TECHNOCRATS
BASIC MODULE

LSA048

LSA08 is a advance auto-calibrating line sensor that has 8 sensor array for taking the inputs. LSA08 is capable to operate on surface with colour of Red, Green, Blue, White,Black, Gray and possibly other colours with distinct brightness different. LSA08 has several different output modes, for the convenience of use for any system. Namely, the digital output port (8 parallel output line), the serial communication port (UART) and the analog output port.Features:

- 8 sensor pairs spaced 16mm.
- 12V input power
- On board Mode and Select button for instant configuration of LSA08
- 3 Different output mode (digital output port, UART output port, analog output port)
- LCD display unit showing 8 sensors analog value with bar chart and line position.
- Simple Auto-Calibration function to the line following surface.
- Junction Pulse (JPULSE) for detecting junction crossing and junction counting
- Power polarity protection
- Low current consumption (typically 26mA)
- Works on glossy or reflective surface

- Refresh rate up to 200Hz.

Pin connection for UART mode of communication

Pin	Description	Symbol
1	UART TX (Transmit)	TX
2	UART RX (Receive)	RX
3	UART Output Enable	$\overline{\text{UEN}}$
4	Analog Output	AN
5	Junction Pulse	JPULSE
6	Not used	-
7	Not used	-
8	Not used	-
9	VIN (12V)	VIN
10	GND	GND

Pixy Cam

Pixy processes images from the image sensor and only sends the useful information (e.g. purple dinosaur detected at x, y) to your microcontroller. And it does this at frame rate (50 Hz). The information is available through one of several interfaces: UART serial, SPI, I2C, USB, or digital/analog output. So your Arduino or other microcontroller can talk easily with
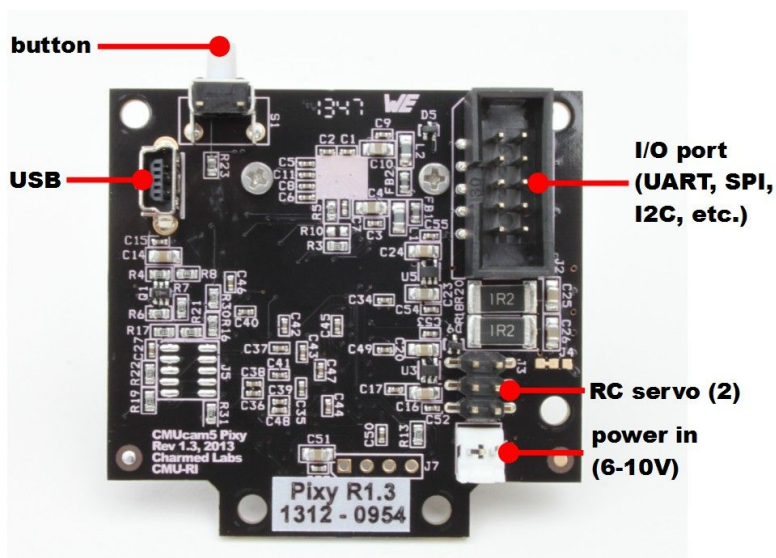
Pixy and still have plenty of CPU available for other tasks.Pixy uses a color-based filtering algorithm to detect objects. Color-based filtering methods are popular because they are fast, efficient, and relatively robust. Most of us are familiar with RGB (red, green, and blue) to represent colors. Pixy calculates the color (hue) and saturation of each RGB pixel from

the image sensor and uses these as the primary filtering parameters. The hue of an object remains largely unchanged with changes in lighting and exposure. Changes in lighting and exposure can have a frustrating effect on color filtering algorithms, causing them to break. Pixy's filtering algorithm is robust when it comes to lighting and exposure changes.

reference:https://docs.pixycam.com/wiki/doku.php?id=wiki:v1:overview

16 channel PCA9685

The PCA9685 is a 16 Channel 12 Bit PWM I2C-bus controlled Servo motor Driver.The Adafruit 16-Channel 12-bit PWM/Servo Driver will drive up to 16 servos over I2C with only 2 pins. The on-board PWM controller will drive all 16 channels simultaneously with no additional Arduino processing overhead.
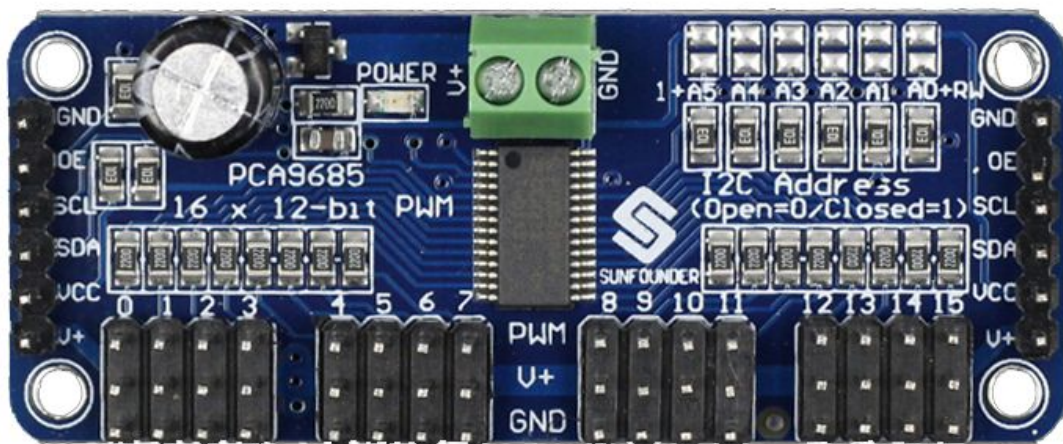
There are 16 output ports. Each port has 3 pins: V+, GND and the PWM output. Each PWM runs completely independently *but* they must all have the same PWM frequency. That is, for LEDs you probably want 1.0 KHz but servos need 60 Hz - so you cannot use half for LEDs @ 1.0 KHz and half @ 60 Hz.They're set up for servos but you can use them for LEDs!

Max current per pin is 25mA.There are 220 ohm resistors in series with all PWM Pins and the output logic is the same as **VCC** so keep that in mind if using LEDs.
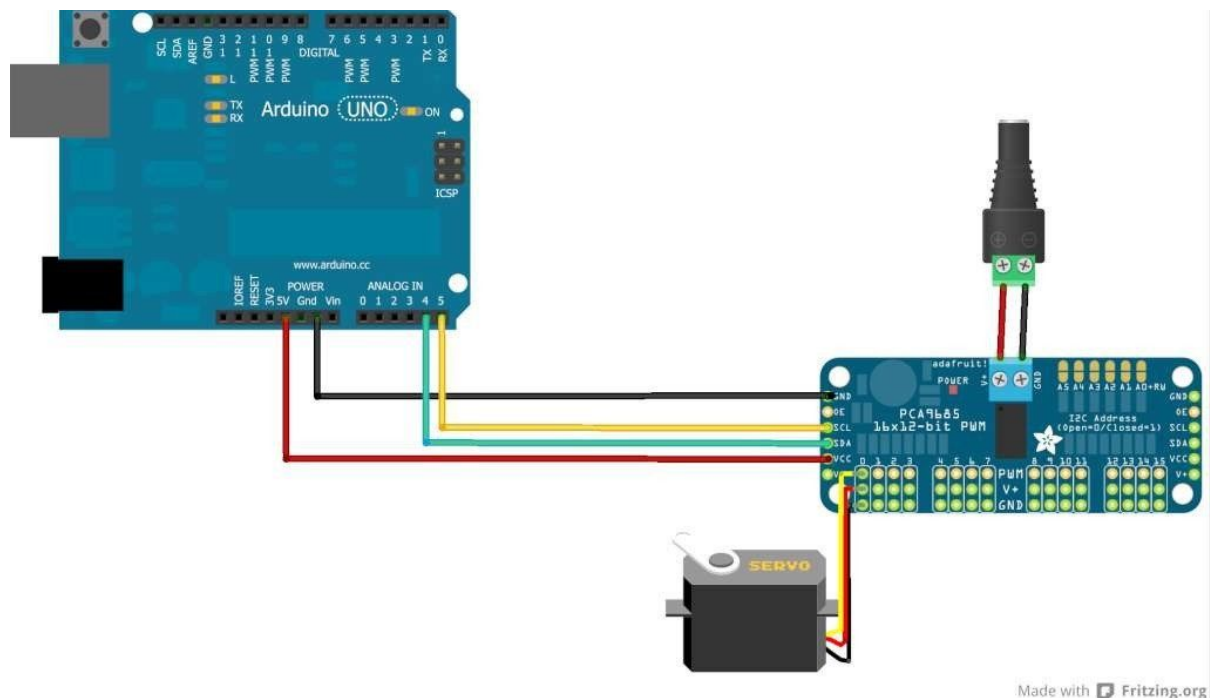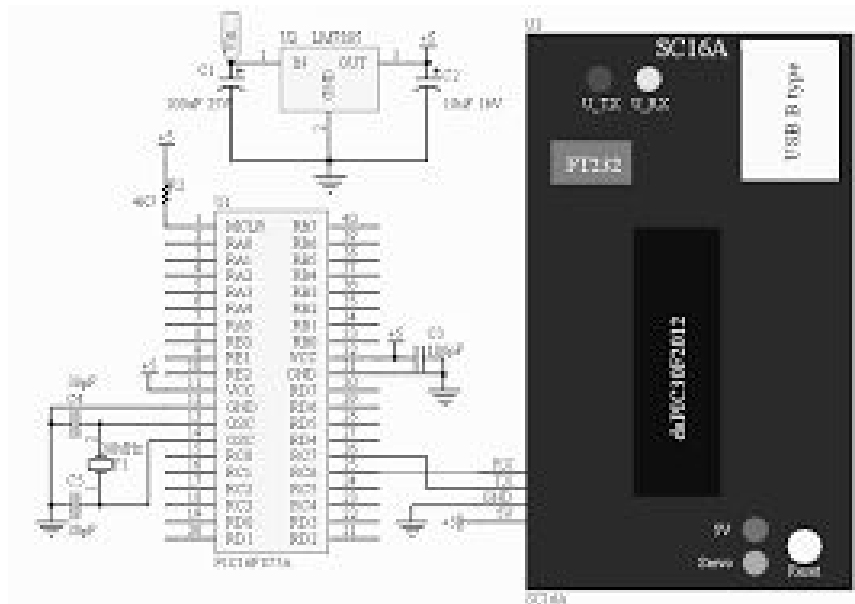

Cytron SC16A

SC16 A is a 16 channels servo controller (extendable to 32 channels with an additional SC16A) that allows controlling 16 (single-board) or 32 (double-board) standard RC servo motors simultaneously.SC16A offers reliable yet user friendly RC Servo motor controller to hobbyist and students. It is designed to control 16 independent standard RC (Remote Control) servo motors simultaneously in a single board. Each servo signal pin is able to

generate servo pulses from 0.5 ms to 2.5 ms, which is greater than the range of most servos, further allows for servos to operate 180 degrees. Through serial communication, SC16A can be daisy chain in 2 boards to offer independent control over 32 RC servo motors simultaneously. The host of SC16A can either be a PC desktop, Laptop with USB port, or microcontroller with UART interface. Both USB and UART interface present a flexible, fast and easy to use feature. With USB, it is plug and play, user is able to get it running within 5 minutes time.

Pdf for better understanding: http://synacorp.my/datasheet/PR18_DD.pdf

 Manual:https://www.mikrocontroller.net/attachment/59378/SC16A_User_s_Manual.pdf

Cytron mdds10(SmartDriveDuo-10)

SmartDriveDuo-10 is one of the latest smart series motor drivers designed to drive medium power brushed DC motor with current capacity up to 30A peak (few seconds) and 10A continuously. This driver is designed specially for controlling differential drive mobile robot using RC controller. Nevertheless, MDDS10 also can be controlled using analog joystick or microcontroller (PWM, Serial). MOSFETs are switched at 16 KHz to ensure quiet

operation and no annoying whining sound. Besides, it also equipped with a microcontroller unit to provide smart features such as multiple input mode and thermal protection.
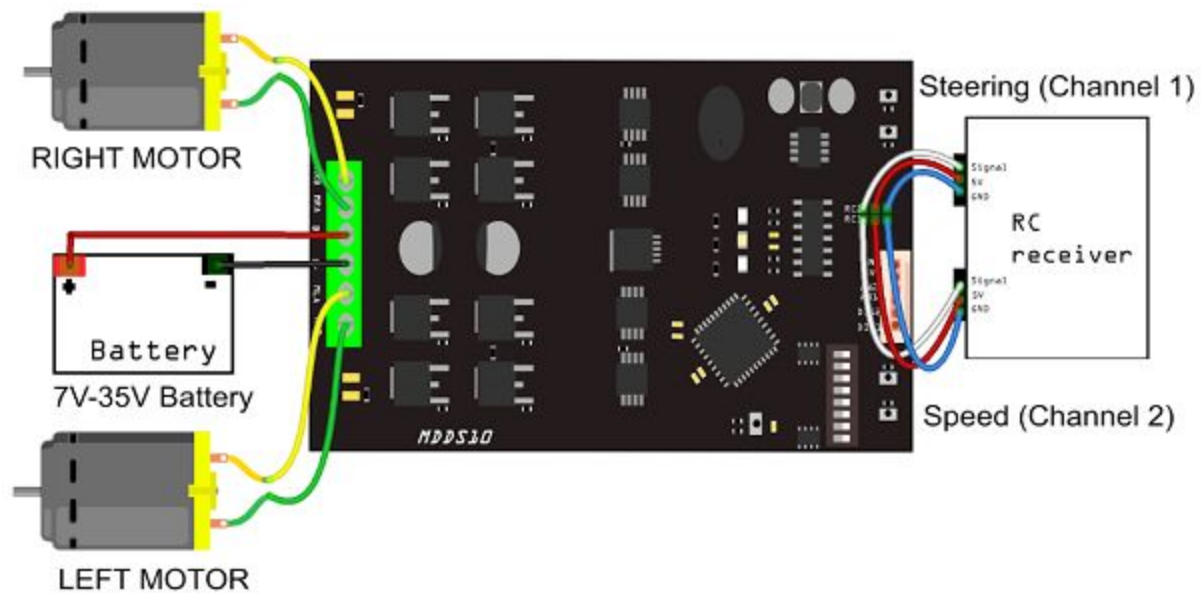
Some of the features for SmartDriveDuo-10 are summarized as below:

● Bi-directional control for dual brushed DC motor.

● Support motor voltage from 7V to 35V.

● Maximum current up to 30A peak (few seconds), 10A continuously.

● 16 KHz switching frequency for quiet operation.

● Battery low voltage indicator.

● Battery over voltage indicator.

● Thermal protection.

● Multiple input modes: RC, Analog, PWM, Simplified Serial and Packetized Serial.

● On board push buttons for fast test and manual operation.