

ETAS INCA-EIP V7.5



User Guide

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1 Introduction

This user guide provides relevant information on the knowledge required to work with INCA and INCA-EIP as the experiment environment in your software development.

It describes how to install the INCA-EIP add-on package, what to consider for the hardware configuration, and what has to be observed when using rapid and virtual prototyping systems for experimenting in INCA.

See chapter "[About INCA-EIP](#)" on page 8 for an overview of the features and functions of INCA-EIP.

1.1 Intended Use

INCA and INCA add-ons are developed and approved for automotive applications and procedures as described in the user documentation for INCA and INCA add-ons.

INCA and the INCA add-ons are intended to be used in industrial labs and in test vehicles.

The INCA-EIP add-on package allows you to use the INCA measurement and calibration system as an experiment environment for the software development of real-time systems. It gives you access to the experimental hardware called E-Target.

ETAS GmbH cannot be made liable for damage that is caused by incorrect use and not adhering to the safety information.

1.2 Target Group

This software product and this user guide address qualified personnel working in the fields of automotive ECU development and calibration, as well as system administrators and users with administrator privileges who install, maintain, or uninstall software. Specialized knowledge in the areas of measurement and ECU technology is required.

1.3 Classification of Safety Messages

Safety messages warn of dangers that can lead to personal injury or damage to property:



DANGER

DANGER indicates a hazardous situation that, if not avoided, will result in death or serious injury.

**WARNING**

WARNING indicates a hazardous situation that, if not avoided, could result in death or serious injury.

**CAUTION**

CAUTION indicates a hazardous situation that, if not avoided, could result in minor or moderate injury.

NOTICE

NOTICE indicates a situation that, if not avoided, could result in damage to property.

1.4 Safety Information

Observe the following safety information when working with INCA and INCA add-ons:

**WARNING****Risk of unexpected vehicle behavior**

Calibration activities influence the behavior of the ECU and the systems that are connected to the ECU.

This can lead to unexpected vehicle behavior, such as engine shutdown as well as breaking, accelerating, or swerving of the vehicle.

Only perform calibration activities if you are trained in using the product and can assess the possible reactions of the connected systems.



WARNING

Risk of unexpected vehicle behavior

Sending messages via bus systems, such as CAN, LIN, FlexRay, or Ethernet, influences the behavior of the systems connected to it.

This can lead to unexpected vehicle behavior, such as engine shutdown as well as breaking, accelerating, or swerving of the vehicle.

Only perform the sending of messages via a bus system if you have sufficient knowledge in using the respective bus system and can assess the possible reactions of the connected systems.

Adhere to the instructions in the ETAS Safety Advice and the safety information given in the online help and user guides.

Open the ETAS Safety Advice in the INCA help menu ? > **Safety Advice**.

1.5 Data Protection

If the product contains functions that process personal data, legal requirements of data protection and data privacy laws shall be complied with by the customer. As the data controller, the customer usually designs subsequent processing. Therefore, he must check, if the protective measures are sufficient.

1.6 Data and Information Security

To securely handle data in the context of this product, see the INCA Help section "Data and Information Security".

2 About INCA-EIP

The INCA-EIP add-on package allows you to use the INCA measurement and calibration system as an experiment environment for the software development of real-time systems. It gives you access to the experimental hardware called E-Target. E-Targets are for example an ES910 Compact Rapid Prototyping device or an ES830 based system. Each of these hardware devices enables you to test the runtime behavior of your software designs. Moreover it is possible to experiment on PC-based hardware using prototypes that are generated by INTECRIO. This type of configuration allows different time scalings.

When working with INCA as your experiment environment, you can use the entire range of our measurement and calibration tools for testing and parameterizing your designs. You can also record measured data, analyze them with the INCA tools and exchange datasets between INCA and ASCET. Moreover you can employ virtual hardware with virtual prototyping models generated by INTECRIO for measuring and calibration tasks.

The add-on installation is only required for rapid and virtual prototyping use cases in INCA. Measurement and calibration tasks using ECU hardware only require an INCA base installation.

3 Installation

INCA-EIP is available as an add-on package for the ETAS measurement and calibration system INCA. INCA must be installed on your computer before you can install this add-on package.

3.1 Preparing to Install

Check to make sure all the items have been delivered and that your workstation complies with the system requirements. Make sure you have the necessary user privileges for the operating system and the network connection being used.

3.1.1 Package Contents

The INCA-EIP package has the following contents:

- Program files for INCA-EIP
- RTA tools for virtual prototyping
- Hardware Service Pack (HSP)
- INCA-EIP documentation

3.1.2 System Requirements

The system requirements are listed in the release notes of INCA-EIP.

3.1.3 Required User Privileges

In order to install INCA-EIP on a PC, you need administrator authorization access. Contact your system administrator, if necessary.

3.2 Installing

The dialog boxes for installing from the DVD and installing from the network drive are identical.

You must have administrator privileges to install INCA-EIP.



Note

Make sure that INCA is installed on your computer and that the release number of the INCA installation is compatible with the release number of the INCA-EIP add-on package.

To download the INCA installation package

1. On the ETAS homepage, click **Download Center**.
2. Search for **INCA > INCA V7.5 > Software**.
3. Download the Installation Package (*.zip).
4. In the Windows File Explorer, select the downloaded ZIP file, right-click and

select **Properties**.

5. On the **General** tab, at the Security option disable the **Unblock** button.
6. Extract the complete structure of the ZIP file.

Note

The fully qualified file name of all components of the setup and the directory name are subjects of a restriction and must fall below a certain character length. The character length is calculated individually.

The path length of the folder where you save the `Setup_ServicePack.exe` shall not exceed 80 characters.

Do not change the folder structure, the folder-names, or any name of installation executables of the installation package.

To install the software

1. Close all open ETAS software.

Note

Do not execute other software updates in parallel, for example an update of the operating system. Wait until all updates are installed and restart the computer before starting the installation.

2. Execute the `Setup_ServicePack.exe` file from your installation directory.
The "Service Pack Installer" window opens.
3. In the **Install** column, enable your desired software products and add-ons.
To select all, enable the corresponding package on top level.
4. Read the license agreement and enable **I read and accept the end user license agreement** option.
5. Select your preferred setup language.

Note


The language you select changes the user interface language for the Service Pack Installer and the language for newly installed and for all already installed INCA and INCA add-on products.

6. Click on **Install**.
The installation process is initiated.
7. Click on **Restart Options**.

The "Restart" dialog box opens.



Note

It is recommended to restart your system after the installation is finished. Some installations require a restart in between the installation routine. In this case, a warning sign  is displayed in the Status column. After a restart, the installation will continue automatically.

8. Select the desired restart options.
9. Click **Ok**.

All your desired software products and add-ons will be installed in silent mode. This means no additional dialog windows are displayed during installation.

If you want to do PC-based virtual prototyping, install the virtual OS execution platform simulating the hardware for VP experiments. It is provided with ETAS INTECRIO.

To license INCA-EIP

Like INCA, INCA-EIP is subject to license management. In order to work with INCA-EIP after the installation, you need a license file for your computer. Without this file, INCA-EIP can be installed, but you cannot use it.

For information on licensing, refer to "[Licensing the Software](#)" below.

3.3 Licensing the Software

A valid license is required to use the software. You can obtain a license in one of the following ways:

- from your tool coordinator
- via the self-service portal on the ETAS website at www.etas.com/support/licensing
- via the ETAS License Manager

To activate the license, you must enter the Activation ID that you received from ETAS during the ordering process.

For more information about ETAS license management, see the [ETAS License Management FAQ](#) or the ETAS License Manager help.

To open the ETAS License Manager help

The ETAS License Manager is available on your computer after the installation of any ETAS software.

1. From the Windows Start menu, select **E > ETAS > ETAS License Manager**.
The ETAS License Manager opens.
2. Click in the ETAS License Manager window and press F1.
The ETAS License Manager help opens.

Remote usage of INCA

It is not allowed to use an INCA workstation license (MACHINE-BASED LICENSE) through internet or network applications, for example, Microsoft Remote Desktop, other terminal or device services. This does not apply for the operation of INCA over test bench protocols (ASAP 3, MCD-3 MC, iLinkRT).

The usage of a USER-NAMED or FLOATING license allows to access INCA via Microsoft Remote Desktop as long as it is ensured that only one user uses one license at the same time.

4 Configuring the Hardware

This chapter describes special considerations for your hardware setup and how to set the hardware parameters in INCA.

4.1 System Design

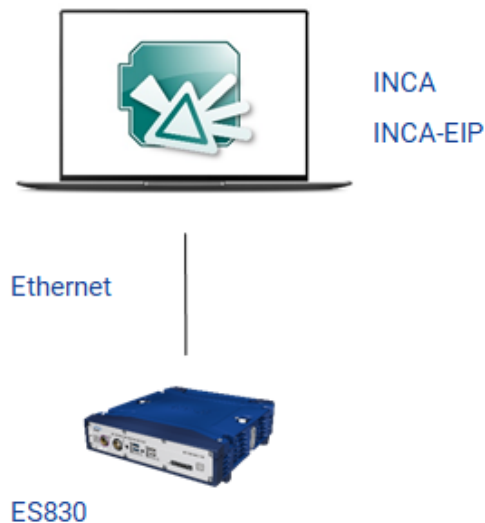
Either an ES830 Rapid Prototyping device or an ES910 Compact Rapid Prototyping device can be used as the E-Target. Moreover, you can use your PC to execute virtual prototyping models that are generated by INTECRIO.

4.1.1 ES830 Rapid Prototyping System Design

The ES830 is a rapid prototyping module for the function development with bypass and direct bus access. Using the ES830 Compact Rapid Prototyping device as the E-Target, you can perform in parallel both rapid prototyping of control functions as well as measurements and calibration on the ECU via FETK or XETK.

If you would like to use FETK or XETK access for measurement and calibration, you need to add an FETK or an XETK controller in the INCA Hardware Configuration Editor in addition to the ES830/Simulation Controller.

If you would like to do CAN, CAN FD, LIN or FlexRay monitoring, you have to add an associated bus interface with a monitoring device in the INCA Hardware Configuration Editor in addition to the ES830/Simulation Controller.



INCA supports only one ES830 module at a time.

4.1.2 ES910 Rapid Prototyping System Design

Using the ES910 Compact Rapid Prototyping device as the E-Target, you can perform in parallel both rapid prototyping of control functions as well as measurements and calibration on the ECU via ETK and CAN monitoring via the CAN

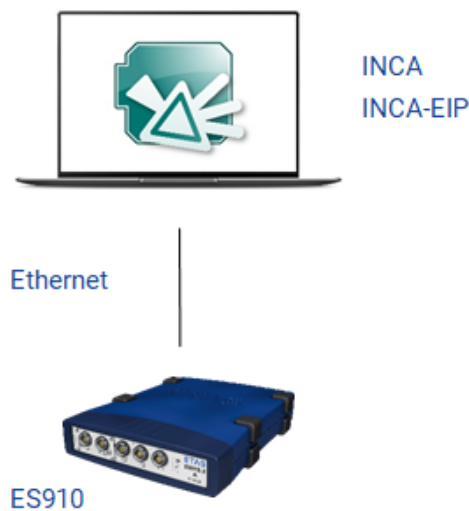
interface.

Moreover, you can connect an ES930 Multi I/O device to the ES910 in order to measure model signals provided by this device.

The ES930 device will not be displayed in the Hardware Configuration Editor and does not require any specific configuration for prototyping purposes.

If you would like to use ETK access for measurement and calibration, you need to add an ETK controller in the INCA Hardware Configuration Editor in addition to the ES910/Simulation Controller.

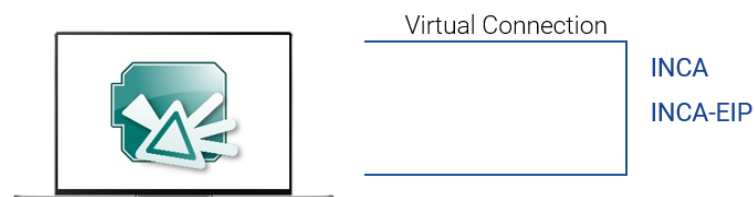
If you would like to do CAN monitoring, you have to add a CAN interface with a CAN monitoring device in the INCA Hardware Configuration Editor in addition to the ES910/Simulation Controller.



ETK access and CAN Monitoring are possible with only the INCA base program installed. When using the ES910 system, the INCA-EIP add-on is required only for the Rapid Prototyping use case.

4.1.3 PC-Based Virtual Prototyping System Design

If you use your PC as E-Target that runs with virtual prototyping models generated by INTECRIO, you can measure and calibrate on the PC hardware directly in INCA.



**Note**

The PC shows the same behavior in INCA as other E-Targets. Working with the PC requires a separate installation providing the virtual execution platform. For using the PC with INCA-EIP, the same conditions apply as for using it with INTECRIO. For further information, refer to the INTECRIO documentation.

4.1.4 Difference Between Rapid Prototyping and Virtual Prototyping

To further explain the difference between virtual and rapid prototyping, the main differences are listed in the following table:

Virtual Prototyping	Rapid Prototyping
Non real-time	Meets hard real-time conditions
Runs as fast as possible or with time scale	Interacts with the real world
No connection to the real world: <ul style="list-style-type: none"> – no I/O devices – no communication busses 	Comprehensive support for peripherals, e.g.: <ul style="list-style-type: none"> – analog and digital I/O devices – communication busses
Stimuli or plant model required	For real-time prototyping and bypass applications
For early validation and pre-calibration on the Windows® PC on the developer's desk	Validation and calibration on the test bench or on the road

The VP-ECU.exe does not provide a NonVolatileRAM (NVRAM) and will thus not store changes made during runtime for the next VP-ECU start. In consequence the next startup uses the initial values provided by the code. In order to use datasets different from the initial code values with INCA-EIP ensure to set the option AUTOMATIC UPLOAD TO DATASET = NO within INCA.

4.2 IP Address Handling for Rapid Prototyping Systems

To simplify the IP handling for rapid prototyping use cases with an ES891 and an FETK, the "IP helper tool" allows to connect the hardware. The "IP helper tool" appears automatically when a connection is initialized. The IP helper tool receives the desired IP address for the ES891 and sets it on the hardware using an interface of the ETAS IP manager. The complete IP management to configure the rapid prototyping system is done automatically, with a one click solution. The hardware system will be rebooted automatically after assigning the static IP address.

 **Note**

The IP helper tool appears only for Rapid Prototyping projects created with INTECRIO Version 4.7.3 or lower. All Rapid Prototyping projects created with INTECRIO versions released after Version 4.7.3 do not display the IP helper tool.

4.3 Parameterizing the Hardware

When working with the INCA-EIP add-on package, use the INCA database browser as usual to prepare your experiments. Import your experiment project with the associated ASAM-2MC file into the INCA database and then create a workspace.

When importing an ASCET-RP or an INTECRIO-generated project, you cannot select the HEX file for the project as usual. Instead of the HEX file, a code file (name extension `*.a21.cod`, e.g. `system.a21.cod`) is used that is loaded into the INCA database automatically if a file with the same base file name as the A2L file is found.

Select your hardware in the Hardware Configuration Editor, assign the corresponding project, and set the desired parameters.

The selection procedure in the Hardware Configuration Editor depends upon the hardware used, i.e. which device (ES830, ES910) is connected to the Ethernet port in your PC or whether you use the PC for a virtual prototyping. The corresponding methods are described below.

 **Note**

You can use a maximum of four E-Targets at a time in your hardware configuration.

 **Note**

INCA provides user options for the E-Target which you can adopt before you start working with INCA-EIP. For further information, see the INCA-EIP online help.

4.3.1 Inserting a Prototyping Target

The following methods of inserting prototyping targets are possible:

- Inserting the E-Target (ES830 or ES910 directly connected)
- Inserting a PC for virtual prototyping

To insert the E-Target

1. In the INCA Hardware Configuration Editor, choose the **Device > Insert** menu option.
2. The “Add hardware device” dialog box is displayed.

3. In the “Available HW devices” list box, double-click one of the following entries:
 - ES830
 - ES910/Simulation System
 - ES910.3
4. Select the desired subentry.
5. Click **OK** to accept this device into your current hardware configuration.
The “Select project and working data for < device name >:1” dialog box is displayed.
6. In the “1 Projects” list box, select the control unit project you want to use for your experiments.
Unless you already have datasets from previous sessions or from an export file, the database does not contain datasets for the project.
7. Click **OK** to assign the project to the E-Target.



Note

If you insert an ES830 or an ES910 as the E-Target and would like to use it both for rapid prototyping and for measurement and calibration, you need to add both the Simulation Controller and an ETK Controller to the ES830 or the ES910 system. If you would like to use the ES830 or the ES910 module also for CAN monitoring, you have to add a CAN interface with a CAN monitoring device below the ES830 or the ES910 system. If your ES910 module is equipped with a ES921 CAN module and you would like to use its additional CAN ports, you have to add an ES921 module below the ES910 system. In a similar way, if you want to use an interface on an ES8xx device for monitoring, the corresponding device needs to be added to the hardware configuration.

To insert PC hardware for virtual prototyping

1. In the INCA Hardware Configuration Editor, choose the **Device > Insert** menu option.
2. The “Add hardware device” dialog box is displayed.
3. In the “Available HW devices” list box, double-click the entry `PC/Simulation System` to display the sub-entries. Then double-click the entry `Virtual Prototyping`.
4. Select the sub-entry `X86 PC Controller`.
5. Click **OK** to accept this device into your current hardware configuration.
The “Select project and working data for < device name >:1” dialog box is displayed.
6. In the “1 Projects” list box, select the control unit project you want to use for your experiments.
Unless you already have datasets from previous sessions or from an export file, the database does not contain datasets for the project.

7. Click **OK** to assign the project to the E-Target.
8. An empty working dataset is created and assigned to the E-Target, and the E-Target is added to the current hardware configuration.

4.3.2 Configuring the E-Target

After the E-Target has been added to the hardware configuration, you can use the Hardware Configuration Editor to set the parameters. Set the desired parameters for the simulation system and the device. See the following sections for details.

To configure an E-Target

1. Select the E-Target in the “1 HW devices” list box of the Hardware Configuration Editor.

or

If you are working with PC-based Virtual Prototyping, select the virtual prototyping system.

The **Parameters** tab shows the available options, together with their current values.

2. In the “Value” column, double-click the current value to edit it directly.

The value can be changed either in a text field or a list box, depending on the available selections.

Repeat the steps for all current values to set the options for your experiment.

3. Click the **Apply** button to save your changes.

or

Click the **Reset** button to cancel your changes and reset the parameters to the last version saved.

The following overview describes the parameters for the Ethernet connection and explains the meaning of the available options. The default for each option is indicated in brackets.

— Name

[ES830:<n>]

or [ES910/SimulationSystem:<n>]

or [Virtual Prototyping]

Enter any name for the link system.

— Serial number

[Not assigned]

Enter the serial number for the system. Mapping the serial numbers to the actual existing devices is checked while the devices are being initialized and can still be changed during that time, if necessary.

 **Note**

If you are using the PC for virtual prototyping, the serial number is provided by the server application and cannot be edited.

— Alias name

[Not assigned]

Enter an alias name for the system.

— Firmware version

Shows the firmware version of the hardware. Note that the firmware version is only available if an online firmware check is executed.

— INCA hardware communication

[Ethernet]

The Ethernet port is used for connecting the E-Target.

To configure the device

1. In the Hardware Configuration Editor, select the available simulation controller in the "1 Hardware devices" list box.

The **Parameters** tab shows the available options, together with their current values.

2. In the "Value" column, double-click the current value to edit it directly.

The value can be changed either in a text field or a list box, depending on the available selections.

Repeat the steps for all current values to set the options for your experiment.

3. Click the **Apply** button to save your changes.

or

Click **Reset** button to cancel your changes and reset the parameters to the last version saved.

The following overview describes the parameters for the ES910 device or the X86 PC controller and explains the meaning of the available options. These devices offer the same configuration options. The default for each option is indicated in brackets.

— Name

[ES830/Simulation Controller:<n>]

or [ES910/Simulation Controller:<n>]

or [X86 PC Controller:<n>]

Enter any name for the device. The name assigned here is used as the device name in compound variable names.

— Meas. Failure behavior

[Abort after failure]

Specify how the device is supposed to respond to measurement errors. You can choose whether measurement is stopped when an error occurs either when starting a measurement or reading data (`Abort after failure`), whether it is stopped only in case of errors when reading data (`Abort at start, try again later`), or whether measurement is restarted in any case of a measurement failure (`Retry always`).

— `Start after Initialization`

[No]

Specify whether the program should start automatically right after the program has been downloaded and the hardware has been initialized (`Yes`), or whether it is to be manually started later on from the experiment environment (`No`). Automatic program start is only executed if there is either no program version or a different program version stored in the flash memory. Deactivate this and the next option if you want to resume a connection to a running experiment that was previously interrupted, in order to prevent the experiment from being reset after the connection has been established.

 **Note**

If you are using a model containing both reference and working page, the Memory Page Manager will be opened automatically if two different datasets are detected during the initialization of the device.

— `Automatic upload to dataset`

[Yes]


Overwrites the automatically generated empty initial dataset(s) in the INCA dataset(s), using the code file's initial values. The code file's values are accepted into the INCA data version right after the experiment starts.

— `Automatic freeze after flashing WP`

[Yes/No]

Specifies whether INCA performs an automatic dataset freeze after you flash the working page or not.

Yes	INCA performs an automatic dataset freeze after you flash the working page. That means, that INCA uses the current working page as new reference page and creates a copy to be used as working page dataset. After flashing, the checksums on the reference page between INCA and the E-Target are equal.
No	The datasets will be the same as before. After flashing, the checksums on the reference page usually differ between INCA and the E-Target.

The default setting depends on the setting in the INCA User Options. To change the default setting, in the Database Manager click  > **E-Target** tab > **Automatic freeze after flashing WP**.

— Project working data

[no assignment]

Or [working dataset>]

Assign an ECU project and the associated working dataset to the device.

— Reference data

[no assignment]

Or [reference dataset]

Assign an ECU project and the associated reference dataset to the device.

The working page / reference page concept is not supported by all E-Targets, i.e. this field may be disabled for certain E-Targets.

— Differences (bytes)

[no assignment]

Or [bytes]

Shows the difference in bytes between the working dataset and the reference dataset. You can not edit this field.

The working page / reference page concept is not supported by all E-Targets, i.e. this field may be disabled for certain E-Targets.

— Memory Page Comparison Method

[Regular]

Or [Fast]

Determines whether the memory page comparison method of the datasets is regular or fast.

Regular The regular memory page comparison method counts the byte difference for working page and reference page datasets.

In the Experiment Environment Device Information bar, the differences are displayed as follows:



Diff.: 0	Indicates equal datasets.
Diff.: <n>	Any other number indicates the corresponding byte difference of the datasets.

Fast The fast memory page comparison method only checks the memory page equality of the working page and reference page checksum. Use this option for very large datasets. After each calibration, the Experiment Environment Device Information list is updated faster. In the Experiment Environment Device Information bar, the differences are displayed as follows:



Diff.: Equal	Indicates available checksum and equal datasets.
Diff.: Not equal	Indicates available checksum and that the datasets are not equal.
Diff.: Unknown	Indicates that there is no checksum before hardware initialization, no reference page or no confirmed calibration.

To configure the ETKC device

The procedure for configuring the ETKC device is the same as for all simulation controller. For detailed information on the parameters of the ETKC device see the INCA online help, "Module Parameters for ETK".

To configure the CAN interface and CAN monitoring device

The procedure for configuring the CAN interface and the CAN monitoring device is the same as for other devices in INCA. For detailed information on the parameters of the CAN interface and the CAN monitoring device see the INCA online help, "Module Parameters for CAN Interface" and "Module Parameters for CAN Monitoring".

4.3.3 Resetting a Locked RTIO Driver

In case of communication errors occur between the ECU and the E-Target during ETK bypass operation, it may happen that the RTIO driver goes into a "locked" state. To unlock the driver again and to make sure that the ECU is in a defined state afterwards, it is necessary to download the executable prototype to the E-Target again and execute all initialization routines like at an initial E-Target start-up.

When a download is attempted, INCA-EIP checks the state of the RTIO driver whether the project to be downloaded is the same as the one that was downloaded before. According to the results of this check, the system reacts in the following way:

- If INCA-EIP detects that the RTIO driver is locked, the system will always download and reinitialize the current INCA-EIP project.
- If the same project has already been downloaded to the E-Target and the RTIO driver is not locked, the system will not download the current INCA-EIP project. It will reconnect to the project running on the E-target.
- For some cases, RTIO driver can be unlocked only by switching to RP and executing Stop OS and Start OS.

5 Experimenting on the E-Target

When using INCA for experimenting on the E-Target, you also control the program flow on the experimental hardware being used from within the INCA experiment environment. This raises a few special considerations regarding operation, which are described in this chapter.

Note

The PC with virtual prototyping models generated by INTECRIO shows the same behavior in INCA as other E-Targets. Working with virtual hardware requires a separate installation providing the virtual execution platform. For using virtual hardware with INCA-EIP, the same conditions apply as for using it with INTECRIO. For further information, refer to the INTECRIO documentation.

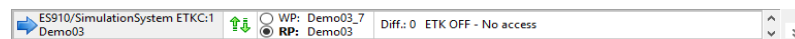
5.1 Selecting the E-Target

The INCA workspace may contain up to four different E-Targets. If a workspace contains multiple E-Targets and you open an experiment associated with the workspace, INCA will automatically download all assigned projects to the E-Target devices.

Before starting experimenting, you can select in the experiment environment which E-Target will be used in your further proceedings.

To select the E-Target that you want to use in the experiment

1. Select the desired E-Target from the device information bar in the upper toolbar.



All further actions in the experiment environment will apply to or be executed on the selected E-Target.

Note

If you want to perform the same actions for several E-Targets and ECUs at once, you can group them for joint calibration just like any other calibration device.


If devices are grouped which have different functionality (e.g. one target supports memory page switching and the other target does not) and you execute an action which is not supported by one of the devices, INCA will perform the corresponding action only for the device which is supporting it.

Grouping is not supported for VP targets.

5.2 Configuring the Experiment

5.2.1 Enabling Measurement of Calibrations

All E-Targets support the measurement of calibrations. This allows for measuring and recording the changes of the calibration variables along with the measure variables in the same raster.

Measurement of Calibrations can be activated in the INCA user options  under **Experiment** tab > **Measure** > **General** > **Enable Measurement of Calibrations**.

For further information, see the INCA online help.

5.2.2 Managing Raster Access for MC and RP Usage

If a bypass setup uses measurement rasters for prototyping purposes, conflicts in ECU access can arise between INCA and the prototyping application. To avoid such conflicts, you can set the desired behavior in the INCA user options under **Hardware** > **ETK steal measurement rasters**.

This user option defines whether measurement rasters are allocated for INCA measurement automatically, even if they are in use by another application.

– **Yes**

If the system detects that a raster used by the ETK is already accessed, the ETK will use the conflicting measurement raster(s) immediately and informs you that these raster(s) are not available for another application.

NOTICE

This may lead to an uncontrolled crash of concurrent bypass applications. It is highly recommended to switch this option to "No"!

– **No**

If the system detects that a raster used by the ETK is already accessed, the measurement via ETK will not be started.

Moreover, INCA informs you explicitly about any raster access conflict that may arise during bypass operation.

5.2.3 Changing the Number of Axis Points of Curves and Maps

You can change the number of active axis points on the X-axis of curves, as well as the number of active axis points on the X-axis and the Y-axis of maps.

The procedure is the same as for ECUs: you will find the corresponding commands in the context menu of each axis that is used in the experiment.

For further information, see the INCA online help.

5.2.4 Using the Experiment Offline

With INCA-EIP you can prepare the Experiment offline, that means you can select measure and calibration variables and assign them to instruments even if the target hardware is not connected to INCA.

If INCA cannot retrieve the correct initial values of the calibration variables, dashes will be shown instead of initial values in all numeric displays. These will be replaced by the actual values after the first upload from the E-Target.

You can start calibrating offline, either by entering values manually or reading them from data exchange files (CDFX).

To import variable values from data exchange files (CDFX) for offline calibration

1. In the INCA Database Manager, select **Edit > Add > ECU-Project (A2L)**.
2. Select the corresponding A2L file.
3. Click **OK**.

The code for the E-Target is loaded from the COD file and the initial dataset values are used from the CDFX file if available.

In the Monitor window, you can check if the datasets were copied correctly.

4. Modify calibration values and save changes to project.
5. To use the created datasets on the E-Target hardware, download the project datasets from the computer to the E-Target hardware, see "[Managing Datasets of an E-Target System](#)" on page 29.

Note

The imported values from the data exchange file (CDFX file) are used for the initial E-Target datasets in INCA. If a hardware is connected, the initial values are uploaded from the connected E-Target hardware. The E-Target hardware values are always the master and the imported CDFX values will be overwritten. However, before overwriting the datasets, the Memory Page Manager displays a message that the datasets differ. You can change the **Action** from **Upload** to **Download** to avoid overwriting.

5.3 Memory Pages in the E-Target

When using an ES830 or an ES910 Rapid Prototyping system, the E-Targets have both a working and a reference page. You can switch back to an approved dataset, and copying from the reference page to the working page is possible.



For all other E-Targets including virtual hardware as well as for ES830/ES910 models that do not support the working page / reference page concept, the E-Target for the simulation system has only one memory page that is always accessed as the working page from within the INCA experiment environment. When

conducting experiments on the E-Target, you cannot switch back and forth between the working page and reference page in the INCA experiment environment; the corresponding controls are grayed out.

5.4 Controlling the Program Flow

The program start on the E-Target is not coupled with the start of the measurement display or recording in INCA. Displaying and recording in the experiment environment are started and stopped in INCA as usual.

There are two ways to automatically start the control unit program in the E-Target. Either you store it in the E-Target's flash memory, thus starting it directly when switching the unit on, or you initiate the automatic program start through the configuration parameter `start after Initialization`.

You can restart and stop the program from within the INCA experiment environment, regardless of whether the program was started automatically or not.

The following sections describe the automatic start behavior and the manual control for the program flow.

5.4.1 Automatic Program Start

The actual behavior depends upon whether the E-Target's flash memory contains a program version:

- The E-Target's flash memory contains a program version:

The program is automatically started after the hardware has been started or reset. In this case, the current value of the configuration parameter `start after Initialization` does not influence the automatic program start.

If you are using an ES830 or an ES910, the firmware checks whether a flashed dataset exists in the persistent memory of the E-Target. If this is the case, the model is started automatically with the flashed dataset values (not with the default values of the COD file).

- The E-Target's flash memory does not contain a program version:

The configuration parameter `start after Initialization` can automatically initiate the program start. That means the program version is written to the E-Target that is assigned to the INCA device. The program will or will not be started automatically, depending on the setting for this configuration parameter.

5.4.2 Manual Control of the Program Flow

You prepare your experiments as usual by selecting variables for the measured data display and for calibrating them in the experiment environment, and by configuring the display windows for your experiment.


The program flow in the E-Target can be controlled from within the INCA experiment environment. When the experiment environment is started, the **Start OS** button shows whether the program has already been started in the E-Target.

Depending on your task, start the measured data display or recording as usual in the INCA experiment environment, before or after starting the program in the E-Target.


Note

Whenever you change the dataset in a running experiment, the program in the E-Target is automatically halted, and you need to restart it.

To start the program

1. In the INCA experiment environment, select the **E-Target** >  **Start OS** menu option to start the program in the E-Target. The **Start OS** icon button indicates that the program is running. If you have already started the measured data display, the measured data from the E-Target are displayed.

To stop the program

1. In the INCA experiment environment, select the **E-Target** >  **Stop OS** menu option to stop the program in the E-Target. The **Stop OS** icon button indicates that the program has been stopped. The measured data display or recording is not automatically exited after the program in the E-Target has been stopped.

5.4.3 Manual Reinitialization of Measure Variables

In many ECUs most measure variables are initialized to 0 or the original model value after KL15 (Power OFF/ON) being switched on.

The E-Target provides additional flexibility: you can trigger a reset of measure variables externally by selecting **E-Target** > **Reinitialize** in the experiment environment, while the current values of calibration data are kept unchanged.

Note

Reinitialization of measure variables is not supported by all E-Target devices.

To reset measure variables

1. In the INCA experiment environment, choose **E-Target** > **Reinitialize Measure Variables**. All measure variables provided by E-Target are reset to 0 or their initial model values.

5.4.4 Displaying Program Errors

The program in the E-Target has its own monitor window for displaying error messages that are triggered by the `asdWriteUserDebug ()` command.

To display the monitor window for program errors

1. In the INCA Experiment Environment, choose **E-Target > Debug Monitor**.

The C-Target Debug Window is opened. This window displays all messages that are triggered by the `asdWriteUserDebug()` command.

2. Click the radio button **on** to refresh the monitor output automatically.

Error messages triggered by the `asdWriteUserError()` command are displayed in the INCA monitor window.

5.5 Managing Datasets of an E-Target System

When you use INCA-EIP to load a description file into the INCA database, two empty, non-initialized datasets will be created first: one for the reference page and one for the working page. The default values from the project's COD file are written into these datasets when the program in the E-Target is started for the first time, (see `Automatic upload to dataset` parameter in this chapter).



Note

Before managing datasets, make sure that the datasets exist. Therefore first run the program on the E-Target hardware and perform an automatic or manual upload. Otherwise it is not possible to use dataset manipulation tools such as CDM.

When using an an ES910 Rapid Prototyping System, the following dataset management operations are possible:

— Data

- Download the selected dataset from the PC to the E-Target
- Upload both datasets from the E-Target to the PC (it is not possible to upload just one dataset)
- Copy data between datasets, either on the PC or the E-Target
- Flash programming of the selected dataset from the PC to the E-Target's flash memory

— Code and data

- Download from the selected dataset on the PC to the working and/or reference page and code page on the E-Target
- Flash programming of the selected dataset and code page to the E-Target's flash memory; this dataset will be initially used for both the reference and the working dataset after power off/on of the ES910

To perform dataset management operations

1. Stop the measured data display if it is running.
2. In the Experiment Environment, choose **Hardware > Manage memory pages**.

The "Memory pages < device >/SimulationController:1 [WORKING_PAGE]" dialog box is displayed.

3. In the "Action" field, select the required action.
4. Click **Do It** to start the process.
A message window will inform you about the progress.
5. When the process has finished, click **Close** to exit the Memory Page Manager.

For detailed information on the Memory Page Manager see the INCA online help.

5.6 Using Non-Volatile Variables (Adaptive Characteristics)

You can also use E-Target models that are containing non-volatile variables generated by ASCET. In the INCA Experiment Environment, it is therefore possible to read non-volatile variables from a DCM file or write them to a DCM file. You can find the corresponding menu options under **Variables > Adaptive Characteristics > Write to DCM file** and **Read adapt. characteristics from file**.

For further information, see the INCA online help.

6 Interfaces

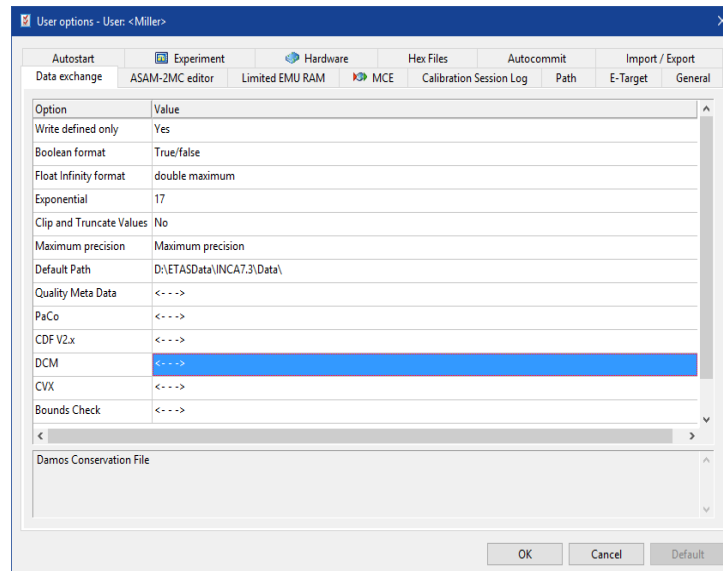
This chapter describes the procedure for transferring data versions from INCA to ASCET and the restrictions that apply when using the ASAM-3MC interface in combination with experiments on the E-Target.

6.1 Data Exchange with ASCET

Datasets created in INCA can be exported after the experiment has been completed so they can then be re-used in ASCET. The datasets are exported using the INCA Calibration Data Manager. INCA datasets can be exported in the DCM V1.x or DCM V2.x format.

To specify the format version

1. In the INCA Database Manager, choose **Options > User options > Open**.
The "User options" dialog box is displayed.



2. Change to the "Data exchange" tab.
3. Double-click the value of the DCM option.
A dialog box with DCM-specific options opens.
4. Double-click the current value of the DCM format version option.
5. Select the desired value from the list box.
6. Click **OK** to apply the setting and close the dialog box.

You get back to the "User Options" dialog box.

When you switch to the Calibration Data Manager, you can select the dataset and the desired variables as usual, and you can generate an export file for the dataset using the "Lists" action.

6.2 The ASAM-3MC Interface

When testing programs on the E-Target, the program version is not contained in a HEX file in INCA as it usually is, but it is imported into the INCA database from a COD file that is automatically assigned.

There are limitations to ASAM-3MC commands when using them to access test benches. These commands can only be used when a HEX file exists.

The following table provides an overview of the restricted use of the ASAM-3MC commands.

Command	Restriction
COPY BINARY	Command has no effect.
CHANGE BINARY	Command has no effect.
SELECT DESCRIPTION FILE AND BINARY	Checks the program version; does not affect the dataset.

7 Contact Information

Technical Support

For details of your local sales office as well as your local technical support team and product hotlines, take a look at the ETAS website:

www.etas.com/hotlines

ETAS offers trainings for its products:

www.etas.com/academy



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