USER MANUAL

CSM Link Software v3.2



Content

1	Indications for Use4		
	1.1	Features	4
	1.2	How it works	4
	1.3	Compatibility	4
2	Settings		5
		Communication Port	
		Hospital Information	
		Data Folder	
3		ant To	
		Start capturing online data from a CSM Monitor	
	3.2	•	
	3.3	Review a CSM Case from file	
		Scan the computer for CSM devices	
4		oture real-time data	
4		Start Capturing	
		The Capture Window	
	4.2	4.2.1 Parameters	
		4.2.2 EEG Waveform	
		4.2.3 Trend Graph	
		4.2.4 Quick Event List	
		4.2.5 Tabular Data	
	43	Trace data	
	4.4		
	4.5	Stop Capturing	
	4.6		
		Auto save	
5		mory Management	
		CSM Monitor MK1	
		CSM Monitor MK2	
	5.2	5.2.1 Setting the CSM Monitor clock	
	53	Downloading Data	
		Clear Memory	
		•	
6		riew Data	
	6.1	Open CSM File for Review	
	6.2	The Review Window	
	6.3	F	
		Save Picture of Graph	
	6.5	Create Report	
		6.5.1 Report Profiles	
	0.0	6.5.2 Report Sample	
		Convert old CSV file	
7	Co	mmand Line Arguments	
	7.1	How to download to CSM File	
	7.2	How to download to CSV File	20
	7.3	How to download to XML File	20

This manual is published by Danmeter A/S who reserves the right to improve and modify the contents without prior notice. Modifications will, however, be published in future editions of this manual. All rights reserved.

Cerebral State Monitor, CSM & CSI are trademarks of Danmeter A/S Products distributed by Danmeter A/S

English PN 564200002-3.2

1 Indications for Use

Online and offline data management of case documentation and reporting or clinical and scientific research. The CSM Link Software™ for Windows® wirelessly downloads cases automatically stored in the CSM monitor or wirelessly captures (online) the CSM monitor parameters and processed EEG waveform.

1.1 Features

- Wireless download of cases from the CSM Monitor™ memory for the last 18 hours of CSM parameters, or 10 sessions.
- Wireless online data capture from the CSM monitor including processed EEG waveform.
- Cerebral State Index (CSI), Electromyography (EMG%), Burst Suppression (BS%), Signal Quality Index (SQI), Sensor impedance, monitor events and CSI alarm values parameter capture.
- User event marker.
- Monitor and User Event labelling with notes.
- Event locator function.
- Indicators for sensor alarm, artifacts, battery status etc.
- Display of trend curves for CSI, EMG%, BS%, SQI (user selectable).
- Display of CSI high and low alarms.
- Display of processed EEG waveform with online trace function.
- Tabular data for CSI and BS
- Zoom and scroll option online and offline.
- Trend marker values of all parameters and EEG waveform.
- Case data information.
- Case reporting to screen, printer or PDF file.
- WYSIWYG picturing in popular file formats.
- Export cases to CSV or XML files.
- Convert old CSM Link Software and CSM Capture files to new CSM file format.
- Set Clock on CSM monitor.
- Smart scan of all communications port(s) available on the computer operating the CSM Link Software™

1.2 How it works

Wireless exchange of data takes place between the CSM Monitor™ and the CSM Link™ .The CSM Link™ device is connected to a Windows® computer or laptop hosting the CSM Link Software™ through a serial RS232 or USB communication port. All processing of parameters and waveforms takes place in the CSM Monitor™. CSM Link Software™ does not change / delete the data received from the CSM Monitor™.

1.3 Compatibility

- CSM Link™ firmware version 2.000.001 or higher is required.
- Full utilization of the CSM Link Software v3.2 features requires CSM Monitor™ firmware version 2.000.004 or higher.
- Imports all previous CSM Case files (*.CSV files) created with CSM Capture and CSM Link Software™ and converts to the new CSM file format.

2 Settings

In the "Settings" menu it is possible to set the following properties for the program:

- Communication Port set which communication port to use by default
- Hospital Information set logo and hospital name to be used in the Case Report
- Data Folder set where to store recorded and downloaded data by default

The settings are stored and will be used the next time the program is started. The settings can only be changed when the program is <u>not</u> recording, downloading or reviewing data.

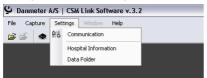


Figure 1: The "Settings" menu.

2.1 Communication Port

Before running CSM Link Software for the first time a communication port must be selected.

Use the "Settings | Communication" or use the "I Want To..." shortcut to display the "Communication Settings" dialog.

The "Communication Settings" dialog scans the computer for CSM devices. Use the "Scan Ports" button to execute a new scan of the computer.

The currently used communication port is shown with an icon to the left. To change the communication port used, select it in the list and click the "Select" button.

If experiencing problems with the connection to the CSM Monitor use the "Communication Settings" to check the status of the communication.

Only Link Types with RS232(High) or USB can be used with the CSM Link Software.



Figure 2: The Communication Settings dialog with scan functionality

2.2 Hospital Information

Use the "Settings | Hospital Information" menu to display the "Hospital Information" dialog.

If a Hospital/department name is supplied it will appear on the Case Report. It is also possible to link to a logo picture, which also will appear on the Report. The logo will be resized to a maximum height of 100 pixels and width of 200 pixels. The aspect ratio of the image is maintained.



Do not use a large picture as logo. This will increase the size of the saved Case Report (PDF) file.

Figure 3: Apply the Hospital name and logo and it will appear on the Case Report.

2.3 Data Folder

If the Data Folder is not avaliable, CSM Link Software will set the Data Folder location to: C:\Program Files\Danmeter\CSM Link Software\Data

Sessions downloaded from or captured by the CSM Monitor will allways be stored in the Data Folder by default.

Use the "Settings | Data Folder" menu to set the Data Folder.

Select the folder to use as default data folder. This is where the program will save all recorded and downloaded data by default.

Create a new folder by using the "Make New Folder" button.

All users on the computer use the selected folder. Do not select a folder in your private working area if other users are to access the CSM Files.

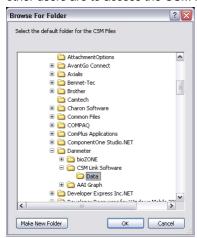


Figure 4: Select folder to use as Data Folder

3 I Want To

When the software is idle the "I Want To" screen will be shown. This screen is a quick menu with the main functions in the software.

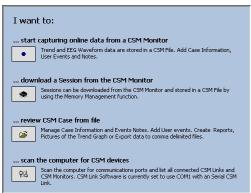


Figure 5: The quick start guide.

3.1 Start capturing online data from a CSM Monitor

- Use this function to capture data from a CSM Monitor. Online capturing is done while the CSM Monitor is running. The main difference between downloading and capturing data is that when capturing data the EEG waveform data is captured and stored in the CSM-File. EEG waveform data are not available when downloading data.
- No data from the CSM Monitor are changed/deleted by the software.
- User events can be set/deleted while capturing.
- Notes can be attached to user/monitor events while capturing.
- Case information can be entered while capturing.
- Scrolling data or changing the zoom will not affect the captured data.

3.2 Download a session from a CSM Monitor

- Use this function to download sessions from the CSM Monitor.
- EEG waveform data are not available in downloaded sessions.

3.3 Review a CSM Case from file

- Use this function to review/update information in a CSM Case
- User events can be set/deleted.
- Notes can by attached to user/monitor events.
- Case information can be attached.
- Case Report can be saved (PDF-file) or printed.
- Data can be exported to CSV or XML format.
- Images of the trend graph can be created.

3.4 Scan the computer for CSM devices

- Use this function to scan the computer for CSM devices.
- It detects where a CSM Device is attached and lets you select the communication port to use.

4 Capture real-time data

This section describes which functionality is available when capturing real-time data from the CSM Monitor and how to use these functions.

4.1 Start Capturing

Use either the "Capture | Start" menu, toolbar button or the "I Want To..." shortcut to start capturing data.



Figure 6: Start capturing data

If a message displaying "Scanning for CSM Link" is shown, it indicates that the CSM Link Software cannot detect any CSM Link on the selected communication port (the status bar shows which communication port is to be used).

If a message displaying "CSM Link detected - Scanning for CSM Monitor" is shown, it indicates that no CSM Monitor is linked with CSM Link.

If a message displaying "CSM Link and CSM Monitor detected – Waiting for sessions to start" is shown, it indicates that CSM Link Software is connected to the CSM Monitor and ready for capturing data as soon as a session starts on the CSM Monitor.

4.2 The Capture Window

The capture window has 3 main components:

- Parameters
- EEG Waveform
- Trend Graph with Quick Event List or Tabular data



CSM Link Software v3.2 – User Manual

Page 8 of 21

The toolbar contains most of the functions available when capturing data from the CSM Monitor:

- Start Capture
- Stop Capture stops capturing data if the action is confirmed and ask if the data are to be saved
- Show Trend Graph
- Show Tabular Data
- Trace Marker Values starts tracing marker values when the mouse moves across the Trend.
 Marker values are shown for the Parameters and EEG Waveform
- Show CSI on the Trend Graph
- Show BS on the Trend Graph
- Show EMG on the Trend Graph
- Show SQI on the Trend Graph
- Show Events on the Trend Graph
- Show Alarm Zone on the Trend Graph
- Open Event dialog
- Open Case Information dialog
- EEG Amplitude changes the amplitude on the EEG Waveform
- EEG Speed changes the speed of the EEG Waveform
- Trend Graph time format selects whether to show clock or timer values on the Trend Graph. The clock is the real time clock of the computer and the timer is the time from the case starts on the computer.
- Tabular Data period changes the period length of the Tabular Data

The Status bar contains information of the current recording:

- Status indicator of the communication
- Selected communication port
- Serial number of the CSM Monitor
- Battery status of the CSM Monitor
- Name of the current CSM Case
- Total time captured with the CSM Link Software
- Free physical memory when this value goes below 20 MB the recording is automatically saved to prevent data loss due to low memory.

4.2.1 PARAMETERS

The available Index Parameters are:

- CSI
- BS
- EMG
- SQI
- Alarm Zone the high and low alarm values set on the CSM Monitor and information about whether they are activated or not
- Impedance sensor impedance for the white and black sensor
- Status shows status of the current data record such as Sensor Alarm, Artifact etc.

4.2.2 EEG WAVEFORM

The EEG Waveform can show 10, 20 or 40 seconds of processed EEG Waveform data with amplitude from ±5µV to ±180µV depending on the selected EEG Speed.

The EEG Speed and amplitude can be changed with the controls in the Toolbar.

4.2.3 TREND GRAPH

Event Indicator

Shows an event marker with event number at every event set in the case. Events set on the CSM Monitor are prefixes with an "M" and event set on the CSM Link Software are prefixed with a "U".

Trend Graph

Displays the CSI, BS, EMG, and SQI as curves and Alarm values as a zone.

Navigation Panel

Use the Navigation Panel to change the zoom.

It is only possible to scroll in the Trend Graph if "Trace Marker Values" is selected.

If the graph is running with a zoom higher than 1-second, data is still captured at 1-second interval and all data will be stored. The zoom can be changed from 1 to 255 seconds.

EMG-bar

Shows the EMG value as a bar.

4.2.4 QUICK EVENT LIST

The Quick Event List shows all events. Click an Event to display the note of this event.

In Trace mode, events can be located on the Trend Graph by selecting an Event and clicking the "Locate Event" button.

4.2.5 TABULAR DATA

The period length of the calculated Tabular data is selected in the Toolbar.

The last row of tabular data is updated as data is received from the CSM Monitor.



Figure 8: Tabular data during online recording.

4.3 Trace data

Online data can be traced while still recording data in the background. Select the "Trace Marker Values" button in the toolbar to trace data.

When the Trend Graph is shown – select the "Trace Marker Values" in the toolbar to start trace value when the mouse moves across the Trend Graph.

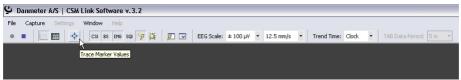


Figure 9: Use the toolbar button "Trace Marker Values" to start tracing marker values.

4.4 Manage Events

Use the "Window | Event List" menu to open the "Event List" dialog.

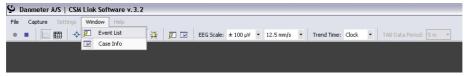


Figure 10: Open the Event List dialog

In the "Event List" dialog all events set on the monitor are listed with the clock, session timer, event number, event type and note.

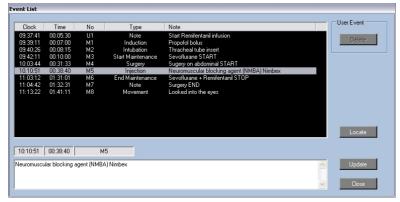


Figure 11: The Event dialog shows all events set. Attach notes and locate events

When an event is set on the CSM Monitor it appears in the event list. Click on any event in the list. The event note can now be changed. Enter a note for the event and click the "Update" button to attach a note to the event. Notes attached to events will be saved in the CSM File.

Only User Events can be deleted.

If the recorded data spans over more than one screen it is possible to locate a specific event by selecting the event in the list and click the *Locate* button. The system will enter "Trace Marker Values" mode and the Trend Graph will be adjusted to show the selected event in the middle of the graph.

User events can only be set when in "Trace" mode. Click the "Set User Event" button below the "Quick Event List" and left click on the trend where the user event is to be set.

Right click on the trend to cancel the action.

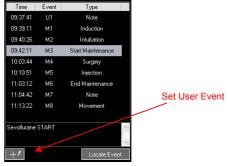


Figure 12: Set user event while recording data

4.5 Stop Capturing

Use the "Capture | Stop" menu or the toolbar button to stop capturing data and save the captured data to a CSM File.

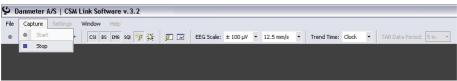


Figure 13: Stop capturing data.

The captured data will be saved to the file name shown in the status bar and will be placed in the Data Folder or the folder selected in the "Case Information" dialog. The CSM File name and storage folder for the current recording can be changed at any time during data recording.

The default name of the saved CSM File depends on the local short date format on the computer. If the local short date format is DDMMYYYY the file will be named: DDMMYYYYhhmmss.csm

DD : the day when the capturing was started
MM : the month when the capturing was started
YYYY : the year when the capturing was started
hh : the hour when the capturing was started
mm : the minute when the capturing was started
ss : the second when the capturing was started

4.6 Case Info

Use the "Window | Case Info" menu to open the "Case Info" window.



Figure 14: Open the Case Info dialog

The "Case Info" window contains information about the case. Enter data and click the "Save" button to save the data. Case Info data are saved in the CSM File.

The Case Length is not available during Capturing real-time data.

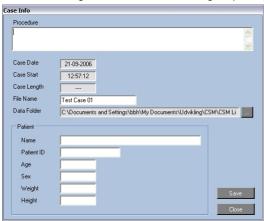


Figure 15: Case Information dialog

4.7 Auto save

If the free physical memory on the computer goes below 20MB the program automatically saves the Case and stops recording to prevent data loss.

5 Memory Management

Before starting Memory Management make sure that the CSM Monitor has been started without sensors being connected and is linked with the CSM Link

Use the "File | Memory Management" menu or the "I Want To..." shortcut to start Memory Management.

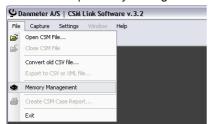


Figure 16: Start Memory Management

5.1 CSM Monitor MK1

The Memory Management module shows the serial number and firmware version of the CSM Monitor and CSM Link.

A list of the latest 10 completed sessions can be seen. Should 10 sessions not have been recorded or if the memory has been cleared, the number of sessions on the list may vary.

The CSM Monitor MK1 has no internal clock, therefore the sessions are marked with numbers. The name of any downloaded file will default to the time when the session was downloaded.

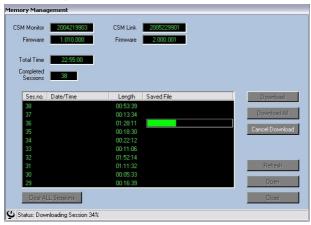


Figure 17: The Memory Management Module for the CSM Monitor MK1

5.2 CSM Monitor MK2

The Memory Management module shows the serial number and firmware version of the CSM Monitor and CSM Link.

The CSM Monitor Clock is shown and can be adjusted by using the "Set CSM Clock" button.

5.2.1 SETTING THE CSM MONITOR CLOCK

Use the "Get PC Time" button to retrieve the clock from the computer or adjust the date and time manually. Click the "Save" button to save the settings to the CSM Monitor.



Figure 18: Setting the CSM Monitor clock

A list of the latest 10 completed sessions can be seen. Should 10 sessions not have been recorded or if the memory has been cleared, the number of sessions on the list may vary.

Sessions on the monitor can be identified by a timestamp applied to the session when it was recorded or by the session number.

If the CSM monitor is running DMX, the sessions left in the monitor are shown.

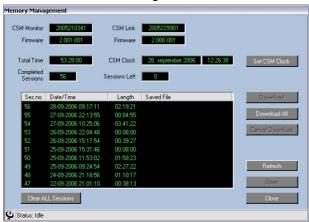


Figure 19: The Memory Management Module for the CSM Monitor MK2

5.3 Downloading Data

Downloaded sessions are not deleted in the CSM Monitor after download

If closing the Memory Management module and opening it again, earlier downloaded sessions will not be shown with a file name.

Download a specific session

To download a session – select the session on the list and click the "Download" button. A progress indicator is shown for the selected download.

When the session is downloaded a default name is suggested and the CSM File will be saved in the default "Data Folder". After saving the CSM File, the filename appears on the list. To open and review the session in CSM Link Software, select the session on the list and click the "Open" button. The session is saved as a CSM File in the default "Data Folder".

Download All sessions

Click the "Download All" button to download all sessions from the CSM Monitor. The sessions are downloaded one by one, named with a default name and saved to the default "Data Folder".

5.4 Clear Memory

The memory of the CSM Monitor can be cleared (ALL recorded sessions will be lost). The Completed Session and Total Time counter are not cleared when clearing the memory.

To clear the memory of the CSM Monitor, click the "Clear Memory" button.

6 Review Data

Data recorded with the CSM Monitor can be reviewed with the CSM Link Software.

6.1 Open CSM File for Review

Use the "File | Open CSM File" menu or the "I Want To..." shortcut to review a CSM File.

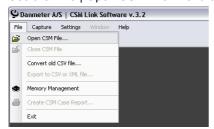


Figure 20: Open a CSM File for review

6.2 The Review Window

The Review Window has the same components as the Capture Window but there are some extended possibilities when reviewing a CSM Case.



The toolbar contains most of the functions available when reviewing a CSM Case either captured online or downloaded from a CSM Monitor:

- Open CSM File
- Close CSM File if the file has been changed the system will prompt to save the change
- Save image of the Trend Graph to a file
- Create a Case report in PDF format
- Show Trend Graph
- Show Tabular Data
- Show CSI on the Trend Graph

- Show BS on the Trend Graph
- Show EMG on the Trend Graph
- Show SQI on the Trend Graph
- Show Events on the Trend Graph
- Show Alarm Zone on the Trend Graph
- Open Event dialog
- Open Case Information dialog
- EEG Amplitude changes the amplitude on the EEG Waveform
- EEG Speed changes the speed of the EEG Waveform
- Trend Graph time format selects whether to show clock or timer values on the Trend Graph. The clock is the real time clock of the computer and the timer is the time from the case starts on the computer.
- Tabular Data period changes the period length of the Tabular Data



Figure 22: The toolbar for the Review Window

6.3 Export data to CSV or XML file

Use the "File | Export to CSV or XML file" menu to export data to a comma delimited file.

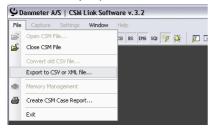


Figure 23: Export data to CSV or XML file

Data can be exported to either CSV or XML format. If exporting data to the CSV format the column separator must be selected.

Set a checkmark at the data to export and click the "Export" button. Disabled checkboxes indicate that the parameter is not available in the CSM File and therefore it cannot be exported.

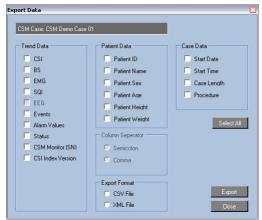


Figure 24: The Export data dialog

6.4 Save Picture of Graph

Pictures of the graph can be extracted to various image formats.

Use the button in the toolbar to save a picture of the Trend Graph as shown on the screen.

6.5 Create Report

Use the "File | Print Report" menu to print or save a report for the complete case.

The report can be saved as a PDF file. To preview or print the report Adobe Reader is required.

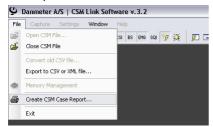


Figure 25: Print Case Report

The report contain the following sections:

- Case Info Hospital/department name and logo if applied. Serial number of the CSM Monitor(s) used for the recording and physical name of the stored CSM File. Information typed in the Case Info window
- Event list detailed list of all events in the case
- Graph graph with the selected parameters (CSI, EMG, BS, SQI, Event Markers, Alarm Zones).
 The Graph can split at every 30 minutes, 1, 2 or 3 hour and shown in colour or greyscale. Split Graph = 1 hour will show 1 hour of data across the page.

A Graph Split of 30 minutes will have the same resolution as a graph on the screen with zoom set to 4. A Graph Split of 1 hour = zoom 8 on the screen etc.

6.5.1 REPORT PROFILES

The last used Report Profile will be used by default when creating a Report. Select another Report Profile in the Report Profile combo box to change the used Report Profile.

To create a new Report Profile – use the "New Report Profile" button and enter the Report Settings for the new Report Profile in the following window.

To change the current Report Profile – make the changes and click the "Update Report Profile" button.

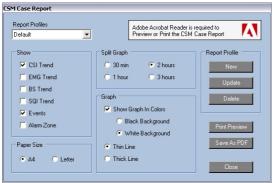


Figure 26: The Report window

6.5.2 REPORT SAMPLE

In this sample report the Graph Split time is set to 30 minutes with a black background and thin line.

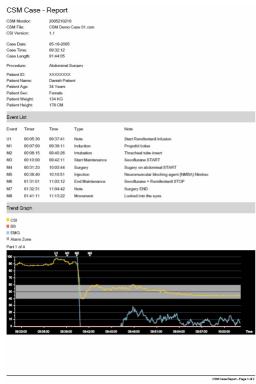


Figure 27: The Printed Report - Page 1 of 2

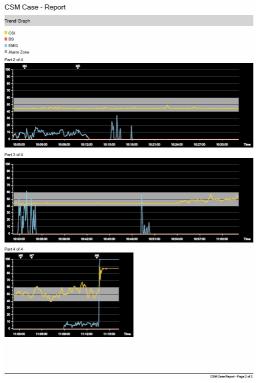


Figure 28: The Printed Report – Page 2 of 2

CSM Link Software v3.2 – User Manual

6.6 Convert old CSV file

Data files (CSV) created with older versions of CSM Capture or CSM Link Software can be converted to the new binary format.

Use the "File | Convert old CSV file" to convert an old data file. The file will be converted when closing the file.

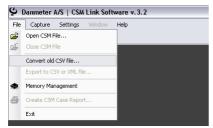


Figure 29: Convert old CSV file to binary format

7 Command Line Arguments

Applying the correct command line arguments can download the last recorded session on the CSM Monitor without user interaction on the CSM Link Software.

Data can be downloaded to a user defined destination and file name. Depending on the selected download format individual parameters can be downloaded.

The communication port set under the settings is used when downloading with command line arguments.

7.1 How to download to CSM File

This file is the standard CSM File format where all available parameters will be downloaded and can therefore be used with CSM Link Software

To download the last session from the CSM Monitor use this command line argument:

/DOWNLOAD_LATEST_CSM Destination CaseName

Destination: Specifies the directory for the downloaded file

CaseName: Specifies the filename for the CSM-File (file extension will be added)

Example:

CSM Link Software.exe /DOWNLOAD_LATEST_CSM c:\csmdata\ TestCase01

All parameters from the latest case will be downloaded to the CSM-File c:\csmdata\TestCase01.csm

7.2 How to download to CSV File

Parameters to download can be selected.

To download the last session from the CSM Monitor use this command line argument:

/DOWNLOAD_LATEST_CSV Destination CaseName Parameters

Destination: Specifies the directory for the downloaded file

CaseName: Specifies the filename for the CSV-File (file extension will be added)
Parameters: Binary pattern (7bit) describing which parameters to download

Value = 0, do not download this parameter

Value = 1, download this parameter

Position 1: Events

Position 2: CSI Index version

Position 3: CSI
Position 4: BS
Position 5: EMG
Position 6: SQI

Position 7: Alarm values

Example:

CSM Link Software.exe /DOWNLOAD_LATEST_CSV c:\csmdata\ TestCase01 1011111

All parameters except "CSI Index version" from the latest case will be downloaded to the CSV-File c:\csmdata\TestCase01.csv

7.3 How to download to XML File

Parameters to download can be selected

To download the last session from the CSM Monitor use this command line argument:

/DOWNLOAD_LATEST_XML Destination CaseName Parameters

Destination: Specifies the directory for the downloaded file

CaseName: Specifies the filename for the XML-File (file extension will be added)

 ${\tt Parameters:} \qquad {\tt Binary\ pattern\ (7bit)\ describing\ which\ parameters\ to\ download}$

Value = 0, do not download this parameter Value = 1, download this parameter

Position 1: Events

Position 2: CSI Index version

Position 3: CSI Position 4: BS Position 5: EMG Position 6: SQI

Position 7: Alarm values

Example:

 ${\it CSM Link Software.exe / DOWNLOAD_LATEST_XML \ c: \ \ csmdata \setminus \ TestCase01 \ 10111111}$

All parameters except "CSI Index version" from the latest case will be downloaded to the XML-File c:\csmdata\TestCase01.xml