eman ta zabal zazu

BILBOKO INDUSTRIA INGENIARITZA TEKNIKOKO UNIBERTSITATE ESKOLA

INDUSTRIA ELEKTRONIKAREN ETA AUTOMATIKAREN INGENIARITZAKO GRADUA

GRADU AMAIERAKO LANA

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LANAREN BESO ROBOTIKO MUGIKOR BATEN DISEINU PROGRAMAZIO ETA MUNTAIA

ERANSKINAK

IKASLEAREN DATUAK	**ZUZENDARIAREN DATUAK**
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DATA: 2015/06/19	DATA: 2015/06/19

Me-Base Shield

Introduction

Me-Base Shield is an Arduino Shield that brings out most of the Arduino Pins to the uniform 6pin RJ25 connectors. Here is a top-down view:

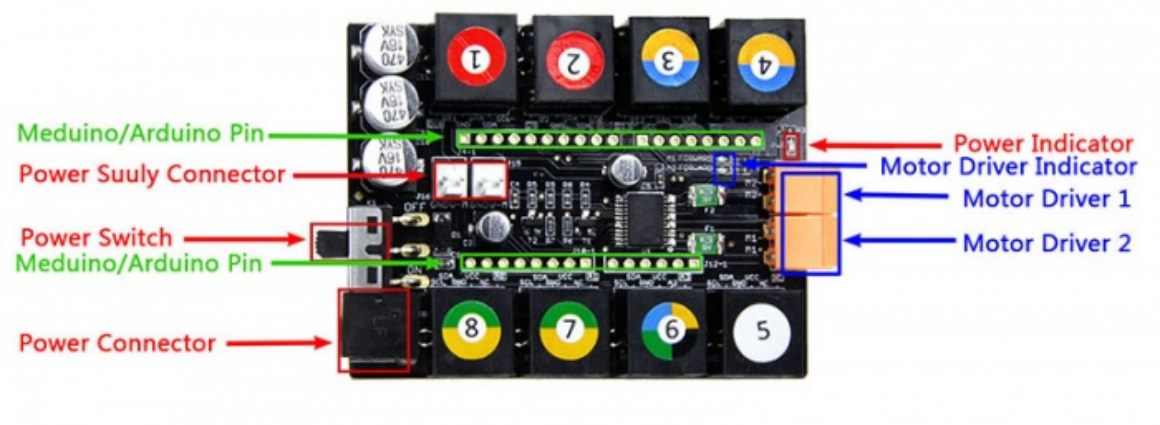
You can easily connect Me Series Electronic Modules to Arduino board through the Base Shield. With a TB6612 motor driver IC on board, it can drive 2 DC motors.

Besides the 8 RJ25 port, there are 2.54mm pin pad on the board, all I/O pins on the bottom Arduino board are conected to these pads.

Features

- 6-12VDC power supply
- Two channel motor driver integrated
- Intuitive connection by labeling tags with different color and number for each connector
- Over-current protection
- Comes with Arduino library for easy programing
- Easy wiring with 6 Pin RJ25 interface
- 2.54mm breakout pins for connecting with jumper wires

Interface Function



Specifications for Connectors

There're 8 RJ25 connectors in total. The tags on the connectors have 5 types of color. Check the following table for the function and attribute of each connector.

The function of each tag

Tag Color	Function	Typical Me Modules
	Red represents the output voltage of Vin (9-12 VDC), which is the power input voltage. Generally, it is connected to some voltage driver module with 9-12V.	Motor Driver, Servo Driver, Microstep Driver, Lego Motor Bridge
	Orange, blue, green, black and white represent the output voltage of Vcc (5VDC), which is the Stable output voltage. Generally, it is connected to some voltage driver module with 5V.	Ultrasonic Sensor, Limit Switch, RJ25 Adaper
		Infrared Receiver , Line Finder, Bluetooth, RJ25 Adaper
		RJ25 Adaper
		RJ25 Adaper
		RJ25 Adaper

Connectors'function and attribute

PORT NO.	Tag Color	Compatible Module types	Typical Me Modules
1		(9-12VDC) driven modules	Motor Driver, Servo Driver, Lego Motor Bridge
2		(9-12VDC) driven modules	Motor Driver, Servo Driver, Lego Motor Bridge
3		1 or 2 way digital modules or I2C modules	Line Finder, Bluetooth, Infrared Receiver, Lego Digital Bridge, RJ25 Adaper
4		1 or 2 way digital modules or I2C modules	Line Finder, Bluetooth, Infrared Receiver, Lego Digital Bridge, RJ25 Adaper
5		I2C modules	I2C modules, RJ25 Adaper
6		1 or 2 way digital or analog modules or I2C modules	Line Finder, Bluetooth, Infrared Receiver, Lego Digital Bridge, Lego Analog Bridge, RJ25 Adaper
7		1 way digital or analog modules or I2C modules	Infrared Receiver, Lego Analog Bridge, RJ25 Adaper
8		1 way digital or analog modules or I2C modules	Infrared Receiver, Lego Analog Bridge, RJ25 Adaper

Meduino

Introduction

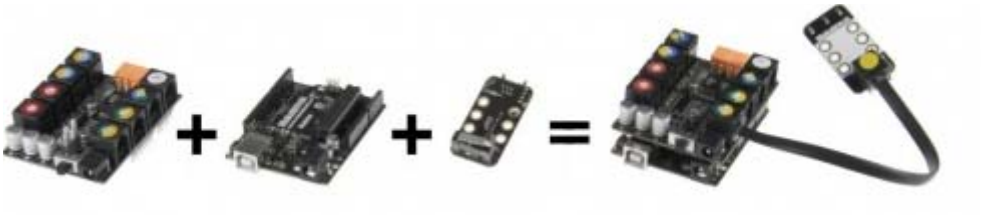
Meduino is an Arduino compatible board. Based on Uno R3 Schematic, 100% compatible to its existing program, shield and IDEs. We also provide a Makeblock Arduino library for Meduino and Me series electronic modules to make it easier to use and program.

Features

- ATmega328 microcontroller
- Input voltage - 7-12V
- 14 Digital I/O Pins (of which 6 provide PWM output)
- 6 Analog Inputs
- 32 KB Flash Memory
- 2 KB SRAM
- 1 KB EEPROM
- 16 MHz Clock Speed

Specification of Connection

With Me-base shield connection diagram(the following picture):



Power

The Arduino Uno can be powered via the USB connection or with an external power supply. The power source is selected automatically.

External (non-USB) power can come either from an AC-to-DC adapter (wall-wart) or battery. The adapter can be connected by plugging a 2.1mm center-positive plug into the board's power jack. Leads from a battery can be inserted in the Gnd and Vin pin headers of the POWER connector.

The board can operate on an external supply of 6 to 20 volts. If supplied with less than 7V, however, the 5V pin may supply less than five volts and the board may be unstable. If using more than 12V, the voltage regulator may overheat and damage the board. The recommended range is 7 to 12 volts.

The power pins are as follows:

- VIN. The input voltage to the Arduino board when it's using an external power source (as opposed to 5 volts from the USB connection or other regulated power source). You can supply voltage through this pin, or, if supplying voltage via the power jack, access it through this pin.
- 5V.This pin outputs a regulated 5V from the regulator on the board. The board can be supplied with power either from the DC power jack (7 - 12V), the USB connector (5V), or the VIN pin of the board (7-12V). Supplying voltage via the 5V or 3.3V pins bypasses the regulator, and can damage your board. We don't advise it.
- 3V3. A 3.3 volt supply generated by the on-board regulator. Maximum current draw is 50 mA.
- GND. Ground pins.

Memory

The ATmega328 has 32 KB (with 0.5 KB used for the bootloader). It also has 2 KB of SRAM and 1 KB of EEPROM (which can be read and written with the EEPROM library).

Input and Output

Each of the 14 digital pins on the Uno can be used as an input or output, using pinMode(), digitalWrite(), and digitalRead() functions. They operate at 5 volts. Each pin can provide or receive a maximum of 40 mA and has an internal pull-up resistor (disconnected by default) of 20-50 kOhms. In addition, some pins have specialized functions:

- Serial: 0 (RX) and 1 (TX). Used to receive (RX) and transmit (TX) TTL serial data. These pins are connected to the corresponding pins of the ATmega8U2 USB-to-TTL Serial chip.
- External Interrupts: 2 and 3. These pins can be configured to trigger an interrupt on a low value, a rising or falling edge, or a change in value. See the attachInterrupt() function for details.
- PWM: 3, 5, 6, 9, 10, and 11. Provide 8-bit PWM output with the analogWrite() function.
- SPI: 10 (SS), 11 (MOSI), 12 (MISO), 13 (SCK). These pins support SPI communication using the SPI library.
- LED: 13. There is a built-in LED connected to digital pin 13. When the pin is HIGH value, the LED is on, when the pin is LOW, it's off.

The Uno has 6 analog inputs, labeled A0 through A5, each of which provide 10 bits of resolution (i.e. 1024 different values). By default they measure from ground to 5 volts, though is it possible to change the upper end of their range using the AREF pin and the analogReference() function. Additionally, some pins have specialized functionality:

- TWI: A4 or SDA pin and A5 or SCL pin. Support TWI communication using the Wire library.

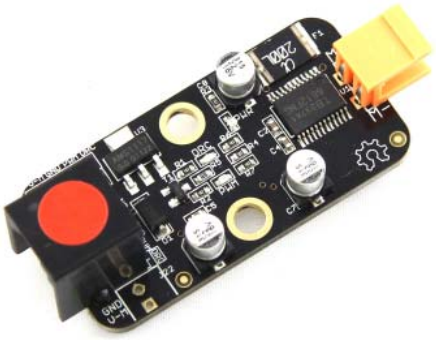
There are a couple of other pins on the board:

- AREF. Reference voltage for the analog inputs. Used with analogReference().
- Reset. Bring this line LOW to reset the microcontroller. Typically used to add a reset button to shields which block the one on the board.

Me-Motor Driver

Introduction

Me-Motor Driver is designed to drive a 6~12V DC geared motor. The following picture is the top-down view:



Me-Motor Driver could drive a DC motor with a RJ25 port which contains power lines and signal lines.The wiring has been simpified.
The motor driver IC on the board is TB6612, which is a high efficiency MOSFET driver with low heat disipation. Over current protection has included to stop the driver IC burned out.

Power Supply

9-12VDC. When connected, the Me–Motor Driver can be powered from the port 1 or 2 of the Me – Base Shield with 9-12 VDC .

Features

- TB6612PNG motor driver IC with High efficent MOSFET-based H-bridges
- Comes with Arduino library for easy programing
- 6 V to 12 V motor supply range
- 1 A maximum continuous current per motor (2 A peak)
- Over-current protection
- Easy wiring with 6 Pin RJ25 interface
- Labeled with red tag and compatible with Me–Base Shield
- 2.54mm breakout pins for connecting with jumper wires
- 16mm interval M4 mounting holes, compatible with Makeblock beams
- Two indicator LEDs on board for debugging and feedback
- LED indicator: PWR (Red LED) – Power indicator. PWM (Blue LED) – PWM indicator. DRC (Blue LED) – Direction indicator.

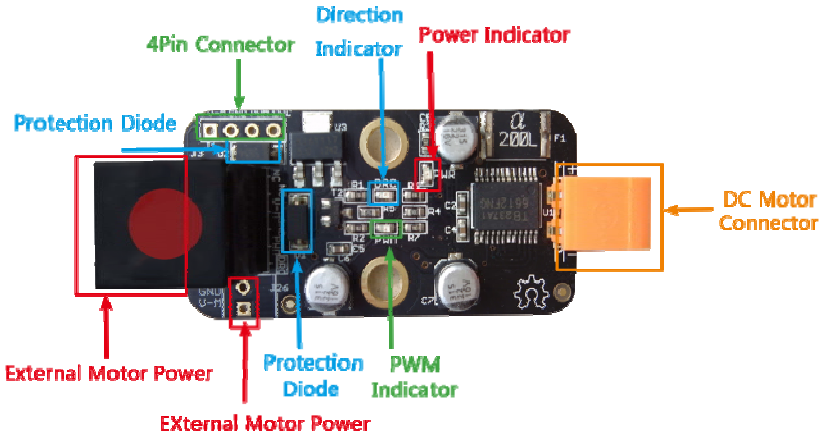
General specifications

- Motor driver: TB6612FNG
- Motor channels: 1
- Minimum operating voltage: 6 V
- Maximum operating voltage: 12 V
- Continuous output current per channel: 1 A
- Peak output current per channel: 2 A

Dimensions

2.4cm x 4.8cm

Interface Function



Me-Servo Driver

Introduction

Me-Servo Driver is designed to drive servo motors. With high efficiency DC-DC converter, it could converts the input voltage into suitable voltage for servo, wchich is 6V. Don't need to find special power supply for servos. The following picture is the top-down view:

Power supply

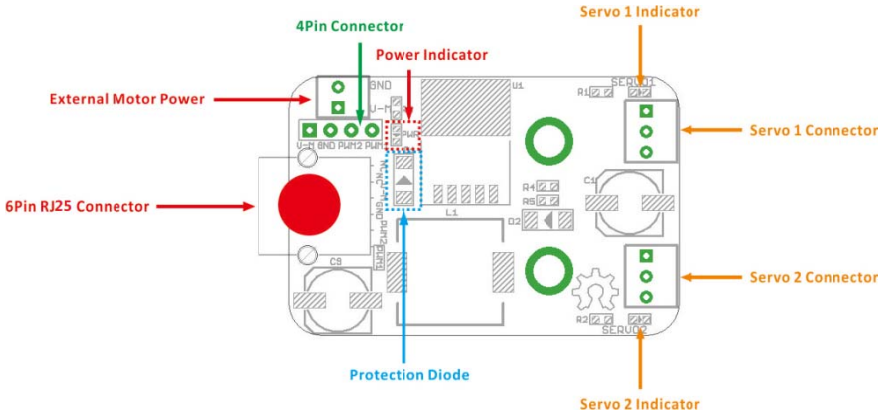
When connected, the Me–Servo Driver can be powered by the 9-12V DC power from the port 1 or 2 of the Me–Base Shield.

Features

- High efficiency DC-DC converter on board
- 9-12VDC power supply
- Two PWM output channels for controlling two servo motors
- The power voltage for servos are regulated to 6V
- Comes with Arduino library for easy programing
- Over-current protection
- Easy wiring with 6 Pin RJ25 interface
- Labeled with red tag and compatible with Me–Base Shield
- 2.54mm breakout pins for connecting with jumper wires
- 16mm interval M4 mounting holes, compatible with Makeblock beams
- Three indicator on board LEDs for debugging and feedback
- LED indicator: PWR (Red LED) – Power indicator. SERVO-1 (Blue LED) – PWM indicator for Servo1. SERVO-2 (Blue LED) – PWM indicator for Servo2.

Dimensions

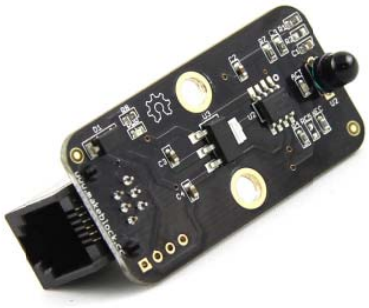
3.2cm x 4.8cm


4Pin Connector
Power Indicator
Servo 1 Indicator
External Motor Power
Servo 1 Connector
6Pin RJ25 Connector
Servo 2 Connector
Protection Diode
Servo 2 Indicator

Me-Infrared Reciver Decode

Introduction

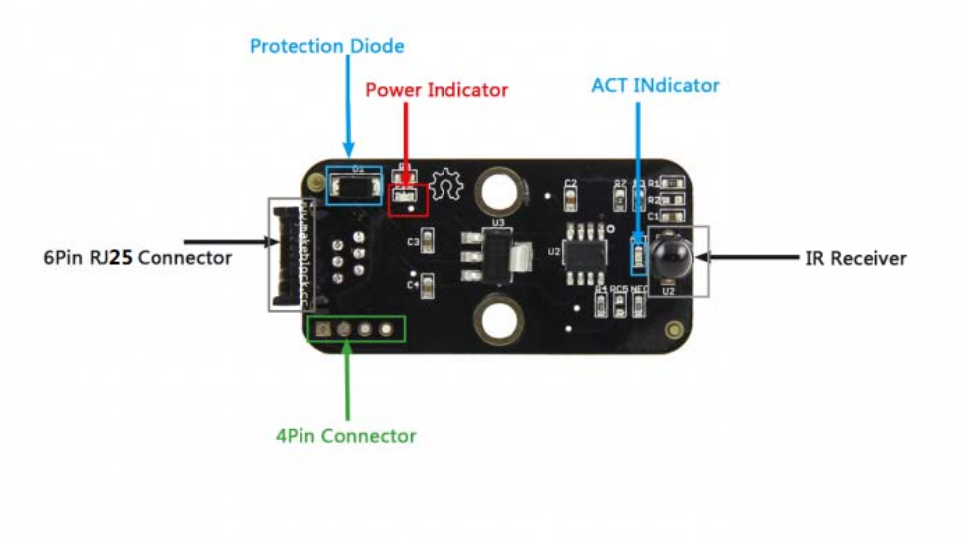
The Me– Infrared Receiver module is designed for controlling the robotics by receiving the commands from the infrared remote control. The IR detector have a demodulator inside that looks for modulated IR at 38 KHz. The Infrared Receiver can receive signals well within 10 meters.



Features

- Power Supply: 5VDC power supply
- 6 Pin RJ11 interface and 2.54mm breakout pins
- Compatible with Me – Base Shield
- Transmission Distance: 10 meters in free space
- LED indicator: PWR (Red LED) – Power indicator. Blinking while receiving infrared signals

Interface Function



Me-UltraSonic Sensor

Introduction

Me Ultrasonic Sensor can be used to measure distance or obstacle avoidance, from 3cm to 4m. With the Arduino library we provide, users can get the distance directly and use the module easily. The following picture is the top-down view:

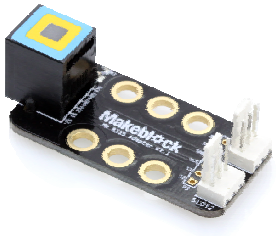
Features

- Comes with Arduino library for easy programing
- Over-current protection
- Easy wiring with 6 Pin RJ25 interface
- Labeled with yellow tag and compatible with Me–Base Shield
- 2.54mm breakout pins for connecting with jumper wires
- 16mm interval M4 mounting holes, compatible with Makeblock beams
- One indicator LEDs on board for debugging and feedback
- LED indicator: D1 (Red LED) – Power indicator.

Detecting range

3cm--4m, best in 30 degree angle

Me RJ25 Adapter



Introduction

Me RJ25 Adapter converts 6P6C RJ25 connector to two common signal connectors.RJ25 Adapter can be connected to the port with yellow,blue or black tag on mainboard.

Features

- Break out two singnal connectors;
- Connect modules from other manufacturers with Me series modules;
- Support Arduino IDE programming control, we also provide Makeblock Library for Arduino, easy programming;
- Support Scratch For Robot, cover all ages people;
- Modular installation, and compatible with LEGO Bricks;

Parameters

Operating Voltage: 5V DC;

Connector: two signal connectors;

Dimension: 52 x 24 x 16 mm (Length x Width x Height);

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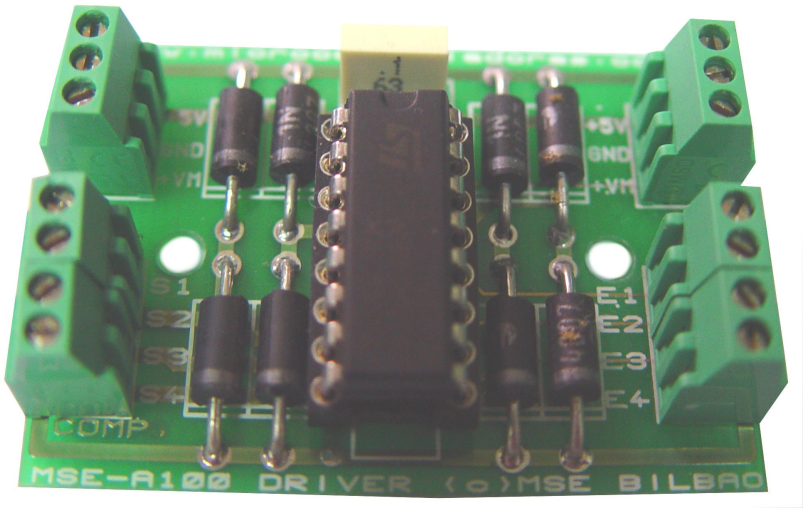
MSE Microsystems Engineering

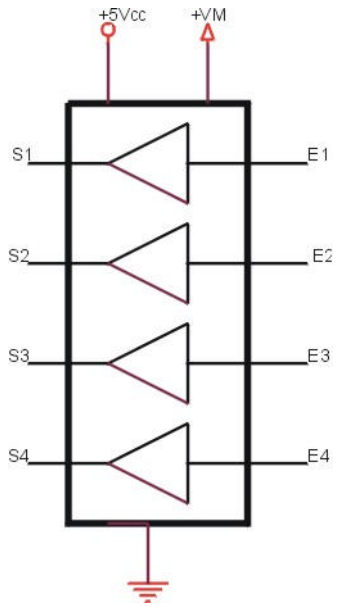
1.- DESCRIPCION

Se trata de un driver de propósito general basado en el dispositivo L293B de la firma SGS-THOMSON. Se muestra en la figura 1.



Consiste en 4 canales amplificadores totalmente independientes entre si. Cada canal es capaz de soportar corrientes de salida de 1 A con picos de hasta 2 A. Poseen una alta inmunidad al ruido, protección de sobre temperaturas y tensión de alimentación de las cargas separada de la tensión de alimentación de la lógica. La señal de entrada de cada canal es compatible con señales TTL. Las señales de salida disponen de los correspondientes diodos de absorción para las corrientes inversas que generan las cargas inductivas. La figura 2 muestra el esquema simplificado del driver MSE-A100, junto con una descripción de sus señales.

SEÑAL	DESCRIPCION
E1-E4	Señales de entrada, una por cada canal. Estas señales son compatibles con niveles lógicos TTL.
S1-S4	Señales amplificadas de salida, una por cada canal. Estas se conectan a las cargas que se desean controlar. Cada salida puede soportar cargas de hasta 1 A.
+5Vcc	Entrada de +5V para alimentación de la lógica interna.
+VM	Entrada de tensión para la alimentación de las cargas cuyo valor máximo es de 35V
GND	Tierra de alimentación.



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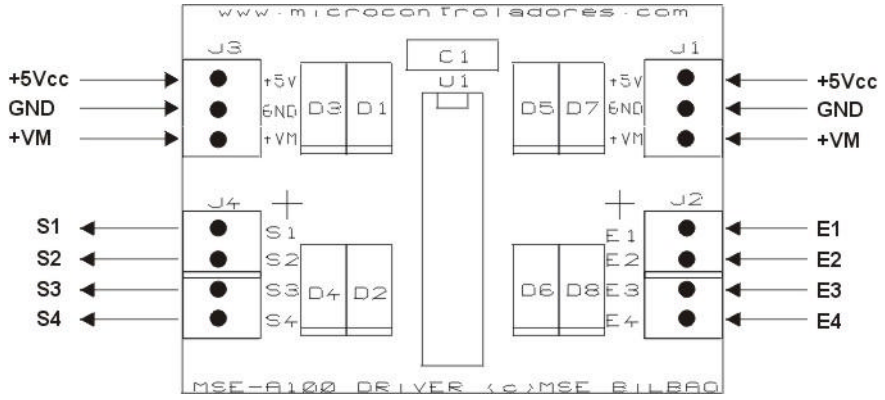
2.- CARACTERISTICAS TECNICAS

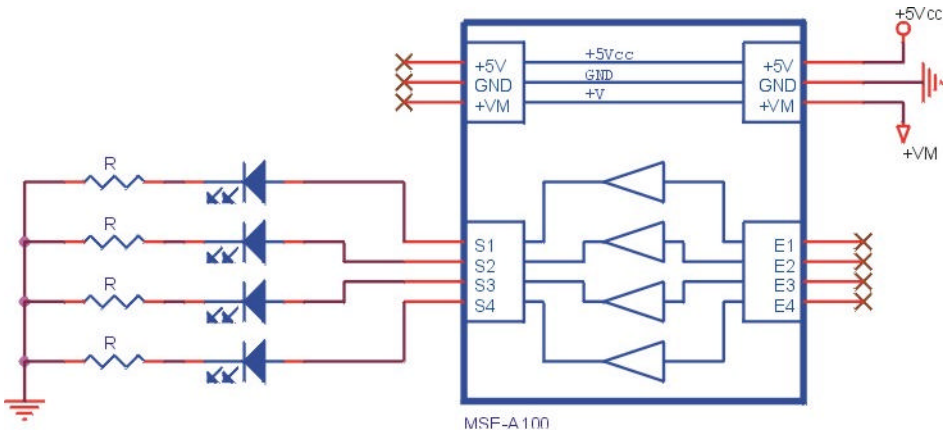
PARAMETRO	VALOR	UNIDAD
Dimensiones del circuito	45 x 33	mm
Tensión de alimentación para la lógica interna (+5Vcc)	5	V
Tensión máxima de alimentación de las cargas (+VM)	35	V
Tensión de entrada máxima en E1-E3 a nivel bajo	1.5	V
Tensión de entrada mínima en E1-E3 a nivel alto	2.3	V
Corriente máxima de entrada en E1-E3 a nivel bajo	-10	µA
Corriente típica de entrada en E1-E3 a nivel alto	30	µA
Intensidad máxima de salida en S1-S3	1000	mA
Intensidad de pico máxima en S1-S3	2000	mA
Disipación total de potencia	5	W

3. CONEXIONADO

Se realiza mediante una serie bornas que permiten una fácil conexión. Se presenta en la figura 3.



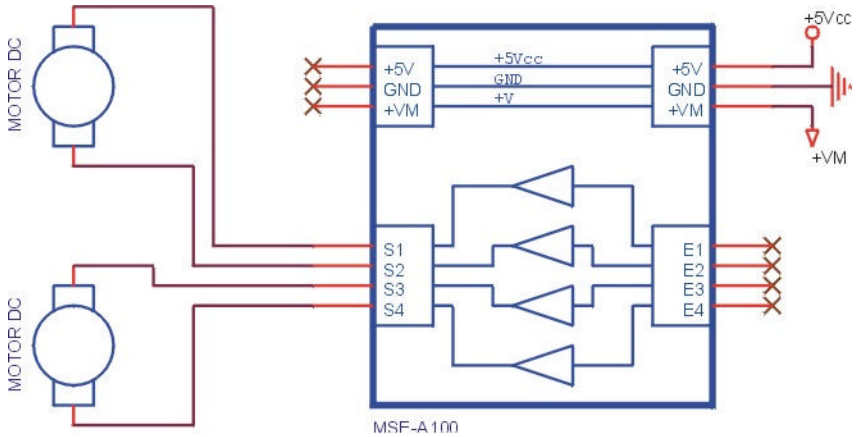
El driver MSE-A100 puede controlar diferentes tipos de cargas. A continuación se muestra, a modo de ejemplos, la conexión de MSE-A100 con diferentes tipos de periféricos. Así, la figura 4, muestra la conexión del driver con cargas luminosas de tipo led.



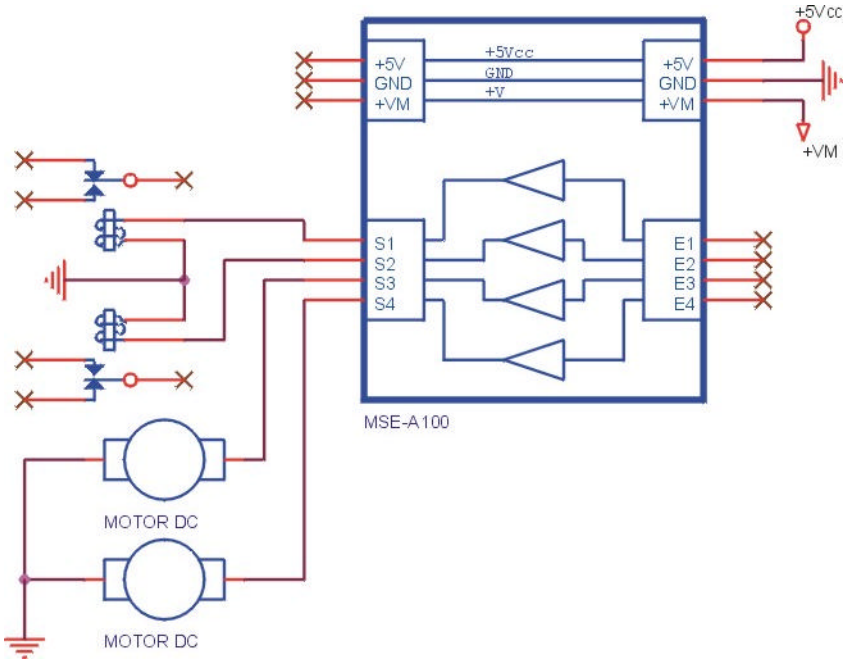
La resistencia R de absorción asociada a cada led se debe calcular en función de la tensión +VM empleada según la siguiente fórmula: R = (+VM – VLED) / ILED

La figura 5 muestra la conexión del driver MSE-A100 con dos motores CC. Cada motor se conecta con dos de las salidas y se gobierna desde las correspondientes dos entradas. Tal y como se muestra en la tabla, es posible controlar la conexión/desconexión del motor así como el sentido de giro del mismo. También es posible regular la velocidad de cualquiera de los dos motores. Basta con aplicar por la entrada apropiada una señal PWM.

E1	E2	MOTOR 1
0	**0**	OFF
0	**1**	Giro horario
1	**0**	Giro antihorario
1	**1**	OFF



La figura 6 muestra la forma de conectar, a modo de ejemplo, dos relés y dos motores CC. En este caso tanto los relés como los motores se conectan a cada una de las 4 salidas disponibles, por lo que únicamente pueden tener el estado ON/OFF. En el caso de los motores sólo pueden tener un único sentido de giro, que será horario o antihorario en función de cómo se realicen las conexiones de los mismos.



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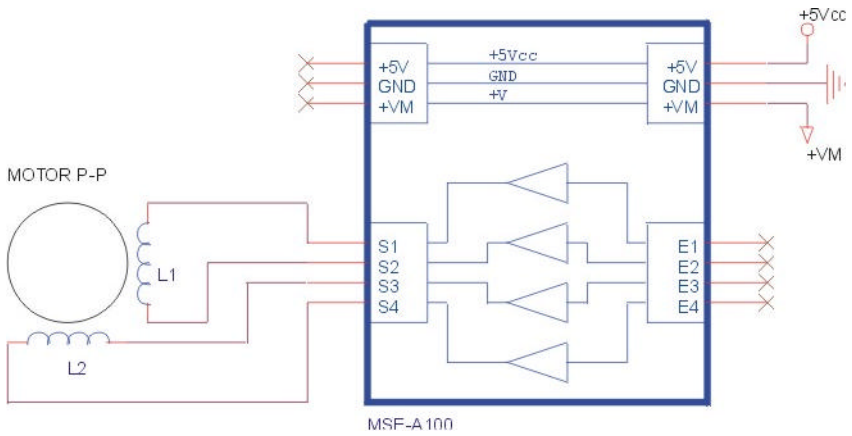
Finalmente, la figura 7 presenta la conexión del driver MSE-A100 con un motor paso a paso (P-P) de dos bobinas.



Según las combinaciones binarios que se apliquen por las entradas E1-E3, las bobinas se excitan con una determinada polaridad y produciendo un desplazamiento de rotación en el eje del motor. El número de grados de esta rotación o "paso" dependerá del motor empleado. Las siguientes tablas muestran las secuencias binarias que han de aplicarse para producir un giro en uno u otro sentido.

SENTIDO HORARIO				
PASO	**E4**	**E3**	**E2**	**E1**
1	1	0	0	1
2	0	1	0	1
3	0	1	1	0
4	1	0	1	0

SENTIDO ANTI HORARIO				
PASO	**E4**	**E3**	**E2**	**E1**
1	1	0	1	0
2	0	1	1	0
3	0	1	0	1
4	1	0	0	1

4.- AJUSTES

El driver MSE-A100 no necesita de ningún tipo de ajuste ni calibraci

5.- APLICACIONES

MSE-A100 es un driver de 4 canales de propósito general capaz de actuar sobre diferentes tipos de cargas. Su empleo está dirigido a cualquier aplicación en la que sea necesario amplificar señales lógicas de control para ser aplicadas a diferentes tipos de actuadores: diferentes tipos motores, relés, indicadores luminosos, sonoros, etc.