ASAM ASAP3/iLinkRT Interface

User Guide

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ASAM ASAP3/iLinkRT Interface | User Guide R05 EN | 09.2023

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1 Safety and Privacy Information

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.

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

The safety messages used here 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

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.

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 Privacy Notice

Note that personal data is processed when using INCA. As the controller, the purchaser undertakes to ensure the legal conformity of these processing activities in accordance with Art. 4 No. 7 of the General Data Protection Regulation (GDPR/EU). As the manufacturer, ETAS is not liable for any mishandling of this data.

For further information, refer to the INCA online help.

2 About INCA ASAM ASAP3 Interface

The ASAM standard provides several ASAM test automation interfaces.

The following figure gives an overview of the ASAM test automation interfaces:

- ASAM ASAP3
- ASAM MCD-3MC
- ASAM iLinkRT

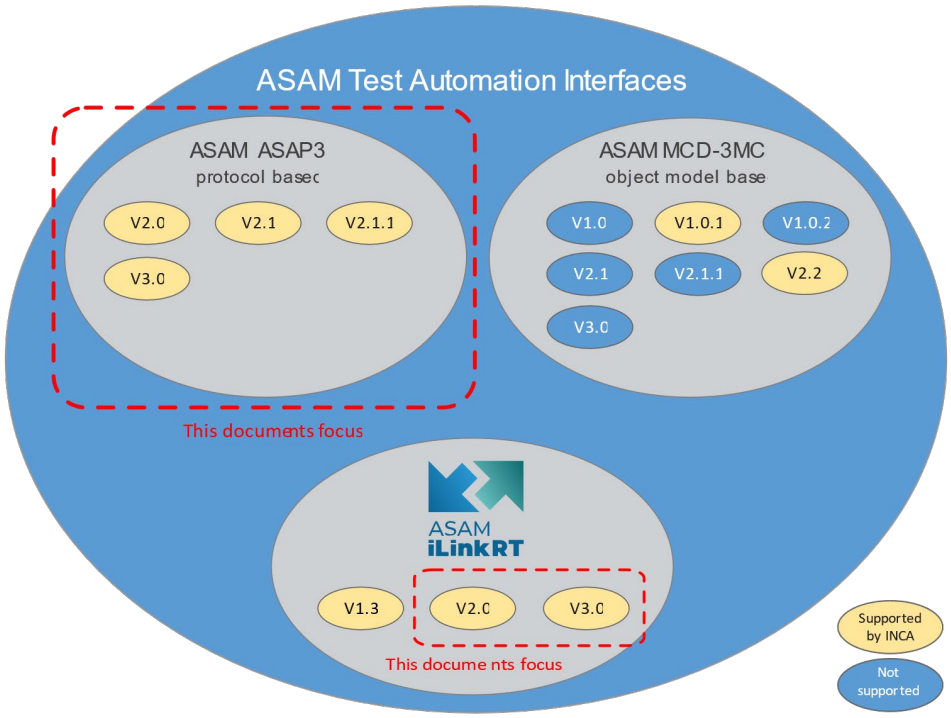


Fig. 1-1 ASAM test automation interfaces

This document describes the ETAS implementation of the ASAM ASAP3 interface and the iLinkRT PC interface for INCA.

Throughout this document, the term *ASAP3* is used as an abbreviation for *ASAM ASAP3*.

INCA's ASAP3 interface implements the ASAP3 V3.0 standard but also supports the previous versions V2.0, V2.1, and V2.1.1 covered in this document.

The executable that implements these interfaces is called *ASAP3.EXE* or *ASAM ASAP3 Server*. In fact, ASAP3.EXE implements all of them, the legacy ASAP3 interface, the ASAM MCD-3MC interface, and the iLinkRT 2.0 interface side by side. The selection between ASAP3 interface and ASAM MCD-3MC interface is made by selecting the MCD3 version to be used in the INCA GUI. This is only mentioned here for the sake of completeness. The iLinkRT interface can only be used in parallel to the ASAP3 interface and is enabled within the ASAP3 connection dialog. This is described later in this document.

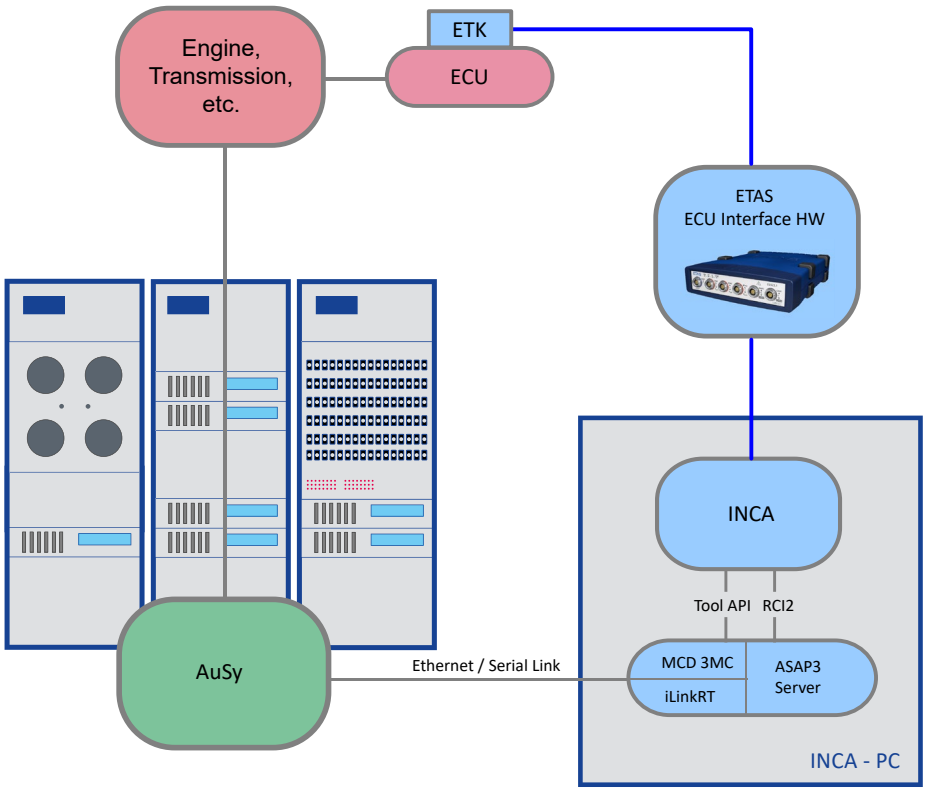


Fig. 1-2 Component setup

The ASAM ASAP3 interface, shown with the general expression ASAM MCD-3MC Server, listens at its Ethernet port or serial link (RS232) for commands sent by the Automation System (AuSy). These commands are translated into several calls to the Tool API / RCI2 interface of the INCA core and also logged into the ASAM MCD-3MC interface window by the ASAM MCD-3MC Server of INCA.

In parallel to the ASAM MCD-3MC Server, the iLinkRT server is running. It listens on its Ethernet port for general queries and connection requests. The iLinkRT server provides the resources, that were previously configured within an ASAP3 session. Additional connected iLinkRT clients alsohave access to these resources. For the iLinkRT connection to work properly, an ASAP3 session has been previously setup and that it is still active. The measurements and characteristics to be accessed via iLinkRT must be configured (selected, accessed) via this ASAP3 session so that they are available to iLinkRT. Only devices, calibration variables, and measurement variables that have an active LUN, MAP ID, and entry in the PARAMETER FOR VALUE ACQUISITION list are accessible to iLnikRT.

iLinkRT requires an active MCE license which is provided via the ETAS License Manager. Without such a license, iLinkRT

- delivers only 30 measurement values with correct data
- allows only access to 30 calibration variables.

If the user configures more than 30 measurement labels, only the first 30 will return correct values via iLinkRT, the others will return NaN. If you try to access

more than 30 calibration variables via iLinkRT, access to the 31st and counting calibration variable returns an error.

While the iLinkRT specification allows measurement transport either by multicast or by unicast to numerous clients, this implementation fully supports only multicast. In unicast mode, only one single client is supported.

2.1 Further Information

Information on the ASAM ASAP3 is provided in the INCA online help.

2.2 ASAM ASAP3 Server

The ASAM ASAP3 Server is an additional software (ASAP3.exe) running on the same computer as INCA. You start the software from the INCA Experiment Environment via **Components** >**ASAM-3MC - Open ASAM-3MC Interface**.

For the ASAP3 protocol, two different communication types are supported: Serial communication or TCP/IP communication. The iLinkRT protocol only supports TCP/IP communication. It also requires a so called “multicast” address, so it can distribute the measurement values in an efficient way to several clients.

2.2.1 ASAP3 Communication Options

2.2.1.1 Serial Communication Options

- Standard: Serial, 9600 Baud (adjustable up to 115200 Baud) 8N1 (8 Data bits, no parity, one stop bit); the quality of the connection, especially above 9600Baud, depends on the current system configuration and the quality of the device drivers. Port and Baud rate can be adjusted by the user.

2.2.1.2 Network (TCP/IP) Communication Options

- The ASAP3 protocol implementation uses TCP/IP sockets for communication. The used transport protocol is TCP. ASAP3.EXE works as a server, it listens at a specific IP address and port number for incoming connection requests. As soon as a connection is established, the status line shows the IP addresses of both communicating instances, server and client.
- For listening it is possible to choose a specific network card installed in the current PC or to enter a specific Local Network (IP) address.
- In case Network Card is selected, it is possible to choose among all installed network cards that are found in the current PC.
- In case Local Network Address is selected, a fixed IP address at which a socket will listen can be entered, or you can enter “0” (zero) to listen at the default IP address of the current PC.
- The network port at which ASAM-ASAP3 will listen can also be entered. The default value is 22222.
- If you choose to use fast socket communication, a specific, faster communication routine is used for the ASAP3 protocol.

2.2.1.3 Both communication types:

- After starting the ASAM-3MC interface, the software tries to setup the last used communication type along with the last communication options stored in the windows registry.
- The communication parameters can be adjusted after breaking the connection. The connection can be broken explicitly only while there is no active ASAP3 session.
- The ASAM-ASAP3 interface can be adjusted in a way that it does not send an immediate acknowledge back after each received command. This can be changed from the “Options/General/Send Acknowledge” settings.
- For serial connections, the reaction on a not completely received command can be adjusted via the registry. It offers the possibility to set a value for the time-out, after which an error shall be regarded.
- In addition to the EXIT command, you have the possibility to stop an ASAP3 session in the ASAM-ASAP3 interface. This releases allocated resources (LUNs, references, lists, etc.).

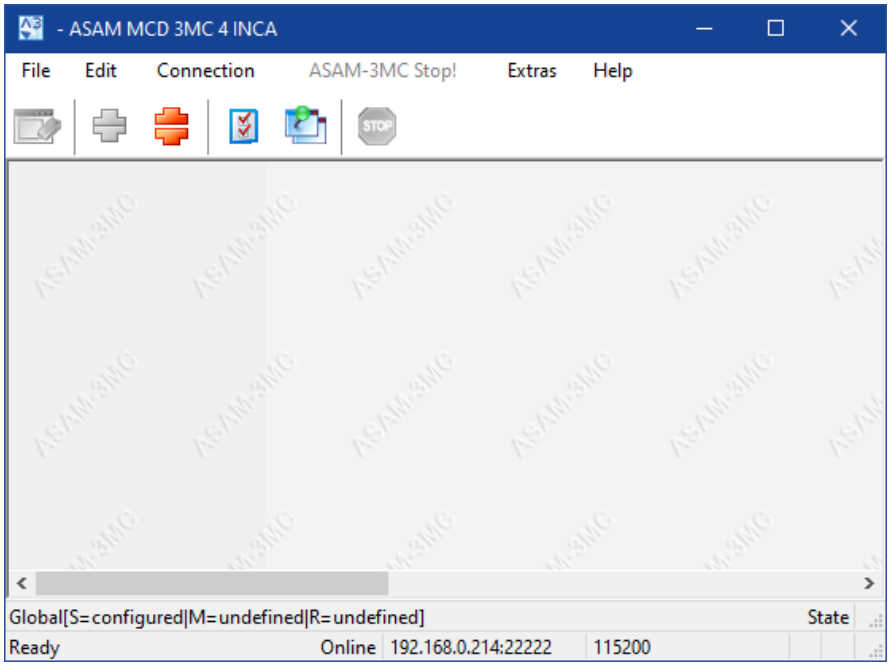
2.2.2 iLinkRT Communication Options

- The iLinkRT protocol implementation uses TCP/IP sockets for communication. The used transport protocol is UDP. ASAP3.EXE works as a server, it listens at a specific IP address and port number for client broadcasts that search for available servers. On another port, probably on a differen t IP, the server listens for RT_CONNECT commands from clients to establish a connection and to receive client commands. A third socket (with probably different IP and port number) is used by the iLinkRT server to distribute events to the clients.
- After starting the ASAM-3MC interface, the software tries to setup the last used communication type along with the last communication options stored in the windows registry.
- The communication parameters can be adjusted after breaking the connection. The connection can be broken explicitly only while there is no active ASAP3 session.
- By default, the iLinkRT 3.0 protocol sends the measurement values to the multicast address that you entered in the **iLinkRT Measuremen / Events Multicast Address** field.
- The **Use unicast** option enables switching from multicast to unicast. In unicast mode, the IP addresses of the connected client parameter in the RT3_SERVER_CONNECT request frame are used instead of the iLinkRT Measurement / Events Multicast Address.

3 User Interface

The ASAM-MCD-3MC interface implementation displays an own window on the screen. The last used window positions are saved in the registry.

3.1 ASAM MCD-3MC 4 INCA Interface Window (ASAM-ASAP3 server GUI)



In the status bar, information about the connection is displayed. This comprises information about the state (Online, Offline), the selected serial port and the selected baud rate. During receiving or transmitting the data the symbols 'Rx' and 'Tx' indicate this activity.

The window can be displayed permanently in the topmost position; the option is saved in the registry.

3.2 The Toolbar

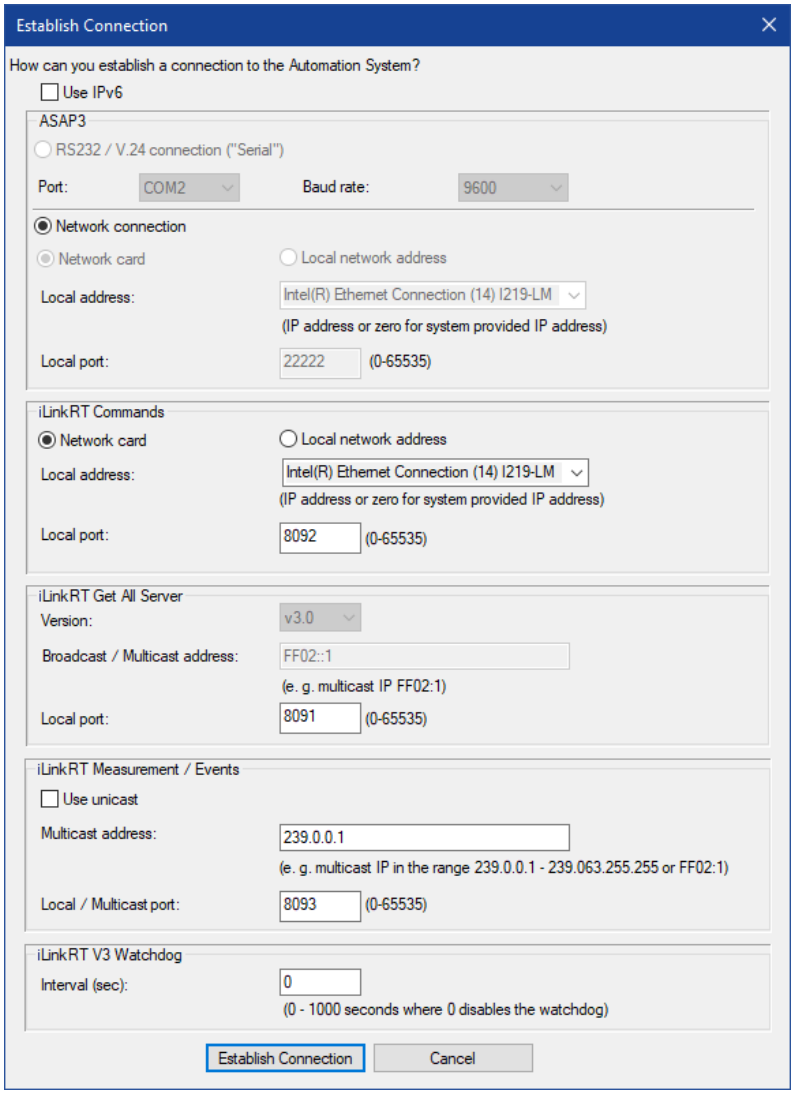
The toolbar on top of the viewer window gives fast access to all essential menu commands of the ASAM-ASAP3 interface.

3.3 ASAM-ASAP3 Status Icon in Taskbar

In the system tray an ASAM-ASAP3 icon indicating the communication state is shown. The signs for transmit (Tx) and receive (Rx) are dark grey, as long as the command INIT hasn't been sent yet. After this, the signs are displayed in white color. Transmission is shown by red flushing.

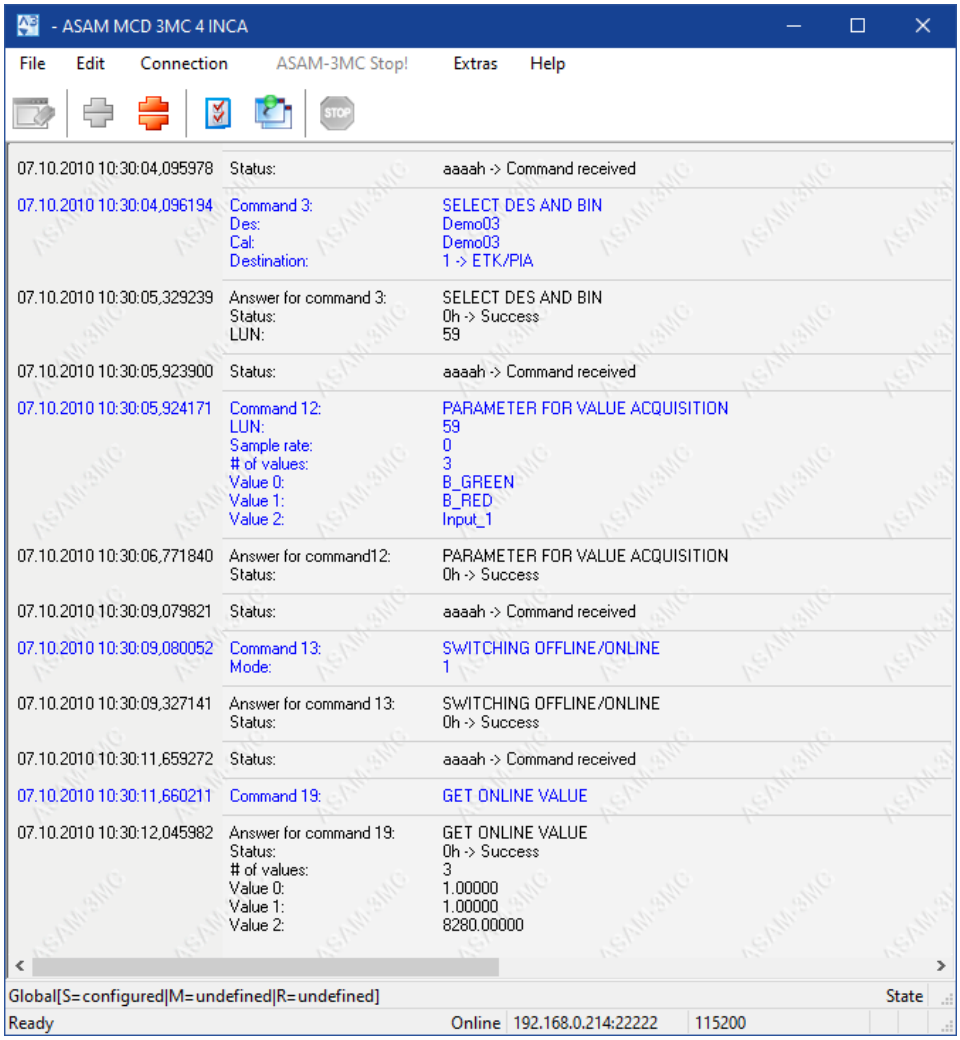
3.4 Communication Options

The following dialog box is used to re-establish the connection (with different communication parameters) after manually breaking the connection with the menu command 'Break Connection'.



3.5 Logging in the Interface Window

Received commands are displayed in blue color. The answer of a command is displayed in black color. Error messages are displayed in red. The last 1000 lines are buffered for display in the window.



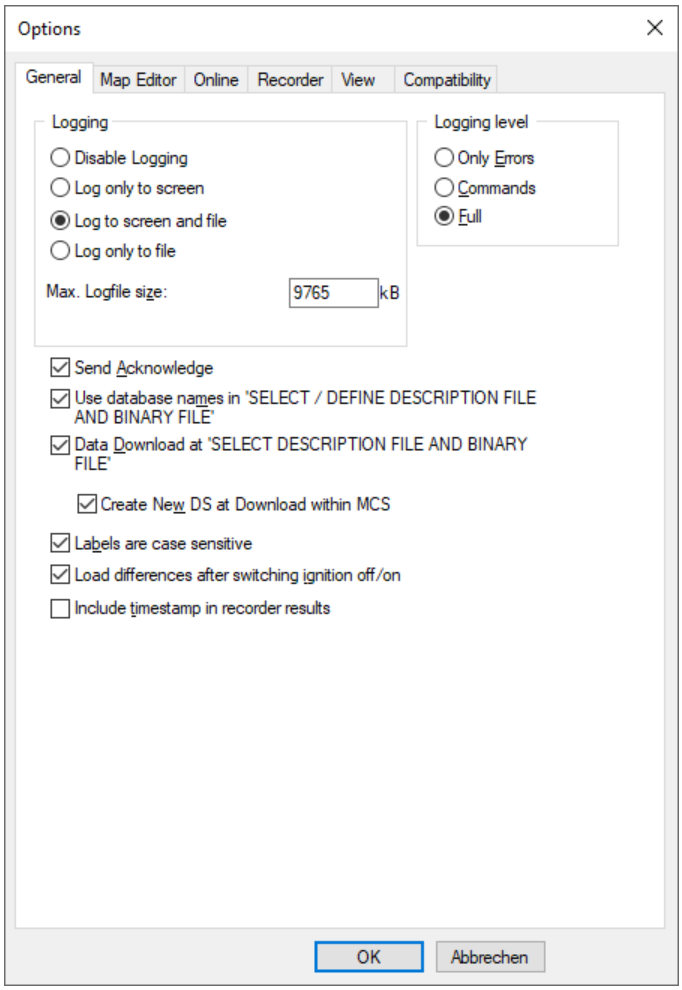
It is possible to reset the log window via the menu option File|Clear Window. Furthermore it is possible to select one or more lines with the mouse or all lines with CTRL+A (Keyboard) or via the Menu (Edit|Select All). A selection can be copied to the clipboard with CTRL+C (Keyboard) or via the Menu (Edit|Copy) and then be pasted into any text editor.

Each new command line contains a timestamp with a precision of 1µs.

3.6 Options

The options can be modified by a tabbed dialog with the following sections. They are generally valid for all protocols except where mentioned otherwise.

3.6.1 General Options



Logging

The user can select whether he wants to Disable Logging (for fastest operation), Log only to screen, Log to screen and file or Log only to file. The logging options apply to both the ASAP3 and to the iLinkRT protocol.

The maximum size of the log file can be adjusted with the field Max log file size. The given amount times 1024 is the maximum log file size in bytes.

If Log to screen and file or Log only to file is selected, the logged data is also written to the file ASAP3.LOG in the ASAP3 log directory, which is located below the INCA log directory. The file is created, if not yet existent. Otherwise the new data is appended to the file. The log file hast to be deleted by the user if not needed anymore. Logging to file will stop automatically if not more than 1MB free disk space is available.

Logging Level

The user can select whether he wants to log *Only Errors*, only the *Commands*, or to perform a *Full*logging which also displays the parameters of the commands and answers.

Further Options

Selecting *Send Acknowledge* causes the ASAM-ASAP3 interface to send an acknowledge after each command it received successfully. The acknowledge is defined with the status code $AAAA.

If *Use database names in 'SELECT / DEFINE DESCRIPTION FILE AND BINARY FILE'* is selected, parameters in these commands are interpreted as locations within the INCA database instead of names within the PCs file system.

If *Data Download at 'Select Description and Binary File'* is selected, the data is automatically downloaded to the ECU.

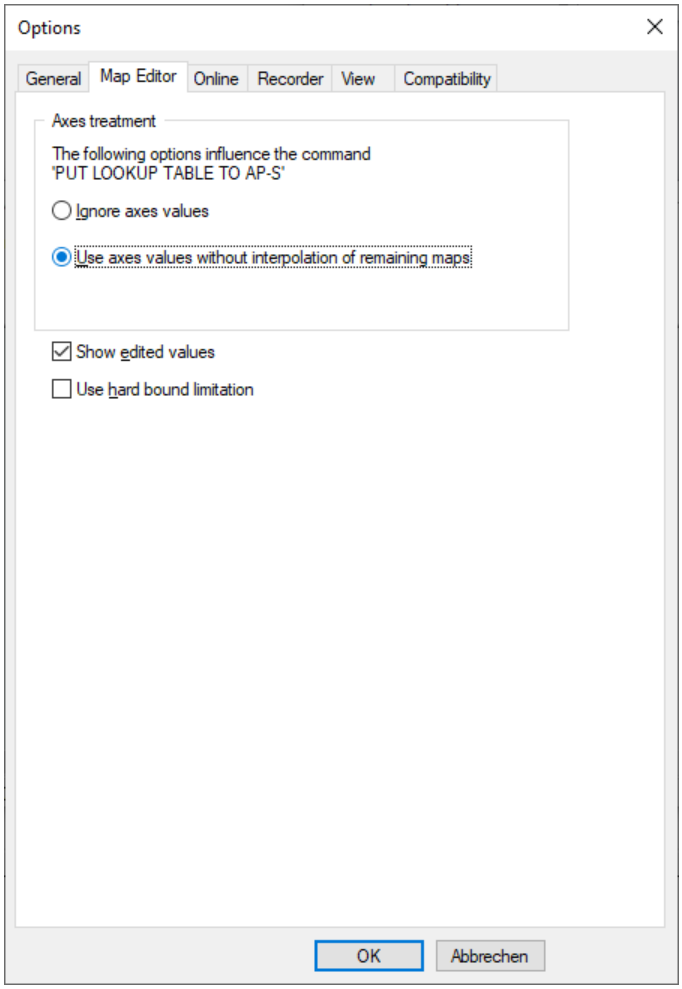
If *Data Download at 'Select Description and Binary File'* is selected, you can choose the option *Create New DS at download within MCS*. If enabled, INCA creates a new data set into which it imports the hex file. If disabled, INCA overwrites the current data set with the imported data.

If *Labels are case sensitive* is set, labels differing only in case are treated as different in ASAM-ASAP3.

Load differences after switching ignition off/on means that CAN ECUs that lose their emulation memory contents during power down are automatically reinitialized with the PCs calibration data by INCA after ignition is switched on.

If *Include timestamp in recorder results* is selected, every call of GET RECORDER RESULTS (Command 46) will return an additional channel with the label "_time_", with the timestamp in ms in float format.

3.6.2 Map Editor Options



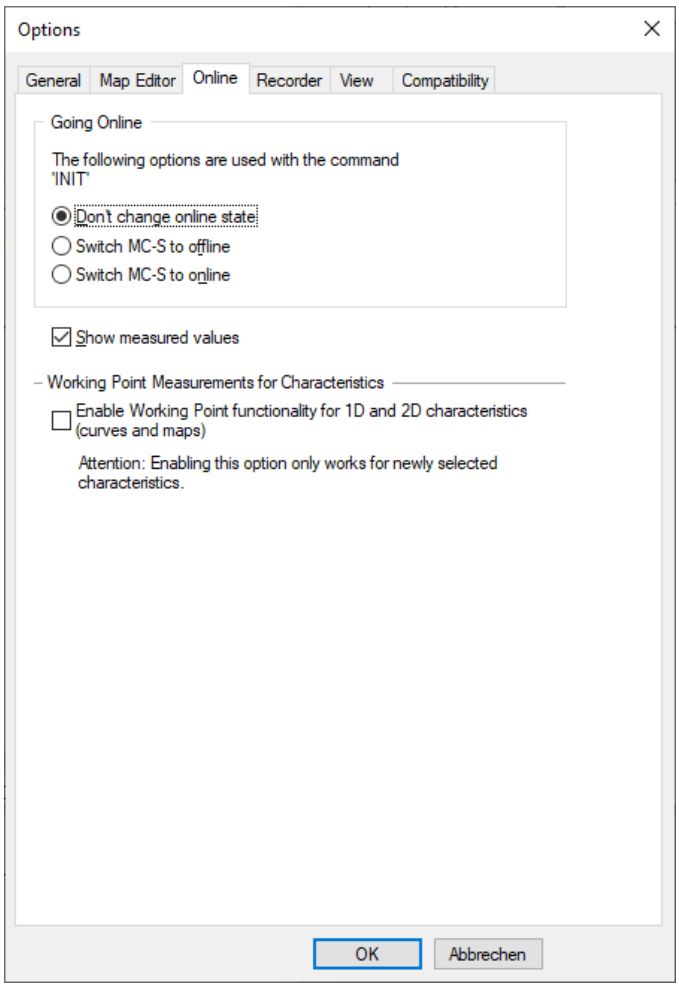
The command PUT LOOKUP TABLE TO AP-S contains besides the data for the map also data for the axes. The user can setup, whether this data for the axes shall be ignored or all the remaining maps shall be used without interpolation.

The default is *Use axes values without interpolation of remaining maps*.

If *Show edited values* is checked, a view is opened for the selected maps or parameters.

If *Use hard bound limitation* is checked and a value of a calibration object, which has to be set, is outside the weak bounds, the weak bounds of the object will be set to the hard bounds. This option allows using the complete range of the hard bounds. The default is that this option is not set, which means that the weak bounds will be used for limitation. If in that case a value outside the weak bounds shall be set, it will be set to the upper or lower weak bound automatically. Additionally the hard bounds (Min./Max. values) will be returned when getting the values of a calibration object via ASAM-ASAP3.

3.6.3 Online Options



Going Online

When the command INIT is sent, ASAM-ASAP3 can modify the online state of INCA in the following way:

Don't change online state, Switch MC-S to offline (measurement and ECU calibration access is stopped) or *Switch MC-S to online* (measurement and ECU calibration access is started).

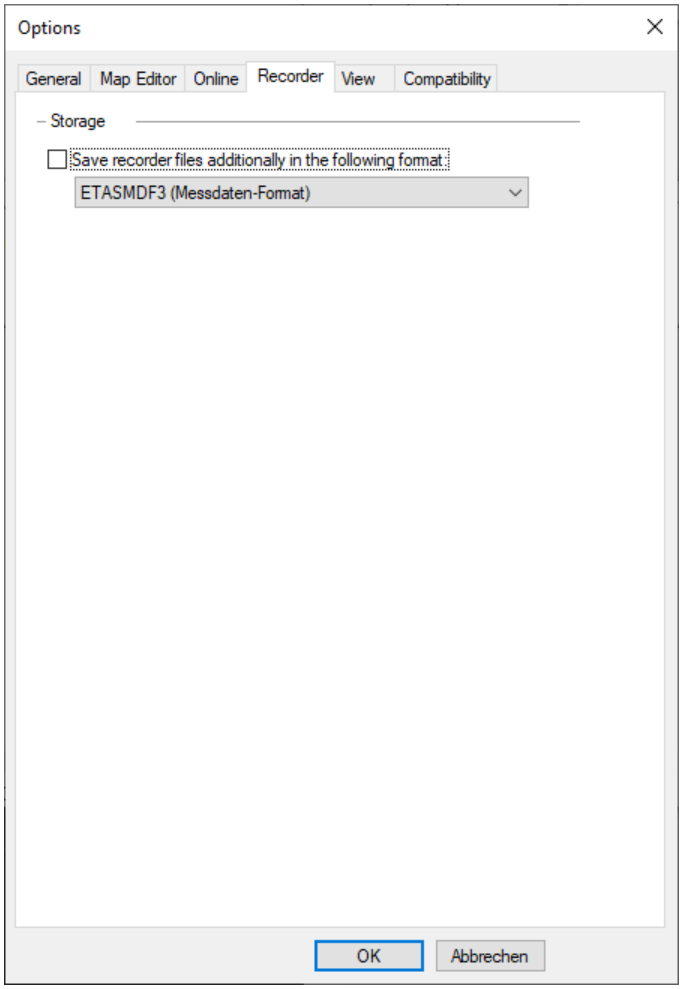
Show Measured Values

If *Show measured values* is checked, a view is opened for the selected online values within the current INCA Experiment.

Working Point Measurements for Characteristics

This option enables or disables the working point functionality which is provided by the EXTENDED GetWorkingPoint command. In case the functionality is disabled, the EXTENDED GetWorkingPoint command will issue an error in case it is executed. If the option is changed, it has only effect on newly selected characteristics, so it is a good strategy to set this option before session start.

3.6.4 Recorder Options



By default the results of every recorder measurement are stored in an MDF (=Measure Data Format) file. With the option *Save recorder files additionally in the following format* it is possible to store every measurement in an alternative format. This is always done additionally to the MDF format, i.e. the MDF file is always written, but if this option is selected, the measurement is additionally stored in another format of choice.

Note: When the Primary Recorder Format in INCA is set to MDF4, it is not possible to store the recorder file in an additional recorder file format.

Background Operation of Load/Save Recorder File

The following .reg file defines a registry key that is evaluated by ASAP3.EXE and that enables or disables this new feature:

```
Windows Registry Editor Version 5.00

[HKEY_CURRENT_USER\Software\ETAS\INCA\x.y\ASAP3\Settings]

"EnableBackgroundOperations"=dword:00000001
```

(`x.y` Must be replaced with the used INCA version.) In case this key is set to a value different from 0, the new background operation features are enabled. They can be configured via the Recorder Options dialog, which looks like this now:

ACTIVATE RECORDER with “STOP” as a parameter, can implicitly cause a new recorder file to be saved. This save operation can be configured to be executed in the background. Please be aware that with enabled background operation ACTIVATE RECORDER, only the native INCA MDF format is supported. The format selection option will be disabled while background operation for ACTIVATE RECORDER is enabled.

For each command, enabling and disabling background operation can be performed independently of each other by a separate check box for each command.

An active background operation can cause some commands to return errors because they would conflict with the background operation. These conflicting commands are:

- ACTIVATE RECORDER
- GET RECORDER STATUS
- GET RECORDER RESULTS HEADER
- GET RECORDERRESULTS
- SAVE RECORDER FILE
- LOAD RECORDER FILE

The error code returned in this case will be either

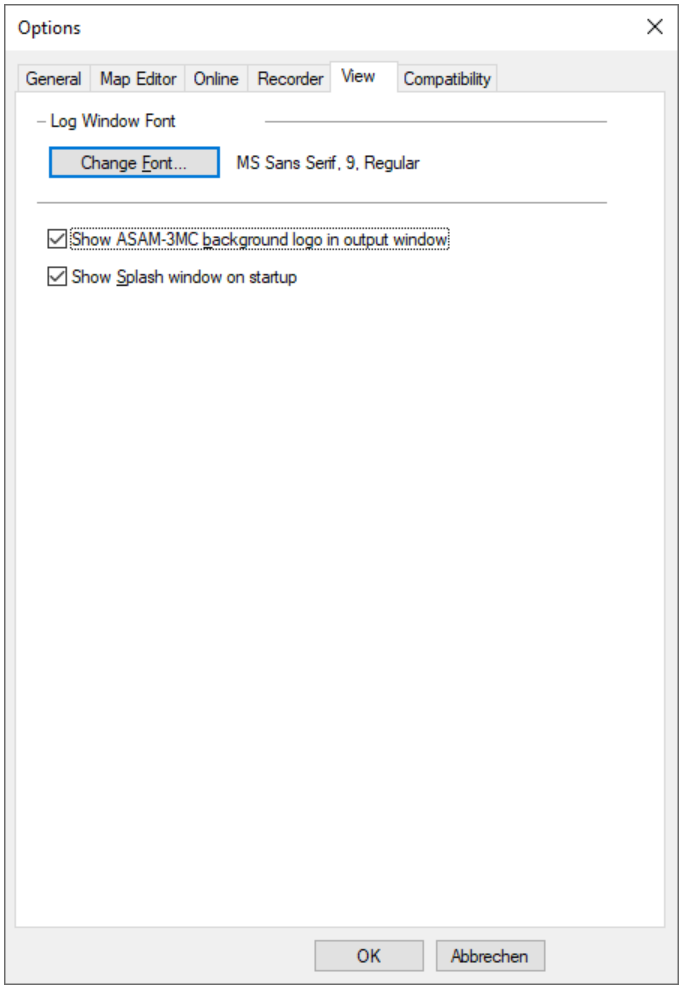
“60832 Command not possible because a 'LOAD RECORDER FILE' command is still running in the background!”

or

“60833 Command not possible because a 'SAVE RECORDER FILE' command is still running in the background!”

depending on whether a load or a save operation is in progress.

3.6.5 View Options



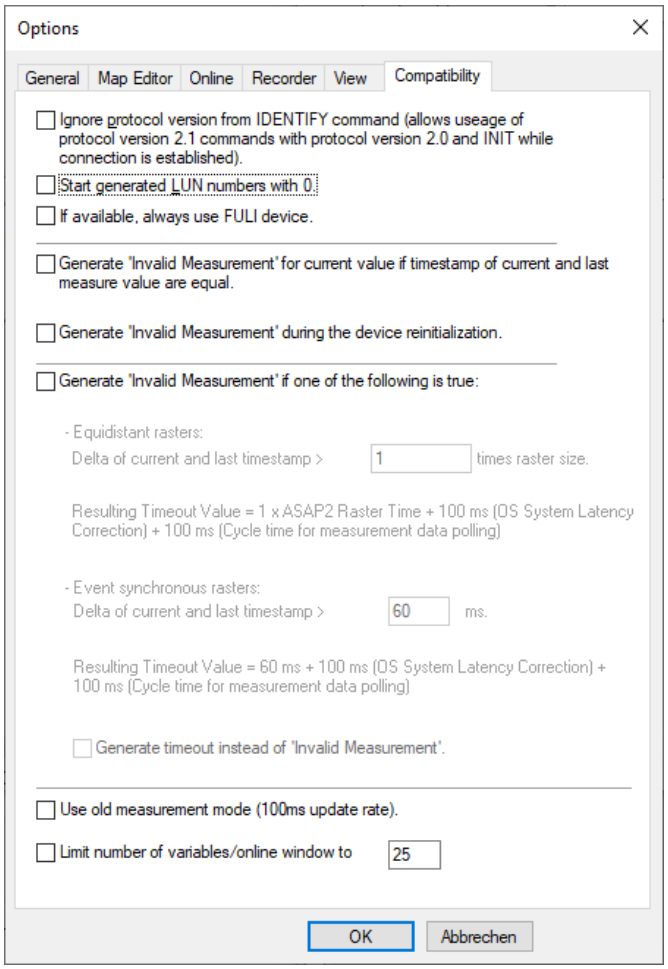
With *Change Font* the user can select the font (-size) used for the output in the log window.

Show ASAM-3MC background logo in output window is helpful for systems with slow graphic adapters, if the scrolling of the log window is very slow. In this case these options should be unchecked.

Show Splash window on startup enables the splash window (default).

3.6.6 Compatibility Options

The following options have been added to allow for greatest compatibility with the previous ASAM-ASAP3 implementations of early INCA versions.



The option Ignore Protocol Version from IDENTIFY command (allows usage of protocol version 2.1 commands with protocol version 2.0 and INIT while connection is established) allows the AuSy to execute protocol version 2.1 commands while identifying itself with protocol version 2.0.

The option Start generated LUN numbers with 0 will force the SELECT DESCRIPTION FILE AND BINARY FILE command and the DEFINE DESCRIPTION FILE AND BINARY FILE command to generate LUN numbers starting with 0 and increased by one. Without this option set, the LUN numbers are starting with 59 and increased by 29 to simulate “arbitrary” numbers.

The option If available, always use FULI device if available defines that all LUNs of devices, that potentially support FULI, will be treated as FULI, regardless of if the used destination code in the commands SELECT DESCRIPTION FILE or DEFINE DESCRIPTION FILE is from the “_FULI” range or not. Recording labels from such FULI LUNs result in recording the labels as if they were from a non-FULI LUN. (ASAP3 only)

The option Generate 'Invalid Measurement' for current value if timestamp of current and last measure value are equal checks if the current measure value is

really a new one, and not the last one that was send repeatedly because no newer values are available. By default INCA repeats the latest value until a new one is available. If this checkmark is set, the system reports 'Invalid Measurement' if there is no new measure value.

The option Generate 'Invalid Measurement during the device re-initialization is off by default, which means that during a device re-initialization the last valid value is (repeatedly) returned. If this value is checked, the value for 'Invalid Measurement' is returned during every device re-initialization.

The option Generate 'Invalid Measurement' if one of the following is true allows to generate an invalid measurement if the measurement data isn't updated for a certain amount of time. Up that time the last valid value is returned. Basically the option is differs between 2 raster types:

- Equidistant raster:

  If the delta between the current and the last timestamp exceeds n times the current raster size an invalid measurement value is returned. Example: The value is wired in a 50ms raster and the option is set to 5. In this case after a time of 5 x 50ms = 250ms an invalid measurement is returned.

- Event synchronous raster:

  If the delta between the current and the last timestamp exceeds a certain amount of time in ms an invalid measurement is returned.

Additionally, it is possible to generate a timeout on the client side with the option *Generate timeout instead of 'Invalid Measurement'*. This option is valid for both raster types.

NOTE

In a standard installation, the maximum value for equidistant raster is limited to 1000 ms. It turned out that for the measurement of CAN-Monitoring signals, this limit can be too tight. This is true for signals that are only sent very rarely, e.g. if their value changes or after a certain time span, e.g. 10 seconds, has elapsed.
To avoid invalid measurement values in these cases, the maximum value for equidistant raster can be overridden in the windows registry. The following reg file specifies a timeout of 5000ms (1388 hex):

```
Windows Registry Editor
[HKEY_CURRENT_USER\Software\ETAS\INCA\x.y\ASAP3\Settings]
"MeasureTimeoutSynchroMaxValue"=dword:00001388
```

Similar thoughts lead to an equivalent feature for the time equidistant raster. The following registry file specifies a timeout of 6000ms (1770 hex):

```
Windows Registry Editor


[HKEY_CURRENT_USER\Software\ETAS\INCA\x.y\ASAP3\Settings]
"MeasureTimeoutFactorEquidistantMaxValue"=dword:00001770
```

(Replace `x.y` with the used INCA version.)

For both Settings to take effect, a restart of ASAP3.EXE is required.

> **NOTE**
>
> All these options are only valid during normal operation. After a measurement was started the system always waits up to 1000ms for the first data. If after 1000ms no new data is available the system returns with an INVALID MEASUREMENT error. Once valid data is available, the system will react as defined with the settings before.
>
> With the option *Use old measure mode* it is possible to switch back to the measurement behavior of INCA ASAP3 implementation before INCA 5.3. If this option is switched off, the client is able to retrieve all available measurement data, as long as he polls fast enough, but in this case every data has a fixed delay of n+50ms. For further information on measurement modes, refer to chapter 2.8.

> **NOTE**
>
> Measurement via iLinkRT is only supported if ASAP3 is configured to use the new measurement mode. If “Use old measure mode” is checked, no iLinkRT measurement telegrams are sent to the clients..

The option *Limit number of variables/online window* limits the number of measurement variables that can be displayed in one experiment view. After that number a new view is opened when adding new measurement variables.

3.7 Usage of ASAP3.INI

With the menu option 'Extras|Export Current Options…' you can save the current settings to an ASAP3.INI file.

The settings in the asap3.ini file can be used with the first start of the ASAM ASAP3 interface as default settings. To enable this function, the asap3.ini file must be copied into the INCA data directory (e.g. \ETASData\INCAx.y). At the end of the first run of the ASAM ASAP3 interface, the settings are stored in the registry:

HKEY_CURRENT_USER\Software\ETAS\INCA\x.y\ASAP3

All later runs of ASAM ASAP3 will load and store the settings at this registry location.

This way, every user has its own ASAM-ASAP3 settings.

If the settings later shall be replaced again with an ASAP3.INI file, the ASAM ASAP3 registry settings have to be deleted (HKEY_CURRENT_USER\Software\ETAS\INCA\x.y\ASAP3 should not exist anymore). This forces ASAM ASAP3 to reload the settings from ASAP3.INI this time, but again only once.

3.8 Measurement modes

As already mentioned in section 2.6.6 there are 2 possible measurement modes. The former one witch has a fixed update rate of 100ms that has been kept for

compatibility reasons and a new one that enables the client to get all available data.

3.8.1 Old Measure Mode (Compatibility Mode)

This measurement mode uses a fixed update rate of 100ms (INCA target server update rate in default “High bandwidth” mode). If a client polls he always gets the latest available value. Polling at rates > 10Hz does not really make sense, as in this case only the latest available value is repeatedly handed to the client. The following overview explains the behavior:

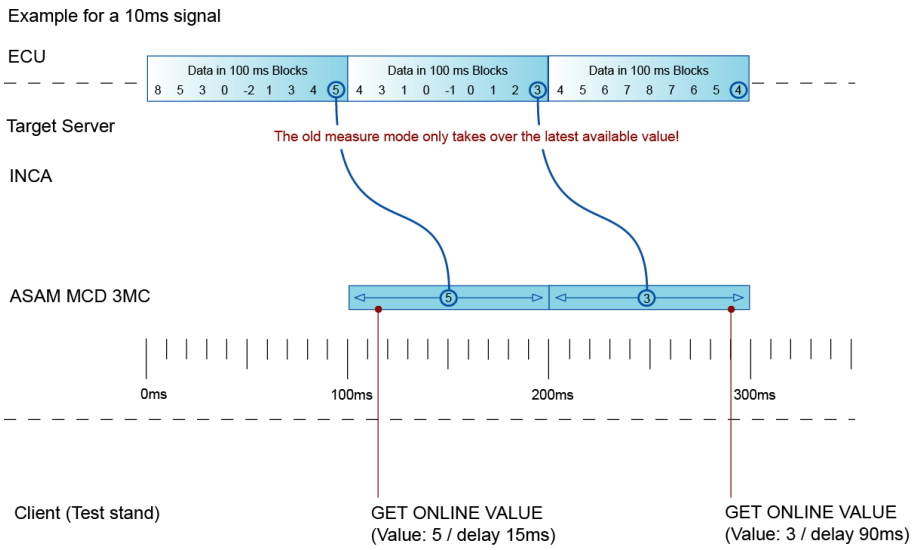


Fig. 2-1 Old measure mode

The data at the client side are delayed, depending on when the client calls GET ONLINE VALUE. The delay is in the range of 0 - 100ms. Therefore, it is recommended for a client to call at GET ONLINE VALUE at a fixed rate of 10Hz for best performance. Higher rates will result in higher workload, but not in more precise results.

It is possible to switch between 2 operating modes of the target server:

- High bandwidth mode (the default mode, internal update rate: 100ms)
- High performance mode (internal update rate: xxms)

All things said so far are also valid for the high performance mode, with the only difference that the 100ms update rate is changed to xxms and all timings will change accordingly.

But even with the high performance mode it is not possible to get all available values of a raster that is faster than the update rate of xxms.

To make it possible to get all values of faster signals a new measure mode was introduced, which is explained in the following section.

> **NOTE**
>
> Measurement via iLinkRT is only supported if ASAP3 is configured to use the new measurement mode. If “Use old measure mode” is checked, no iLinkRT measurement telegrams are sent to the clients.

3.8.2 New Measure Mode

With measurement signals at rates faster than the rate of the selected target server mode it is necessary to be able to poll at higher rates. Therefore, a new measurement mode was introduced that allows a client to get the ‘in between’ data. As the target server delivers the data in 100ms blocks (INCA target server update rate in default “High bandwidth” mode), the data is buffered in the ASAM ASAP3 server of INCA and then returned to the client depending on ‘when’ it calls GET ONLINE VALUE. The following overview explains again the behavior:

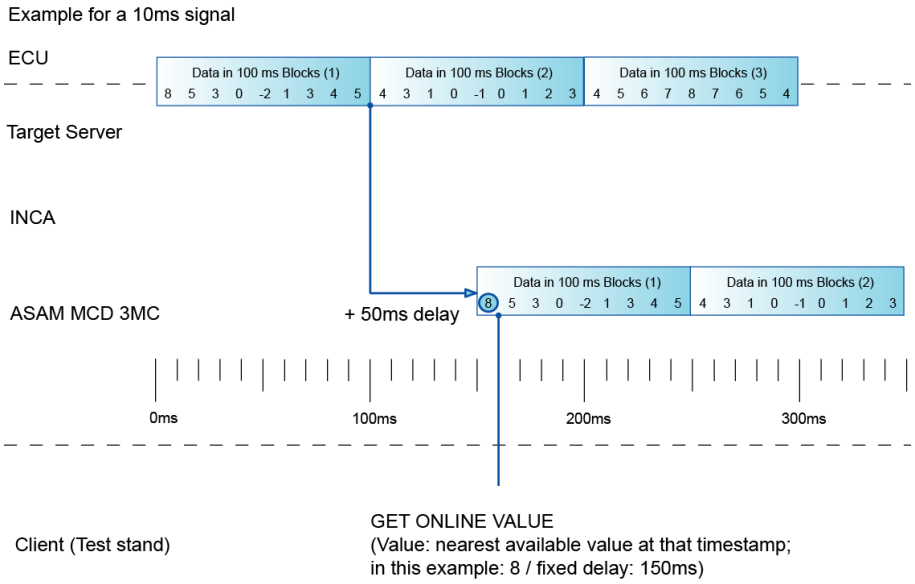


Fig. 2-2 New measure mode

If the user wires a 10ms signal and calls at a certain time GET ONLINE VALUE he gets the value with a fixed delay of 150ms. If he calls GET ONLINE VALUE 10 times in 100ms, i.e. uses a polling rate of 100Hz, he will get all 10 values that were recorded in that frame.

Since INCA 5.3 it is possible to switch between 2 operating modes of the target server:

- High bandwidth mode (fixed delay at internal update rate + 50ms = 100+50ms = 150ms as in the overview)

High performance mode (fixed delay at internal update rate + 50ms = xx+50ms = xxms)

> **NOTE**
>
> In order to be able to get all values of faster signals it is necessary that the test stand is connected through Ethernet (serial is too slow) and that the server and client (test stand) PC are fast enough to handle the higher workload that is caused by higher polling rates.

> **NOTE**
>
> Everything said about GET ONLINE VALUE is also true for the Command GET USER DEFINED VALUES.

If iLinkRT is used for transmission of measurements, the behaviour is different, because in iLinkRT, the clients do not poll for data but get measurement telegrams sent by the server automatically and asynchronously. For performance reasons, the current iLinkRT implementation always sends the most recent measurement values which it receives from the hardware to the client. There is no delay and the values in between are not transmitted.

3.9 Search Mechanism for ASAM ASAP3 Variables

Some ASAM ASAP3 commands need a variable name or a variable name list as parameters. ASAM ASAP3 gets these variables with the following mechanism:

- In most cases the user/automation system knows the variable name and the LUN of the device the variable belongs to. In this case the user takes the LUN and the variable name as parameters.
- If the user/AuSy doesn't know the LUN (in this case he sets the LUN parameter to $FFFF) the list of all devices is checked, whether one of the devices contains the variable. Note: This mechanism is only supported for measurement variables.
- If the user/AuSy has different variables with different LUN, every variable should have the following form: "variable\device". If in some variables the device name is missing, it is treated like in case I or II.

3.10 Realization of ASAM ASAP3 Commands in INCA

This chapter describes how ASAM ASAP3 commands are executed in INCA.

In the case of unimplemented commands the error code $5656 is returned.

Error codes:

There are several categories of errors:

- Errors in the communication between ASAM-ASAP3 server and INCA
- Command specific errors (exceeding of limits, invalid handles (LUN, Map numbers),...)

INCA specific errors like internal table overflows, declaration errors in description file, general communication errors between ETAS HW and external devices and so on; these errors are returned via ASAM ASAP3 with

a general description (e.g. command failed), but are logged in more detail in the INCA monitor window.

NOTE

- INCA can work with 32bit or 64bit integer values. In ASAM ASAP3, a four-byte float format is used, which has a precision of 7 - 8 digits. The 32bit integer values have a precision of 10 digits. Therefore, you will loose precision of data when dealing with 32bit variables.
  With the EXTENDED commands of ASAM ASAP3 V2.1.x, it is possible to transfer eight byte float which allow to transfer up to 32bit integer vales without loos of precision.
  With the new commands of ASAM ASAP3 V3.0 it possible to transfer calibration data in original integer format.
- Invalid measurements will not be indicated to the AuSy with the current implementation of the tool chain. Only in some cases where the ASAM ASAP3 server cannot get correct data from INCA, the invalid measurement value will be returned.
- The new behavior of default LUN = 0 is implemented like this: LUN 0 will always access the first ECU in the current INCA Workspace.
- Download to some K-Line devices fails because they do not support the download of the full calibration area. Disable download via ASAM ASAP3 and instead do a differential download directly in the INCA UI in this cases before the ASAP3 session is started.
- The commands SELECT DESCRIPTION FILE AND BINARY FILE and DEFINE DESCRIPTION FILE AND BINARY FILE are now able to load a different dataset into the ECU. Only the description file is used to select the device. If you want to use two identical ECUs, you cannot distinguish them by the binary file. Therefore, you must create a copy of the description file with a different name and create a new project within INCA with this renamed description file. Then you can use these two different description file names within ASAM ASAP3 to distinguish the two ECUs.
- If a calibration object in INCA will be changed and this object exists also for a second ECU, it will automatically be changed for both ECUs if *Group Device* was selected before. This feature is also available in ASAM ASAP3.
- Switching Online does not automatically start the measurement. The measurement is started if an ASAM ASAP3 command that requires a running measurement is issued. Nevertheless, the SWITCHING OFFLINE/ONLINE command must still be issued in advance because the access to the ECU must already be provided when starting a measurement.
  The measurement is stopped automatically when a command that requires the measurement to be stopped is issued. This will not be done in case a recorder is running. In this case, an error message is returned.
- Normally, the IDENTIFY command is required to use ASAM ASAP3

V3.0 or V2.1. Without issuing the IDENTIFY, a MCD system is regarded as a V2.0 system.
In the INCA ASAM ASAP3 server, this behavior can be changed by an option in the “Compatibility” settings. The option allows ignoring the protocol version at all and allowing the V2.1 command even if no IDENTIFY command was sent. Nevertheless, when using the IDENTIFY command with version 2.0 or 3.0, also version 2.0 or 3.0 is reported back in the telegram answer.

The calibration pages of an ECU can be switched by the EXTENDED Service “Switch Emulation Page”. Besides this explicit page switch, some other commands can also change the calibration page in some situations.

The following commands always switch the calibration page to the working page, provided the pages are switchable:
SELECT LOOKUP TABLE
SELECT DESCRIPTION FILE AND BINARY FILE
DEFINE DESCRIPTION FILE AND BINARY FILE

The following commands switch the calibration page to the working page only once for each command and label:
GET PARAMETER FROM AP-S
SET PARAMETER ON AP-S

The following commands switch the calibration page to the working page when they access LUN 0:
COPY BINARY FILE
CHANGE BINARY FILE NAME
RESET DEVICE
EXTENDED Service “GetToolSetupInfo”

The following commands switch the calibration page to the working page when they access LUN0 and there are variables wired that do have no device postfix in their name:
PARAMETER FOR VALUE ACQUISITION
DEFINE RECORDER PARAMETERS

3.11 Performance Considerations

There are several things that should be taken into consideration, to get the maximum performance when working with INCA’s ASAM ASAP3 server.

- First of all be sure to use the maximum available speed of the serial interface that is available at the test stand (up to 115200 baud).
- To increase speed when adding new variables with DEFINE RECORDER PARAMETERS (Command 41) and PARAMETER FOR VALUE ACQUISITION (Command 12) be sure, that in the General options dialog (section 2.6.1) the parameter *‘Labels are case sensitive’* is checked. Uncheck this option only if you really need case insensitive variable names.

Another possibility to increase speed, especially on slower PCs, is to turn off logging in the view window in the General options dialog (section 2.6.1). To do this, select the item *'Only errors'* in the group *'Logging'*. This will increase the speed especially for repeatedly called commands like GET ONLINE VALUE (Command 19), GET USER DEFINED VALUE (Command 21) or GET RECORDER RESULTS (Command 46).

In cases where logging cannot be disabled, it can be made faster by switching off the *'Show ASAM-3MC background logo in output window'* check in the "View" options tab. The disabling of the *'Update LED Indicators'* in the "General" options tab also increases speed.

3.12 FULI – Fast Upper Level Interface (INCA-MCE)

The FULI configuration enables the selection of measurements and calibration for an alternative data transmission path beside the standard ASAM MCD-3MC interfaces. This is used to configure the measurements and calibration for the ETAS INCA-MCE product.

For INCA's ASAM ASAP3 interface a separate LUN for each standard device has to be used for the transmission via FULI link (see chapter 4.5 and 4.6).

If a measurement value is wired via such a FULI LUN, the label is registered for the FULI device and will be transported via an alternative data transmission link (i.e. INCA-MCE EtherCAT/iLinkRT).

New wiring rules apply. (①, ② = sequence order of execution)

A (Norm)	A (FULI)	Action
① measurement		① wire normal
① measurement	② measurement	① wire normal, ② enable FULI
② measurement	① measurement	① wire normal, enable FULI
	① measurement	① wire normal, enable FULI

Tab. 2-1 New wiring rules (Add)

A (Norm)	A (FULI)	Action
① measurement		① remove
① measurement	② measurement	② disable FULI, remove
② measurement	① measurement	① disable FULI, ② remove
	① measurement	① disable FULI, remove

Tab. 2-2 New wiring rules (Remove)

GET ONLINE VALUE returns the values of all wired variables, despite of FULI or not.

Wiring of FULI variables in the recorder is not supported.

Maps and curves of a FULI-LUN are registered for FULI access when the corresponding SELECT LOOKUP TABLE command is executed. Scalar parameters are registered when they are actively read the first time with a FULI-LUN. Registration needs to be done before going online with the ECU, because when the ECU is online, no change of the registration is possible any more – the

configuration is sent to the FULI device just before going online. The AuSy must be aware of this and must create all map handles and access all scalar parameters that it wants to be available at the FULI device before it switches online. This, in addition, means that the FULI device will only receive correct data while INCA is in online state. In offline State, the INCA configuration and the FULI configuration might be different.

The option “If available, always use FULI device if available” defines that all LUNs of devices, that potentially support FULI, will be treated as FULI, regardless of if the used device type is _FULI or not. Recording labels from such FULI LUNs result in recording the labels as if they were from a non-FULI LUN.

3.13 INCA GUI

During the use of ASAP3.EXE, that is, while a session is active (INIT-Command was sent and no EXIT command was issued since), the INCA GUI is locked by a message window. The reason for this is, that INCA does not support parallel use of GUI and ASAP3. While it is technically possible to close that message window and use the INCA GUI while an ASAP3 session is active, there are no guarantees about data consistency and correct program operation in such a scenario. If, for example, the measurement configuration is changed in the GUI while ASAP3 has a measurement running, the measurement in ASAP3 is corrupted (will return wrong measurement values) and could even result in a crash of either INCA or ASAP3.EXE.

NOTE

Because of these possible inconsistencies, it is strongly recommended to not use the INCA GUI during a running ASAP3 session. The only exception should be emergency situations. If the INCA GUI was in fact used by an operator during an ASAP3.EXE session, it is required to stop the ASAP3 session, close ASAP3.EXE, close and reopen the experiment, restart ASAP3.EXE and finally reestablish the session with the AuSy.

NOTE

To avoid such inconsistent states, it is suggested that the following sequence of operation is executed in case a manual operation in INCA is required:

1. Send the EXIT command from the AuSy to the ASAP3.EXE to terminate the session.
2. Perform the manual interaction within INCA. Do not close the experiment window.
3. Restart the script (e.g. send INIT, IDENTIFY ... from the AuSy to ASAP3.EXE).

After that, normal operation of INCA/ASAP3/AuSy can continue.
In case the experiment window of INCA needs to be closed, ASAP3.EXE must be closed at the end of step 1 and restarted at the beginning of step 3.

> **NOTE**
>
> Since iLinkRT 3.0 supports starting the ASAP3.exe without opened experiment the lock window is opened immediatly after the start of the ASAP3.exe.

3.14 Registry-Only Settings

Some features of ASAP3.EXE are rarely used or only applicable in edge cases. To keep the Settigns GUI of ASAP3.EXE understandable, the following settings are not available in the GUI but only via Registry.

Please note that the registry path is dependant on the INCA version so replace the version with the current INCA version for which this setting shall apply.

3.14.1 DCOM Setting RunAs="InteractiveUser" and the SetInteractiveUser setting

There is a use case where ASAP3.EXE needs to be executed as a different user than the current user. This can be accomplished by using the "runas" command on the comman dline or by using the explorer shift-right-klick menu entry "Run as different user". This causes ASAP3.EXE to execute with the rights and environment of that different user. This includes also the DCOM settings of ASAP3.EXE of that different user. The DCOM "RunAs" settings for ASAP3.EXE are normally set to "InteractiveUser" by ASAP3.EXE by default at startup and cause it to run as the "Interactive User" regarding DCOM rights. Since in this use case, the interactive user is not the user under which the ASAP3.EXE process is running, DCOM does not work as expected and causes runtime errors.

A solution for this problem is to set the DCOM settings "RunAs" property in a way that ASAP3.EXE is not forced to run as the interactve user but as the launching user. Removing the "RunAs" property from the DCOM settings or selecting "Run as launching user" in dcomcnfg does exactly that. It is also possible to specify a certain user in the "RunAs" property.

The "SetInteractiveUser" setting of ASAP3.EXE will prevent ASAP3.EXE from changing the "RunAs" registry entry for the DCOM settings of ASAP3.EXE during startup. The following text can be copied into a REG file and then be easily executed with a double-click from the file explorer:

```
Windows Registry Editor Version 5.00

[HKEY_CURRENT_USER\SOFTWARE\ETAS\INCA\7.4\ASAP3\Settings]
„SetInteractiveUser"="off"
```

> **NOTE**
>
> This reg file has to be executed for both the current user and the user that will be used to start ASAP3.EXE!

In case “SetInteractiveUser” is set to “off” or “no” or “0”, ASAP3.EXE **will not change** the “RunAs” DCOM AppID Setting in any way.

In case “SetInteractiveUser” is set to “on” or “yes” or “1”, ASAP3.EXE **will change** the ”RunAs” DCOM AppID setting on startup to “InteractiveUser”.

4 iLinkRT 3.0 Mode and Multiclient-Support

If the INCA user option for the ASAM MCD3 MC interface was set to 'iLinkRT V3.0' the ASAP3.exe will be in the iLinkRT 3.0 mode the next time its being started.

In this mode the ASAP3 and iLinkRT 2.0 protocols are disabled and only iLinkRT 3.0 commands can be received.

Apart from that the bottom area of the UI will be extended by a second toolbar showing the states (MC-SERVER-STATE, MEASURING_STATE and RECORDER_STATE) of the global server and all connected clients:

In this example the server (represented by 'Global') has the MC-SERVER_STATE CONFIGURED, the MEASURING_STATE STARTED and the RECORDER_STATE UNDEFINED and two clients both called 'iLinkRT 3.0 Client' are connected to the server.

The difference between both client states is that the first client has started a measuring (MEASURING_STATE = STARTED) and the second client has stopped it(MEASURING_STATE = STOPPED; default value).

The 'Establish Connection' dialog provides an option 'iLinkRT Watchdog Interval (sec)' that can be used for automatically clearing stale client connections.

If its value is set to 0 the watchdog is disabled but if it's changed to a value between 1 or 1000 each client is required to call at least one command within this interval to avoid an automatic RT3_SERVER_DISCONNECT.

5 Implementation Notes for ASAP3 Commands

5.1 EMERGENCY COMMAND: 1

Command:

Entry	Data type
Event	WORD

Answer:

Entry	Data type
No data	-

All connected ECU's in the current INCA Workspace, which support page switching, are switched to the Reference Page. Event has to be set to 0.

> **NOTE**
>
> INIT must be executed before EMERGENCY can be executed.

Error codes:

INCA specific errors
Not yet identified
Only Event 0 allowed

5.2 INIT COMMAND: 2

Command:

Entry	Data type
No data	-

Answer:

Entry	Data type
No data	-

When an INIT is received although there was already an INIT sent, the ASAM ASAP3 session is reinitialized. This means, that allocated resources are freed; LUNs, map numbers and other implicit states are no longer valid; graphic mode and case sensitivity of labels are reset to the default specified in the options, a running flight recording is cancelled. Objects in the experiment that have been there already before ASAM ASAP3 was started stay in the experiment.

If specified in the settings, INCA is put into online state.

> **NOTE**
>
> Make sure that INCA is already using the right workspace/project, because with ASAM ASAP3 it is not possible to change projects.

Error codes:

INCA specific errors

5.3 IDENTIFY COMMAND: 20

Command:

Entry	Data type
Protocol version number	WORD
AuSy name	STRING

Answer:

Entry	Data type
Protocol version number	WORD
MC system name	STRING

The current implementation of the ASAP3 server supports ASAM ASAP3 V2.x and V3.0 implementation of the client (test bed). The interface itself works by default according to the ASAM ASAP3 V2.1.1 specification. Therefore it returns the value 2.1 (→ 513) and the current version string of INCA (e.g. "INCA V7.0.0 Protocol Version 2.1"}).

The returned version number is 2.1 for all cases where the AuSy identifies itself using a version 2.x above 2.0. If the AuSy identifies itself using V2.0, the interface adjusts itself to ASAM ASAP3 V2.0 functionality and returns V2.0. If the interface works in V2.0 mode, all commands/behavior newly defined in V2.1 or higher are not available to the AuSy and will result in error messages if requested.

In the case that this command wasn't issued by the client, all following commands, except for *IN/T*, are answered with the error code 'This command requires at least Protocol Version 2.1!'.

- EXIT
- DEFINE DESCRIPTION FILE AND BINARY FILE
- GET USER DEFINED VALUE
- GET USER DEFINED VALUE LIST
- QUERY AVAILABLE SERVICES
- GET SERVICE INFO
- EXECUTE SERVICE

The INIT command with LUN equal to 0 is not supported if no IDENTIFY command was issued.

If the 'Protocol version number' is set to 768, protocol version 3 is activated.

This protocol version supports all commands of the previous versions, but with slightly modified behavior and mapped standardized error codes in the ASAP3 specification.

Besides the existing commands also the following new V3.0 commands are supported:

- GET CALPAGE INFO
- GET CURRENT CALPAGE
- SET CURRENT CALPAGE
- GET RASTER OVERVIEW
- GET CHARACTERISTIC INFO
- READ CHARACTERISTIC
- READ CELL VALUES

- WRITE CHARACTERISTIC
- WRITE CELL VALUES

Error codes:

INCA specific errors
Only Event 0 allowed
Already Identified
Command order error! Need command 2 before!

5.4 EXIT COMMAND: 50

Command:

Entry	Data type
No data	-

Answer:

Entry	Data type
No data	-

All resources that were used by the AuSy will be released in INCA. That means, that all inserted online/flight recorder variables and all opened editor windows caused by the AuSy will be removed/closed.

When flight recorder was used by ASAM ASAP3, just the variables inserted by ASAP3 will be removed; this command will not restore the previous state before using ASAM ASAP3.

This command works the same as the menu item 'ASAP3 Stop!' in the ASAM ASAP3 server window.

Error codes:

Missing INIT (command 2)
Only Event 0 allowed

5.5 SELECT DESCRIPTION-FILE AND BINARY FILE COMMAND: 3

Command:

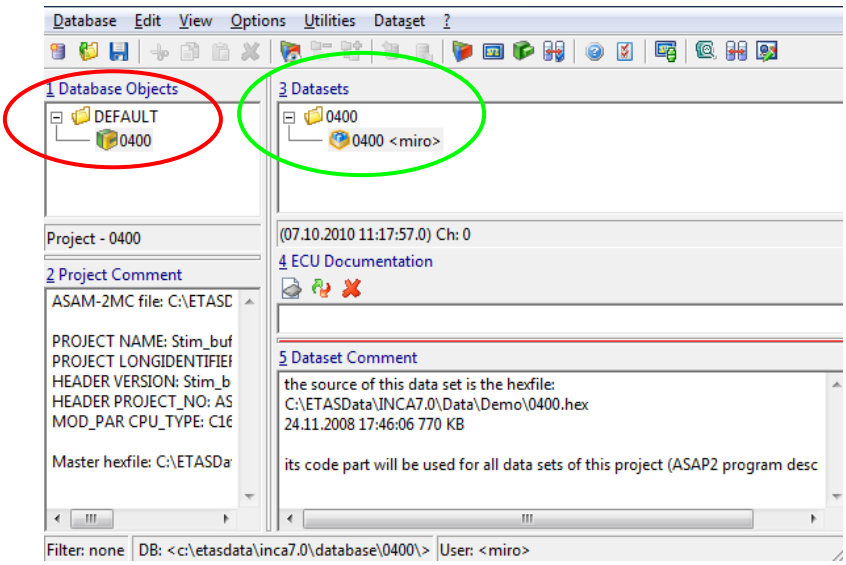
Entry	Data type
Description file name	STRING
Binary file name	STRING
Destination	WORD

Answer:

Entry	Data type
Emulator LUN	WORD

Depending on the option *Use database names in 'SELECT / DEFINE DESCRIPTION FILE AND BINARY FILE'*, the parameters in this command are treated differently. If the option is checked, the names are treated as database names: The description file name is interpreted as a path and a database item name for the project item in the INCA database, e.g. DEFAULT\0400. The same holds true for the Binary File Name, but here the path is interpreted only within the INCA project

item, e.g. 0400\0400_1. The following picture shows how this example looks like in the INCA GUI (left side Description File Name, right side Binary File Name):



The text further down in this chapter describes the behavior in the case this option is deselected.

Binary File Name has to reference a valid calibration data file, if the option ***Data Download at 'Select Description And Binary File'*** is enabled. Either it contains only the filename or it contains also an absolute, full specified path to the file. The default file extension of ".hex" can be overridden. In case the mentioned option is not set, the file needs not to exist on the hard drive, only the INCA database is searched for the name. But the file name must still match the name of the file, which was used when reading the data file.

Description File Name has to reference a valid ASAP2 file. Either it contains only the filename or it contains also an absolute, fully specified path to the file. The default file extension of ".a2l" can be overridden.

Description File Name is only used to select a specific device. *Binary File Name* can be used to load a different binary file with this command. The selection algorithm for the device first compares *Description File Name* to all installed devices. If no one matches, it repeats the comparison with only the filename without path of both the required description file and the description file loaded in each device. If this also fails, the same step is done with the base name (filename without extension) only. If this doesn't succeed, an error is returned.

If the download option is activated and the binary file contains no fully qualified path name, the file is searched in the same directory from which the hex file of the current data set was read. If the hex file cannot be found there, ASAM ASAP3 server searches for the file in the hex file directory which is specified in the user settings. The "current dataset" in this context means the dataset that is currently selected in the device; that is, the one that can be chosen in the menu 'Dataset|Change Working Data...'.

The value for *Destination* determines the way an ECU is accessed. The currently supported values are:

Destination Code	Destination
0x0	any device (the order the devices are tried is the order in which they are defined in the Workspace)
0x1	ETK
0x2	CAN (CCP-Protocol)
0x3	K-Line (KWP2000, McMess)
0x8000	AUXIN
0x8001	CAN-Monitoring
0x8002	FlexRay-Monitoring
0x8003	XCP (onCAN, onEthernet, onFlexRay,…)
0x8004	CalcDev
0x8005	LIN-Monitoring
0x8006	ODX-Link
0x8100	any FULI device (the order the devices are tried is the order in which they are defined in the Workspace)
0x8101	ETK via FULI
0x8102	CAN (CCP-Protocol) via FULI
0x8203	XCP (onCAN, onEthernet, onFlexRay,…) via FULI

Tab. 4-1 Destination Code

If the option “If available, always use FULI device” is checked, destination codes below 0x8100 lead to LUNs that are treated as FULI devices, as far as the underlying device support FULI at all.

The calibration data are loaded and sent to the ECU by this command if the option *Data Download at 'Select Description And Binary File'* is enabled.

If the option *Data Download at 'Select Description And Binary File'* is enabled, this command loads the specified calibration data in every case (even if it was already loaded into the PC before starting ASAM-ASAP3 server). The previously loaded calibration data is not saved (even if it was modified).

This command cannot be issued a second time after the *INIT* command, when the resulting device would be the same; an error message indicates this.

The ECU for this LUN is switched to the Working Page if more than one calibration page is available in the project used for this ECU.

Error codes:

INCA specific errors
Missing INIT (command 2)
Unable to change the "Load differences after switching ignition off/on" option.

5.6 DEFINE DESCRIPTION-FILE AND BINARY FILE COMMAND: 30

Command:

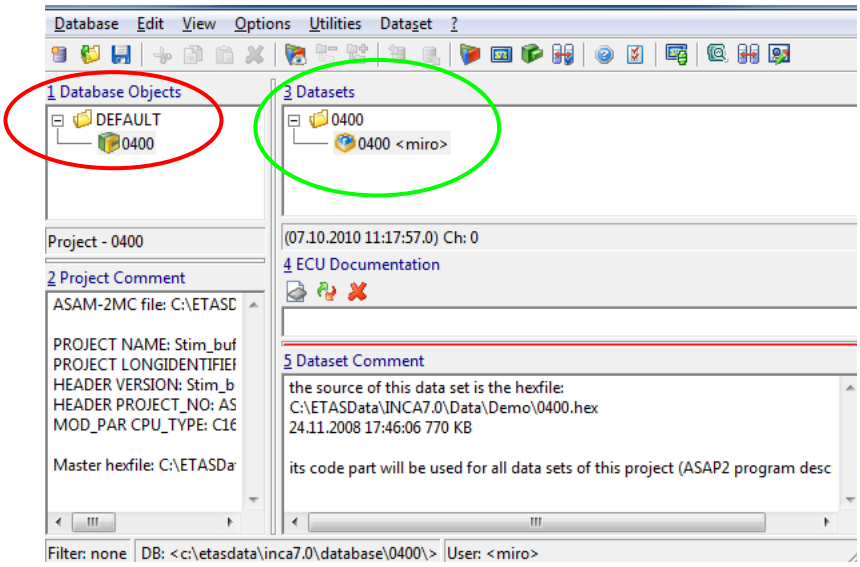
Entry	Data type
Description file name	STRING
Program code (+Calibration data) file name	STRING
Calibration data file name	STRING

Destination	WORD
Mode	WORD

Answer:

Entry	Data type
Emulator LUN	WORD
Description file name	STRING
Program code (+Calibration data) file name	STRING
Calibration data file name	STRING

Depending on the option *Use database names in 'SELECT / DEFINE DESCRIPTION FILE AND BINARY FILE'*, the parameters in this command are treated differently. If the option is checked, the names are treated as database names: The description file name is interpreted as a path and a database item name for the project item in the INCA database, e.g. DEFAULT\0400. The same holds true for the Binary File Name, but here the path is interpreted only within the INCA project item, e.g. 0400\0400_1. The following picture shows how this example looks like in the INCA GUI (left side Description File Name, right side Binary File Name):



The text further down in this chapter describes the behavior in the case this option is deselected.

Program code file name and Calibration data file name have to reference a valid program file/calibration data file, if the option "Data Download at 'Select Description And Binary File' " is enabled. Either they contain only the filename or they contain an absolute, fully specified path to the file. The default file extension of ".hex" can be overridden. In case the mentioned option is not set, the files don't need to exist on the hard drive, only the INCA database is searched for the name. But the file names must still match the names of the files which were used during data import.

Description File Name has to reference a valid ASAP2 file. Either it contains only the filename or it contains also an absolute, fully specified path of the file. The default file extension of ".a2l" can be overridden. The file handling is the same as for the Binary File.

Description File Name is only used to select a specific device. *Binary File Name* can be used to load a different binary file with this command. The selection algorithm for the device first compares *Description File Name* to all installed devices. If no one matches, it repeats the comparison with only the filename without path of both the required description file and the description file loaded in each device. If this also fails, the same step is done with the base name (filename without extension) only. If this doesn't succeed, an error is returned.

If *a Mode* value of 2 is used and the binary file contains no fully qualified path name, the file is searched in the same directory from which the hex file of the current data set was read. If the hex file cannot be found there, the ASAM ASAP3 server searches for the file in the hex file directory which is specified in the user settings. The "current data set" in this context means the dataset that is currently selected in the device; that is, the one that can be chosen with the menu 'DatasetlChange Working Data…'.

The field for *Program code file name* will be used if *Calibration data file name* is empty, otherwise it is ignored.

The field for *Calibration data file name* can be blank. In this case, the LUN will directly refer to the first ECU in the INCA Workspace, which matches the description file name. If the Description file name is empty, too, the first ECU in the Workspace will be used.

The value for *Destination* determines the way an ECU is accessed. The currently supported values are:

Destination Code	Destination
0x0	any device (the order the devices are tried is the order in which they are defined in the Workspace)
0x1	ETK
0x2	CAN (CCP-Protocol)
0x3	K-Line (KWP2000, McMess)
0x8000	AUXIN
0x8001	CAN-Monitoring
0x8002	FlexRay-Monitoring
0x8003	XCP (onCAN, onEthernet, onFlexRay,…)
0x8004	CalcDev
0x8005	LIN-Monitoring
0x8006	ODX-Link
0x8100	any FULI device (the order the devices are tried is the order in which they are defined in the Workspace)
0x8101	ETK via FULI
0x8102	CAN (CCP-Protocol) via FULI
0x8203	XCP (onCAN, onEthernet, onFlexRay,…) via FULI

If the option “If available, always use FULI device” is checked, destination codes below 0x8100 lead to LUNs that are treated as FULI devices, as far as the underlying device support FULI at all.

With INCA, *mode* values of 1 and 3 will not be supported, because the program is not supported.

With *mode* equal to 2, the calibration data are loaded and sent to the ECU by this command.

This command loads the specified calibration data in every case (even if it was already loaded into the PC before starting ASAM ASAP3 server). The previously loaded calibration data isn't saved (even if it was modified).

This command cannot be issued a second time after the *INIT* command, if the resulting device is the same; an error message indicates this.

The returned description and calibration data file name will be the name extracted from the device. This is the original file name, which was used during import of the project and calibration data.

The returned file name of calibration file will ALWAYS have an absolute pathname; i.e. it will contain drive, path and file name.

The ECU for this LUN is switched to the Working Page if more than one calibration page is available in the project used for this ECU.

5.6.1.1 Extended Support for Measurement-Only Devices, e.g. ADSCAN, CalcDev, CAN-Monitoring, FlexRay Monitoring

To be able to read in measurement values, the following command will select a specific measurement device and will provide a LUN for it:

Entry	Data type	Value
Description file name	STRING	“_AUXIN_”
Program code (+Calibration data) file name	STRING	**<device name>**
Calibration data file name	STRING	“”
Destination	WORD	0x8000
Mode	WORD	0

Tab. 4-2 Extended support for measurement-only devices

The answer for this command will be:

Entry	Data type	Value
Emulator LUN	WORD	‹dynamic value›
Description file name	STRING	“_AUXIN_”
Program code (+Calibration data) file name	STRING	‹device name›
Calibration data file name	STRING	“”

Tab. 4-3 The answer for this command

Device name refers to the logical device name used within INCA.

This command has to be executed for every single measurement device that shall be accessed by the AuSy.

The returned LUN can be used with every command that deals with online/recorder variables.

This mechanism is available in addition to the second way to access measurement values, where you simply add the measurement device name at the end of a measurement value name with a LUN which was requested via the standard way.

Error codes:

INCA specific errors
Missing INIT (command 2)
There is already a LUN for the device with this description and binary file assigned!
Invalid value for 'Mode'!
Invalid value for 'Destination'!
No device with given name found
Only the modes 0 and 2 are supported
Unable to change the "Load differences after switching ignition off/on" option.

Examples

To create a LUN for the INCA CalcDev device, use the DEFINE DESCRIPTION AND BINARY FILE command with the following parameters:

Entry	Data type	Value
Description file name	STRING	"_AUXIN_"
Program code (+Calibration data) file name	STRING	"CalcDev"
Calibration data file name	STRING	""
Destination	WORD	0x8000
Mode	WORD	0

Tab. 4-4 Create a LUN

For CAN Monitoring, use the name of the respective device instead of "CalcDev", e.g. "CAN-Monitoring:1", like in the following command:

Entry	Data type	Value
Description file name	STRING	"_AUXIN_"
Program code (+Calibration data) file name	STRING	"CAN-Monitoring:1"
Calibration data file name	STRING	""
Destination	WORD	0x8000
Mode	WORD	0

Tab. 4-5 "CalcDev"

This method works for all devices that allow at least for measurement.

5.7 COPY BINARY FILE COMMAND: 4

Command:

Entry	Data type
Target	WORD (see Target/Source Code)
Source	WORD (see Target/Source Code)
Emulator LUN	WORD

Answer:

Entry	Data type
No data	-

Target / Source Code:

	ASAP3 definition:	INCA specific assignment:
1	EPROM	currently not implemented (we will not read/write EPROMs/FLASH)
2	FILE	calibration data file (hex)
3	Virtual Emulator Board	PC (INCA database)
4	Physical Emulator Board	emulation memory (e.g. ETK)

The following transitions are possible:

Transitions:	Action:
3 → 2	Save binary file
4 → 2	Receive binary file + Save binary file
4 → 3	Receive binary file
2 → 3	Load binary file
3 → 4	Send binary file
2 → 4	Load & Send binary file

Load binary file: Loads the specified calibration data in every case (even if it was already loaded onto the PC before). The previously loaded calibration data is not saved (even if it was modified).

Save binary file: An existing calibration data file is overwritten without an error message. Trying to overwrite read-only files causes an error message.

Error codes:

INCA specific errors
Invalid LUN
Invalid number for Source/Destination

5.8 CHANGE BINARY FILE NAME COMMAND: 5

Command:

Entry	Data type
New Binary File Name	STRING
Emulator LUN	WORD

Answer:

Entry	Data type
No data	-

The new file name is saved at first in a LUN specific memory location in the ASAM ASAP3 interface. With the command *COPY BINARY FILE* with the transitions 4 → 2 / 3 → 2 the saved file name is used to store the calibration data. The transitions 2 → 3 / 2 → 4 can be used to load another calibration data file.

The client (test stand) has to make sure, that the given file name is a valid OS file name; if directory parts are included, the directories must already exist. Relative pathnames are not allowed, they must always be absolute. The standard calibration data directory is the directory where the A2L description file is located. If the calibration file name contains no path, this standard directory is used as path.

Error codes:

Invalid LUN

5.9 SELECT LOOKUP TABLE COMMAND: 6

Command:

Entry	Data type
Emulator LUN	WORD
Map name	STRING

Answer:

Entry	Data type
Map number	WORD
y-Dimension (ny)	WORD
x-Dimension (nx)	WORD
Address (logging info)	WORD

As map name, the internal item name is expected. Valid map types for this command are 1dim and 2dim maps or arrays respectively matrices. Names of set points are rejected. If the option “Show edited values” is set or the command SET GRAPHIC MODE ON AP-S was used before, the map is opened within INCA if it was not yet opened.

With 1dim maps the value for y-Dim is 1. The address field contains the lower 16 bit of the address read from the description file. The maximal extent for a dimension is 1025. In total a command must not exceed 65534 bytes!

NOTE

Together with 1 dim / 2 dim maps the associated online values of their axis are always wired. This is necessary for the extended command GET WORKING POINT (Command 42001). They have the same raster priority than values wired with PARAMETER FOR VALUE ACQUISITION (Command 12) and therefore influence the raster of already wired online values. To avoid this it is necessary to call the command SELECT LOOKUP TABLE always before the command PARAMETER FOR VALUE ACQUISITON.

Error codes:

INCA communication errors
Invalid LUN
LUN of AUXIN not allowed
Map name not found
No 1dim or 2dim map
Access of an axis failed
Map dimension has exceeded

5.10 PUT LOOKUP TABLE TO AP-S COMMAND: 7

Command:

Entry	Data type
Map number	WORD
Map length	WORD
Y(1)	REAL
Y(2)	REAL
:	:
Y(ny)	REAL
X(1)	REAL
X(2)	REAL
:	:
X(nx)	REAL
Minimum Z(i,j)	REAL
Maximum Z(i,j)	REAL
Minimum Increment	REAL
Z[X(1),Y(1)]	REAL
Z[X(2),Y(1)]	REAL
Z[X(3),Y(1)]	REAL
:	:
Z[X(2),Y(5)]	REAL
:	:

Answer:

Entry	Data type
No data	-

The values received from the client are adjusted according to the physical conversion of the description file (not to the value range of the data type, which can be bigger).

In off-line mode, the changes apply only to the data on the PC. They will become effective for the ECU as soon as the system goes on-line.

There are two levels of dealing with axes: ignoring values for axes and transmitting axes without interpolation of the remaining maps that are using these axes. The user can decide between these options in the *Extras/Options/Map Editor* dialog box. The axes values for arrays and matrices will be ignored.

The value of Map Length has to be calculated according to the ASAM ASAP3 specification. Every time, the complete map has to be transmitted; no elements at the end of the data block are allowed to be omitted.

The values in the fields *Minimum, Maximum and Minimum Increment* are ignored.

It is also possible to use this command for objects with rescale axes (RES_AXIS) and curve axes (CURVE_AXIS). In this case only the Z-values will be written, the axes values (X/Y) will be ignored. The command has to be complete concerning the amount of values - this means that also the values for the axes have to be there even if they will not be used (but e.g. they can all be zero). **Note:** No message will be written into the log window which indicates this behavior.

If a map or an axis is write-protected the values will not be updated in the MC system and a message will be written to the log window.

Error codes:

INCA communication errors
Invalid map number
Out of memory
Invalid map length value
Values from the MC system can't be interpreted
Values can't be set in the MC system
Values are out of the limits of the data type

5.11 GET LOOKUP TABLE FROM AP-S COMMAND: 8

Command:

Entry	Data type
Map number	WORD

Answer:

Entry	Data type
Map length	WORD
Y(1)	REAL
Y(2)	REAL
:	:

Y(ny)	REAL
X(1)	REAL
X(2)	REAL
:	:
X(nx)	REAL
Minimum Z(i,j)	REAL
Maximum Z(i,j)	REAL
Minimum Increment	REAL
Z[X(1),Y(1)]	REAL
Z[X(2),Y(1)]	REAL
Z[X(3),Y(1)]	REAL
:	:
Z[X(2),Y(5)]	REAL
:	:

Reads the data being located on the PC. The map length is calculated according the ASAM ASAP3 specification. Always the whole map is transmitted. The values for *Minimum and Maximum* are the limits of the conversion, not of the data type. For example, if RPM is defined as 0h -> 0.0 and 1FE0H -> 8160.0, the values 0.0 and 8160.0 are returned instead of 0 and 65535 what would be the range of the data type unsigned int. *Minimum Increment* is derived from the conversion.

Error codes:

INCA communication errors
Invalid map number
Access of an axis failed
Values from the MC system can't be interpreted

5.12 GET LOOKUP TABLE VALUE COMMAND: 9

Command:

Entry	Data type
Map number	WORD
Y-Index	WORD
X-Index	WORD

Answer:

Entry	Data type
Value	REAL

Indices are starting at 1. *Y-Index* is ignored for 1dim maps.

Returns the value being located on the PC.

Error codes:

INCA communication errors
Invalid map number
Index out of limits
Values from the MC system can't be interpreted

5.13 INCREASE LOOKUP TABLE COMMAND: 10

Command:

Entry	Data type
Map Number	WORD
Y-Index	WORD
X-Index	WORD
Y-Delta	WORD
X-Delta	WORD
Offset	REAL

Answer:

Entry	Data type
No data	-

Indices are starting at 1; delta has to be at least 1. Y-Values are ignored for 1dim maps.

The value for *Offset* can be either positive or negative.

The map values are calculated accordingly and are subsequently subject to limit checks (if a value exceeds the range of a physical conversion it is limited accordingly) before the calibration data is modified.

If a map is write-protected the value(s) will not be updated in the MC system and a message will be written to the log window.

Error codes:

INCA communication errors
Invalid map number
Range error
Values from the MC system can't be interpreted
Values can't be set in the MC system
Values are out of the limits of the data type

5.14 SET LOOKUP TABLE COMMAND: 11

Command:

Entry	Data type
Map number	WORD
Y-Index	WORD
X-Index	WORD

Y-Delta	WORD
X-Delta	WORD
Value	REAL

Answer:

Entry	Data type
No data	-

Indices are starting at 1; delta has to be at least 1. Y-Values are ignored with 1dim maps.

The map values are set accordingly as far as they don't exceed the limits of the limit checks (if a value exceeds the range of a physical conversion it is limited accordingly).

If a map is write-protected the value(s) will not be updated in the MC system and a message will be written to the log window.

Error codes:

INCA communication errors
Invalid map number
Range error
Values from the MC system can't be interpreted
Values can't be set in the MC system
Values are out of the limits of the data type

5.15 PARAMETER FOR VALUE ACQUISITION COMMAND: 12

Command:

Entry	Data type
Emulator LUN	WORD
Scanning time (ms)	WORD
Number of values	WORD
Name of 1st value	STRING
Name of 2nd value	STRING
⋮	⋮

Answer:

Entry	Data type
No data	-

Opens a *Tool API Measurement* window, if none was opened before. Inserts the variables into the window, if not yet inserted. Already existing values will be rejected.

If the number of elements inserted into the current window exceeds the *Maximum number of elements in one measure window* that can be configured in

the experiment (see menu: [ComponentsIASAM-3MCIOptions]), a new window is opened.

With *Number of values* = 0 all online variables, that were inserted by ASAM ASAP3 are removed from the experiment. Online variables that have been configured before, stay in the experiment.

It is also possible to use "variable\device"-name instead of variable names only. This allows wiring of different values with different devices (LUNs) in one step. This is a deviation of ASAM ASAP3 that allows faster setup of measurements with variables from many different devices.

Contrary to ASAM ASAP3 the recording type and scanning time of the latest call for a LUN does **not** overwrite all former settings for the variables of the same LUN! (This only happens in certain cases if a variable is added for recording, see Command 41 *DEFINE RECORDER PARAMETERS* for more information).

Single variables used in a measurement must not be defined more than once, otherwise they will be rejected.

If the time raster for the desired scanning time is already full, the nearest free raster is used to wire the value. If all rasters are used an error is reported.

> **NOTE**
>
> If a desired time raster is full, adding of new values lasts longer because every action has to be retried with the next available raster! In the worst case all rasters are checked until an error is reported.
>
> Contrary to ASAM ASAP3 it is also possible to wire a variable with a synchronous raster. In this case the scanning time must be set to 0!

If a variable is already wired as user defined value or recorder value, the rate of that value will override the currently selected one, i.e. our signal is attached to the already wired value. Only recorder values have higher 'timing' priority and would overwrite the existing raster with the desired one (See Command: DEFINE RECORDER PARAMETERS for more details).

For CAN-Monitoring and CalcDev (calculated signals) devices the scanning time has no influence, because variables of these devices are always wired in their default raster. In case of wiring problems, no fallback rewiring is done, as the signals can only be wired in a specific raster.

In order to wire measurement values in INCA, it is necessary that the measurement is stopped while doing that. Therefore, the measurement is stopped and restarted again, which leads to a short interruption of online data (at least 100ms – see Command 19: GET ONLINE VALUE).

PARAMETER FOR VALUE ACQUISITION executed in the context of protocol version 3 also supports specifying raster references or a reference to the default raster of a variable as the value of the 'Scanning time (ms)'.

Raster references:

Hexadecimal Value	Decimal Value	Data type
0xF001 … 0xFFFE	61441 … 65534	Raster references

0xFFFF	65535	Default raster specified by the A2L device description

Error codes:

Communication errors
Missing INIT (Command 2)
Missing IDENTIFY (Command 20)
Invalid LUN (error code 2 in protocol version 3)
Not offline. SWITCHING OFFLINE/ONLINE (Command 13)
Unknown variable (error code 9 in protocol version 3)

5.16 SWITCHING OFFLINE/ONLINE COMMAND: 13

Command:

Entry	Data type
Mode	WORD

Answer:

Entry	Data type
No data	-

This command corresponds to the menu items [Hardware\|ECU calibration access (checked)] in case of mode=1 or [Hardware\|ECU calibration access (unchecked)] in case of mode=0.

When going online (mode=1) and the calibration data in the INCA database differs from the calibration data in the ECU, INCA database data is automatically downloaded to the ECU.

Contrary to the ASAM ASAP3 V2.0 specification, this command can be executed also without issuing the command *PARAMETER FOR VALUE ACQUISITION* before to be able to modify maps offline.

While executing the command *INIT*, the ASAM ASAP3 interface tries to set the online state according to the [Extras\|Options\|Online] “Going Online” options.

If maps and parameters have been modified offline, the calibration data should be sent to the emulation memory by going online.

Before switching hardware access, ASAM ASAP3 checks if there is at least one ECU in the workspace which supports at least one calibration page. If this is not the case, hardware access is not changed.

Error codes:

INCA specific errors
Missing INIT (command 2)
Invalid value for online mode

5.17 GET ONLINE VALUE COMMAND: 19

Command:

Entry	Data type
No data	-

Answer:

Entry	Data type
Number of actual values	WORD
Value of the 1st actual value	REAL
Value of the 2nd actual value	REAL
⋮	⋮

Returns the values of the selected acquisition variables in the order they got configured. If the measurement is not running, it is started before.

If the system was offline before or the measurement was not running, the system waits at least 100ms until it tries to get the values from the INCA target server, otherwise no valid data would be available.

NOTE

Calling GET ONLINE VALUE with rates higher than 10Hz only makes sense if the new measure mode is activated (See compatibility options for more information on that).

NOTE

new measure mode

If the measurement was started, the system waits up to 1000ms for valid data and then – if still no data is available – returns with an INVALID MEASUREMENT error. This is valid only for the startup phase. Once valid data was available the system will react as configured in the compatibility options (see 2.6.6 for more information).

Error codes:

Communication errors
Missing INIT (Command 2)
Missing IDENTIFY (Command 20)
Not online. SWITCHING OFFLINE/ONLINE (Command 13)
No online variables defined

5.18 GET USER DEFINED VALUE COMMAND: 21

Command:

Entry	Data type
No data	-

Answer:

Entry	Data type
Number of actual values	WORD
Value of the 1st actual value	REAL
Value of the 2nd actual value	REAL

If this command (or the command GET USER DEFINED VALUE LIST) is issued, all variables that were manually defined by the user are returned. If the measurement is not running it is started before.

If the system was offline before or the measurement was not running, the system waits at least 100ms until it tries to get the values from the INCA target server, otherwise no valid data would be available.

NOTE

Calling GET USER DEFINED VALUE with rates higher than 10Hz only makes sense if the new measure mode is activated (See compatibility options for more information on that).

NOTE

new measure mode

If the measurement was started the system waits up to 1000ms for valid data and then – if still no data is available – returns with an INVALID MEASUREMENT error. This is valid only for the startup phase. Once valid data was available the system will react as configured in the compatibility options (see 2.6.6 for more information).

Error codes:

Communication errors
Missing INIT (Command 2)
Missing IDENTIFY (Command 20)
Not online. SWITCHING OFFLINE/ONLINE (Command 13)

5.19 GET USER DEFINED VALUE LIST COMMAND: 22

Command:

Entry	Data type
No data	-

Answer:

Entry	Data type
Number of actual values	WORD
Emulator LUN of 1st value	WORD
Name of 1st value	STRING
Emulator LUN of 2nd value	WORD
Name of 2nd value	STRING
⋮	⋮

Returns the list of all user defined variables. Always necessary before calling GET USER DEFINED VALUE (Command 21), if values were manually added or removed since the last call.

Error codes:

Communication errors
Missing INIT (Command 2)
Missing IDENTIFY (Command 20)

5.20 GET PARAMETER FROM AP-S COMMAND: 14

Command:

Entry	Data type
Emulator LUN	WORD
Parameter name	STRING

Answer:

Entry	Data type
Value	REAL
Minimum value	REAL
Maximum value	REAL
Minimum Increment	REAL

Reads the data located on the PC. The parameter name is the internal name of the description file.

If the option “Show edited values” is set or the command SET GRAPHIC MODE ON AP-S was used before, the parameter is opened within INCA if it was not yet opened. For *Minimum value, Maximum value and Minimum Increment* see Command 8.

Error codes:

INCA communication errors

Invalid LUN
LUN of AUXIN not allowed
Parameter not found
Object is no parameter
Values from the MC system can't be interpreted

5.21 SET PARAMETER ON AP-S COMMAND: 15

Command:

Entry	Data type
Emulator LUN	WORD
Parameter name	STRING
Value	REAL

Answer:

Entry	Data type
No data	-

The values received from the client are adjusted according to the physical conversion of the description file (not to the value range of the data type, which can be bigger).
In off-line mode, the changes only apply to the data on the PC. They will become effective for the ECU as soon as the system goes on-line.

If the option “Show edited values” is set or the command SET GRAPHIC MODE ON AP-S was used before, the parameter is opened within INCA if it was not yet opened.

If a parameter is write-protected it will not be updated in the MC system and a message will be written to the log window.

Error codes:

INCA communication errors
Invalid LUN
LUN of AUXIN not allowed
Parameter not found
Object is no parameter
Values from the MC system can't be interpreted
Values can't be set in the MC system
Values are out of the limits of the data type

5.22 DEFINE RECORDER PARAMETERS COMMAND: 41

Command:

Entry	Data type
Emulator LUN	WORD
Recording type	WORD

Scanning time [ms]	REAL
Divider factor	WORD
Number of values	WORD
Name of 1st value	STRING
Name of 2nd value	STRING
⋮	⋮

Answer:

Entry	Data type
No data	-

If this command is issued, the current recorder settings are reset. If *recording type* is set to *synchronous to the system interval time*, the *scanning time* is ignored and should be set to 0.

The field *divider factor* of the command is ignored and should be set to 0!

Single variables used in a recording must not be defined more than once, otherwise they will be rejected.

The command can be recalled repeatedly for each LUN. Every LUN can have its own scanning time.

It is also possible to use "variable\device"-name instead of variable names only. This allows wiring different values with different devices (LUNs) in one step. This is a deviation of ASAM ASAP3 that allows faster setup of measurements with variables from many different devices.

Contrary to ASAM ASAP3 the recording type and scanning time of the latest call for a LUN overwrites only the settings of an already wired variable with the same name and LUN (e.g. as user defined variable).

NOTE

If a variable already exists as user defined value or online value, the time raster of that variable is changed to the current one requested by the recorder setting

NOTE

If the time raster for the desired scanning time is already full, an error is reported.

For CAN-Monitoring and CalcDev (calculated signals) devices the scanning time has no influence, because variables of these devices are always wired in their default raster.

By design all values being wired through ASAM ASAP3 in INCA are recorded and an additional index file (with the extension '.dati') is created together with every measurement, containing the names of all channels that were wired for recording. This allows all related commands to return only these variables.

> **NOTE**
>
> If the index file is lost somehow, the commands LOAD RECORDER FILE and GET RECORDER RESULTS will return all values available in the measurement file, i.e. all variables that were wired with PARAMETER FOR VALUE ACQUISITION and DEFINE RECORDER PARAMETERS at the time the recording is done.

In order to wire recorder values in INCA, it is necessary that the measurement is stopped while doing that. Therefore, the measurement is stopped and restarted again which leads to a short interruption of online data (at least 100ms – see Command 19: GET ONLINE VALUE).

If the name of a not existing measurement is used or the raster is full, only the successful values are wired in protocol versions prior to 3. In version 3 all successfully wired measurements within the same request are unwired if the raster is full or at least one measurement doesn't exist.

Versions prior to 3 support the values 0, 1 and 2 for the 'Recording Type'. Version 3 ignores the 'Recording Type' parameter and internally always sets the recording type to '2'.

DEFINE RECORDER PARAMETERS executed in the context of protocol version 3 also supports specifying raster references or a reference to the default raster as the value of the 'Scanning time (ms)'.

Raster references:	Hexadecimal Value	Decimal Value	Data type
	0xF001 … 0xFFFE	61441 … 65534	Raster references
	0xFFFF	65535	Default raster specified by the A2L device description. If the device description contains a comma-separated list of raster names, a multi-raster based on these names is used.
Error codes:	Communication errors		
	Missing INIT (Command 2)		
	Missing IDENTIFY (Command 20)		

Invalid LUN (error code 2 in protocol version 3)
Not offline. SWITCHING OFFLINE/ONLINE (Command 13)
Unknown variable
Invalid value for 'Recording type'! (error code 12)

5.23 DEFINE TRIGGER CONDITION COMMAND: 42

Command:

Entry	Data type
Trigger START	STRING
Trigger STOP	STRING
Max. sample number	INTEGER4
Start delay	INTEGER4
Stop delay	INTEGER4

Answer:

Entry	Data type
No data	-

If no trigger condition is used, the strings for Trigger START and Trigger STOP must be empty.

For a manual trigger, the value of Trigger START must be set to "*MANUAL*".

As INCA does not support a measurement limited by a *max. sample number* the command calculates the recording time in the following way:

recording time = sample rate * max. sample number.

This works only if an equidistant measurement (*Recording type* = 0) was defined with DEFINE RECORDER PARAMETERS (Command 20), otherwise the parameter is ignored. Furthermore, the Trigger START and Trigger STOP strings must be empty.

All variables must contain the device name in the following way: "variable\devicename". Example: "ub\ETK-Testdevice:1"

All variables uses in trigger conditions must have been defined before with the commands *PARAMETER FOR VALUE AQUISTITION* (Command 12) or *DEFINE RECORDER PARAMETERS* (Command 41).

Start delay and Stop delay must be in ms.

NOTE

If a STOP trigger is defined, it is not possible to use a stop delay. In that case the stop delay should be set to 0.

> **NOTE**
>
> There must be blanks before and after all operators in the trigger conditions!

Possible trigger operators are:

"!"	not
"="	equal
"<"	less than
">"	greater than
"<="	less than or equal
">="	greater than or equal
"!="	not equal
"&"	logical and
"|"	logical or
"up"	rising edge and greater
"down"	falling edge and lower

In addition to that, for combining conditions brackets should be always used to be on the save side (e.g.: (A\ETK > 1) & (A\ETK < 2)).

In order to define a trigger condition in INCA, it is necessary that the measurement is stopped while doing that. Therefore, the measurement is stopped and restarted again which leads to a short interruption of online data (at least 100ms – see Command 19: GET ONLINE VALUE).

Error codes:

Communication errors
Missing INIT (Command 2)
Missing IDENTIFY (Command 20)
Invalid LUN
Not offline. SWITCHING OFFLINE/ONLINE (Command 13)
Unknown variable

5.24 ACTIVATE RECORDER COMMAND: 43

Command:

Entry	Data type
Mode	WORD

Answer:

Entry	Data type
No data	-

Depending on the mode value, the recorder function is controlled as follows:

0: Recording stops regardless of the end trigger.
1: Recording starts. If a start-trigger condition has been set, the recorder waits for the condition.
2: Recording starts unconditionally; the trigger condition specified by DEFINE TRIGGER CONDITION (command 41) is invalid and has no effect.

Error codes:

Communication errors
Missing INIT (Command 2)
Missing IDENTIFY (Command 20)
Missing DEFINE RECORDER PARAM. (Command 41)
Missing DEFINE TRIGGER CONDITION (Command 42)
Invalid value for mode.
Not online. SWITCHING OFFLINE/ONLINE (Command 13)

5.25 GET RECORDER STATUS COMMAND: 44

Command:

Entry	Data type
No data	-

Answer:

Entry	Data type
Recorder Status	WORD
Current Samples	INTEGER4
Stop Condition	WORD
Stop Information	STRING

The value for *Current Samples* is calculated in the following way:

current samples = recorded time / sample rate

As INCA only provides the recorded time and not the already recorded amount of samples, the value has to be calculated in that way. After the recording has stopped the exact number of recorded samples is available.

NOTE

In very short measurements the sample count showed with GET RECORDER STATUS during and after a measurement may differ, because there is a little jitter in INCA when starting a recording.

Error codes:

Communication errors
Missing IDENTIFY (Command 20)
Missing ACTIVATE RECORDER (Command 43)
Not online. SWITCHING OFFLINE/ONLINE (Command 13)

5.26 GET RECORDER RESULTS HEADER COMMAND: 45

Command:

Entry	Data type

No data	-

Answer:

Entry	Data type
Start time (Trigger Start) [s]	STRING
Recording type	WORD
Scanning time [ms]	REAL
Divider factor	WORD
Number of samples	INTEGER4
Start delay	INTEGER4
Stop delay	INTEGER4
Lost samples	INTEGER4
Max. Phase Error	INTEGER4

Returns the recorder results of the last recorded measurement. This command can not be executed while the recorder is running. After the end of recording, the information comes from a temporary file until it is saved with SAVE RECORDER FILE (Command 47).

If LOAD RECORDER FILE (Command 48) was called prior to this command the data comes from any file that was saved earlier with SAVE RECORDER FILE (Command 47).

Scanning time will be set to 0 if *Recording Type* in DEFINE RECORDER PARAMETERS (Command 41) was set to 1.

Divider Factor will always be set to 1; *the values for Start Delay, Stop Delay, Lost Samples* and *Max. Phase Error* will always be 0.

NOTE

The Recording type parameter is not supported and is always reported as 0, because the underlying file formats do not provide this information.

Error codes:

Communication errors
Missing IDENTIFY (Command 20)
Recorder is running.

5.27 GET RECORDER RESULTS COMMAND: 46

Command:

Entry	Data type
Data Packet Number n	INTEGER 4

Answer:

Entry	Data type

Data Packet Number n	INTEGER4
Number of values m	WORD
Value 1 in sample n	REAL
Value 2 in sample n	REAL
Value 3 in sample n	REAL
⋮	REAL
Value m in sample n	REAL

The numbering for Data Packet Number starts with 1!

If Include timestamp in recorder results is selected in the general options dialog, every call of GET RECORDER RESULTS returns one additional value with the label "_time_" that contains the timestamp of the current sample in float format.

LOAD RECORDER FILE normally returns all variables that were stored in the index file that is saved in parallel to the measurement file and has the extension '.dati'. If that index file is not available, all variables contained in the measurement file are returned (see DEFINE RECORDER PARAMETERS for more information on index files).

Error codes:

Communication errors
Missing IDENTIFY (Command 20)
Recorder is running.

5.28 SAVE RECORDER FILE COMMAND: 47

Command:

Entry	Data type
Filename	STRING

Answer:

Entry	Data type
No data	-

Saves the currently open measurement data in a file. If an additional file format was selected for recording (see Recorder Options for more information on that) that file is additionally saved at the same location as the one given by filename. Beyond that, also the index files with the extension '.dati' are stored at that location (see DEFINE RECORDER PARAMETERS for more information on index files).

Error codes:

Communication errors
Missing IDENTIFY (Command 20)
Recorder is running.

5.29 LOAD RECORDER FILE COMMAND: 48

Command:

Entry	Data type
Filename	STRING

Answer:

Entry	Data type
Number of values	WORD
Name of the 1st value	STRING
Name of the 2nd value	STRING
⋮	

Loads a recorder file of a recording that was previously saved with SAVE RECORDER FILE (Command 46). If no path name is given, the ASAM ASAP3 server uses the USERS measurement files path.

If Include timestamp in recorder results is selected in the general options dialog, LOAD RECORDER returns one additional value with the label "_time_" that contains the timestamp of the current sample in float format.

LOAD RECORDER FILE normally returns all variables stored in the index file that is saved in parallel to the measurement file and has the extension '.dati'. If that index file is not available all variables contained in the measurement file are returned (see DEFINE RECORDER PARAMETERS for more information on index files).

Error codes:

Communication errors
Missing IDENTIFY (Command 20)
Recorder is running.

5.30 SET GRAPHIC MODE ON AP-S COMMAND: 16

Command:

Entry	Data type
Mode	WORD

Answer:

Entry	Data type
No data	-

This command overrides the options [Extras\Options\Map Editor] "Show edited values" and [Extras\Option\Online] "Show measured values" for the current ASAM ASAP3 session.

Error codes:

Missing INIT (COMMAND 2)

5.31 RESET DEVICE COMMAND: 17

Command:

Entry	Data type
Emulator LUN	WORD

Answer:

Entry	Data type
No data	-

The reset command is sent to the device specified in the command SELECT DESCRIPTION FILE AND BINARY FILE. If this device doesn't support resetting, then no other device is used to reset the ECU. The ECU is put into the reset state for a short time and resumes its previous state afterwards.

This command does nothing for CAN devices/ECUs!

Error codes:

INCA specific errors
Missing INIT (command 2)
invalid LUN

5.32 SET FORMAT COMMAND: 18

Command:

Entry	Data type
Log. data type	WORD
Model	WORD

Answer:

Entry	Data type
No data	-

Coding for log. data type: 0 = all, 1 = maps, 2 = parameters, 3 = online and recorder values

Coding for model: 0 = physical values, 1 = controller (hex) values

Initially, all data are expected and returned in the physical model.

In INCA, physical conversions as well as string conversions are possible. Because ASAM ASAP3 commands accept only real values for setting and returning values, variables with string conversion are always transferred in the controller model, independent of the settings for model. Whether a returned controller model value is signed or unsigned depends on the data type of the individual variable.

The value 2 for *mode* is not supported even in ASAM ASAP3 V2.1 mode!

Executed in the context of protocol version 3 SET FORMAT returns an error 2 if 'Log. Data type is set to 'all' (0) or 'online and recorder values (3) and the 'Model' parameter has the value 'hex' (1). Apart from that an error is also thrown if the 'Model' is set to 'physical' (3).

Error codes:

Missing INIT (command 2)
Invalid value for data type (error code 2 in protocol version 3)
Invalid value for model (error code 2 in protocol version 3)

5.33 SET CASE SENSITIVE LABELS COMMAND: 61

Command:

Entry	Data type
No data	-

Answer:

Entry	Data type

No data	-

This command overrides the [Extras|Options|General] “Labels are case sensitive” option for the current session.

Error codes:	Missing INIT (command 2)

5.34 EXTENDED GET PARAMETER / GET PARAMETER EV2 COMMAND: 114

Command:

Entry	Data type
Emulator LUN	WORD
Parameter name	STRING

Answer:

Entry	Data type
Data type	DATATYPE
Value	data type
Minimum value	data type
Maximum value	data type
Minimum Increment	data type

Reads the data located on the PC. The parameter name is the internal name of the description file.

If the option “Show edited values” is set or the command SET GRAPHIC MODE ON AP-S was used before, the parameter is opened within INCA if it was not yet opened. For *Minimum value, Maximum value and Minimum Increment* see Command 8. The data type for those entries is equal to the DATATYPE indicated in the *Data type* field.

The command supports all labels that are defined as “VALUE” (scalar) or “ASCII” (string) in the “Type” parameter of the ASAP2 CHARACTERISTIC element. For “VALUE” labels, only the data types “IEEE-Real” and “IEEE-Real 8” are supported. For “ASCII” labels, only the data type “STRING” is supported. This implies that variables with a textual conversion (“TAB_VERB”) will always be handled as “IEEE-Real” and transport the ECU value (corresponding to the ASAP2 “InVal” of “COMPU_VTAB”). This conforms to FORMAT commands “Model” parameter set to 0.

The following data types are supported:

Data Type in ASAP2	**Data type in ASAP3**
8-Bit integer or 16-Bit integer (with or without sign) or 4-Byte Real	IEEE-Real (4-Byte-Real, single)
32-Bit integer or 64-Bit integer (with or without sign) or 8-Byte Real	IEEE-Real 8 (8-Byte-Real, double)
ASCII	String

Tab. 4-6 Data types

For “ASCII” labels, the Minimum value, Maximum value and Minimum increment will deliver empty strings. An empty string consists of a WORD with the value zero.

In case the “ASCII” label is longer than the maximum transportable data in an ASAP3 telegram, the string is truncated at the maximum telegram length and returned to the AuSy.

Error codes:

INCA communication errors
Invalid LUN
LUN of AUXIN not allowed
Parameter name not found
Object is no parameter
Values from the MC system can't be interpreted
No RAMCal device with given name found

5.35 EXTENDED SET PARAMETER / SET PARAMETER EV2 COMMAND: 115

Command:

Entry	Data type
Emulator LUN	WORD
Parameter name	STRING
Data type	DATATYPE
Value	data type

Answer:

Entry	Data type
No data	-

The values received from the client are adjusted according to the physical conversion of the description file (not to the value range of the data type, which can be bigger).
In off-line mode, the changes only apply to the data on the PC. They will become effective for the ECU as soon as the system goes on-line.

If the option “Show edited values” is set or the command SET GRAPHIC MODE ON AP-S was used before, the parameter is opened within INCA if it was not yet opened.

If a parameter is write-protected it will not be updated in the MC system and a message will be written to the log window.

The description for EXTENDED GET PARAMETER / GET PARAMETER EV2 regarding supported label types is valid for this command, too.

The data types that are provided by the AuSy must match the data types of the table in EXTENDED GET PARAMETER / GET PARAMETER EV2. For the case of a Physical Representation format, IEEE-Real (8-Byte-Real, double) can be used as well. In case the given “Data type” is incompatible to the data type of the label,

e.g. if “Data type” is set to “STRING” but the parameter is only a “VALUE” label, an error Status $FFFF is returned along with a corresponding error message.

Error codes:

INCA communication errors
Invalid LUN
LUN of AUXIN not allowed
Parameter not found
Object is no parameter
Values from the MC system can't be interpreted
Values can't be set in the MC system
Values are out of the limits of the data type
The data type is not valid for the parameter.

5.36 EXTENDED PARAMETER FOR VALUE ACQUISITION / PARAMETER FOR VALUE ACQUISITION EV2COMMAND: 112

Command:

Entry	Data type
Emulator LUN	WORD
Scanning time (ms)	WORD
Number of values	WORD
Name of 1st value	STRING
Name of 2nd value	STRING
⋮	⋮

Answer:

Entry	Data type
Data type of the 1st actual value (physical)	DATATYPE
Data type of the 1st actual value (controller)	DATATYPE
Data type of the 2nd actual value (physical)	DATATYPE
Data type of the 2nd actual value (controller)	DATATYPE
⋮	⋮

Opens a *Tool API Measurement* window, if none was opened before. Inserts the variables into the window, if not yet inserted. Already existing values will be rejected.

If the number of elements inserted into the current window exceeds the *Maximum number of elements in one measure window* that can be configured in

the experiment (see menu: [Components\ASAM-3MC\Options]), a new window is opened.

With *Number of values* = 0 all online variables, that were inserted by ASAM ASAP3 are removed from the experiment. Online variables that have been configured in the experiment before, stay in the experiment.

It is also possible to use "variable\device"-name instead of variable names only. This allows wiring of different values with different devices (LUNs) in one step. This is a deviation of ASAM ASAP3 that allows faster setup of measurements with variables from many different devices.

Contrary to ASAM ASAP3 the recording type and scanning time of the latest call for a LUN does **not** overwrite all former settings for the variables of the same LUN! (This only happens in certain cases if a variable is added for recording, see Command 41 *DEFINE RECORDER PARAMETERS* for more information).

Single variables used in a measurement must not be defined more than once, otherwise they will be rejected.

If the time raster for the desired scanning time is already full, the nearest free raster is used to wire the value. If all raster are used an error is reported.

> **NOTE**
>
> If a desired time raster is full, adding of new values lasts longer because every action has to be retried with the next available raster! In the worst case all raster are checked until an error is reported.

Contrary to ASAM ASAP3 it is also possible to wire a variable with a synchronous raster. In this case the scanning time must be set to 0!

If a variable is already wired as user defined value or recorder value, the rate of that value will override the currently selected one, i.e. our signal is attached to the already wired value. Only recorder values have higher 'timing' priority and would overwrite the existing raster with the desired one (See Command: DEFINE RECORDER PARAMETERS for more details).

For CAN-Monitoring and CalcDev (calculated signals) devices the scanning time has no influence, because variables of these devices are always wired in their default raster. In case of wiring problems, no fallback rewiring is done, as the signals can only be wired in a specific raster.

In order to wire measurement values in INCA, it is necessary that the measurement is stopped while doing that. Therefore, the measurement is stopped and restarted again, which leads to a short interruption of online data (at least 100ms – see Command 119: EXTENDED GET ONLINE VALUE / GET ONLINE VALUE EV2).

In the Answer telegram, contrary to the specification, only physical data types are reported, even for the controller values, because the ASAP3 specification does not define the required encodings for the typical controller data types (e.g. BYTE, WORD, …)

The commands PARAMETER FOR VALUE ACQUISITION and EXTENDED PARAMETER FOR VALUE ACQUISITION / PARAMETER FOR VALUE ACQUISITION EV2 can only be used mutually exclusive at one time. As soon as one of the two commands has been used successfully, using the other command will result in an error. A switch between the two commands is only possible after resetting the value acquisition list, e.g. by calling one of the two commands with the parameter “Number of Variables” set to 0.

The values configured with EXTENDED PARAMETER FOR VALUE ACQUISITION / PARAMETER FOR VALUE ACQUISITION EV2 must be read with the command EXTENDED GET ONLINE VALUES / GET ONLINE VALUES EV2. An attempt to use GET ONLINE VALUES for this purpose will result in an error message.

If the name of a not existing value is used or the raster is full, only the successful values are wired in protocol versions prior to 3. In version 3 all successfully wired values within the same request are unwired if the raster is full or at least one value doesn’t exist.

PARAMETER FOR VALUE ACQUISITION EV2 executed in the context of protocol version 3 also supports specifying raster references or a reference to the default raster as the value of the ‘Scanning time (ms)’.

Raster references:

Hexadecimal Value	Decimal Value	Data type
0xF001 … 0xFFFE	61441 … 65534	Raster references
0xFFFF	65535	Default raster specified by the A2L device description. If the device description contains a comma-separated list of raster names, a multi-raster based on these names is used.

Error codes:

Communication errors
Missing INIT (Command 2)
Missing IDENTIFY (Command 20)
Invalid LUN (error code 2 in protocol version 3)
Not offline. SWITCHING OFFLINE/ONLINE (Command 13)
Unknown variable (error code 9 in protocol version 3)
Mixed use of 'STANDARD' and 'EXTENDED' PARAMETER FOR VALUE ACQUISITION and GET ONLINE VALUE commands is not allowed. Please clear the acquisition list before switching command types.

5.37 EXTENDED GET ONLINE VALUE / GET ONLINE VALUE EV2 COMMAND: 119

Command:

Entry	Data type
No data	-

Answer:

Entry	Data type
Number of actual values	WORD
Value of the 1st actual value	REAL
Value of the 2nd actual value	REAL
⋮	⋮

Returns the values of the selected acquisition variables in the order they got configured. If the measurement is not running, it is started before.

If the system was offline before or the measurement was not running, the system waits at least 100ms until it tries to get the values from the INCA target server, otherwise no valid data would be available.

NOTE

Calling GET ONLINE VALUE with rates higher than 10Hz only makes sense if the new measure mode is activated (See compatibility options for more information on that).

NOTE

new measure mode

If the measurement was started, the system waits up to 1000ms for valid data and then – if still no data is available – returns with an INVALID MEASUREMENT error. This is valid only for the startup phase. Once valid data was available the system will react as configured in the compatibility options (see 2.6.6 Compatibility Options for more information).

This command can only be used if the command **EXTENDED** PARAMETER FOR VALUE AQCUISITION / PARAMETER FOR VALUE ACQUISITION **EV2** was used before successfully to set up the acquisition list. If this is not the case, an error message is returned.

Error codes:

Communication errors
Missing INIT (Command 2)
Missing IDENTIFY (Command 20)
Not online. SWITCHING OFFLINE/ONLINE (Command 13)

No online variables defined
Mixed use of 'STANDARD' and 'EXTENDED' PARAMETER FOR VALUE ACQUISITION and GET ONLINE VALUE commands is not allowed. Please clear the acquisition list before switching command types.

5.38 GET CALPAGE INFO COMMAND: 160

Command:

Entry	Data type
Emulator LUN	WORD

Answer:

Entry	Data type
Number of calibration pages	WORD
Index of the 1st page	WORD
Name of the 1st page	STRING
Properties of the 1st page	WORD
Index of the 2nd page	WORD
Name of the 2nd page	STRING
Properties of the 2nd page	WORD
:	:
Index of the last page	WORD
Name of the last page	STRING
Properties of the last page	WORD

The minimum page index is always 0 which refers to the 'reference page' all other pages are working pages.

Page property value:

Value	Description
0	Neither Read nor Write access
1	Only Read access
2	Only Write access
3	Read and write access

Error codes:

Missing INIT (command 2)
LUN not defined (error code 2)
This command requires at least Protocol Version 3.0

5.39 GET CURRENT CALPAGE COMMAND: 161

Command:

Entry	Data type
Emulator LUN	WORD

Answer:

Entry	Data type
Page index	WORD

The minimum page index is always 0 which refers to the 'reference page' and all other pages are working pages.

Error codes:

Missing INIT (command 2)
LUN not defined (error code 2)
This command requires at least Protocol Version 3.0

5.40 SET CURRENT CALPAGE COMMAND: 162

Command:

Entry	Data type
Emulator LUN	WORD
Page index	WORD

Answer:

Entry	Data type
No data.	-

The minimum page index is always 0 which refers to the 'reference page' and all other pages are working pages.

Error codes:

Missing INIT (command 2)
LUN not defined (error code 2)
Invalid parameter / not existing page index (error code 12)
This command requires at least Protocol Version 3.0

5.41 GET RASTER OVERVIEW COMMAND: 164

Command:

Entry	Data type
Emulator LUN	WORD

Answer:

Entry	Data type
Number of raster	WORD
Name of the 1st raster	STRING
CSE scaling unit of 1st raster	WORD
CSE factor of 1st raster	WORD
Reference of 1st raster	WORD
Name of the 2nd raster	STRING
CSE scaling unit of 2nd raster	WORD
CSE factor of 2nd raster	WORD
Reference of 2nd raster	WORD
:	:
Name of the last raster	STRING

CSE scaling unit of last raster	WORD
CSE factor of last raster	WORD
Reference of last raster	WORD

The value of the raster reference can be used by the commands PARAMETER FOR VALUE ACQUISITION and EXTENDED PARAMETER FOR VALUE ACQUISITION / PARAMETER FOR VALUE ACQUISITION EV2 as 'Sample rate' to select the corresponding referenced raster.

Raster in different LUNs are identified by different raster references and the numbers are generated based on the schema in the following table:

Raster reference:

Value	Description
0xFFFE	1st raster in the device description related to the requested LUN
0xFFFD	2nd raster in the device description related to the requested LUN
:	:
0xFFFF - N	Nth raster in the device description related to the requested LUN

Error codes:

Missing INIT (command 2)
LUN not defined (error code 2)
This command requires at least Protocol Version 3.0

5.42 GET CHARACTERISTIC INFO COMMAND: 165

Command:

Entry	Data type
Emulator LUN	WORD
Characteristic name	STRING

Answer:

Entry	Data type
Characteristic identifier	ULONG
Characteristic Type	CHAR_TYPE
Size of dimension X	WORD
Size of dimension Y	WORD
Size of dimension Z	WORD

Size of dimension W	WORD
Size of dimension V	WORD
Physical data type of the X axis values	DATATYPE
Physical data type of the Y axis values	DATATYPE
Physical data type of the Z axis values	DATATYPE
Physical data type of the W axis	DATATYPE
Physical data type of the V axis values	DATATYPE
Physical data type of the cell values	DATATYPE
Hex data type of the X axis values	DATATYPE
Hex data type of the Y axis values	DATATYPE
Hex data type of the Z axis values	DATATYPE
Hex data type of the W axis values	DATATYPE
Hex data type of the V axis values	DATATYPE
Hex data type of the cell values	DATATYPE
Display format	STRING
Lower Limit (Weak bound min)	Depends on the DATATYPE of the 'Physical data type of the cell values'
Extended Lower Limit (Hard bound min)	Depends on the DATATYPE of the 'Physical data type of the cell values'
Upper Limit (Weak bound max)	Depends on the DATATYPE of the 'Physical data type of the cell values'
Upper Lower Limit (Hard bound max)	Depends on the DATATYPE of the 'Physical data type of the cell values'
Physical unit	STRING

The display format depends on the physical cell value data type:

Display format:

Format	Type
%f	FLOAT32
%Lf	FLOAT64
%hi	INT16
%hu	UINT16
%li	INT32
%lu	UINT32
%lli	INT64
%llu	UINT64
%s	STRING
Empty String	NO_TYPE

'Physical unit' currently always returns an empty string.

The CHAR_TYPE enumeration represents the type of a characteristic and supports the following values:

Characteristic type:

Value	Type	Description
0	VALUE	One single value
1	CURVE	One axis vector (X) and a value vector (N values)
2	MAP	Two axis vectors (X, Y) and a value matrix (N * M values)
3	CUBE3D	Three axis vectors (X, Y, Z) and a value cuboid (N * M * L values)
4	CUBE4D	Four axis vectors (X, Y, Z, W) and a value 4D cuboid (N * M * L * K values)
5	CUBE5D	Five axis vectors (X, Y, Z, W, V) and a 5D value cuboid (N * M * L *K * J values)
6	1D VALBLK	One dimensional value array
7	2D VALBLK	Two dimensional value array
8	3D VALBLK	Three dimensional value array

9	4D VALBLK	Four dimensional value array
10	5D VALBLK	Five dimensional value array

Error codes:

Missing INIT (command 2)
LUN not defined (error code 2)
Characteristic unknown (error code 4)
This command requires at least Protocol Version 3.0

5.43 READ CHARACTERISTIC COMMAND: 166

Command:

Entry	Data type
Characteristic identifier	UINT32

Answer:

Entry	Data type
X Axis Value (1)	Depends on the DATATYPE of physical or hex X axis values; X = 1
:	N axis values
X Axis Value (N)	Depends on the DATATYPE of physical or hex X axis values; X = N
Y Axis Value (1)	Depends on the DATATYPE of physical or hex Y axis values; Y = 1
:	M axis values
Y Axis Value (M)	Depends on the DATATYPE of physical or hex Y axis values; Y = M
Z Axis Value (1)	Depends on the DATATYPE of physical or hex Z axis values; Z = 1
:	L axis values
Z Axis Value (L)	Depends on the DATATYPE of physical or hex Z axis values; Z = L

W Axis Value (1)	Depends on the DATATYPE of physical or hex W axis values; W = 1
:	K axis values
W Axis Value (K)	Depends on the DATATYPE of physical or hex W axis values; W = K
V Axis Value (1)	Depends on the DATATYPE of physical or hex V axis values; V = 1
:	J axis values
V Axis Value (J)	Depends on the DATATYPE of physical or hex V axis values; V = J
Cell Value (1, 1, 1, 1, 1)	Depends on the DATATYPE of physical or hex Z axis values; X=1, Y=1, Z=1, W=1, V=1
:	N * M * L * K * J cell values
Cell Value (N, M, L, K, J)	Depends on the DATATYPE of physical or hex cell values; X=N, Y=M, Z=L, W=K, V=J

The CHAR_TYPE in the response of GET CHARACTERISTIC INFO determines, for which axes values are available and how much cell values are contained.

Scalars contain only one cell value and no axis values.

Error codes:

Missing INIT (command 2)
Invalid parameter / characteristic identifier (error code 12)
This command requires at least Protocol Version 3.0

5.44 READ CELL VALUES COMMAND: 167

Command:

Entry	Data type
Characteristic identifier	UINT32
X Start Index	WORD
X Stop Index	WORD
Y Start Index	WORD

Y Stop Index	WORD
Z Start Index	WORD
Z Stop Index	WORD
W Start Index	WORD
W Stop Index	WORD
V Start Index	WORD
V Stop Index	WORD

Answer:

Entry	Data type
Cell Value 1	Depends on the DATATYPE of physical or hex cell values
Cell Value 2	Depends on the DATATYPE of physical or hex cell values
:	:
Cell Value N	Depends on the DATATYPE of physical or hex cell values

The Start Index and Stop Index parameters are based on the behavior represented in the following table:

Index definition:

Parameter	Description
Start Index	1 for the first element and 0 for not existing dimension of a characteristic
Stop Index	-1 for last element and 0 for not existing dimension of a characteristic

Error codes:

Missing INIT (command 2)
Dimension out of range (error code 8)
Invalid parameter / characteristic identifier (error code 12)
This command requires at least Protocol Version 3.0

5.45 WRITE CHARACTERISTIC COMMAND: 168

Command:

Entry	Data type
Characteristic identifier	UINT32

X Axis Value (1)	Depends on the DATATYPE of physical or hex X axis values; X = 1
:	N axis values
X Axis Value (N)	Depends on the DATATYPE of physical or hex X axis values; X = N
Y Axis Value (1)	Depends on the DATATYPE of physical or hex Y axis values; Y = 1
:	M axis values
Y Axis Value (M)	Depends on the DATATYPE of physical or hex Y axis values; Y = M
Z Axis Value (1)	Depends on the DATATYPE of physical or hex Z axis values; Z = 1
:	L axis values
Z Axis Value (L)	Depends on the DATATYPE of physical or hex Z axis values; Z = L
W Axis Value (1)	Depends on the DATATYPE of physical or hex W axis values; W = 1
:	K axis values
W Axis Value (K)	Depends on the DATATYPE of physical or hex W axis values; W = K
V Axis Value (1)	Depends on the DATATYPE of physical or hex V axis values; V = 1
:	J axis values
V Axis Value (J)	Depends on the DATATYPE of physical or hex V axis values; V = J
Cell Value (1, 1, 1, 1, 1)	Depends on the DATATYPE of physical or hex cell values; X=1, Y=1, Z=1, W=1, V=1
:	N * M * L * K * J cell values
Cell Value (N, M, L, K, J)	Depends on the DATATYPE on physical or hex cell values; X=N, Y=M, Z=L, W=K, V=J

Answer:

Entry	Data type
No data	-

Error codes:

Missing INIT (command 2)
Characteristic data length does not fit to characteristic structure (error code 7)
Invalid data type / wrong data type for cell or axis value (error code 11)
Invalid parameter / characteristic identifier (error code 12)
This command requires at least Protocol Version 3.0

5.46 WRITE CELL VALUES COMMAND: 169

Command:

Entry	Data type
Characteristic identifier	UINT32
Value Type	VALUETYPE (WORD)
X Start Index	WORD
X Stop Index	WORD
Y Start Index	WORD
Y Stop Index	WORD
Z Start Index	WORD
Z Stop Index	WORD
W Start Index	WORD
W Stop Index	WORD
V Start Index	WORD
V Stop Index	WORD
Cell Value 1	Depends on the DATATYPE of physical or hex cell values
Cell Value 2	Depends on the DATATYPE of physical or hex cell values
:	:
Cell Value N	Depends on the DATATYPE of physical or hex cell values

Answer:

Entry	Data type
No data	-

The Start Index and Stop Index parameters are based on the behavior represented in the following table:

Index definition:

Parameter	Description
Start Index	1 for the first element and 0 for not existing dimension of a characteristic
Stop Index	-1 for last element and 0 for not existing dimension of a characteristic

Error codes:

Missing INIT (command 2)
Characteristic data length does not fit to selected characteristic length and value type (error code 7)
Dimension out of range (error code 8)
Invalid parameter / characteristic identifier (error code 12)
This command requires at least Protocol Version 3.0

5.47 EXTENDED QueryAvailableServices / QUERY AVAILABLE SERVICES COMMAND: 200

Command:

Entry	Data type
No data	-

Answer:

Entry	Data type
Number of services	WORD
Name of the 1st service	STRING
Name of the 2nd service	STRING
:	:
Name of last service	STRING

Eight services are supported. Therefore, number of services is 8. The names of the supported services are: “Switch Emulation Page”, “Get Tool Setup Information”, “Set Option”, “Get Option”, “Get State”, “Get Option Information”, “Get State Information” and “Read all Calibrations from File”.

Error codes:

Missing INIT (command 2)
This command requires at least Protocol Version 2.1

5.48 EXTENDEDGetServiceInformation / GET SERVICE INFORMATION COMMAND: 201

Command:

Entry	Data type
Service	STRING

Answer:

Entry	Data type
InfoString	STRING

The following services are supported: “Switch Emulation Page”, “Get Tool Setup Information”, “Set Option”, “Get Option”, “Get State”, “Get Option Information”, “Get State Information” and “Read all Calibrations from File”. The returned info specifies the syntax of the services.

Switch Emulation Page:

```
The service "Switch Emulation Page" requires the following
parameters:
LUN: <valid LUN number>; PAGE: <valid page number>
The service returns an empty string.
```

Valid page numbers are 0 for the working page and 1 for the reference page.

Get Tool Setup Information:

```
The service "Get Tool Setup Information" requires the
following parameters:
LUN: <valid LUN number>; INFO: <meta data identifier>

The service is called with one of the following meta data
identifiers and returns a string with the (LUN specific)
information for each given meta data identifier (the meta
data identifier is not part of the returned string):
Description_File_Name: <file name of description file>
Description_File_Database_Name: <database name of description
file>
Binary_File_Name_WP: <file name of binary file of working
page>
Binary_File_Name_RP: <file name of binary file of ref. page>
Binary_Database_Name_WP: <database name of binary of working
page>
Binary_Database_Name_RP: <database name of binary of
reference page>
Device_Name: <name of device that is associated with the
selected LUN>
Current_Page: <currently active page number on target, 0 =
WP, 1 = RP>
Experiment_Name: <currently active experiment database name>
Workspace_Name: <currently active workspace database name>
Database_Name: <currently active database path name>
```

Set Option:

The service "Set Option" requires the following parameters:

MODULE: <MC Tool module name>; MODULEPATH: <MC Tool module path, optional>; LUN: <LUN for which this option shall be set, optional>; OPTIONNAME: <option name>; OPTIONVALUE: <new option value>

The service returns an empty string.

Please see the "INCA Tool-API Documentation.chm" file under the "SetOption" method of the "Inca" class for further details, e.g. possible values for "MODULE", "OPTIONNAME" and "OPTIONVALUE".

Get Option:

The service "Get Option" requires the following parameters:

MODULE: <MC Tool module name>; MODULEPATH: <MC Tool module path, optional>; LUN: <LUN for which this option shall be retrieved, optional>; OPTIONNAME: <option name>

The service returns a string with the current value of the requested option.

Please see the "INCA Tool-API Documentation.chm" file under the "GetOption" method of the "Inca" class for further details, e.g. possible values for "MODULE" and "OPTIONNAME".

Get State:

The service "Get State" requires the following parameters:

MODULE: <MC Tool module name>; LUN: <LUN for which this option shall be retrieved, optional>; STATENAME: <state name>

The service returns a string with the current value of the requested option.

Please see the "INCA Tool-API Documentation.chm" file under the "GetState" method of the "Inca" class for further details, e.g. possible values for "MODULE" and "STATENAME".

Get Option Information:

The service "Get Option Information" requires the following parameters:

MODULE: <MC Tool module name>; LUN: <LUN for which this option shall be retrieved>; OPTIONNAME: <option name>

The service returns a string with the current value of the requested option.

Please see the "INCA Tool-API Documentation.chm" file under the "GetOptionInformation" method of the "Inca" class for further details, e.g. possible values for "MODULE" and "OPTIONNAME".

Get State Information:

The service "Get State Information" requires the following parameters:

MODULE: <MC Tool module name>; LUN: <LUN for which this option shall be retrieved>; STATENAME: <state name>

The service returns a string with the current value of the requested state.

```
Please see the "INCA Tool-API Documentation.chm" file under
the "GetStateInformation" method of the "Inca" class for
further details, e.g. possible values for "MODULE" and
"STATENAME".
```

Read all Calibrations from File:

```
The service 'Read all Calibrations from File' requires the
following parameters:

MODULE: CDM; LUN: <LUN for which this option shall be set>;
PATHNNAME: <path name>

The service returns an empty string.

Please see the "INCA Tool-API Documentation.chm" file under
the "ReadAllCalibrationsFromFile" method of the
"WorkbaseDevice" class for further details, e.g. possible
values for "MODULE" and "PATHNAME".
```

For all services, the following restrictions apply:

The order of the parameters is significant. The parameter names are not case sensitive. The colon has to follow immediately after the parameter name without a blank.

Possible values for LUN are the LUN numbers which have been returned with the commands “SELECT DESCRIPTION FILE AND BINARY FILE” or “DEFINE DESCRIPTION FILE AND BINARY FILE”.

Error codes:

Not yet identified
This command requires at least Protocol Version 2.1!
Unknown service
Invalid LUN!
This meta data identifier is only supported for LUNs which refer workbase devices (devices with associated data set)

5.49 EXTENDED ExecuteService / EXECUTE SERVICE COMMAND: 202

Command:

Entry	Data type
Service	STRING
Service input parameter	STRING

Answer:

Entry	Data type
Service output parameter	STRING

This command supports the services “Switch Emulation Page”, “Get Tool Setup Information”, “Set Option”, “Get Option”, “Get State”, “Get Option Information”, “Get State Information” and “Read All Calibrations From File”.

The input parameters of this services have to follow the syntax described in the command GetServiceInformation (201).

For all services, the parameters are separated by semicolons.

The services are described in more details here:

Switch Emulation Page:

This service simply switches to the given emulation page for the device which is identified by the given LUN.

Get Tool Setup Information:

This service returns a meta data information string as described in the command GetServiceInformation (201). This string describes important aspects of the current tool setup for documentation purposes.

Set Option:

This service changes the current value of a concrete option of the MC Tool. The parameter MODULE has to specify the module which contains the option. The optional parameter MODULEPATH is only used for the option "Allow Copy On" and can optionally be used to specify a certain CDM configuration object in the INCA database. The optional parameter LUN is required by some MODULEs, e.g. HWC, to identify a certain device inside this MODULE. The parameter OPTIONNAME is the name of the option that has to be changed. The parameter OPTIONVALUE is the value of the new setting.

The 'MC Tool module path' (path in the INCA database to a CDM configuration object) is only needed when INCA shall set the option in a special CDM configuration object. If the path is missing INCA uses the following CDM configuration objects

- If the CDM is open INCA uses the related CDM configuration object
- If an experiment is open INCA uses the CDM configuration object linked to the related workspace (CDM parallel to EE)
- If an experiment is open and there is no CDM configuration object linked to the related workspace INCA creates a CDM configuration object, links it to the related workspace and stores it in the INCA database (default name, same path as the experiment)
- In all other cases INCA responds with an error

For the MODULE ASAP3, the only supported OPTIONNAME is "AlwaysUseFuliDeviceIfAvailable". The supported OPTIONVALUEs are "true" and "false".

For all other modules, please refer the "INCA Tool-API Documentation.chm" help file under the "SetOption" method of the "Inca" class for further details.

Example:
"Set Option"
"MODULE: ASAP3; OPTIONNAME: AlwaysUseFuliDeviceIfAvailable;OPTIONVALUE: true"

Get Option:

This service retrieves the current value of a concrete option of the MC Tool. The parameter MODULE has to specify the module which contains the option. The optional parameter MODULEPATH is only used for the option "Allow Copy On" and

can optionally be used to specify a certain CDM configuration object in the INCA database. The optional parameter LUN is required by some MODULEs, e.g. HWC, to identify a certain device inside this MODULE. The parameter OPTIONNAME is the name of the option that has to be retrieved. The service returns a string with the current value of the option. Numerical values and enumerations are converted to a string representation.

The 'MC Tool module path' (path in the INCA database to a CDM configuration object) is only needed when INCA shall set the option in a special CDM configuration object. If the path is missing INCA uses the following CDM configuration objects

- If the CDM is open INCA uses the related CDM configuration object
- If an experiment is open INCA uses the CDM configuration object linked to the related workspace (CDM parallel to EE)
- If an experiment is open and there is no CDM configuration object linked to the related workspace INCA creates a CDM configuration object, links it to the related workspace and stores it in the INCA database (default name, same path as the experiment)
- In all other cases INCA responds with an error

For the MODULE ASAP3, the only supported OPTIONNAME is “AlwaysUseFuliDeviceIfAvailable”. The supported OPTIONVALUEs are “true” and “false”.

For all other modules, please refer the "INCA Tool-API Documentation.chm" help file under the "GetOption" method of the "Inca" class for further details.

Example:
"Get Option"
"MODULE: ASAP3; OPTIONNAME: AlwaysUseFuliDeviceIfAvailable "

Get State:

This service retrieves the current value of a concrete state of the MC Tool. The parameter MODULE has to specify the module which contains the state. The optional parameter LUN is required by some MODULEs, e.g. HWC, to identify a certain device inside this MODULE. The parameter STATENAME is the name of the state that has to be retrieved. The service returns a string with the current value of the state. Numerical values and enumerations are converted to a string representation.

For the MODULE ASAP3, there is currently no supported state.

For all other MODULEs, please refer the "INCA Tool-API Documentation.chm" help file under the "GetState" method of the "Inca" class for further details.

Example:
"Get State"
"MODULE: MEMORYPAGE;LUN: 0;STATENAME: CS_RP_Dataset"

Get Option Information:

This service delivers for a concrete option the possible settings. The tool settings are not changed.

Example:
"Get Option Information"
"MODULE: HWC; LUN: 0; OPTIONNAME: ConnectionInterruptBehaviour"

Get State Information:

This service delivers for a concrete state the possible states. The tool states are not changed.

Example:
"Get Option Information"
"MODULE: HWC;LUN: 0;STATENAME: CheckOfState"

Read all Calibration Files:

Before the test bench executes a script, the ECU parameters must be set to an initial status. This can be done by downloading a complete data set, by calibration of single parameters or by downloading the content of a data exchange file. This service enables the test bench to download a data exchange file. INCA copies the given data exchange file to the working page of the given device.
Precondition: The data exchange file is located where INCA has access to.

Example:
"Read all Calibrations from File"
"MODULE: CDM; LUN: 0; PATHNAME: 'c:\test\my file.cdfx' "

Note: If the path name contains blanks, the path must be enclosed in single or double quotes (apostrophes), e.g. 'path name' or "path name".

Note: It is possible to read calibrations from different file formats CDF, DCM, CVX, PaCo

Error codes:

INCA specific errors
Not yet identified
This command requires at least Protocol Version 2.1!
Unknown service
LUN parameter required for this service
Invalid LUN
LUN of AUXIN device not allowed for this function!
PAGE parameter required for this service
Only page numbers 0 (working page) and 1 (reference page) are supported.
No memory pages supported!
Only one memory page supported!
Invalid meta data identifier.
This meta data identifier is only supported for LUNs which re fer workbase devices (devices with associated data set)
INFO parameter required!
Invalid parameter
The "AlwaysUseFuliDeviceIfAvailable" option cannot be changed because this functionality is currently in use.
MODULE parameter required for this service.
STATENAME parameter required for this service.
OPTIONNAME parameter required for this service.
OPTIONVALUE parameter required for this service.

The INCA method Get-/SetOption or GetStatus or GetOption-/GetStatusInfo returns the following error: *‹ Followed by a service specific INCA error text ›*
This SVC requires a LUN that represents an INCA Workbase Device - a device that is associated with calibration data.
PATHNAME parameter required!
The SVC "Read all Calibrations from File" failed. Inca reported the following error: *‹Followed by an INCA error text ›*

5.50 EXTENDED GetWorkingPoint COMMAND: 42001

Command:

Entry	Data type
Map number	DWORD

Answer:

Entry	Data type
Y-Index	WORD
X-Index	WORD
Y-Delta	WORD
X-Delta	WORD

The working point of the specified map will be returned.

Indices within the map are starting at 1. *Delta* can have one of the values 0, 1 and 2. The value 1 is returned if the working point is lying exactly on a set point value. The value 2 indicates that the associated online value of an axis is currently between the position defined by *Index* and the lower-right neighboring values.

If the working point is not located within the map, the values for the indices will be set to the lowest or highest value possible according to the map dimension. The values for delta will be set to 1.

For 2dim maps, each direction is handled independently; that means that if e.g. the working point is outside the valid range just for the x direction, only these values are set to the lowest or highest value possible.

There are different map types. These types are:

- Maps without any working point or 2dim maps with only one associated online variable.
  For these maps, 0 will always be returned for all the values.
- Maps with interpolation between neighboring values.
  For these maps, if the working point is valid, the delta values will be either 1 or 2!

If the application system is not on-line, the value 0 for all fields will be returned.

Y-Values have to be ignored for 1dim maps.

It is not possible to use this command for arrays and matrices.

To be able to retrieve the working point at any time after a map number was created, the measurement variables for the working point are already wired

during map selection. Since this costs measurement bandwidth even if the working point is never requested, starting with INCA 7, a new option allows enabling and disabling the working point feature globally (refer to chapter 2.6.3 Online Options). In case the working point feature was disabled, an error is emitted when this command is executed.

Error codes:

INCA communication errors
Invalid map number
Access of an axis failed
Values from the MC system can't be interpreted
Values are out of the limits of the data type
The access to the working point data is not possible because the feature is currently disabled in the ASAP3 options.

5.51 Known Problems

In INCA, it is not possible to have the same description file (A2L) and data set assigned to two different ECUs at the same time. If the currently used INCA Workspace contains more than one device, and two or more of those devices are “compatible”, e.g. can have the same INCA project and data set assigned, the attempt to assign the same INCA project (=description file) and data set (=calibration data or binary data) to a device (by using DEFINE DESCRIPTION-FILE AND BINARY FILE) while those are already assigned to another device within INCA, will fail.

Workaround: Select a different data set to the second device – either via the MCD3-Client or via the INCA GUI - even if this device is not further used in the current session.

6 Implementation Notes for ASAM iLinkRT 2.0 Commands

6.1 RT_CONNECT COMMAND: 255

Command:

Entry	Data type
0xFF Command Code	A_UINT8
0x00 Parameter not evaluated	A_UINT8

Success Answer:

Entry	Data type
0xFF (Packet identification)	A_UINT8
RESOURCE	A_UINT8
0x01 Parameter not evaluated	A_UINT8
0xFF Parameter not evaluated	A_UINT8
0x05BC Parameter not evaluated	A_UINT16
0x00 Parameter not evaluated	A_UINT8
0x00 Parameter not evaluated	A_UINT8

The value of the RESOURCE parameter states the components being supported by the iLinkRT implementation.

Description	DAQ	CAL	Value
Neither DAQ nor CAL			0
Only CAL		X	1
Only DAQ	X		4
DAQ and CAL	X	X	5

The iLinkRT implementation of ASAP3 always returns the value '5' as it supports both data acquisition (DAQ) and calibration (CAL).

By default, the internal state of the server is set to DISCONNECTED which leads to a `0x10 error code being returned for all other command than RT_CONNECT and RT_GET_ALL_SERVER.`

After the RT_CONNECT command was executed the state switches from DISCONNECTED to CONNECTED and the execution of all other iLinkRT commands will be possible.

6.2 RT_DISCONNECT COMMAND: 254

Command:

Entry	Data type
0xFE Command Code	A_UINT8

Success Answer:

Entry	Data type
0xFF (Packet identification)	A_UINT8

Error Answer:

Entry	Data type
0xFE (Packet identification)	A_UINT8
Error code	A_UINT8

Changes the internal connection state of the iLinkRT server from CONNECTED to DISCONNECTED.

Error code	Description	Explanation
16	Command execution is currently not possible.	The iLinkRT connection state is currently set to DISCONNECTED. In the DISCONNECTED state only RT_CONNECT and RT_GET_ALL_SERVER can be executed. RT_CONNECT must be called for changing the internal connection state from DISCONNECTED to CONNECTED.

6.3 RT_GET_STATUS COMMAND: 253

Command:

Entry	Data type
0xFD Command Code	A_UINT8

Success Answer:

Entry	Data type
0xFF (Packet identification)	A_UINT8
Current session status	A_UINT8
0x00 Parameter not evaluated	A_UINT8
0x00 Parameter not evaluated	A_UINT8
0x00 Parameter not evaluated	A_UINT16

Returns the current data acquisition status where the value of the 'Current session status' entry depends on at least one running data acquisition.

Description	Value
Data transfer is not running	0

Data transfer is running	64

6.4 RT_SHORT_UPLOAD COMMAND: 244

Command:

Entry	Data type
0xF4 Command Code	A_UINT8
0x08, Parameter not evaluated	A_UINT8
0x00, Parameter not evaluated	A_UINT8
Device Id	A_UINT8
Characteristic identifier	A_UINT32

Success Answer:

Entry	Data type
0xFF (Packet identification)	A_UINT8
Cell value(s)	Depends on the DATATYPE of physical cell values

Error Answer:

Entry	Data type
0xFE (Packet identification)	A_UINT8
Error code	A_UINT8

The successful execution of the command RT_SHORT_UPLOAD returns a list of all physical cell values of a characteristic in a specific device based on the physical cell data type.

If no valid MCE license is provided via the ETAS License manager, this command will only succeed for the first 30 wired characteristics. Without license, an attempt to read further wired characteristics will result in error 0x22 (out of range).

Error code	Description	Explanation
16	Command execution is currently not possible.	The iLinkRT connection state is currently set to DISCONNECTED. In the DISCONNECTED state only RT_CONNECT and RT_GET_ALL_SERVER can be executed. RT_CONNECT must be called for changing the internal connection state from DISCONNECTED to CONNECTED.
34	No characteristic with the requested characteristic identifier was found in the device being identified by the device id. Another reason can be that there is no MCE license provided and the referenced characteristic identifier refers the 31st or higher configured characteristic.	The requested characteristic is not already contained in the internal characteristic list of a specific device. Before calling RT_SHORT_UPLOAD ASAP3 commands like GET PARAMETER (EV2), GET LOOKUP TABLE (EV2) or GET CHARACTERISTIC INFO need to be executed for adding characteristics to this list. Access to the 31st and later wired characteristics is not possible if no valid MCE license is provided. Install an MCE license to the INCA license manager to solve this.

6.5 RT_CAL_DOWNLOAD COMMAND: 241.4

Command:

Entry	Data type
0xF1 Packet identification	A_UINT8
0x04 (Sub command code)	A_UINT8
Device Id	A_UINT8
Characteristic identifier	A_UINT32
Mode (0 = Flat mode, 3 = Area mode)	A_UINT8

Additional request parameters for the Flat mode:

Cell value	Depends on the DATATYPE of physical cell values

In the Flat mode all physical cell values are set to the single value of the 'Cell value' entry (used as a CONSTANT).

Additional request parameters for the Area mode:

X start index (starts with 0)	A_UINT16
Y start index (starts with 0)	A_UINT16
X size	A_UINT16
Y size	A_UINT16
Cell value(s)	Depends on the DATATYPE of physical cell values

The Area Mode writes the physical cell values at a specific range defined via an X and Y start index and a size for the x and y dimensions.

Success Answer:

Entry	Data type
0xFF (Packet identification)	A_UINT8

Error Answer:

Entry	Data type
0xFE (Packet identification)	A_UINT8
Error code	A_UINT8

Writes physical cell values for a specific characteristic (scalar, curve, map, 1 or 2 dimensional array) in a given range.

The following table shows the values that must be set in the Area mode for curves, 1 dimensional arrays and scalars.

Characteristic type	Entry	Value
Curve / 1 dimensional array	Y size	1
Scalar	X size	1
	Y size	1
	X start index	0
	Y start index	0

If no valid MCE license is provided via the ETAS License manager, this command will only return values for the first 30 wired characteristics. Without license, an

attempt to read further wired characteristics will result in error 0x22 (out of range).

Error code	Description	Explanation and solution
16	Command execution is currently not possible.	The iLinkRT connection state is currently set to DISCONNECTED. In the DISCONNECTED state only RT_CONNECT and RT_GET_ALL_SERVER can be executed. RT_CONNECT must be called for changing the internal connection state from DISCONNECTED to CONNECTED.
34	No characteristic with the requested characteristic identifier was found in the device being identified by the device id. Another reason might be that the range in the Area mode or the cell value(s) are incompatible with the target characteristic or now correctly configured. A third reason can be that there is no MCE license provided and the referenced characteristic identifier refers the 31st or higher configured characteristic.	The requested characteristic is not already contained in the internal characteristic list of a specific device. Before calling RT_CAL_DOWNLOAD ASAP3 commands like GET PARAMETER (EV2), GET LOOKUP TABLE (EV2) or GET CHARACTERISTIC INFO need to be executed for adding characteristics to this list. Check the values of the 'X start index', 'Y start index', 'X size' and 'Y size' or 'Cell value(s)' entries and verify if they match the structure of the requested characteristic. Access to the 31st and later wired characteristics is not possible if no valid MCE license is provided. Install an MCE license to the INCA license manager to solve this.

6.6 RT_CAL_UPLOAD COMMAND: 241.7

Command:

Entry	Data type
0xF1 Packet identification	A_UINT8
0x07 (Sub command code)	A_UINT8
Device Id	A_UINT8
Characteristic identifier	A_UINT32
Mode (3 = Cell values, 4 = Cell values and axis values)	A_UINT8
X start index (starts with 0)	A_UINT16
Y start index (starts with 0)	A_UINT16
X size	A_UINT16
Y size	A_UINT16

Success Answer:

Entry	Data type
0xFF (Packet identification)	A_UINT8
Cell value(s)	Depends on the DATATYPE of physical cell values
X axis value(s)	Depends on the DATATYPE of physical x axis values X axis value(s) are only contained in the response if the 'Mode' entry in the request is set to 4 (Cell values and axis values).
Y axis value(s)	Depends on the DATATYPE of physical y axis values Y axis value(s) are only contained in the response if the 'Mode' entry in the request is set to 4 (Cell values and axis values).

Error Answer:

Entry	Data type
0xFE (Packet identification)	A_UINT8
Error code	A_UINT8

Get the physical values of a characteristic (scalar, curve, map, 1 or 2 dimensional array) in a specific range.

If the 'Mode' entry is set to 3, only the values of physical cell values are returned and if the value is set to 4 the physical values of the cells and the x and y dimensions are contained in the response.

The following table shows the values that must be set in the Area mode for curves, 1 dimensional arrays and scalars.

Characteristic type	Entry	Value
Curve / 1 dimensional array	Y size	1
Scalar	X size	1
	Y size	1
	X start index	0
	Y start index	0

If no valid MCE license is provided via the ETAS License manager, this command will only succeed for the first 30 wired characteristics. Without license, an attempt to read further wired characteristics will result in error 0x22 (out of range).

Error code	Description	Explanation and solution
16	Command execution is currently not possible.	The iLinkRT connection state is currently set to DISCONNECTED. In the DISCONNECTED state only RT_CONNECT and RT_GET_ALL_SERVER can be executed. RT_CONNECT must be called for changing the internal connection state from DISCONNECTED to CONNECTED.
34	No characteristic with the requested characteristic identifier was found in the device being identified by the device id. Another reason might be that the range is incompatible with the target characteristic or not correctly configured. A third reason can be that there is no MCE license provided and the referenced characteristic identifier refers the 31st or higher configured characteristic.	The requested characteristic is not already contained in the internal characteristic list of a specific device. Before calling RT_CAL_UPLOAD ASAP3 commands like GET PARAMETER (EV2), GET LOOKUP TABLE (EV2) or GET CHARACTERISTIC INFO need to be executed for adding characteristics to this list. Check the values of the 'X start index', 'Y start index', 'X size' and 'Y size' entries and verify if they match the structure of the requested characteristic. Access to the 31st and later wired characteristics is not possible if no valid MCE license is provided. Install an MCE license to the INCA license manager to solve this.

6.7 RT_SHORT_DOWNLOAD COMMAND: 237

Command:

Entry	Data type
0xED Command code	A_UINT8
0x08, Parameter not evaluated	A_UINT8
0x00, Parameter not evaluated	A_UINT8
Device Id	A_UINT8
Characteristic identifier	A_UINT32
Cell value(s)	Depends on the DATATYPE of physical cell values

.

Success Answer:

Entry	Data type
0xFF (Packet identification)	A_UINT8

Error Answer:

Entry	Data type
0xFE (Packet identification)	A_UINT8
Error code	A_UINT8

Writes physical cell values for a specific characteristic (scalar, curve, map, 1 or 2 dimensional array).

If no valid MCE license is provided via the ETAS License manager, this command will only return values for the first 30 wired characteristics. Under that condition, an attempt to read further wired characteristics will result in error 0x22 (out of range).

Error code	Description	Explanation and solution
16	Command execution is currently not possible.	The iLinkRT connection state is currently set to DISCONNECTED. In the DISCONNECTED state only RT_CONNECT and RT_GET_ALL_SERVER can be executed. RT_CONNECT must be called for changing the internal connection state from DISCONNECTED to CONNECTED.
34	No characteristic with the requested characteristic identifier was found in the device being identified by the device id. Another reason can be that there is no MCE license provided and the referenced characteristic identifier refers the 31st or higher configured characteristic.	The requested characteristic is not already contained in the internal characteristic list of a specific device. Before calling RT_SHORT_DOWNLOAD ASAP3 commands like GET PARAMETER (EV2), GET LOOKUP TABLE (EV2) or GET CHARACTERISTIC INFO need to be executed for adding characteristics to this list. Access to the 31st and later wired characteristics is not possible if no valid MCE license is provided. Install an MCE license to the INCA license manager to solve this.

6.8 RT_GET_DAQ_EVENT_INFO COMMAND: 215

Command:

Entry	Data type
0xD7 Command code	A_UINT8
0x00, Parameter not evaluated	A_UINT8
DAQID	A_UINT16

Success Answer:

Entry	Data type
0xFF (Packet identification)	A_UINT8
0x04, Parameter not evaluated	A_UINT8
0x01, Parameter not evaluated	A_UINT8
0x00, Parameter not evaluated	A_UINT8
EVENT_CHANNEL_TIME_CYCLE (0 = Not cyclic, 1 = Cyclic)	A_UINT8
EVENT_CHANNEL_TIME_UNIT (must be ignored if EVENT_TIME_CHANNEL_TIME_CYCLE = 0)	A_UINT8
0x00, Parameter not evaluated	A_UINT8

Error Answer:

Entry	Data type
0xFE (Packet identification)	A_UINT8
Error code	A_UINT8

The command returns the time cycle information of an ASAP3 measurement list based on a specific data acquisition identifier (DAQID).

The following table shows the possible values of the EVENT_CHANNEL_TIME_UNIT entry:

EVENT_CHANNEL_TIME_UNIT	Description	Value
1NS	1 nanosecond	0
10NS	10 nanoseconds	1
100NS	100 nanoseconds	2
1US	1 microsecond	3
10US	10 microseconds	4
100US	100 microseconds	5
1MS	1 millisecond	6

10MS	10 milliseconds	7
100MS	100 milliseconds	8
1S	1 second	9
1PS	1 picosecond	10
10PS	10 picoseconds	11
100PS	100 picoseconds	12

Error code	Description	Explanation and solution
16	Command execution is currently not possible.	The iLinkRT connection state is currently set to DISCONNECTED. In the DISCONNECTED state only RT_CONNECT and RT_GET_ALL_SERVER can be executed. RT_CONNECT must be called for changing the internal connection state from DISCONNECTED to CONNECTED.
34	No measurement list with the requested data acquisition identifier (DAQID) was found.	The requested measurement list not exists. Before calling RT_GET_DAQ_EVENT_INFO ASAP3 commands like PARAMETER FOR VALUE ACQUISITION (EV2) need to be executed for creating measurement lists with measurements.
	Another reason might be that the mapped ASAP3 unit is not supported by the iLinkRT standard.	The units ´1 day´, ´1 femtosecond´, ´10 femtoseconds´, ´100 femtoseconds´, ´1 picosecond´, ´10 picoseconds´, ´100 pictoseconds´ are not supported by INCA and the iLinkRT standard. If one of these units is internally returned to the logic of the iLinkRT implementation, the error code 34 is used since they cannot be properly mapped to the iLinkRT units.

6.9 RT_GET_DAQ_RESOLUTION_INFO COMMAND: 217

Command:

Entry	Data type
0xD9 Command code	A_UINT8

Success Answer:

Entry	Data type
0xFF (Packet identification)	A_UINT8
0x01, Parameter not evaluated	A_UINT8
0x08, Parameter not evaluated	A_UINT8
0x00, Parameter not evaluated	A_UINT8
0x00, Parameter not evaluated	A_UINT8
TIMESTAMP_MODE (contains timestamp unit)	A_UINT8
TIMESTAMP_TICKS (factor for the unit the TIMESTAMP_MODE is based on)	A_UINT16

Error Answer:

Entry	Data type
0xFE (Packet identification)	A_UINT8
Error code	A_UINT8

The command RT_GET_DAQ_RESOLUTION_INFO of the current iLinkRT implementation always returns the TIMESTAMP_MODE 108 (1 millisecond) and the value 1 for the TIMESTAMP_TICKS.

The following table shows the possible values of the TIMESTAMP_MODE entry:

TIMESTAMP_MODE	Description	Value
1NS	1 nanosecond	12
10NS	10 nanoseconds	28
100NS	100 nanoseconds	44
1US	1 microsecond	60
10US	10 microseconds	76
100US	100 microseconds	92
1MS	1 millisecond	108
10MS	10 milliseconds	124
100MS	100 milliseconds	140
1S	1 second	156

1PS	1 picosecond	172
10PS	10 picoseconds	188
100PS	100 picoseconds	204

Error code	Description	Explanation and solution
16	Command execution is currently not possible.	The iLinkRT connection state is currently set to DISCONNECTED. In the DISCONNECTED state only RT_CONNECT and RT_GET_ALL_SERVER can be executed. RT_CONNECT must be called for changing the internal connection state from DISCONNECTED to CONNECTED.

6.10 RT_SET_DAQ_PTR COMMAND: 226

Command:

Entry	Data type
0xE2 Command code	A_UINT8
0x00, Parameter not evaluated	A_UINT8
DAQID [0, 1, … 0xFB]	A_UINT16
0x00, Parameter not evaluated	A_UINT8
0x00, Parameter not evaluated	A_UINT8

Success Answer:

Entry	Data type
0xFF (Packet identification)	A_UINT8

Error Answer:

Entry	Data type
0xFE (Packet identification)	A_UINT8
Error code	A_UINT8

The command switches to another internal measurement list based on a specific data acquisition identifier (DAQ).

The measurements of the selected measurement lists can then be read via RT_READ_DAQ.

Error code	Description	Explanation and solution
16	Command execution is currently not possible.	The iLinkRT connection state is currently set to DISCONNECTED. In the DISCONNECTED state only RT_CONNECT and RT_GET_ALL_SERVER can be executed. RT_CONNECT must be called for changing the internal connection state from DISCONNECTED to CONNECTED.
34	No measurement list with the requested data acquisition identifier (DAQID) was found.	The requested measurement list with the data acquisition identifier (DAQID) not exists. Before calling RT_SET_DAQ_PTRASAP3 commands like PARAMETER FOR VALUE ACQUISITION (EV2) need to be executed for creating measurement lists with measurements and a unique data acquisition identifier.

6.11 RT_START_STOP_DAQ_LIST COMMAND: 222

Command:

Entry	Data type
0xDE Command code	A_UINT8
Mode (0 = stop, 1 = start)	A_UINT8
DAQID [0, 1, … 0xFB]	A_UINT16

Success Answer:

Entry	Data type
0xFF (Packet identification)	A_UINT8
0x00, Parameter not evaluated	A_UINT8

Error Answer:

Entry	Data type
0xFE (Packet identification)	A_UINT8
Error code	A_UINT8

This command doesn't implicitly start the measurement. It activates or deactivates the iLinkRT measurement filter of a single measurement list being identified by a unique data acquisition identifier (DAQID).

The measurement itself must be started with ASAP3 commands like GET ONLINE VALUE (EV2).

NOTE

If no valid MCE license is provided via ETAS License Manager, only the first 30 transmitted measurement values will contain valid data. All other values will be set to NaN.

Error code	Description	Explanation and solution
16	Command execution is currently not possible.	The iLinkRT connection state is currently set to DISCONNECTED. In the DISCONNECTED state only RT_CONNECT and RT_GET_ALL_SERVER can be executed. RT_CONNECT must be called for changing the internal connection state from DISCONNECTED to CONNECTED.
34	No measurement list with the requested data acquisition identifier (DAQID) was found.	The requested measurement list with the data acquisition identifier (DAQID) not exists. Before calling RT_START_STOP_DAQ_LIST ASAP3 commands like PARAMETER FOR VALUE ACQUISITION (EV2) need to be executed for creating measurement lists with measurements and a unique data acquisition identifier.

6.12 RT_START_STOP_SYNCH COMMAND: 221

Command:

Entry	Data type
0xDD Command code	A_UINT8
Mode (0 = stop all, 4 = start all)	A_UINT8

Success Answer:

Entry	Data type
0xFF (Packet identification)	A_UINT8
0x00, Parameter not evaluated	A_UINT8

Error Answer:

Entry	Data type
0xFE (Packet identification)	A_UINT8
Error code	A_UINT8

This command doesn't implicitly start the measurement. It activates or deactivates the iLinkRT measurement filter for all measurement lists.

The measurement itself has to be started with ASAP3 commands like GET ONLINE VALUE (EV2).

Error code	Description	Explanation and solution
16	Command execution is currently not possible.	The iLinkRT connection state is currently set to DISCONNECTED. In the DISCONNECTED state only RT_CONNECT and RT_GET_ALL_SERVER can be executed. RT_CONNECT must be called for changing the internal connection state from DISCONNECTED to CONNECTED.

6.13 RT_GET_ALL_SERVER COMMAND: 241.1

Command:

Entry	Data type
0xF1 (Packet identification)	A_UINT8
0x01 (Sub command code)	A_UINT8
MC-Client Name	RT_STRING

Success Answer:

Entry	Data type
0xFF (Packet identification)	A_UINT8
0x00, Parameter not evaluated	A_UINT8
PROTOCOL version	A_UINT8
COMPATIBILITY ID	A_UINT8
MC-Server Name	RT_STRING
UDP port for DAQ lists	A_UINT16
Multicast address of DAQ lists (0 in case of unicast)	A_UINT32
Number of devices	A_UINT8
Device information for each device follows subsequently	
Device Id	A_UINT8
Number of data acquisition identifiers (DAQIDs)	A_UINT8
Device name	RT_STRING

Command is sent from the iLinkRT-Clients to iLinkRT server via broadcast before the communication is started with RT_CONNECT.

All iLinkRT servers are responding to the command with information necessary for the initialization of a point-to-point connection.

The 'MC-Server Name' entry always contains the host name of the computer where the server is running.

RT_GET_ALL_SERVER only returns devices that are currently wired by using ASAP3 commands.

6.14 RT_READ_CAL COMMAND: 241.6

Command:

Entry	Data type
0xF1 (Packet identification)	A_UINT8
0x06 (Sub command code)	A_UINT8
Device Id	A_UINT8
Calibration element number	A_UINT16

Success Answer:

Entry	Data type
0xFF (Packet identification)	A_UINT8
Device Id	A_UINT8
Characteristic Identifier	A_UINT32
Characteristic Name	RT_STRING
Characteristic Unit Name	RT_STRING
Characteristic Type	A_UINT8 (CHAR_DIM)
Physical Data Type Cell Values	A_UINT8 (DATA_TYPE)
0x00, Parameter not evaluated	A_UINT16
Size of X Axis or 1st dimension of VAL_BLK Value 0 is used if the characteristic has no X axis.	A_UINT16
Size of Y Axis or 2nd dimension of VAL_BLK Value 0 is used if the characteristic has no Y axis.	A_UINT16
Physical Data Type X-Axis values Value 0xFF is used for the physical data type if no X axis is available.	A_UINT8 (DATA_TYPE)
Phyiscal Data Type Y-Axis values Value 0xFF is used for the physical data type if no Y axis is available.	A_UINT8 (DATA_TYPE)

Error Answer:

Entry	Data type
0xFE (Packet identification)	A_UINT8
Error code	A_UINT8

RT_READ_CAL is responsible for getting the meta data of a specific characteristic being previously obtained by ASAP3 commands like GET PARAMETER (EV2), GET LOOK-UP TABLE (EV2) or GET CHARACTERISTIC INFO.

Command execution sequence:

Command	Request data	Result and explanation
GET CHARACTERISTIC INFO (ASAP3)	- LUN: 7 - Characteristic Name: MyMap	Characteristic 'MyMap' with the characteristic identifier 83 is stored at an internal characteristic list for the device with the logical unit number 7 and the device id 0.
RT_CAL_READ (iLinkRT)	- Device Id: 0 - Calibration Element Id: 0	'MyMap' with the characteristic identifier 83 is returned since it's the first element in the device with the id 0.
GET CHARACTERISTIC INFO (ASAP3	- LUN: 7 - Characteristic Name: MyCurve	Characteristic 'MyCurve' with the characteristic identifier 120 is stored at an internal characteristic list for the device with the logical unit number 7 and the device id 0.
RT_CAL_READ (iLinkRT)	- Device Id: 0 - Calibration Element Id: 1	'MyCurve' with the characteristic identifier 120 is returned since it's the second element in the device with the id 0.
GET CHARACTERISTIC INFO (ASAP3)	- LUN: 10 - Characteristic Name: MyScalar	Characteristic 'MyCurve' with the characteristic identifier 157 is stored at an internal characteristic list for the device with the logical unit number 10 and the device id 1.
RT_CAL_READ (iLinkRT)	- Device Id: 1 - Calibration Element Id: 0	'MyScalar' with the characteristic identifier 157 is returned since it's the first element in the device with the id 1.
RT_CAL_READ (iLinkRT)	- Device Id: 0 - Calibration Element Id: 2	Error code 34 is returned since no characteristic is located at the third position of the characteristic list of the device with the id 0.

Error code	Description	Explanation and solution
16	Command execution is currently not possible.	The iLinkRT connection state is currently set to DISCONNECTED. In the DISCONNECTED state only RT_CONNECT and RT_GET_ALL_SERVER can be executed. RT_CONNECT must be called for changing the internal connection state from DISCONNECTED to CONNECTED.
34	No characteristic with the requested characteristic element number was found in the device being identified by the device id.	The requested characteristic is not already contained in the internal characteristic list of a specific device. Before calling RT_READ_CAL ASAP3 commands like GET PARAMETER (EV2), GET LOOKUP TABLE (EV2) or GET CHARACTERISTIC INFO need to be executed for adding characteristics to this list.

6.15 RT_READ_DAQ COMMAND: 241.2

Command:

Entry	Data type
0xF1 (Packet identification)	A_UINT8
0x02 (Sub command code)	A_UINT8

Success Answer:

Entry	Data type
0xFF (Packet identification)	A_UINT8
Device Id	A_UINT8
Measurement Identifier	A_UINT32
Measurement Name	RT_STRING
Measurement Unit Name	RT_STRING
Measurement Long Name	RT_STRING
Physical Data Type Measurement	A_UINT8 (DATA_TYPE)

Error Answer:

Entry	Data type
0xFE (Packet identification)	A_UINT8
Error code	A_UINT8

RT_READ_DAQ reads the meta data of a single measurement in a specific measurement list being identified by the current unique data acquisition identifier (DAQID).

The command acts like an iterator over the active measurement list and reminds the last position.

The active data acquisition identifier (DAQID) can be changed via SET_DAQ_PTR. Each time SET_DAQ_PTR was executed the last measurement position of the command RT_READ_DAQ is reset to 0.

Error code	Description	Explanation and solution
16	Command execution is currently not possible.	The iLinkRT connection state is currently set to DISCONNECTED. In the DISCONNECTED state only RT_CONNECT and RT_GET_ALL_SERVER can be executed. RT_CONNECT must be called for changing the internal connection state from DISCONNECTED to CONNECTED.
34	No measurement list with the active data acquisition identifier (DAQID) was found.	The requested measurement list with the current data acquisition identifier (DAQID) not exists. Before calling RT_READ_DAQ the ASAP3 command PARAMETER FOR VALUE ACQUISITION (EV2) needs to be executed for creating measurement lists with measurements and a unique data acquisition identifier. After PARAMETER_FOR_VALUE_ACQUISITION (EV2) was called the current DAQID must be set by using the iLinkRT command RT_SET_DAQ_PTR.
	No measurement was found at the current position of the active measurement list	RT_READ_DAQ acts like an iterator that can be called multiple times and internally reminds the last element position. If the measurement contains two items RT_READ_DAQ will return the error code 34 after its third invocation since no item is located at this position. The last element position can be reset by calling RT_SET_DAQ_PTR.

7 Implementation Notes for ASAM iLinkRT 3.0 Commands

To be able to better distinguish iLinkRT 2.0 commands from iLinkRT 3.0 commands, the iLinkRT 3.0 commands are written with an “RT3_” prefix in this document.

7.1 RT3_GET_ALL_SERVER COMMAND: 65535

Command:

Entry	Data type
0xFFFF Command Code	A_UINT16
Internet Protocol version being supported by the client - 0x01 IPv4 - 0x02 - 0x03 IPv4 and IPv6	A_UINT8

Success Answer:

Entry	Data type
0x00FF (Packet identification)	A_UINT16
Protocol version - 0x30 V 3.0	A_UINT8
Compatibility version - 0x20 V 3.0	A_UINT8
MC-Server Name	RT_STRING
MC-Server Vendor Name	RT_STRING
MC-Server Product Name	RT_STRING
MC-Server Product Version	RT_STRING
Internet protocol version being used by the server - 0x01 IPv4 - 0x02 IPv6	A_UINT8
UDP port for command channel	A_UINT16
Supported server functionality - 0x01 C-Server - 0x04 M-Server - 0x05 MC-Server - 0x0C M-Server with recording - 0x0D MC-Server with recording	A_UINT8
Reserved parameter	A_UINT16

This command is sent from the MC-Client to all MC-Servers by a broadcast message. Each MC-Server responds to the command with server-specific information the MC-Client needs in order to set up a logical point to point communication.

7.2 RT3_GET_SERVER_STATE COMMAND: 256

Command:

Entry	Data type
0x0100 Command Code	A_UINT16

Success Answer:

Entry	Data type
0x00FF (Packet identification)	A_UINT16
MC-SERVER_STATE - 0 CONFIGURED - 1 CONFIGURABLE	A_UINT8
MEASURING_STATE - 0 UNDEFINED - 1 STOPPED - 2 CONFIGURABLE - 3 STARTED	A_UINT8
DAQ_LIST_LAYOUT - 0 NO - 1 PRECONFIGURED - 2 UNCHANGED - 3 EXTENDED - 4 CHANGED	A_UINT8
RECORDER_STATE - 0 UNDEFINED - 1 STOPPED - 2 ACTIVATED - 3 RUNNING - 4 PAUSED	A_UINT8

Error Answer:

Entry	Data type
0x00FE (Packet identification)	A_UINT16
Standard error code	A_UINT16
Vendor specific error code (same value as 'Standard error code' in the ASAP3.exe)	A_UINT16
Vendor code description	RT_STRING

Command returns all current state information of the MC-Server.

Error code	Description	Explanation and solution
16	Command execution is currently not possible.	The iLinkRT 3.0 connection state is currently set to DISCONNECTED for the current client. In the DISCONNECTED state only RT3_SERVER_CONNECT and RT3_GET_ALL_SERVER can be executed. RT3_SERVER_CONNECT must be called for changing the internal server-managed client connection state from DISCONNECTED to CONNECTED. The server automatically switches single clients from the state CONNECTED to DISCONNECTED if the 'iLinkRT Watchdog Interval (sec)' in the 'Eastablish Connection' dialog is set to another value than 0 and the client executed no commands in the configured time span.
65535	An unexpected error occurred.	Additional information will be provided in the error message.

7.3 RT3_GET_SERVER_TIME COMMAND: 257

Command:

Entry	Data type
0x0101 Command Code	A_UINT16

Success Answer:

Entry	Data type
0x00FF (Packet identification)	A_UINT16
Data transfer clock counter	A_UINT64
Time quality class - 0 local PC reference time (used by the ASAP3.exe) - 10 external time source - 16 external absolute synchronized time	A_UINT8
Absolute time stamp	A_UINT64

Error Answer:

Entry	Data type

0x00FE (Packet identification)	A_UINT16
Standard error code	A_UINT16
Vendor specific error code (same value as 'Standard error code' in the ASAP3.exe)	A_UINT16
Vendor code description	RT_STRING

Queries the current time of the MC-Server with the current value of the data transfer clock counter.

Error code	Description	Explanation and solution
16	Command execution is currently not possible.	The iLinkRT 3.0 connection state is currently set to DISCONNECTED for the current client. In the DISCONNECTED state only RT3_SERVER_CONNECT and RT3_GET_ALL_SERVER can be executed. RT3_SERVER_CONNECT must be called for changing the internal server-managed client connection state from DISCONNECTED to CONNECTED. The server automatically switches single clients from the state CONNECTED to DISCONNECTED if the 'iLinkRT Watchdog Interval (sec)' in the 'Eastablish Connection' dialog is set to another value than 0 and the client executed no commands in the configured time span.
65535	An unexpected error occurred.	Additional information will be provided in the error message.

7.4 RT3_SERVER_CONNECT COMMAND: 258

Command:

Entry	Data type
0x0102 Command Code	A_UINT16
MC-Client Name	RT_STRING
MC-Client Product Name	RT_STRING
MC-Client Product Version	RT_STRING

Requested UDP port for unicast DAQ lists (Ignored by the ASAP3.exe since it's always using the global UDP port for data acquisition and event packets)	A_UINT16

Success Answer:

Entry	Data type
0x00FF (Packet identification)	A_UINT16
UDP port for multicast DAQ lists and events	A_UINT16
IP address for multicast DAQ lists and events	4x UINT32
Watchdog interval in seconds - Supported values from 1 to 1000 for setting the seconds - 0 disables the watchdog in the MC-Server	A_UINT16
Grandmaster clock identifier (always 0)	A_UINT64
Local clock identifier (always 0)	A_UINT64

Establishes a continuous, logical, point-to-point connection with a MC-Server.

A MC-Server always responds to RT3_GET_ALL_SERVER and RT3_SERVER_CONNECT.

All other commands are only processed for connected MC-Clients.

7.5 RT3_SERVER_DISCONNECT COMMAND: 259

Command:

Entry	Data type
0x0103 Packet identification	A_UINT16

Success Answer:

Entry	Data type
0x00FF (Packet identification)	A_UINT16

Error Answer:

Entry	Data type
0x00FE (Packet identification)	A_UINT16
Standard error code	A_UINT16
Vendor specific error code (same value as 'Standard error code' in the ASAP3.exe)	A_UINT16
Vendor code description	RT_STRING

Disconnects the requested MC-Client from the MC-Server.

The following operations were done by the server implicitly for the target client:

- Stop the recording
- Stop the measuring
- Clear the client's measuring list
- Change the MC-SERVER_STATE to CONFIGURED

Error code	Description	Explanation and solution
16	Command execution is currently not possible.	The iLinkRT 3.0 connection state is currently set to DISCONNECTED for the current client. In the DISCONNECTED state only RT3_SERVER_CONNECT and RT3_GET_ALL_SERVER can be executed. RT3_SERVER_CONNECT must be called for changing the internal server-managed client connection state from DISCONNECTED to CONNECTED. The server automatically switches single clients from the state CONNECTED to DISCONNECTED if the 'iLinkRT Watchdog Interval (sec)' in the 'Eastablish Connection' dialog is set to another value than 0 and the client executed no commands in the configured time span.
65535	An unexpected error occurred.	Additional information will be provided in the error message.

7.6 RT3_GET_CALPAGE_INFO COMMAND: 512

Command:

Entry	Data type
0x0200 Command code	A_UINT16
Device Id	A_UINT16

Success Answer:

Entry	Data type
0x00FF (Packet identification)	A_UINT16
Number (N) of accessible pages of the MC-Server	A_UINT16
Page Index 1	A_UINT16
Page Name 1	RT_STRING
Page Properties 1 - 0 Neither read nor write access - 1 Only read access - 2 Only write access - 3 Read and write access	A_UINT16
…	
Page Index N	A_UINT16
Page Name N	RT_STRING
Page Properties N - 0 Neither read nor write access - 1 Only read access - 2 Only write access - 3 Read and write access	A_UINT16

Error Answer:

Entry	Data type
0x00FE (Packet identification)	A_UINT16
Standard error code	A_UINT16
Vendor specific error code (same value as 'Standard error code' in the ASAP3.exe)	A_UINT16
Vendor code description	RT_STRING

Get the page properties of all available memory pages.

The command is only allowed in the MC-SERVER_STATE CONFIGURED.

0 is the minimum page index and refers to the reference page: This page is usually read-only.

Error code	Description	Explanation and solution
16	Command execution is currently not possible.	The iLinkRT 3.0 connection state is currently set to DISCONNECTED for the current client. In the DISCONNECTED state only RT3_SERVER_CONNECT and RT3_GET_ALL_SERVER can be executed. RT3_SERVER_CONNECT must be called for changing the internal server-managed client connection state from DISCONNECTED to CONNECTED. The server automatically switches single clients from the state CONNECTED to DISCONNECTED if the 'iLinkRT Watchdog Interval (sec)' in the 'Eastablish Connection' dialog is set to another value than 0 and the client executed no commands in the configured time span.
80	Device Id Is unknown.	No device with the requested 'Device Id' was found.

96	MC-SERVER not in state CONFIGURED.	By default the server is in the MC-SERVER_STATE CONFIGURED. If it was changed to CONFIGURABLE the command RT3_CONFIGURE_SERVER with the server configuration mode END_CONFIG must be executed before the invocation of the commands RT3_GET_CALPAGE_INFO, RT3_GET_CHARACTERISTIC_ID_LIST, RT3_GET_CHARACTERISTIC_INFO, RT3_GET_DEVICE_INFO, RT3_GET_DEVICE_STATE, RT3_GET_MEASUREMENT_ID_LIST, RT3_GET_MEASUREMENT_INFO, RT3_GET_RASTER_OVERVIEW, RT3_GET_SELECTED_DEVICES, RT3_GET_DAQ_EVENT_INFO, RT3_GET_DAQ_MEASUREMENT_LIST, RT3_READ_CELL_VALUES, RT3_WRITE_CELL_VALUES, RT3_WRITE_CHARACTERISTIC, RT3_CONFIGURE_RECORDER, RT3_CONTROL_RECORDER, RT3_GET_RETRIGGERING, RT3_SET_CLIENT_BOOKMARK, RT3_SET_RETRIGGERING and RT3_SET_TRIGGER.
256	Functionality not supported.	Only workbase devices are supported by calibration commands like RT3_GET_CALPAGE_INFO.
65535	An unexpected error occurred.	Additional information will be provided in the error message.

7.7 RT3_GET_CHARACTERISTIC_ID_LIST COMMAND: 513

Command:

Entry	Data type
0x0201 Command code	A_UINT16

.

Success Answer:

Entry	Data type
0x00FF (Packet identification)	A_UINT16
Number (N) of selected characteristics	A_UINT32
Characteristic Identifier 1	A_UINT32
…	
Characteristic Identifier N	A_UINT32

Error Answer:

Entry	Data type
0x00FE (Packet identification)	A_UINT16
Standard error code	A_UINT16
Vendor specific error code (same value as 'Standard error code' in the ASAP3.exe)	A_UINT16
Vendor code description	RT_STRING

Command is only allowed in the MC-SERVER_STATE CONFIGURED and returns the identifiers for already selected characteristics.

Further information about the characteristic behind a specific characteristic identifier can be obtained via the command RT3_GET_CHARACTERISTIC_INFO.

If no valid MCE license is provided via the ETAS License manager, this command will only return identifiers for the first 30 wired characteristics.

Error code	Description	Explanation and solution
16	Command execution is currently not possible.	The iLinkRT 3.0 connection state is currently set to DISCONNECTED for the current client. In the DISCONNECTED state only RT3_SERVER_CONNECT and RT3_GET_ALL_SERVER can be executed. RT3_SERVER_CONNECT must be called for changing the internal server-managed client connection state from DISCONNECTED to CONNECTED. The server automatically switches single clients from the state CONNECTED to DISCONNECTED if the 'iLinkRT Watchdog Interval (sec)' in the 'Eastablish Connection' dialog is set to another value than 0 and the client executed no commands in the configured time span.

96	MC-SERVER not in state CONFIGURED.	By default the server is in the MC-SERVER_STATE CONFIGURED. If it was changed to CONFIGURABLE the command RT3_CONFIGURE_SERVER with the server configuration mode END_CONFIG must be executed before the invocation of the commands RT3_GET_CALPAGE_INFO, RT3_GET_CHARACTERISTIC_ID_LIST, RT3_GET_CHARACTERISTIC_INFO, RT3_GET_DEVICE_INFO, RT3_GET_DEVICE_STATE, RT3_GET_MEASUREMENT_ID_LIST, RT3_GET_MEASUREMENT_INFO, RT3_GET_RASTER_OVERVIEW, RT3_GET_SELECTED_DEVICES, RT3_GET_DAQ_EVENT_INFO, RT3_GET_DAQ_MEASUREMENT_LIST, RT3_READ_CELL_VALUES, RT3_WRITE_CELL_VALUES, RT3_WRITE_CHARACTERISTIC, RT3_CONFIGURE_RECORDER, RT3_CONTROL_RECORDER, RT3_GET_RETRIGGERING, RT3_SET_CLIENT_BOOKMARK, RT3_SET_RETRIGGERING and RT3_SET_TRIGGER.
65535	An unexpected error occurred.	Additional information will be provided in the error message.

7.8 RT3_GET_CHARACTERISTIC_INFO COMMAND: 514

Command:

Entry	Data type
0x0202 (Packet identification)	A_UINT16
Characteristic Identifier	A_UINT16

Success Answer:

Entry	Data type
0x00FF (Packet identification)	A_UINT16
Device Id	A_UINT16
Characteristic Name	RT_STRING
Characteristic Type	A_UINT8 (CHAR_TYPE)
Size of X Axis or 1st dimension of VAL_BLK Value 0 is used if the characteristic has no X axis.	A_UINT16
Size of Y Axis or 2nd dimension of VAL_BLK Value 0 is used if the characteristic has no Y axis.	A_UINT16
Size of Z Axis or 3nd dimension of VAL_BLK Value 0 is used if the characteristic has no Z axis.	A_UINT16
Size of W Axis or 4nd dimension of VAL_BLK Value 0 is used if the characteristic has no W axis.	A_UINT16
Size of V Axis or 5nd dimension of VAL_BLK Value 0 is used if the characteristic has no V axis.	A_UINT16
Physical Data Type X-Axis values Value 0xFF is used for the physical data type if no X axis is available.	A_UINT8 (DATA_TYPE)

Phyiscal Data Type Y-Axis values Value 0xFF is used for the physical data type if no Y axis is available.	A_UINT8 (DATA_TYPE)
Phyiscal Data Type Z-Axis values Value 0xFF is used for the physical data type if no Z axis is available.	A_UINT8 (DATA_TYPE)
Phyiscal Data Type W-Axis values Value 0xFF is used for the physical data type if no W axis is available.	A_UINT8 (DATA_TYPE)
Phyiscal Data Type V-Axis values Value 0xFF is used for the physical data type if no V axis is available.	A_UINT8 (DATA_TYPE)
Physical Cell Value Data Type	A_UINT8 (DATA_TYPE)
Hex Data Type X-Axis values Value 0xFF is used for the hex data type if no X axis is available.	A_UINT8 (DATA_TYPE)
Hex Data Type Y-Axis values Value 0xFF is used for the hex data type if no Y axis is available.	A_UINT8 (DATA_TYPE)
Hex Data Type Z-Axis values Value 0xFF is used for the hex data type if no Z axis is available.	A_UINT8 (DATA_TYPE)
Hex Data Type W-Axis values Value 0xFF is used for the hex data type if no W axis is available.	A_UINT8 (DATA_TYPE)

Hex Data Type V-Axis values Value 0xFF is used for the hex data type if no V axis is available.	A_UINT8 (DATA_TYPE)
Hex Cell Value Data Type	A_UINT8 (DATA_TYPE)
Display Format %[<length>].<layout>	RT_STRING
Lower Limit	Depends on the dynamic DATATYPE of the cell values
Extended Lower Limit	Depends on the dynamic DATATYPE of the cell values
Upper Limit	Depends on the dynamic DATATYPE of the cell values
Extended Upper Limit	Depends on the dynamic DATATYPE of the cell values
Physical Unit	RT_STRING

Error Answer:

Entry	Data type
0x00FE (Packet identification)	A_UINT16
Standard error code	A_UINT16
Vendor specific error code (same value as 'Standard error code' in the ASAP3.exe)	A_UINT16
Vendor code description	RT_STRING

RT3_GET_CHARACTERISTIC_INFO is responsible for getting the meta data of a specific characteristic being previously obtained by ASAP3 commands like RT3_SELECT_CHARACTERISTIC_ID or RT3_GET_CHARACTERISTIC_ID_LIST.

Error code	Description	Explanation and solution
16	Command execution is currently not possible.	The iLinkRT 3.0 connection state is currently set to DISCONNECTED for the current client. In the DISCONNECTED state only RT3_SERVER_CONNECT and RT3_GET_ALL_SERVER can be executed. RT3_SERVER_CONNECT must be called for changing the internal server-managed client connection state from DISCONNECTED to CONNECTED. The server automatically switches single clients from the state CONNECTED to DISCONNECTED if the 'iLinkRT Watchdog Interval (sec)' in the 'Eastablish Connection' dialog is set to another value than 0 and the client executed no commands in the configured time span.
82	No characteristic with the requested characteristic identifier was found	The requested characteristic is not already selected. Before calling RT3_GET_CHARACTERISTIC_INFO the command RT3_SELECT_CHARACTERISTIC_ID must be called with the name of the corresponding characteristic.
65535	An unexpected error occurred.	Additional information will be provided in the error message.

96	MC-SERVER not in state CONFIGURED.	By default the server is in the MC-SERVER_STATE CONFIGURED. If it was changed to CONFIGURABLE the command RT3_CONFIGURE_SERVER with the server configuration mode END_CONFIG must be executed before the invocation of the commands RT3_GET_CALPAGE_INFO, RT3_GET_CHARACTERISTIC_ID_LIST, RT3_GET_CHARACTERISTIC_INFO, RT3_GET_DEVICE_INFO, RT3_GET_DEVICE_STATE, RT3_GET_MEASUREMENT_ID_LIST, RT3_GET_MEASUREMENT_INFO, RT3_GET_RASTER_OVERVIEW, RT3_GET_SELECTED_DEVICES, RT3_GET_DAQ_EVENT_INFO, RT3_GET_DAQ_MEASUREMENT_LIST, RT3_READ_CELL_VALUES, RT3_WRITE_CELL_VALUES, RT3_WRITE_CHARACTERISTIC, RT3_CONFIGURE_RECORDER, RT3_CONTROL_RECORDER, RT3_GET_RETRIGGERING, RT3_SET_CLIENT_BOOKMARK, RT3_SET_RETRIGGERING and RT3_SET_TRIGGER.

7.9 RT3_GET_DAQ_RESOLUTION_INFO COMMAND: 515

Command:

Entry	Data type
0x0203 Command code	A_UINT16

Success Answer:

Entry	Data type
0x00FF (Packet identification)	A_UINT16
Scaling Unit	A_UINT8
Timestamp Ticks (factor for TIMESTAMP_UNIT)	A_UINT16

Error Answer:

Entry	Data type
0x00FE (Packet identification)	A_UINT16
Standard error code	A_UINT16
Vendor specific error code (same value as 'Standard error code' in the ASAP3.exe)	A_UINT16
Vendor code description	RT_STRING

The command RT3_GET_DAQ_RESOLUTION_INFO of the current iLinkRT 3.0 implementation always returns the TIMESTAMP_UNIT 3 (1 millisecond) and the value 1 for the Timestamp Ticks.

The following table shows the possible values of the TIMESTAMP_UNIT entry:

TIMESTAMP_UNIT	Description	Value
1US	1 microsecond	0
10US	10 microseconds	1
100US	100 microseconds	2
1MS	1 millisecond	3
10MS	10 milliseconds	4
100MS	100 milliseconds	5
1S	1 second	6
10S	10 seconds	7
1M	1 minute	8
1H	1 hour	9
1D	1 day	10
1FS	1 femto second	20
10FS	10 femto seconds	21
100FS	100 femto seconds	22
1PS	1 pico second	23
10PS	10 pico seconds	24
100PS	100 pico seconds	25
1NS	1 nanosecond	26
10NS	10 nanoseconds	27
100NS	100 nanoseconds	28
Angle (Rate defines the number of degrees after that a trigger occurs)	Angular degrees	100
Revolutions (Rate defines the number of revolutions after that a trigger occurs)	Revolutions 360 degrees	101

Cycles (e. g. in case of IC engines rate defines the number of cycles (cycle of 4-stroke cycle engine) after that a trigger occurs)	Cycle 720 degrees	102
Combustion (e. g. in case of IC engines rate defines the cylinder number (Combustion) the trigger is related to)	Cylinder segment	103
Without fixed scaling. (The value from RATE is not interpreted and the rate is set to '0')	Non deterministic	1000

Error code	Description	Explanation and solution
16	Command execution is currently not possible.	The iLinkRT 3.0 connection state is currently set to DISCONNECTED for the current client. In the DISCONNECTED state only RT3_SERVER_CONNECT and RT3_GET_ALL_SERVER can be executed. RT3_SERVER_CONNECT must be called for changing the internal server-managed client connection state from DISCONNECTED to CONNECTED. The server automatically switches single clients from the state CONNECTED to DISCONNECTED if the 'iLinkRT Watchdog Interval (sec)' in the 'Eastablish Connection' dialog is set to another value than 0 and the client executed no commands in the configured time span.

96	MC-SERVER not in state CONFIGURED.	By default the server is in the MC-SERVER_STATE CONFIGURED. If it was changed to CONFIGURABLE the command RT3_CONFIGURE_SERVER with the server configuration mode END_CONFIG must be executed before the invocation of the commands RT3_GET_CALPAGE_INFO, RT3_GET_CHARACTERISTIC_ID_LIST, RT3_GET_CHARACTERISTIC_INFO, RT3_GET_DEVICE_INFO, RT3_GET_DEVICE_STATE, RT3_GET_MEASUREMENT_ID_LIST, RT3_GET_MEASUREMENT_INFO, RT3_GET_RASTER_OVERVIEW, RT3_GET_SELECTED_DEVICES, RT3_GET_DAQ_EVENT_INFO, RT3_GET_DAQ_MEASUREMENT_LIST, RT3_READ_CELL_VALUES, RT3_WRITE_CELL_VALUES, RT3_WRITE_CHARACTERISTIC, RT3_CONFIGURE_RECORDER, RT3_CONTROL_RECORDER, RT3_GET_RETRIGGERING, RT3_SET_CLIENT_BOOKMARK, RT3_SET_RETRIGGERING and RT3_SET_TRIGGER.
65535	An unexpected error occurred.	Additional information will be provided in the error message.

7.10 RT3_GET_DEVICE_INFO COMMAND: 516

Command:

Entry	Data type
0x0204 Command code	A_UINT16
Device Id	A_UINT16

Success Answer:

Entry	Data type
0x00FF (Packet identification)	A_UINT16
Device Name	RT_STRING
Description File Name	RT_STRING

Hex File Name	RT_STRING
Physical Link Name	RT_STRING
DEVICE_FUNCTIONALITY - 0 Neither CAL nor DAQ - 1 Only CAL - 2 Only DAQ - 3 DAQ and CAL	A_UINT8

Error Answer:

Entry	Data type
0x00FE (Packet identification)	A_UINT16
Standard error code	A_UINT16
Vendor specific error code (same value as 'Standard error code' in the ASAP3.exe)	A_UINT16
Vendor code description	RT_STRING

Returns the metadata for a specific device being identified by its device id.

Error code	Description	Explanation and solution
16	Command execution is currently not possible.	The iLinkRT 3.0 connection state is currently set to DISCONNECTED for the current client. In the DISCONNECTED state only RT3_SERVER_CONNECT and RT3_GET_ALL_SERVER can be executed. RT3_SERVER_CONNECT must be called for changing the internal server-managed client connection state from DISCONNECTED to CONNECTED. The server automatically switches single clients from the state CONNECTED to DISCONNECTED if the 'iLinkRT Watchdog Interval (sec)' in the 'Eastablish Connection' dialog is set to another value than 0 and the client executed no commands in the configured time span.
80	Device Id Is unknown.	No device with the requested 'Device Id' was found.

96	MC-SERVER not in state CONFIGURED.	By default the server is in the MC-SERVER_STATE CONFIGURED. If it was changed to CONFIGURABLE the command RT3_CONFIGURE_SERVER with the server configuration mode END_CONFIG must be executed before the invocation of the commands RT3_GET_CALPAGE_INFO, RT3_GET_CHARACTERISTIC_ID_LIST, RT3_GET_CHARACTERISTIC_INFO, RT3_GET_DEVICE_INFO, RT3_GET_DEVICE_STATE, RT3_GET_MEASUREMENT_ID_LIST, RT3_GET_MEASUREMENT_INFO, RT3_GET_RASTER_OVERVIEW, RT3_GET_SELECTED_DEVICES, RT3_GET_DAQ_EVENT_INFO, RT3_GET_DAQ_MEASUREMENT_LIST, RT3_READ_CELL_VALUES, RT3_WRITE_CELL_VALUES, RT3_WRITE_CHARACTERISTIC, RT3_CONFIGURE_RECORDER, RT3_CONTROL_RECORDER, RT3_GET_RETRIGGERING, RT3_SET_CLIENT_BOOKMARK, RT3_SET_RETRIGGERING and RT3_SET_TRIGGER.
65535	An unexpected error occurred.	Additional information will be provided in the error message.

7.11 RT3_GET_DEVICE_STATE COMMAND: 517

Command:

Entry	Data type
0x0205 Command code	A_UINT16
Device Id	A_UINT16

Success Answer:

Entry	Data type
0x00FF (Packet identification)	A_UINT16
Connection Mode - 0 Offline - 1 Online	A_UINT8
Device Reachability - 0 Reachable, the device can communicate with the MC-Server - 1 Not reachable, but configured for cold start - 2 Not reachable	A_UNIT8

Error Answer:

Entry	Data type
0x00FE (Packet identification)	A_UINT16
Standard error code	A_UINT16
Vendor specific error code (same value as 'Standard error code' in the ASAP3.exe)	A_UINT16
Vendor code description	RT_STRING

This command returns the state of a device connection.

Error code	Description	Explanation and solution
16	Command execution is currently not possible.	The iLinkRT 3.0 connection state is currently set to DISCONNECTED for the current client. In the DISCONNECTED state only RT3_SERVER_CONNECT and RT3_GET_ALL_SERVER can be executed. RT3_SERVER_CONNECT must be called for changing the internal server-managed client connection state from DISCONNECTED to CONNECTED. The server automatically switches single clients from the state CONNECTED to DISCONNECTED if the 'iLinkRT Watchdog Interval (sec)' in the 'Eastablish Connection' dialog is set to another value than 0 and the client executed no commands in the configured time span.
80	Device Id Is unknown.	No device with the requested 'Device Id' was found.

96	MC-SERVER not in state CONFIGURED.	By default the server is in the MC-SERVER_STATE CONFIGURED. If it was changed to CONFIGURABLE the command RT3_CONFIGURE_SERVER with the server configuration mode END_CONFIG must be executed before the invocation of the commands RT3_GET_CALPAGE_INFO, RT3_GET_CHARACTERISTIC_ID_LIST, RT3_GET_CHARACTERISTIC_INFO, RT3_GET_DEVICE_INFO, RT3_GET_DEVICE_STATE, RT3_GET_MEASUREMENT_ID_LIST, RT3_GET_MEASUREMENT_INFO, RT3_GET_RASTER_OVERVIEW, RT3_GET_SELECTED_DEVICES, RT3_GET_DAQ_EVENT_INFO, RT3_GET_DAQ_MEASUREMENT_LIST, RT3_READ_CELL_VALUES, RT3_WRITE_CELL_VALUES, RT3_WRITE_CHARACTERISTIC, RT3_CONFIGURE_RECORDER, RT3_CONTROL_RECORDER, RT3_GET_RETRIGGERING, RT3_SET_CLIENT_BOOKMARK, RT3_SET_RETRIGGERING and RT3_SET_TRIGGER.
65535	An unexpected error occurred.	Additional information will be provided in the error message.

7.12 RT3_GET_MEASUREMENT_ID_LIST COMMAND: 518

Command:

Entry	Data type
0x0206 Command code	A_UINT16

Success Answer:

Entry	Data type
0x00FF (Packet identification)	A_UINT16
Number of selected measurements (N)	A_UINT32
Measurement Id 1	A_UNIT32
…	
Measurement N	A_UINT32

Error Answer:

Entry	Data type
0x00FE (Packet identification)	A_UINT16
Standard error code	A_UINT16
Vendor specific error code (same value as 'Standard error code' in the ASAP3.exe)	A_UINT16
Vendor code description	RT_STRING

Returns the identifiers of the already selected measurements.

Error code	Description	Explanation and solution
16	Command execution is currently not possible.	The iLinkRT 3.0 connection state is currently set to DISCONNECTED for the current client. In the DISCONNECTED state only RT3_SERVER_CONNECT and RT3_GET_ALL_SERVER can be executed. RT3_SERVER_CONNECT must be called for changing the internal server-managed client connection state from DISCONNECTED to CONNECTED. The server automatically switches single clients from the state CONNECTED to DISCONNECTED if the 'iLinkRT Watchdog Interval (sec)' in the 'Eastablish Connection' dialog is set to another value than 0 and the client executed no commands in the configured time span.

96	MC-SERVER not in state CONFIGURED.	By default the server is in the MC-SERVER_STATE CONFIGURED. If it was changed to CONFIGURABLE the command RT3_CONFIGURE_SERVER with the server configuration mode END_CONFIG must be executed before the invocation of the commands RT3_GET_CALPAGE_INFO, RT3_GET_CHARACTERISTIC_ID_LIST, RT3_GET_CHARACTERISTIC_INFO, RT3_GET_DEVICE_INFO, RT3_GET_DEVICE_STATE, RT3_GET_MEASUREMENT_ID_LIST, RT3_GET_MEASUREMENT_INFO, RT3_GET_RASTER_OVERVIEW, RT3_GET_SELECTED_DEVICES, RT3_GET_DAQ_EVENT_INFO, RT3_GET_DAQ_MEASUREMENT_LIST, RT3_READ_CELL_VALUES, RT3_WRITE_CELL_VALUES, RT3_WRITE_CHARACTERISTIC, RT3_CONFIGURE_RECORDER, RT3_CONTROL_RECORDER, RT3_GET_RETRIGGERING, RT3_SET_CLIENT_BOOKMARK, RT3_SET_RETRIGGERING and RT3_SET_TRIGGER.
65535	An unexpected error occurred.	Additional information will be provided in the error message.

7.13 RT3_GET_MEASUREMENT_INFO COMMAND: 519

Command:

Entry	Data type
0x0207 (Packet identification)	A_UINT16
Measurement Id	A_UINT32

Success Answer:

Entry	Data type
0x00FF (Packet identification)	A_UINT16
Device Id	A_UNIT16
Measurement Name	RT_STRING
Number of available rasters for the requested measurement (N)	A_UNIT16
Raster Name 1	RT_STRING
Raster CSE Scaling Unit 1	A_UINT16
Raster SCE Factor 1	A_UNIT16
Raster Reference 1	A_UNIT16
…	
Raster Name N	RT_STRING
Raster CSE Scaling Unit N	A_UINT16
Raster SCE Factor N	A_UNIT16
Raster Reference N	A_UNIT16
Display Format %[<length>].<layout>	RT_STRING
Measurement Hex Value Data Type	A_UINT8 (DATA_TYPE)
Measurement Physical Value Data Type	A_UNIT8 (DATA_TYPE)
Lower Limit	Depends on the dynamic DATATYPE of the cell values
Upper Limit	Depends on the dynamic DATATYPE of the cell values
Physical Unit	RT_STRING

Error Answer:

Entry	Data type
0x00FE (Packet identification)	A_UINT16

Standard error code	A_UINT16
Vendor specific error code (same value as 'Standard error code' in the ASAP3.exe)	A_UINT16
Vendor code description	RT_STRING

Command returns the meta data of a selected measurement being identified by its measurement id.

In the case of the measurement being contained in a monitoring device only one proxy raster with raster reference 0x0000 will be contained in the response.

Error code	Description	Explanation and solution
16	Command execution is currently not possible.	The iLinkRT 3.0 connection state is currently set to DISCONNECTED for the current client. In the DISCONNECTED state only RT3_SERVER_CONNECT and RT3_GET_ALL_SERVER can be executed. RT3_SERVER_CONNECT must be called for changing the internal server-managed client connection state from DISCONNECTED to CONNECTED. The server automatically switches single clients from the state CONNECTED to DISCONNECTED if the 'iLinkRT Watchdog Interval (sec)' in the 'Eastablish Connection' dialog is set to another value than 0 and the client executed no commands in the configured time span.
81	Measurement Id Is unknown.	No measurement with the requested 'Measurement Id' was found.

96	MC-SERVER not in state CONFIGURED.	By default the server is in the MC-SERVER_STATE CONFIGURED. If it was changed to CONFIGURABLE the command RT3_CONFIGURE_SERVER with the server configuration mode END_CONFIG must be executed before the invocation of the commands RT3_GET_CALPAGE_INFO, RT3_GET_CHARACTERISTIC_ID_LIST, RT3_GET_CHARACTERISTIC_INFO, RT3_GET_DEVICE_INFO, RT3_GET_DEVICE_STATE, RT3_GET_MEASUREMENT_ID_LIST, RT3_GET_MEASUREMENT_INFO, RT3_GET_RASTER_OVERVIEW, RT3_GET_SELECTED_DEVICES, RT3_GET_DAQ_EVENT_INFO, RT3_GET_DAQ_MEASUREMENT_LIST, RT3_READ_CELL_VALUES, RT3_WRITE_CELL_VALUES, RT3_WRITE_CHARACTERISTIC, RT3_CONFIGURE_RECORDER, RT3_CONTROL_RECORDER, RT3_GET_RETRIGGERING, RT3_SET_CLIENT_BOOKMARK, RT3_SET_RETRIGGERING and RT3_SET_TRIGGER.
65535	An unexpected error occurred.	Additional information will be provided in the error message.

7.14 RT3_GET_RASTER_OVERVIEW COMMAND: 520

Command:

Entry	Data type
0x0208 (Packet identification)	A_UINT16
Device Id	A_UINT16

Success Answer:

Entry	Data type
Number of available rasters for the requested measurement (N)	A_UNIT16
Raster Name 1	RT_STRING

Raster CSE Scaling Unit 1	A_UINT16
Raster SCE Factor 1	A_UNIT16
Raster Reference 1	A_UNIT16
…	
Raster Name N	RT_STRING
Raster CSE Scaling Unit N	A_UINT16
Raster SCE Factor N	A_UNIT16
Raster Reference N	A_UNIT16

Error Answer:

Entry	Data type
0x00FE (Packet identification)	A_UINT16
Standard error code	A_UINT16
Vendor specific error code (same value as 'Standard error code' in the ASAP3.exe)	A_UINT16
Vendor code description	RT_STRING

Command returns the rasters of a selected device

In the case of a monitoring device only one proxy raster with raster reference 0x0000 will be contained in the response.

Error code	Description	Explanation and solution
16	Command execution is currently not possible.	The iLinkRT 3.0 connection state is currently set to DISCONNECTED for the current client. In the DISCONNECTED state only RT3_SERVER_CONNECT and RT3_GET_ALL_SERVER can be executed. RT3_SERVER_CONNECT must be called for changing the internal server-managed client connection state from DISCONNECTED to CONNECTED. The server automatically switches single clients from the state CONNECTED to DISCONNECTED if the 'iLinkRT Watchdog Interval (sec)' in the 'Eastablish Connection' dialog is set to another value than 0 and the client executed no commands in the configured time span.
80	Device Id Is unknown.	No device with the requested 'Device Id' was found.

96	MC-SERVER not in state CONFIGURED.	By default the server is in the MC-SERVER_STATE CONFIGURED. If it was changed to CONFIGURABLE the command RT3_CONFIGURE_SERVER with the server configuration mode END_CONFIG must be executed before the invocation of the commands RT3_GET_CALPAGE_INFO, RT3_GET_CHARACTERISTIC_ID_LIST, RT3_GET_CHARACTERISTIC_INFO, RT3_GET_DEVICE_INFO, RT3_GET_DEVICE_STATE, RT3_GET_MEASUREMENT_ID_LIST, RT3_GET_MEASUREMENT_INFO, RT3_GET_RASTER_OVERVIEW, RT3_GET_SELECTED_DEVICES, RT3_GET_DAQ_EVENT_INFO, RT3_GET_DAQ_MEASUREMENT_LIST, RT3_READ_CELL_VALUES, RT3_WRITE_CELL_VALUES, RT3_WRITE_CHARACTERISTIC, RT3_CONFIGURE_RECORDER, RT3_CONTROL_RECORDER, RT3_GET_RETRIGGERING, RT3_SET_CLIENT_BOOKMARK, RT3_SET_RETRIGGERING and RT3_SET_TRIGGER.
65535	An unexpected error occurred.	Additional information will be provided in the error message.

7.15 RT3_GET_SELECTED_DEVICES COMMAND: 521

Command:

Entry	Data type
0x0209 (Packet identification)	A_UINT16

Success Answer:

Entry	Data type
0x00FF (Packet identification)	A_UINT16
Device Set Name	RT_STRING
Number of selected devices (N)	A_UINT16
Selected Device Id 1	A_UINT16

...	
Selected Device Id N	A_UINT16

Error Answer:

Entry	Data type
0x00FE (Packet identification)	A_UINT16
Standard error code	A_UINT16
Vendor specific error code (same value as 'Standard error code' in the ASAP3.exe)	A_UINT16
Vendor code description	RT_STRING

RT3_GET_SELECTED_DEVICES returns the device ids of all selected devices.

Error code	Description	Explanation and solution
16	Command execution is currently not possible.	The iLinkRT 3.0 connection state is currently set to DISCONNECTED for the current client. In the DISCONNECTED state only RT3_SERVER_CONNECT and RT3_GET_ALL_SERVER can be executed. RT3_SERVER_CONNECT must be called for changing the internal server-managed client connection state from DISCONNECTED to CONNECTED. The server automatically switches single clients from the state CONNECTED to DISCONNECTED if the 'iLinkRT Watchdog Interval (sec)' in the 'Eastablish Connection' dialog is set to another value than 0 and the client executed no commands in the configured time span.

96	MC-SERVER not in state CONFIGURED.	By default the server is in the MC-SERVER_STATE CONFIGURED. If it was changed to CONFIGURABLE the command RT3_CONFIGURE_SERVER with the server configuration mode END_CONFIG must be executed before the invocation of the commands RT3_GET_CALPAGE_INFO, RT3_GET_CHARACTERISTIC_ID_LIST, RT3_GET_CHARACTERISTIC_INFO, RT3_GET_DEVICE_INFO, RT3_GET_DEVICE_STATE, RT3_GET_MEASUREMENT_ID_LIST, RT3_GET_MEASUREMENT_INFO, RT3_GET_RASTER_OVERVIEW, RT3_GET_SELECTED_DEVICES, RT3_GET_DAQ_EVENT_INFO, RT3_GET_DAQ_MEASUREMENT_LIST, RT3_READ_CELL_VALUES, RT3_WRITE_CELL_VALUES, RT3_WRITE_CHARACTERISTIC, RT3_CONFIGURE_RECORDER, RT3_CONTROL_RECORDER, RT3_GET_RETRIGGERING, RT3_SET_CLIENT_BOOKMARK, RT3_SET_RETRIGGERING and RT3_SET_TRIGGER.
65535	An unexpected error occurred.	Additional information will be provided in the error message.

7.16 RT3_CHANGE_HEX_FILE COMMAND: 769

Command:

Entry	Data type
0x0301 (Packet identification)	A_UINT16
Device Id	A_UINT16
Hex File Name	RT_STRING
Hex File Absolute Path	RT_STRING

Success Answer:

Entry	Data type
0x00FF (Packet identification)	A_UINT8

Error Answer:

Entry	Data type
0x00FE (Packet identification)	A_UINT16
Standard error code	A_UINT16
Vendor specific error code (same value as 'Standard error code' in the ASAP3.exe)	A_UINT16
Vendor code description	RT_STRING

Can only be executed if no measuring is running and changes the hex file for an already selected device.

After successfully changing the hex file the server informs the client with an EV_DEVICE_CONFIGURATION_CHANGED event.

The Hex File Name is based on a default directory and a default extension of the MC-Server. An empty string for the parameter Hex File Name is forbidden.

Error code	Description	Explanation and solution
16	Command execution is currently not possible.	The iLinkRT 3.0 connection state is currently set to DISCONNECTED for the current client. In the DISCONNECTED state only RT3_SERVER_CONNECT and RT3_GET_ALL_SERVER can be executed. RT3_SERVER_CONNECT must be called for changing the internal server-managed client connection state from DISCONNECTED to CONNECTED. The server automatically switches single clients from the state CONNECTED to DISCONNECTED if the 'iLinkRT Watchdog Interval (sec)' in the 'Eastablish Connection' dialog is set to another value than 0 and the client executed no commands in the configured time span.
67	The hex file name or hex file absolute path is invalid.	The hex file name must not be empty.
80	Device Id Is unknown.	No device with the requested 'Device Id' was found.
97	Measuring not in state CONFIGURABLE.	The measuring state must be changed to CONFIGURABLE by using the command RT3_START_STOP_MEASURING with the mode CONFIGURE (2).
65535	An unexpected error occurred.	Additional information will be provided in the error message.

7.17 RT3_CONFIGURE_SERVER COMMAND: 770

Command:

Entry	Data type
0x0302 (Packet identification)	A_UINT16
Server Configuration Mode - 0 BEGIN CONFIG Starts a MC-Server configuration to change into the MC-SERVER_STATE = CONFIGURABLE - 1 END_CONFIG Stops an MC-Server configuration to change into the MC-SERVER_STATE = CONFIGURED	A_UINT8

Success Answer:

Entry	Data type
0x00FF (Packet identification)	A_UINT8

Error Answer:

Entry	Data type
0x00FE (Packet identification)	A_UINT16
Standard error code	A_UINT16
Vendor specific error code (same value as 'Standard error code' in the ASAP3.exe)	A_UINT16
Vendor code description	RT_STRING

The command starts or ends an MC-SERVER configuration. The default MC-SERVER_STATE is CONFIGURED.

A state change to MC-SERVER_STATE = CONFIGURABLE requires the recorder and all running measurements to be stopped by the respective MC-Clients.

In the MC-SERVER_STATE = CONFIGURABLE no events with data acquisition identifiers will be sent anymore.

Measuring lists are cleared with the state change.

All connections to devices will be set to OFFLINE. The MC-Server informs all MC-Clients with the respective state events (EV_DEVICE_CONNECTION, EV_SERVER) about the state change. All assigned measurements ids, characteristics ids and device ids become invalid.

Error code	Description	Explanation and solution
16	Command execution is currently not possible.	The iLinkRT 3.0 connection state is currently set to DISCONNECTED for the current client. In the DISCONNECTED state only RT3_SERVER_CONNECT and RT3_GET_ALL_SERVER can be executed. RT3_SERVER_CONNECT must be called for changing the internal server-managed client connection state from DISCONNECTED to CONNECTED. The server automatically switches single clients from the state CONNECTED to DISCONNECTED if the 'iLinkRT Watchdog Interval (sec)' in the 'Eastablish Connection' dialog is set to another value than 0 and the client executed no commands in the configured time span.
34	Invalid value for the server configuration mode.	The 'Server Configuration Mode' response parameter contains another value than BEGIN_CONFIG (0) or END_CONFIG (1).
80	Device Id Is unknown.	No device with the requested 'Device Id' was found.
97	Measuring not in state CONFIGURABLE.	The measuring state must be changed to CONFIGURABLE by using the command RT3_START_STOP_MEASURING with the mode CONFIGURE (2).
112	Server configuration is used by another client.	Only one client can change the MC-SERVER_STATE into the state CONFIGURABLE.
65535	An unexpected error occurred.	Additional information will be provided in the error message.

7.18 RT3_COPY_DATA_EXCHANGE_FILE_TO_DEVICE COMMAND: 771

Command:

Entry	Data type
0x0303 (Packet identification)	A_UINT16
Device Id	A_UINT16
Data Exchange File Name	RT_STRING
Data Exchange File Absolute Path (e. g. UNC path)	RT_STRING

Success Answer:

Entry	Data type
0x00FF (Packet identification)	A_UINT8

Error Answer:

Entry	Data type
0x00FE (Packet identification)	A_UINT16
Standard error code	A_UINT16
Vendor specific error code (same value as 'Standard error code' in the ASAP3.exe)	A_UINT16
Vendor code description	RT_STRING

The command exchanges the data exchange file for an already selected device and downloads the data to the device.

It's only allowed in the MC-SERVER_STATE = CONFIGURED and if no measuring is running.

After a successful execution all MC-Clients are notified with an EV_DEVICE_CONFIGURATION_CHANGED event.

Error code	Description	Explanation and solution
16	Command execution is currently not possible.	The iLinkRT 3.0 connection state is currently set to DISCONNECTED for the current client. In the DISCONNECTED state only RT3_SERVER_CONNECT and RT3_GET_ALL_SERVER can be executed. RT3_SERVER_CONNECT must be called for changing the internal server-managed client connection state from DISCONNECTED to CONNECTED. The server automatically switches single clients from the state CONNECTED to DISCONNECTED if the 'iLinkRT Watchdog Interval (sec)' in the 'Eastablish Connection' dialog is set to another value than 0 and the client executed no commands in the configured time span.
67	The data exchange file name or data exchange file absolute path is invalid.	The data exchange file name must not be empty.
80	Device Id Is unknown.	No device with the requested 'Device Id' was found.
96	MC-SERVER not in state CONFIGURED.	By default the server is in the MC-SERVER_STATE CONFIGURED. If it was changed to CONFIGURABLE the command RT3_CONFIGURE_SERVER with the server configuration mode END_CONFIG must be executed before the invocation of the command RT3_COPY_DATA_EXCHANGE_FILE_TO_DEVICE.
97	Measuring not in state CONFIGURABLE.	The measuring state must be changed to CONFIGURABLE by using the command RT3_START_STOP_MEASURING with the mode CONFIGURE (2).

65535	An unexpected error occurred.	Additional information will be provided in the error message.

7.19 RT3_DEVICE_CONNECT COMMAND: 772

Command:

Entry	Data type
0x0304 (Packet identification)	A_UINT16
Device Id (Only the global device id 0xFFFF is supported by the ASAP3.exe)	A_UINT16
Connection Mode - 0 Offline - 1 Online	A_UINT8
Transfer Mode - 0 UPLOAD Adjustment between calibration pages oft he MC-Server and devices is realized by upload from the devices - 1 DOWNLOAD Adjustment between calibration pages of the MC-Server and devices is realized by download to the devices. - 2 NONE No adjustment takes place.	A_UINT8

Success Answer:

Entry	Data type
0x00FF (Packet identification)	A_UINT8

Error Answer:

Entry	Data type
0x00FE (Packet identification)	A_UINT16
Standard error code	A_UINT16
Vendor specific error code (same value as 'Standard error code' in the ASAP3.exe)	A_UINT16
Vendor code description	RT_STRING

Sets the connection mode for the required devices. The command is only allowed in the MC-SERVER_STATE = CONFIGURED.

For the 'Device Id' only 0xFFFF is supported and it changes the connection mode of all selected devices.

The MC-Server finally sends an EV_DEVICE_CONNECTION event for every single selected device id on the server.

Error code	Description	Explanation and solution
16	Command execution is currently not possible.	The iLinkRT 3.0 connection state is currently set to DISCONNECTED for the current client. In the DISCONNECTED state only RT3_SERVER_CONNECT and RT3_GET_ALL_SERVER can be executed. RT3_SERVER_CONNECT must be called for changing the internal server-managed client connection state from DISCONNECTED to CONNECTED. The server automatically switches single clients from the state CONNECTED to DISCONNECTED if the 'iLinkRT Watchdog Interval (sec)' in the 'Eastablish Connection' dialog is set to another value than 0 and the client executed no commands in the configured time span.
34	Invalid value for the connection mode or the transfer mode. Switching from OFFLINE to ONLINE with the transfer modes NONE or UPLOAD is not supported.	The 'Connection Mode' or 'Transfer mode' request parameters contain not supported values.
80	Device Id Is unknown.	No device with the requested 'Device Id' was found.
97	Measuring not in state CONFIGURABLE.	The measuring state must be changed to CONFIGURABLE by using the command RT3_START_STOP_MEASURING with the mode CONFIGURE (2).
65535	An unexpected error occurred.	Additional information will be provided in the error message.

96	MC-SERVER not in state CONFIGURED.	By default the server is in the MC-SERVER_STATE CONFIGURED. If it was changed to CONFIGURABLE the command RT3_CONFIGURE_SERVER with the server configuration mode END_CONFIG must be executed before the invocation of the commands RT3_GET_CALPAGE_INFO, RT3_GET_CHARACTERISTIC_ID_LIST, RT3_GET_CHARACTERISTIC_INFO, RT3_GET_DEVICE_INFO, RT3_GET_DEVICE_STATE, RT3_GET_MEASUREMENT_ID_LIST, RT3_GET_MEASUREMENT_INFO, RT3_GET_RASTER_OVERVIEW, RT3_GET_SELECTED_DEVICES, RT3_GET_DAQ_EVENT_INFO, RT3_GET_DAQ_MEASUREMENT_LIST, RT3_READ_CELL_VALUES, RT3_WRITE_CELL_VALUES, RT3_WRITE_CHARACTERISTIC, RT3_CONFIGURE_RECORDER, RT3_CONTROL_RECORDER, RT3_GET_RETRIGGERING, RT3_SET_CLIENT_BOOKMARK, RT3_SET_RETRIGGERING and RT3_SET_TRIGGER.
112	Server configuration is used by another client.	Only one client can change the MC-SERVER_STATE into the state CONFIGURABLE.
256	Functionality not supported.	Only a 'Device Id' request parameter with the global device identifier 0xFFFF is supported.

7.20 RT3_DISTRIBUTE_EVENT COMMAND: 773

Command:

Entry	Data type
0x0305 (Packet identification)	A_UINT16
Client Activity - 0 MEASURING_STOP - 1 RECORDER_STOP - 255 ANY	A_UINT8
MC-Client message	RT_STRING

Success Answer:

Entry	Data type
0x00FF (Packet identification)	A_UINT8

Error Answer:

Entry	Data type
0x00FE (Packet identification)	A_UINT16
Standard error code	A_UINT16
Vendor specific error code (same value as 'Standard error code' in the ASAP3.exe)	A_UINT16
Vendor code description	RT_STRING

Command informs all MC-Clients about the client activity and the client message via an EV_CLIENT_INFORMATION event.

Error code	Description	Explanation and solution
16	Command execution is currently not possible.	The iLinkRT 3.0 connection state is currently set to DISCONNECTED for the current client. In the DISCONNECTED state only RT3_SERVER_CONNECT and RT3_GET_ALL_SERVER can be executed. RT3_SERVER_CONNECT must be called for changing the internal server-managed client connection state from DISCONNECTED to CONNECTED. The server automatically switches single clients from the state CONNECTED to DISCONNECTED if the 'iLinkRT Watchdog Interval (sec)' in the 'Eastablish Connection' dialog is set to another value than 0 and the client executed no commands in the configured time span.
34	Invalid value for the client activity.	The 'Client Activity' request parameter contains a not supported value.
65535	An unexpected error occurred.	Additional information will be provided in the error message.

7.21 RT3_SELECT_CHARACTERISTIC_ID COMMAND: 775

Command:

Entry	Data type
0x0307 (Packet identification)	A_UINT16
Device Id	A_UINT16
Characteristic Name	RT_STRING

Success Answer:

Entry	Data type
0x00FF (Packet identification)	A_UINT16
Characteristic Id	A_UINT32

Error Answer:

Entry	Data type
0x00FE (Packet identification)	A_UINT16
Standard error code	A_UINT16
Vendor specific error code (same value as 'Standard error code' in the ASAP3.exe)	A_UINT16
Vendor code description	RT_STRING

Selects a characteristic and returns its assigned characteristic id.

The command is only allowed in the MC-SERVER_STATE = CONFIGURED.

Error code	Description	Explanation and solution
16	Command execution is currently not possible.	The iLinkRT 3.0 connection state is currently set to DISCONNECTED for the current client. In the DISCONNECTED state only RT3_SERVER_CONNECT and RT3_GET_ALL_SERVER can be executed. RT3_SERVER_CONNECT must be called for changing the internal server-managed client connection state from DISCONNECTED to CONNECTED. The server automatically switches single clients from the state CONNECTED to DISCONNECTED if the 'iLinkRT Watchdog Interval (sec)' in the 'Eastablish Connection' dialog is set to another value than 0 and the client executed no commands in the configured time span.
70	The characteristic name is unknown.	No characteristic with the specified name was found in the device.
80	Device Id Is unknown.	No device with the requested 'Device Id' was found.
65535	An unexpected error occurred.	Additional information will be provided in the error message.

96	MC-SERVER not in state CONFIGURED.	By default the server is in the MC-SERVER_STATE CONFIGURED. If it was changed to CONFIGURABLE the command RT3_CONFIGURE_SERVER with the server configuration mode END_CONFIG must be executed before the invocation of the commands RT3_GET_CALPAGE_INFO, RT3_GET_CHARACTERISTIC_ID_LIST, RT3_GET_CHARACTERISTIC_INFO, RT3_GET_DEVICE_INFO, RT3_GET_DEVICE_STATE, RT3_GET_MEASUREMENT_ID_LIST, RT3_GET_MEASUREMENT_INFO, RT3_GET_RASTER_OVERVIEW, RT3_GET_SELECTED_DEVICES, RT3_GET_DAQ_EVENT_INFO, RT3_GET_DAQ_MEASUREMENT_LIST, RT3_READ_CELL_VALUES, RT3_WRITE_CELL_VALUES, RT3_WRITE_CHARACTERISTIC, RT3_CONFIGURE_RECORDER, RT3_CONTROL_RECORDER, RT3_GET_RETRIGGERING, RT3_SET_CLIENT_BOOKMARK, RT3_SET_RETRIGGERING and RT3_SET_TRIGGER.

7.22 RT3_SELECT_DEVICE COMMAND: 776

Command:

Entry	Data type
0x0308 (Packet identification)	A_UINT16
Device Name	RT_STRING
Description File Name	RT_STRING
Hex File Name	RT_STRING
Physical Link Name - CAN-Monitoring - FLX Monitoring A - FLX Monitoring B - XCP - CalcDev - LIN-Monitoring - McMess - CCP - ETK - ODX	RT_STRING

Success Answer:

Entry	Data type
0x00FF (Packet identification)	A_UINT16
Device Id	A_UINT16

Error Answer:

Entry	Data type
0x00FE (Packet identification)	A_UINT16
Standard error code	A_UINT16
Vendor specific error code (same value as 'Standard error code' in the ASAP3.exe)	A_UINT16
Vendor code description	RT_STRING

Selects a device and assigns a unique device id.

Device ids are starting with 0. If only empty strings are set the default device (e. g. 'LUN 0 behavior` in the ASAP3 protocol) is returned.

If the 'Device Name' is set, the server will search for a device by its name and check if other non-empty request values match the configuration of the device.

In the case of no 'Device Name' being set the logic of the ASAP3 command SELECT DESCRIPTION-FILE AND BINARY FILE is executed.

Error code	Description	Explanation and solution
16	Command execution is currently not possible.	The iLinkRT 3.0 connection state is currently set to DISCONNECTED for the current client. In the DISCONNECTED state only RT3_SERVER_CONNECT and RT3_GET_ALL_SERVER can be executed. RT3_SERVER_CONNECT must be called for changing the internal server-managed client connection state from DISCONNECTED to CONNECTED. The server automatically switches single clients from the state CONNECTED to DISCONNECTED if the 'iLinkRT Watchdog Interval (sec)' in the 'Eastablish Connection' dialog is set to another value than 0 and the client executed no commands in the configured time span.
67	The description file name, hex file name or physical link is invalid.	The request parameters 'Description File Name', 'Hex File Name' or 'Physical Link Name' may contain invalid values.
65535	An unexpected error occurred.	Additional information will be provided in the error message.

7.23 RT3_SELECT_DEVICE_SET COMMAND: 777

Command:

Entry	Data type
0x0309 (Packet identification)	A_UINT16
Device Set Name	RT_STRING
Device Set Absolute Path	RT_STRING

Success Answer:

Entry	Data type
0x00FF (Packet identification)	A_UINT16
Number (N) Of Preselected Devices	A_UINT16
Device Id Of Preselected Device 1	A_UINT16
…	A_UNIT16
Device Id Of Preselected Device N	A_UINT16

Error Answer:

Entry	Data type
0x00FE (Packet identification)	A_UINT16
Standard error code	A_UINT16
Vendor specific error code (same value as 'Standard error code' in the ASAP3.exe)	A_UINT16
Vendor code description	RT_STRING

Selects a preconfigured device set for the iLinkRT session.

It can only be used if the MC-SERVER_STATE is set to CONFIGURABLE and just one device set can be active at the same time.

The previous device set is closed and all its device ids, measurement ids and characteristic ids become invalid after a new device set is selected.

In the context of INCA a device set is a workspace. If a workspace was already opened before starting the ASAP3.exe it's implicitly used as initial device set but if the ASAP3.exe was started from the database browser no workspace is selected and RT3_SELECT_DEVICE_SET has to be used before other commands requiring a set device set can be executed.

If an empty stiring is used for the 'Device Set Name' the active device set will be closed without setting a new one.

The result of such an execution is the same as starting the ASAP3.exe from the database browser with no already opened workspace.

Error code	Description	Explanation and solution
16	Command execution is currently not possible.	The iLinkRT 3.0 connection state is currently set to DISCONNECTED for the current client. In the DISCONNECTED state only RT3_SERVER_CONNECT and RT3_GET_ALL_SERVER can be executed. RT3_SERVER_CONNECT must be called for changing the internal server-managed client connection state from DISCONNECTED to CONNECTED. The server automatically switches single clients from the state CONNECTED to DISCONNECTED if the 'iLinkRT Watchdog Interval (sec)' in the 'Eastablish Connection' dialog is set to another value than 0 and the client executed no commands in the configured time span.
67	The device set name,or device set absolute path is invalid	The request parameters 'Device Set Name' or 'Device Set Absolute Path' may contain invalid values.
96	MC-SERVER not in state CONFIGURABLE.	By default the server is in the MC-SERVER_STATE CONFIGURED. If the server state is currently in the state CONFIGURABLE the command RT3_CONFIGURE_SERVER with the server configuration mode BEGIN_CONFIG must be executed before the invocation of the commands RT3_SELECT_DEVICE_SET.
112	Server configuration is used by another client.	Only one client can change the MC-SERVER_STATE within the state CONFIGURABLE.
65535	An unexpected error occurred.	Additional information will be provided in the error message.

7.24 RT3_SELECT_MEASUREMENT_ID COMMAND: 778

Command:

Entry	Data type
0x030A (Packet identification)	A_UINT16
Device Id	A_UINT16
Measurement Name	RT_STRING

Success Answer:

Entry	Data type
0x00FF (Packet identification)	A_UINT16
Measurement Id	A_UINT32

Error Answer:

Entry	Data type
0x00FE (Packet identification)	A_UINT16
Standard error code	A_UINT16
Vendor specific error code (same value as 'Standard error code' in the ASAP3.exe)	A_UINT16
Vendor code description	RT_STRING

Selects a measurement and returns its assigned mesurement id.

The command is only allowed in the MC-SERVER_STATE = CONFIGURED.

Error code	Description	Explanation and solution
16	Command execution is currently not possible.	The iLinkRT 3.0 connection state is currently set to DISCONNECTED for the current client. In the DISCONNECTED state only RT3_SERVER_CONNECT and RT3_GET_ALL_SERVER can be executed. RT3_SERVER_CONNECT must be called for changing the internal server-managed client connection state from DISCONNECTED to CONNECTED. The server automatically switches single clients from the state CONNECTED to DISCONNECTED if the 'iLinkRT Watchdog Interval (sec)' in the 'Eastablish Connection' dialog is set to another value than 0 and the client executed no commands in the configured time span.
70	The measurement name is unknown.	No measurement with the specified name was found in the device.
80	Device Id Is unknown.	No device with the requested 'Device Id' was found.
65535	An unexpected error occurred.	Additional information will be provided in the error message.

96	MC-SERVER not in state CONFIGURED.	By default the server is in the MC-SERVER_STATE CONFIGURED. If it was changed to CONFIGURABLE the command RT3_CONFIGURE_SERVER with the server configuration mode END_CONFIG must be executed before the invocation of the commands RT3_GET_CALPAGE_INFO, RT3_GET_CHARACTERISTIC_ID_LIST, RT3_GET_CHARACTERISTIC_INFO, RT3_GET_DEVICE_INFO, RT3_GET_DEVICE_STATE, RT3_GET_MEASUREMENT_ID_LIST, RT3_GET_MEASUREMENT_INFO, RT3_GET_RASTER_OVERVIEW, RT3_GET_SELECTED_DEVICES, RT3_GET_DAQ_EVENT_INFO, RT3_GET_DAQ_MEASUREMENT_LIST, RT3_READ_CELL_VALUES, RT3_WRITE_CELL_VALUES, RT3_WRITE_CHARACTERISTIC, RT3_CONFIGURE_RECORDER, RT3_CONTROL_RECORDER, RT3_GET_RETRIGGERING, RT3_SET_CLIENT_BOOKMARK, RT3_SET_RETRIGGERING and RT3_SET_TRIGGER.

7.25 RT3_CLEAR_MEASURING_LIST COMMAND: 1024

Command:

Entry	Data type
0x0400 (Packet identification)	A_UINT16

Success Answer:

Entry	Data type
0x00FF (Packet identification)	A_UINT16

Error Answer:

Entry	Data type
0x00FE (Packet identification)	A_UINT16
Standard error code	A_UINT16

Vendor specific error code (same value as 'Standard error code' in the ASAP3.exe)	A_UINT16
Vendor code description	RT_STRING

Clears the measuring list of the current MC-Client.

Internally the whole measurement list is cleared and rebuilt based on the information of all other MC-Clients.

The command can only be called if the measuring state is set to CONFIGURABLE via using the mode CONFIGURE during an invocation of RT3_START_STOP_MEASURING.

Finally, the DAQ_LIST_LAYOUT is set to CHANGED.

Error code	Description	Explanation and solution
16	Command execution is currently not possible.	The iLinkRT 3.0 connection state is currently set to DISCONNECTED for the current client. In the DISCONNECTED state only RT3_SERVER_CONNECT and RT3_GET_ALL_SERVER can be executed. RT3_SERVER_CONNECT must be called for changing the internal server-managed client connection state from DISCONNECTED to CONNECTED. The server automatically switches single clients from the state CONNECTED to DISCONNECTED if the 'iLinkRT Watchdog Interval (sec)' in the 'Eastablish Connection' dialog is set to another value than 0 and the client executed no commands in the configured time span.
97	Measuring not in state CONFIGURABLE.	RT3_START_STOP_MEASURING must be called with the mode CONFIGURE before calling RT3_CLEAR_MEASURING_LIST, RT3_CONFIGURE_MEASURING, RT3_GET_AVAILABLE_CHARACTERISTICS or RT3_GET_AVAILABLE_MEASUREMENTS.
65535	An unexpected error occurred.	Additional information will be provided in the error message.

7.26 RT3_CONFIGURE_MEASURING COMMAND: 1025

Command:

Entry	Data type
0x0401 (Packet identification)	A_UINT16
Device Id	A_UINT16

Raster Reference - 0x0000 Monitor raster - 0x0001 … 0xFFFE Raster number generated by the MC-Server - 0xFFFF Default raster	A_UINT16
Representation Type - 0 dynamic (only supported mode) - 1 hex - 2 physical	A_UINT16
Number of measurements (N)	A_UINT16
Measurement Id 1	A_UINT32
…	
Measurement Id N	A_UINT32

Success Answer:

Entry	Data type
0x00FF (Packet identification)	A_UINT16

Error Answer:

Entry	Data type
0x00FE (Packet identification)	A_UINT16
Standard error code	A_UINT16
Vendor specific error code (same value as 'Standard error code' in the ASAP3.exe)	A_UINT16
Vendor code description	RT_STRING

This command sends the configuration for the acquisition of measuring to the MC-Server, containing the measurement ids and one raster reference. It can be called multiple times.

The command is only allowed in the MC-SERVER_STATE = CONFIGURED and MEASURING_STATE = CONFIGURABLE.

Error code	Description	Explanation and solution
16	Command execution is currently not possible.	The iLinkRT 3.0 connection state is currently set to DISCONNECTED for the current client. In the DISCONNECTED state only RT3_SERVER_CONNECT and RT3_GET_ALL_SERVER can be executed. RT3_SERVER_CONNECT must be called for changing the internal server-managed client connection state from DISCONNECTED to CONNECTED. The server automatically switches single clients from the state CONNECTED to DISCONNECTED if the 'iLinkRT Watchdog Interval (sec)' in the 'Eastablish Connection' dialog is set to another value than 0 and the client executed no commands in the configured time span.
80	Device Id Is unknown.	No device with the requested 'Device Id' was found.
81	Measurement was not found.	At last one 'Measurement Id' cannot be resolved. The measurement must be selected via RT3_SELECT_MEASUREMENT_ID.
65535	An unexpected error occurred.	Additional information will be provided in the error message.

96	MC-SERVER not in state CONFIGURED.	By default the server is in the MC-SERVER_STATE CONFIGURED. If it was changed to CONFIGURABLE the command RT3_CONFIGURE_SERVER with the server configuration mode END_CONFIG must be executed before the invocation of the commands RT3_GET_CALPAGE_INFO, RT3_GET_CHARACTERISTIC_ID_LIST, RT3_GET_CHARACTERISTIC_INFO, RT3_GET_DEVICE_INFO, RT3_GET_DEVICE_STATE, RT3_GET_MEASUREMENT_ID_LIST, RT3_GET_MEASUREMENT_INFO, RT3_GET_RASTER_OVERVIEW, RT3_GET_SELECTED_DEVICES, RT3_GET_DAQ_EVENT_INFO, RT3_GET_DAQ_MEASUREMENT_LIST, RT3_READ_CELL_VALUES, RT3_WRITE_CELL_VALUES, RT3_WRITE_CHARACTERISTIC, RT3_CONFIGURE_RECORDER, RT3_CONTROL_RECORDER, RT3_GET_RETRIGGERING, RT3_SET_CLIENT_BOOKMARK, RT3_SET_RETRIGGERING and RT3_SET_TRIGGER.
97	Measuring not in state CONFIGURABLE.	RT3_START_STOP_MEASURING must be called with the mode CONFIGURE before calling RT3_CLEAR_MEASURING_LIST, RT3_CONFIGURE_MEASURING, RT3_GET_AVAILABLE_CHARACTERISTICS or RT3_GET_AVAILABLE_MEASUREMENTS.

256	Functionality not supported.	Only the dynamic representation type is supported. Monitoring devices only support the raster references 0x0000 or 0xFFFF.

7.27 RT3_GET_DAQ_EVENT_INFO COMMAND: 1026

Command:

Entry	Data type
0x0402 (Packet identification)	A_UINT16
Data Acquisition Identifier	A_UINT16

Success Answer:

Entry	Data type
0x00FF (Packet identification)	A_UINT16
Raster Reference	A_UNIT16

Error Answer:

Entry	Data type
0x00FE (Packet identification)	A_UINT16
Standard error code	A_UINT16
Vendor specific error code (same value as 'Standard error code' in the ASAP3.exe)	A_UINT16
Vendor code description	RT_STRING

Get the raster reference for a specific data acquisition identifier.

The command is only allowed in the MC-SERVER_STATE = CONFIGURED.

For data acquisition identifiers being based on monitoring devices always the proxy raster reference 0x0000 is returned.

Error code	Description	Explanation and solution
16	Command execution is currently not possible.	The iLinkRT 3.0 connection state is currently set to DISCONNECTED for the current client. In the DISCONNECTED state only RT3_SERVER_CONNECT and RT3_GET_ALL_SERVER can be executed. RT3_SERVER_CONNECT must be called for changing the internal server-managed client connection state from DISCONNECTED to CONNECTED. The server automatically switches single clients from the state CONNECTED to DISCONNECTED if the 'iLinkRT Watchdog Interval (sec)' in the 'Eastablish Connection' dialog is set to another value than 0 and the client executed no commands in the configured time span.
83	Data acquisition identifier is invalid.	No data acquisition list with the identifier can be found. New data acquisition lists can be generated by using RT3_CONFIGURE_MEASURING.
65535	An unexpected error occurred.	Additional information will be provided in the error message.

96	MC-SERVER not in state CONFIGURED.	By default the server is in the MC-SERVER_STATE CONFIGURED. If it was changed to CONFIGURABLE the command RT3_CONFIGURE_SERVER with the server configuration mode END_CONFIG must be executed before the invocation of the commands RT3_GET_CALPAGE_INFO, RT3_GET_CHARACTERISTIC_ID_LIST, RT3_GET_CHARACTERISTIC_INFO, RT3_GET_DEVICE_INFO, RT3_GET_DEVICE_STATE, RT3_GET_MEASUREMENT_ID_LIST, RT3_GET_MEASUREMENT_INFO, RT3_GET_RASTER_OVERVIEW, RT3_GET_SELECTED_DEVICES, RT3_GET_DAQ_EVENT_INFO, RT3_GET_DAQ_MEASUREMENT_LIST, RT3_READ_CELL_VALUES, RT3_WRITE_CELL_VALUES, RT3_WRITE_CHARACTERISTIC, RT3_CONFIGURE_RECORDER, RT3_CONTROL_RECORDER, RT3_GET_RETRIGGERING, RT3_SET_CLIENT_BOOKMARK, RT3_SET_RETRIGGERING and RT3_SET_TRIGGER.

7.28 RT3_GET_DAQ_MEASUREMENT_LIST COMMAND: 1027

Command:

Entry	Data type
0x0403 (Packet identification)	A_UINT16
Data Acquisition Identifier	A_UINT16

Success Answer:

Entry	Data type
0x00FF (Packet identification)	A_UINT16
Number of measurements (N)	A_UNIT16
Measurement Id 1	A_UINT32

Data Type 1	A_UINT8 (DATA_TYPE)
Representation Type - 0 dynamic - 1 hex - 2 physical	A_UINT8
…	
Measurement Id 2	A_UINT32
Data Type 2	A_UINT8 (DATA_TYPE)
Representation Type 2	

Error Answer:

Entry	Data type
0x00FE (Packet identification)	A_UINT16
Standard error code	A_UINT16
Vendor specific error code (same value as 'Standard error code' in the ASAP3.exe)	A_UINT16
Vendor code description	RT_STRING

Command returns information about the internal structure of a specific data acquisition list by its identifier.

The command is only allowed in the MC-SERVER_STATE = CONFIGURED.

Error code	Description	Explanation and solution
16	Command execution is currently not possible.	The iLinkRT 3.0 connection state is currently set to DISCONNECTED for the current client. In the DISCONNECTED state only RT3_SERVER_CONNECT and RT3_GET_ALL_SERVER can be executed. RT3_SERVER_CONNECT must be called for changing the internal server-managed client connection state from DISCONNECTED to CONNECTED. The server automatically switches single clients from the state CONNECTED to DISCONNECTED if the 'iLinkRT Watchdog Interval (sec)' in the 'Eastablish Connection' dialog is set to another value than 0 and the client executed no commands in the configured time span.
83	Data acquisition identifier is invalid.	No data acquisition list with the identifier can be found. New data acquisition lists can be generated by using RT3_CONFIGURE_MEASURING.
65535	An unexpected error occurred.	Additional information will be provided in the error message.

96	MC-SERVER not in state CONFIGURED.	By default the server is in the MC-SERVER_STATE CONFIGURED. If it was changed to CONFIGURABLE the command RT3_CONFIGURE_SERVER with the server configuration mode END_CONFIG must be executed before the invocation of the commands RT3_GET_CALPAGE_INFO, RT3_GET_CHARACTERISTIC_ID_LIST, RT3_GET_CHARACTERISTIC_INFO, RT3_GET_DEVICE_INFO, RT3_GET_DEVICE_STATE, RT3_GET_MEASUREMENT_ID_LIST, RT3_GET_MEASUREMENT_INFO, RT3_GET_RASTER_OVERVIEW, RT3_GET_SELECTED_DEVICES, RT3_GET_DAQ_EVENT_INFO, RT3_GET_DAQ_MEASUREMENT_LIST, RT3_READ_CELL_VALUES, RT3_WRITE_CELL_VALUES, RT3_WRITE_CHARACTERISTIC, RT3_CONFIGURE_RECORDER, RT3_CONTROL_RECORDER, RT3_GET_RETRIGGERING, RT3_SET_CLIENT_BOOKMARK, RT3_SET_RETRIGGERING and RT3_SET_TRIGGER.

7.29 RT3_GET_DEVICE_DAQ_LIST COMMAND: 1028

Command:

Entry	Data type
0x0404 (Packet identification)	A_UINT16
Device Id	A_UINT16

Success Answer:

Entry	Data type
0x00FF (Packet identification)	A_UINT16
Number of data acquisition identifiers (N)	A_UNIT16
Data acquisition identifier 1	A_UINT16
…	

Data acquisition identifier 2	A_UNIT16

Error Answer:

Entry	Data type
0x00FE (Packet identification)	A_UINT16
Standard error code	A_UINT16
Vendor specific error code (same value as 'Standard error code' in the ASAP3.exe)	A_UINT16
Vendor code description	RT_STRING

Returns all data acquisition identifiers for a specific device.

The command is only allowed in the MC-SERVER_STATE = CONFIGURED.

Error code	Description	Explanation and solution
16	Command execution is currently not possible.	The iLinkRT 3.0 connection state is currently set to DISCONNECTED for the current client. In the DISCONNECTED state only RT3_SERVER_CONNECT and RT3_GET_ALL_SERVER can be executed. RT3_SERVER_CONNECT must be called for changing the internal server-managed client connection state from DISCONNECTED to CONNECTED. The server automatically switches single clients from the state CONNECTED to DISCONNECTED if the 'iLinkRT Watchdog Interval (sec)' in the 'Eastablish Connection' dialog is set to another value than 0 and the client executed no commands in the configured time span.
80	Device Id Is unknown.	No device with the requested 'Device Id' was found.

96	MC-SERVER not in state CONFIGURED.	By default the server is in the MC-SERVER_STATE CONFIGURED. If it was changed to CONFIGURABLE the command RT3_CONFIGURE_SERVER with the server configuration mode END_CONFIG must be executed before the invocation of the commands RT3_GET_CALPAGE_INFO, RT3_GET_CHARACTERISTIC_ID_LIST, RT3_GET_CHARACTERISTIC_INFO, RT3_GET_DEVICE_INFO, RT3_GET_DEVICE_STATE, RT3_GET_MEASUREMENT_ID_LIST, RT3_GET_MEASUREMENT_INFO, RT3_GET_RASTER_OVERVIEW, RT3_GET_SELECTED_DEVICES, RT3_GET_DAQ_EVENT_INFO, RT3_GET_DAQ_MEASUREMENT_LIST, RT3_READ_CELL_VALUES, RT3_WRITE_CELL_VALUES, RT3_WRITE_CHARACTERISTIC, RT3_CONFIGURE_RECORDER, RT3_CONTROL_RECORDER, RT3_GET_RETRIGGERING, RT3_SET_CLIENT_BOOKMARK, RT3_SET_RETRIGGERING and RT3_SET_TRIGGER.
65535	An unexpected error occurred.	Additional information will be provided in the error message.

7.30 RT3_START_STOP_MEASURING COMMAND: 1029

Command:

Entry	Data type
0x0405 (Packet identification)	A_UINT16
Measuring Mode - 1 STOP - 2 CONFIGURE - 3 START	A_UINT16

Success Answer:

Entry	Data type
0x00FF (Packet identification)	A_UINT16

Error Answer:

Entry	Data type
0x00FE (Packet identification)	A_UINT16
Standard error code	A_UINT16
Vendor specific error code (same value as 'Standard error code' in the ASAP3.exe)	A_UINT16
Vendor code description	RT_STRING

Starts or stops the measurement for the configured measurements.

The command is only allowed in the MC-SERVER_STATE = CONFIGURED.

For multiple MC-Clients the measuring will not be stopped until the last MC-Client has stopped the data acquisition with the measuring mode STOP.

Error code	Description	Explanation and solution
16	Command execution is currently not possible.	The iLinkRT 3.0 connection state is currently set to DISCONNECTED for the current client. In the DISCONNECTED state only RT3_SERVER_CONNECT and RT3_GET_ALL_SERVER can be executed. RT3_SERVER_CONNECT must be called for changing the internal server-managed client connection state from DISCONNECTED to CONNECTED. The server automatically switches single clients from the state CONNECTED to DISCONNECTED if the 'iLinkRT Watchdog Interval (sec)' in the 'Eastablish Connection' dialog is set to another value than 0 and the client executed no commands in the configured time span.
34	Invalid value for the measuring mode.	The 'Measuring Mode' request parameter contains a not supported value.
65	Measuring configuration is invalid.	Wire at least one measurement variable with the command RT3_CONFIGURE_MEASURING before starting the measureing with RT3_START_STOP_MEASURING.

96	MC-SERVER not in state CONFIGURED.	By default the server is in the MC-SERVER_STATE CONFIGURED. If it was changed to CONFIGURABLE the command RT3_CONFIGURE_SERVER with the server configuration mode END_CONFIG must be executed before the invocation of the commands RT3_GET_CALPAGE_INFO, RT3_GET_CHARACTERISTIC_ID_LIST, RT3_GET_CHARACTERISTIC_INFO, RT3_GET_DEVICE_INFO, RT3_GET_DEVICE_STATE, RT3_GET_MEASUREMENT_ID_LIST, RT3_GET_MEASUREMENT_INFO, RT3_GET_RASTER_OVERVIEW, RT3_GET_SELECTED_DEVICES, RT3_GET_DAQ_EVENT_INFO, RT3_GET_DAQ_MEASUREMENT_LIST, RT3_READ_CELL_VALUES, RT3_WRITE_CELL_VALUES, RT3_WRITE_CHARACTERISTIC, RT3_CONFIGURE_RECORDER, RT3_CONTROL_RECORDER, RT3_GET_RETRIGGERING, RT3_SET_CLIENT_BOOKMARK, RT3_SET_RETRIGGERING and RT3_SET_TRIGGER.
98	The recorder is running.	Use the command RT3_CONTROL_RECORDER for stopping the recorder.
65535	An unexpected error occurred.	Additional information will be provided in the error message.

7.31 RT3_GET_CALPAGE COMMAND: 1280

Command:

Entry	Data type
0x0500 (Packet identification)	A_UINT16
Device Id	A_UINT16

Success Answer:

Entry	Data type
0x00FF (Packet identification)	A_UINT16

Page index of currently used page	A_UNIT16

Error Answer:

Entry	Data type
0x00FE (Packet identification)	A_UINT16
Standard error code	A_UINT16
Vendor specific error code (same value as 'Standard error code' in the ASAP3.exe)	A_UINT16
Vendor code description	RT_STRING

The command returns the current page index of a workbase device.

Error code	Description	Explanation and solution
16	Command execution is currently not possible.	The iLinkRT 3.0 connection state is currently set to DISCONNECTED for the current client. In the DISCONNECTED state only RT3_SERVER_CONNECT and RT3_GET_ALL_SERVER can be executed. RT3_SERVER_CONNECT must be called for changing the internal server-managed client connection state from DISCONNECTED to CONNECTED. The server automatically switches single clients from the state CONNECTED to DISCONNECTED if the 'iLinkRT Watchdog Interval (sec)' in the 'Eastablish Connection' dialog is set to another value than 0 and the client executed no commands in the configured time span.
80	Device Id Is unknown.	No device with the requested 'Device Id' was found.
256	Functionality not supported.	Only workbase devices are supported.
65535	An unexpected error occurred.	Additional information will be provided in the error message.

7.32 RT3_READ_CELL_VALUES COMMAND: 1281

Command:

Entry	Data type

0x0501 (Packet identification)	A_UINT16
Characteristic Id	A_UINT32
Representation Type - 0 dynamic - 1 hex - 2 physical	A_UINT8
X axis position start index	A_UINT16
X axis position stop index	A_UINT16
Y axis position start index	A_UINT16
Y axis position stop index	A_UINT16
Z axis position start index	A_UINT16
Z axis position stop index	A_UINT16
W axis position start index	A_UINT16
W axis position stop index	A_UINT16
V axis position start index	A_UINT16
V axis position stop index	A_UINT16

Success Answer:

Entry	Data type
0x00FF (Packet identification)	A_UINT16
Cell Value 1	Depends on the DATA_TYPE of physical or hex cell values
Cell Value 2	Depends on the DATA_TYPE of physical or hex cell values
…	
Cell Value N	Depends on the DATA_TYPE of physical or hex cell values

Error Answer:

Entry	Data type
0x00FE (Packet identification)	A_UINT16
Standard error code	A_UINT16
Vendor specific error code (same value as 'Standard error code' in the ASAP3.exe)	A_UINT16
Vendor code description	RT_STRING

Command returns cell values of a characteristic in a selected range. It can only be executed in the MC-SERVER_STATE = CONFIGURED.

The Start Index and Stop Index parameters are based on the behavior represented in the following table:

Index definition:

Parameter	Description
Start Index	1 for the first element and 0 for not existing dimension of a characteristic
Stop Index	0xFFFF for last element and 0 for not existing dimension of a characteristic

Error code	Description	Explanation and solution
16	Command execution is currently not possible.	The iLinkRT 3.0 connection state is currently set to DISCONNECTED for the current client. In the DISCONNECTED state only RT3_SERVER_CONNECT and RT3_GET_ALL_SERVER can be executed. RT3_SERVER_CONNECT must be called for changing the internal server-managed client connection state from DISCONNECTED to CONNECTED. The server automatically switches single clients from the state CONNECTED to DISCONNECTED if the 'iLinkRT Watchdog Interval (sec)' in the 'Eastablish Connection' dialog is set to another value than 0 and the client executed no commands in the configured time span.
34	Invalid value for the representation type.	The 'Representation Type' request parameter contains a not supported value.
82	No characteristic with the requested characteristic identifier was found	The requested characteristic is not already selected. Before calling RT3_GET_CHARACTERISTIC_INFO the command RT3_SELECT_CHARACTERISTIC_ID must be called with the name of the corresponding characteristic.

96	MC-SERVER not in state CONFIGURED.	By default the server is in the MC-SERVER_STATE CONFIGURED. If it was changed to CONFIGURABLE the command RT3_CONFIGURE_SERVER with the server configuration mode END_CONFIG must be executed before the invocation of the commands RT3_GET_CALPAGE_INFO, RT3_GET_CHARACTERISTIC_ID_LIST, RT3_GET_CHARACTERISTIC_INFO, RT3_GET_DEVICE_INFO, RT3_GET_DEVICE_STATE, RT3_GET_MEASUREMENT_ID_LIST, RT3_GET_MEASUREMENT_INFO, RT3_GET_RASTER_OVERVIEW, RT3_GET_SELECTED_DEVICES, RT3_GET_DAQ_EVENT_INFO, RT3_GET_DAQ_MEASUREMENT_LIST, RT3_READ_CELL_VALUES, RT3_WRITE_CELL_VALUES, RT3_WRITE_CHARACTERISTIC, RT3_CONFIGURE_RECORDER, RT3_CONTROL_RECORDER, RT3_GET_RETRIGGERING, RT3_SET_CLIENT_BOOKMARK, RT3_SET_RETRIGGERING and RT3_SET_TRIGGER.
256	Functionality not supported.	Reading string values for non-scalar characteristics is not supported.
65535	An unexpected error occurred.	Additional information will be provided in the error message.

7.33 RT3_READ_CHARACTERISTIC COMMAND: 1282

Command:

Entry	Data type
0x0502 (Packet identification)	A_UINT16
Characteristic Id	A_UINT32
Representation Type - 0 dynamic - 1 hex - 2 physical	A_UINT8

Success Answer:

Entry	Data type
0x00FF (Packet identification)	A_UINT16
X Axis Value (1)	Depends on the DATA_TYPE of physical or hex X axis values; X = 1
…	N axis values
X Axis Value (N)	Depends on the DATA_TYPE of physical or hex X axis values; X = N
Y Axis Value (1)	Depends on the DATA_TYPE of physical or hex Y axis values; Y = 1
…	M axis values
Y Axis Value (M)	Depends on the DATA_TYPE of physical or hex Y axis values; Y = M
Z Axis Value (1)	Depends on the DATA_TYPE of physical or hex Z axis values; Z = 1
…	L axis values
Z Axis Value (L)	Depends on the DATA_TYPE of physical or hex Z axis values; Z = L
W Axis Value (1)	Depends on the DATA_TYPE of physical or hex W axis values; W = 1
…	K axis values
W Axis Value (K)	Depends on the DATA_TYPE of physical or hex W axis values; W = K
V Axis Value (1)	Depends on the DATA_TYPE of physical or hex V axis values; V = 1
…	J axis values
V Axis Value (J)	Depends on the DATA_TYPE of physical or hex V axis values; V = J
Cell Value (1, 1, 1, 1, 1)	Depends on the DATA_TYPE of physical or hex Z axis values; X=1, Y=1, Z=1, W=1, V=1
…	N * M * L * K * J cell values

Cell Value (N, M, L, K, J)	Depends on the DATA_TYPE of physical or hex cell values; X=N, Y=M, Z=L, W=K, V=J

Error Answer:

Entry	Data type
0x00FE (Packet identification)	A_UINT16
Standard error code	A_UINT16
Vendor specific error code (same value as 'Standard error code' in the ASAP3.exe)	A_UINT16
Vendor code description	RT_STRING

Command returns all axis and cell values of a characteristic. It can only be executed in the MC-SERVER_STATE = CONFIGURED.

Error code	Description	Explanation and solution
16	Command execution is currently not possible.	The iLinkRT 3.0 connection state is currently set to DISCONNECTED for the current client. In the DISCONNECTED state only RT3_SERVER_CONNECT and RT3_GET_ALL_SERVER can be executed. RT3_SERVER_CONNECT must be called for changing the internal server-managed client connection state from DISCONNECTED to CONNECTED. The server automatically switches single clients from the state CONNECTED to DISCONNECTED if the 'iLinkRT Watchdog Interval (sec)' in the 'Eastablish Connection' dialog is set to another value than 0 and the client executed no commands in the configured time span.
34	Invalid value for the representation type.	The 'Representation Type' request parameter contains a not supported value.
82	No characteristic with the requested characteristic identifier was found	The requested characteristic is not already selected. Before calling RT3_GET_CHARACTERISTIC_INFO the command RT3_SELECT_CHARACTERISTIC_ID must be called with the name of the corresponding characteristic.
65535	An unexpected error occurred.	Additional information will be provided in the error message.

96	MC-SERVER not in state CONFIGURED.	By default the server is in the MC-SERVER_STATE CONFIGURED. If it was changed to CONFIGURABLE the command RT3_CONFIGURE_SERVER with the server configuration mode END_CONFIG must be executed before the invocation of the commands RT3_GET_CALPAGE_INFO, RT3_GET_CHARACTERISTIC_ID_LIST, RT3_GET_CHARACTERISTIC_INFO, RT3_GET_DEVICE_INFO, RT3_GET_DEVICE_STATE, RT3_GET_MEASUREMENT_ID_LIST, RT3_GET_MEASUREMENT_INFO, RT3_GET_RASTER_OVERVIEW, RT3_GET_SELECTED_DEVICES, RT3_GET_DAQ_EVENT_INFO, RT3_GET_DAQ_MEASUREMENT_LIST, RT3_READ_CELL_VALUES, RT3_WRITE_CELL_VALUES, RT3_WRITE_CHARACTERISTIC, RT3_CONFIGURE_RECORDER, RT3_CONTROL_RECORDER, RT3_GET_RETRIGGERING, RT3_SET_CLIENT_BOOKMARK, RT3_SET_RETRIGGERING and RT3_SET_TRIGGER.
256	Functionality not supported.	Reading string values for non-scalar characteristics is not supported.

7.34 RT3_SET_CALPAGE COMMAND: 1283

Command:

Entry	Data type
0x0503 (Packet identification)	A_UINT16
Device Id	A_UINT16
New page index	A_UINT16

Success Answer:

Entry	Data type
0x00FF (Packet identification)	A_UINT16

Error Answer:

Entry	Data type
0x00FE (Packet identification)	A_UINT16
Standard error code	A_UINT16
Vendor specific error code (same value as 'Standard error code' in the ASAP3.exe)	A_UINT16
Vendor code description	RT_STRING

The command sets a new calpage with the given index at a workbase device.

Error code	Description	Explanation and solution
16	Command execution is currently not possible.	The iLinkRT 3.0 connection state is currently set to DISCONNECTED for the current client. In the DISCONNECTED state only RT3_SERVER_CONNECT and RT3_GET_ALL_SERVER can be executed. RT3_SERVER_CONNECT must be called for changing the internal server-managed client connection state from DISCONNECTED to CONNECTED. The server automatically switches single clients from the state CONNECTED to DISCONNECTED if the 'iLinkRT Watchdog Interval (sec)' in the 'Eastablish Connection' dialog is set to another value than 0 and the client executed no commands in the configured time span.
69	Page index out of range.	The 'New page index' request parameter has an invalid value not being supported by the device.
80	Device Id Is unknown.	No device with the requested 'Device Id' was found.
65535	An unexpected error occurred.	Additional information will be provided in the error message.

96	MC-SERVER not in state CONFIGURED.	By default the server is in the MC-SERVER_STATE CONFIGURED. If it was changed to CONFIGURABLE the command RT3_CONFIGURE_SERVER with the server configuration mode END_CONFIG must be executed before the invocation of the commands RT3_GET_CALPAGE_INFO, RT3_GET_CHARACTERISTIC_ID_LIST, RT3_GET_CHARACTERISTIC_INFO, RT3_GET_DEVICE_INFO, RT3_GET_DEVICE_STATE, RT3_GET_MEASUREMENT_ID_LIST, RT3_GET_MEASUREMENT_INFO, RT3_GET_RASTER_OVERVIEW, RT3_GET_SELECTED_DEVICES, RT3_GET_DAQ_EVENT_INFO, RT3_GET_DAQ_MEASUREMENT_LIST, RT3_READ_CELL_VALUES, RT3_WRITE_CELL_VALUES, RT3_WRITE_CHARACTERISTIC, RT3_CONFIGURE_RECORDER, RT3_CONTROL_RECORDER, RT3_GET_RETRIGGERING, RT3_SET_CLIENT_BOOKMARK, RT3_SET_RETRIGGERING and RT3_SET_TRIGGER.
256	Functionality not supported.	Only workbase devices are supported.

7.35 RT3_WRITE_CELL_VALUES COMMAND: 1284

Command:

Entry	Data type
0x0504 (Packet identification)	A_UINT16
Characteristic Id	A_UINT32
Representation Type - 0 dynamic - 1 hex - 2 physical	A_UINT8

Characteristic Value Type - 0 value Invidual value for each selected cell. - 1 constant Same constant for all elements. - 2 pos_offset Same positive offset for all elements. - 3 neg_offset Same negative offset for all elements. - 4 factor Same factor for all elements.	A_UINT8
X axis position start index	A_UINT16
X axis position stop index	A_UINT16
Y axis position start index	A_UINT16
Y axis position stop index	A_UINT16
Z axis position start index	A_UINT16
Z axis position stop index	A_UINT16
W axis position start index	A_UINT16
W axis position stop index	A_UINT16
V axis position start index	A_UINT16
V axis position stop index	A_UINT16
Cell Value 1	Depends on the DATA_TYPE of physical or hex cell values
Cell Value 2	Depends on the DATA_TYPE of physical or hex cell values
…	
Cell Value N	Depends on the DATA_TYPE of physical or hex cell values

Success Answer:

Entry	Data type
0x00FF (Packet identification)	A_UINT16

Error Answer:

Entry	Data type

0x00FE (Packet identification)	A_UINT16
Standard error code	A_UINT16
Vendor specific error code (same value as 'Standard error code' in the ASAP3.exe)	A_UINT16
Vendor code description	RT_STRING

Command writes cell values of a characteristic in a selected range with a specific characteristic value mode. It can only be executed in the MC-SERVER_STATE = CONFIGURED.

The Start Index and Stop Index parameters are based on the behavior represented in the following table:

Index definition:

Parameter	Description
Start Index	1 for the first element and 0 for not existing dimension of a characteristic
Stop Index	0xFFFF for last element and 0 for not existing dimension of a characteristic

Error code	Description	Explanation and solution
16	Command execution is currently not possible.	The iLinkRT 3.0 connection state is currently set to DISCONNECTED for the current client. In the DISCONNECTED state only RT3_SERVER_CONNECT and RT3_GET_ALL_SERVER can be executed. RT3_SERVER_CONNECT must be called for changing the internal server-managed client connection state from DISCONNECTED to CONNECTED. The server automatically switches single clients from the state CONNECTED to DISCONNECTED if the 'iLinkRT Watchdog Interval (sec)' in the 'Eastablish Connection' dialog is set to another value than 0 and the client executed no commands in the configured time span.
34	Invalid value for the representation type.	The 'Representation Type' request parameter contains a not supported value.
82	No characteristic with the requested characteristic identifier was found	The requested characteristic is not already selected. Before calling RT3_GET_CHARACTERISTIC_INFO the command RT3_SELECT_CHARACTERISTIC_ID must be called with the name of the corresponding characteristic.
65535	An unexpected error occurred.	Additional information will be provided in the error message.

96	MC-SERVER not in state CONFIGURED.	By default the server is in the MC-SERVER_STATE CONFIGURED. If it was changed to CONFIGURABLE the command RT3_CONFIGURE_SERVER with the server configuration mode END_CONFIG must be executed before the invocation of the commands RT3_GET_CALPAGE_INFO, RT3_GET_CHARACTERISTIC_ID_LIST, RT3_GET_CHARACTERISTIC_INFO, RT3_GET_DEVICE_INFO, RT3_GET_DEVICE_STATE, RT3_GET_MEASUREMENT_ID_LIST, RT3_GET_MEASUREMENT_INFO, RT3_GET_RASTER_OVERVIEW, RT3_GET_SELECTED_DEVICES, RT3_GET_DAQ_EVENT_INFO, RT3_GET_DAQ_MEASUREMENT_LIST, RT3_READ_CELL_VALUES, RT3_WRITE_CELL_VALUES, RT3_WRITE_CHARACTERISTIC, RT3_CONFIGURE_RECORDER, RT3_CONTROL_RECORDER, RT3_GET_RETRIGGERING, RT3_SET_CLIENT_BOOKMARK, RT3_SET_RETRIGGERING and RT3_SET_TRIGGER.
256	Functionality not supported.	Reading string values for non-scalar characteristics is not supported.

7.36 RT3_WRITE_CHARACTERISTIC COMMAND: 1285

Command:

Entry	Data type
0x0505 (Packet identification)	A_UINT16
Characteristic Id	A_UINT32
Representation Type - 0 dynamic - 1 hex - 2 physical	A_UINT8

X Axis Value (1)	Depends on the DATA_TYPE of physical or hex X axis values; X = 1
…	N axis values
X Axis Value (N)	Depends on the DATA_TYPE of physical or hex X axis values; X = N
Y Axis Value (1)	Depends on the DATA_TYPE of physical or hex Y axis values; Y = 1
…	M axis values
Y Axis Value (M)	Depends on the DATA_TYPE of physical or hex Y axis values; Y = M
Z Axis Value (1)	Depends on the DATA_TYPE of physical or hex Z axis values; Z = 1
…	L axis values
Z Axis Value (L)	Depends on the DATA_TYPE of physical or hex Z axis values; Z = L
W Axis Value (1)	Depends on the DATA_TYPE of physical or hex W axis values; W = 1
…	K axis values
W Axis Value (K)	Depends on the DATA_TYPE of physical or hex W axis values; W = K
V Axis Value (1)	Depends on the DATA_TYPE of physical or hex V axis values; V = 1
…	J axis values
V Axis Value (J)	Depends on the DATA_TYPE of physical or hex V axis values; V = J
Cell Value (1, 1, 1, 1, 1)	Depends on the DATA_TYPE of physical or hex Z axis values; X=1, Y=1, Z=1, W=1, V=1
…	N * M * L * K * J cell values
Cell Value (N, M, L, K, J)	Depends on the DATA_TYPE of physical or hex cell values; X=N, Y=M, Z=L, W=K, V=J

Success Answer:

Entry	Data type
0x00FF (Packet identification)	A_UINT16

Error Answer:

Entry	Data type
0x00FE (Packet identification)	A_UINT16
Standard error code	A_UINT16
Vendor specific error code (same value as 'Standard error code' in the ASAP3.exe)	A_UINT16
Vendor code description	RT_STRING

Command writes the axis and cell values of a specific characteristic. It can only be executed in the MC-SERVER_STATE = CONFIGURED.

Error code	Description	Explanation and solution
16	Command execution is currently not possible.	The iLinkRT 3.0 connection state is currently set to DISCONNECTED for the current client. In the DISCONNECTED state only RT3_SERVER_CONNECT and RT3_GET_ALL_SERVER can be executed. RT3_SERVER_CONNECT must be called for changing the internal server-managed client connection state from DISCONNECTED to CONNECTED. The server automatically switches single clients from the state CONNECTED to DISCONNECTED if the 'iLinkRT Watchdog Interval (sec)' in the 'Eastablish Connection' dialog is set to another value than 0 and the client executed no commands in the configured time span.
34	Invalid value for the representation type.	The 'Representation Type' request parameter contains a not supported value.
82	No characteristic with the requested characteristic identifier was found	The requested characteristic is not already selected. Before calling RT3_GET_CHARACTERISTIC_INFO the command RT3_SELECT_CHARACTERISTIC_ID must be called with the name of the corresponding characteristic.
65535	An unexpected error occurred.	Additional information will be provided in the error message.

96	MC-SERVER not in state CONFIGURED.	By default the server is in the MC-SERVER_STATE CONFIGURED. If it was changed to CONFIGURABLE the command RT3_CONFIGURE_SERVER with the server configuration mode END_CONFIG must be executed before the invocation of the commands RT3_GET_CALPAGE_INFO, RT3_GET_CHARACTERISTIC_ID_LIST, RT3_GET_CHARACTERISTIC_INFO, RT3_GET_DEVICE_INFO, RT3_GET_DEVICE_STATE, RT3_GET_MEASUREMENT_ID_LIST, RT3_GET_MEASUREMENT_INFO, RT3_GET_RASTER_OVERVIEW, RT3_GET_SELECTED_DEVICES, RT3_GET_DAQ_EVENT_INFO, RT3_GET_DAQ_MEASUREMENT_LIST, RT3_READ_CELL_VALUES, RT3_WRITE_CELL_VALUES, RT3_WRITE_CHARACTERISTIC, RT3_CONFIGURE_RECORDER, RT3_CONTROL_RECORDER, RT3_GET_RETRIGGERING, RT3_SET_CLIENT_BOOKMARK, RT3_SET_RETRIGGERING and RT3_SET_TRIGGER.
256	Functionality not supported.	Reading string values for non-scalar characteristics is not supported.

7.37 RT3_CONFIGURE_RECORDER COMMAND: 1537

Command:

Entry	Data type
0x0601 (Packet identification)	A_UINT16
File Device Count - 0 one file for all devices (only supported value) - 1 for each device a separate file	A_UINT8

Retriggering File Content - 0 one file for each stream between RECDATASTART and RECDATASTOP - 1 one file from the first RECDATASTART till the last RECDATASTOP (only supported value)	A_UINT8
Recorder File Name	RT_STRING
Recorder File Absolute Path	RT_STRING

Success Answer:

Entry	Data type
0x00FF (Packet identification)	A_UINT16

Error Answer:

Entry	Data type
0x00FE (Packet identification)	A_UINT16
Standard error code	A_UINT16
Vendor specific error code (same value as 'Standard error code' in the ASAP3.exe)	A_UINT16
Vendor code description	RT_STRING

Sets the recorder file's name and directory.

The command is only allowed in the MC-SERVER_STATE = CONFIGURED and the RECORDER_STATE = STOPPED.

Error code	Description	Explanation and solution
16	Command execution is currently not possible.	The iLinkRT 3.0 connection state is currently set to DISCONNECTED for the current client. In the DISCONNECTED state only RT3_SERVER_CONNECT and RT3_GET_ALL_SERVER can be executed. RT3_SERVER_CONNECT must be called for changing the internal server-managed client connection state from DISCONNECTED to CONNECTED. The server automatically switches single clients from the state CONNECTED to DISCONNECTED if the 'iLinkRT Watchdog Interval (sec)' in the 'Eastablish Connection' dialog is set to another value than 0 and the client executed no commands in the configured time span.
34	Invalid or not supported value for the 'File Device Count' or 'Retriggering File Content' request parameters.	Change the value of the 'File Device Count' request parameter to 'one file for all devices' and the value of the 'Retrigger File Content' parameter to 'one file from the first RECDATASTART till the last RECDATASTOP' (1).
65535	An unexpected error occurred.	Additional information will be provided in the error message.

96	MC-SERVER not in state CONFIGURED.	By default the server is in the MC-SERVER_STATE CONFIGURED. If it was changed to CONFIGURABLE the command RT3_CONFIGURE_SERVER with the server configuration mode END_CONFIG must be executed before the invocation of the commands RT3_GET_CALPAGE_INFO, RT3_GET_CHARACTERISTIC_ID_LIST, RT3_GET_CHARACTERISTIC_INFO, RT3_GET_DEVICE_INFO, RT3_GET_DEVICE_STATE, RT3_GET_MEASUREMENT_ID_LIST, RT3_GET_MEASUREMENT_INFO, RT3_GET_RASTER_OVERVIEW, RT3_GET_SELECTED_DEVICES, RT3_GET_DAQ_EVENT_INFO, RT3_GET_DAQ_MEASUREMENT_LIST, RT3_READ_CELL_VALUES, RT3_WRITE_CELL_VALUES, RT3_WRITE_CHARACTERISTIC, RT3_CONFIGURE_RECORDER, RT3_CONTROL_RECORDER, RT3_GET_RETRIGGERING, RT3_SET_CLIENT_BOOKMARK, RT3_SET_RETRIGGERING and RT3_SET_TRIGGER.
98	The recorder is running.	Use the command RT3_CONTROL_RECORDER for stopping the recorder.

7.38 RT3_CONTROL_RECORDER COMMAND: 1538

Command:

Entry	Data type
0x0602 (Packet identification)	A_UINT16
Recorder Control - 0 START_TRIGGERED - 1 START_UNTRIGGERED - 2 STOP - 3 PAUSE - 4 RESUME	A_UINT8

Auto Measuring Control - 0 MEASURING_LINKED RT3_CONTROL_RECORDER implicitly calls RT3_START_STOP_MEASURING with the mode START if RT3_CONTROL_RECORDER is called with the 'Recorder Control' parameters START_TRIGGERED or START_UNTRIGGERED. (only supported value) - 1 RECORDER ONLY	A_UINT8
Recorder File Name	RT_STRING
Recorder File Absolute Path	RT_STRING

Success Answer:

Entry	Data type
0x00FF (Packet identification)	A_UINT16

Error Answer:

Entry	Data type
0x00FE (Packet identification)	A_UINT16
Standard error code	A_UINT16
Vendor specific error code (same value as 'Standard error code' in the ASAP3.exe)	A_UINT16
Vendor code description	RT_STRING

Starts or stops a recorder.

The command is only allowed in the MC-SERVER_STATE = CONFIGURED.

'Recorder File Name' and 'Recorder File Absolute Path' are only evaluated if RT3_CONTROL_RECORDER is called with the 'Recorder Control' request parameter value STOP (2).

Error code	Description	Explanation and solution
16	Command execution is currently not possible.	The iLinkRT 3.0 connection state is currently set to DISCONNECTED for the current client. In the DISCONNECTED state only RT3_SERVER_CONNECT and RT3_GET_ALL_SERVER can be executed. RT3_SERVER_CONNECT must be called for changing the internal server-managed client connection state from DISCONNECTED to CONNECTED. The server automatically switches single clients from the state CONNECTED to DISCONNECTED if the 'iLinkRT Watchdog Interval (sec)' in the 'Eastablish Connection' dialog is set to another value than 0 and the client executed no commands in the configured time span.
34	Invalid or not supported value for the 'Recorder Control' or 'Auto Measuring Control' request parameters.	Change the value of the 'Recorder Control' request parameter to START_TRIGGERED (0), START_UNTRIGGERED (1), STOP (2), PAUSE (3) or RESUME (4) and the value of the 'Auto Measuring Control' parameter to MEASURING LINKED (0).
41	Invalid recorder state transition.	The recorder state PAUSED can only be switched to RESUME or STOP. Recorder must be started before switching it to states like PAUSE or RESUME.
67	'Recorder File Name' and 'Recorder File Absolute Path' are only supported if RT3_CONTROL_RECORDER is used with the 'STOP' mode.	If RT3_CONTROL_RECORDER is executed with another 'Recorder Control' parameter than STOP 'Recorder File Name' and 'Recorder File Absolute Path' must be set to an empty string.

96	MC-SERVER not in state CONFIGURED.	By default the server is in the MC-SERVER_STATE CONFIGURED. If it was changed to CONFIGURABLE the command RT3_CONFIGURE_SERVER with the server configuration mode END_CONFIG must be executed before the invocation of the commands RT3_GET_CALPAGE_INFO, RT3_GET_CHARACTERISTIC_ID_LIST, RT3_GET_CHARACTERISTIC_INFO, RT3_GET_DEVICE_INFO, RT3_GET_DEVICE_STATE, RT3_GET_MEASUREMENT_ID_LIST, RT3_GET_MEASUREMENT_INFO, RT3_GET_RASTER_OVERVIEW, RT3_GET_SELECTED_DEVICES, RT3_GET_DAQ_EVENT_INFO, RT3_GET_DAQ_MEASUREMENT_LIST, RT3_READ_CELL_VALUES, RT3_WRITE_CELL_VALUES, RT3_WRITE_CHARACTERISTIC, RT3_CONFIGURE_RECORDER, RT3_CONTROL_RECORDER, RT3_GET_RETRIGGERING, RT3_SET_CLIENT_BOOKMARK, RT3_SET_RETRIGGERING and RT3_SET_TRIGGER.
112	The access is prohibited, because the functionality is used by another client.	Only the client that started the recorder is able to change the recorder settings.
65535	An unexpected error occurred.	Additional information will be provided in the error message (e. g. 'Resuming the recorder was not successful.').

7.39 RT3_GET_RETRIGGERING COMMAND: 1539

Command:

Entry	Data type
0x0603 (Packet identification)	A_UINT16

Success Answer:

Entry	Data type
0x00FF (Packet identification)	A_UINT16

Retrigger Count	A_INT64

Error Answer:

Entry	Data type
0x00FE (Packet identification)	A_UINT16
Standard error code	A_UINT16
Vendor specific error code (same value as 'Standard error code' in the ASAP3.exe)	A_UINT16
Vendor code description	RT_STRING

The command is only allowed in the MC-SERVER_STATE = CONFIGURED and it informs the MC-Client about the existing setting of a retrigger count.

Error code	Description	Explanation and solution
16	Command execution is currently not possible.	The iLinkRT 3.0 connection state is currently set to DISCONNECTED for the current client. In the DISCONNECTED state only RT3_SERVER_CONNECT and RT3_GET_ALL_SERVER can be executed. RT3_SERVER_CONNECT must be called for changing the internal server-managed client connection state from DISCONNECTED to CONNECTED. The server automatically switches single clients from the state CONNECTED to DISCONNECTED if the 'iLinkRT Watchdog Interval (sec)' in the 'Eastablish Connection' dialog is set to another value than 0 and the client executed no commands in the configured time span.

96	MC-SERVER not in state CONFIGURED.	By default the server is in the MC-SERVER_STATE CONFIGURED. If it was changed to CONFIGURABLE the command RT3_CONFIGURE_SERVER with the server configuration mode END_CONFIG must be executed before the invocation of the commands RT3_GET_CALPAGE_INFO, RT3_GET_CHARACTERISTIC_ID_LIST, RT3_GET_CHARACTERISTIC_INFO, RT3_GET_DEVICE_INFO, RT3_GET_DEVICE_STATE, RT3_GET_MEASUREMENT_ID_LIST, RT3_GET_MEASUREMENT_INFO, RT3_GET_RASTER_OVERVIEW, RT3_GET_SELECTED_DEVICES, RT3_GET_DAQ_EVENT_INFO, RT3_GET_DAQ_MEASUREMENT_LIST, RT3_READ_CELL_VALUES, RT3_WRITE_CELL_VALUES, RT3_WRITE_CHARACTERISTIC, RT3_CONFIGURE_RECORDER, RT3_CONTROL_RECORDER, RT3_GET_RETRIGGERING, RT3_SET_CLIENT_BOOKMARK, RT3_SET_RETRIGGERING and RT3_SET_TRIGGER.
65535	An unexpected error occurred.	Additional information will be provided in the error message.

7.40 RT3_SET_CLIENT_BOOKMARK COMMAND: 1541

Command:

Entry	Data type
0x0605 (Packet identification)	A_UINT16
MC-Client generated bookmark identifier	A_UINT64
MC-Client generated bookmark description. This may be an empty string.	RT_STRING

Success Answer:

Entry	Data type
0x00FF (Packet identification)	A_UINT16

Error Answer:

Entry	Data type
0x00FE (Packet identification)	A_UINT16
Standard error code	A_UINT16
Vendor specific error code (same value as 'Standard error code' in the ASAP3.exe)	A_UINT16
Vendor code description	RT_STRING

Writes a comment to the recorder file that contains the value of the parameter 'MC-Client generated bookmark identifier' followed by a space and the value of the parameter 'MC-Client generated bookmark description'

If the value of the parameter 'MC-Client generated bookmark identifier' is set to 0 only the value of the parameter 'MC-Client generated bookmark description' is written.

The command is only allowed in the MC-SERVER_STATE = CONFIGURED and RECORDER_STATE = RUNNING. (RECORDER_STATE = PAUSED or ACTIVATED are currently not supported.)

Error code	Description	Explanation and solution
16	Command execution is currently not possible.	The iLinkRT 3.0 connection state is currently set to DISCONNECTED for the current client. In the DISCONNECTED state only RT3_SERVER_CONNECT and RT3_GET_ALL_SERVER can be executed. RT3_SERVER_CONNECT must be called for changing the internal server-managed client connection state from DISCONNECTED to CONNECTED. The server automatically switches single clients from the state CONNECTED to DISCONNECTED if the 'iLinkRT Watchdog Interval (sec)' in the 'Eastablish Connection' dialog is set to another value than 0 and the client executed no commands in the configured time span.
41	Invalid recorder state transition.	Recorder must be started before calling RT3_SET_CLIENT_BOOKMARK.

96	MC-SERVER not in state CONFIGURED.	By default the server is in the MC-SERVER_STATE CONFIGURED. If it was changed to CONFIGURABLE the command RT3_CONFIGURE_SERVER with the server configuration mode END_CONFIG must be executed before the invocation of the commands RT3_GET_CALPAGE_INFO, RT3_GET_CHARACTERISTIC_ID_LIST, RT3_GET_CHARACTERISTIC_INFO, RT3_GET_DEVICE_INFO, RT3_GET_DEVICE_STATE, RT3_GET_MEASUREMENT_ID_LIST, RT3_GET_MEASUREMENT_INFO, RT3_GET_RASTER_OVERVIEW, RT3_GET_SELECTED_DEVICES, RT3_GET_DAQ_EVENT_INFO, RT3_GET_DAQ_MEASUREMENT_LIST, RT3_READ_CELL_VALUES, RT3_WRITE_CELL_VALUES, RT3_WRITE_CHARACTERISTIC, RT3_CONFIGURE_RECORDER, RT3_CONTROL_RECORDER, RT3_GET_RETRIGGERING, RT3_SET_CLIENT_BOOKMARK, RT3_SET_RETRIGGERING and RT3_SET_TRIGGER.
65535	An unexpected error occurred.	Additional information will be provided in the error message.

7.41 RT3_SET_RETRIGGERING COMMAND: 1542

Command:

Entry	Data type
0x0606 (Packet identification)	A_UINT16
Retrigger Count	A_INT64

Success Answer:

Entry	Data type
0x00FF (Packet identification)	A_UINT16

Error Answer:

Entry	Data type
0x00FE (Packet identification)	A_UINT16
Standard error code	A_UINT16
Vendor specific error code (same value as 'Standard error code' in the ASAP3.exe)	A_UINT16
Vendor code description	RT_STRING

Sets the retrigger count.

The command is only allowed in the MC-SERVER_STATE = CONFIGURED and the RECORDER_STATE = STOPPED.

Error code	Description	Explanation and solution
16	Command execution is currently not possible.	The iLinkRT 3.0 connection state is currently set to DISCONNECTED for the current client. In the DISCONNECTED state only RT3_SERVER_CONNECT and RT3_GET_ALL_SERVER can be executed. RT3_SERVER_CONNECT must be called for changing the internal server-managed client connection state from DISCONNECTED to CONNECTED. The server automatically switches single clients from the state CONNECTED to DISCONNECTED if the 'iLinkRT Watchdog Interval (sec)' in the 'Eastablish Connection' dialog is set to another value than 0 and the client executed no commands in the configured time span.

96	MC-SERVER not in state CONFIGURED.	By default the server is in the MC-SERVER_STATE CONFIGURED. If it was changed to CONFIGURABLE the command RT3_CONFIGURE_SERVER with the server configuration mode END_CONFIG must be executed before the invocation of the commands RT3_GET_CALPAGE_INFO, RT3_GET_CHARACTERISTIC_ID_LIST, RT3_GET_CHARACTERISTIC_INFO, RT3_GET_DEVICE_INFO, RT3_GET_DEVICE_STATE, RT3_GET_MEASUREMENT_ID_LIST, RT3_GET_MEASUREMENT_INFO, RT3_GET_RASTER_OVERVIEW, RT3_GET_SELECTED_DEVICES, RT3_GET_DAQ_EVENT_INFO, RT3_GET_DAQ_MEASUREMENT_LIST, RT3_READ_CELL_VALUES, RT3_WRITE_CELL_VALUES, RT3_WRITE_CHARACTERISTIC, RT3_CONFIGURE_RECORDER, RT3_CONTROL_RECORDER, RT3_GET_RETRIGGERING, RT3_SET_CLIENT_BOOKMARK, RT3_SET_RETRIGGERING and RT3_SET_TRIGGER.
98	The recorder is running.	Use the command RT3_CONTROL_RECORDER for stopping the recorder.
65535	An unexpected error occurred.	Additional information will be provided in the error message.

7.42 RT3_SET_TRIGGER COMMAND: 1543

Command:

Entry	Data type
0x0607 (Packet identification)	A_UINT16
Trigger Kind - 0 START_TRIGGER - 1 STOP_TRIGGER	A_UINT8

Trigger Type - 0 CONDITION Trigger will be fired when the specific Condition becomes true after the trigger activation. - 1 TIME_SPAN_DURATION Trigger will be fired after a specific time span relative to the trigger activation is expired.	A_UINT8
Delay Time in seconds	A_FLOAT64
Time Span in seconds, 0 in case of Trigger Type = CONDITION	A_FLOAT64
Condition, empty string in case of Trigger Type = TIME_SPAN_DURATION	RT_STRING

Success Answer:

Entry	Data type
0x00FF (Packet identification)	A_UINT16

Error Answer:

Entry	Data type
0x00FE (Packet identification)	A_UINT16
Standard error code	A_UINT16
Vendor specific error code (same value as 'Standard error code' in the ASAP3.exe)	A_UINT16
Vendor code description	RT_STRING

Sets a start or stop trigger being based on a condition or time span duration.

The command is only allowed in the MC-SERVER_STATE = CONFIGURED and the RECORDER_STATE = STOPPED.

Error code	Description	Explanation and solution
16	Command execution is currently not possible.	The iLinkRT 3.0 connection state is currently set to DISCONNECTED for the current client. In the DISCONNECTED state only RT3_SERVER_CONNECT and RT3_GET_ALL_SERVER can be executed. RT3_SERVER_CONNECT must be called for changing the internal server-managed client connection state from DISCONNECTED to CONNECTED. The server automatically switches single clients from the state CONNECTED to DISCONNECTED if the 'iLinkRT Watchdog Interval (sec)' in the 'Eastablish Connection' dialog is set to another value than 0 and the client executed no commands in the configured time span.
33	The trigger condition is invalid.	The 'Condtion' request parameter contains an invalid expression.

34	Invalid or not supported value for the 'Trigger Type', 'Trigger Kind', 'Time span in seconds' and 'Condition' request parameters.	Value of the 'Trigger Kind' must be set to START_TRIGGER (0) or STOP_TRIGGER (1). The 'Trigger Type' must be set to CONDITION (0) or TIME_SPAN_DURATION (1). If the 'Trigger Type' is set to CONDITION the 'Time Span in seconds' must be set to 0. In the case of the 'Trigger Type' being set to TIME_SPAN_DURATION the value of the 'Condition' parameter must be an empty string. If 'Trigger Kind' is set to STOP_TRIGGER (1) the 'Delay Time in seconds' must be equals or greater than zero.
41	Invalid recorder state transition.	The recorder state PAUSED can only be switched to RESUME or STOP. Recorder must be started before switching it to states like PAUSE or RESUME.
67	'Recorder File Name' and 'Recorder File Absolute Path' are only supported if RT3_CONTROL_RECORDER is used with the 'STOP' mode.	If RT3_CONTROL_RECORDER is executed with another 'Recorder Control' parameter than STOP 'Recorder File Name' and 'Recorder File Absolute Path' must be set to an empty string.

96	MC-SERVER not in state CONFIGURED.	By default the server is in the MC-SERVER_STATE CONFIGURED. If it was changed to CONFIGURABLE the command RT3_CONFIGURE_SERVER with the server configuration mode END_CONFIG must be executed before the invocation of the commands RT3_GET_CALPAGE_INFO, RT3_GET_CHARACTERISTIC_ID_LIST, RT3_GET_CHARACTERISTIC_INFO, RT3_GET_DEVICE_INFO, RT3_GET_DEVICE_STATE, RT3_GET_MEASUREMENT_ID_LIST, RT3_GET_MEASUREMENT_INFO, RT3_GET_RASTER_OVERVIEW, RT3_GET_SELECTED_DEVICES, RT3_GET_DAQ_EVENT_INFO, RT3_GET_DAQ_MEASUREMENT_LIST, RT3_READ_CELL_VALUES, RT3_WRITE_CELL_VALUES, RT3_WRITE_CHARACTERISTIC, RT3_CONFIGURE_RECORDER, RT3_CONTROL_RECORDER, RT3_GET_RETRIGGERING, RT3_SET_CLIENT_BOOKMARK, RT3_SET_RETRIGGERING and RT3_SET_TRIGGER.
98	The recorder is running.	Use the command RT3_CONTROL_RECORDER for stopping the recorder.
112	The access is prohibited, because the functionality is used by another client.	Only the client that started the recorder is able to change the recorder settings.
65535	An unexpected error occurred.	Additional information will be provided in the error message (e. g. 'Resuming the recorder was not successful.').

7.43 RT3_EXECUTE_SERVICE COMMAND: 1792

Command:

Entry	Data type
0x0700 (Packet identification)	A_UINT16

Service to be executed by the MC-Server	RT_STRING
Service Input Data Container	RT_STRING

Success Answer:

Entry	Data type
0x00FF (Packet identification)	A_UINT16
Service Input Data Container	RT_STRING

Error Answer:

Entry	Data type
0x00FE (Packet identification)	A_UINT16
Standard error code	A_UINT16
Vendor specific error code (same value as 'Standard error code' in the ASAP3.exe)	A_UINT16
Vendor code description	RT_STRING

Command executes a proprietary service of the MC-Server by the name of the service.

The command supports the same services as the command EXTENDED ExecuteService / EXECUTE SERVICE (Command 202) of the ASAP3 protocol but instead of 'LUN' a parameter called 'DEVICEID' with the corresponding device id should be used for the value of the request parameter 'Service Input Data Container'.

Besides the **Set Option** possibilities described in the ASAP3 command 202 there are additional HWC (Hardware Configuration Editor in INCA) options available that can be used if the experiment is closed.

For further information about these options please check the HWC module settings in the CEBRA documentation of INCA (INCA.SetOption Method).

NOTE

Some of the other options require an opened experiment.

Error code	Description	Explanation and solution
16	Command execution is currently not possible.	The iLinkRT 3.0 connection state is currently set to DISCONNECTED for the current client. In the DISCONNECTED state only RT3_SERVER_CONNECT and RT3_GET_ALL_SERVER can be executed. RT3_SERVER_CONNECT must be called for changing the internal server-managed client connection state from DISCONNECTED to CONNECTED. The server automatically switches single clients from the state CONNECTED to DISCONNECTED if the 'iLinkRT Watchdog Interval (sec)' in the 'Eastablish Connection' dialog is set to another value than 0 and the client executed no commands in the configured time span.
256	Functionality not supported.	The service is not supported.
65535	An unexpected error occurred.	Additional information will be provided in the error message.

7.44 RT3_GET_AVAILABLE_CHARACTERISTICS COMMAND: 1793

Command:

Entry	Data type
0x0701 (Packet identification)	A_UINT16
Device Id	A_UINT16
Start position in list (Starts with 0.)	A_UINT32
Required number of characteristics	A_UINT32

Success Answer:

Entry	Data type
0x00FF (Packet identification)	A_UINT16
Number of available characteristics	A_UINT32
Count (N) of characteristics contained in this response	A_UINT32

	Characteristic Name 1	RT_STRING
	…	
	Characteristic Name N	RT_STRING
Error Answer:	Entry	Data type
	0x00FE (Packet identification)	A_UINT16
	Standard error code	A_UINT16
	Vendor specific error code (same value as 'Standard error code' in the ASAP3.exe)	A_UINT16
	Vendor code description	RT_STRING

The command returns the available characteristics in the MC-Server for the selected device in a specific range. It's only allowed in the MEASURING_STATE = UNDEFINED or CONFIGURABLE.

Error code	Description	Explanation and solution
16	Command execution is currently not possible.	The iLinkRT 3.0 connection state is currently set to DISCONNECTED for the current client. In the DISCONNECTED state only RT3_SERVER_CONNECT and RT3_GET_ALL_SERVER can be executed. RT3_SERVER_CONNECT must be called for changing the internal server-managed client connection state from DISCONNECTED to CONNECTED. The server automatically switches single clients from the state CONNECTED to DISCONNECTED if the 'iLinkRT Watchdog Interval (sec)' in the 'Eastablish Connection' dialog is set to another value than 0 and the client executed no commands in the configured time span.
80	Device Id Is unknown.	No device with the requested 'Device Id' was found.
97	Measuring not in state CONFIGURABLE.	RT3_START_STOP_MEASURING must be called with the mode CONFIGURE before calling RT3_CLEAR_MEASURING_LIST

		, RT3_CONFIGURE_MEASURING, RT3_GET_AVAILABLE_CHARACTERISTICS or RT3_GET_AVAILABLE_MEASUREMENTS.
65535	An unexpected error occurred.	Additional information will be provided in the error message.

7.45 RT3_GET_AVAILABLE_DEVICE_SETS COMMAND: 1794

Command:

Entry	Data type
0x0702 (Packet identification)	A_UINT16
Start position in list (Starts with 0.)	A_UINT32
Required number of device sets	A_UINT32

Success Answer:

Entry	Data type
0x00FF (Packet identification)	A_UINT16
Number of available device sets	A_UINT32
Count (N) of device sets contained in this response	A_UINT32
Device Set Name 1	RT_STRING
…	
Device Set Name N	RT_STRING

Error Answer:

Entry	Data type
0x00FE (Packet identification)	A_UINT16
Standard error code	A_UINT16
Vendor specific error code (same value as 'Standard error code' in the ASAP3.exe)	A_UINT16
Vendor code description	RT_STRING

The command returns the available device sets in the MC-Server. A device set is equivalent to a Workspace in INCA.

Error code	Description	Explanation and solution
16	Command execution is currently not possible.	The iLinkRT 3.0 connection state is currently set to DISCONNECTED for the current client. In the DISCONNECTED state only RT3_SERVER_CONNECT and RT3_GET_ALL_SERVER can be executed. RT3_SERVER_CONNECT must be called for changing the internal server-managed client connection state from DISCONNECTED to CONNECTED. The server automatically switches single clients from the state CONNECTED to DISCONNECTED if the 'iLinkRT Watchdog Interval (sec)' in the 'Eastablish Connection' dialog is set to another value than 0 and the client executed no commands in the configured time span.
65535	An unexpected error occurred.	Additional information will be provided in the error message.

7.46 RT3_GET_AVAILABLE_DEVICES COMMAND: 1795

Command:

Entry	Data type
0x0703 (Packet identification)	A_UINT16
Start position in list (Starts with 0.)	A_UINT32
Required number of devices	A_UINT32

Success Answer:

Entry	Data type
0x00FF (Packet identification)	A_UINT16
Number of available devices	A_UINT32
Count (N) of device contained in this response	A_UINT32
Device Name 1	RT_STRING
…	
Device Name N	RT_STRING

Error Answer:

Entry	Data type
0x00FE (Packet identification)	A_UINT16
Standard error code	A_UINT16
Vendor specific error code (same value as 'Standard error code' in the ASAP3.exe)	A_UINT16
Vendor code description	RT_STRING

The command returns the available devices in the selected device set.

Error code	Description	Explanation and solution
16	Command execution is currently not possible.	The iLinkRT 3.0 connection state is currently set to DISCONNECTED for the current client. In the DISCONNECTED state only RT3_SERVER_CONNECT and RT3_GET_ALL_SERVER can be executed. RT3_SERVER_CONNECT must be called for changing the internal server-managed client connection state from DISCONNECTED to CONNECTED. The server automatically switches single clients from the state CONNECTED to DISCONNECTED if the 'iLinkRT Watchdog Interval (sec)' in the 'Eastablish Connection' dialog is set to another value than 0 and the client executed no commands in the configured time span.
65535	An unexpected error occurred.	Additional information will be provided in the error message.

7.47 RT3_GET_AVAILABLE_MEASUREMENTS COMMAND: 1796

Command:

Entry	Data type
0x0704 (Packet identification)	A_UINT16
Device Id	A_UINT16
Start position in list (Starts with 0.)	A_UINT32
Required number of measurements	A_UINT32

Success Answer:

Entry	Data type
0x00FF (Packet identification)	A_UINT16
Number of available measurements	A_UINT32
Count (N) of measurements contained in this response	A_UINT32
Measurement Name 1	RT_STRING
…	
Measurement Name N	RT_STRING

Error Answer:

Entry	Data type
0x00FE (Packet identification)	A_UINT16
Standard error code	A_UINT16
Vendor specific error code (same value as 'Standard error code' in the ASAP3.exe)	A_UINT16
Vendor code description	RT_STRING

The command returns the available measurements in the MC-Server for the selected device in a specific range. It's only allowed in the MEASURING_STATE = UNDEFINED or CONFIGURABLE.

Error code	Description	Explanation and solution
16	Command execution is currently not possible.	The iLinkRT 3.0 connection state is currently set to DISCONNECTED for the current client. In the DISCONNECTED state only RT3_SERVER_CONNECT and RT3_GET_ALL_SERVER can be executed. RT3_SERVER_CONNECT must be called for changing the internal server-managed client connection state from DISCONNECTED to CONNECTED. The server automatically switches single clients from the state CONNECTED to DISCONNECTED if the 'iLinkRT Watchdog Interval (sec)' in the 'Eastablish Connection' dialog is set to another value than 0 and the client executed no commands in the configured time span.
80	Device Id Is unknown.	No device with the requested 'Device Id' was found.
97	Measuring not in state CONFIGURABLE.	RT3_START_STOP_MEASURING must be called with the mode CONFIGURE before calling RT3_CLEAR_MEASURING_LIST, RT3_CONFIGURE_MEASURING, RT3_GET_AVAILABLE_CHARACTERISTICS or RT3_GET_AVAILABLE_MEASUREMENTS.
65535	An unexpected error occurred.	Additional information will be provided in the error message.

8 Appendix: Error Codes

8.1 ASAP3 Errors in Log Window Without Error Code R eturned to AuSy

The following errors are displayed in the log window without a separate error code returned to the AuSy (Automation System).

Error code	Description
20003	**(%s error; unexpected end of command)** (replace %s with anyone of: STRING, BYTE, WORD, INTEGER4, REAL) The command received from the AuSy or the response to be sent to the AuSy is malformed. This was detected while trying to log the command or response. If this happens for a command, either the communication link is not reliable enough or a programming error on the AuSy side caused the problem. If this happens for a response, a programming error within ASAP3.EXE caused the problem.
20005	**Unknown command: %u(%xh)** (replace %u with a decimal number and %x with a hexadecimal number) The command with the given number is not recognized by ASAP3.EXE. This is either one of the unsupported extended commands or an erroneous telegram sent by the AuSy side.
20014	**Environment of was changed interactively** This message is shown if the connection is currently being stopped by the user and another command is received from the AuSy or if there was no correct initialization with the INIT command.
20050	**Cannot log map because of unknown map number!** This message is displayed during the command PUT LOOK-UP TABLE if that command asks for a map number which is not known in the current list of selected maps (via SELECT LOOK-UP TABLE).

Tab. 7-1 Errors in Log Window without Error Code

8.2 ASAP3 Errors in Log Window with Error Code Returned to AuSy

Answers of ASAP3.EXE to the AuSy may be affirmative or negative. The affirmative answers are given with a status code of 0x0000 or 0x1232. Negative answers have one of the following states:

Status code (hex)	Description
0x0000	**Success** *(ASAP3 spec: Faultless execution of the last command)*
0x1232	**Success** *(ASAP3 spec: Faultless execution of the last command)*

Status code (hex)	Description
0x2343	**Environment of INCA was changed interactively.** *(ASAP3 spec: Value $2343 indicates that the last sent telegram was not processed and that the AuSy must again set up communication, as interactively major changes have been made to the MC system configuration predefined by the AuSy. The successful execution of the 'INIT' command (Code 2) resets this status (see 'User command "START"' in the section on 'some command sequences').)* In INCA, this telegram indicates that there was no INIT command before the last command. This can happen if the ASAP3 server was reset or restarted or the communication was reestablished without the AuSy's knowledge.
0x2344	**Measuring data list has changed** *(ASAP3 spec: Measuring data list has changed)* This status can occur in the response to the GET USER DEFINED VALUE in case the user has changed INCAs list of measured values.
0x3454	**Success – simulation mode** *(ASAP3 spec: A $3454 status informs the AuSy that the MC system is in simulation mode. The status is interpreted in the subsequent processing as a '0' or '$1232' status (faultless command execution).)* INCA does not support simulation mode, so this status will never occur.
0x5656	**Command not implemented** *(ASAP3 spec: This status informs the AuSy of the non-availability of the function of the last sent command.)* This status occurs if INCA receives the commands EXIT, DEFINE DESCRIPTION AND BINARY FILE, GET USER DEFINED VALUE, GET USER DEFINED VALUE LIST and ASAP3 protocol mode is not 2.01 or higher (e.g. no IDENTIFY command was sent). This status also occurs if an unknown command or an unimplemented extended command was received.
0xFFFF	**Error** *(ASAP3 spec: An error occurred during the processing of the last AuSy command sent to the MC system. An error number and a detailed error message in clear text are sent by the MC system to the AuSy.)* INCA shows further error codes and error text in the description part of the answer telegram. Please see next table for a detailed description of those error codes

Status code (hex)	Description
0xAAAA	**Command received** *(ASAP3 spec: This status is considered as an acknowledgement of the last command by the AuSy. The final answer of the MC system occurs after the command has been processed (see telegram above).)* This status is returned if the option "Send Acknowledge" on the General option tab is checked. It indicates that a command was received from the AuSy. The command will be executed right after the telegram with status 0xAAAA was sent to the AuSy. The answer telegram for the command will be sent after the command was executed (or aborted due to an error). This means, the flow control on the AuSy must depend on the status of the final answer to the command; the 0xAAAA telegram is only an interims indicator that INCA is still communicating.
0xEEEE	**Retry command** *(ASAP3 spec: In conjunction with command code 0 in the AuSy RETRY telegram, this status may be considered as a command repeat request (see telegram above).)*

Tab. 7-2 Errors in Log Window with Error Code

The following errors are displayed in the log window (if logging of at least errors is enabled) and returned in the response to the AuSy, except where explicitly stated differently. These errors are contained in answer telegrams that have a status field with the value 0xFFFF.

Error code (decimal)	Description
60001	**Invalid LUN!** The LUN of the command was not provided by the ASAP3 interface since the last INIT command. If you get this message you should first check the option "Start generated LUN numbers with 0" in the Compatibility page of the Options. Normally LUN numbers start from 59. A script that expects the LUN numbers starting from 59 will cause this error if the above option is set and vice versa. If at least protocol version 3 is active, the error code 2 is returned instead of 60001. PARAMETER FOR VALUE ACQUISITION DEFINE RECORDER PARAMETERS SELECT LOOK-UP TABLE

Error code (decimal)	Description
60003	**Command order error! Missing INIT (command 2)!** One of the commands IDENTIFY, SELECT DESCRIPTION AND BINARY FILE or DEFINE DESCRIPTION AND BINARY FILE was sent without a prior call to the INIT command. This violates the required sequence of setting up a connection: INIT IDENTIFY and then SELECT DESCRIPTION FILE AND BINARY FILE or DEFINE DESCRIPTION AND BINARY FILE.
60004	**Cannot work with ASAP3 protocol versions different than V2.x or V3.x!** This error message is shown in case one of the commands SELECT DESCRIPTION FILE AND BINARY FILE or DEFINE DESCRIPTION AND BINARY FILE have been called but no IDENTIFY command was sent before. ASAP3.EXE supports only ASAP3 protocol versions 2.x and 3.x. You archive best results, that is, you get the most features if you identify with version 2.1 or 3.0.
60005	**Cannot send calibration data to EPROM!** This error indicates that INCA does not support sending calibration data to the EPROM via ASAP3 with the command COPY BINARY FILE. The *Target* parameter of this command should not be set to 1 (EPROM). COPY BINARY FILE
60006	**Cannot receive calibration data from EPROM!** This error indicates that INCA does not support receiving calibration data from the EPROM via ASAP3 with the command COPY BINARY FILE. The *Source* parameter of this command should not be set to 1 (EPROM). COPY BINARY FILE
60007	**Invalid values for source or destination!** The error appears if the command COPY BINARY FILE was used with invalid parameters for *Source* and/or *Destination*. The values for these parameters must not be zero nor exceed the value of 4. COPY BINARY FILE
60008	**Already identified!** The command IDENTIFY was sent again, after another IDENTIFY command has been sent already, without an INIT or EXIT command in-between. To prevent this error, send an INIT command before the IDENTIFY command. IDENTIFY

Error code (decimal)	Description
60009	**Need an ASAP3 protocol version V2.x!** The command IDENTIFY was sent with a parameter *Protocol version number* set to a version smaller than 2.0 or greater or equal to 3.0. To prevent this error, use only variants of version 2 (2.xx), because those are the only ones that are supported. IDENTIFY
60010	**Not yet identified! Missing IDENTIFY (command 20)!** Received a command without the command IDENTIFY being issued before. IDENTIFY is required to check the protocol version. ASAP3 protocol version 1.0 doesn't send the command IDENTIFY. It is possible to suppress this message with the option "Ignore protocol version from IDENTIFY command…" With this option set it is possible to use protocol version 2.1 commands with protocol version 2.0 without the need of calling IDENTIFY. GET USER DEFINE VALUE LIST GET USER DEFINED VALUE PARAMETER FOR VALUE ACQUISITION EXTENDED PARAMETER FOR VALUE ACQUISITION / PARAMETER FOR VALUE ACQUISITION EV2 GET ONLINE VALUE DEFINE TRIGGER CONDITION ACTIVATE RECORDER GET RECORDER STATUS GET RECORDER RESULTS HEADER GET RECORDER RESULTS SAVE RECORDER FILE LOAD RECORDER FILE
60012	**Out of memory!** There is not enough memory to create the memory representation of a map. Check the memory in the task manager and quit all applications you don't need. PUT LOOK-UP TABLE
60013	**Call was canceled; operation wasn't completed by MCS!** INCA did not complete a COM call and the user terminated the communication by clicking "Abort" on the dialog box COM shows after a certain timeout was reached while COM waited for INCA. Since this COM dialogs are disabled, the error should never show up.

Error code (decimal)	Description
60014	**Internal error: <individual error text>** This is a general error message for all exceptions that can occur during operation, mostly exceptions from external applications. The reason for this error is an unexpected behavior of one of the used subcomponents. Therefore, there is no general help how to avoid this type of error. Often a restart of the whole system can help. Otherwise, you should contact the local support for help. If at least protocol version 3 is active, the error code 5 is returned instead of 60014.
60016	**For 'Event', only 0 is allowed!** This error occurs if the ASAP3 command EMERGENCY is called with the parameter *Event* set to a value different from zero. Only the event value 0 is supported by INCA. EMERGENCY
60017	**Invalid map number!** The map number of the command was not provided by ASAP3 since the last INIT command. If at least protocol version 3 is active, the error code 12 is returned instead of 60017. GET LOOK-UP TABLE PUT LOOK-UP TABLE GET LOOK-UP TABLE VALUE SET LOOK-UP TABLE INCREASE LOOK-UP TABLE GET WORKING POINT GET CHARACTERISTIC INFO READ CHARACTERISTIC WRITE CHARACTERISTIC READ CELL VALUES WRITE CELL VALUES
60020	**Invalid structure of received command!** The last received command telegram was analyzed and found to have not the correct length. Please check on the sending side that the correct command telegrams are sent. This error can occur for all commands that contain additional data besides the *command code*.
60021	**There is already LUN %d for the device with this description and binary file assigned!** The command SELECT DESCRIPTION FILE AND BINARY FILE or DEFINE DESCRIPTION FILE AND BINARY FILE has been executed with parameters that lead to a device for which a LUN has already been assigned. Please check the given description file or device name and the devices for which a LUN already has been generated. SELECT DESCRIPTION FILE AND BINARY FILE DEFINE DESCRIPTION FILE AND BINARY FILE

Error code (decimal)	Description
60023	**Map name not found in description file!** The map name specified in the command SELECT LOOK-UP TABLE couldn't be found in the description file currently loaded for the given LUN. If at least protocol version 3 is active, the error code 4 is returned instead of 60023. SELECT LOOK-UP TABLE GET CHARACTERISTIC INFO
60024	**Name found in description file but it is no 1dim or 2dim map!** The map name specified in the command SELECT LOOK-UP TABLE was found in the description file currently loaded for the given LUN, but is not a 1- or 2-dim map. Possibly the name was a parameter, a set point or a 3-dim map. If at least protocol version 3 is active, the error code 4 is returned instead of 60024. SELECT LOOK-UP TABLE GET CHARACTERISTIC INFO
60025	**Invalid value for data type!** The command SET FORMAT was used with an invalid parameter *Log. data type*. The parameter was larger than the maximum value of 3. Please use a valid value of 0 to 3 instead. If at least protocol version 3 is active, the error code 2 is returned instead of 60045 SET FORMAT
60026	**Invalid value for model!** The command SET FORMAT was used with an invalid parameter *Model*. The parameter was larger than the maximum value of 2. Please use a valid value of 0 to 2 instead. SET FORMAT
60027	**Answer packet is too long! Data will be clipped!** This message can appear in the log file in the case the answer telegram would grow beyond its maximum size of 65534 Bytes. In that case, all additional data is dropped. The message is shown only in the log file, the client will receive the telegram with the clipped data.
60028	**Map has already been selected!** Received the command SELECT LOOK-UP TABLE with a map that already has been selected since the last INIT command. SELECT LOOK-UP TABLE
60030	**A map dimension has exceeded the limit of 1025!** Received the command SELECT LOOK-UP TABLE, that resulted in a map with at least one dimension above 1025 (either x- or y-dimension). SELECT LOOK-UP TABLE

Error code (decimal)	Description
60031	**Invalid value for online mode!** The command SWITCHING ONLINE/OFFLINE was called with an invalid value for parameter *Mode*. Please use only values 0 (OFF-LINE) or 1 (ON-LINE). SWITCHING ONLINE/OFFLINE
60033	**An unsupported function has been called!** There was a call to a COM object with a function that is not supported in the COM object (CNotSupportedException). This is either a version incompatible with INCA or a problem of the installation of INCA. Please start INCA before you start the ASAP3 session. If the error persists, try to reinstall INCA.
60034	**An unspecified error occurred!** There was a call to a COM object that caused an exception which is not specified in more detail. The additional error text should give additional information about the root cause. Most likely the system reached an unrecoverable error state. Please restart the system.
60035	**LUN of AUXIN device not allowed for this function!** An AUXIN device does not contain calibration values. Therefore, it is not possible to use AUXIN device LUN numbers together with calibration commands. If at least protocol version 3 is active, the error code 2 is returned instead of 60035. SELECT LOOK-UP TABLE GET PARAMETER SET PARAMETER EXTENDED GET PARAMETER / GET PARAMETER EV2 EXTENDED SET PARAMETER / SET PARAMETER EV2 READ CELL VALUES WRITE CELL VALUES READ CHARACTERISTIC WRITE CHARACTERISTIC
60036	**Invalid value for 'Mode'!** The mode parameter can only have the values 0 (=Recorder stop), 1 (=Activate Recorder) or 2 (Start Recorder). Every other value will cause this error. ACTIVATE RECORDER
60037	**Invalid value for 'Destination'!** The command DEFINE DESCRIPTION AND BINARY FILE was called with an invalid value for parameter *Destination*. Please use a valid value (see description of command). DEFINE DESCRIPTION AND BINARY FILE

Error code (decimal)	Description
60042	**Invalid value for 'Recording type'!** The recording type parameter can only have the values 0 (= equidistant raster) or 1 (= sync. raster). Every other value will cause this error. If at least protocol version 3 is active, the error code 12 is returned instead of 60042. DEFINE RECORDER PARAMETERS
60045	**ASAP3 command DEFINE RECORDER PARAMETERS has to be called before!** No recorder parameters were defined so far. Please call DEFINE RECORDER PARAMETERS before calling the current command. ACTIVATE RECORDER DEFINE TRIGGER CONDITION
60047	**ASAP3 command DEFINE TRIGGER CONDITION has to be called before!** No trigger condition was defined so far. Please call DEFINE TRIGGER CONDITION before calling the current command. ACTIVATE RECORDER
60048	**ASAP3 command ACTIVATE RECORDER has to be called before!** If the recorder was not started with ACTIVATE RECORDER (1 or 2), it is not possible to stop the recorder with ACTIVATE RECORDER (0) or retrieve the recorder status with GET RECORDER STATUS. ACTIVATE RECORDER GET RECORDER STATUS
60049	**Internal error: invalid date/time!** The timestamp within a measurement file was not valid. GET RECORDER RESULTS HEADER
60052	**Start delay' must be 0 or negative!** INCA only supports negative start delays (or none) over ASAP3. This is a limitation of the INCACOM interface. DEFINE TRIGGER CONDITION
60061	**ASAP3 command SWITCHING OFF/ONLINE with Mode=1 has to be called before!** If at least protocol version 3 is active, the error code 11 is returned instead of 60061. System must be online for the current command. GET ONLINE VALUE GET USER DEFINED VALUE
60200	**Error switching to work page.** INCA rejected to switch to the working page. Please see the Monitor Window for additional information about this problem. SELECT DESCRIPTION FILE AND BINARY FILE DEFINE DESCRPITION FILE AND BINARY FILE EXTENDED ExecuteService

Error code (decimal)	Description
60201	**Unable to get database handle from INCA.** There was a problem detected while retrieving a handle to the current INCA database via COM. Please check if there is a valid database opened within INCA. If this is the case, please restart INCA and ASAP3.EXE. This error can only occur during startup of ASAP3.EXE and is displayed in a message box, it is never returned to the AuSy.
60205	**Error could not be specified precisely (<hexadecimal error code>)** An error (exception) occurred but there was no additional information about the error available. Only the error code (HRESULT in case of COM) is returned and given in the brackets as a hexadecimal number. Please restart INCA and ASAP3.EXE.
60206	**Unable to open current opened Experiment** While trying to get a handle of the current opened experiment in INCA, an error was returned. Please make sure that INCA has an experiment window open before starting ASAP3.EXE. When starting ASAP3.EXE regularly via the INCA menu "ASAM-3MC", this error should never occur. This error can only occur during startup of ASAP3.EXE and is displayed in a message box, it is never returned to the AuSy.
60207	**No device with given description and binary name found in current workspace** The command SELECT DESCRIPTION AND BINARY FILE was called with parameters that did not describe an existing device within INCA. Please specify a description file that is currently loaded within INCA. Use the database name or the file name of the description file (A2L file), according to the setting of the option "Use database names in 'SELECT / DEFINE DESCRIPTION FILE AND BINARY FILE'" of the ASAP3.EXE tool.
60208	**Cannot set or create work base to/from file '<filename>' or cannot download** There was an error while the file with the given name was read into INCA and set to a (new) work base during execution of the following commands (probably including the download to the target): SELECT DESCRIPTION AND BINARY FILE COPY BINARY FILE The Monitor window of INCA might show more information about this error.

Error code (decimal)	Description
60210	**Cannot copy binary to file <filename>** During the execution of the COPY BINARY FILE command, an error occurred. The monitor window of INCA might show more information about this error. For example, the target file might already exist and be write-protected or the target path is on a write-protected media or the free space on the target media is not sufficient for the copy operation. COPY BINARY FILE
60211	**Only the following combinations are supported:** **target 2 with source 3 or 4** **target 3 with source 4** **target 4 with source 3.** The command COPY BINARY FILE was called with invalid parameters for source and/or target. Only the listed combinations are supported by this version. COPY BINARY FILE
60212	**No device with given name found** The device name given in the form variable\device is not available. In INCA it is possible to wire a variable in 2 ways. First as a combination of LUN and variable name. In this case the LUN represents the device and the variable must be a valid variable within the device represented by that LUN. Alternatively it is possible to use the combination of a variable\device instead of the variable. In this case the device supersedes the device addressed by the LUN. If a device with that name doesn't exist the error above is reported. PARAMETER FOR VALUE ACQUISTION DEFINE RECORDER PARAMETERS
60213	**Only the modes 0 and 2 are supported** The command DEFINE DESCRIPTION AND BINARY FILE was sent with the parameter *Mode* set to a value of 1 or 3. These values are not supported, only values 0 and 2 are. DEFINE DESCRIPTION AND BINARY FILE
60214	**Unable to switch calibration access on** This error is returned in case INCA is not able to switch the calibration access on. This may be due to errors in the hardware. Please see the Monitor window for further error description. SELECT DESCRIPTION FILE AND BINARY FILE DEFINE DESCRIPTION AND BINARY FILE INIT SWITCHING OFFLINE/ONLINE

Error code (decimal)	Description
60215	**Unable to start measurement** Some commands need to switch off INCA measurement before they can perform their main work. For example, to read and download a new binary file requires INCA to stop the measurement. After the command has performed its main work, measurement will be switched back on automatically. In case this switch fails, this error will be returned. A possible reason can be a hardware problem. Please check the monitor window for further error description. SELECT DESCRIPTION FILE AND BINARY FILE DEFINE DESCRIPTION FILE AND BINARY FILE SWITCHING OFFLINE/ONLINE COPY BINARY FILE RESET DEVICE
60216	**Unable to stop measurement** Some commands need to switch off INCA measurement before they can perform their main work. For example, to read and download a new binary file requires INCA to stop the measurement. In case this switch fails, this error will be returned. A possible reason can be a hardware problem. Please check the monitor window for further error description. SELECT DESCRIPTION FILE AND BINARY FILE DEFINE DESCRIPTION FILE AND BINARY FILE SWITCHING OFFLINE/ONLINE COPY BINARY FILE RESET DEVICE
60217	**Unable to switch calibration access off** This error is returned in case INCA is not able to switch the calibration access off. This may be due to errors in the hardware. Please check the Monitor window for further error description. SELECT DESCRIPTION FILE AND BINARY FILE DEFINE DESCRIPTION FILE AND BINARY FILE INIT SWITCHING OFFLINE/ONLINE
60218	**Cannot reset device** INCA returns an error when trying to reset a device. Please see the Monitor window for further error description. RESET DEVICE
60219	**Received command while processing already command! Please increase timeout.** ASAP3.EXE received a new command while it was still processing the previous command. This occurs often when ASAP3.EXE is busy with a command that lasts very long and the AuSy received a timeout and therefore repeated the last command. To prevent this, either optimize the options of ASAP3.EXE for high performance (turn off all logging, turn off LED indicators) or increase the timeout for the problematic command on AuSy side.

Error code (decimal)	Description
60220	**Internal error (GetOverlappedResult (Read); error code: <error code>)** An error was reported by the operating system while reading data for the next command. The error code is given as decimal number in place of the text <error code> of the above message. The reason for this error is unclear. If this error occurs repeatedly, you should try to recover by restarting the whole system.
60221	**Could not switch to reference page of at least one device.** While executing the EMERGENCY command, INCA was not able to switch to the reference page of at least one device. See the monitoring window for additional error description.
60222	**Unable to open current opened Experiment View** ASAP3.EXE was unable to get a handle for the currently opened Experiment View in INCA. Please make sure that INCA has an experiment window open before starting ASAP3.EXE. When starting ASAP3.EXE regularly via the INCA menu “ASAM-3MC”, this error should never occur. This error can only occur during startup of ASAP3.EXE and is displayed in a message box, it is never returned to the AuSy.
60223	**This command requires at least Protocol Version 2.1** This error occurs if one of the extended commands for services is executed but the AuSy did not identify with a version number of 2.1 or higher. To use the extended commands for services, please make sure that you identify with a protocol version that covers these commands. EXTENDED QueryAvailableServices EXTENDED GetServiceInformation EXTENDED ExecuteService
60224	**Unknown service** The service that was requested by the commands EXTENDED GetServiceInformation or EXTENDED ExecuteService is not supported by this version of ASAP3.EXE. Please make sure you use the correct version of ASAP3.EXE and that you only use supported commands (as reported by EXTENDED QueryAvailableServices). Currently, only the service “Switch Emulation Page” is supported. EXTENDED GetServiceInformation EXTENDED ExecuteService
60225	**LUN parameter required for this service** The service "Switch Emulation Page" requires the following parameters: LUN: <valid LUN number>; PAGE: <valid page number> The service returns an empty string. If the parameter with the name “LUN” is missing, above error will be returned. EXTENDED ExecuteService (Switch Emulation Page)

Error code (decimal)	Description
60226	**PAGE parameter required for this service** The service "Switch Emulation Page" requires the following parameters: LUN: <valid LUN number>; PAGE: <valid page number> The service returns an empty string. If the parameter with the name “PAGE” is missing, above error will be returned. EXTENDED ExecuteService (Switch Emulation Page)
60227	**Error switching to reference page.** INCA returned an error while trying to switch to the reference page. See the monitor window for further error description. EXTENDED ExecuteService (Switch Emulation Page)
60228	**Only page numbers 0 (working page) and 1 (reference page) are supported.** The command EXTENDED ExecuteService (Switch Emulation Page) contains an invalid value for the parameter PAGE. Only 0 and 1 are allowed. EXTENDED ExecuteService (Switch Emulation Page)
60231	**No device with given destination, description and binary name found.** ASAP3 was not able to find a device with the given destination, description file and binary name in the INCA database while executing the command DEFINE DESCRIPTION FILE AND BINARY FILE. Please check that the correct names and the destination are given and that the option “Use database names in 'SELECT / DEFINE DESCRIPTION FILE AND BINARY FILE'” in the General options dialog is set correctly. DEFINE DESCRIPTION FILE AND BINARY FILE

Error code (decimal)	Description
60233	**Unable to switch calibration access on because there is a running MDA. You should go online before starting MDA.** This error occurs either in case you execute a SWITCHING OFFLINE/ONLINE command with parameter *Mode* equal to 1 (ON-LINE) while there is already a recorder (Measurement Data Acquisition) running, in order to prepare online calibration, or in case you execute a SELECT DESCRIPTION FILE AND BINARY FILE command while there is already a recorder running and the option “Data &Download at 'SELECT DESCRIPTION FILE AND BINARY FILE'” was checked, or in case you execute a DEFINE DESCRIPTION FILE AND BINARY FILE command while there is already a recorder running and the *Mode* parameter is set to 2. The SELECT/DEFINE DESCRIPTION FILE AND BINARY FILE commands try to switch the calibration access on, if this was not yet done with a preceding SWITCHING OFFLINE/ONLINE command. In case there was already a recorder started, INCA is not able to switch the calibration access on. To circumvent this problem, stop the recorder before executing the SELECT/DEFINE ESCRIPTION FILE AND BINARY FILE commands. SELECT DESCRIPTION FILE AND BINARY FILE DEFINE DESCRIPTION FILE AND BINARY FILE SWITCHING OFFLINE/ONLINE
60234	**Cannot upload workbase from device!** This error occurs if the command COPY BINARY FILE is executed with the parameter *Target* set to 3 (virtual emulator board; PC memory) and the parameter *Source* set to 4 (physical emulator board; e.g. ETK) and INCA is not able to upload the workbase from the physical emulator board into the PC. See the Monitor window for further error descriptions. COPY BINARY FILE
60236	**Cannot download workbase to device!** This error occurs if the command COPY BINARY FILE is executed with the parameter *Target* set to 4 (physical emulator board; e.g. ETK) and the parameter *Source* set to 3 (virtual emulator board; PC memory) and INCA is not able to download the workbase from the PC into the physical emulator board. See the Monitor window for further error descriptions. COPY BINARY FILE

Error code (decimal)	Description
60237	**The command '<command name>' cannot be executed while the system is online. Please go offline first.** This error can appear when either the command SELECT DESCRIPTION FILE AND BINARY FILE (3), the command DEFINE DESCRIPTION FILE AND BINARY FILE (30) or the command COPY BINARY FILE (4) is executed. In the error message, the text <command name> is replaced by the according command name. To execute above commands, INCA needs to perform certain actions that are not possible while ASAP3 is in the online state. Therefore, the AuSy has to explicitly switch to off-line mode before executing one of these commands. SELECT DESCRIPTION FILE AND BINARY FILE DEFINE DESCRIPTION FILE AND BINARY FILE COPY BINARY FILE
60238	**Create Dispatch Error: Cannot connect to the INCA process. This is probably due to a bad installation of the JAVA runtime. Please execute msjavax86.exe in the INCA cebra directory.** Original error text: <original error text from the COM subsystem> When starting, ASAP3.EXE tries to connect to running instance or to create a new instance of INCA. If this is not possible, above error message is shown. The original error text that follows above error message is emitted by the COM subsystem and can give additional hints why INCA cannot be connected to or started. This error occurs only during startup of ASAP3.EXE. Please check that the JAVA runtime is installed correctly. If not, execute msjavax86.exe from the subdirectory “cebra” in your INCA program installation directory. **Note:** Starting with INCA 6.0, the Cebra protocol is implemented using .NET instead of Java. If this error occurs in INCA 6.0 or higher, the installation of the .NET runtime has to be checked.
60239	**Cannot set workbase to the following database entry:** If the attempt to assign a new working data set to a device within INCA fails, the above error is returned. The error can only occur when the option “Use database names in 'SELECT / DEFINE DESCRIPTION FILE AND BINARY FILE'” in the General options dialog is checked. See the monitor window for more error information. SELECT DESCRIPTION FILE AND BINARY FILE DEFINE DESCRIPTION FILE AND BINARY FILE

Error code (decimal)	Description
60240	**No MeasureCal device with given name found** The device given in PARAMETER FOR VALUE ACQUISITION, EXTENDED PARAMETER FOR VALUE ACQUISITION / PARAMETER FOR VALUE ACQUISITION EV2 or DEFINE RECORDER PARAMETERS can not be found. This is an internal error or may be caused due to a configuration change during an ASAP3 session. PARAMETER FOR VALUE ACQUISITION EXTENDED PARAMETER FOR VALUE ACQUISITION / PARAMETER FOR VALUE ACQUISITION EV2 GET USER DEFINED VALUE LIST DEFINE RECORDER PARAMETERS
60241	**Cannot download working page "<data set name>" to device. Please see INCA monitor log for further information.** If the option "Data Download at 'SELECT DESCRIPTION FILE AND BINARY FILE'" in the General options dialog is checked, ASAP3.EXE tries to download the working page to the device after the working data set has been selected within the commands SELECT DESCRIPTION FILE AND BINARY FILE and DEFINE DESCRIPTION FILE AND BINARY FILE. If this fails, above error is returned. SELECT DESCRIPTION FILE AND BINARY FILE DEFINE DESCRIPTION FILE AND BINARY FILE
60242	**Cannot create a copy of the data set with the new name '<new data set name>' in project '<project name>'.** In case the SELECT DESCRIPTION FILE AND BINARY FILE command is executed while the options "Data Download at 'SELECT DESCRIPTION FILE AND BINARY FILE'" and "Create New DS at Download within MCS" are checked, or the DEFINE DESCRIPTION FILE AND BINARY FILE command is executed with parameter *Mode* set to 2 while the option "Create New DS at Download within MCS" is checked, ASAP3.EXE tries to create a copy of the selected data set. If INCA is not able to create a copy, the error message is shown. SELECT DESCRIPTION FILE AND BINARY FILE DEFINE DESCRIPTION FILE AND BINARY FILE
60244	**No RAMCal device with given name found** This error can occur if during the calibration access (table or parameter) to a label that represents a measurement the corresponding RAMCal device for the device of that label could not be found in the current experiment.
60245	**MODULE parameter required for this service.** This error can occur during the "EXTENDED ExecuteService" command with one of the services "Set Option", "Get Option" or "Get State" when the parameter MODULE is missing in the service input parameter string.

Error code (decimal)	Description
60246	**%s parameter required for this service.** This error can occur during the "EXTENDED ExecuteService" command execution with one of the services "Get Option", "Get State", "Get Option Information" or "Get State Information" when the parameter OPTIONNAME or STATENAME is missing.
60247	**OPTIONVALUE parameter required for this service.** This error can occur during the "EXTENDED ExecuteService" command execution with the service "Set Option" when the parameter OPTIONVALUE is missing.
60248	**The INCA method Get-/SetOption or GetStatus or GetOption-/GetStatusInfo returns the following error: <Followed by a service specific INCA error text>** This error can occur if any of the following "EXTENDED ExecuteService" command services fails within core INCA: "Set Option" , "Get Option", "Get State", "Get Option Information" and "Get State Information". The INCA error text is appended to the shown error text.
60282	**There is already a LUN to the first device in the INCA workspace assigned!** For protocol version 2.01, ASAP3 allows to access the first device in the INCA workspace by using the LUN 0. This is possible without the need of the AuSy to explicitly call the command SELECT DESCRIPTION FILE AND BINARY FILE or DEFINE DESCRIPTION FILE AND BINARY FILE and is intended to work as a shortcut. Internally, with the first use of the LUN 0, almost the same process is executed as with SELECT DESCRIPTION FILE AND BINARY FILE, which would create a LUN 0 as the first device in the INCA workspace. In case this process detects that already another command requested a LUN for the same first device in the INCA workspace, this error is returned, because it is not allowed to have two LUNs assigned to the same device. SELECT LOOK-UP TABLE GET PARAMETER SET PARAMETER READ CELL VALUES WRITE CELL VALUES READ CHARACTERISTIC WRITE CHARACTERISTIC COPY BINARY FILE CHANGE BINARY FILE NAME RESET DEVICE EXTENDED ExecuteService (Switch Emulation Page) PARAMETER FOR VALUE ACQUISITION EXTENDED PARAMETER FOR VALUE ACQUISITION / PARAMETER FOR VALUE ACQUISITION EV2 DEFINE RECORDER PARAMETERS

Error code (decimal)	Description
60283	**Loading data into the INCA database is not allowed during online state to avoid inconsistencies between the ECU and MCD system.** The command COPY BINARY FILE was called with the parameter *Target* set to 3 (virtual emulator board; INCA Database) and the parameter *Source* set to 2 (File). Advice: Explicitly switch off-line with command SWITCHING OFF-LINE/ON-LINE before issuing the COPY BINARY FILE (*Source=2, Target=3*). COPY BINARY FILE
60284	**Internal error: Cannot retrieve the project database path of the device '<device name>' (INCACOM GetProjectDataBasePath)** When the commands SELECT DESCRIPTION FILE AND BINARY FILE and DEFINE DESCRIPTION FILE AND BINARY FILE are executed, ASAP3.EXE has to look for a device within INCA that has the given description file loaded. In case INCA issues an error when it is asked for the description file name of a given device, above error is shown; <device name> is hereby replaced by the current device under investigation. See the monitor window for more information about the error. SELECT DESCRIPTION FILE AND BINARY FILE DEFINE DESCRIPTION FILE AND BINARY FILE
60285	**Internal Error: The project database path of the device '<device name>' is empty! (INCACOM GetProjectDataBasePath)** When the commands SELECT DESCRIPTION FILE AND BINARY FILE and DEFINE DESCRIPTION FILE AND BINARY FILE are executed, ASAP3.EXE has to look for a device within INCA that has the given description file loaded. In case INCA returns an empty name when it is asked for the description file name of a given device, above error is shown; <device name> is hereby replaced by the current device under investigation. See the monitor window for more information about the error. SELECT DESCRIPTION FILE AND BINARY FILE DEFINE DESCRIPTION FILE AND BINARY FILE

Error code (decimal)	Description
60286	**Cannot find data set '<data set name>' in project '<project database path>'. Please verify project name and data set name. Be sure to prefix the data set name with the folder name within project!** If the option "Use database names in 'SELECT / DEFINE DESCRIPTION FILE AND BINARY FILE'" in the General options dialog is checked and either of the commands SELECT DESCRIPTION FILE AND BINARY FILE or DEFINE DESCRIPTION FILE AND BINARY FILE is called with a dataset name that does not exist within INCA in the given project name, the above error is returned. Please check that the project specified with the given project data base path contains a data set that has the same name as indicated as the data set name. SELECT DESCRIPTION FILE AND BINARY FILE DEFINE DESCRIPTION FILE AND BINARY FILE
60287	**Passover time from receive thread exceeded 1 second: <number of milliseconds> ms total passover time. Possible reason: system load too high** ASAP3.EXE uses a separate thread to read commands from the serial line or from TCP/IP. If a new command is available, the main thread is notified about this fact. The main thread then tries to read the command as soon as possible. If the time between notification and current reading of the command is longer than one second, this warning is logged in the logging window to inform the user about a possibly too high system load. Normally, passing a received telegram to the main thread should be a matter of a few (e.g. 10) milliseconds. This error is never returned to the AuSy.
60288	**No memory pages supported!** This error can occur with the EXTENDED Service "Switch Emulation Page". It means that the used Device (LUN) does not support memory pages and therefore the command cannot be applied.
60289	**Only one memory page supported!** This error can occur with the EXTENDED Service "Switch Emulation Page". It means that the used Device (LUN) does support only one memory page and therefore the command cannot be applied.
60305	**Invalid meta data identifier.** This error can occur with the EXTENDED Service "Get Tool Setup Information" and means that an unknown/unsupported meta data identifier was used in the request string.
60306	**This meta data identifier is only supported for LUNs which refer workbase devices (devices with associated data set)** This error can occur with EXTENDED Service "Get Tool Setup Information" and means that a LUN was used that does not support the requested meta data identifer, e.g. an AD-Converter cannot be asked about the name of his working page, because there is no working page for this device type.

Error code (decimal)	Description
60307	**INFO parameter required!** This error can occur with EXTENDED Service “Get Tool Setup Information” and means that the mandatory “INFO” parameter is missing in the request string. Check the syntax of the string.
60321	**The "AlwaysUseFuliDeviceIfAvailable" option cannot be changed because this functionality is currently in use.** This error is returned if the user tries to execute the EXTENDED ExecuteService command with service SetOption for MODULE: ASAP3 and OPTIONNAME: AlwaysUseFuliDeviceIfAvailable set to OPTIONVALUE: true but there are already devices (LUNs) created and hence system consisntency can only be guaranteed by keeping this option as it was for the first created device (LUN).
60505	**The command can't be executed because the index which is used to have access to the data is out of the possible limits!** If at least protocol version 3 is active, the error code 8 is returned instead of 60505. SET LOOK-UP TABLE GET LOOK-UP TABLE VALUE INCREASE LOOK-UP TABLE READ CELL VALUES WRITE CELL VALUES
60512	**Because of write protection the map values can't be changed!** Possible reason could be that the wrong page is active (reference page) or that the map is write-protected. PUT LOOK-UP TABLE INCREASE LOOK-UP TABLE SET LOOK-UP TABLE
60513	**Because of write protection the x-axis values can't be changed!** Possible reason could be that the wrong page is active (reference page) or that the map is write-protected. PUT LOOK-UP TABLE
60514	**Because of write protection the y-axis values can't be changed!** Possible reason could be that the wrong page is active (reference page) or that the map is write-protected. PUT LOOK-UP TABLE
60515	**Because of write protection the parameter value can't be changed!** Possible reason could be that the wrong page is active (reference page) or that the map is write-protected. SET PARAMETER
60517	**The access to the working point data is not possible because the feature is currently disabled in the ASAP3 options.** The option “Enable Working Point functionality for 1D and 2D characteristics (curves and maps)” in the “Online” option tab is not checked.

Error code (decimal)	Description
60518	**The given data type is not supported.** Error is returned if the value of the 'Representation Type' in the command SET FORMAT is not supported (e. g. the not supported value 4 is used for the 'Representation Type' parameter).
60519	**The data type is not valid for the parameter.** Commands like EXTENDED SET PARAMETER / SET PARAMETER EV2 only support float and double data types. If another data type is requested the error 60519 is returned.
60800	**The value […] is already wired as Recorder value!** It is not possible to wire a recorder value twice. As the DEFINE RECORDER PARAMERTERS command is cumulative, please check if you have wired that value in a prior call of DEFINE RECORDER PARAMETERS. If at least protocol version 3 is active, the error code 9 is returned instead of 60800. DEFINE RECORDER PARAMETERS
60801	**The value […] is already wired as Online value!** It is not possible to wire an online value twice. As the PARAMETER FOR VALUE ACQUISTION command is cumulative, please check if you have wired that value in a prior call of PARAMETER FOR VALUE ACQUISITION. If at least protocol version 3 is active, the error code 15 is returned instead of 60801. PARAMETER FOR VALUE ACQUISITION EXTENDED PARAMETER FOR VALUE ACQUISITION / PARAMETER FOR VALUE ACQUISITION EV2
60808	**The value […] is contained twice in the list r the new values!** It is not possible to wire the same value twice. Please check the value list of the current command, it must contain the same value twice. PARAMETER FOR VALUE ACQUISITION DEFINE RECORDER PARAMETERS
60809	**Invalid start trigger condition!** Please check your trigger condition for: – Typing errors – Missing blanks between variables and operators – Wrong device names for variables – Missing quotation marks for variables or variable/device names that contain blanks DEFINE TRIGGER CONDITION

Error code (decimal)	Description
60810	**Invalid stop trigger condition!** Please check your trigger condition for: – Typing errors – Missing blanks between variables and operators – Wrong device names for variables – Missing quotation marks for variables or variable/device names that contain blanks DEFINE TRIGGER CONDITION
60811	**Command […] is not possible while recorder is running. Stop recorder with the command ACTIVATE RECORDER and Mode=0 first!** The recorder must be stopped for the current command. PARAMETER FOR VALUE ACQUISTION GET USER DEFINED VALUE LIST DEFINE RECORDER PARAMETERS DEFINE TRIGGER CONDITION GET RECORDER RESULTS HEADER GET RECORDER RESULTS SAVE RECORDER FILE LOAD RECORDER FILE
60812	**No recorder data available. Load a recorder file or set up a new recording first! If a start trigger is configured, check if it was in conditioned state.** A possible reason could also be that the last LOAD RECORDER FILE operation failed for some reason (e.g. access restrictions, corrupted file etc). GET RECORDER RESULTS HEADER GET RECORDER RESULTS SAVE RECORDER FILE
60816	**No device found for LUN […]** Please check your script for prior errors. A possible reason could be a missing or failed SELECT DESCRIPTION FILE AND BINARY FILE or DEFINE DESCRIPTION FILE AND BINARY FILE. PARAMETER FOR VALUE ACQUISITION EXTENDED PARAMETER FOR VALUE ACQUISITION / PARAMETER FOR VALUE ACQUISITION EV2 GET USER DEFINED VALUE LIST DEFINE RECORDER PARAMETERS Note: Only devices that support calibration pages can be used with the SELECT DESCRIPTION FILE AND BINARY FILE command or the standard syntax of the DEFINE DESCRIPTION FILE AND BINARY FILE command. See the _AUXIN_ variant of the DEFINE DESCRIPTION FILE AND BINARY FILE for further information.

Error code (decimal)	Description
60819	**Start/stop trigger not possible in combination with Nr. of Samples!** If triggers are defined Nr. of Samples must be set to 0! INCA does only support start/stop trigger or sample limitation over ASAP3. DEFINE TRIGGER CONDITION
60820	**The file […] already exists and can not be overwritten because it is read-only!** Remove the read-only flag from this file to be able to overwrite it. Check also if the target device (e.g. a removable media) is write-protected. This error could also be caused by right limitations on a network drive. In this case you have to contact you network administrator. SAVE RECORDER FILE
60823	**No acquisition rates available for the device with LUN […]!** Perhaps the ASAP2 file does contain incorrect raster definitions for the device represented by the LUN. PARAMETER FOR VALUE ACQUISITION EXTENDED PARAMETER FOR VALUE ACQUISITION / PARAMETER FOR VALUE ACQUISITION EV2 DEFINE RECORDER PARAMETERS

Error code (decimal)	Description
60825	**1. An error occurred when adding new value(s)!** The following value(s) could not be found: [60815] Please check the spelling or case of the values. If at least protocol version 3 is active, the error code 9 is returned instead of 60825. PARAMETER FOR VALUE ACQUISITION EXTENDED PARAMETER FOR VALUE ACQUISITION / PARAMETER FOR VALUE ACQUISITION EV2 DEFINE RECORDER PARAMETERS Do also check the option “Labels are case sensitive” in the General page of the Options dialog. In some cases the client uses variable names in uppercase which will fail if this option is set. **2. An error occurred when adding new value(s)!** Could not add the following value(s) because all raster tables are full: [60826] No further wiring possible. Try to remove variables before adding new ones. PARAMETER FOR VALUE ACQUISITION EXTENDED PARAMETER FOR VALUE ACQUISITION / PARAMETER FOR VALUE ACQUISITION EV2 DEFINE RECORDER PARAMETERS **3. An error occurred when adding new value(s)!** Could not get a Raster for the following variables (Check your ASAP2 file): [60828] The ASAP2 file might contain incorrect raster definitions. PARAMETER FOR VALUE ACQUISITION EXTENDED PARAMETER FOR VALUE ACQUISITION / PARAMETER FOR VALUE ACQUISITION EV2 DEFINE RECORDER PARAMETERS
60832	**Command not possible because a 'LOAD RECORDER FILE' command is still running in the background!** ASAP3 performs a LOAD RECORDER FILE in the background, to allow for a fast response to the LOAD RECORDER FILE command. During the background execution of this command, no other command that affects the recorder configuration, is allowed to be executed. ACTIVATE RECORDER GET RECORDER STATUS GET RECORDER RESULTS HEADER GET RECORDERRESULTS SAVE RECORDER FILE LOAD RECORDER FILE

Error code (decimal)	Description
60833	**Command not possible because a 'SAVE RECORDER FILE' command is still running in the background!** ASAP3 performs a LOAD RECORDER FILE in the background to allow for a fast response to the LOAD RECORDER FILE command. During the background execution of this command, no other command that affects the recorder configuration is allowed to be executed. ACTIVATE RECORDER GET RECORDER STATUS GET RECORDER RESULTS HEADER GET RECORDERRESULTS SAVE RECORDER FILE LOAD RECORDER FILE
60834	**Too many rasters used within INCA. Reduce the number of rasters (e. g. for CalcDev devices use fixed rate).** Error can be returned by commands like (EXTENDED) GET ONLINE VALUE / GET ONLINE VALUE (EV2) if too many rasters are in use.
60835	**It is not allowed to wire values from FULI-LUNs into a recorder.** If DEFINE RECORDER PARAMETERS tries to wire a parameter within a fuli device while the setting 'AlwaysUseFuliDevice' is set to false an error is returned.
60836	**Could not get a file manager for a specific file. The file format might be unknown.** Can occur in the context of the command LOAD RECORDER FILE if loading a file with a not supported format is requested.
60837	**While opening the file an error occurred by the MDF reader.** Returned if an unexpected occurred during creating the MDF reader in the context of the command LOAD RECORDER FILE.
60838	**The file has an unknown format.** Only the formats 'mdf3.0', 'mdf3.3', 'mdf4.0' and 'mdf4.1' are supported by the command LOAD RECORDER FILE.
60839	**Conversion type is not allowed.** The conversion types 'ConversionTypeAsamMcd2Text', 'ConversionTypeValue2Text', 'ConversionTypeValueRange2Text', 'ConversionTypeText2Value' and 'ConversionTypeText2Text' are not allowed by the command LOAD RECORDER FILE.
60840	**Missing time channel for raster group.** Possible error in the context of the command LOAD RECORDER FILE.
60841	**The raster sizes are missing in the measurement file.** Error in the context of the command LOAD RECORDER FILE.
60842	**Data type is not supported.** The channel data types 'ChannelDataTypeByteArray' and 'ChannelDataTypeASCIIString'' are not supported by LOAD RECORDER FILE.

Error code (decimal)	Description
60843	**Error while reading samples.** Returned if reading the samples failed during a GET RECORDER RESULTS command invocation.
60844	**The file doesn't exist.** Will be returned if the measurement file requested by LOAD RECORDER FILE doesn't exist.
60847	**Mixed use of 'STANDARD' and 'EXTENDED' PARAMETER FOR VALUE ACQUISITION and GET ONLINE VALUE commands is not allowed. Please clear the acquisition list before switching command types.** PARAMETER FOR VALUE ACQUISITION and EXTENDED PARAMETER FOR VALUE ACQUISITION can only be used mutually exclusive. To switch the command types, the acquisition list has to be cleared before, e.g. by using one of both commands with the parameter "Number of Values" set to 0.
60848	**An RCI2-error occurred when adding new value(s): %1. Please close ASAP3, reopen the experiment and restart ASAP3 to ensure that INCA again is in a consistent state.** This error can occur during PARAMETER FOR VALUE ACQUISITION in case a user interaction in the GUI of INCA took place that caused the measurement setup to change. (This is an unsupported use case and can lead to an instable system. Therefore the GUI should not be used during ASAP3 use.)

Tab. 7-3 Error codes (decimal)

8.3 iLinkRT Errors

Error	Code	Description
ERR_CMD_BUSY	0x0010	Command was not executed.
ERR_CMD_UNKNOWN	0x0020	Unknown command or not implemented optional command.
ERR_CMD_SYNTAX	0x0021	Command syntax invalid
ERR_OUT_OF_RANGE	0x0022	Command syntax valid but command parameter(s) out of range.
ERR_ACCESS_DENIED	0x0024	The memory location is not accessible.
ERR_SEQUENCE	0X0029	Sequence error
ERR_RESOURCE_TEMP-ORARY_NOT_ACCESSIBLE	0x0033	Access to the requested resource is temporary not possible.
ERR_MULTIPLE_RASTER	0x0040	Multiple rasters not supported.
ERR_INVALID_CONFIG	0x0041	Measuring configuration invalid.
ERR_RASTER_FULL	0x0042	Requested raster is full.
ERR_FILE_UNKNOWN	0x0043	File name or path invalid.
ERR_FILE_EXISTS	0x0044	File exists and should not be overwritten.
ERR_INDEX_OUT_OF_RANGE	0x0045	Index out of range
ERR_NAME_UNKNOWN	0x0046	Name unknown
ERR_REP_TYPE_MISMATCH	0x0047	Identical measurement in different measurement representation types configured.
ERR_DEVID_UNKNOWN	0x0050	Device Id invalid
ERR_MID_UNKNOWN	0x0051	Measurement Id invalid
ERR_CID_UNKNOWN	0x0052	Characteristic Id invalid
ERR_DAQID_UNKNOWN	0x0053	Data Acquisition Id invalid
ERR_RASTER_INVALID	0x0054	Raster Reference not supported
ERR_INVALID_STATE	0x0060	Command not allowed in this MC-Server state.
ERR_MEAS_RUNNING	0x0061	Command not allowed while MEASURING_STATE < > CONFIGURABLE
ERR_REC_NOT_STOPPED	0x0062	Command not allowed in this Recorder state
ERR_ACCESS_RIGHTS	0x0070	The access is prohibited, because the functionality is used by another MC-Client.
ERR_LIST_TOO_LONG	0x0080	The response exceeds the DATA field length.
ERR_FUNCTIONALITY_ NOT_SUPPORTED	0x0100	Specific requested functionality not supported.
ERR_UNKNOWN	0xFFFF	There is no standard error but a vendor specific error. Used for unexpected errors in the ASAP3.exe.

9 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 website: www.etas.com/hotlines

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