of the eight ports of an ULN2803a Darlington Array chip to provide open collector drivers. These are used to turn off and on devices, especially those that need a different voltage or higher current than that available on the Gertboard and are powered by an external power supply. The ULN2803a can withstand up to 50V and drive 500mA on each of its ports.

Motor controller

The Gertboard uses an L6203 (Miniwat11) motor controller for DC motors. The controller has two input pins, A and B (labelled MOTA and MOTB on the board). The pins can be driven high or low, and the motor responds according to the table below. The speed of the motor can be controlled by applying a pulse-width-modulated (PWM) signal to either the A or B pin. The motor controller IC has internal temperature protection and Current protection is provided by the fuse on the Gertboard.

ATmega controller

The Gertboard has an ATmega328P Atmel AVR microcontroller, a 28-pin ATmega device located at U8 on the board. All input/output pins for the chip are brought out to header J25 on the board. There is a separate 6-pin header located at J23 that can be used to program the device. The PD0/PD1 pins (ATmega UART TX and RX, labelled MCTX and MCRX on the board) are brought out to pins placed adjacent to the Raspberry Pi UART pins (labelled GP14 & GP15) so you only need to place two jumpers to connect the two devices.

AD/DA Convertor

The Gertboard has an MCP4801 8-bit digital to analogue (D/A) converter and a MCP3002 10-bit analogue to digital (A/D) converter both are 8-pin chips from Microchip. The D/A chip is located at U6 and the A/D chip is located at U10. Each chip supports 2 channels and both use the SPI bus to communicate with the Raspberry Pi. These can be used to read sensors using the Pi SPI bus and will return a value between 0 – 1023.