

# Common Q Platform

## Background

The Westinghouse Common Qualified, or Common Q™, safety grade instrumentation and control (I&C) platform is the U.S. Nuclear Regulatory Commission (NRC)-approved safety platform for global new plant build applications and certain safety system upgrades for operating plants. The AC160 platform is the ABB product that is the core of the I&C digital safety system. The node box/flat panel display is the human-machine interface for the safety systems. The Common Q platform is defined in Topical Report WCAP-16097, which was approved by the NRC.

A full spectrum of Class 1E systems can be implemented with Westinghouse's Common Q platform such as:

- Reactor protection system
- Engineered safety features actuation system
- Post-accident monitoring system
- Diesel load sequencer
- Core protection calculator system

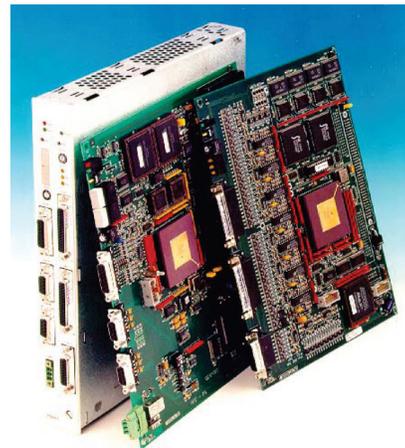
## Description

Common Q platform is a group of building blocks that can be configured for safety-related systems. The Common Q platform consists of the following major building blocks that are used in the design of the replacement safety systems:

- Advant Controller 160
- PM646 processor module
- S600 I/O
- AF100 communication interface
- Flat panel display system
- PC node box
- Flat panel display
- AF100 communication interface

### Advant Controller AC160

The AC160 is a high-performance modular controller with multiprocessing capability for logic control. It can be used stand-alone or as an integrated controller in a distributed control system, communicating with other Advant equipment. The processor module used for Common Q applications is the PM646A. The AC160 is fully modular. All process connections are made to compression terminals on standardized connection units. The AC160 is designed to operate in demanding industrial environments.



PM646A processor

### S600 Input and Output Modules

The S600 family of I/O modules contains traditional I/O functions such as analog input (including differential, thermocouple and resistance temperature detector), analog output, digital input and digital output. S600 I/O modules typically contain 8, 16 or 32 input or output channels, depending on the module. The I/O modules are placed in the AC160 Controller subrack and extension subracks. The extension subracks communicate with the main AC160 subrack via a hardwired bus extension. Process signals are connected to the front of each I/O module via pre-fabricated cables from either field terminal blocks or termination units.

### Flat Panel Display System

The flat panel display system is the human-system interface for the Common Q safety system. It consists of a PC node box and a touch screen video display. The display is available in various screen sizes: 6.5 in (16.51 cm), 12 in (30.48 cm), 15 in (38.1 cm) and 19 in (48.26 cm).



PC node box

### Benefits

A Common Q platform provides significant features and benefits that include:

- Improved reliability
  - Improved reliability is attained through utilization of high reliability equipment.

- Reduced manual surveillance and test labor
  - Internal self-diagnostics of the equipment and automated surveillance test applications are combined to provide the potential to reduce or eliminate periodic surveillance testing. These self-diagnostics and test provisions have been reviewed and approved by the NRC as described in the Common Q safety evaluation report. This provides the potential to extend the periodicity of calibration checks and manual tests.
- Improved maintainability
  - The self-test and diagnostic features reduce technician burden for surveillance and periodic testing. This feature improves technician ability to perform troubleshooting of channel equipment failures. An advanced maintenance interface with a color touch screen improves the ability for the technician to determine the detailed status of the system, including the ability to interact with the automated self-test features and diagnostics.
- Plant computer interface
  - The maintenance and test panel provides an isolated Ethernet connection to the plant computer. This feature allows the plant computer to monitor the status of the safety systems.
- System performance enhancement
  - The Common Q platform significantly reduces the utility operation and maintenance costs, including technical support, training and spare parts logistics.

### Experience

As of 2012, the Common Q system is implemented in various systems in 22 nuclear power plants in operation or under construction in the Europe, the United States and Asia.

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