

## **AccelNET Control Technology (ACT) System**



*NEC ACT chassis populated with 7 boards*

### **APPLICATIONS**

NEC's AccelNET Control Technology (ACT) is a modular data acquisition system designed to meet the needs of modern accelerator equipment. This system is integrated with the NEC AccelNET control computer to provide a complete computer control system for NEC accelerators. Since 2009, all new computer controlled NEC accelerators are equipped with ACT.

### **DESIGN**

ACT was designed by NEC as a replacement for the previously commonly used data acquisition system, CAMAC.

The ACT system consists of a base chassis populated with up to 8 modules. The rear panel is modular and loaded with 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.

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 manual controlled accelerators can be upgraded to computer control with the integration of ACT and the NEC AccelNET Control system.

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## MODULE TYPES

### Analog Modules

A total of six different analog modules are offered (16-24 channels) for input and output to provide maximum flexibility for system configuration. The modules provide transient protected inputs and outputs. A separate A/D converter (ADC) is used for each input channel. A separate D/A converter (DAC) is used for each output channel. Each channel's gain and unipolar/bipolar mode can be independently set. The ADC contains a filter that is used to reduce AC line noise. The front panel channel LED brightness is proportional to the input/output voltage. The channels are continuously converted and stored in the internal memory. The internal memory may be read at any time by the host computer. Each module has front panel test points and an on-board calibration table. The output modules include a watchdog timer system.

	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 boards

There are also three different digital boards offered (16-24 channels) for both input and output to provide maximum flexibility for system configuration. These modules have optically isolated inputs/outputs and include a front panel LED for each input/output. The output boards include a watchdog/timer system. They can accommodate AC or DC input/output voltage and have self resetting fuses.

## CHASSIS UNIT

The chassis is designed to accommodate up to 8 modules. It has a wide range of power input, being capable of running at 100-250VAC at 50/60Hz. It is fan cooled and over temperature protected.

## WATCHDOG TIMER SYSTEM

The digital control and analog control modules both have watchdog capability. If digital or analog control mezzanines are mounted on digital or analog read boards then they have watchdog capability as well.

The watchdog timeout value is set by writing to the timeout period register. The timeout value is in milliseconds with a decimal range of 0-65534.

The AccelNET software programs the board for a 3 second timeout and refreshes it once per second. Individual channels may be excluded from watchdog timeout by setting the appropriate bit in the digital/analog control mask word.

The software allows the watchdog to be operated in two possible ways. It can automatically reset (legacy) if a timeout occurs or it may be reset by explicit command.



[ACT v1]

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## SPECIFICATIONS

The ACT system is designed for maximum flexibility. Number and type of channels can be selected for your specific requirements. Each chassis can hold up to 8 boards.

### Board Types:

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



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



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