Table of Contents

1 Product Description

HIPRO-S is a protocol for safety-related communication between HIMA controllers programmed with ELOP II (e.g., H41q/H51q).

The present document describes how to use HIPRO-S Check Tool to verify the assignment of the HIPRO-S variables. HIPRO-S Check Tool can be used to detect HIPRO-S configuration errors, which cannot be detected using the standard HIPRO-S signature.

⚠ NOTE

HIMA strongly recommends using HIPRO-S Check Tool if no *Enhanced HIPRO-S Signature* has been configured (ELOP II V5.1 build 730.1646 IV5 and higher) and any of the following conditions applies:

- Prior to starting up the controllers.
- Whenever HIPRO-S variables are changed in the resources.
- After upgrading or downgrading ELOP II.
- After switching between download and reload code generation.

If changes were performed to the project, proceed as described in the safety manual (HI 800 013 E).

1.1 Changed HIPRO-S Assignment

A change in the assignment of HIPRO-S variables can already result from adding, deleting or renaming HIPRO-S variables in one of the two resources.

The signature for HIPRO-S communication is determined in ELOP II (up to build 710 IV7) based on the first 8 characters of the HIPRO-S variable names. As long as HIPRO-S variable names exist for which the first 8 characters composing the name are identical, any change in the order of the HIPRO-S variables remains undetected.

1.2 ELOP II Versions up to V5.1 Build 710 IV7

A HIPRO-S Check Tool variant is available for ELOP II V4.1 (build 6123 and higher) and one for ELOP II V5.1 (up to build 710 IV7).

If projects created with ELOP II V3.0 or ELOP II V3.5 should be checked, they must be previously converted to V4.1 or V5.1; refer to Chapter 1.2.1 and Chapter 1.2.2 for further details.

1.2.1 Conversion from V3.0 to V3.5

A project created with ELOP II V3.0 must be previously converted from ELOP II V3.0 to ELOP II V3.5. The conversion results in a new code version.

Follow the instructions provided in the manual *Instructions for conversion of user programs from ELOP II-NT V 3.0 to ELOP II V 3.5* (HI 800 307 E) to convert projects from ELOP II V3.0 to ELOP II V3.5.

1.2.2 Conversion from V3.5 to V4.1

A project created with ELOP II V3.5 must be previously converted from ELOP II V3.5 to ELOP II V4.1. The conversion results in a new code version if certain functions such as step sequences were used in V3.5.

Follow the instructions provided in the manual *Converting Projects from ELOP II V3.5 to ELOP II V4.1* (HI 800 317 E) to convert projects from ELOP II V3.5 to ELOP II V4.1.

1.3 ELOP II V5.1 Build 730.1646 IV5 and Higher

HIPRO-S Check Tool is already included in ELOP II V5.1 (build 730.1646 IV5 and higher).

For ELOP II V5.1 (build 730.1646 IV5 and higher), the complete name of the HIPRO-S variable is taken into account when determining the signature. Improper assignment of HIPRO-S variables can thus be avoided. To this end, the *Enhanced HIPRO-S Signature* attribute must be set prior to generating the code.

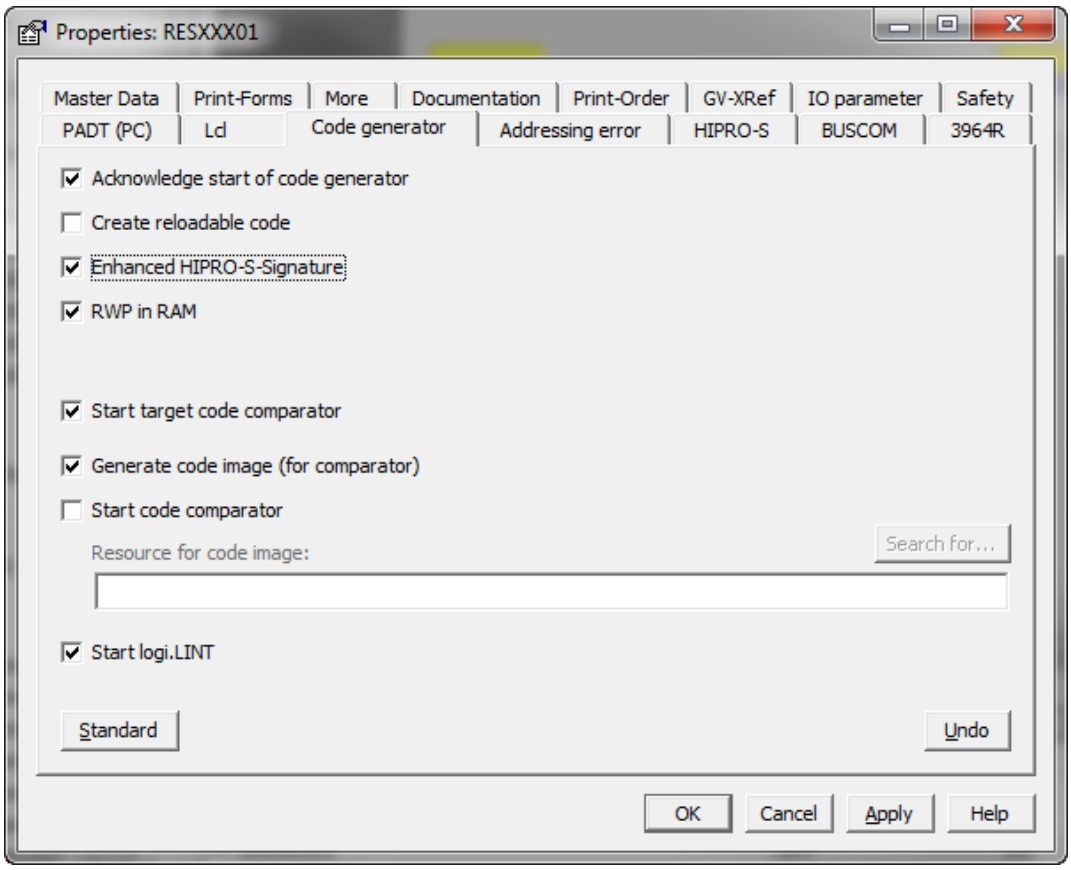

Figure 1: Resource Properties

For projects (up to build 730.1646 IV5) with improper assignment of HIPRO-S variables, *Enhanced HIPRO-S Signature* muss be activated after successful conversion to build 730.1646 IV5!

In the corresponding resources, deactivate *Create reloadable code* in the code generator and generate the code for download.

2 Using the HIPRO-S Check Tool

HIPRO-S Check Tool can be used to verify if HIPRO-S data exchange between resources is consistent within a project.

Each of the variants of HIPRO-S Check Tool can only be used for the intended ELOP II version, either V4.1 or V5.1. If HIPRO-S Check Tool is not started in the suitable ELOP II version, an error message appears.

HIPRO-S Check Tool must be used for resources communicating via HIPRO-S, provided that HIPRO-S variables exist for which the **first 8 characters** composing the name are identical.

The installation package *HIPROCHECK.zip* is located on the HIMA DVD in the *ELOP II/Tools* directory and at this link ->Download HIPROCHECK.zip.

2.1 Checking Projects with HIPRO-S Check Tool

The following chapters describe the installation of HIPRO-S Check Tool and how to check and evaluate ELOP II projects.

2.1.1 Installing HIPRO-S Check Tool

The *HIPRO-S Check Tool* file and the *batch file* suitable for the ELOP II version in use must be copied to the *ELOP II/BIN* working directory.

Files for ELOP II V4.1

- **H5ChkHiproSLayoutV41.exe** (HIPRO-S Check Tool)
- **HIPROCHK.bat** (batch file)

Files for ELOP II V5.1 (up to build 710 IV7)

- **H5ChkHiproSLayoutV51.exe** (HIPRO-S Check Tool)
- **HIPROCHK.bat** (batch file)

Files for ELOP II V5.1 (build 730.1646 IV5 and higher)

- **H5ChkHiproSLayout.exe** (is already included in build 730 IV4)
- **HIPROCHK.bat** (batch file)

2.1.2 Checking ELOP II Projects

All generated and loaded HIPRO-S connections of the ELOP II project are checked by calling the batch file.

To perform the check

1. From the **ELOP II Control Center**, select and start the **ELOP II Command Prompt**.
2. From the *ELOP II Command Prompt,* open the configuration directory for the project to be checked (folder with the file extension **.L2C*).
   Example: `D:\HIPRO_TEST.L2P\02_Configuration_OK.L2C>`
3. Call **HIPROCHK** to start the project check.
   Example: `D:\HIPRO_TEST.L2P\02_Configuration_OK.L2C>HIPROCHK`
   ☑ The check result is displayed in the *ELOP II Command Prompt*. Additionally, the check result is saved as *.log file in the configuration directory of the checked project.

2.2 Check Evaluation

The check results help users not only to recognize if faulty versions have already been loaded, but also if faults would occur when loading the resource(s).

For details on possible check results and connected mandatory actions, refer to Chapter 2.2.1, Chapter 2.2.2 and Chapter 2.2.3.

2.2.1 Identical Signatures and Data Layouts

If the signatures and the HIPRO-S data layouts of the resources are consistent, a success message is displayed.

```
ELOP II Version 5.1B730 H5ChkHiproSLayout Version 1.9 Win32
Check HIPRO-S layouts
Copyright logi.cals(R) (kirchner SOFT GmbH) 1994-2012. All rights reserved.


INFO: Run layout checks for ressource <RESXXX01>.
INFO: Layout checks for ressource <RESXXX01> finished with 0 error(s) and 0 warning(s).

INFO: Run layout checks for ressource <RESXXX02>.
INFO: Layout checks for ressource <RESXXX02> finished with 0 error(s) and 0 warning(s).
```

Figure 2: Consistent Signatures and HIPRO-S Data Layouts

2.2.2 Identical Signatures, Differing Data Layouts

A faulty assignment of HIPRO-S variables has been detected. An error message appears.

Please contact HIMA technical support!

```
ELOP II Version 5.1B730 H5ChkHiproSLayout Version 1.9 Win32
Check HIPRO-S layouts
Copyright logi.cals(R) (kirchner SOFT GmbH) 1994-2012. All rights reserved.


INFO: Run layout checks for ressource <RESXXX01>.
ERROR: Layout downloaded/import SIG=A927 (RESXXX01) -> downloaded/export SIG=A927 (RESXXX02) is different but
signatures are equal! Reliable communication cannot be assured and must be checked! Please contact HIMA support.
ERROR: Layout generated/import SIG=A927 (RESXXX01) -> downloaded/export SIG=A927 (RESXXX02) is different but
signatures are equal! Reliable communication cannot be assured and must be checked! Please contact HIMA support.
ERROR: Layout generated/import SIG=A927 (RESXXX01) -> generated/export SIG=A927 (RESXXX02) is different but
signatures are equal! Reliable communication cannot be assured and must be checked! Please contact HIMA support.
INFO: Layout checks for ressource <RESXXX01> finished with 3 error(s) and 0 warning(s).

INFO: Run layout checks for ressource <RESXXX02>.
ERROR: Layout downloaded/export SIG=A927 (RESXXX02) -> downloaded/import SIG=A927 (RESXXX01) is different but
signatures are equal! Reliable communication cannot be assured and must be checked! Please contact HIMA support.
ERROR: Layout generated/export SIG=A927 (RESXXX02) -> downloaded/import SIG=A927 (RESXXX01) is different but
signatures are equal! Reliable communication cannot be assured and must be checked! Please contact HIMA support.
ERROR: Layout generated/export SIG=A927 (RESXXX02) -> generated/import SIG=A927 (RESXXX01) is different but
signatures are equal! Reliable communication cannot be assured and must be checked! Please contact HIMA support.
INFO: Layout checks for ressource <RESXXX02> finished with 3 error(s) and 0 warning(s).


ERROR: 2 ressource checks failed (see above messages)!
```

Figure 3: Faulty Assignment of HIPRO-S Variables Detected

2.2.3 Differing Signatures and Data Layouts

If the HIPRO-S signatures and the HIPRO-S data layouts of two resources differ, a warning message is displayed.

```
ELOP II Version 5.1B730 H5ChkHiproSLayout Version 1.7 Win32
Check HIPRO-S layouts
Copyright logi.cals(R) (kirchner SOFT GmbH) 1994-2012. All rights reserved.


INFO: Run layout checks for resource <RESXXX01>.
WARNING: Layout downloaded/read  SIG=142B (RESXXX01) -> downloaded/write SIG=88E7 (RESXXX02) is different
WARNING: Layout  generated/read  SIG=142B (RESXXX01) -> downloaded/write SIG=88E7 (RESXXX02) is different
WARNING: Layout  generated/read  SIG=142B (RESXXX01) ->  generated/write SIG=88E7 (RESXXX02) is different
INFO: Layout checks for resource <RESXXX01> finished with 0 error(s) and 3 warning(s).

INFO: Run layout checks for resource <RESXXX02>.
WARNING: Layout downloaded/write SIG=88E7 (RESXXX02) -> downloaded/read  SIG=142B (RESXXX01) is different
WARNING: Layout  generated/write SIG=88E7 (RESXXX02) -> downloaded/read  SIG=142B (RESXXX01) is different
WARNING: Layout  generated/write SIG=88E7 (RESXXX02) ->  generated/read  SIG=142B (RESXXX01) is different
INFO: Layout checks for resource <RESXXX02> finished with 0 error(s) and 3 warning(s).
```

Figure 4: Differing Signatures and Data Layouts Detected

Differing signatures and data layouts can be due to the code generation type. A reload code generation can provide a data layout that differs from the data layout resulting from a download code generation.

Differences can be due to changes performed to the data type, or because HIPRO-S variables were added or deleted on either of the two resources.

Use *Cross-Reference* to check the HIPRO-S configuration.

To open the cross-reference

1. In the structure tree, right-click **Configuration** and then select **PES Master** from the context menu.
2. In the *PES Master* dialog box, click **Apply** in the *Compile* area.
3. In the *PES Master* dialog box, click **Cross-Reference**.

   ☑ The *Cross-Reference List* specifies the HIPRO-S configuration errors in detail.
4. Remove the displayed configuration errors and perform the download code generation.

PES master - 10 Configuration | **H51 PES master CRF docu<<10 ...**

PES master	BSN	CU	CM	Variable	Data type	Source	Target	Saftey rel.	Error
PES01	1	1	1	PES1->PES2_Var3	UINT	PES___01	PES___02	*	-
PES01	1	1	1	PES1->PES2_Var4	UINT	PES___01	PES___02	*	-
PES01	1	1	1	PES2->PES1_Var1	UINT	PES___02	PES___01	*	Different data blocks
PES01	1	1	1	PES2->PES1_Var2	UINT	PES___02	PES___01	*	Different data blocks
PES01	1	1	1	PES2->PES1_Var5	BOOL	PES___02	PES___01	*	No source

Figure 5: Cross-Reference

3 Support

The HIMA hotline is free of charge and available from Monday to Friday, 8.30 am – 4.00 pm (CET/CEST).

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