APC300 Steptrack Antenna Controller

WorldWide Application

Supports Domestic and International Applications.

Inclined Orbit Tracking Capability

Enables Access to Economical Satellites.

Non-Volatile Data Memory

Retains Tracking Data for Up to 10 Inclined Satellites and 30 Stationery Satellite Positions.

Minimizes Drive System Wear

Based on Predicted Positioning Historical Data.

Multiple Signal Inputs

AGC or Beacon Driven.

Remote Control Capability

Via RS232 Computer Interface Port with User Selectable BAUD Rate.

Manual Jog Capability

Allows Individual Axis Accessibility.

Built-In Design Features. The Andrew APC300 controller incorporates a system self-test feature, a PC computer utilities package and both local and remote fault reporting.

Multiple Control Functions. The Andrew steptrack control unit is capable of antenna positioning, performing steptrack, Smartrack® and program-tracking control functions via an internal microprocessor.

Manual or Automatic Operation. The control system enables both manual or automatic tracking of selected satellites by earth station antennas used in satellite communications.

Extremely Accurate Positioning. Antenna positioning resolution of 0.01° (± LSB) in both azimuth and elevation axes.

Ease of Operation. Convenient keypad data entry/recall, comprehensive 32 character alphanumeric display and easily accessible from panel mode selection.

Dual-Band Steptrack Operation. The APC300 antenna control system is operational in both the C- and Ku-Bands.

Continuous Status Display. The earth station controller provides a continuous display of the current system status.

Universal Power Supply. Auto-sense/select power supply enables worldwide operation.

Why Use a Steptrack System?

The apparent stability of a geosynchronous satellite is defined by its "stationkeeping window". This "window" represents the East-West (E-W) and North-South (N-S) travel limits that apply to a satellite. Most domestic geosynchronous satellites are maintained in a stationkeeping window of 0.1 degree.

As a satellite approaches the end of its fuel supply, the satellite owner may seek to extend its useful life by shutting off the North-South stationkeeping, permitting a controlled excursion in the satellite orbit to preserve stationkeeping fuel.

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An inclined orbit satellite will have its N-S movement or "eccentricity" increase from the predetermined value at the center of the stationkeeping window.

With the satellite in an inclined orbit, earth stations are required to have a more sophisticated tracking system to transmit or receive a signal from the satellite. Earth station owners able to track these inclined orbit satellites may take advantage of significantly lower satellite transponder prices.

As a satellite moves away from its "stationary" position, the earth station antenna must anticipate or detect the change and re-orient itself to receive the new maximum signal.

How Does It Work?

The Andrew Steptrack Controller has the capability to accomplish tracking by using any one or a combination of the following three methods:

Steptrack Operation. Pure steptracking uses a special beacon receiver or the AGC from a normal video receiver to sample a satellite's signal level. The antenna is systematically moved to various points around the nominal satellite position until the position producing the greatest signal strength is found. This process is continually repeated to keep the satellite signal strength at its peak.

Smartrack® Operation. The Andrew Smartrack method builds a data base of predicted satellite positions for a 24-hour period. From the data base, predictions are reviewed once every minute. The antenna is automatically repositioned whenever the predicted position differs from the current pointing position by a user-specified amount.
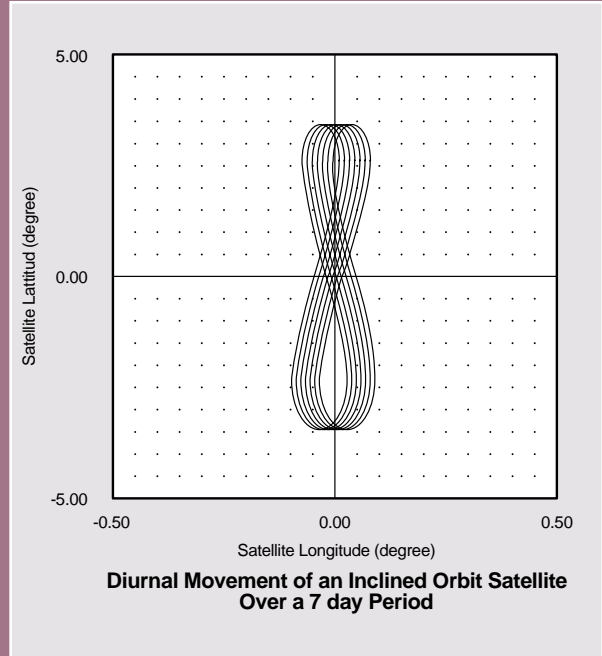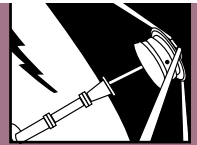
The data base includes signal strength information which is used in conjunction with user-defined parameters to decide whether or not the current signal is correct.

Upon reaching the predicted satellite position, Smartrack evaluates the satellite signal strength, previously recorded satellite data and recent steptrack activity. If the signal strength is within user-specified parameters, no further action is performed. If the signal is not within the prescribed boundary, the unit begins a new steptrack cycle. The new position coordinates are used to update the Smartrack database to predict the satellite's future position.

If the positioning cycle fails to improve the signal strength, Smartrack will not initiate a new steptrack cycle for a user-specified period of time. It continues to follow its own predicted path. This design feature allows the satellite to be tracked normally during rain fades or beacon outages.

Program-Track Operation. During program-track, data for the satellite positions is loaded in the database from a computer. This data is calculated by an external program, like Intelsat's pointing algorithm IESS-412, or NASA's two-line element set, which predefines the satellite's position for days or weeks. These predicted satellite positions are then downloaded to the steptrack controller. Finally, Smartrack takes over and keeps the antenna pointed to the correct position.

Diurnal Movement of an Inclined Orbit Satellite Over a 7 day Period

Electrical

Power Input	85-265 Vac 50/60 Hz, 1ø, 45 Watts
Display Format	32 Character,14 Segment Fluorescent Mode, Satellite Name and Number, Azimuth, Elevation, Polarization, Beacon Signal Level Status
Character Height	.25" (6mm)
Local Control	Antenna Position Control via Keypad Entered Coordinates or Manual Jog. Modification of Control Parameters, Steptrack Parameters, Axis Offset, Software, Axis Travel Limits and Box Limits. Self-Test Mode, Steptrack, Smartrack™, Resolver Scaling and Calibration Factors Control and Status
P.C. Utilities	Utilities Package for Maintenance and Operational Testing via PC. Include ACULOG, APCSAVE, APCLOAD, IESS-412 and NASA TLE Programs
Remote Control	Antenna Position Control via RS232 Serial Link Steptrack, Smartrack Control and Status
Summary Alarm "Failsafe" Output Relay Contact Rating	Form C 28 Vdc at 100 ma. maximum

Mechanical	
Weight	18 lb.
Dimensions	5.25" (133 mm) high (3 rack units) 18" (457 mm) deep 19" (483 mm) wide, rack mount
Front Panel Color	Black