

**Response to NRC Request for Additional Information on the  
Common Qualified Platform Topical Report  
(WCAP-16097-P, Rev. 1)**

**January 2012**

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1. The AC160 S600 I/O modules listed below are described in Section 5.2.1.1.3 of the topical report (TR) but are not listed as AC160 Hardware Modules in Table 11-1 of the TR. Since Table 11-1 shows components to the common Q platform that are qualified for use per document 2C48361, it is unclear why these non-approved modules are being described.

S600 Input / Output Modules		
4	AI630	RTD / Resistance Input
5	AI635	Thermocouple Input
6	DI621	Digital Input
7	DO610	Digital Output

Please provide an explanation for why these modules are being described in the Common Q TR or why they are not listed as approved common Q platform components. The U.S. Nuclear Regulatory Commission (NRC) staff would like to know if it is Westinghouse Electric Company's (Westinghouse) intent to have these modules included as approved common Q platform components.

**Westinghouse Response:**

The modules listed in the table above have been superseded by other modules, or they are no longer being used. Therefore, Revision 2 of the Topical Report will remove those modules from subsection 5.2.1.1.3.

2. Use of the terms "Channel" and "Division" throughout the TR is not consistent with industry accepted terminology. For example, throughout the TR, the term channel is used to denote redundant implementations of safety applications; however, Section 5.6 of the TR contains a discussion of AF100 configurations that cross division boundaries. This section also discusses the use of High Speed Link (HSL) links to cross divisional boundaries. It appears that the terms are being used in a synonymous manner. These terms are not defined in the Glossary of the TR. The following definitions are provided in IEEE Std 7-4.3.2 2010.

*channel: An arrangement of components and modules as required to generate a single protective action signal when required by a generating station condition. A channel loses its identity where single protective action signals are combined. (IEEE Std 603-2009)*

*division: The designation applied to a given system or set of components that enables the establishment and maintenance of physical, electrical, and functional independence from other redundant sets of components.*

It is important for the purposes of this safety evaluation for the NRC staff to understand the intended context for these terms as they are applied in the TR. Please provide definitions for these terms relative to how they are used in the TR.

**Westinghouse Response:**

Revision 1 of the Topical Report was reviewed, and the use of "channel" and "division" are now used consistent with IEEE Std. 603 for Revision 2.

3. I/O Modules

In Section 5.2.1.1.3 of the TR, the following statement is made in regard to the replacement capabilities of I/O modules:

*“All I/O modules may be replaced electrically, not necessarily system wise, while the system is powered (and typically in test mode).”*

The NRC staff requires clarification of what is meant by the terminology “system wise.” Please explain this terminology and provide information regarding any limitations that would need to be imposed on system operability when I/O modules are to be replaced.

**Westinghouse Response:**

The term “system wise” refers to the ability to replace an I/O module in a particular system without having to bypass a channel/division. This restriction has been defined in WNA-DS-01070-GEN, “Application Restrictions for Generic Common Q Qualification”. Restriction H48 states:

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Westinghouse submitted documents, WNA-DS-01070-GEN-P and NP on the docket under transmittal letter, LTR-NRC-11-67.

4. Please provide additional information regarding the various watchdog timer (WDT) functions that are described in Sections 4.1, 5.2.4, 5.2.1.2.1 and 5.4.4. Specifically, the staff requests clarification in regard to the following WDT functions of the common Q platform.
  - a. Since there does not seem to be a separate WDT module included in the common Q platform any longer, it is not clear why a separate module is being described. Please provide a description of the WDT module if it is to be included as a common Q platform component or clarify what is being referred to in Section 5.2.

**Westinghouse Response:**

The description of the watchdog timer was supplemented with additional information and moved to subsection 5.2.1.3. A figure will be added that provides a configuration of the

watchdog timer. Table 5-1 will be added to provide a summary of the watchdog timer arrangement. This information has been provided in Appendix A.

Accordingly, WDT will be removed from Section 5.2, since it is not considered a separate building block of the Common Q Platform.

- b. Since the WDT is built into the processor module it is unclear to the staff how it would be connected to external systems as described in Section 4.1. Please provide an explanation and/or specific example of how a system would be configured to utilize this function. This explanation should include a description of how signal isolation between systems is achieved.

**Westinghouse Response:**

The figure that will be added in 5.2.1.3 (provided in Appendix A) depicts a normally closed relay. This relay can be used to initiate a fail-safe state (e.g., Reactor Trip).

- c. Section 5.2.1.2.1 on page 5-13 implies that there are two different watchdog functions being performed by the system; however, only one watchdog function (other than the application watchdog function) is described within the TR in Section 5.2.4, "Watchdog Timer".

**Westinghouse Response:**

The two watchdog functions described in subsection 5.2.1.2.1 refer to the [ ]<sup>a,c</sup> Subsection 5.2.1.3 will provide a further description of the watchdogs in the PM646A. See Appendix A.

- d. Please provide a description of the functions performed by the "WD-Timer of the uP58360" which is also referred to as the "processor watchdog" within the TR.

**Westinghouse Response:**

Subsection 5.2.1.3 will provide a description of the functions performed by Watchdog timer of the uP68360. See Appendix A.

- e. Does the updated common Q system retain the capability for an Application Watchdog Timer to be implemented? Section 5.4.4 of the TR was revised to eliminate previous requirements for application WDTs and explanations were added to justify this change. It is not clear to the staff whether these application WDTs will be retained as a feature of the common Q system or if this feature is being eliminated from the common Q system altogether. As revised, Section 5.4.4 no longer provides any description of the application WDT function or provisions for when it is to be implemented. Please provide an explanation of this feature including a discussion of when it would be implemented, or state that application WDTs are no longer required for common Q systems if this is the case.

**Westinghouse Response:**

The application watchdog function was never a platform function. It was a requirement on the project-specific application software to implement logic heartbeats. This requirement is not required as justified in Section 5.4.4.

To eliminate confusion, "hardware watchdog" was changed to "hardware watchdog function" in subsection 5.4.4.

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5. The staff's approach to this safety evaluation update is to determine if the previously established safety conclusions are impacted by revisions made to the TR and changes made to the common Q platform components. As such, any restrictions imposed by previous SE's are not being revised or evaluated. Please identify if there are any restrictions or previous SE conclusions that Westinghouse intends for the staff to re-evaluate as a part of this SE effort.

**Westinghouse Response:**

There are no restrictions or conclusions in the previous SER that Westinghouse would like the staff to re-evaluate.

## Appendix A – Watchdog Timer

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] <sup>a.c</sup>

The watchdog timer relay is a form C relay, whose contacts are accessible from the processor front panel. Depending on the specific system application, the watchdog timer can be used to annunciate a failure, actuate a divisional trip, or set output states to predefined conditions. For example, the watchdog timer relay may be used to control the power to the relays for the digital output module. Isolation is provided for those applications where the watchdog timer is connected to external systems.

<b>Table 1 Processor Module WDT Arrangement Watchdog Timer Summary</b>			

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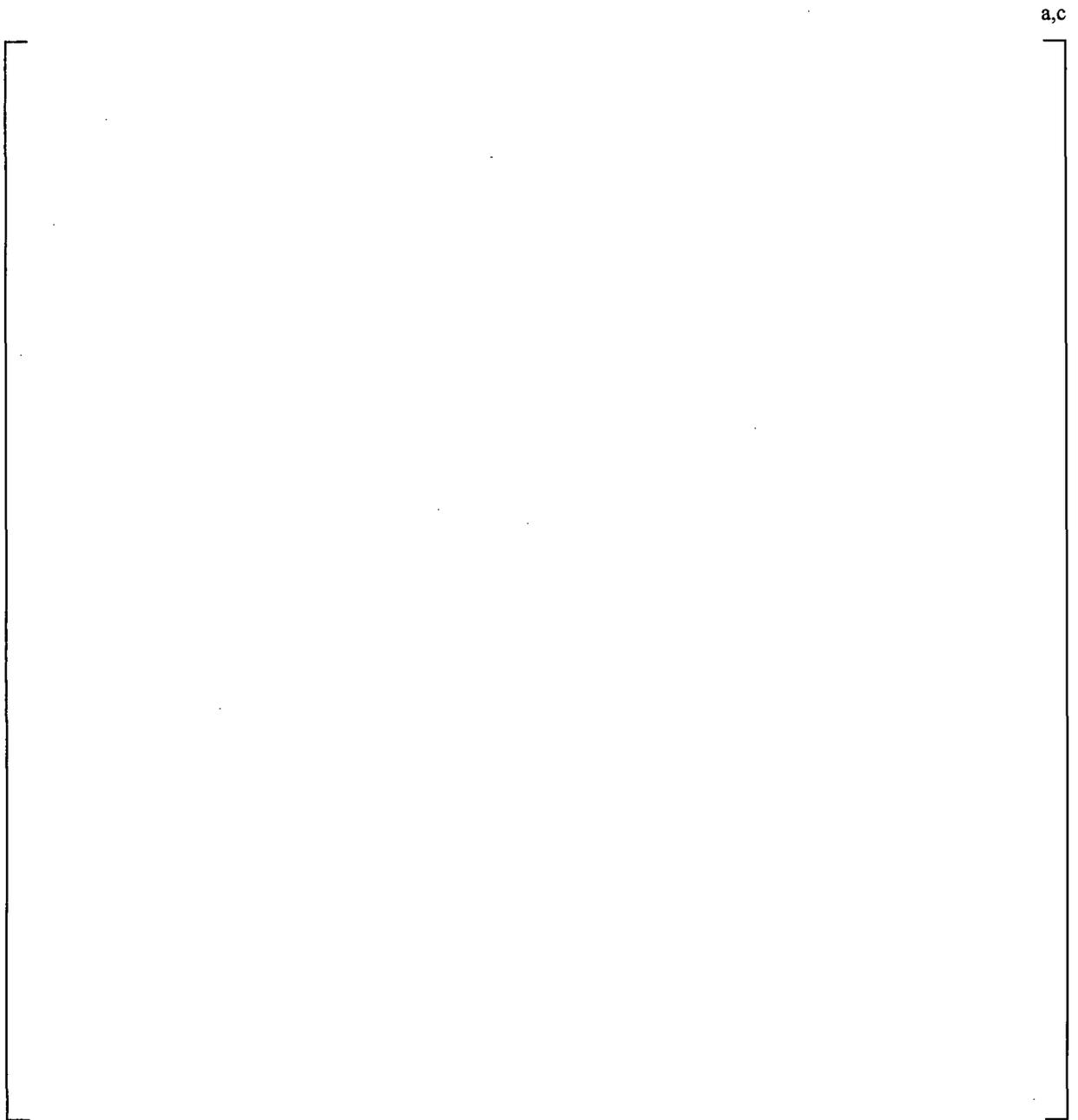


Figure 1 Watchdog Timer Configuration