

# Control Room Annunciators

Plant Information Solutions

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Power & Process Products and Services



## About

Curtiss-Wright is a global integrated company with a long tradition of providing state-of-the-art, reliable solutions through trusted customer relationships.

The Plant Optimization Group, a business unit within Plant Information Monitoring and Control, provides a variety of products, services, and software-related solutions to the global power industry. We are leaders in thermal performance software and services; equipment reliability solutions; valve condition monitoring; and advanced data analytics. We further enhance our customer support through our Monitoring and Diagnostic Center providing remote detailed evaluation of the condition of clients' assets.

We are committed to the safe operation and improved performance and reliability of power plants worldwide.

## Seamless Annunciator Update and Installation

Control Room Annunciators (CRA) alert operators to off-normal plant conditions and guide them in the mediation and resolution of emergent plant issues. Most CRAs in service today are 1970 era designs that, while having served well, have both material aging (fragility) and component obsolescence issues that demand immediate attention for the continued safe and reliable operation of the plant.

Annunciators are generally, stand-alone systems that collect, condition, and aggregate data from all over the plant. This data is then combined logically to indicate off-normal conditions and alert the operators, visually and audibly, that remedial actions may be required to return the plant to its normal operating state. Replacing these obsolete devices with modern state-of-the-art collection, conditioning, and display devices need not be a complex or risky endeavor.

A new Annunciator system, using traditional light boxes, standard large format flat screens, or uniquely configured small format flat screens that fit existing control panel cutouts, can easily and cost effectively update the control room. Further, the new Annunciator is able to share its information with personnel throughout the plant, thus improving worker efficiency without compromising cyber security. The new system enables automatic alarm procedure recall, operator defined workstation screens for managing common plant upsets and displays that may be "steered" to multiple workstations, should it be required.

The Annunciator is redundant throughout with seamless transfer between the primary system and backup. System health is indicated on the operators display and in the maintenance center. Further, the system, I/O hardware (down to the input) and network components can be 100% supervised by the system fulfilling both cyber security (network) and maintenance department (hardware and software) requirements.

Installation risks and time are minimized by the use of adapter cables to connect all input signals. Should the Annunciator logic require modification at a later date, it is accomplished by simple logic object reconfiguration rather than hardware modifications. Annunciator logic functions are executed in the self-contained, fully redundant, seamless failover systems.

The Annunciator may be connected to the plant network and share time stamped information that is the core of the alarm function. This enables and empowers the engineering staff to analyze and correct issues ranging from repetitive plant anomalies to spurious nuisance alarms.

The Annunciator system uses standard commercial-off-the-shelf equipment that implement standard device and communication interfaces such as Ethernet, HDMI, DVI and VGA to ensure forward compatibility with evolving display technology. Only where required are custom displays used to meet control board physical requirements and these are configured, to the largest extent possible, with standard, readily obtainable components.

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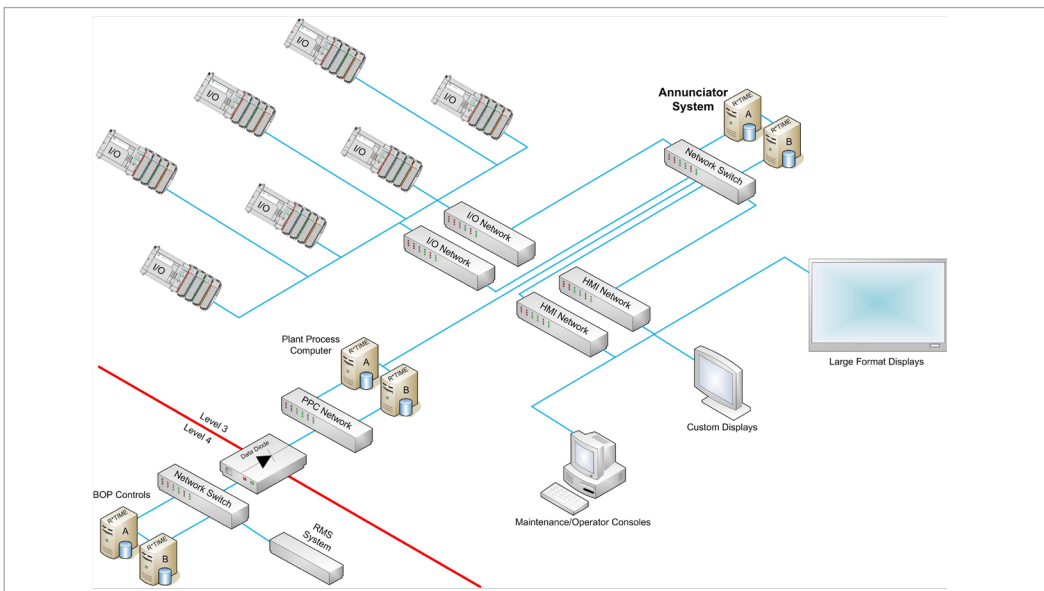
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The system is configured to replicate the current system operation. The number of alarm states (e.g. Normal, Unacknowledged, Acknowledged, Unacknowledged Return to Normal) and operating modes per alarm such as Seal-in and Not Seal-in are all accommodated. Audible alarm notification is carried out using the same or new physical devices.

Availability is an integral part of the product design. Redundancy can be augmented in several different ways to increase the robustness of the design beyond 99.99%. Annunciator logic execution is accomplished in dual redundant processors. End-to-end system integrity is assured by the capability to steer annunciator displays to any console in the control room should a primary display failure occur.

The system is designed to replicate the current operator interface. It is, however, not limited to that paradigm and can be adjusted to reflect the operating needs of the plant. This capability empowers the plant to refine the Annunciator operation to match the plant's changing requirements up to and including safe shutdown and safe store.

The Annunciator can be configured to accommodate various plant operating modes including maintenance and surveillance. Special symbols and condition indicators may be included on alarm panels. Programmable alarm delays can be incorporated in the system to inhibit the display of distracting information.



The system has the ability to combine multiple digital inputs into a single alarm. This permits the development of multiple input alarm Drops. These Drops will behave in the same manner as a single input Drop with the exception that when the Drop is in the Acknowledged Alarm state and another Drop input enters the alarm state the Drop will reflash and return to the Acknowledged Alarm state when acknowledged. Likewise, if multiple inputs are in the alarm state and one returns to normal, the Drop will reflash and return to the Acknowledged Alarm state when acknowledged. Individual inputs into multiple input Drops can be normalized to support the black board concept and prevent masking a new item of concern with a long standing condition.

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