

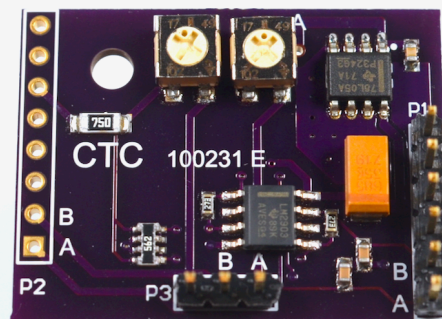
LX200 Classic Motor Encoder PCB

OVERVIEW

The Motor Encoder PCB is a replacement circuit board for the 8", 10", and 12" Meade LX200 Telescope*. It is a functional replacement for the original circuit board and has the same dimensions and pin-out connections. The electronic circuit is similar but not identical to the original, with component availability or opportunistic improvements accounting for the changes. The function of this board is to convert signals from the optical encoders into well-behaved square waves, which are then used by the main CPU board to calculate speed and position. There are two channels of output signal, which together represent a quadrature encoding of speed, position, and direction.

FEATURES

- Full replacement of original functionality, in the same size board.
- Pin positions are same as original, with the exception of test points which are slightly shifted. Those are not necessary for operation
- Components derated for long life.
- Power components run at lower temperatures.
- Power consumption of board is lower.



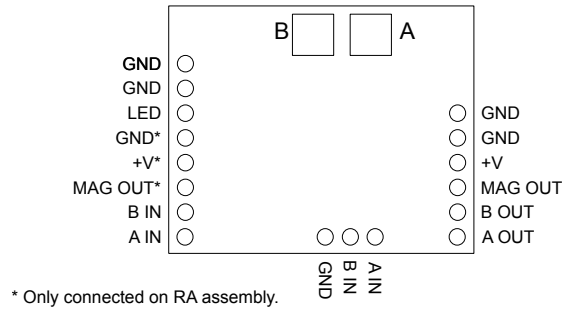
APPLICATION

The motor encoder board is a replacement for either the RA motor encoder board in the base of the telescope, or the DEC motor encoder in the fork arm. When used in the DEC motor assembly, only 5 of the pins on P2 (left side in the above photo) are used, the other three pertaining to the Hall-Effect sensor which is only present in the RA motor assembly.

The two potentiometers on the board control the collector resistance of the switching phototransistors which are inside the motor assembly gearbox housing. There are two of these, for the two channels of encoder signal, A and B. The infrared LEDs which trigger these phototransistors are also in the housing, and their current (and therefore their light intensity) is supplied through a 75-ohm resistor on the encoder board. Since the phototransistors and LEDs properties vary over a wide range, each channel's phototransistor collector resistance must be adjusted to match its phototransistor's properties.

PIN OUT

The following diagram and tables show the connections on the encoder board, viewed from the top. The three pins at the bottom of the board are test points and are not connected in normal operation.



P2 Pin Functions

GND	LED return
GND	Phototransistors emitter return
LED	Current for IR LEDs in series
GND*	Hall-Effect sensor ground (RA only)
+V*	Hall-Effect sensor power (RA only)
MAG OUT*	Hall-Effect sensor output (RA only)
B IN	Phototransistor B collector
A IN	Phototransistor A collector

P1 Pin Functions

GND	Board ground
GND	Board ground
+V	Board power
MAG OUT*	Hall-Effect sensor output (RA only)
B OUT	Quadrature signal B
A OUT	Quadrature signal A