



ACCELERATOR CONTROL COMPONENTS

National Electrostatics Corp.

AccelNET Control Technology (ACT) System



NEC ACT chassis populated with 7 modules

Applications

NEC's ACT (AccelNET Control Technology) is a modular data acquisition system designed to meet the needs of modern accelerator equipment. This system interfaces power supplies, controllers, and other beamline items with NEC's AccelNET control software to provide a complete computer control system for NEC accelerators. Since 2009, all new computer-controlled NEC accelerators have been equipped with ACT.

Existing NEC accelerators with computer control can be upgraded to use the ACT system as a replacement for the original CAMAC system. In addition, most manually controlled accelerators can be upgraded to computer control with the integration of ACT and the NEC AccelNET Control system.

Design - Chassis Unit

The ACT system consists of a base chassis populated with up to 8 modules. The rear panel is customized and contains base plates containing the connectors needed for the application. The system offers a choice of four types of data acquisition modules: analog input, analog output, digital input, and digital output, as well as various connector types such as D-sub and BNC.

The base chassis accommodates a wide range power input (100-250 VAC at 50/60 Hz) and is fan cooled with over temperature protection. Additional hardware safety interlocking can be built into each chassis, such as contact closures and status signals up to 24 VDC. Hardware interlocking can be extended into the AC power distribution system if provided by NEC. Units are connected to a control computer running NEC's AccelNET software via a proprietary bus.

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Module Types

Analog Modules

A total of six different analog modules are offered that include transient protected inputs or outputs for system configuration. Each input channel uses a separate A/D converter (ADC), while a separate D/A converter (DAC) is used for each output channel. Additionally, the ADC contains a filter that is used to reduce AC line noise.

Each module has front panel test points and an on-board calibration table. The front panel channel LED brightness is proportional to the input/output voltage. These functions allow for troubleshooting by the customer or NEC technicians.

Each analog channel's gain and unipolar/bipolar mode can be independently set. The channels are continuously updated with digital values and stored in the internal memory. The internal memory may be read at any time by the host computer.

	Unipolar Ranges	Bipolar Ranges
Analog Output 16 bit DAC	10V 5V	10V 5V 2.5V
Analog Input 16 bit ADC	10V 5V 2.5V 1.25V	10V 5V 2.5V 1.25V

Digital Modules

Similar to the Analog Modules, six different input and output modules can be included to provide flexibility for system configuration. These modules have optically isolated inputs/outputs and include a front panel LED for each input/output.

The digital control modules have watchdog capability, so that if communication with the control software is ever disconnected, the outputs of the related power supplies will stop. This occurs within seconds and may be programmed differently per channel.

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Module Options

The ACT system is designed for flexibility, with the number and type of channels customized for the individual system. Each chassis can hold up to 8 Modules.

Analog/Digital	Input/Output	Total No. of Channels	Catalog No.	Features	
Analog	Input	16	2HA015040	<ul style="list-style-type: none"> • Transient protected inputs and outputs • Each channel has software selectable gain and unipolar/bipolar mode • Front panel channel LED brightness is proportional to output voltage • Front panel test points • On board calibration table 	
Analog	Input	24	2HA015041		
Analog	Input/Output	16 in 8 out	2HA015042		
Analog	Output	16	2HA015050		
Analog	Output	24	2HA015051		
Analog	Input/Output	16 in 8 out	2HA015052		
Digital	Input	16	2HA015220		<ul style="list-style-type: none"> • Front panel LED for each input/output channel • Watchdog timer (output modules) • Optically isolated inputs/outputs • Solid state relays (output modules) • Self resetting fuses (output modules)
Digital	Input	24	2HA015221		
Digital	Input/Output	16 in 8 out	2HA015222		
Digital	Output	16	2HA015230		
Digital	Output	24	2HA015231		
Digital	Input/Output	16 in 8 out	2HA015232		



Top: Analog 24 channel input board Bottom: Digital 16 channel output board

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