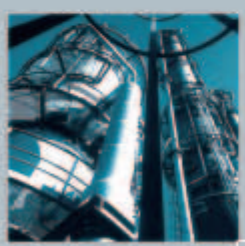
Hardware configuration changes in RUN mode

Product Brief · April 2003

simatic S7-400



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CiR – Configuration in Run

Introduction

Modifications and expansions often become necessary during normal operation of a plant or subsystem, e.g. in order to implement additional sensors or actuators, or in order to assign new parameters to I/O modules for such purposes as changing alarm limits.

Applications of this type are typically found in those sectors with non-stop requirements, in continuous processes that cannot be shut down or in which production must not be interrupted. Examples for this include processing plants or manufacturing plants with high restart costs.

With SIMATIC S7-400, changes can be made to the hardware configuration during normal operation reaction-free. CiR (**C**onfiguration **i**n **R**UN) enables plant expansions and conversions to be implemented during the operating phase.

Advantages

- CiR makes plant expansion and optimization possible. Equipment can be expanded and changed during normal process operation. These modifications to the plant are implemented without any adverse effects. Expansion and conversion are therefore cheaper and faster to implement.
- Changes in RUN mode also support an extremely flexible response to industrial changes and process optimizations.
- Also in the case of plants that do not have any non-stop requirements, modification and reconfiguration in RUN mode can shorten conversion times, because there is no need to reinitialize or resynchronize the plant.

Application

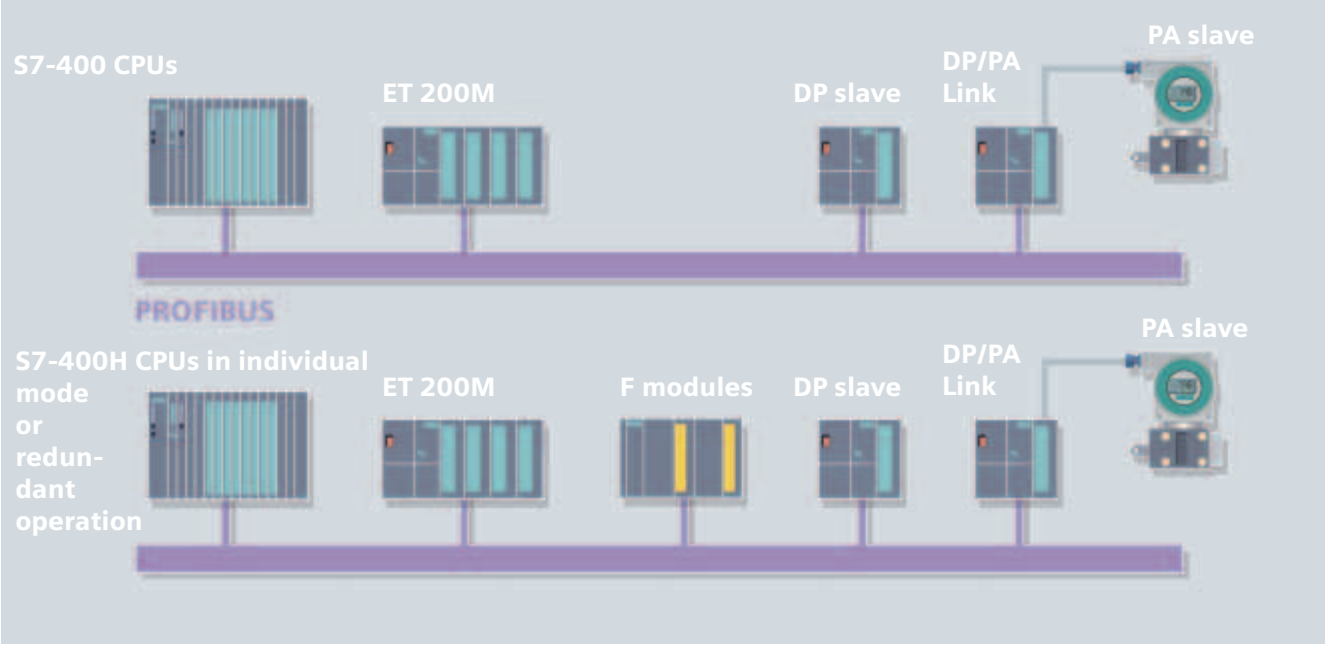
Changes to the hardware configuration in RUN mode are possible for distributed I/O.

All standard CPUs of S7-400 can be used as well as the high-availability S7-400H CPUs in individual mode.

CiR procedures can be performed with the following DP masters:

- CPU through integrated interfaces
- CP 443-5 ext (V5.0 upwards)
- IF 964-DP interface module

S7-400H CPUs in redundant configurations can be modified during operation using the H-CiR function.



Spectrum of the modules that can be added to or removed from a system with an S7-400 as master

CiR – Configuration in Run

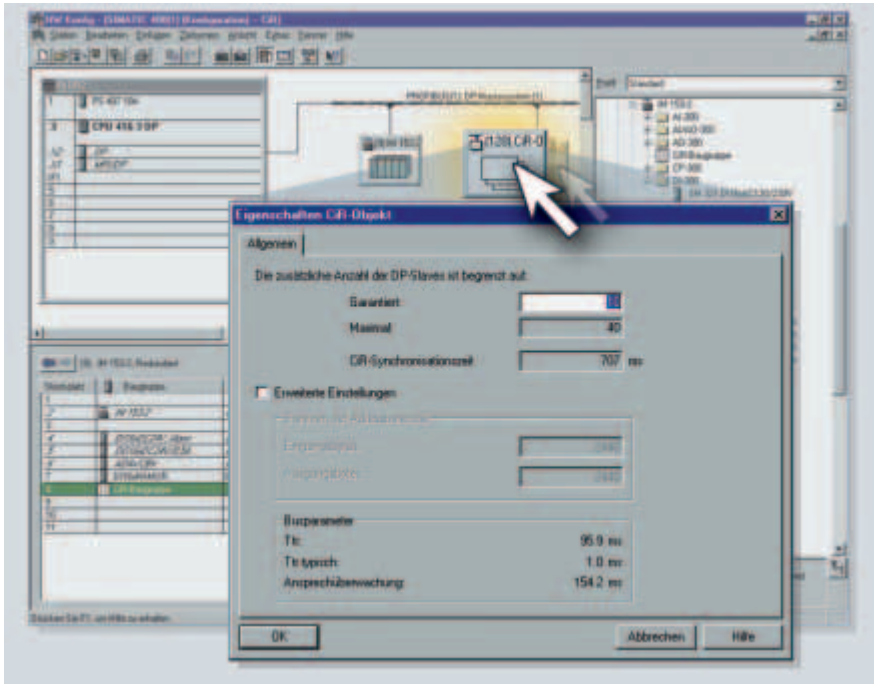
Functions
The following changes to the hardware configuration of a system can be performed during normal operation:

- Stations can be added to the distributed I/O (PROFIBUS DP and PROFIBUS PA slaves), e.g. to establish another process line
- I/O modules can be added to the ET 200M I/O station, e.g. to implement additional sensors
- Changes can be reversed, i.e. additional field devices (DP/PA slaves) and modules can be removed again
- I/O modules in the ET 200M I/O station can be reparameterized, e.g. when a sensor is replaced with one with a different specification during repair or to change alarm limits

Mode of operation
The basic principle of CiR is:

During initial configuration of the hardware configuration with STEP 7, preparations are made for future hardware changes in that the "CiR capability" is activated. "CiR elements" are defined that can be replaced later in CPU mode RUN successively by physical components.

STEP 7 determines the bus parameters taking into account the CiR elements in addition to the slaves that actually exist. The bus parameters remain stable throughout all CiR procedures.



Hardware configuration in STEP 7 using the properties window of a "CiR" element

During reconfiguration in RUN mode, the process inputs and outputs are maintained at their last current value. This period is known as the "CiR synchronization time" and is displayed to the user in STEP 7. The duration is dependent on the degree of expansion of the DP master system and can be optimized by the user.

Workflow for CiR			
Project phase	**Operator step**	**CPU operating mode**	**Frequency**
Initial configuration	Configuring the system Activating the CiR capability Loading the configuration	STOP	Once
Normal operation	**Converting "CiR elements" into real components**	**RUN**	**As often as required**

Technical specifications

Configuration changes	To the following components	Requirements
Adding stations to the distributed I/O	▪ DP slaves, e.g. interface module IM 153-2 ▪ DP/PA coupler, e.g. interface module IM 157 ▪ PA slaves, e.g. SIMOCODE®	▪ All S7-400 standard and H CPUs, firmware version V3.1 upwards ▪ STEP 7, Version 5.2 ▪ No multicomputing ▪ No multimaster configurations
Adding I/O modules to the ET 200M I/O system: ▪ IM153-2 High Feature interface module (Order No. 6ES7153-2BA00-....) or ▪ IM153-2 High Feature FO interface module (Order No. 6ES7153-2BB00-....)	▪ Standard I/O modules ▪ Failsafe I/O modules	
Reversing changes	▪ Added modules	
Reparameterizing I/O modules in the ET 200M I/O station with IM 153-2 (e.g. activating unused channels or assigning new parameters to previously used channels; changing alarm limits)	▪ Standard I/O modules	

Further information regarding SIMATIC controllers can be found in the Internet:
www.siemens.com/simatic-controller

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