Getting Started

Initial power connection and test.

Connect the module to a suitable supply (12-32v with the Vin terminal to positive and Gnd to negative.

A keypad can be attached and will allow you to check the functionality and familiarise yourself with the operation (refer to the manual on my website).
There's no need to connect a stepper driver/motor at this point.

Apply power and the unit will power up; the screen should illuminate and momentarily display the welcome screen and then query for the profile.
The profile defaults to '1', simply press [G] to accept this and go to the main menu.
(If you only intend to have one profile you can remove this step in Setup)

Keypad.

An 8 pin header is provided which will plug directly to the keypad.

If you are using the keypad I provide the orientation is correct with the wire coming out of the top of the keypad.

If you're using an alternative keypad then please consult the manual for details on configuring it.

Using the controller, a Quick Guide

[G] behaves like an enter key, pressing it will enter the currently displayed value.

[C] behaves like a cancel or back button. Pressing it will reset a value you were changing or take you back to the previous screen.
If you're lost just keep pressing [C] until you get back to the main menu.

[<] and [>] rotate the table CCW and CW in the various division modes.
When editing numbers they behave like cursor keys allowing you to move back and forth along it to change an individual digit.

[STOP] is an 'emergency' stop.

[Speed] cycles through the 5 speeds (1=low, 5 = high) – but only when the table is stopped.

Whilst on the main menu press the required number key to enter the required mode.

Separating the display from the controller.

The LCD is connected to the PCB using a header and socket allowing them to be separated for ease of fitting into a case.
Once separated the LCD can be attached to the front panel using the provided screws and the controller PCB bolted back on.

When reconnecting make sure the LCD and controller PCB are firmly seated together with the connector pushed fully home.

Choosing a stepper driver / motor.

The following is just rough advice covering the sorts of dividing heads / rotary tables found in a typical small shop (4" - 12"). More detailed advice can be found online.

The usual size of stepper motor for the above is Nema 23.

The motors have a number of parameters but as a rule the lower torque versions (1-2Nm) work well with the smaller 4-6" tables and the larger (2+ Nm) will work with 6" and upwards.
The low torque versions are also shorter which suits the smaller tables.

For stepper drivers I would recommend either the DM542 or TB6600.

The TB6600 is smaller but runs hotter and for continuous use with a larger motor may require a small fan to keep it cool although for intermittent use (i.e. dividing) is usually fine.

The DM542 is larger and more expensive but runs much cooler and smoother.

If you use a metal case you can remove the heatsink and mount it directly to the case using it as the heatsink negating the use of a fan if mounted internally.

With a 24v supply my experience is that even continuous use will only see it run slightly warm.

Finally stepper motors have a lot of torque particularly at low speeds. You can run them at less than their rated current which will help keep them (and their driver) cool as well as running quieter.

Suitable Cases.

If using an overlay then you can purchase cases (usually plastic) with recesses for the overlay (Google "electronics enclosure overlay recess").

The overlay I supply is A5 sized so any recess shouldn't exceed this.

Typically cases in the range 180mm-220mm high by 120-160 wide by 55-100 deep are suitable. Actual size will depend on whether you wish to mount the stepper driver in the case etc

Connecting the stepper driver to the controller.

The most common driver connections have separate negative lines for both step and dir.
In this case connect the two negative lines as shown below and connect them to the Gnd connection on the module. Step+ and Dir+ can then be connected directly.
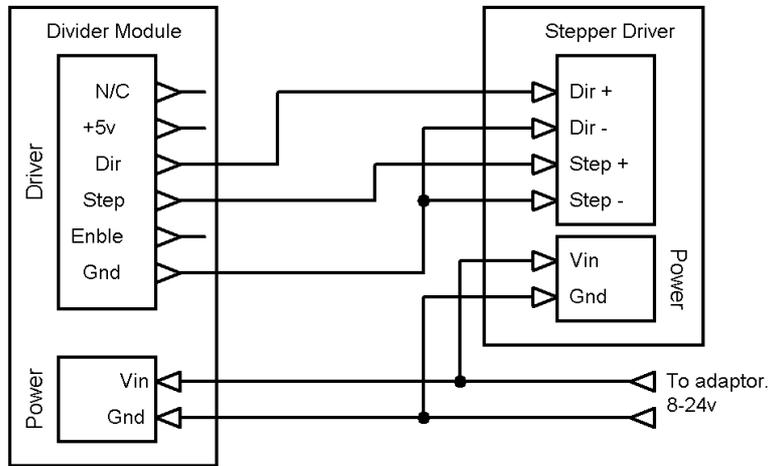
Some drivers only have a single Gnd line as shown below, these are simply connected one to one.
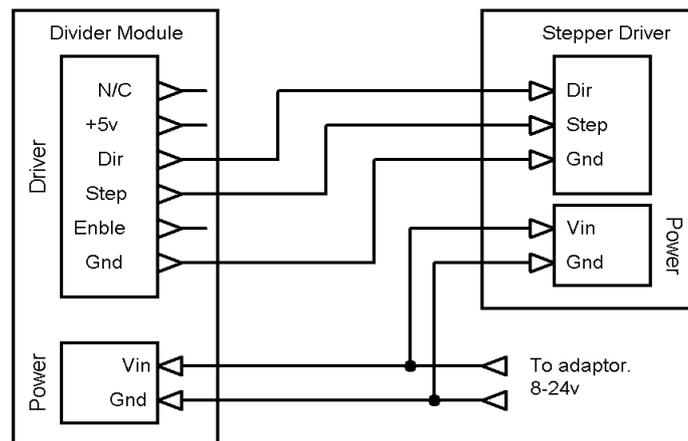
Note some drivers have different nomenclature for the connections.
e.g.
Dir may be CW, DR etc.
Step may be Pul, PU, CLK etc

If you have any questions please contact me via email.

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Component Layout & Circuit Diagram

Component Layout (top)

Programmer

Q3 — C B E
D2
Sounder — LS1
Backlight — R2
LCD

IC2
R5 — 4K7

C7 — 22uF
C6 — 100nF
C4 — 100nF
Q1 — C B E
R12 — 10K
IC1

D4
R8 — 39
D3
C5 — 220uF
R6 4k7 R7 10k R8 10k R9 4k7
Q2 — E B C
R10 — 10K
R11 — 10K
D1
10mhz
C1   C2

R1 10K
R2 10K
R3 10K
R4 10K
Contrast — 10k VR1

Driver 2
Gnd / Enb / Stp / Dir / +5v

Spare

Power — Vin Gnd
Limit/Control — Gnd Sns Ack LM1 LM2
Keypad — R1 R2 R3 R4 C1 C2 C3 C4
worldofward.com V3.1
Driver — +5v Dir Stp Enb Gnd

Circuit Diagram (bottom)

Power (Using Traco module)
Vin / Gnd
D3 IN400x
RS 39
C7 22uF
Traco 2450E — VI GND VO — 1 2 3
*IC2
C5 220uF C3 100nF
D4 5V6
5V
IC1, Pins 11, 32
IC1, Pins 12, 31

Power (7805)
Vin / Gnd
D3 IN400x
C6 100nF
7805 — VI GND VO — 1 2 3
U1
C5 220uF C4 100nF C3 100nF
5V
IC1, Pins 11, 32
IC1, Pins 12, 31

LCD 20x4
VSS VDD VEE RS RW E D0 D1 D2 D3 D4 D5 D6 D7
1 2 3 4 5 6 7 8 9 10 11 12 13 14
5V
Contrast VR1

IC1 PIC18F4x20
C1 33pf
C2 33pf
XTAL 10Mhz
5V — R12 10k

13 OSC1/CLKIN
14 OSC2/CLKOUT
1 MCLR/Vpp/THV
2 RA0/AN0
3 RA1/AN1
4 RA2/AN2/VREF-
5 RA3/AN3/VREF+
6 RA4/T0CKI
7 RA5/AN4/SS
8 RE0/AN5/RD
9 RE1/AN6/WR
10 RE2/AN7/CS

RB0/INT 33
RB1 34
RB2 35
RB3/PGM 36
RB4 37
RB5 38
RB6/PGC 39
RB7/PGD 40

RC0/T1OSO/T1CKI 15
RC1/T1OSI/CCP2 16
RC2/CCP1 17
RC3/SCK/SCL 18
RC4/SDI/SDA 23
RC5/SDO 24
RC6/TX/CK 25
RC7/RX/DT 26

RD0/PSP0 19
RD1/PSP1 20
RD2/PSP2 21
RD3/PSP3 22
RD4/PSP4 27
RD5/PSP5 28
RD6/PSP6 29
RD7/PSP7 30

Stepper Driver
5V / Dir / Enable / Step / Gnd
5V

Driver #2
5v / Dir / Enable / Step / Gnd
5v

Limit / Control
R11 10k R10 10k R7 10k R6 10k
5V
Limit 1 / Limit 2 / Sense / Ack / Gnd
R9 4k7 R8 4k7
D1 IN4148
Q1 BC337
Q2 BC337

Sounder
LS1
5V
D2 IN4148
R5 4k7
Q3 BC337

Keypad
C1 C2 C3 C4
R4 — A 1 2 3 Speed
R3 — B 4 5 6 S
R2 — C 7 8 9 G
R1 — D << 0 >> C
R1 10k R2 10k R3 10k R4 10k

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