

CNCTRK - A DIY AZ/EL Satellite Tracking System

by Bob Freeman, KI4SBL

<http://ki4sbl.dodropin.org/CNCTRK>

Description

This dual axis tracking system enables automated antenna tracking of LEO satellites, the Sun, and Moon. The Kit design is based on a rugged CNC machined aluminum gearbox housing; it employs a worm drive for torque and brushless stepper motors for reliability. The included electronic motor drivers provide fine motion control.

Arduino Interface **NEW!**

The tracking system was originally based on LinuxCNC running on a computer or Raspberry Pi. A New Arduino Sketch allows running the hardware from Windows using SatPC32, GPredict, or similar tracking software. The Arduino communicates via the widely used Yaesu GS-232 protocol. All software is available free and open source.

KITS Available

Kits are available for the AZ/EL Positioner/Rotator (\$400) with mounting hardware for two antennas included. The (optional) Raspberry Pi Controller Kit (\$65) includes bootable image and tracking software; it uses SMD components.



System Characteristics

Azimuth or Elevation Axis

Holding Torque	48 in-oz
Velocity	15 deg/s
Backlash	<2 deg
Theoretical Resolution	0.007 deg

AZ/EL Assembly

Weight	8.5 lb
Finish	Bare Aluminum
Azimuth Range	-90 deg < AZ < 450 deg
Elevation Range	-20 deg < EL < 90 deg
Position Accuracy	+/- 2 deg
Dimensions	Approx. 7x7x8 in
Power Consumption (Idle):	
	0.25A x 12VDC = 3 Watts
Power Consumption (AZ/EL Both Steering):	
	2.00A x 12VDC = 24 Watts

Reference Information

- [AMSAT Journal](#) May/June 2015, "CNCTRK - A LinuxCNC Based Satellite Tracking System." Bob Freeman, KI4SBL
- Arduino Sketch: http://ki4sbl.dodropin.org/CNCTRK/Arduino/RAZEL-duino_2016-05-28.ino
- SatPC32 Program: <http://www.dk1tb.de/indexeng.htm> or: <http://store.amsat.org/catalog/index.php?cPath=2>
- GPredict: <http://gpredict.oz9aec.net/>

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