Links til dokumentet:

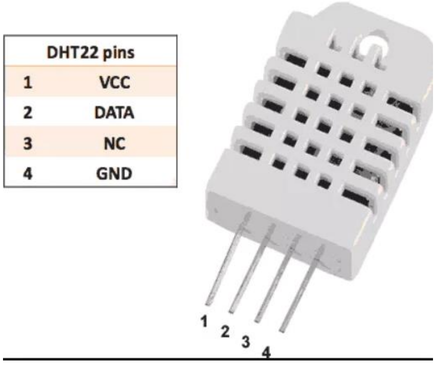
DHT22 temperatur og fugtsensor
Laser
LM393 Sound detection Sensor
HC-12 Wireless Serial Port Connection Module
Micro SD card Adapter
Relæ-kort
2 kanal L298N H-bro DC Motor Driver til Arduino
PIR Infrarød sensor

Diverse Arduino sensorer / Følere

DHT22

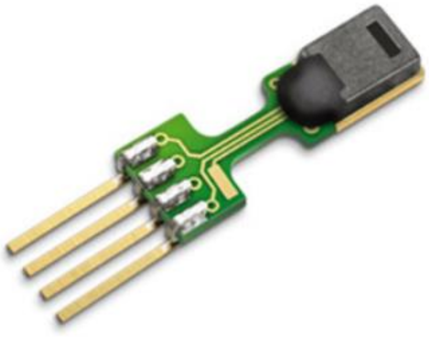
Temperatur og fugt sensor

Se:
https://create.arduino.cc/projecthub/attari/temperature-monitoring-with-dht22-arduino-15b013

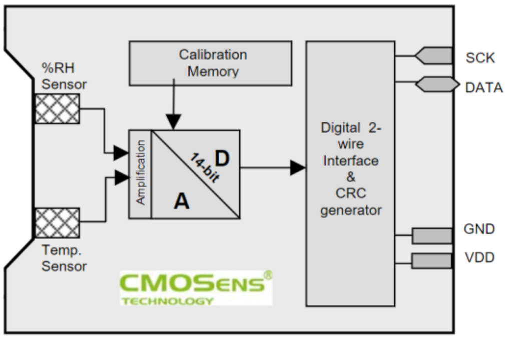


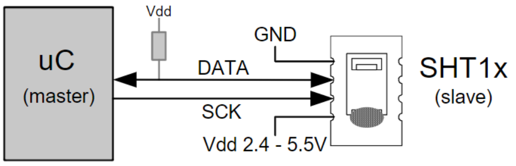
DHT22 pins	
1	VCC
2	DATA
3	NC
4	GND

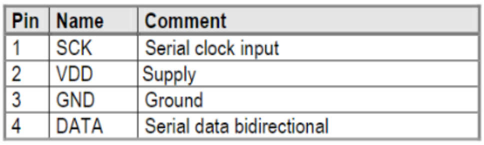
Digital Humidity Sensor SHT75 (RH/T)



https://dk.farnell.com/sensirion/sht75/sensor-humidity-temp-3-3v/dp/1590514

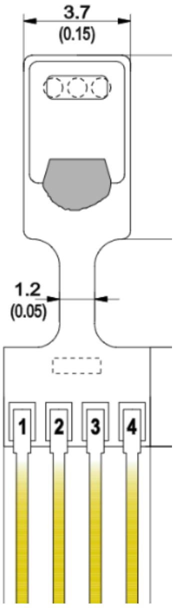






Pin	Name	Comment
1	SCK	Serial clock input
2	VDD	Supply
3	GND	Ground
4	DATA	Serial data bidirectional

SHT7x Pin Description



Laser

Pins: fra toppen:
Signal
5 Volt
Gnd

That one is marked '-' at one side and 'S' at the other, its a standard servo layout,
"-+S" (ie ground, 5V and signal)

SKU: 844137473

LM393 Sound detection Sensor Module - Black

4~6V

Chip: LM393, electret microphone; Working voltage: DC 4 ~ 6 V; With a signal output. One single channel output. Low level output signal; When there is sound output low, lights lit. Can be used for voice-activated lights, with light sensors make a sound and light alarm, and voice control, voice detection occasions

På potmeteret kan der justeres på threshold-værdien !!

Kode eksempel: ??

http://henrysbench.capnfatz.com/henrys-bench/arduino-sensors-and-input/arduino-sound-detection-sensor-tutorial-and-user-manual/

Material: Plastic + copper
- Voltage: DC 3V
- Working current: < 40mA
- Input power: 150mW
- With red dot
- Wavelength: 650nm
- Output laser power: < 5mW
- Cable length: 4.6cm
- Working temperature: -36~65'C
- Perfect for DIY project

SKU: 844154145

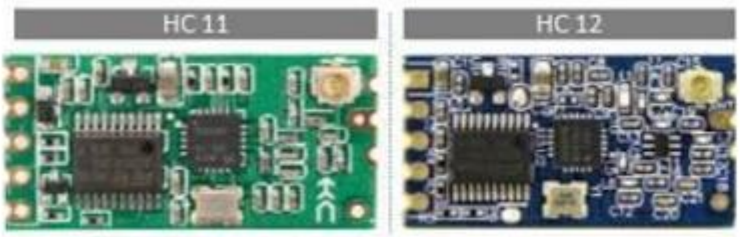
Mangler

HC-12 Wireless Serial Port Connection Module

Formålet er at kunne lave en trådløs seriel kommunikation mellem 2 Arduinoer. Der skal bruges 2 stk. HC-12 print til at lave den trådløse forbindelse.

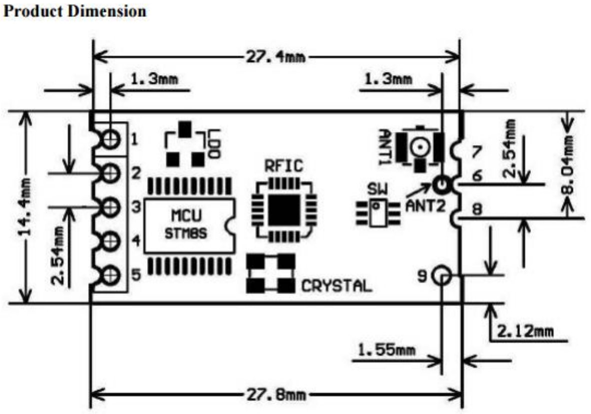
HC-12 Pinout

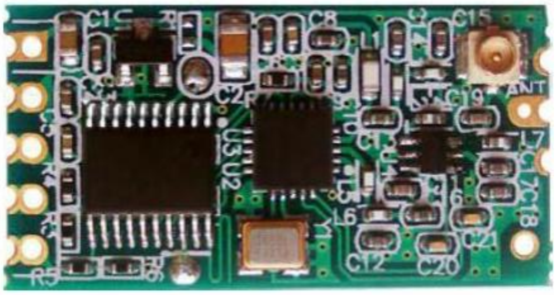
Forgængeren hed HC-11



Pin 1	Definition	Note
1	VCC	Power supply input, 3,3V – 5V DC. Min. 200 mA
2	GND	Common Ground
3	RXD	URAT input port, TTL level. 1k modstand, indsat I serie I kreds.
4	TXD	URAT Output port. TTL level. 1k modstand, indsat I serie I kreds.

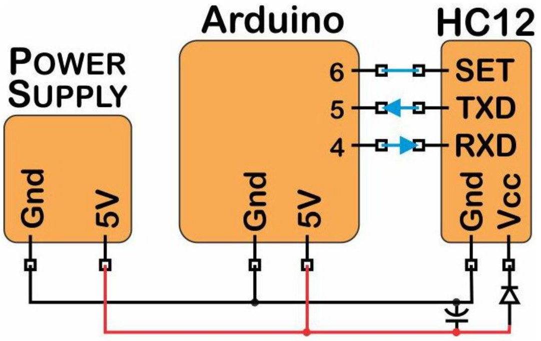
5	SET	Input, internal 10k pull up modstand. Parameter indstilling kontrol pin.
6	ANT	Input/Output. 433 MHz Antenne pin
7	GND	Common Ground
8	GND	Common Ground
9	NC	Not connected. Brugt til fixing. compatible med H-11 module pin position
ANT1	ANT	IPEX20279-001E-03 antenne pin
ANT2	ANT	433MHz Fjeder antenne lodnings øje.

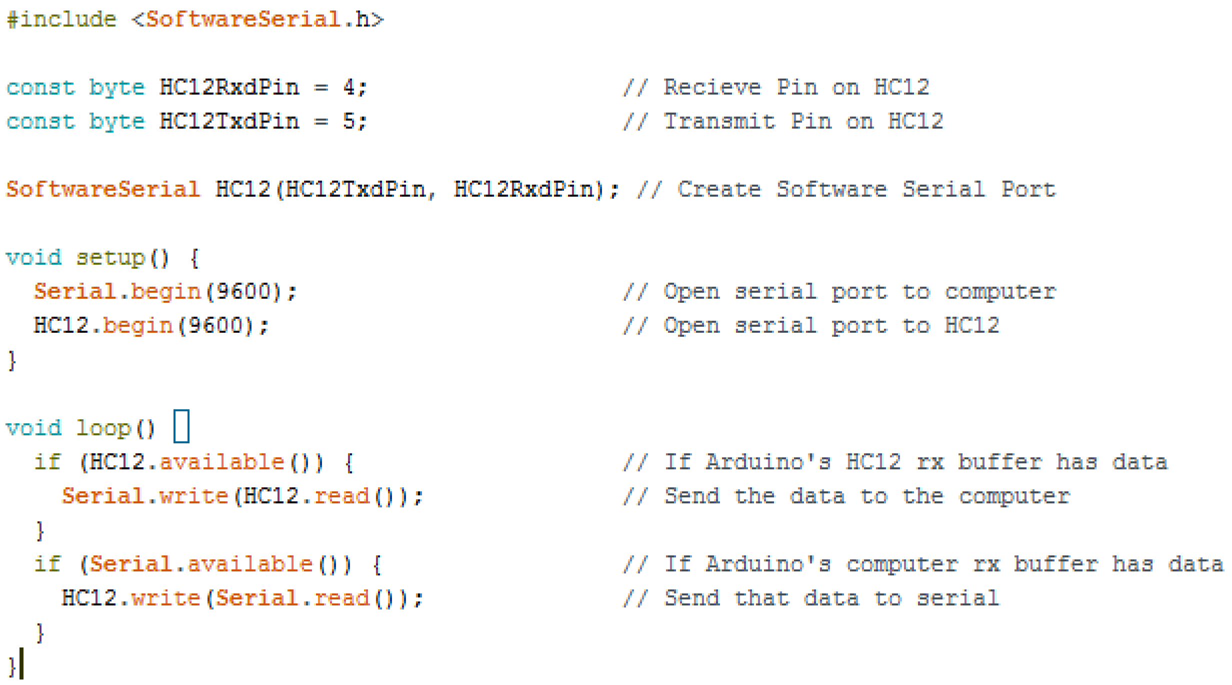




Forbindelser mellem HC-12 og Arduino.

Tilslut RXD_{HC12} til $Arduino_{D4}$
Tilslut TXD_{HC12} til $Arduino_{D5}$
Tilslut SET_{HC12} til $Arduino_{D6}$
Tilslut Gnd_{HC12} til
$Arduino_{Gnd}\ og\ Power\ supply_{Gnd}$
Tilslut Vcc_{HC12} til $Power\ supply_{vcc}$





```
#include <SoftwareSerial.h>

const byte HC12RxdPin = 4;                    // Recieve Pin on HC12
const byte HC12TxdPin = 5;                    // Transmit Pin on HC12

SoftwareSerial HC12(HC12TxdPin, HC12RxdPin); // Create Software Serial Port

void setup() {
  Serial.begin(9600);                         // Open serial port to computer
  HC12.begin(9600);                           // Open serial port to HC12
}

void loop() {
  if (HC12.available()) {                     // If Arduino's HC12 rx buffer has data
    Serial.write(HC12.read());                // Send the data to the computer
  }
  if (Serial.available()) {                   // If Arduino's computer rx buffer has data
    HC12.write(Serial.read());                // Send that data to serial
  }
}
```

```
  #include <SoftwareSerial.h>
const byte HC12RxdPin = 4;                    // Recieve Pin on HC12
const byte HC12TxdPin = 5;                    // Transmit Pin on HC12

SoftwareSerial HC12(HC12TxdPin, HC12RxdPin); // Create Software Serial Port

void setup() {
  Serial.begin(9600);                       // Open serial port to computer
  HC12.begin(9600);                           // Open serial port to HC12
}
void loop() {
  if (HC12.available()) {                     // If Arduino's HC12 rx buffer has data
    Serial.write(HC12.read());                  // Send the data to the computer
  }

  if (Serial.available()) {                 // If Arduino's computer rx buffer has data
    HC12.write(Serial.read());                  // Send that data to serial
  }
}
```

Programmet skal nu oploades. Efterfølgende åbnes den serielle monitor under tools.

Sørg for at Monitoren er indstillet til 9600 i Baud Rate.

Kodekilde: https://www.allaboutcircuits.com/projects/understanding-and-implementing-the-hc-12-wireless-transceiver-module/

https://forum.arduino.cc/index.php?topic=355783.30
http://www.instructables.com/id/Long-Range-18km-Arduino-to-Arduino-Wireless-Commun/

Hello Patrick,

The HC12 and HCS12 are pretty compatible with the older HC11 in the following sense:

1. All the HC11 instructions, are legal on the HC12 and HCS12. The opcodes are however different, so it is necessary to recompile the HC11 code using an HC12/HCS12 assembler, before you can run it on the HC12.

2. The peripherals (SCI, SPI, TIMER etc) are also pretty compatible, although some new features have been added here and there so the peripherals are not 100% compatible, but they resemble much of the HC11 peripherals, so it is usually not too time-consuming to change existing HC11 peripherals code to HC12 code.

The new MC9S12E128 is different from the HC11 in the following main points:

1. The HCS12 External bus is not user friendly - so don't plan on using the external bus. The HCS12 is fine as long as you operate it in Single-Chip mode.

2. Speed - the HCS12 can run to 25MHz bus speed, much faster than the HC11 could.

3. The HCS12 architecture is 16 bits, so many instructions take less bus-cycles to execute and new 16 bit instructions are added to farther increase the performance.

4. The pinout is different.

5. More internal memory is available (Flash, Ram etc.)

6. 5V as well as 3.3V operation is possible on the

MC9S12E128.

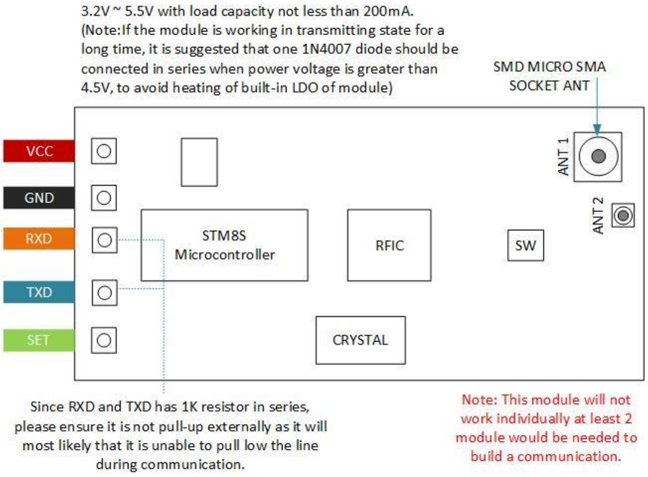
7. There is a new paging scheme to allow code greater than 64K to be executed in a strait forward manner using the CALL and RTC instructions, that did not exist on HC11.

The following document is also helpfull, if you didn't read it already.
http://www.freescale.com/files/microcontrollers/doc/app_note/AN1284.pdf

Hope this helps,
Doron
Nohau Corporation
HC12 In-Circuit Emulators
www.nohau.com/emul12pc.html
https://www.embeddedrelated.com/showthread/68hc12/7999-1.php

Se: http://www.14core.com/wiring-the-hc11-hc12-434433mhz-transceiver/
https://www.allaboutcircuits.com/projects/understanding-and-implementing-the-hc-12-wireless-transceiver-module/

The HC11 wireless communication frequency band is 434MHz in a high transparent FSK transceiver, high output power, high sensitivity and compare to Bluetooth HC05/HC06 it reach to 150~300 Meter on Open Space.
The HC12 maximum transmitting power is 100mW 20dBm, the receiving sensitivity is -117dBm at baud rate 5000bps in the air, communication distance up to 1000m on open space.

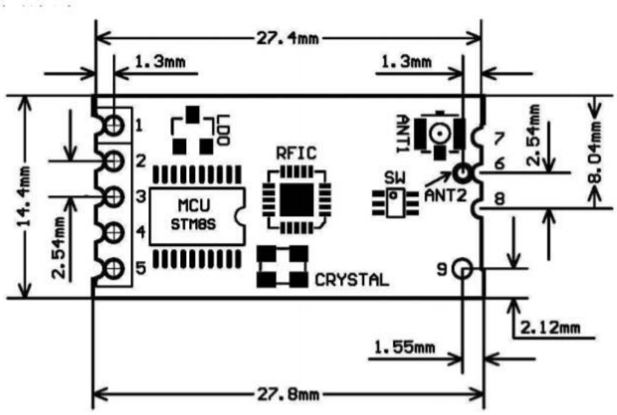


3.2V ~ 5.5V with load capacity not less than 200mA. (Note:If the module is working in transmitting state for a long time, it is suggested that one 1N4007 diode should be connected in series when power voltage is greater than 4.5V, to avoid heating of built-in LDO of module)

SMD MICRO SMA SOCKET ANT

Since RXD and TXD has 1K resistor in series, please ensure it is not pull-up externally as it will most likely that it is unable to pull low the line during communication.

Note: This module will not work individually at least 2 module would be needed to build a communication.



http://www.14core.com/wiring-the-hc11-hc12-434433mhz-transceiver/

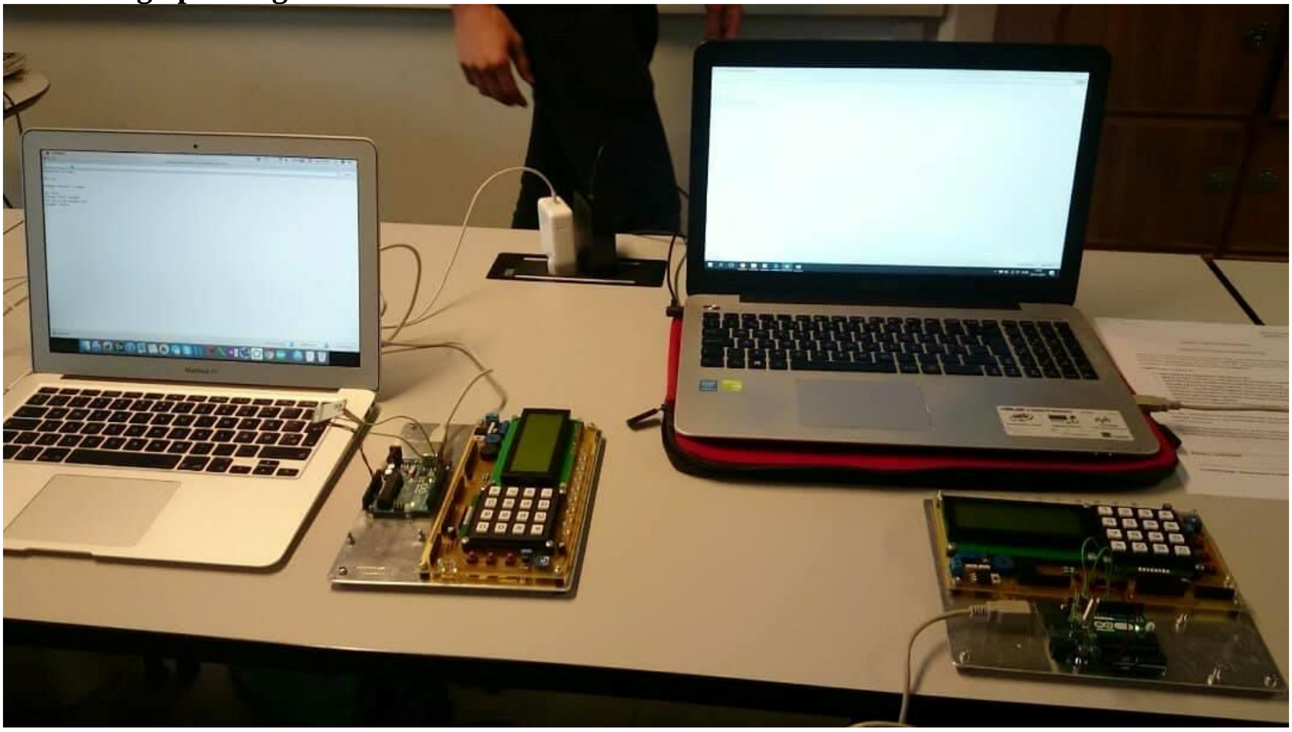
Forklaring/opstilling Simpel start-up kode TOTALE KODE Eksempel på chat

(fra Bastian og Jacob, El 2017-18)

/*
DISCLAIMER: Hvis man vil have tid på sine beskeder, skal Time.h library'et inkluderes.
Det downloades her: http://www.arduinolibraries.info/libraries/time (i skrivende stund: v. 1.5.0)

Dette tilføjes ved at gå til: Sketch > Include Library > Add .zip-library.
*/

Forklaring/opstilling



Idéen med denne opstilling er at man vha. *SoftSerial* kan sende beskeder mellem arduinoer. Dette kan nemt udvides med et HC-11 eller HC-12 komponent.

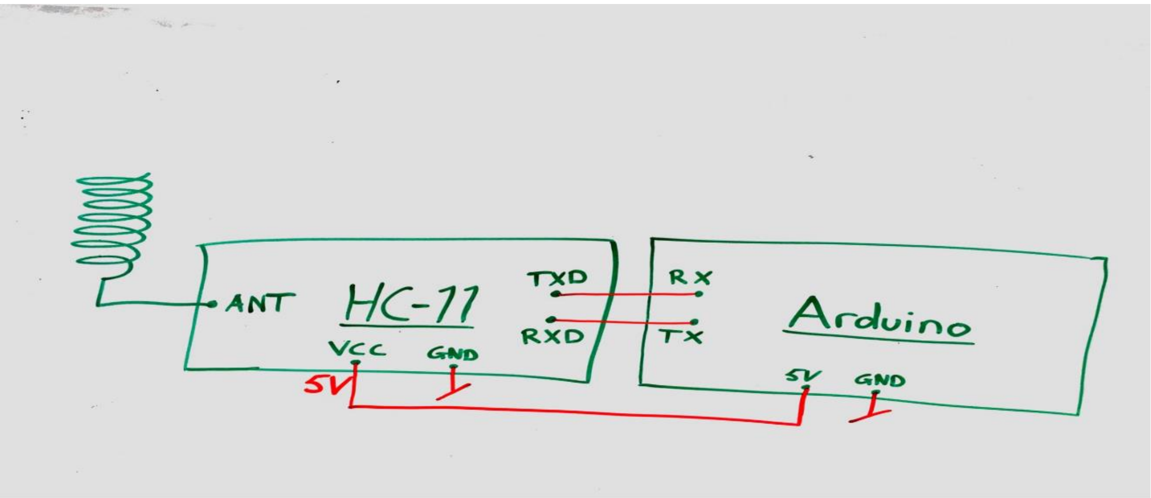
Når man fx skriver

mySerial.print("MySerial ready!");

Sender Arduinoen beskeden "MySerial ready!" hen til modtageren. Og dette vises i modtagerens display, fordi, modtageren har koden:

```
if (mySerial.available()) { //der er altså en besked klar i mySerial,
                                                  //hvorfor if-statementet evaluater til true
  Serial.write(mySerial.read()); //der bliver i Serial-monitor skrevet hvad der ligger i mySerial
 }
```

Dette kan udvides til den “TOTALE KODE”, som viser chat-beskedernes afsender, som ses nederst



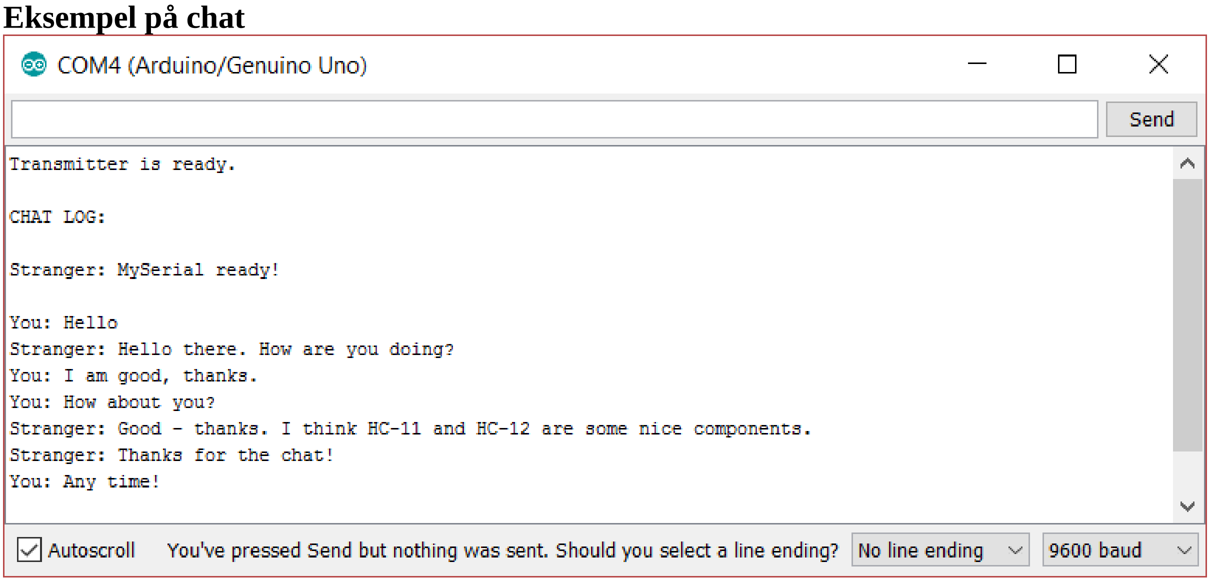
Simpel start-up kode

```
#include <SoftwareSerial.h>

SoftwareSerial mySerial(7,8); //recieve, transmit
char c = ' ';


void setup() {

 Serial.begin(9600); //baudrate arduino kommunikerer med PC med...
 mySerial.begin(9600); //kan være hvad som helst endda 1200
 Serial.println("Hello. Serial ready"); //
 mySerial.print("MySerial ready!");
}

void loop() {
 if (mySerial.available()) {
   Serial.write(mySerial.read());
 }
 if (Serial.available()) {
   c = Serial.read();
   mySerial.write(c);
   Serial.write(c);
}
 }
```

TOTALE KODE

```
#include <SoftwareSerial.h>
#include <time.h>

SoftwareSerial mySerial(8,9);//RX, TX


bool endOfLine = true, endOfLineR = true;
int counter = 0;
int baudrate = 9600;//Receivers baudrate (bits/second)
char c = ' ';//Char to be read

void setup() {
  Serial.begin(9600);//Initialise transmitter serial
  mySerial.begin(baudrate);//Initialise receiver serial
  Serial.println("Transmitter is ready.");
  mySerial.println("Receiver is ready.");
  Serial.println("\nCHAT LOG:\n");
}

void loop() {
  //Receive
  if(mySerial.available() > 0){//If a byte is ready to be read
    counter = 0;
    if (endOfLineR){//If first byte in sentence
      endOfLineR = false;
      Serial.print("Stranger: ");
    }
    Serial.write(mySerial.read());//Print read bytes to serial
  }
  if (counter > baudrate/8){//Check if a expected byte was not received (end of line)
    counter = 0;
    if (!endOfLineR){//Break line if not already broken
      endOfLineR = true;
      Serial.println();
    }
  }
  counter++;

  //Transmit
  if(Serial.available() > 0){//If a byte is ready to be read
    if (endOfLine){//If start of new line
      endOfLine = false;
      Serial.print("You: ");
    }
    c = Serial.read();
    Serial.write(c);
    mySerial.write(c);
  }else if (!endOfLine){//If transmit is done break line if not already broken
    endOfLine = true;
    Serial.println();
  }
}
```

Eksempel på chat



COM4 (Arduino/Genuino Uno)

Send

```
Transmitter is ready.

CHAT LOG:

Stranger: MySerial ready!

You: Hello
Stranger: Hello there. How are you doing?
You: I am good, thanks.
You: How about you?
Stranger: Good - thanks. I think HC-11 and HC-12 are some nice components.
Stranger: Thanks for the chat!
You: Any time!
```

☑ Autoscroll You've pressed Send but nothing was sent. Should you select a line ending? No line ending 9600 baud

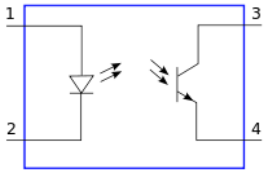
Micro SD card Adapter

Relæboard

Relæ-boardet er beregnet til at switche 230 Volt, og kan således få en uC eller Arduino til at tænde lysnet-apparater.

Det er beskyttet i indgangen med en optokobler, der overfører signal via lys.

Herved opnås at Arduinoen ikke så let ødelægges af eventuelle spændingsspidser fra relæet, når det kobler ud.



Relæerne er 12 Volts udgaver, dvs. der skal 12 Volt på Vcc på den venstre pin, og GND, ground på 2. pin.

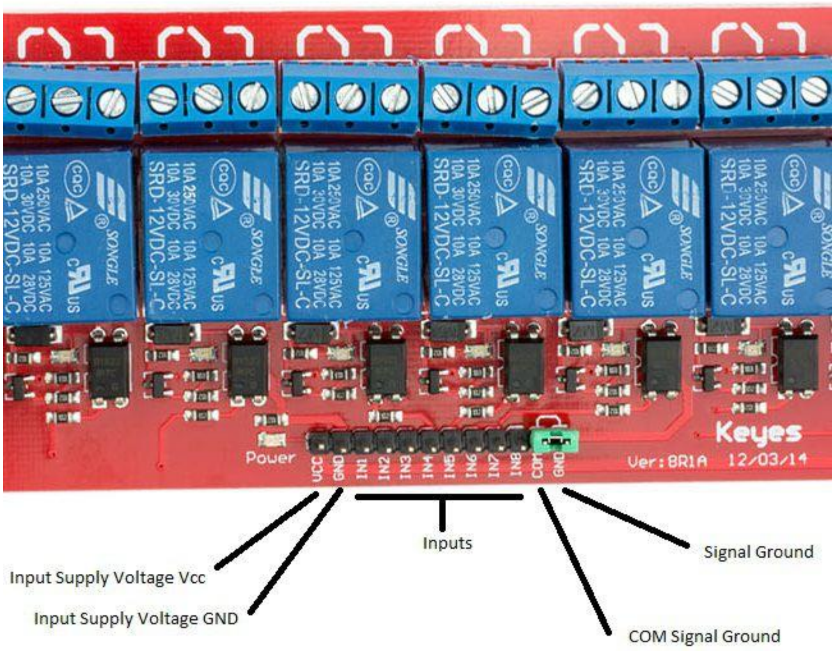
Lysdioden ”Power” lyser op, når der er power på boardet.

Inputs kan styres direkte fra Arduino-udgangene.

(Skal bare have mere end 1 Volt ! men 5 Volt er OK)

Der er placeret en kortslutning mellem de to højreste pins.

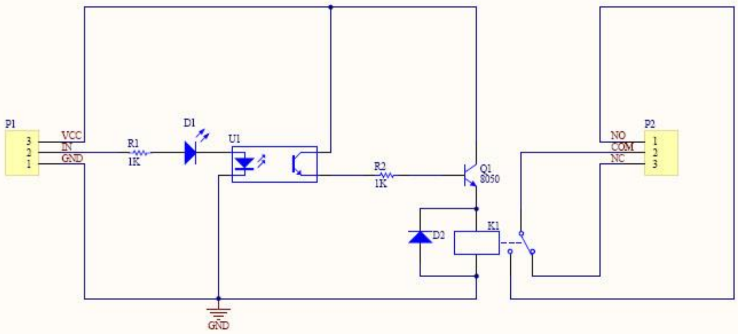
Den højreste, mærket GND er ground for power til relæ-spolerne ligesom pin 2 fra venstre.



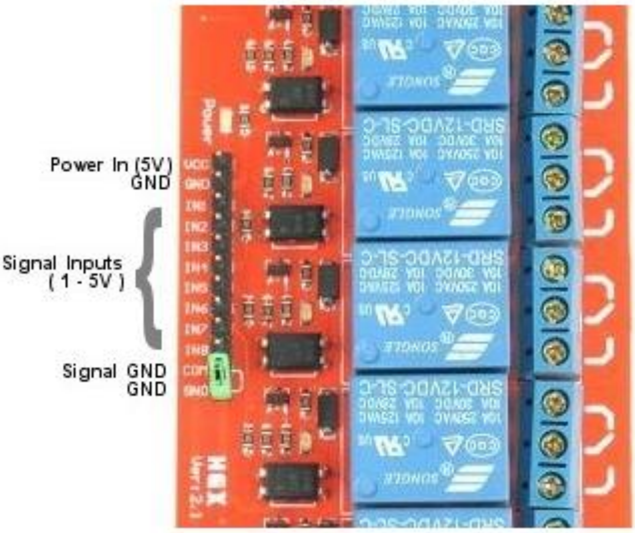
Fjernes kortslutningen kan man køre boardet på to helt separate strømforsyninger, hvilket giver max sikkerhed.

I så fald skal der forbindes en separat GND fra Arduinoen !!

Diagrammet for kortet er lidt i stil med dette, men det er ikke korrekt !!!



Her et andet billede. De 5 Volt skal dog bare være 12 Volt !!!



Hver relæ kan switche 10A/250V AC (DC 30V/10A).

Det kræver kun 1 Volt I styreindgang – min. 5 mA, men helt op til 5 Volt er OK. (selv 12 Volt er vist OK)
Derfor kan det styres af 3,3 Volt uC-er

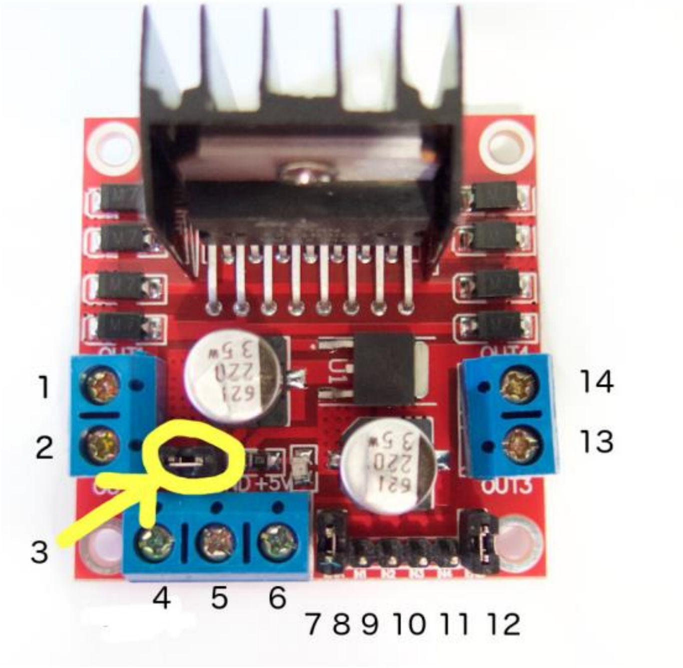
Hvis en styreindgang trækker for meget strøm, kan der vist sættes en modstand i serie . den monterede modstand er 1 K Ohm. Ekstra modstand kan vist virke fra 220 Ohm til 4,7 Kohm, - men så vil lysdioden i Optokobleren jo lyse svagere !!

Features

- 8 x 12V Relays
- Board Size: 14cm x 5.5cm
- Relay Rated: 10A / 250VAC / 30VDC
- Relay Draw Current: 30mA @ 12V
- Power Supply: 8V to 12V
- Fully Opto-Isolated Input Signals
- Input Signal Voltage: 1V to 12V
- Individual Indicator LEDS for Each Relay
- Power On LED Indicator
- Isolated Input GND
- 4 x M3 Mounting Holes
- Manufacturer: Keyes 8R1A
- Applying power the wrong way round will damage the board!

- The jumper acts as a shorting link which links the signal ground to the power ground. If you want full isolation for your microcontroller from potentially noisy relays, this link can be removed.

2 kanal L298N H-bro DC Motor Driver til Arduino



Printet burger en L298N IC, der er en dual H-Bro driver.

Der tilsluttes en motor til klemmerne 1 & 2, eller – og 13 & 14.

Motorerne kan være 12 Volts DC-motorer.

Der skal tilsluttes Power til motorerne på klemmerne 4, og 5.

Pin 4 er 12 Volt, og
Pin 5 er GND. Pin 5 skal også forbindes til Arduino GND for at få samme reference.

Hvis jumperen er sat i, (mærket med ”3”,) kan der tages 5 Volt ud af ben 6. Kan bruges til at drive arduinoen !!

Selve IC-ens logik arbejder på 5 Volt ligesom styresignalerne.

Boardet styres på pin 7 til 12.

Pin 8 og 9 styrer motoren sluttet til på connector 1 og 2.
Tilsvarende vil pin 10 og 11 styre en motor på connector 13 og 14.

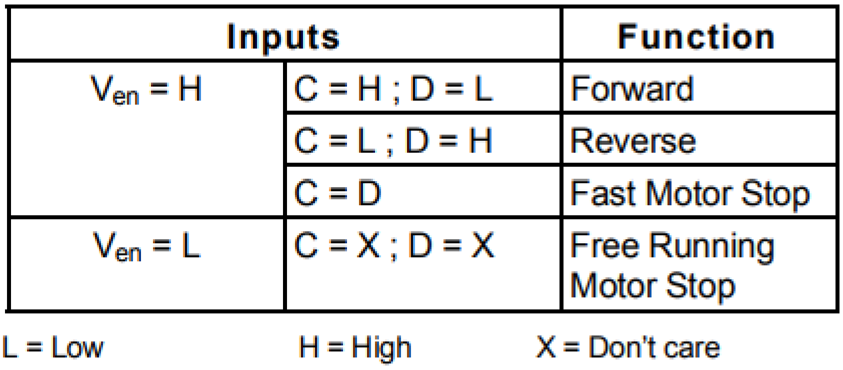
Pin 7 en enable input. Hvis jumperen er isat, er den forbundet direkte til + 5 Volt og således enablet.

Fjernes jumperen, skal der eksternt tilsluttes et enablesignal. Dette kan bruges til PWM af motoren !!)

Pin 8 & 9: In1 og In2.

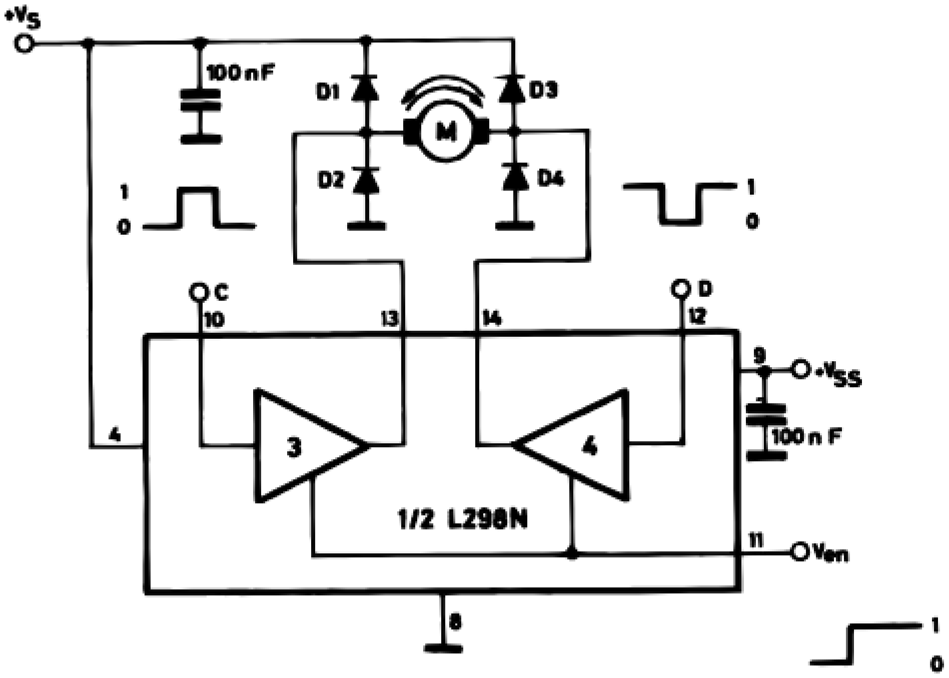
Venstre motor kører den ene vej ved at sætte In1 til Høj, og lav til In2. Skal motoren køre den anden vej, sættes Lav til In1 og Høj på In2

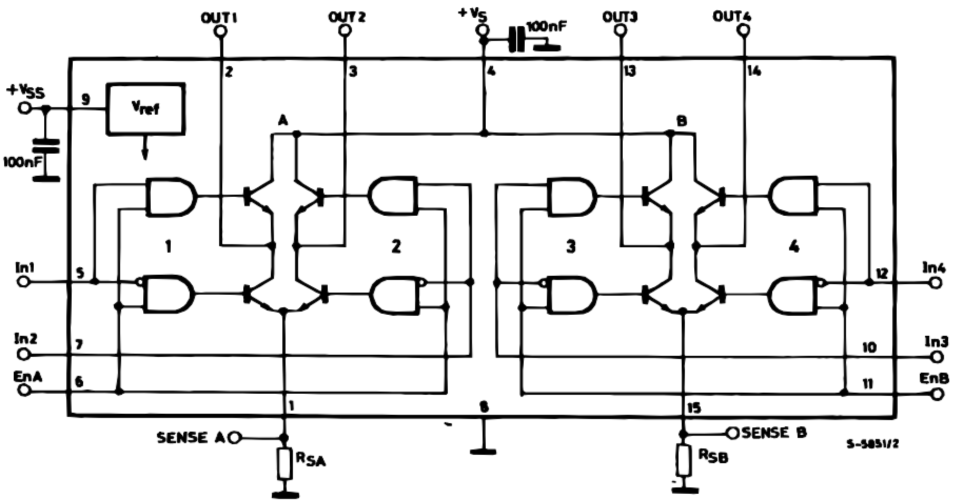
Skal forklares !!

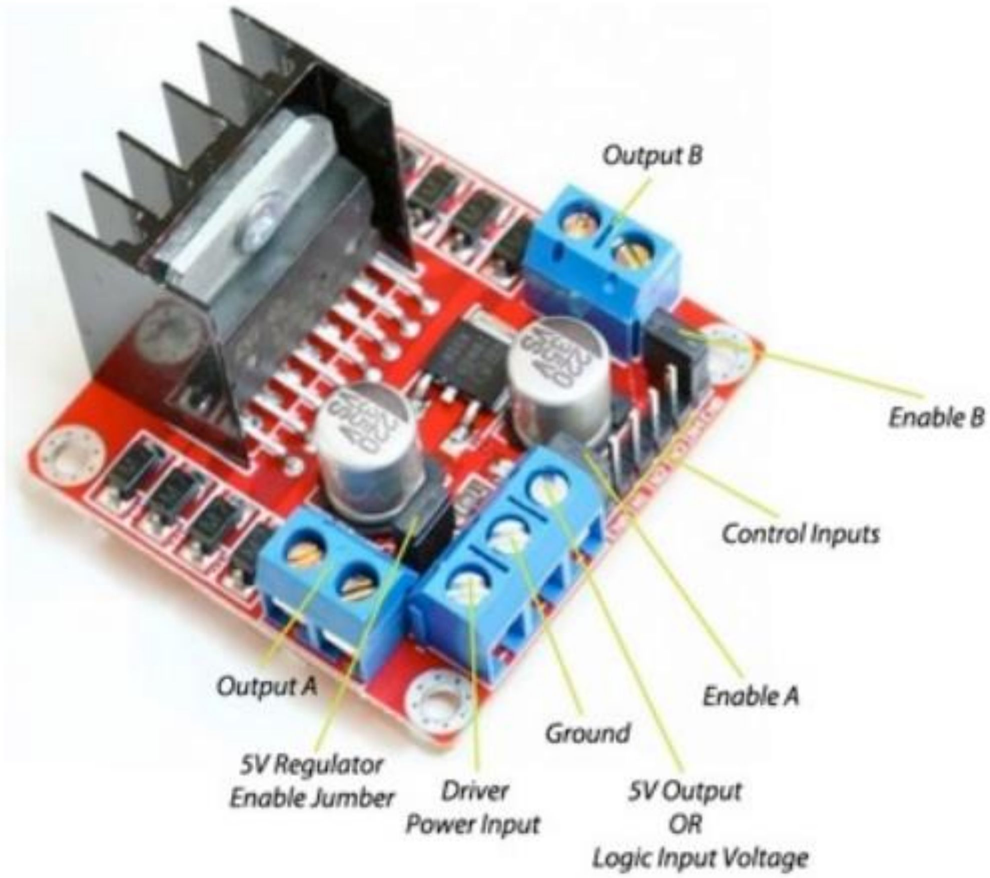


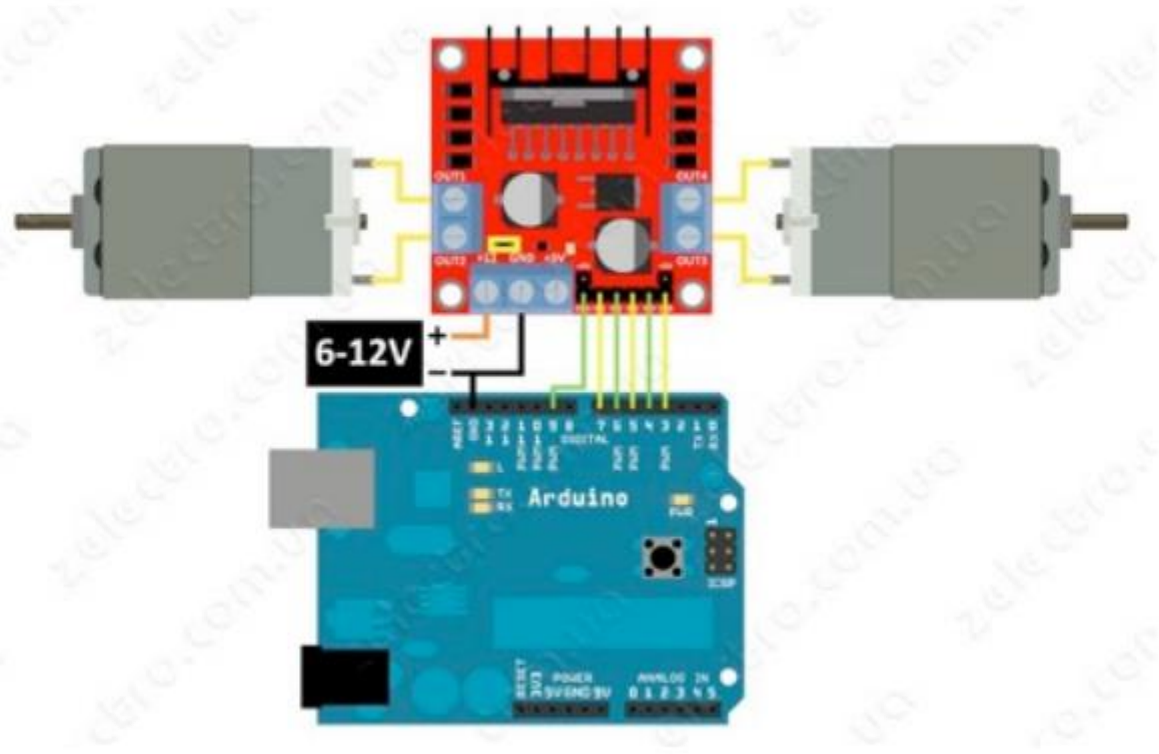
Inputs		Function
V_{en} = H	C = H ; D = L	Forward
	C = L ; D = H	Reverse
	C = D	Fast Motor Stop
V_{en} = L	C = X ; D = X	Free Running Motor Stop

L = Low H = High X = Don't care



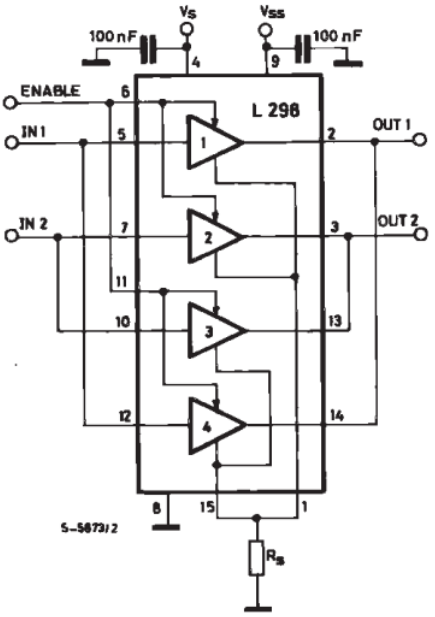



Output B
Enable B
Control Inputs
Enable A
Output A
5V Regulator
Enable Jumber
Driver
Power Input
Ground
5V Output
OR
Logic Input Voltage



Kilde: http://www.fut-electronics.com/wp-content/uploads/2015/11/L298_dual_motor_driver_module_2A_manual_and_arduino_tutorial.pdf

Skal kraftigere motorer drives, - kan de to halvdele af driveren sammenkobles:



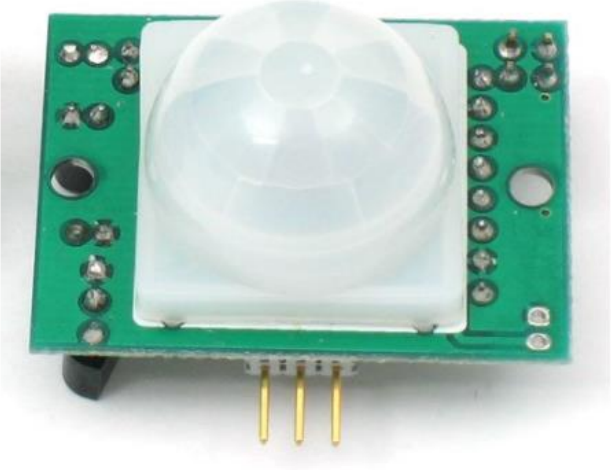
Tekniske detaljer:

- Logic voltage: 5V
- Drive voltage: 5-35V
- Logic Current 0-36mA
- Drive current: 2A (maks. single bridge)
- Maximum Power: 25W

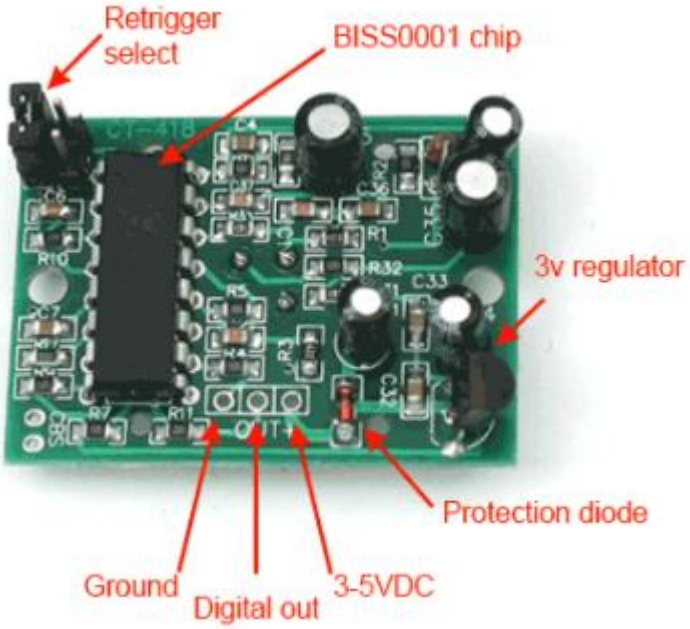
Anvendelseseksempler:

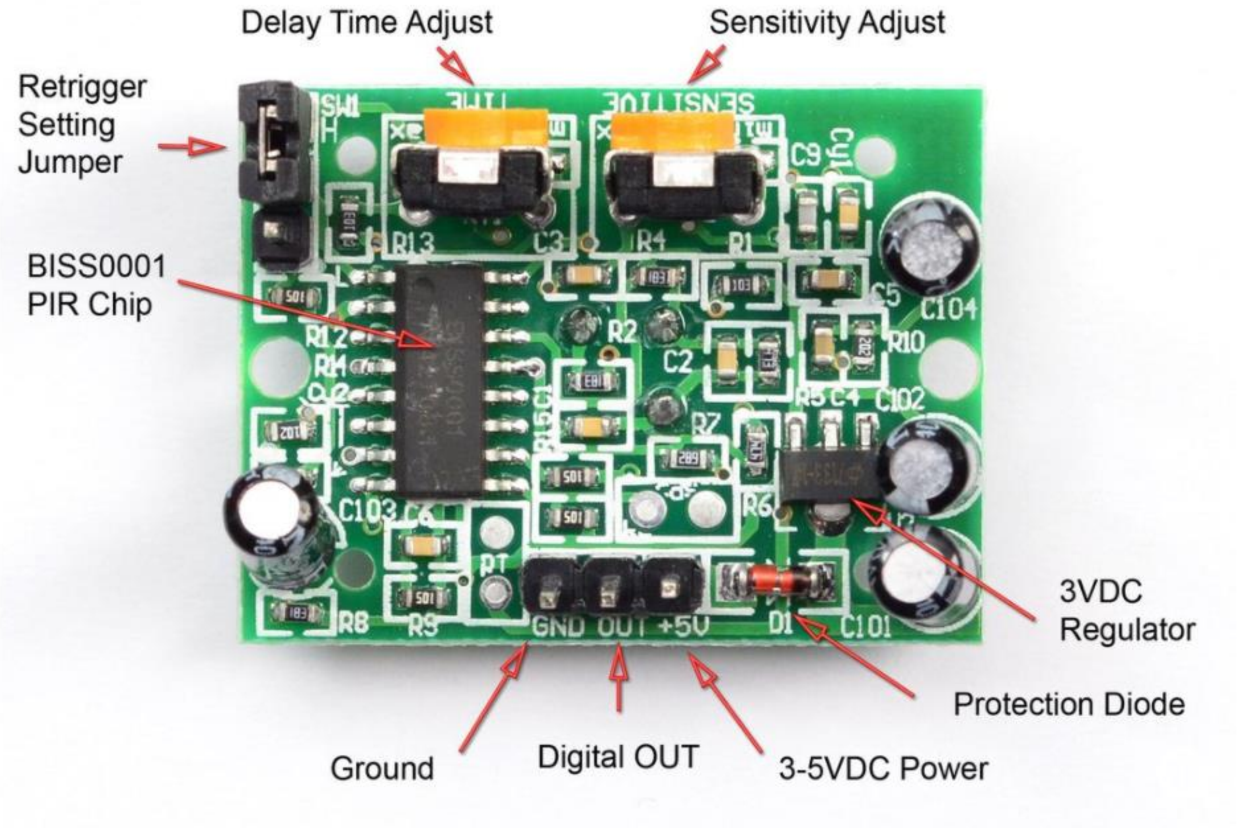
- 1: drive stepper motor. Drive ordinary 4-wire 2-phase motor connection.

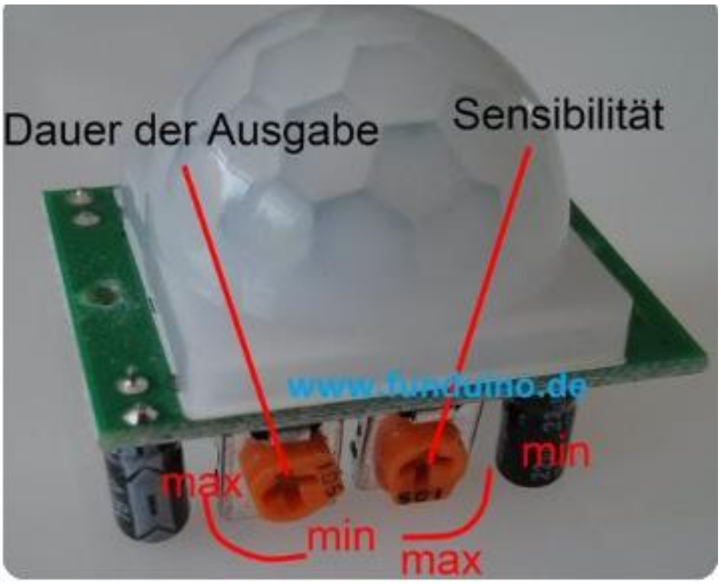
PIR:



Kilde: https://learn.adafruit.com/pir-passive-infrared-proximity-motion-sensor?view=all


Retrigger select
BISS0001 chip
3v regulator
Protection diode
Ground
Digital out
3-5VDC


Delay Time Adjust
Sensitivity Adjust
Retrigger Setting Jumper
BISS0001 PIR Chip
3VDC Regulator
Protection Diode
Ground
Digital OUT
3-5VDC Power
GND OUT +5V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Sensibilität
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