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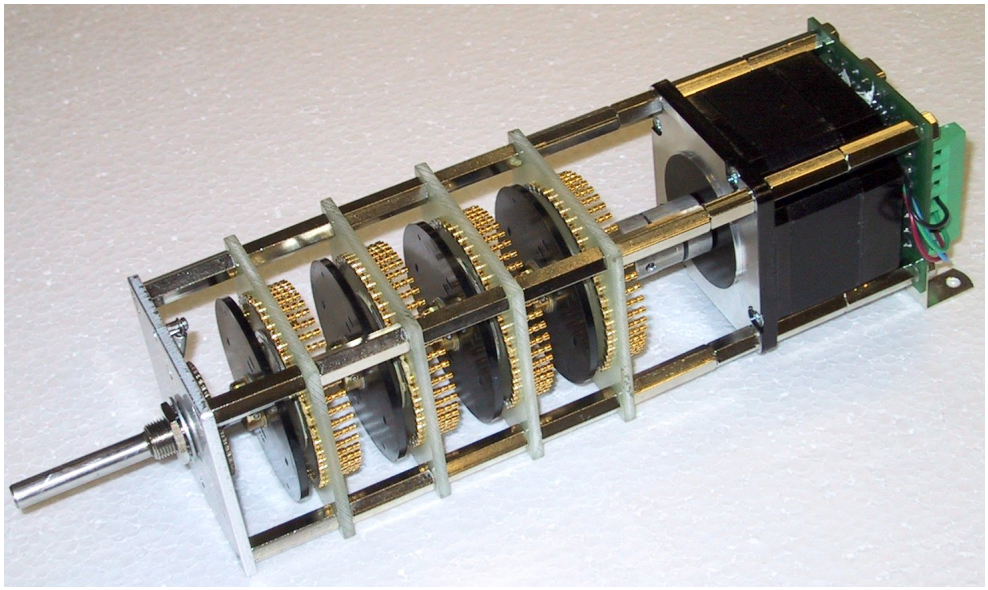
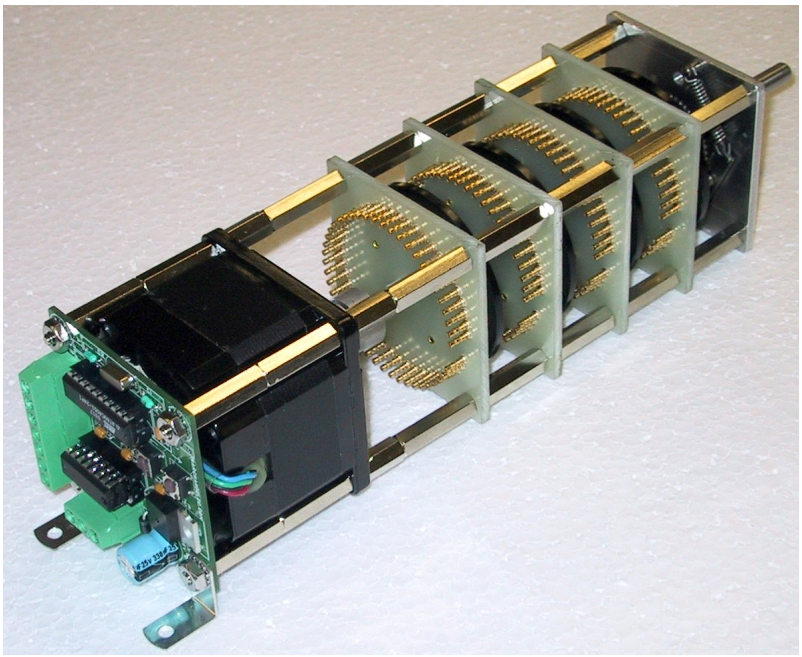
AX111 motor control





AX1 motor control for 48 step attenuator and infrared remote control

The AX1 stepper motor controller is mounted on the rear of the stepper motor. The stepper motor is mounted on the rear of the 46 position Shallco switch. A flexible coupling connects the shaft of the stepper motor to the shaft of the rotary switch.
The switch can be moved a step CCW or CW by pushing either switch S1 or S2 on the AX1 control module. Holding the switch down will cause continuous stepping.
A LED indicator lite can be connected to the AX1.
Each time the motor steps the rotary switch the LED will blink. The LED will also blink twice when the power is first applied to the controller. If the LED blinks only once, or not at all, upon power on there is a problem with the AX1.
The AX1 responds to infrared commands in the RC5 format. The RC5 uses an infrared beam at 920 nM to send signals. The beam is modulated at 36 Khz. The RC5 code has 5 system bits and 6 command bits. The data transfer rate is 1.776 uS/bit. The AX1 uses a Panasonic PNA4611M IR receiver module to see the light. The range of the control is approx. 5-10M.
The controller is programmed so that pushing button 1 or button 2 on the remote control handheld unit will be equivalent to pushing switches S1 or S2 respectively. The controller can learn to use other codes as well. Any valid RC5 code signal can be connected to either S1 or S2.

Teaching the AX1 new codes.

1:
Push down both switches S1 and S2 when turning on the power to the AX1.
The LED will not flash.
2:
Hold down S1 and push the button on the remote handheld to be associated with S1.
The LED will flash once.
3:
Hold down S2 and push the button on the remote handheld to be associated with S2.
The LED will flash once.
4:
Remove power to the AX1.
5:
Done. The code is now stored in the microprocessor EEPROM.

This procedure can be repeated any number of times.

AX1 Power supply.

The AX1 requires a DC power supply of approx 10-12V DC. The supply can be regulated or not regulated. The supply should be able to support a load of 2A. A lower voltage supply will give insufficient power to the stepper motor for the Shallco switch. A higher voltage supply will cause the circuits on the AX1 to overheat and eventually fail.

IR receiver module.

The PNA4611M IR receiver module should be mounted where it can see the handheld when signaling. The receiver can be mounted in plain sight or behind a transparent window. The window must let the infrared light pass. Note that some plastics are transparent to infrared light and some are not. Being transparent to visible light is not a good indicator that the material is transparent to IR.

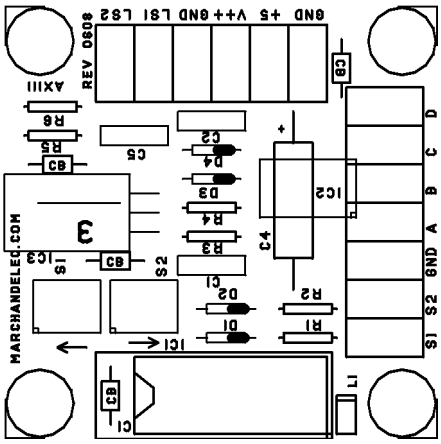
Mounting of the switch assembly.

Use the brackets on the rear of the switch for extra support. If changing the location of the brackets on the AX1 board make sure the brackets do not short out any of the electronic components.

Connection diagram.

Power supply, IR receiver and LED are connected to the AX1 to the terminal blocks as follows:

Terminal Block Label	Description
S1	Output from IR receiver module; connect to PNA4611M, pin1
S2	Cathode of LED
GND	Ground: connect to IR receiver PNA4611M, pin2
A	Connection to motor,black : factory wired ; do not use
B	Connection to motor,green : factory wired ; do not use
C	Connection to motor,red : factory wired ; do not use
D	Connection to motor,blue : factory wired ; do not use
V++	From power supply V+, 10-12VDC @ 2A
+5	5V output: connect to IR receiver PNA4611M, pin3 and also anode of LED
GND	From power supply V- common
LS1	Limit switch 1 : short to ground to disable CW motion
LS2	Limit switch 2 : short to ground to disable CCW motion



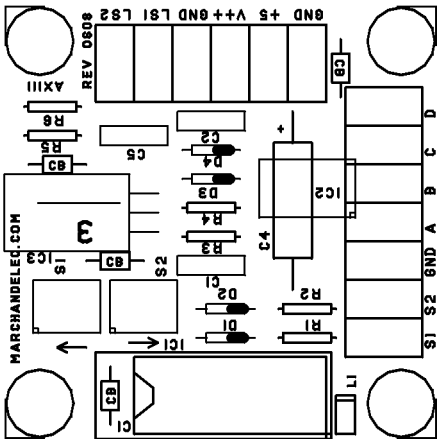
Parts list

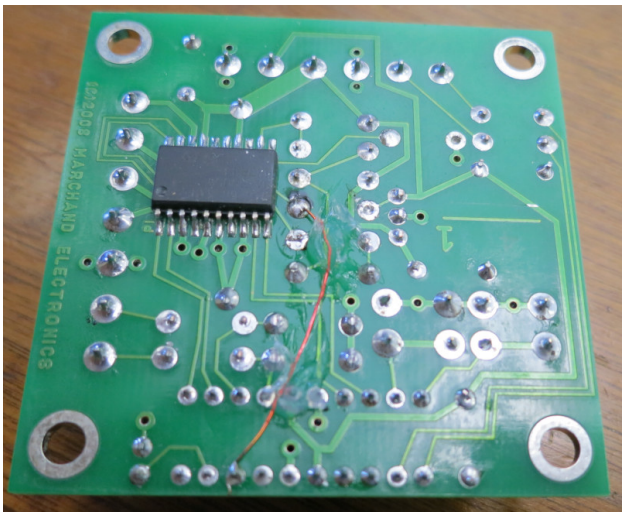
R1	100 Ohm	1% metal film
R2	100 Ohm	1% metal film
R3	100 Ohm	1% metal film
R4	100K	1% metal film
R5	100 Ohm	1% metal film
R6	100 Ohm	1% metal film
CB	0.1uF	Axial Ceramic
C1	0.01uF	Polypropylene
C2	0.1uF	Axial Ceramic
C3	nu	
C4	220uF,25V	electrolytic
C5	0.1uF	Axial Ceramic
D1	1N4735	6.2V Zener Diode
D2	1N4735	6.2V Zener Diode
D3	1N4148	small signal diode
D4	1N4148	small signal diode
L1		Small LED red
IC1	Attiny461	uP
IC2	L6205D	H-driver
IC3	LM7805	5V regulator
		Teminal Block 6 pos.
		Teminal Block 7 pos.

Feet Bracket Keystone 619
Mouser 536-619

For Shallco switch
Spacers Keystone 1638 1.25”
Keystone 1642 2.25”
Clamps McMaster 306012M
Tubing 1.2” Tygothan

Spring use 0.023” wire 9664K13 3/16” OD
cut 18 turns
bend 1 turn on each side





Remove R4 and install wire from r4 to pin 8 on IC1