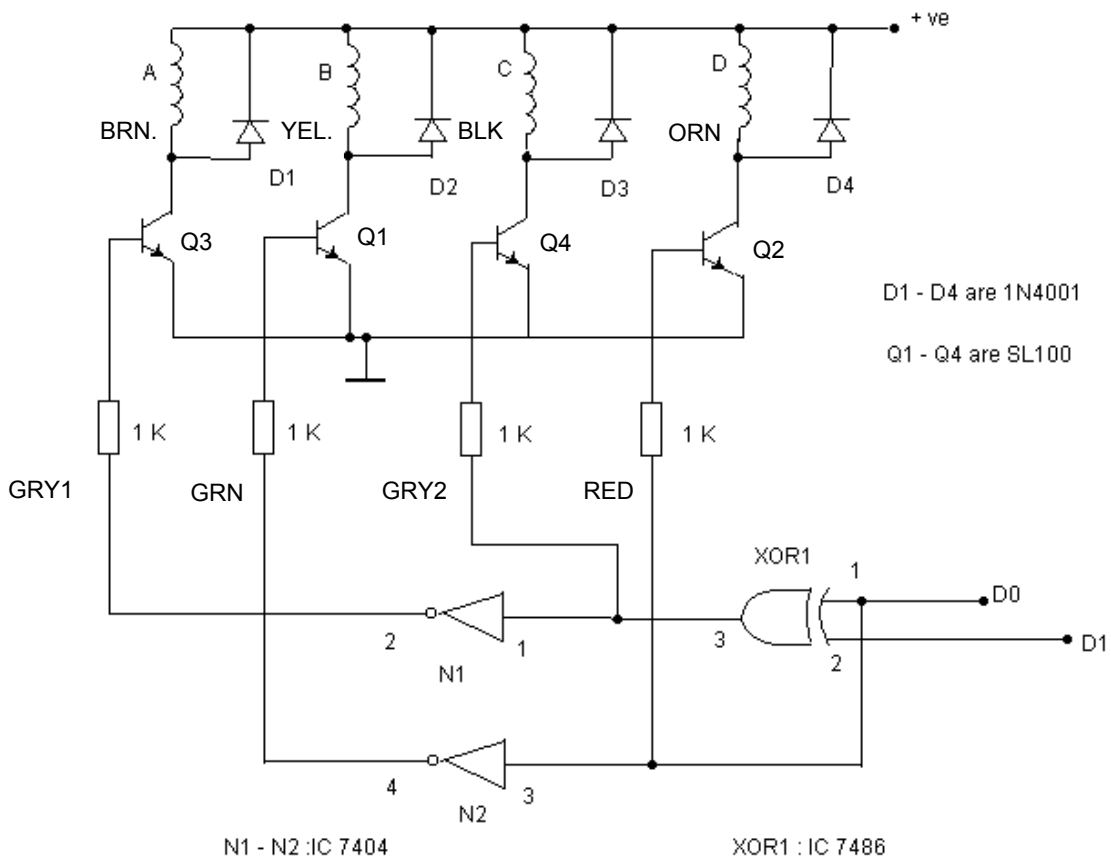


SUPER SIMPLE STEPPER MOTOR CONTROLLER



PINS 14 & 7 of both the ICs are to be connected to +5V and Ground respectively.

The circuit shown above can be used to control a unipolar stepper motor, which has FOUR coils (I've swiped it off an old fax machine). The above circuit can be for a motor current of up to about 500mA per winding with suitable heat sinks for the SL100. For higher currents power transistors like 2N3055 can be used as darlington pair along with SL100. The diodes are used to protect the transistor from transients.

Activating sequence:-

| Inputs | | Coils Energised |
|--------|----|-----------------|
| D0 | D1 | |
| 0 | 0 | A,B |
| 0 | 1 | B,C |
| 1 | 0 | C,D |
| 1 | 1 | D,A |

To reverse the motor just reverse the above sequence viz. 11,10,01,00.

Alternately a 2bit UP/DOWN counter can also be used to control the direction, and a 555 multi-vibrator can be used to control the speed

BIPOLAR AND UNIPOLAR OPERATION

All Thomson Airpax stepper motors are available with either 2-coil *Bipolar*, or 4-coil *Unipolar* windings.

The stator flux with a Bipolar winding is reversed by reversing the current in the winding. It requires a push-pull Bipolar drive as shown in Fig. 14. Care must be taken to design the circuit so that the transistors in series do not short the power supply by coming on at the same time. Properly operated, the Bipolar winding gives the optimum motor performance at low-to-medium step rates.

A Unipolar winding has two coils wound on the same bobbin (one bobbin resides in each stator half) per stator half. Flux is

reversed in each coil bobbin assembly by sequentially grounding ends of each half of the coil winding. The use of a Unipolar winding, sometimes called a *bifilar winding*, allows the drive circuit to be simplified. Not only are half as many power switches required (4 vs. 8), but the timing is not as critical to prevent a current short through two transistors as is possible with a Bipolar drive.

For a Unipolar motor to have the same number of turns per winding as a Bipolar motor, the wire diameter must be decreased and the resistance increased. As a result, Unipolar motors have 30% less torque at low step rates. However, at higher rates the torque outputs are equivalent.

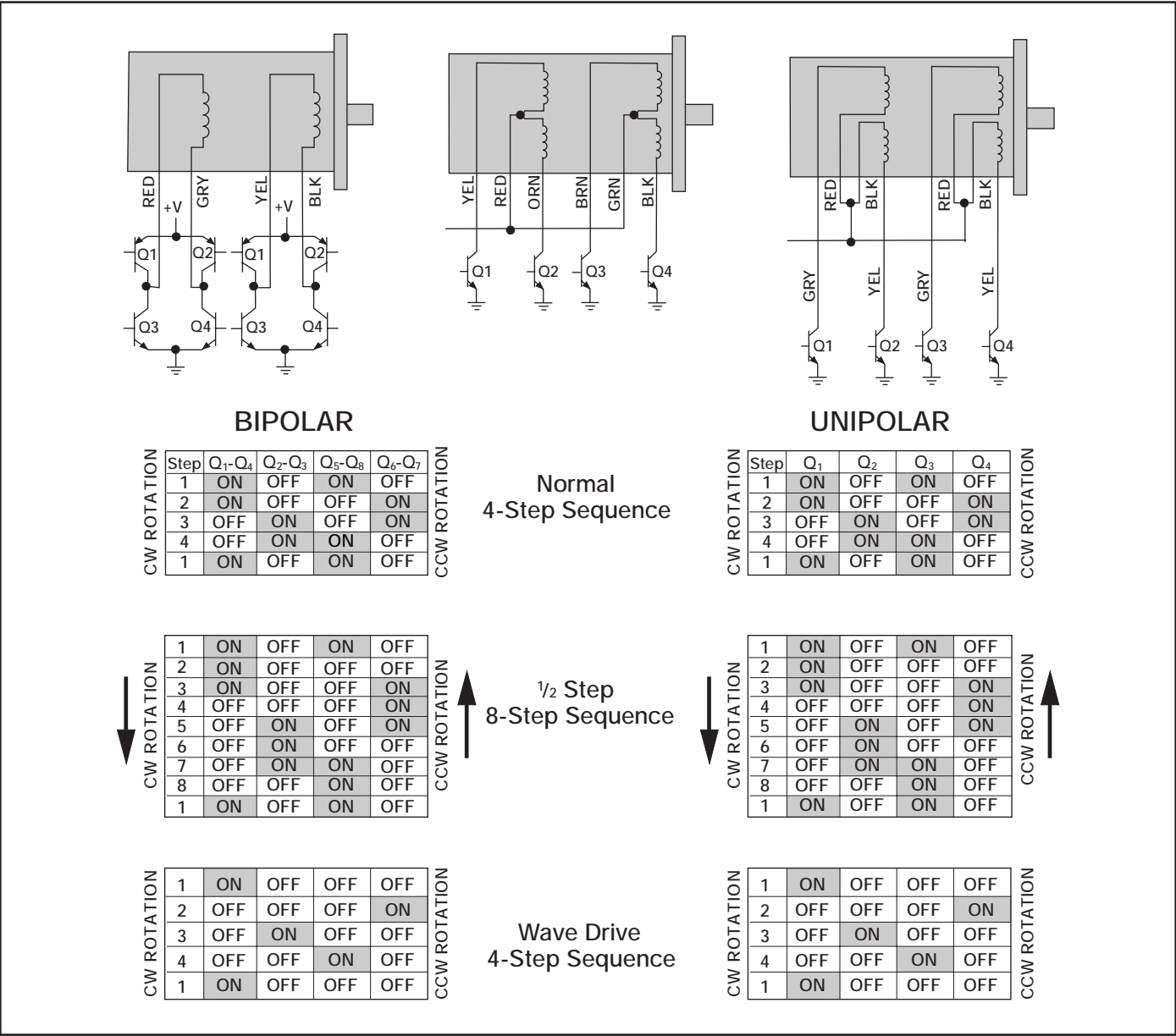


Figure 14: Schematic Bipolar and Unipolar Switching Sequence. Direction of Rotation Viewed from Shaft End.

For information or to place an order in North America: 1 (203) 271-6444 Europe: (44) 1276-691622 Asia: (65) 7474-888

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