Model 133 Antenna Control System

Precision control of satellite tracking

The Model 133 Antenna Control System can be used with almost any antenna for precision satellite tracking, radio and optical telescope applications, and custom structure control.

- Pointing, Steptrack, Optrack, Monopulse systems
- Fixed or transportable earth stations
- Accomodates AZ/EL, X-Y, HA/Dec, AZ/EL/Tilt mounts
- Single or multiple linear variable speed antenna motor drives
- Stable or inclined GEO, MEO, LEO, and celestial targets
- Single or multi-band operation

System

The Antenna Control Unit is the primary control and monitor interface point for the system, featuring PC-based processing and a friendly windowing interface.

The Antenna Control Unit, Tracking Receiver, and Power Drive Unit are linked via serial connections. This provides the flexibility to configure the key system components without concern about separation distances or electrical ground plane transients.

Tracking Accuracy - Optrack

Normally better than 5% of the receive beamwidth in winds of 30 mph gusting to 45 mph, satellite inclination of up to 15º, and signal scintillation of up to 2 dB.

Pointing Accuracy

Normally better than 0.005 RMS in winds of 30 mph gusting to 45 mph. This includes all drive train errors, but excludes structural errors between the position transducers and RF beam.

Operational Modes			**Optional*
Tracking	***Pointing***	***Acquisition***	***Other***
Optrack Steptrack *Monopulse**	Intelsat 11 Memtrack StarTrack Preset Designate *NORAD** *TableTrack**	*Box Scan** *Spiral Scan** *Geo Scan** *Raster Scan**	Maintenance Manual Stop Computer Simulator *Polarization** *Auto Stow**

GENERAL DYNAMICS
SATCOM Technologies

Control units

Antenna Control Unit

The Antenna Control Unit (ACU) provides a menu-driven control and monitoring point for the entire system through a window interface.

Features of the ACU are:

- Optrack, which provides high-performance tracking of stable or inclined orbit satellites with an adaptive, self-learning ephemeris modeling mode
- Minimal keystroke operation using customized, field programmable macro functions
- Quick system installation with automated setup routine
- Informative display with full text readouts
- Extensive diagnostic monitoring and test capabilities
- Fully integrated factory burn-in and test with antenna and satellite simulators
- Supervisory control link - RS232/422 and Ethernet standard, IEEE-488 optional
- Fiber Optic Isolation available for long IFL and reduced lightning suseptibility

Power Consumption
Single phase, 110-240 VAC 350 VA

Physical Characteristics
5 RU rack-mount chassis with slides
8.75H x 19W x 19.5D, weight 25 lbs.

Environment -0º to 55º C,
0 to 95% non-condensing humidity

Manual Rate Unit

The Manual Rate Unit (MRU) provides manually commanded, bi-directional control of up to three axes. It has the following features:

- Axis summary status reported on LED display
- 1 RU, 1.75H x 19W x 8D, weight 5 lbs.

Portable Maintenance Unit

The Portable Maintenance Unit (PMU) is a handheld ruggedized unit with a 50-ft pendant cable for convenient local operation at the antenna. The unit allows the operator to issue independent bi-directional axis enables and position commands for up to three axes. Summary status for each axis is reported via LED indicators.

As an option, the PMU has a two-line, 24-character display for axis positions, tracking signal strength, and scrolling status messages.

Auxiliary Drive Unit

The Auxiliary Drive Unit (ADU) manually controls the antenna axes with the auxiliary drive motors.

- Main drive system independent
- Digital readout of tracking signal strength
- 1 RU, 1.75H x 19W x 8D, weight 5 lbs.

Manual Stow Unit

The Manual Stow Unit (MSU) provides manually commanded control of the electromechanical axis stow mechanism.

- Mechanism status reported with LED display and position meter
- 1 RU, 1.75H x 19W x 8D, weight 5 lbs.

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Power Drive Unit & Drive Assemblies

The Power Drive Units (PDU) close axis position loops based on commands from the Antenna Control Unit (ACU) and feedback from the position transducer units. The resultant position error is used to close the inner axis loops.

Features:

- Embedded microprocessor for local position loop closure
- Single RS232/422 or Fiber Optic cables for ACU to PDU cross-site link
- Antenna interlock switches monitored by redundant hardware for microprocessor independent safety shutdown
- Self-adjusting countertorque/ preload and differential/delta tachometer compensation logic for multiple motor systems

Model 133 Vector PDU

Vector PDU

For antennas with single or multiple motors per axis, where standard performance is required.

- Low to high power applications
- Pulse Width Modulated (PWM) amplifiers
- Ultra low maintenance totally sealed AC motors

Model 133 Brushless PDU

For antennas with single or multiple motors per axis, where dynamic performance is required.

- Low to mid power applications
- Pulse Width Modulated (PWM) amplifiers
- Ultra low maintenance totally sealed, brushless motors
- Low motor inertia for excellent dynamic capability

Brushless DC Motor

Model 133 SCR PDU

For antennas with multiple motors per axis, where traditional DC motors are required.

- Mid to high power applications
- Silicon Controlled Rectifier (SCR) amplifiers
- Shunt field DC motors with integral tachometers

Shunt Field DC Motor

AC Vector Motor

Brushless PDU

SCR PDU

Outdoor SCR PDU

PM DC Motor

Specifications

Weights and Dimensions

PDU:

High Power, Multiple Motor per Axis

Shipping - 89H x 77W x 31D, 1600 lbs.
Net - 81H x 71W x 20D, 1095 lbs.
120/220 VAC, 1Ø, 3A/1.5A

Single DC Motor per Axis

Shipping - 79H x 40W x 27D, 800 lbs.
Net - 71H x 32W x 16D, 400 lbs.
120/220 VAC, 1Ø, 3A/1.5A
208/380/415 VAC, 3Ø, motor dependent
208/380/415 VAC, 3Ø, motor dependent

Transducers

High Accuracy Position Resolver

- 0.0003º resolution,
  0.003º RMS accuracy
- 20-bit, 16:1 design, absolute

Optical Encoders

- Available with resolution to 29 bit, and accuracy to <1 arcsecond