The AL-4100 is ORBIT’s advanced outdoor Antenna Control Unit (ACU), designed to facilitate monitoring and control of tracking systems in remote locations. It incorporates built-in features for a wide range of telemetry and satellite tracking applications. A wide variety of operation modes allows for automatic tracking, slave tracking and remote control operation via a host computer. The AL-4100 is designed to withstand extreme environmental conditions in outdoor applications. It is a rigid and hermetically sealed case equipped with a powerful CPU engine capable of performing complex tracking algorithms.

The connection with the AL-4100 can be established through the host computer via either an Ethernet or RS-422 communication link. By connecting the host computer to the AL-4100, the operator can control and monitor the tracking system.

Features

- Highly modular hardware design provides the reliability and maintainability required in critical applications.
- Fully electronic non-volatile memory eliminates need for mechanical disk drives for maximum reliability.
- Digital algorithms for high-bandwidth closed-loop control.
- Variety of tracking modes for GEO, MEO, LEO satellites and fast-moving targets.
- Stabilized system control using direct interface with gyrocompass and motion reference sensors.
- Direct GPS interface capability.
AL-4100 Mode of Operation

Remote Operation

Using ORBIT’s Microsoft Windows-based GUI console, the operator can remotely monitor and control the ACU. A standard PC connected to the ACU via LAN interface provides the operator with full control of the system using keyboard and mouse.

Search

The pointing angle of the antenna is scanned for target acquisition.

Raster scan: Synchronized movement of azimuth scans and elevation steps.

Zig-zag scan: Unsynchronized movement of azimuth and elevation scans.

Sinusoidal scan: Sinusoidal pattern movement of azimuth and elevation.

Target Acquisition and Auto-Track

The ACU supports Conical Scan, Monopulse or Electronic Scan feeds and provides auxiliary functions to overcome momentary auto-track disruptions.

Multiple receivers tracking: Manually or automatically selects the highest signal strength received from up to 8 tracking receivers’ AGC levels.

Dual antenna tracking: Manually or automatically selects between two antennas for optimal target acquisition and tracking performance as well as
side-lobe locking prevention.

**Backup:** If the target is lost, the ACU reverts to programmable backup mode.

**Position memory:** Brings the antenna back to the point where the target was initially acquired.

**Rate memory:** Upon loss of track, continues movement of both azimuth and elevation with extrapolated velocities.

**Launch acquisition:** Enables better accuracy by preventing the elevation axis from moving downwards for a predefined amount of time after launch.

**Zenith pass:** Moves the antenna to the point where the target is estimated to exit the Zenith cone, re-acquires it and renews Auto-Track.

**Adaptive threshold:** Allows the auto-track acquisition level to follow slow changes in the AGC signals.

**Multi-Path Clipping:** Prevents locking on a reflected signal when tracking targets at low elevation angles. The tracking will be enabled only above a predefined elevation angle.

**Slave-Track**
The ACU can act in slave mode for different resources such as:

**Host Computer via Communication Link:** Using standard RS-422 or Ethernet interface.

**GPS:** Receiver attached to the tracked target transmitting its accurate position.

**Shipboard Stabilization:** The ACU is capable of receiving yaw, pitch and roll angles from IMU or GPS-compass devices and keeping the AZ/EL positioner axes stabilized on a predefined constant angle in space when operating on a moving platform (e.g., ship).

**3rd party control software:** The AL-4100 supports 3rd party control software using Ethernet or RS-422 communication link. ORBIT supplies all necessary documentation to support the communication protocols.

**Step-Tracking**
Periodic jogging of the antenna Up/Down and CW/CCW for repositioning to the point of maximum reception level.

**Program-Track**
Tracking according to preloaded trajectory or a script file.

**Orbit Tracking:** Predefined trajectory files.

**Satellite:** Set of ephemeris data of specific LEO/MEO satellite (NORAD TLE format).

**Solar:** Sun tracking for accurate “northing” and system calibration.

**Scheduler:** Enables switching between different tracking options according to specific time slots. In addition, the scheduler enables positioning according to predefined trajectory.

**Physical Specifications**

<table>
<thead>
<tr>
<th>Physical Specifications</th>
<th>Dimensions</th>
<th>Weight</th>
<th>Power Requirements</th>
<th>Operating Temperature</th>
<th>Storage Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>W: 9.05” (230 mm)</td>
<td>14 lbs (6.5 kg)</td>
<td>Max 100 W (115V/60Hz or 230V/50Hz)</td>
<td>-40°F (-40°C) to 140°F (60°C)</td>
<td>-40°F (-40°C) to 185°F (85°C)</td>
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</tbody>
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