12 – 24 Volt DC H-Bridge Driver For Square-Wave AC Output

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This document describes a solid state driver that will provide an adjustable square wave inverting supply. It is capable of running from around 6Volts to 25Volts DC and 10A.

There are no secrets and the parts are freely available from EBay and other outlets.

Please read this through fully before starting… it is essential that the DC-DC Buck module is set to 5V DC output. Failure to do this will blow up the H-Bridge 5 volt primary side.

You will need:

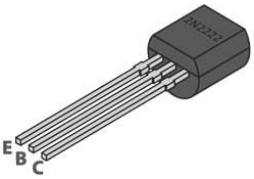
1. LM358 Square wave signal module
2. BTS7960 43A H-Bridge
3. DC-DC Buck Step Down Converter Module LM2596 Voltage Regulator

Figure 1 - LM358 Square Wave Module

Figure 2 - BTS7960 43A H-Bridge

Figure 3 - DC-DC Buck Step Down Converter Module

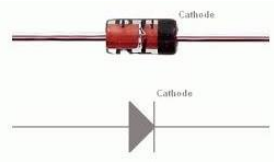
4. General purpose NPN signal transistor (e.g. 2N2222 or equivalent)



5. 10K resistor 1/8th watt (Colours: Brown, Black, Orange)

6. 1K resistor 1/8th watt (Colours: Brown, Black, Red)

7. Two small signal diodes (1N4148, BAV21, 1N914 etc… any general small signal type)



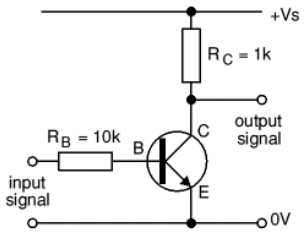
What we are going to do:

The H Bridge needs three things:

- 5 volt supply to run the logic switching functions
- 5 volt (TTL) signal to switch the two channels
- 5 volt (TTL) signal to enable the two channels of the H-Bridge
- 12 – 24 volt supply which will be switched every 5 seconds to the ACE cell.

We are going to attach the two small signal diodes to the underside of the H-Bridge board to provide a 5 volt (TTL) level signal to enable the board. More to follow later on this

The LM358 Square Wave Module will provide a TTL +5Volt -5Volt square wave signal to drive the H Bridge logic. The module only provides one side of the logic signal so we need to invert the output to provide the second side of the signal. We do this by adding a simple Logic inverter made with a single transistor and two resistors.



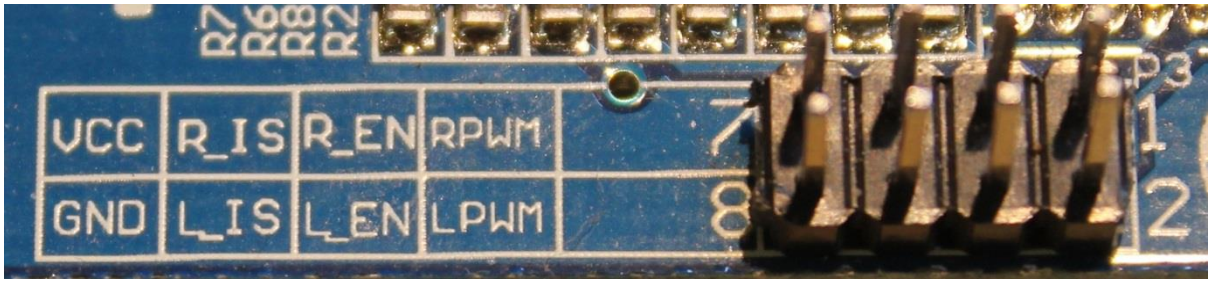
The DC DC Buck Step Down Converter is going to provide us with a stable 5Volt supply for the LM358 Square Wave module and provide a stable 5 volt supply for the primary side of the H-Bridge. The Buck Converter is a fantastic little device:

- Input voltage: 3-40V
- Output voltage: 1.5-35V (adjustable)
- Output current: Rated current is 2A

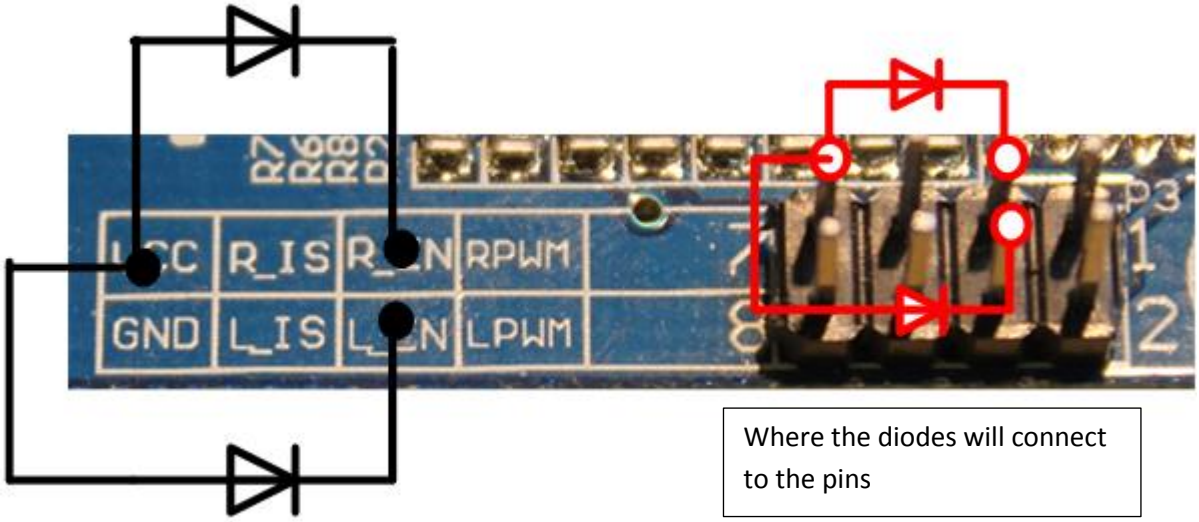
Before using this module attach a suitable power supply to the INPUT and ***set the OUTPUT to 5 volts***

Step 1. Attach Diodes to H-Bridge

There are several ways of doing this but basically we need to tap off a signal from the 5 volt VCC pin of the H_Bridge to each of the "R_EN" and "L_EN" pins via two diodes.

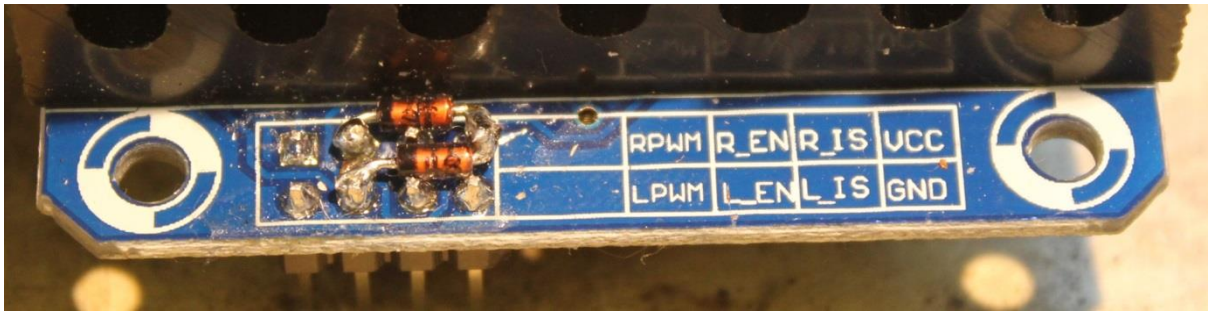


The connections will look like this:



Where the diodes will connect to the pins

Practically… and only if you are really carful you can solder the two small signal diodes onto the underside like this:



It makes for a more compact set-up.

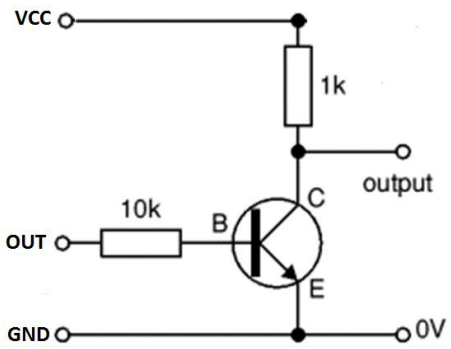
Step 2. Attach Logic Inverter to LM358 Module

We need to make a simple one transistor inverter circuit. It will basically provide a ground level (0 Volts) signal to one side of the H-Bridge while the other side is driven HIGH (+5Volts) and then the inverse as the module cycles every 5 or so seconds.

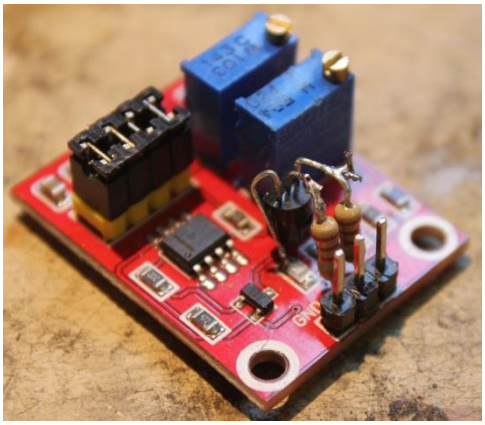
The LM358 module has 3 pins:
VCC
GND
OUT

Take care because these may sometimes be in a different layout according to the supplier/manufacturer. Be aware of which is the OUT, GND and VCC on your module.

Connect the transistor and two diodes to the three output pins as detailed below:

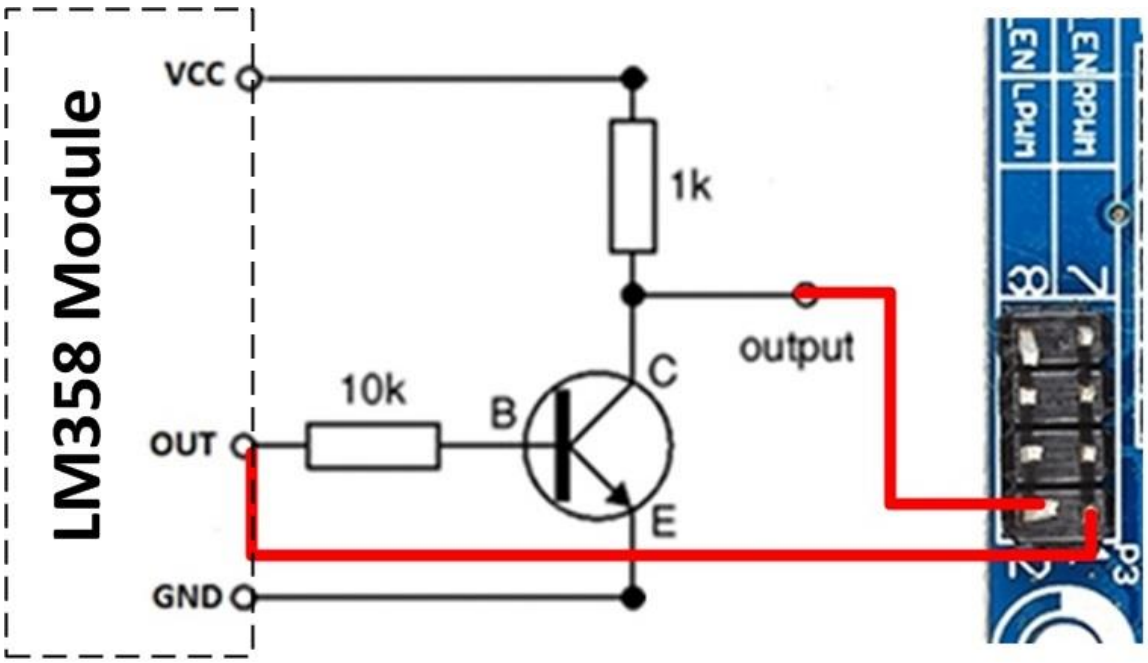


Practically, and again if you take care, you can mount the transistor onto the LM358 board like so:



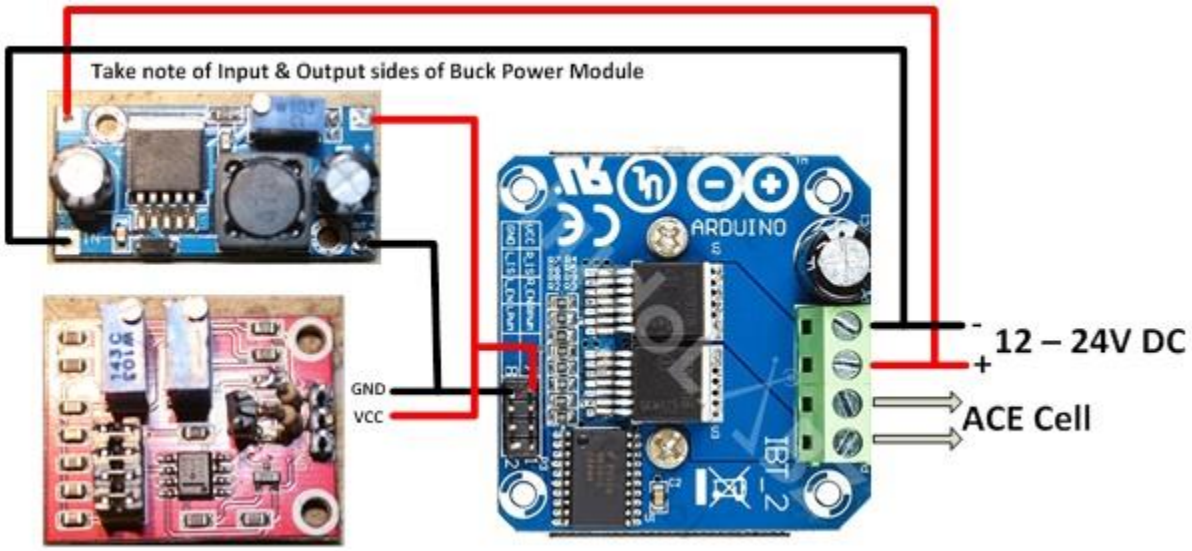
The Emitter of the transistor could be connected to the Ground connection next to the on-board LED or connected just back to the GND pin. It does not matter… just take care.

Step 3. Connect LM358 Module and Inverter to H-Bridge:



- Wire the OUT pin of the LM358 Module to PIN1 of the H-Bridge
- Wire the OUTPUT of the Inverter to PIN2 of the H-Bridge

Step 4. Connect DC-DC Buck Step Down Converter to LM358 Module and H-Bridge:



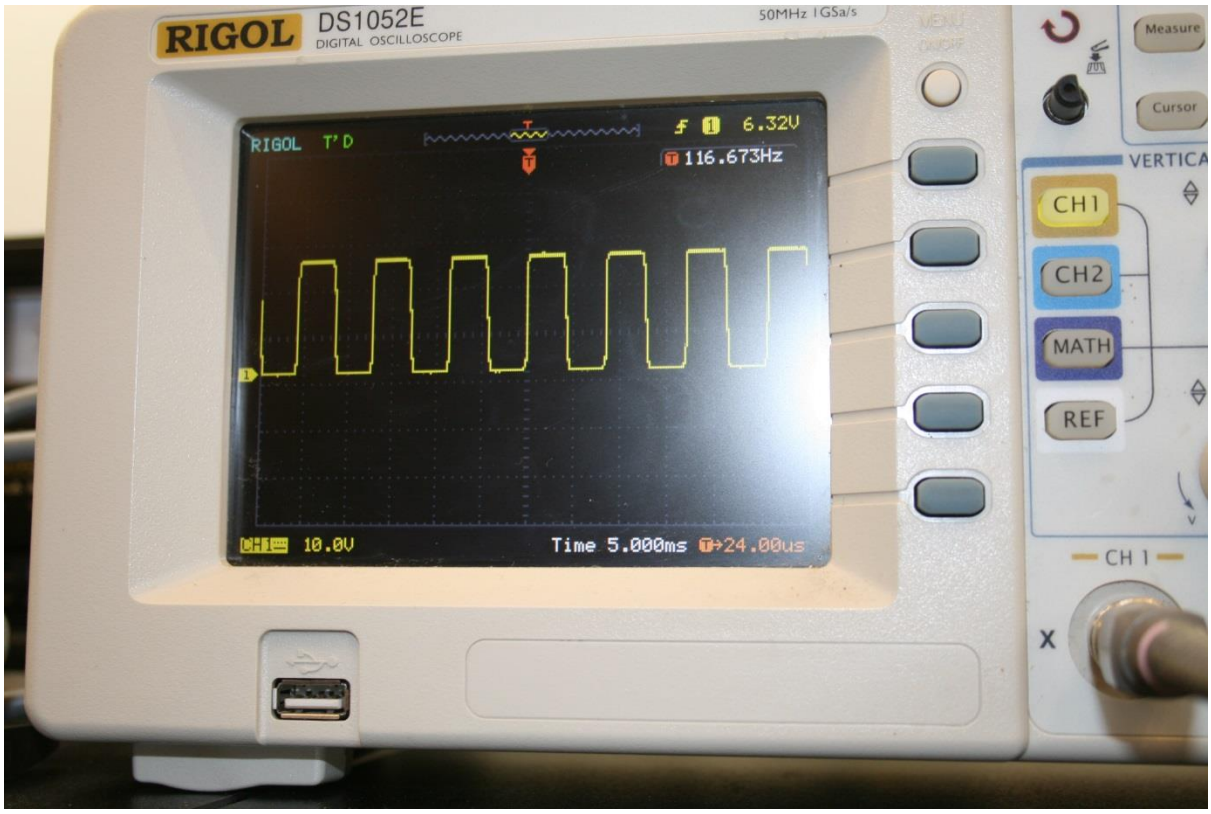
Note- in the illustration above 'ACE Cell' means your LENR System.

Step 5. Adjust the timing of LM358 module:

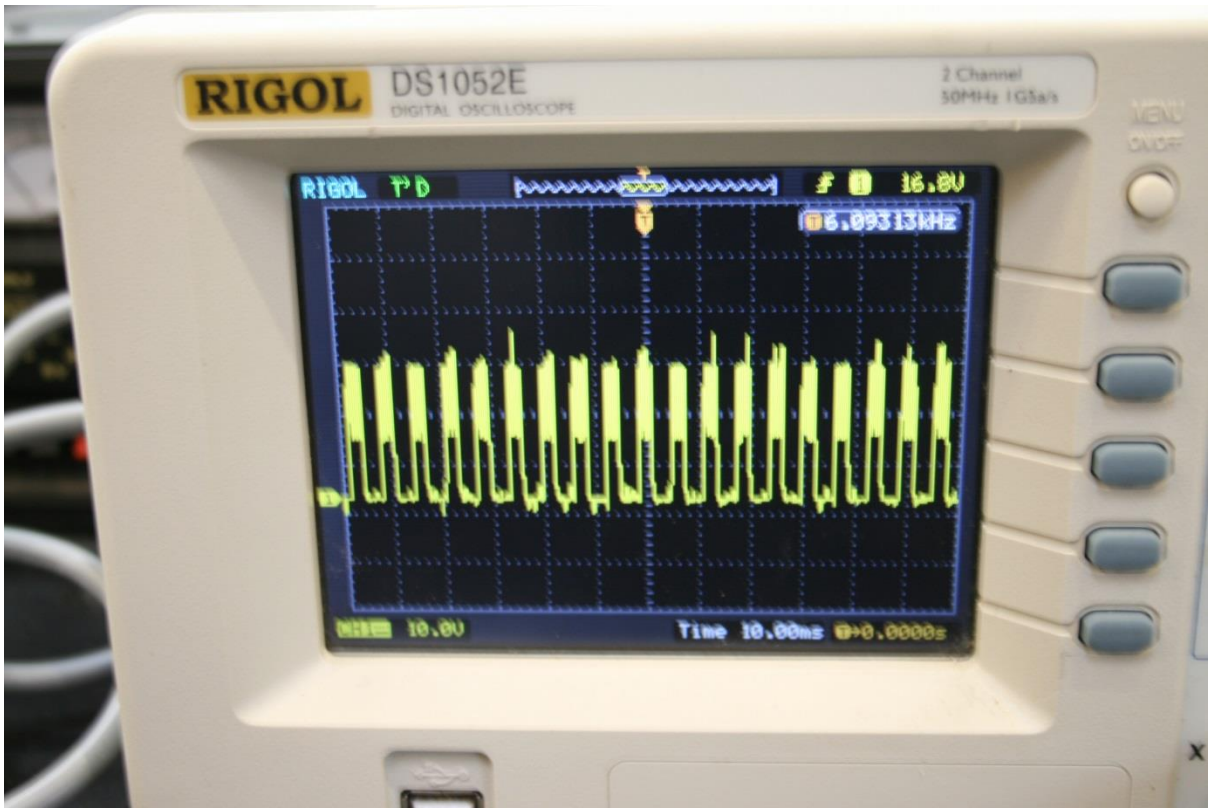
The LM358 module has two trimmers. One will be the frequency and the other will be the duty cycle (or mark:space ratio). Make sure the module has all 4 jumpers inserted and use the on-board LED to gauge the frequency of the output. You could connect a couple of back to back LEDs (and limiting resistors) across the output of the H-Bridge and use these as a visual guide to the frequency and mark:space ratio.

If you are lucky enough to have an oscilloscope then this can be used to set the output parameters accurately.

Using a scope, the output should look like this shot at 116 Hz :-



Or noisier like this one at 6KHz.



Have Fun! We want to share the knowledge!