PROJECT BREADBOARD

GENERAL

Red bars on the bread board are for 5V power. Blue bars are for ground. Hard wires are used to join pins. On the project board, red wire is used to connect power, black wire is used to connect ground, green wire is for PWM, blue wire is for direction, yellow wire connects I/O, white wire is for communication and grey wire is for drives. To prevent shorts, there should be no bare wire showing where wire plugs into board. Join red bars with a red wire. Join blue bars with a black wire.

PIC CHIP

Connect pin 1 to 5V with a 4.9 KΩ resistor and to ground with a 1 µF tube capacitor. Connect pin 20 to 5V. Connect pin 19 to ground. Join pins 20 and 19 with a 0.1 µF flat capacitor. Connect pin 8 to ground. Connect clock to pins 9 and 10. Connect pins 9 and 10 to ground with 22 pF button capacitors. Connect sensor to pin 0 on PIC.

5V REGULATOR

The regulator has 3 pins. When looked at from the metal back, the right leg is connected to power, the middle leg is connected to ground and the left leg is the 5V output.

Connect the power leg to ground with a 0.33 µF capacitor. Connect the 5V leg to ground with a 0.1 µF capacitor.

RS232 CHIP

Connect pin 16 to 5V. Connect pin 15 to ground. Connect pins 15 and 16 with a 0.1 µF capacitor. Connect pin 13 to yellow plug wire and pin 14 to red plug wire. Connect black plug wire to ground. Connect pin 12 to pin 18 on PIC and pin 11 to pin 17 on PIC. Connect pins 1 and 3 with a 0.1 µF capacitor and pin 2 to 5V with a 0.1 µF capacitor and pin 6 to ground with a 0.1 µF capacitor. Connect pins 4 and 5 with a 0.1 µF capacitor.

DAC/EEPROM CHIPS

The SCL pins on the PIC and DAC and EEPROM chips must be connected. The SDA pins must also be connected. Each set of pins needs a 5V pull up 1KΩ resistor. The AD0 AD1 pins on the DAC are used to give it a name. One can put either 5V or ground on these pins. This gives 4 possible combinations. So the PIC can communicate with 4 different DACs. The AD0 AD1 AD2 pins on the EEPROM are used to give it a name. One can put either 5V or ground on these pins. This gives 8 possible combinations. So the PIC can communicate with 8 different EEPROMs.

H BRIDGE CHIP

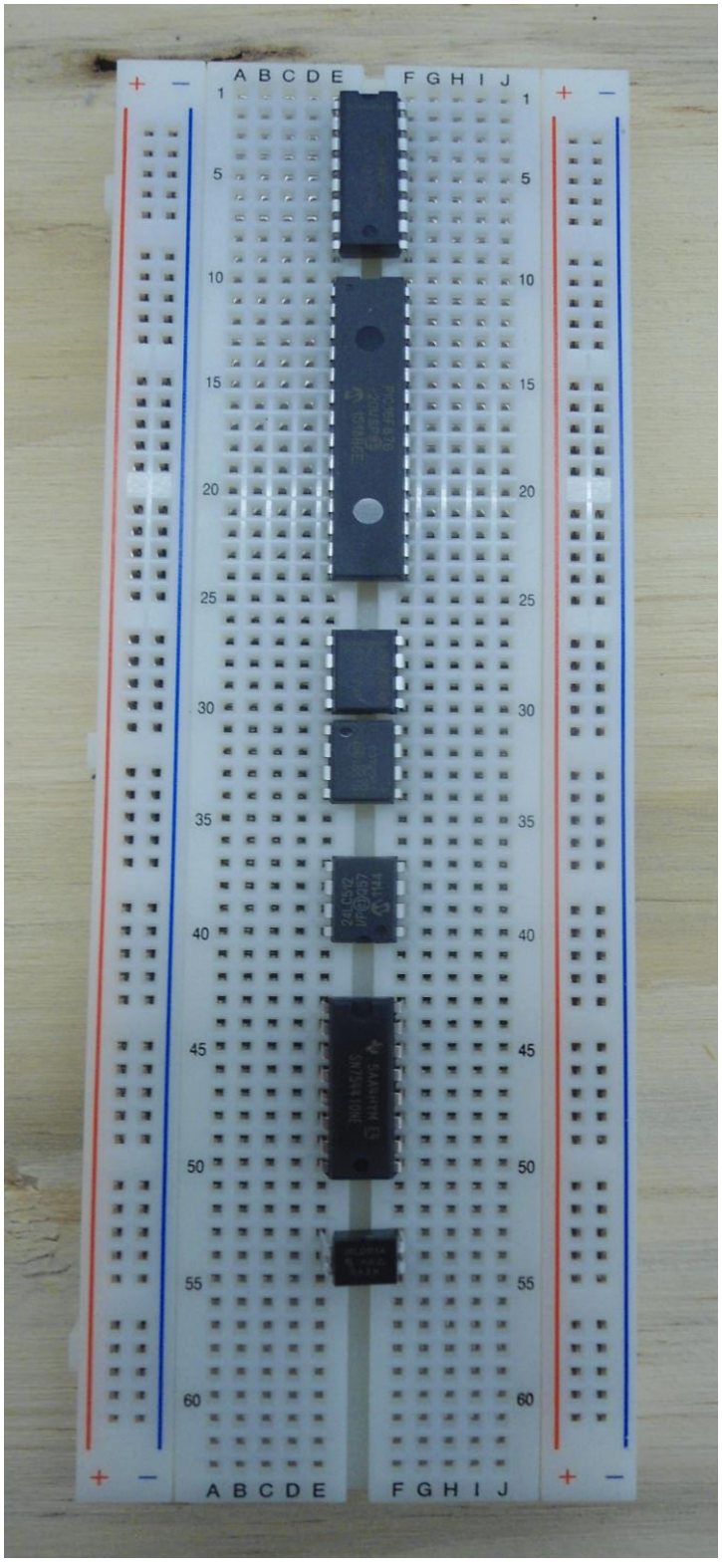
To drive DC motors connect enable pin 1 on the BRIDGE to PWM pin 13 on the PIC. Connect enable pin 9 on the BRIDGE to PWM pin 12 on the PIC. Connect pin 16 to 5V and to ground with a 0.1 µF flat capacitor. Connect pins 4 and 5 and pins 12 and 13 to ground. Connect pins 2 7 10 15 on the BRIDGE to pins 28 27 26 25 on the PIC. Connect pin 8 to the power supply. Connect pins 3 6 11 14 to motors. To drive stepper motors connect both enable pins to 5V.

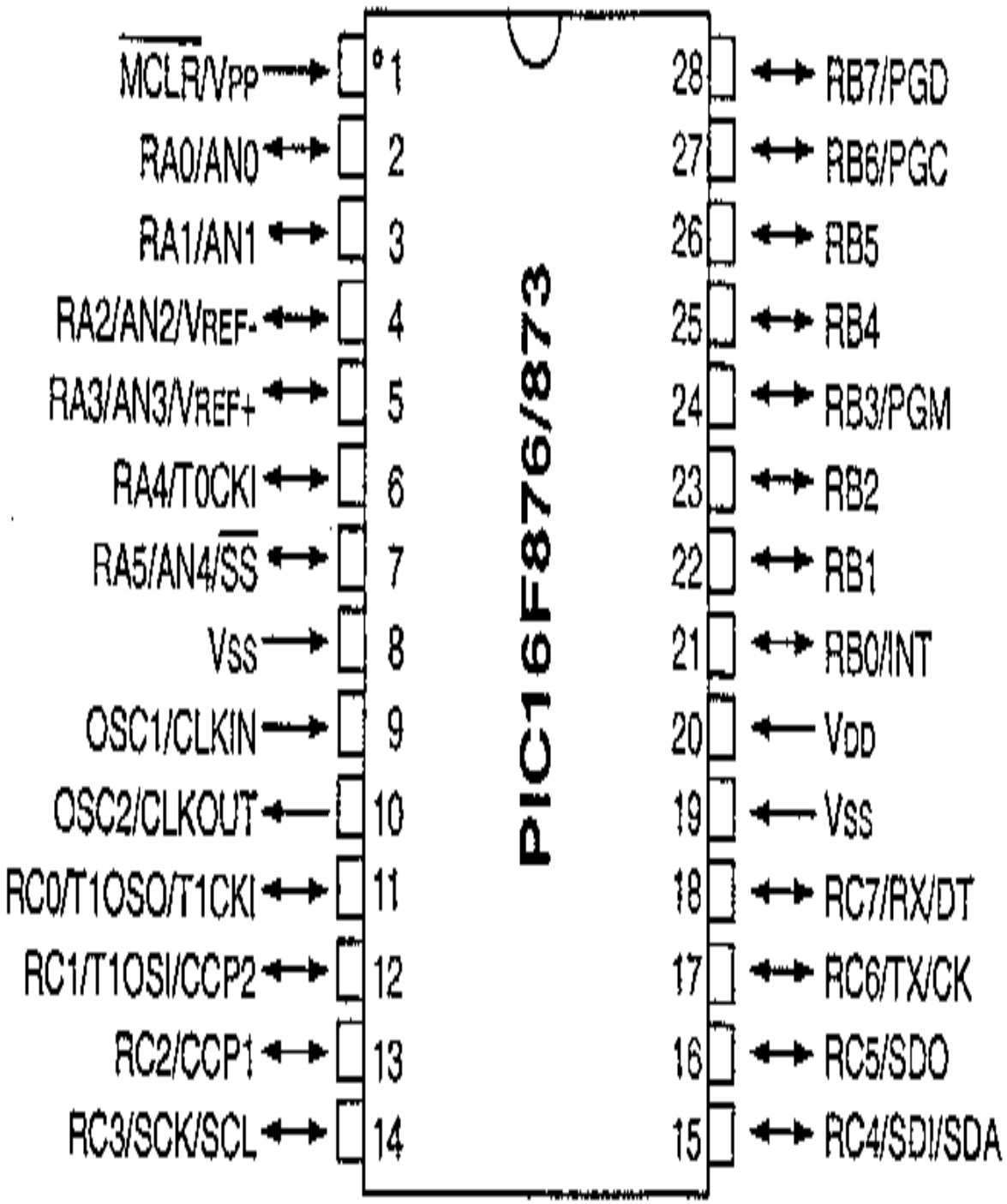
OP AMP CHIP

Connect pins 1 and 8 on the DAC to pins 6 and 7 on the OP AMP. Connect pin 5 on the OP AMP to ground with a 10 KΩ resistor. Connect pin 8 to ground with a 10 KΩ resistor. Connect pin 8 to pin 1 with a 10 KΩ resistor and pin 5 to pin 3 with a 10 KΩ resistor. Connect pin 2 to power. Connect pin 4 to ground. Connect pins 1 and 3 to drive.

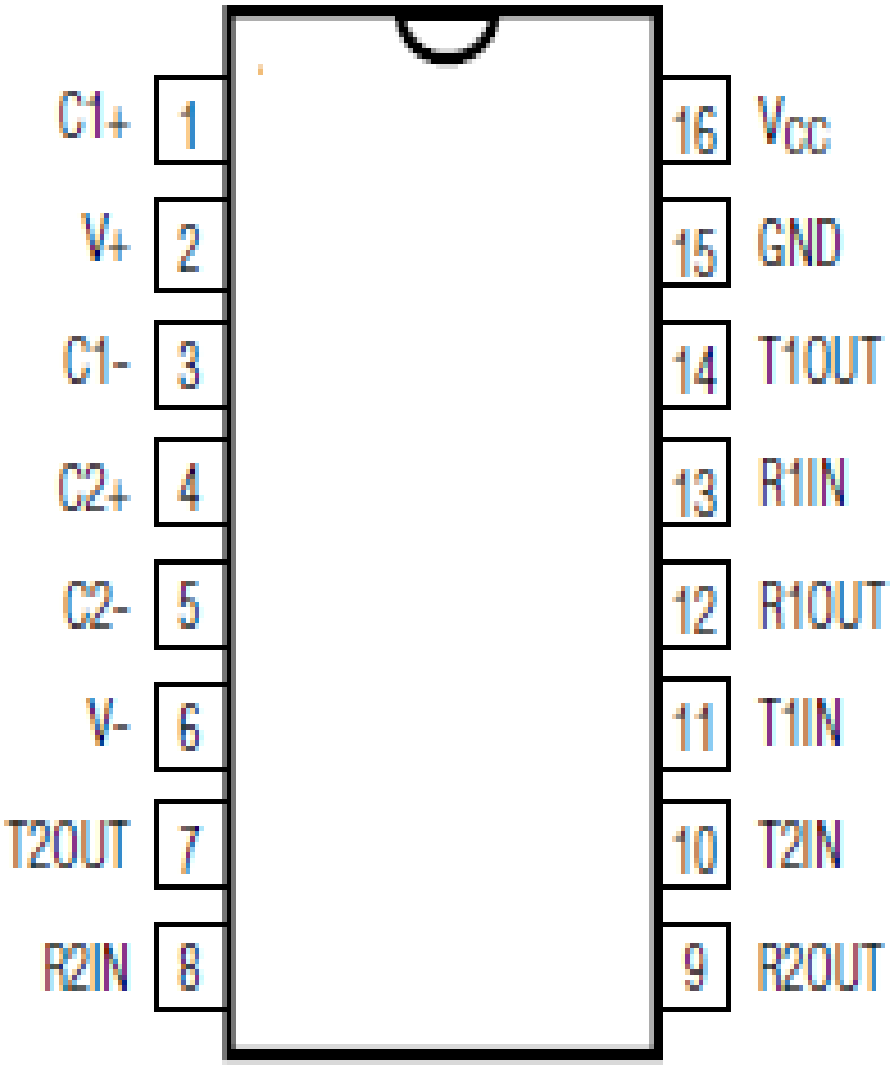
FET CHIP

Connect PWM pin 13 on the PIC to the gate pin on the FET. Connect one end the drive wire to the drain pin and the other end to power. Connect the source pin to ground.

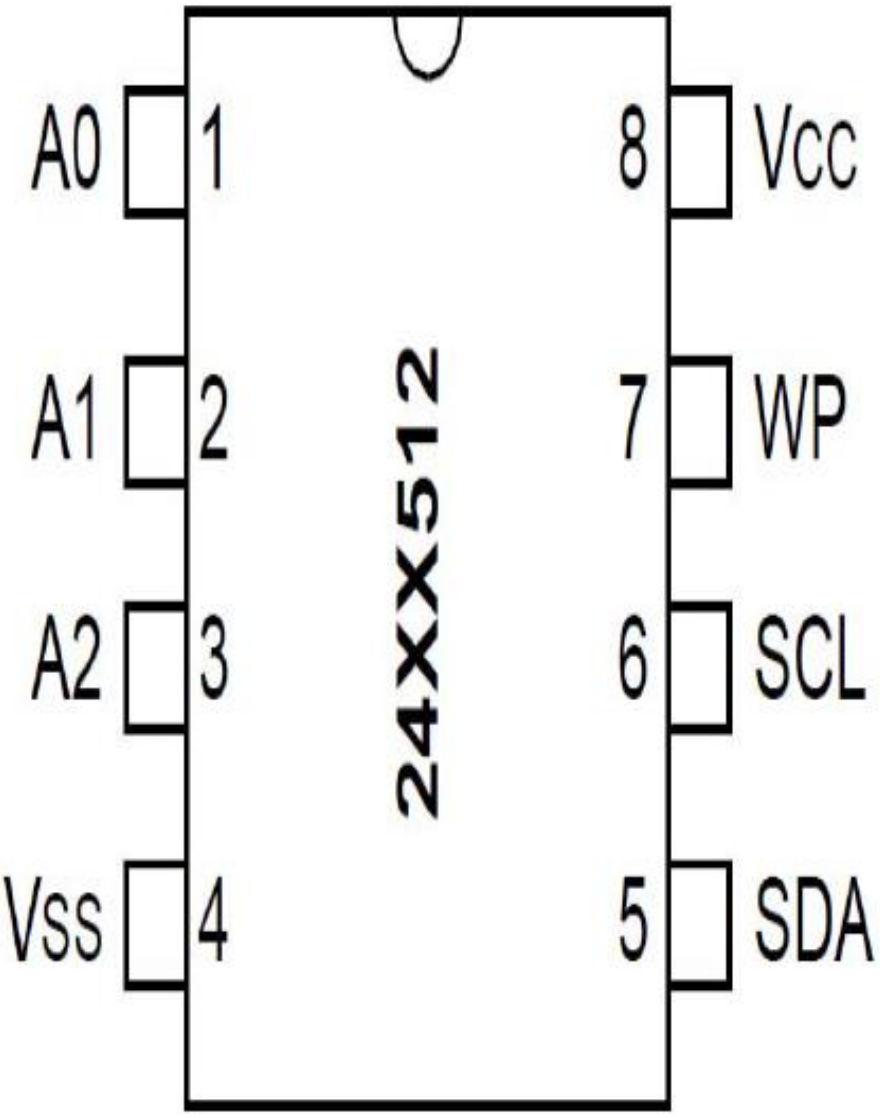

A B C D E
F G H I J
1
5
10
15
20
25
30
35
40
45
50
55
60


PIC16F876/873
MCLR/VPP 1
RA0/AN0 2
RA1/AN1 3
RA2/AN2/VREF- 4
RA3/AN3/VREF+ 5
RA4/T0CKI 6
RA5/AN4/SS 7
VSS 8
OSC1/CLKIN 9
OSC2/CLKOUT 10
RC0/T1OSO/T1CKI 11
RC1/T1OSI/CCP2 12
RC2/CCP1 13
RC3/SCK/SCL 14
28 RB7/PGD
27 RB6/PGC
26 RB5
25 RB4
24 RB3/PGM
23 RB2
22 RB1
21 RB0/INT
20 VDD
19 VSS
18 RC7/RX/DT
17 RC6/TX/CK
16 RC5/SDO
15 RC4/SDI/SDA

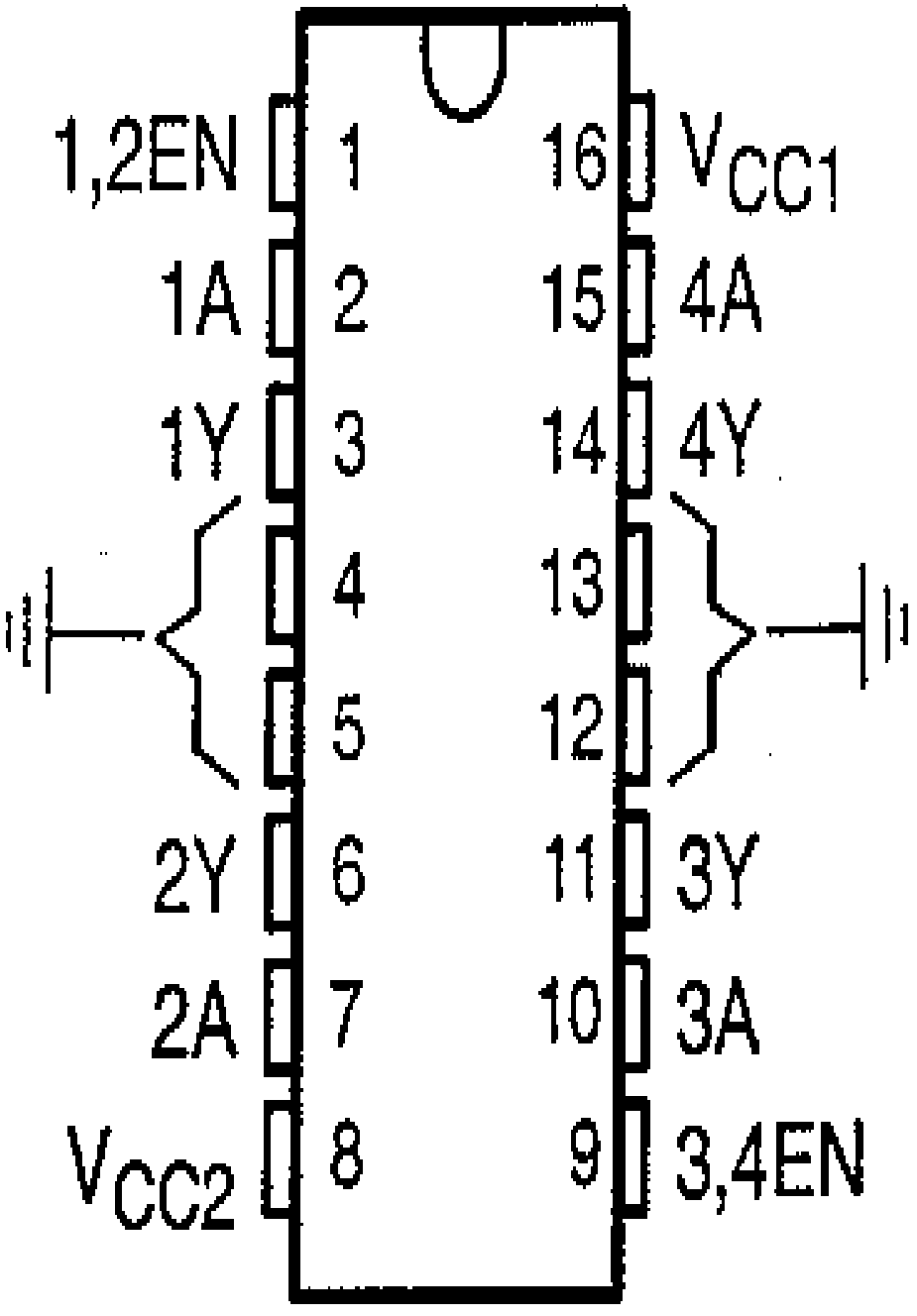
PIC


C1+
1
V+
2
C1-
3
C2+
4
C2-
5
V-
6
T2OUT
7
R2IN
8
16
VCC
15
GND
14
T1OUT
13
R1IN
12
R1OUT
11
T1IN
10
T2IN
9
R2OUT

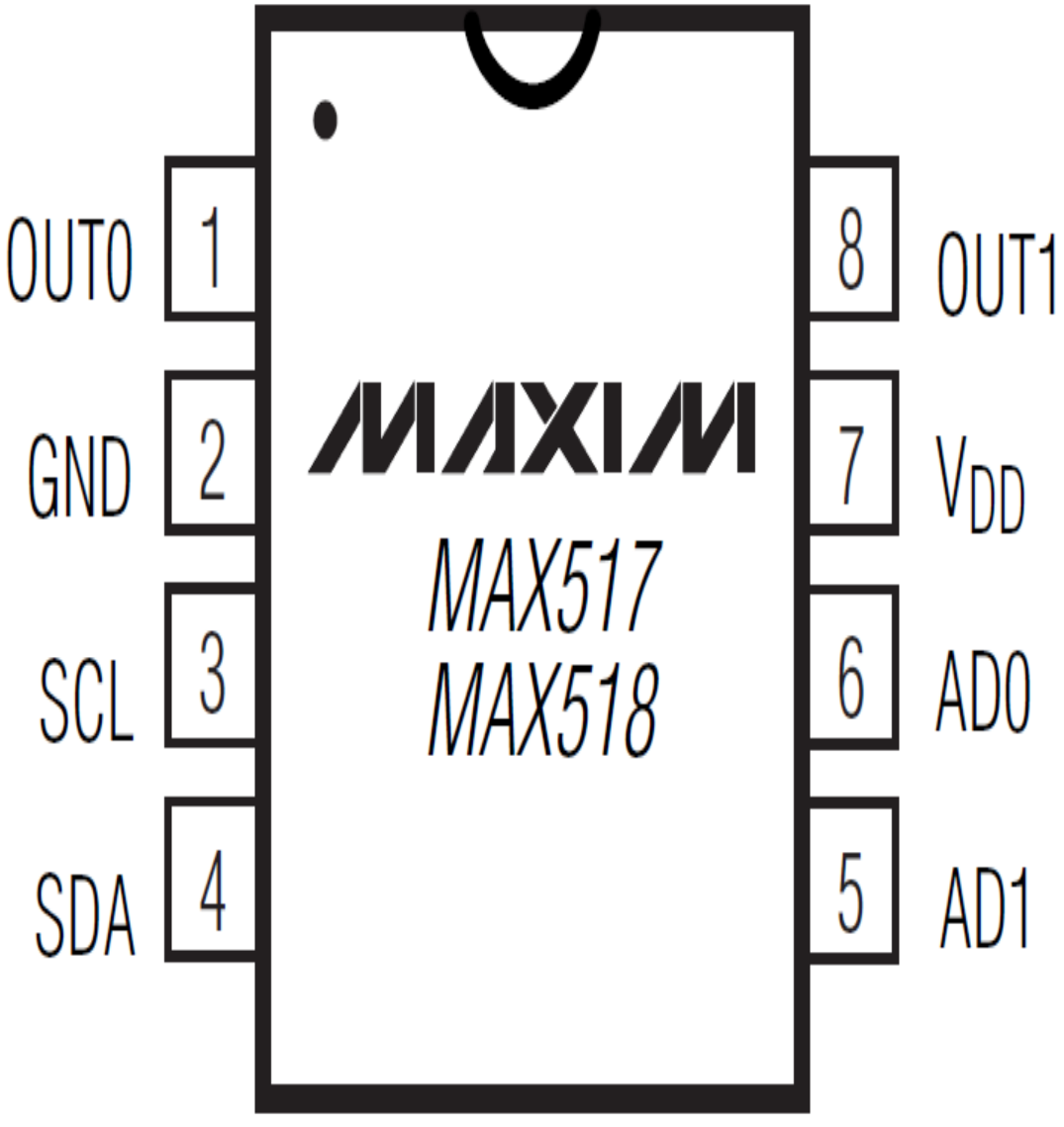
RS232 CHIP



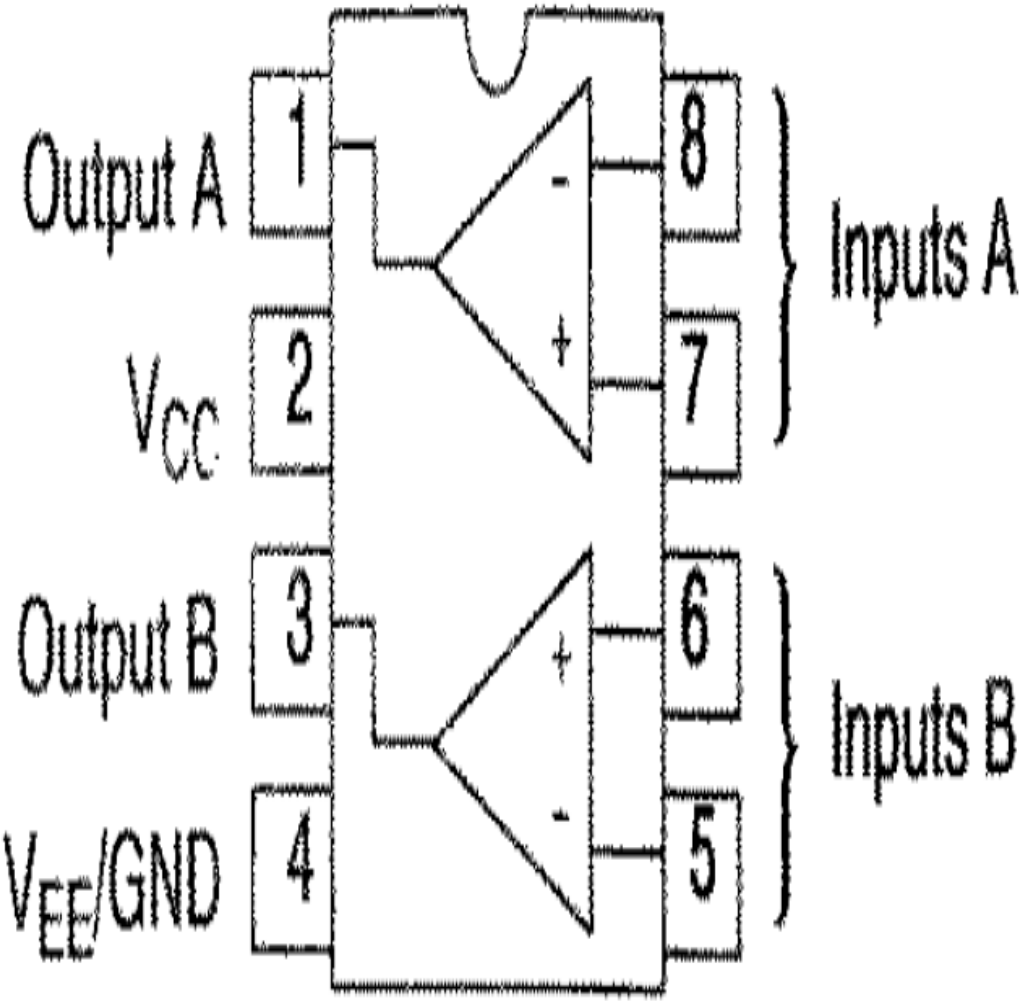
EEPROM


1,2EN
1
16
V_{CC1}
1A
2
15
4A
1Y
3
14
4Y
4
13
5
12
2Y
6
11
3Y
2A
7
10
3A
V_{CC2}
8
9
3,4EN

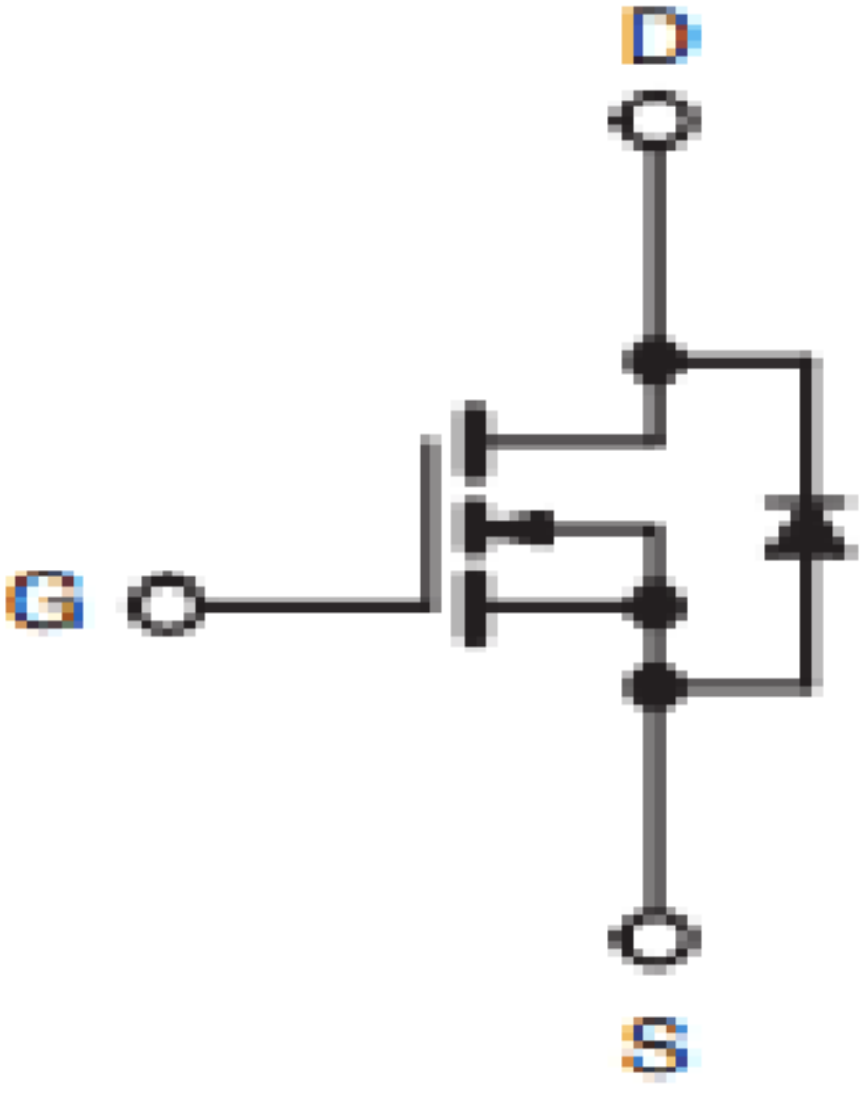
BRIDGE


OUT0
1
GND
2
SCL
3
SDA
4
8
OUT1
7
VDD
6
AD0
5
AD1
MAXIM
MAX517
MAX518

DAC

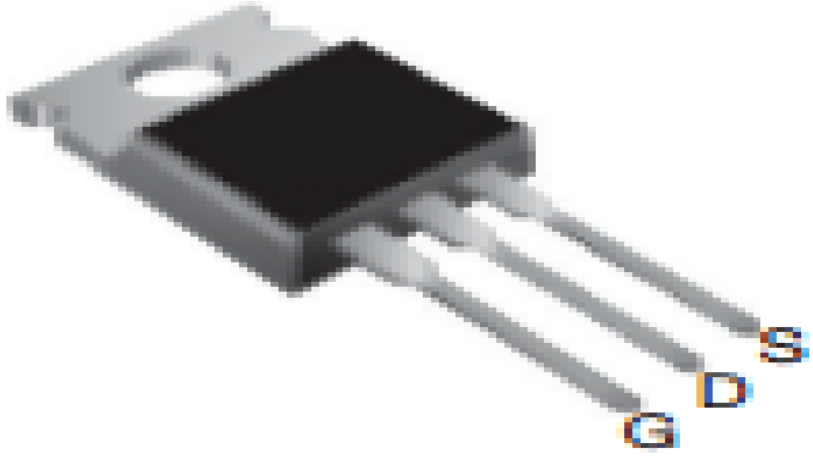


OP AMP



LOGIC LEVEL FET

TO-220AB



HVMDIP