

## The RC2000 Antenna Controller Family

The RC2000 family of dual axis antenna controllers is comprised of the following models: RC2000A, RC2000B POLAR, RC2000B AZ/EL, RC2000C AZ/EL, RC2000C POLAR, and RC2000C EL/AZ. All members of the family share a common motherboard - it is possible to convert from any model to any other model by replacing or adding IC (integrated circuit) chips and/or daughter boards.

All members of the RC2000 family offer the following features...

1. The RC2000 controllers utilize a solid state 36-volt DC drive, which can deliver up to 8 amps to the antenna actuators. The drive has built-in electronic over-current sensing with mechanical relay backup, which can disconnect the drive from the actuators. The controller is capable of simultaneous azimuth and elevation operation.
2. All members of the family incorporate the Adapti-Drive variable speed control system. The Adapti-Drive system allows the user to precisely specify slow speeds for the azimuth and elevation axis. The controller measures the rate of movement and adjusts the voltage applied to the actuators (via pulse width modulation of the solid-state drives) to maintain the speed specified by the user. This alleviates the problem of poor speed regulation associated with reversing the direction of travel about a given axis.
3. The RC2000 controllers support pulse based sensors (reed switch, Hall effect, or electro-optical) for azimuth and elevation position feedback sensing.
4. All members of the RC2000 family support 3 wire servo based polarization control devices. In addition, the AutoPol feature allows the polarization to be controlled via a digital output or contact closure supplied by a satellite receiver.

The following features are available on selected models of the RC2000 antenna controller...

1. The RC2000B and RC2000C models can automatically track inclined orbit satellites. The tracking algorithm supports Step Track, Memory Track, and Search operations. For RC2000B and RC2000C antenna controllers, the model name suffix specifies the type of antenna mount that the controller is designed to work with: POLAR for polar mounts with either motorized declination or motorized latitude angle adjustment; AZ/EL for antennas with an elevation over azimuth type mount; and EL/AZ for antennas with an azimuth over elevation type mount. Please refer to the paper entitled 'Research Concepts Inclined Orbit Tracking Satellite Antenna Controllers' for a description of the tracking algorithms.
2. The RC2000A and RC2000C can be controlled via a RS-422 serial interface. The serial interface supports the SABus protocol originally developed by Scientific Atlanta. The communications protocol is documented in the controller user's manual. Controllers that support the serial port include a diskette, which contain a pair of programs that allow a user to communicate with the antenna controller. One of the programs includes source code. An IBM PC compatible program, AutoPilot, is sold separately (in DOS and Windows versions) to control RC2000 antenna controllers, as well as Standard Agile Omni and DX 657 satellite receivers. Control programs are also available from other vendors. An RS-232 to RS-422 protocol converter is available from Research Concepts - this allows a standard PC serial port (RS-232) to interface with RS-422 based devices. For more information on the communications capability of RC2000 antenna controllers, please refer to the paper entitled 'Computer Control of Satellite Antennas'.
3. The RC2000A and RC2000C antenna controllers can accept an optional daughter board (designated RC2KPOL) which can control a rotating feed powered by a 24 volt DC motor (500 ma max) with potentiometer feedback. The RC2KPOL is designed to interface with Seavey motorized feeds. The RC2000A can accept the RC2KHPP daughterboard, which can provide up to 3 amps at 5 to 40 VDC to a rotating feed with potentiometer feedback.
4. The RC2000A and RC2000C can be interfaced to antennas that are not powered by 36-volt DC motors. The RC2000 can provide an economical control solution for a larger antenna powered by either AC or high voltage DC motors. A number of products are available from RCI to facilitate the interface of the RC2000 to larger antennas. Please refer to the paper entitled 'Controlling Antennas Powered by AC or Large DC Motors with the RC1000 or RC2000 Antenna Controllers'.

The attached table entitled 'RC2000 Family Feature Matrix' summarizes the capabilities of the RC2000 antenna controller.

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## RC2000 Family Feature Matrix

Feature	RC2000A	RC2000B POLAR	RC2000B AZ/EL	RC2000C AZ/EL	RC2000C POLAR	RC2000C EL/AZ
Solid state 36 volt, 10 amp actuator drive -circuits with electronic over-current sensing and Adapti-Drive constant speed slow speed movement system. Capable of simultaneous movement about the azimuth and elevation axis	v	v	v	v	v	v
Support for pulse type position sensors (reed switch, Hall effect, or electro-optical)	v	v	v	v	v	v
Support for 3 wire servo type polarization control.	v	v	v	v	v	v
Support for optional RC2KPOL daughter board to control rotating feeds with potentiometer position sense feedback.	v			v	v	v
Support for RS-422 serial port	v			v	v	v
Maximum number of satellites which may be programmed into the controller's non-volatile memory.	50	50	50	38	38	38
Maximum number of inclined orbit satellites which may be programmed into the controller's non-volatile memory.		5	5	5	5	5
** Inclined Orbit Satellite Tracking **		v	v	v	v	v
Inclined orbit satellite tracking with polar mounts (for both motorized declination angle and motorized latitude angle type polar mounts)		v			v	
Inclined orbit satellite tracking with Elevation over Azimuth type mounts.			v	v		
Inclined orbit satellite tracking with Azimuth over Elevation type mounts.						v
Inclined orbit tracking of both C and Ku band satellites.		v	v	v	v	v
Inclined orbit tracking of L band (weather) satellites.				v	v	v
At least 2 geostationary satellites must be programmed into the controller's non-volatile memory before a track can be initiated on an inclined orbit satellite.		v	v			
Possible to disable the Search mode. Useful for transmit applications				v	v	v

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