CS300

Migrating a CS300 Controller

The following definitions are related to CS300 hardware and are used in only this appendix of this manual.

Abbreviations

- ICCB - Integrated computer control board (the legacy CS300 processor board)
- PI - Process Interface
- PIM - Process Interface Module
- TM - Termination Module

Overview

You can migrate the I/O of an existing CS300 controller to a Trusted TMR System. The migration process lets you retain the hardware and wiring of the existing I/O, and take advantage of the benefits of a Trusted TMR System.

This appendix defines how to safely migrate an existing CS300-based system to a Trusted TMR System for a Safety Instrument Function while retaining the DIN19250/AK6 certification of the original system. The migration of a CS300 controller described here is suitable for low demand applications.

Note: These instructions apply to inputs and outputs used for Safety Instrumented Functions. Where I/O points are used for only monitoring, or only redundant indication, these instructions do not necessarily apply. For guidance on how to migrate a CS300 system for non-safety applications, refer to application note AN-T80014.

The migrated system uses a T8100 Trusted Chassis and its T8110B Trusted TMR Processor module running an updated application, together with three 8162 CS300 Bridge Modules (installed in the original CS300 primary rack) and associated cabling. The migrated system retains the original CS300 racks, I/O modules, and field wiring, but the CS386 integrated computer control boards (ICCBs) are removed and the original application is no longer used.

The hardware changes are summarized as follows. The three ICCBs are removed, and three 8162 CS300 Bridge Modules are fitted in their place. A small PCB is fitted to rear of the CS300 rack, and the rack is connected to the Trusted Chassis by a ready-made cable assembly. The original field wiring remains unchanged. It is recommended that the Trusted chassis is installed close to the original CS300 primary rack. This will make operation and maintenance easier.

The software changes are more complex. In particular:

1. The existing application must be recreated to run on the Trusted TMR System.
2. The new application has to retain the safety integrity of the original system. The DIN19250/AK6 standard of the original controller was the predecessor to the SIL 3 rating of IEC 61508, and while the Trusted TMR System is certified to SIL 3, the original I/O will remain DIN19250/AK6.
3. The new application needs to include diagnostic functions to replicate diagnostic functionality that was built into the original application.
4. The new application must monitor the state of the TM118-TWD watchdog module. If the watchdog module times out, the affected outputs must be latched into the tripped state. See TM118-TWD watchdog module on page 109.

Associated documents

This section provides information about associated documents.

Specifications

AN-T80014: Application Note, Trusted / CS300 Migration Process. Rockwell Automation.

BASS 0257: CS300 Safety System Application Guidelines. Rockwell Automation.

Publication ICSTT-RM404 (PD-8162): CS300 Bridge Module

TÜV Certification

The 8162 CS300 Bridge Module is certified as non-interfering to the Trusted TMR System and can be used to migrate existing applications. It is not intended to be used in new safety systems.

The Autotest management function blocks are approved by TÜV Rheinland for use in safety applications.

You can download a copy of the TÜV certificate from:

http://fs-products.tuvasi.com

List of modules for safety-related applications

A legacy CS300 system is often made up by a large variety of components. The list that follows shows the components of hardware that can be used with the Trusted migration in a safety-related application.

Table C-1 List of CS300 Modules Suitable for Safety-Related Applications

Item	Description	Part No. / Revision	Remarks
1	PI-316 extension chassis (6 series)	001-1053	
	... PI-651 bus interface card (qty 3)	099-1037	
	... process interface module (PIM) chassis	031-0531	
2	PI-317 extension chassis (7 series)	001-1054	
	... PI-751 bus interface card (qty 3)	099-1037	
	... PIM chassis	031-0531	
3	Ext. chassis interface board	001-1024-00	
	... assembled PCB	099-1037-03	
4	PI-331/C triplicated power supply 24V DC	001-1011-00	
	... chassis assembly	031-1003-01	
	... modules 24V DC	031-1000-01	

Table C-1 List of CS300 Modules Suitable for Safety-Related Applications

Item	Description	Part No. / Revision	Remarks
	... cooling fan unit	031-1001-01	
4	PI-110/C PI-M cooling module	001-1010-02	
5	PM108 D/C power supply digital termination (24V DC)	001-1039-00	
	... chassis	031-1005-02	
	... power supply module	031-1004-01	
6	TM118-TWD triplicated watchdog timer	001-1032-00	
7	PI-716 digital input board	099-1045	AK6 certified 3 2 0 and 3 2 1
8	PI-726 digital output board	099-1078	
9	PI-727 digital output board	099-1043	AK6 certified 3 2 1
10	PI-732 analog input board (5V unipolar)	099-1042	
11	PI-616 digital input board	099-1124	AK6 certified 3 2 0 and 3 2 1
12	PI-626 digital output board	099-0084	
13	PI-627 digital output board	099-0074	AK6 certified 3 2 1
14	PI-632 analog input board (5 V unipolar)	099-1105	
15	TM-117-RME termination panel digital output monitor (24V DC)	099-1094-00	Only use in dual tested configurations
16	TM-118-D digital termination panel (24V DC)	099-1003	Only use in dual tested configurations
17	TM117-SME digital output testing	099-1097/8/9	
18	TM117-DC digital input	099-1000	
19	TM118-DH digital input	099-1157	
20	TM119-DH digital input	099-1152	

Note: The PI-641 and PI-741 analog output modules and their associated termination panels are also supported by the migration, but for only non-safety applications. Therefore, there is no function blocks associated with these modules.

Requirements for the Trusted TMR system

The Trusted TMR System requires at least a controller assembly and a power system, and possibly an expander system as well. The controller assembly has a T8100 Trusted Controller Chassis to house the essential modules:

- One T8111 or T8110 Trusted TMR Processor.
- One T8311 Trusted Expander Interface modules to provide the interface between the controller chassis and the CS300 chassis.
- One T8151B Trusted Communication Interface for the Ethernet interface to the engineering workstation and, if present, other Trusted systems or third-party equipment. (A T8151C conformal coated version can also be used).
- One T8153 Trusted Communications Interface Adapter, to allow the physical connections to the T8151B Trusted Communication Interface.

The T8100 Trusted Controller Chassis must be installed in a rack with doors and side panels, and the doors must be kept closed during usual operation. This lets the 8162 Bridge Module achieve compliance with its EMC specifications with no degradation in performance. The front door can have a window so that the LEDs are visible. The CS300 equipment must be inside the cabinet and earthed correctly (see Physical Installation Design on page 75). A

complete list of all Trusted items needed for the migration is given in Table C-2.

Table C-2 Trusted Items Needed for the Migration

Item	Description	Remarks
1	T8100 Trusted Controller Chassis	
2	T8111 or T8110B Trusted TMR Processor	
3	8162 CS300 Bridge Module (qty. 3)	
4	TC 324-02 CS300 interface cable connector card	
5	TC 322-02 CS300/SC300E interface cable assembly	
6	T8311 Trusted Expander Interface Module	
7	T8312 Trusted Expander Interface Adaptor	
8	T8151B Trusted Communication Interface or T8151C Trusted Communications Interface (Conformal coated module)	

System architecture features

The three 8162 CS300 Bridge Modules enable the connection between the Trusted TMR System and the legacy CS300 I/O, as shown in this figure:

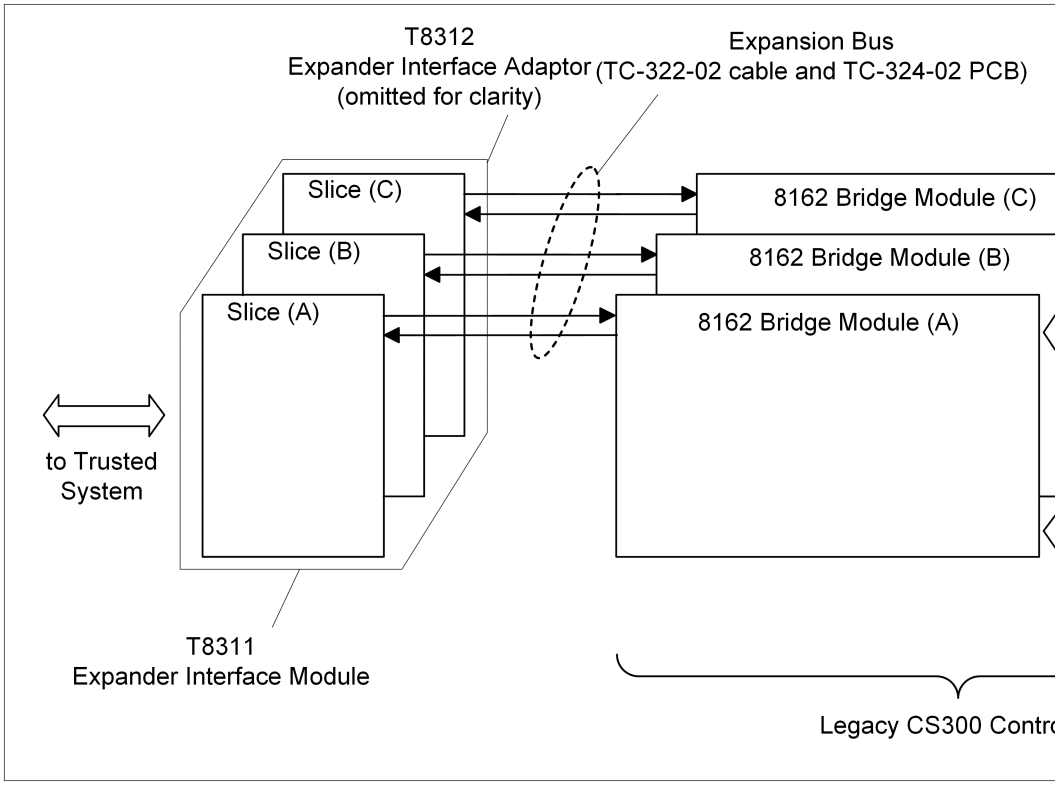

Figure 9: System Architecture features using 8162 Bridge Modules

The system communications must use approved cabling and accessories. In particular:

- The Trusted TMR System carries a T8312 Expander Interface Adaptor and the CS300 rack carries a TC-324-02 PCB.