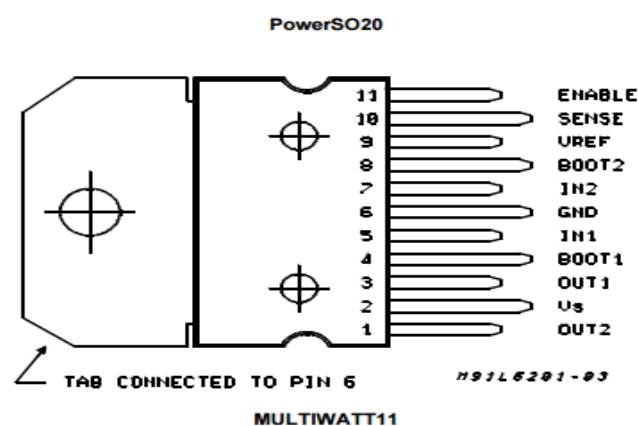


Configuration of TRF-A10 board

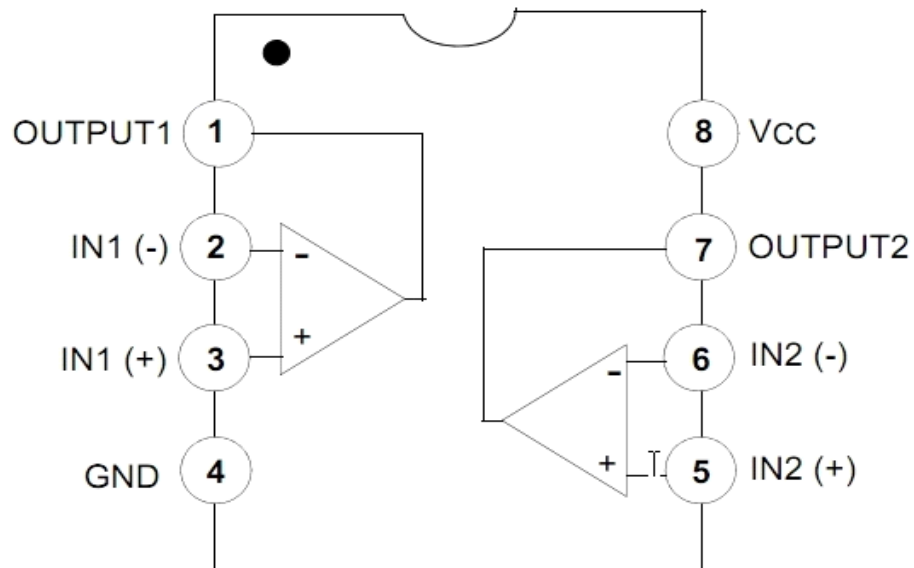
- The board consists of three terminal blocks namely X1, X2 and X3.
- X1 has three pins. 1st pin and 2nd pin are connected to 24V and 0V respectively. It is used as source for motor driver IC L6203.
- The terminal block X2 consist of six pins. 24V from PLC are given to 1st pin and 3rd pin of X2 for Right side motor to sink and right motor to lift respectively. Similarly, X3 is used for left side motor to sink and lift respectively.
- The right side motor is connected between 5th and 6th pin of X2. similarly, left side motor is connected to 5 and 6 pins of X3.

Components used

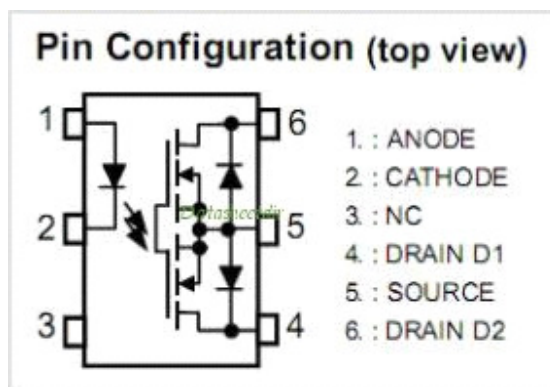
- L6203 - Motor driver IC (DMOS full bridge driver)



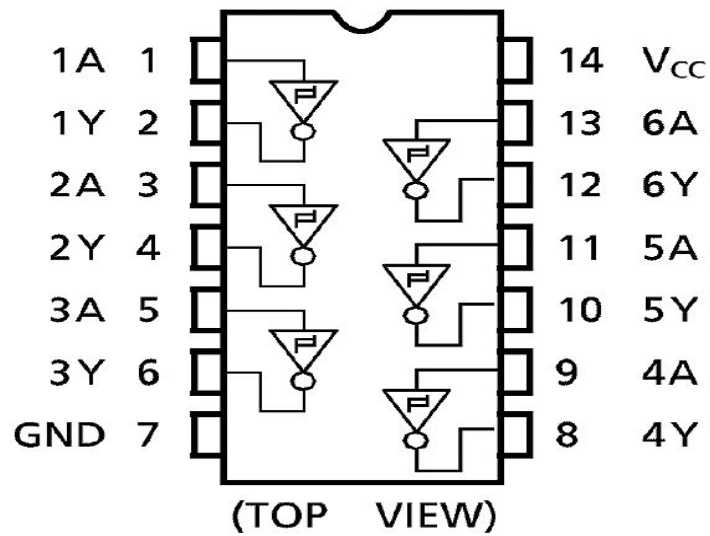
- LM393- Comparator



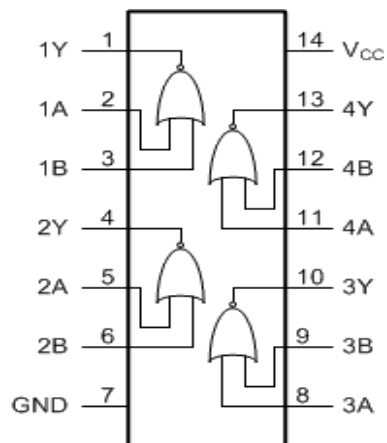
- TLP 598GA - photovoltaic relay/optocoupler



- SN74HC14N- HEX Schmitt trigger inverter



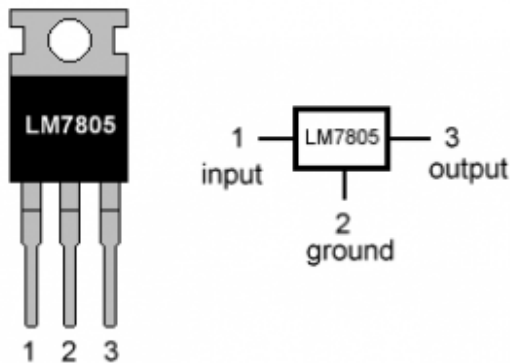
- SN74HC02N- Quadruple 2-I/P +ve NOR gates



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- 7805- voltage regulator

LM7805 PINOUT DIAGRAM



Detailed Working

- This board is used for NGR to NTR transfer height adjustment.
- In the schematics mentioned above, we have drawn only one half of the board i.e left side adjustment. Similarly right side adjustment is done except using terminal block X2 instead of X3.
- The following are list of colours used to representing various IC's pins

Blue - L6203

Green - SN74HC14N

Red -SN74HC02N

Violet - TLP598

Brown - X3 terminal block.

- **TEST CASE - Now considering only one input (left to sink) i.e 24V from PLC given to X3 pin 1. so X3 pin 3 (left to lift) will be at LOGIC 0.**
- **The inputs needed for driving the motor are**
 - a. Motor direction input(pin 5 or pin 7)**
 - b. Enable set (Pin 11)**
 - c. Power (pin 2)**
- X3 pin 1 is connected to pin 5 (input of schmitt trigger) of SN74HC14N. so pin 5 is LOGIC 1 and its output pin 6 is LOGIC 0 (since inverting is done).
- Pin 6 is connected to pin 9(input) so LOGIC 0. Pin 8 (output) is LOGIC 1.
- Pin 8 of SN74HC14N is connected to pin 5 of L6203.(LOGIC 1) i.e one input for rotating motor in one(say clockwise) direction. same pin 8 is connected to pin 11(A input) of SN74HC02N i.e LOGIC 1. **so in this step pin 5 is LOGIC 1. so one direction.**
- X3 pin 3 is connected to pin 3 (input of schmitt trigger) of SN74HC14N. so pin 3 is LOGIC 0 and its output pin 4 is LOGIC 1 (since inverting is done).
- Pin 4 is connected to pin 11(input) so LOGIC 1. Pin 10 (output) is LOGIC 0.
- Pin 10 of SN74HC14N is connected to pin 7 of L6203. (LOGIC 0) i.e one input for rotating motor in one(say anti-

clockwise) direction. same **pin 10** is connected to **pin 12**(B input) of SN74HC02N i.e LOGIC 0. **In this step pin 7 is LOGIC 0. so reverse direction not possible at this instant.**

- Now **pin 11**(A Input) and **pin 12**(B input) of SN74HC02N are at LOGIC 1 and 0 respectively. so output **pin 13** is LOGIC 0 (since it is NOR gate). **pin 13** is connected to **pin 2** (A input) and **pin 5**. so LOGIC 0.
- **Pin 6** is at Logic 0. So **pin 5** and **6** (A & B Input). so **pin 4** is LOGIC 1. this **pin 4** of SN74HC02N is connected to **11th pin** (enable) of L6203. **In this step pin 11 is LOGIC 1. so driver IC is enabled.**
- **Pin 6** is connected to **pin 8**. so LOGIC 0. **pin 9** is connected to **pin 10** of L6203 i.e voltage sense which is normally zero if current doesnot exceed. So **pin 8 and pin 9** (A and B input) are at zero. **Pin 10** of SN74HC02N will be at LOGIC 1. **pin 10** connected to **pin 3** (B input). so same LOGIC 1.
- In the above step **pin 2 and pin 3** (A and B input) are in LOGIC 0 and LOGIC 1. so **Pin 1** will be at LOGIC 0. It is connected to **pin 1** of SN74HC14N. So its output **pin 2** is at LOGIC 1.
- **Pin 2** of SN74HC14N is connected to **pin 2** of optocoupler as triggering input. so the load connected to the **pin 4 and 6** of optocoupler is closed. here L6203 is the load connected. so 24V is connected to **Pin 2** of L6203. **So in this step power(pin 2 = LOGIC 1) for L6203 is given.**
- Hence all the factors for driving the motor are satisfied. Motor out put is obtained from **Pin 1 and Pin 3** of L6203

through **Pin 5 and 6** of X3. **Thus rotating the left side motor in one direction.**

- Similarly, other direction is done by providing 24V supply from PLC to **pin 3** of X3.
- Similarly, other half of the board i.e right side motor lifting and sinking works through inputs and outputs given to terminal block X2.

APPLICATIONS

This same board is used at several places in trimmer namely,

1. Impeller copy struting device AM1
2. Impeller copy struting device AM2
3. Impeller copy struting device AM3
4. Impeller copy struting device AM4
5. Impeller copy struting device AM5
6. Impeller Infeed aligning AM9
7. Trimmer system size adjustment width AM 11 (Head cut and Foot cut)
8. Transfer height adjustment A10
9. NTR feeding height adjustment .IN AM1
10. Delivery chain displacement drive. AM21.

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