

## User Handbook

## Maintenance Software

| TYPE       | Handbook              |
|------------|-----------------------|
| N° APS     | 07873 20 40           |
| SYSTEM     | All                   |
| SUB SYSTEM | Maintenance/Diagnosis |

| DISTRIBUTION | <input type="checkbox"/> Confidential <input type="checkbox"/> Limited <input checked="" type="checkbox"/> Wide |
|--------------|-----------------------------------------------------------------------------------------------------------------|
|--------------|-----------------------------------------------------------------------------------------------------------------|



ed G.

## PREFACE

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### TO AVOID PERSONAL INJURY

Mona is an advanced maintenance software that can perform direct operations on electric or electromechanical systems. Thus, use of this software should be restricted to trained persons with appropriate skills and knowledge.

Under certain working modes, software safeties are disconnected and unconsidered commands may cause damage to system or harm people.

#### Exemption from liability

Faiveley is exempted from damage caused by undue application of Mona during all tasks performed in the system lifecycle (initial operation, trouble shooting, maintenance...).

### SAFETY TERMS AND SYMBOLS

☛ Special attention should be brought to certain topics. That means that the function may endanger the system or harm people if an unconsidered use is performed.

☞ Additional and useful data. Prevent errors without safety relevant consequences.

## CONTACT

Product support can be obtained from your project interlocutor or your local Faiveley supplier. For general matters please contact :

**FAIVELEY TRANSPORT**

*Les Yvaudières*

*75, ave. Yves Farge*

*F-37705 SAINT PIERRE DES CORPS*

*France*

***mona@faiveley.com***

## **GLOSSARY**

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### **MPF : MONA PROJECT CONFIGURATION FILE.**

Contains all project specific data used by Mona.

### **AS : APPLICATION SOFTWARE**

Software embedded in the controller that is project specific. It should be downloaded after each new release.

### **OS : OPERATING SYSTEM**

Low level software containing hardware drivers control and lower layer management.

### **APPLI.TST AND/OR <PROJECT>.SML**

Symbol files for AS & OS, contain data that allow to communicate directly using explicit variable names. One or both may be part of every released Mona project package.

### **<PROJECT>.S19 AND <PROJECT>.TLC**

Binary file, that contains the Application Software (AS) and the Operating System (OS) to be downloaded to the controller.

## WHAT IS MONA ?

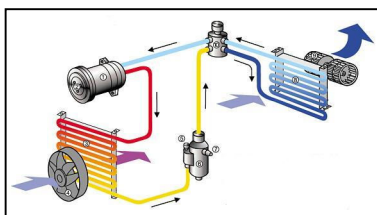
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Mona is a powerful maintenance tool dedicated to a wide range of Faiveley systems. (HVAC, Doors, LVPS, WPS).

It is aimed to provide help during commissioning, investigations or normal maintenance phases.

Connected to a controller, Mona brings the following capabilities<sup>1</sup> :

- Real time & concrete overview of the global system.
- Direct-to-Disk recording of signals (internal as well as inputs/outputs).
- Direct or secured control of system actuators.
- Controller info and setup: software version check, download, real time clock set, communication configuration ...
- Faiveley CAN bus monitoring.
- Actuator life counter analysis - total working time and start counters - of each electromechanical component (compressor, fans, valve) for preventive maintenance and accurate spare part replacement scheduling.
- Enhanced event history including associated contexts and “snapshot” of system conditions for pre-defined occurrences (errors, mode switch...).
- Advanced password administration.



Monitor  
Command  
Control  
Record



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<sup>1</sup> If supported by application.

## REQUIREMENTS

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### COMPUTER REQUIREMENTS

The minimal configuration to run Mona is :

- ✚ PC compatible computer
- ✚ Pentium 1GHz mini, 256 MB RAM
- ✚ 2GB HDD (for Win XP)
- ✚ VGA recommended resolution 1024x768
- ✚ Pointing device
- ✚ At least one available Serial Port, compliant with UART standard.
- ✚ A CDROM drive or a network connection (for installation only).

### SUPPORTED OPERATING SYSTEMS

- ✚ Windows 98, 2000, XP (2000 or XP are recommended).

## INSTALLATION

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### MONA INSTALLATION

- Run the Setup.exe file present on the installation CD-ROM.
- Follow the indications until setup is completed.

### INSTALLATION OF USB DRIVERS (OPTION)

If the controller is equipped with USB connection, you must install the dedicated USB drivers on the computer.

👉 This installation must be done BEFORE plugging the USB cable on the controller !

The drivers are delivered by Faiveley and installation is done by starting the Install shield. No further actions are required.

Refer to the chapter Configuration items / Communication to learn how to setup the ports.

### LICENSING

When Mona starts for the first time, registration codes are requested. Refer to the registration sheet delivered by Faiveley and enter your Customer Name and the corresponding Mona Serial Key.

#### MonA Registration Key

Customer Name : TRAIN CO  
MonA Serial Key : A5FV-SZJ4-W5TY-6YHM

#### Language Serial Key :

English - United States : 6TGU-R4P5-6W2W-3W3W  
French - France : F5MS-6W3W-D7W3-3W3W  
German - Germany : 6G7R-6YLA-6F6C-6C3B

#### Project Serial Key :

B Line R4DU-5TU1-G3HY-9NON

Other codes will be requested when a project is opened for the first time (Project Serial Key), or when a language pack is used for the first time (Language Serial Key). See below.

## LANGUAGE LIBRARIES

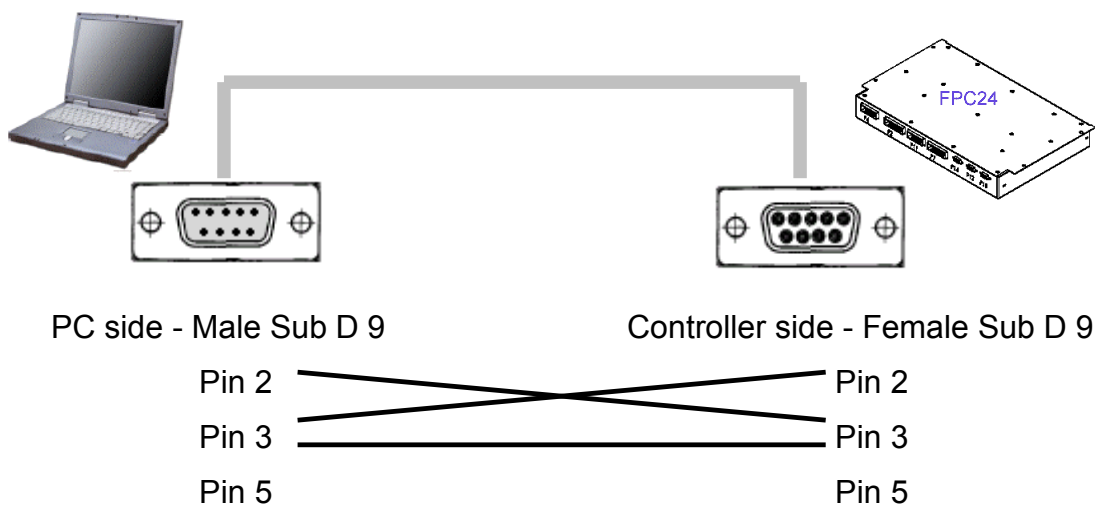
Mona can support various sets of languages. To each language corresponds another registration code. This code is associated with the customer name.

When a project requires a language pack never used before, the registration code for this library is asked once. Proceed as above to enter the code. Note that it is also possible to register a new language pack prior to use.

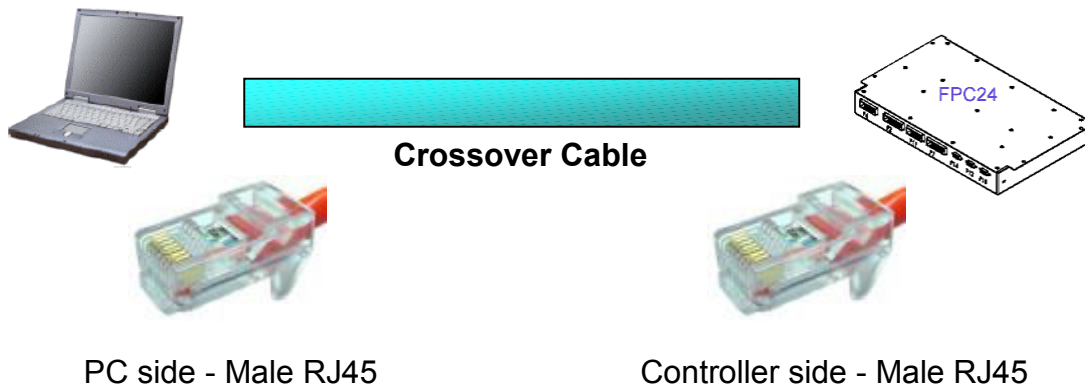
## CONNECTION WITH TARGET THROUGH SERIAL COM PORT

A cable compatible with <F> standard is required.

⚠ Using a not compliant cable may conduct to PC or controller damage.

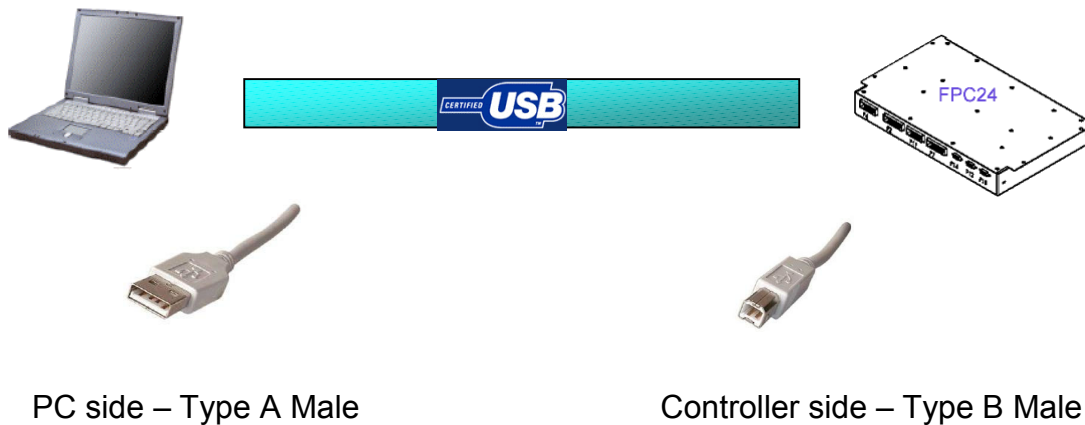


## CONNECTION WITH TARGET THROUGH ETHERNET LINK<sup>2</sup>



⚠ Using a “right” cable will not allow connection to the equipment.

## CONNECTION WITH TARGET THROUGH USB<sup>3</sup>



<sup>2</sup> Depends on product and/or option.

<sup>3</sup> Depends on product and/or option.

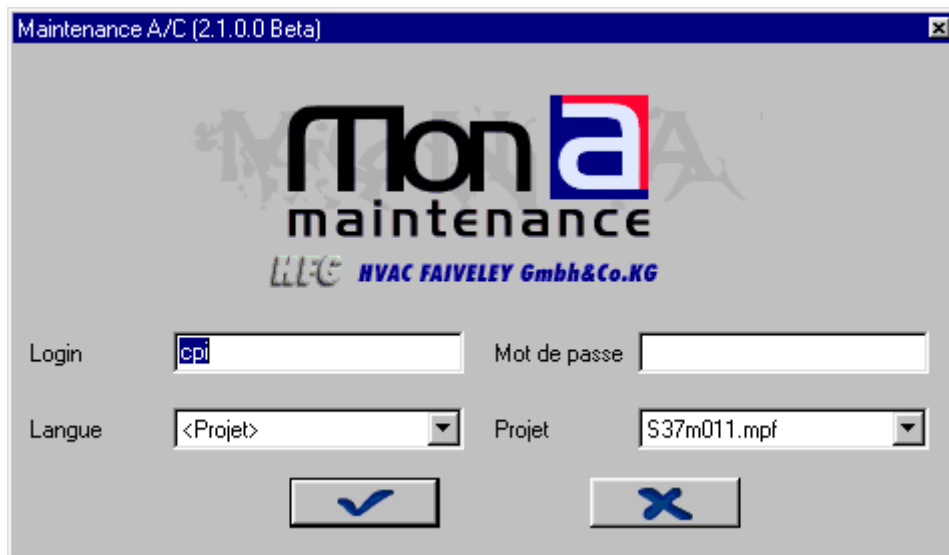
## STARTING WITH MONA

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### OPEN MONA

In the Start Menu, find the Faiveley group and start “ Mona”.

The login windows opens:



### LOGIN NAME

User enters his name in the “Login Field”.

### PASSWORDS (OPTION)

Mona right administration principles are designed to ensure high safety level and easy use for customer administrator.

A set of passwords is available as default, each one corresponding to an access level, as defined in the Administration section.

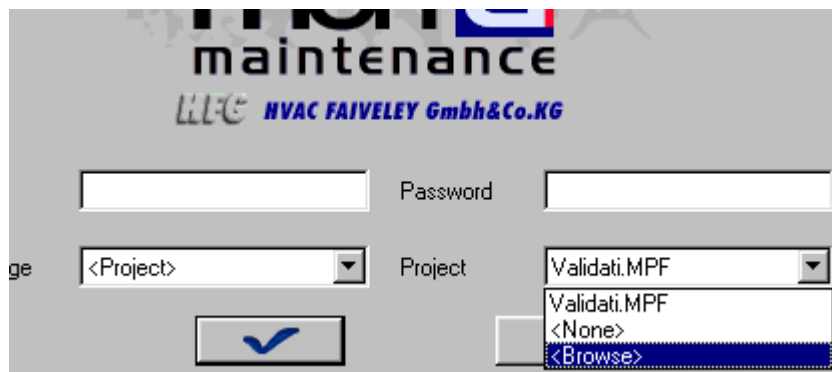
If the password is left blank, the Mona project is opened with first access level restrictions.

If a password is not recognized by the system, the access refused.

✱ This password management ensures that unskilled employees won't be allowed to access to potential harmful functions. Thus, it is particularly recommended that customer administrator regularly changes the password set and ensure that all users are working under level corresponding to their education.

## PROJECT

Here, the user chooses the project. If he already logged in previously, he will find the previous projects he worked on as an history. Otherwise, it is possible to open a project directly under a file explorer by selecting <browse>.



If the project is opened for the first time, the license key will be requested. Refer to your license sheet.

### MonA Registration Key

Customer Name : TRAIN CO  
MonA Serial Key : A5FV-SZJ4-W5TY-6YHM

#### Language Serial Key :

English - United States : 6TGU-R4P5-6YHM-2W5Y  
French - France : F5MS-6YHM-6YHM-6YHM  
German - Germany : 6G7R-6YHM-6YHM-6YHM

#### Project Serial Key :

B Line R4DU-5TU1-6YHM-9NON

Example

## LANGUAGE (OPTION)

As default, the project language is selected. As an option, it is possible to select a language among those available.

If the chosen language has not been used in the past, the license key will be requested by the system. Refer to the license sheet.

### MonA Registration Key

Customer Name : TRAIN CO  
MonA Serial Key : A5FV-SZJ4-W5TY-6YHM

#### Language Serial Key :

English - United States : 6TGU-R4E5-MN-VW-Z

French - France : F5MS-6H3L-D7UW-XS

German - Germany : 6G7R-8LK-V7GP-Q8H

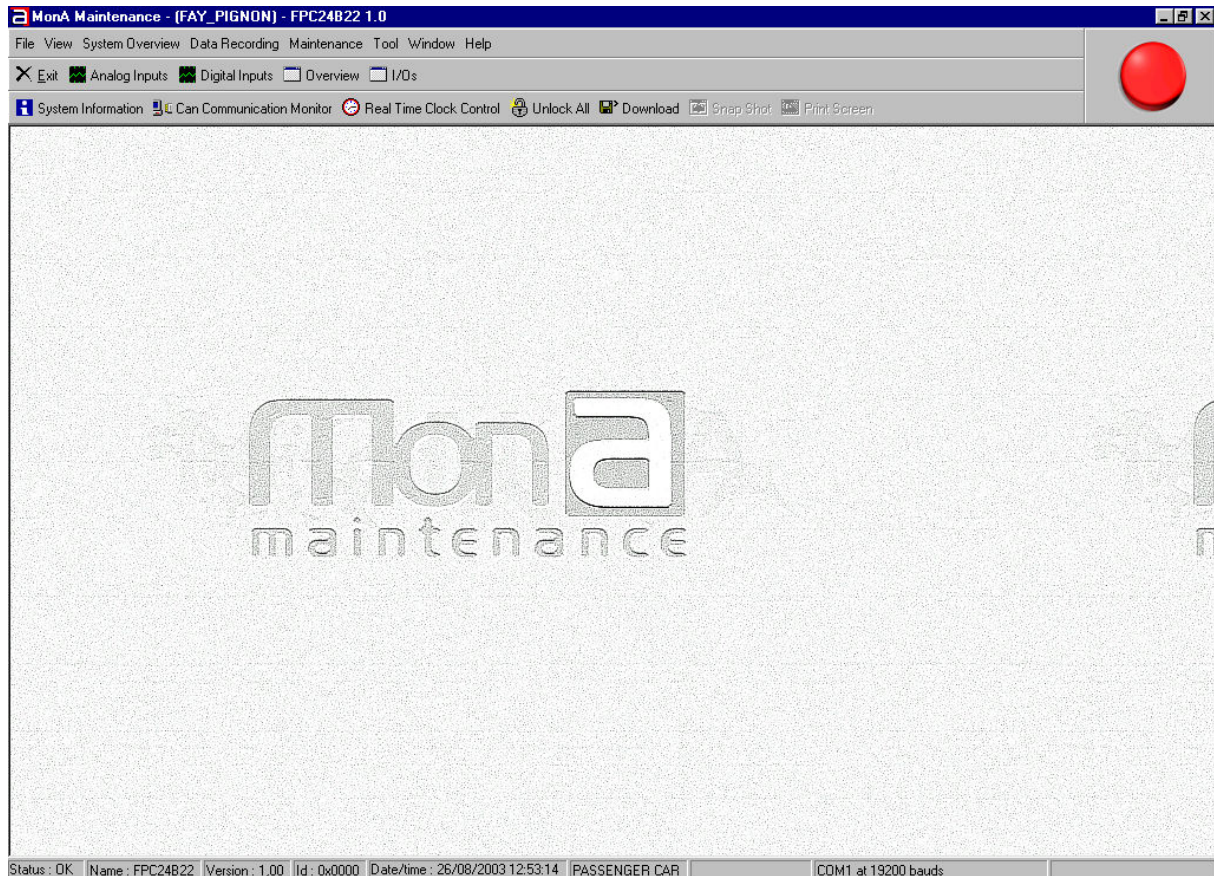
#### Project Serial Key :

B Line R4DU-5TU1-G-1ENON

Example

## MONA ENVIRONMENT

Once login has been correctly proceeded, the following window is displayed.



## EMERGENCY BUTTON



A click on this button triggers a reset of the board.

👉 This action will reset all hardware and system components without any specific stop sequence (eg. pump down...)

## MONA TITLE BAR

 **MonA Maintenance - (FAY\_CUSTOMER) - FPC24B22 1.0**

Contains customer & project name, and current version of the MPF file.

## STATUS BAR

|             |                 |                |             |                                 |               |                     |
|-------------|-----------------|----------------|-------------|---------------------------------|---------------|---------------------|
| Status : OK | Name : FPC24B22 | Version : 1,00 | Id : 0x0001 | Date/time : 26/08/2003 15:34:40 | PASSENGER CAR | COM1 at 19200 bauds |
|-------------|-----------------|----------------|-------------|---------------------------------|---------------|---------------------|

 **Status** informs user about the connection status:

- Online: target is connected and communicates properly with Mona.
-  **Status : Bad Symbols fpc24b22 (1,00 - 14/08/2003)** Bad Symbols: The target is connected, but the software version located on the computer doesn't match the one in controller. Moreover, Mona displays useful information about the software embedded in the controller : name, version, date.
-  **Status : No Running Application** No Application : The Application Software is not compatible with the target Operating System.
-  **Status : OffLine** Offline: no connection can be established with target.

 **Name** : Explicit name of the project

 **Version** : Application version as defined in the software release.

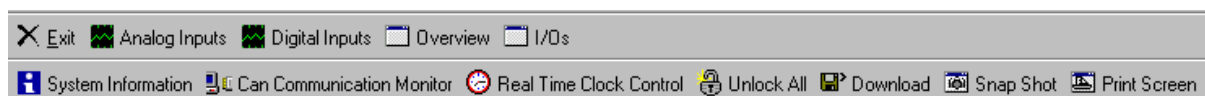
 **Id** : Board ID, as defined in specification.

 **Date / time** : Data from internal clock of the controller. It also blinks red if the target has lost date/time (eg. backup capacitor ran out)

 **"Passenger car"** : area for various comments, project specific.

 **COM1 at 19200 bauds** : Info about the communication port configuration.

## SHORTCUT BARS



Two bars are available and are customized on each project.

## MENU CONTENTS

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Some menus may not be displayed in lower access levels or on certain products.

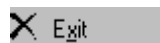
### FILE



Open a project from any local or network disk. Mona projects have the \*.mpf type.

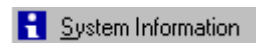


Open a project among those already used on this computer.



Quit Mona.

### VIEW



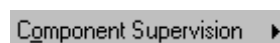
Display information about embedded software in controller.



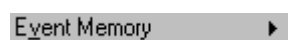
Display the embedded CAN bus configuration and status.



Set the internal controller clock.



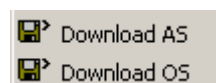
Information about electromechanical component lifecycles.



Event memory management.



Event recorder management.



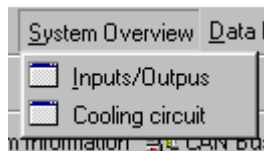
Download the controller with a new application (AS) or operating (OS) software.



Release all locked variables to nominal state.

## SYSTEM OVERVIEW

All available overview are displayed in this menu. In the example below, two windows have been designed : Inputs/Outputs & Cooling Circuit.

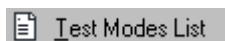


## DATA RECORDING

Based on the same principle as Overview menus : user will find available recording configurations.

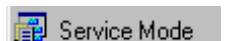


## MAINTENANCE



Test Modes List

Displays all available test modes and their controls.



Service Mode

Direct control of digital outputs

## TOOLS



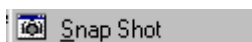
User Administration

Password administration tool



Communication

Communication configuration: Com Port and speed.



Snap Shot

Takes a screen shot of the active window.



Print Screen

Send a screen shot of the active window to a printer.



Shortcuts

Configure keyboard shortcuts.

## WINDOW

Select and arrange window organization on Mona background.

## HELP

About

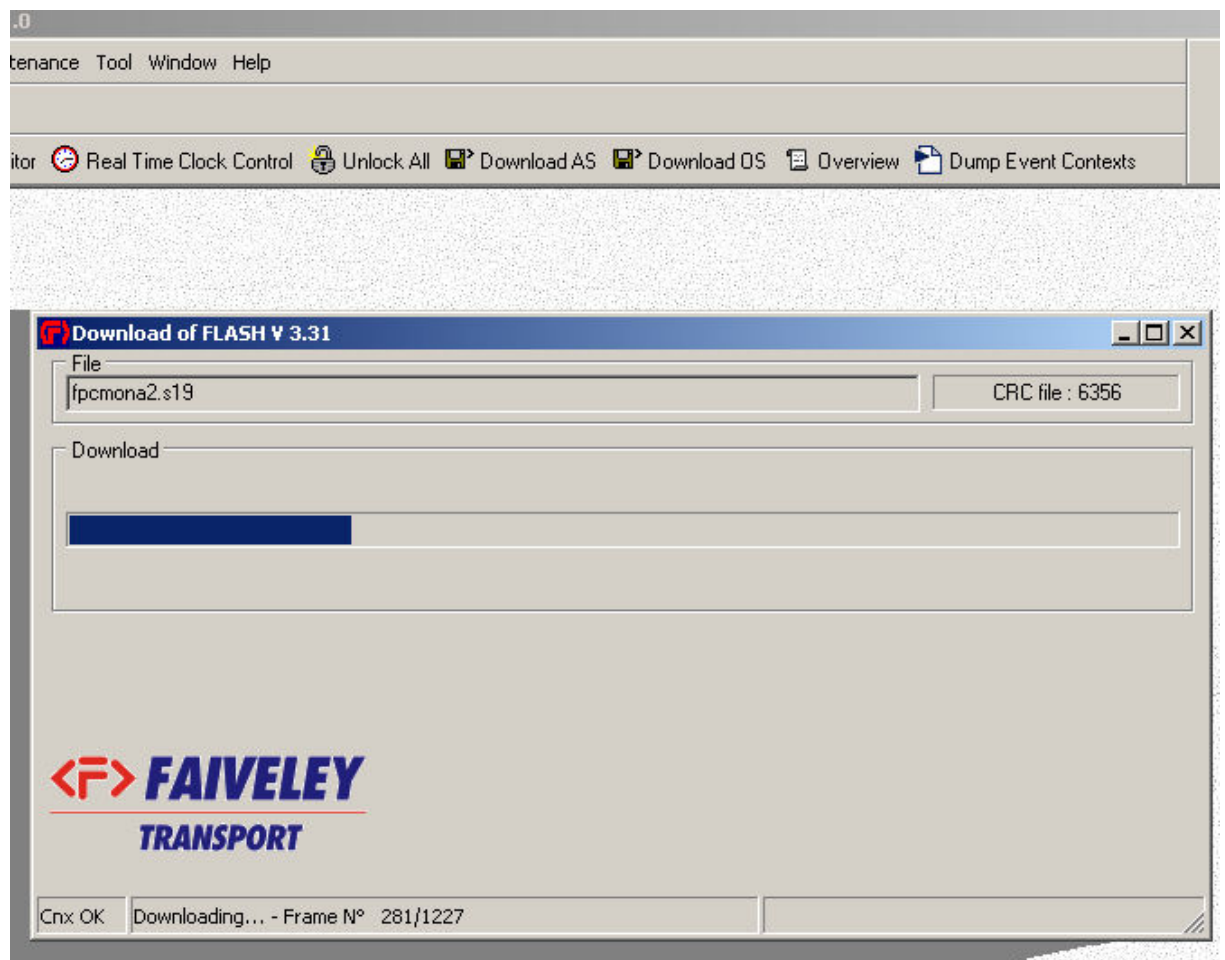
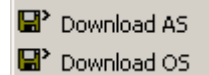
Provide information about Mona Version, and configuration of registration for Mona, language packs and projects.

 Help

Help on Mona.

## DOWNLOAD A NEW SOFTWARE

To proceed to a Download of an application software, click on the download button, either In View menu, or in the shortcut bar.



A download utility will start automatically.

When to download ?

-  If a new software version has been released by Faiveley.
-  After a replacement by a spare part controller.
-  In case of doubt, if the Status field of Mona indicates “Bad Symbols”.

## WORKING WITH OVERVIEWS

### OPEN A OVERVIEW

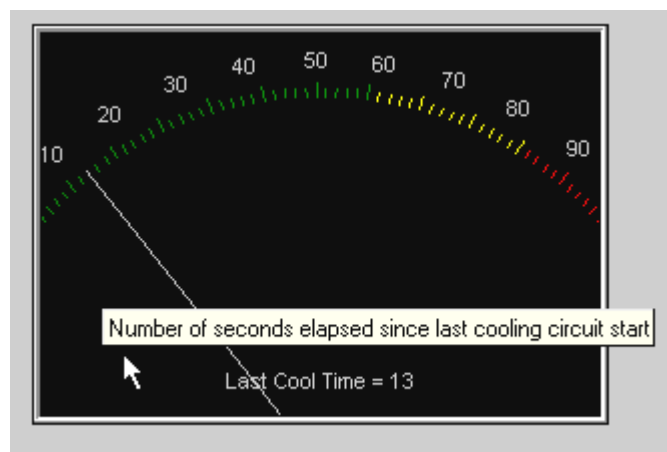
In the System Overview menu, or in the shortcut bar, select a window among those available. (easily identified by the  icon).

 Many windows can be opened simultaneously.

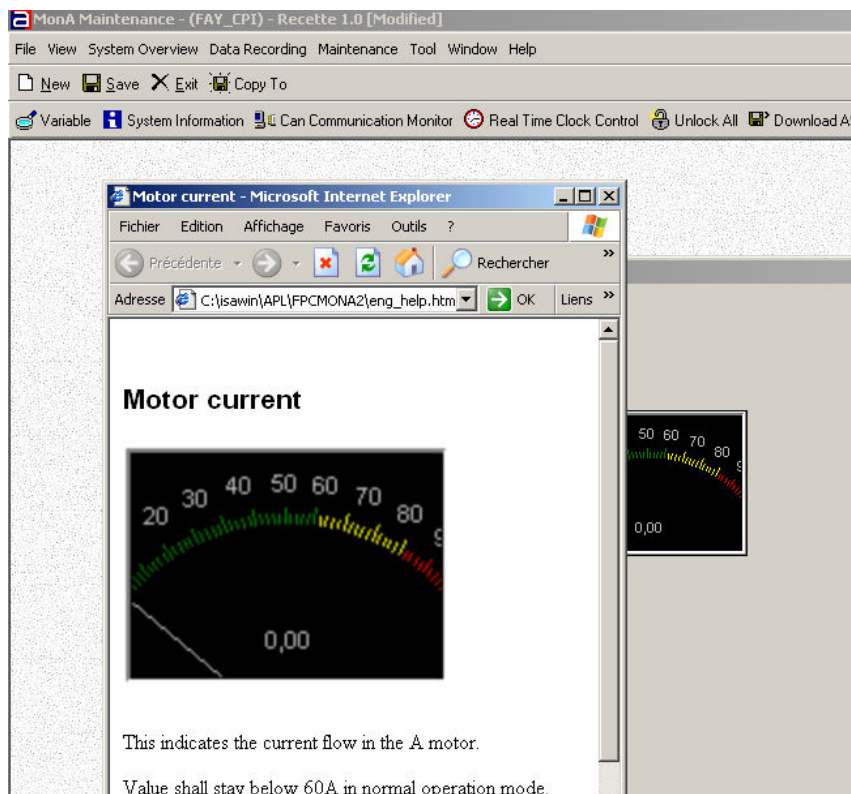
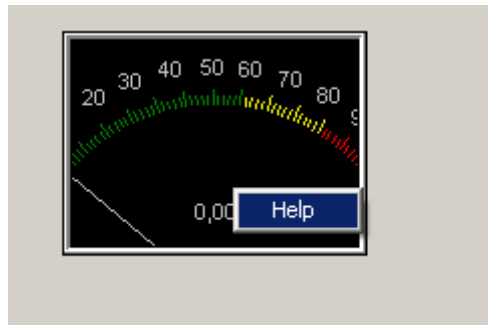
### DISPLAYED INFO

All overviews are designed and customized to match the project environment. Therefore, the following rules apply:

- 🔌 Objects are refreshed automatically. Refresh rate is function of the available bandwidth on the serial link and of the number of items to update.
- 🔌 By letting the mouse on an object, a small description is displayed in a small yellow box. This “hint” gives general information about the variable.



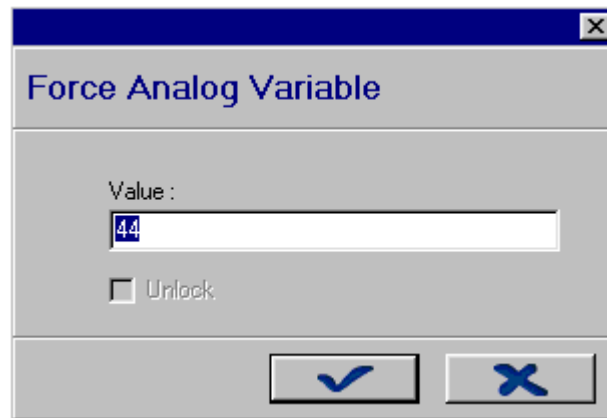
- 🔌 Advanced help is provided in html format. Right click on an object to open a small menu, and click on “help”.



## FORCING VARIABLES

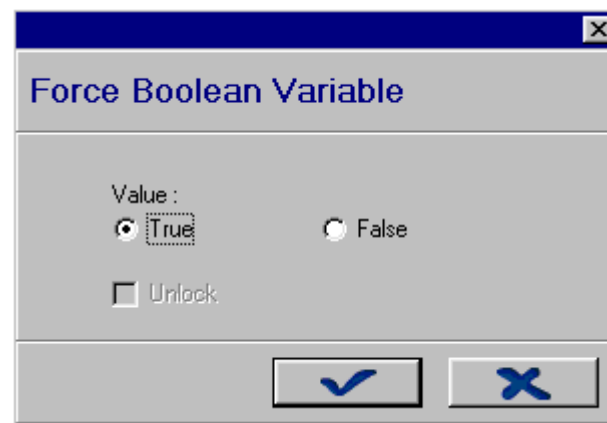
Direct control of variables is permitted only under access levels higher than 3. To force a variable, double click on an object. If forcing is allowed, the following message boxes are displayed.

➤ **Forcing an analog variable** : type the value



A dialog box titled "Force Analog Variable". It contains a "Value :" label followed by a text input field containing the number "44". Below the input field is an "Unlock" checkbox, which is currently unchecked. At the bottom right are two buttons: a checkmark button and a close button (X).

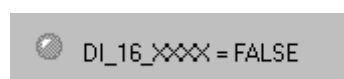
➤ **Forcing a digital variable** : choose between "True" and "False".



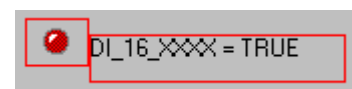
A dialog box titled "Force Boolean Variable". It contains a "Value :" label followed by two radio buttons: "True" (which is selected) and "False". Below the radio buttons is an "Unlock" checkbox, which is currently unchecked. At the bottom right are two buttons: a checkmark button and a close button (X).

➤ **Lock / Unlock**

Inputs and outputs need to be locked before being forced. This is automatically done by Mona, and a red frame is drawn on the object. Internal variables cannot be locked and thus don't require this red frame.

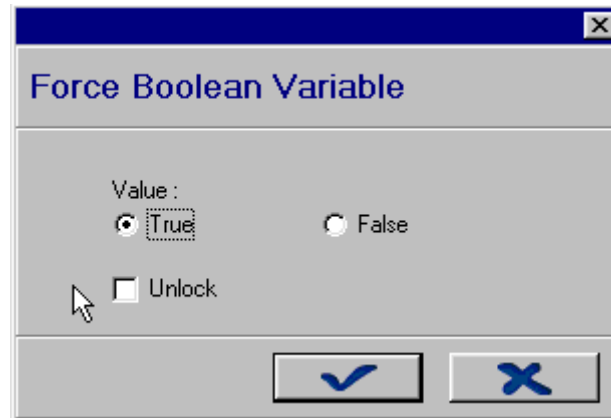


Unlocked input variable



Locked input variable

To unforce an input/output variable, double click again on it, and tick the “unlock” parameter.



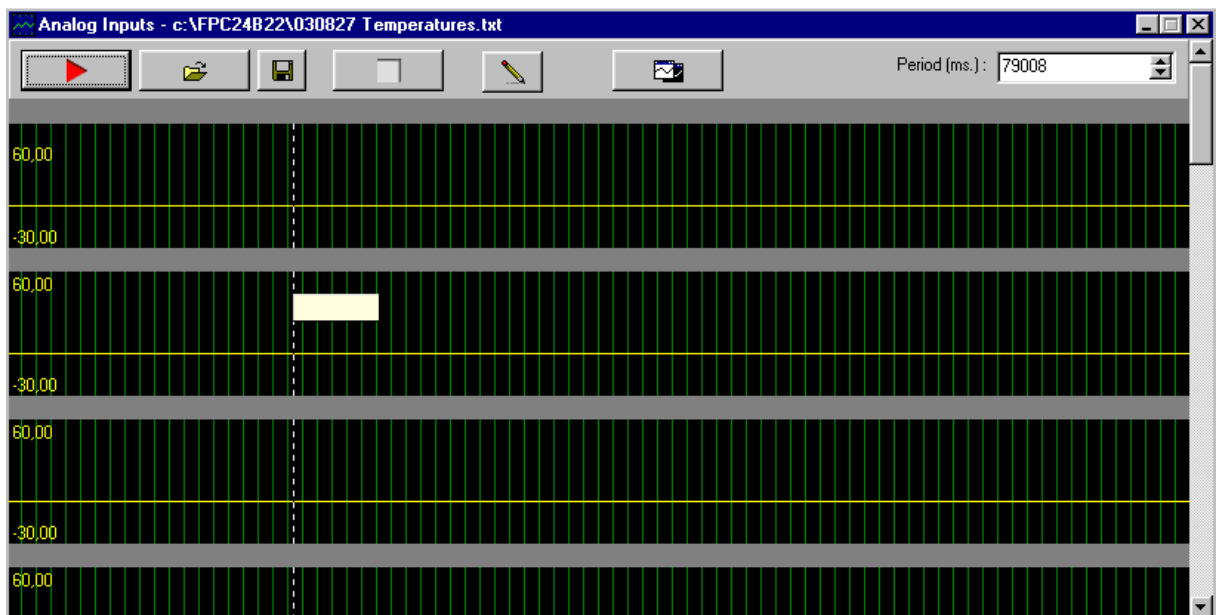
⚠ Direct forcing may cause actuators to run without any software safety ! A particular attention should be taken while using this function not endanger the system or harm people.

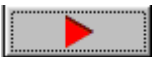
It is possible to unlock all variables using the Unlock button, in the menu View or directly in the additional shortcut bar. 

## RECORDING DATA

### OPEN & START A RECORDING

In Data Recording menu or in the shortcut bar, select a item identified by the  icon.



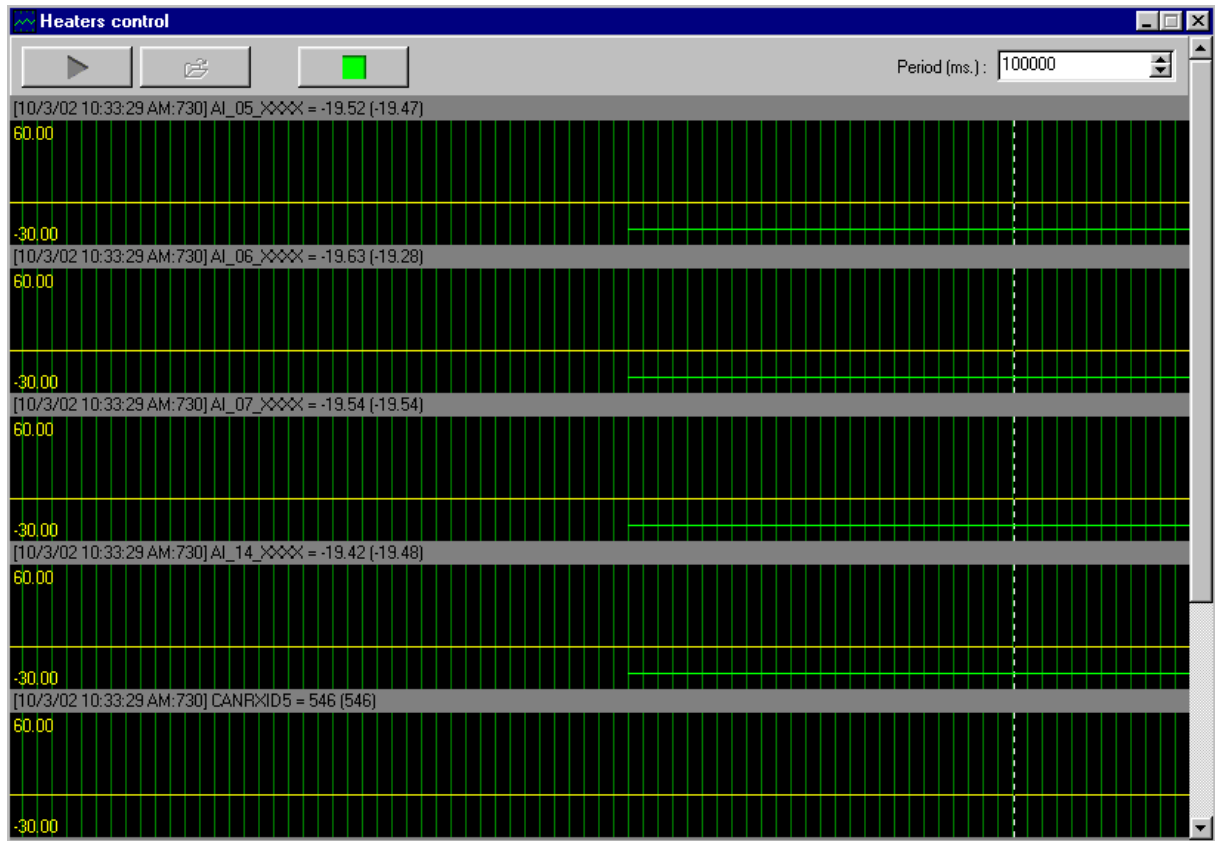
To start a recording, press the button: 

The default path and file name are displayed in the top bar. It is possible to change these parameters by clicking on the  button, before start of the recording operation.

If the file already exists, user can choose between overwriting the file (answer YES) and giving a new name (answer NO).

 It is not possible to open many recording windows simultaneously.

The time scale can be adjusted thanks to the Period field.



Text displayed above each curve gives the following information:

[10/3/02 10:33:29 AM:730] AI\_06\_XXXX = -19.63 (-19.28)

↗ [10/3/02 10:33:29 AM:730] : Date/time of the current cursor position.

↗ AI\_06\_XXXX : Monitored variable name

↗ -19,63 : Value corresponding to the current cursor position.

↗ (19,28) : Last recorded value

## SCROLLING RECORD HISTORY

It is possible to scroll during recording on the past values, with the horizontal scroll bar.

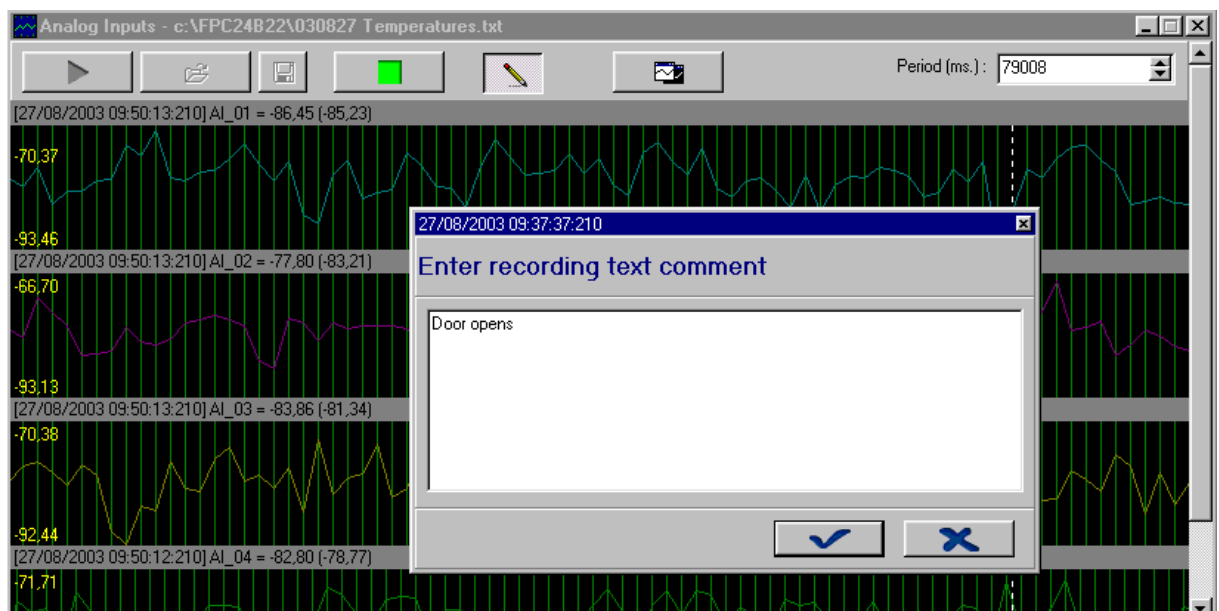
## ADD A MARKER

Adding a marker consists in adding a small text in the destination file, while recording is in course. This text can be used later to identify that a specific event occurred during recording. User is then able to read a timestamp and a description corresponding to a defined event (eg. door opens during a system test).

The marker mode is activated thanks to  . Then move time cursor on the curves, and click to add the marker.

Enter comments in the text box. This will be inserted in the destination file, at the position corresponding to the selected time stamp.

👉 Adding a marker does not stop the recording.



(See in the result file example below the added marker).

## STOP RECORDING

Press:



User can add a header comment to the generated file (Answer YES). Otherwise, answer NO.

## RELOAD A RECORD FILE UNDER MONA

When clicking on



A file explorer opens. Browse the directory to load a previous record file.

☞ The selected record file shall have the same configuration as the current recording windows (same signal list). Otherwise a error message is displayed.

## RECORDING FILE FORMAT

The generated file is compatible with any spreadsheet software (for instance Microsoft® Excel). To open it, import the text file choosing “standard tabulation limiter” and “Windows ANSI format”.

|                                       |                |        |        |        |        |    |            |  |  |
|---------------------------------------|----------------|--------|--------|--------|--------|----|------------|--|--|
| Start Of Recording :                  | 03/10/02 12:00 |        |        |        |        |    |            |  |  |
| End Of Recording:                     | 03/10/02 12:01 |        |        |        |        |    |            |  |  |
| Comments: Temperature regulation test |                |        |        |        |        |    |            |  |  |
| Cold Conditions                       |                |        |        |        |        |    |            |  |  |
| Parameters : 12 / 56,6 / AB           |                |        |        |        |        |    |            |  |  |
|                                       |                |        |        |        |        |    |            |  |  |
|                                       |                |        |        |        |        |    |            |  |  |
| Date                                  | Time           | AI_01  | AI_02  | AI_03  | AI_04  |    |            |  |  |
| 27/08/03                              | 9:37:31 AM     | -19,66 | -19,45 | -58,98 | -39,32 | Ok |            |  |  |
| 27/08/03                              | 9:37:32 AM     | -19,6  | -19,42 | -58,8  | -39,2  | Ok |            |  |  |
| 27/08/03                              | 9:37:33 AM     | -19,5  | -19,55 | -58,5  | -39    | Ok |            |  |  |
| 27/08/03                              | 9:37:34 AM     | -19,57 | -19,47 | -58,71 | -39,14 | Ok |            |  |  |
| 27/08/03                              | 9:37:35 AM     | -19,43 | -19,46 | -58,29 | -38,86 | Ok |            |  |  |
| 27/08/03                              | 9:37:36 AM     | -19,5  | -19,46 | -58,5  | -39    | Ok |            |  |  |
| 27/08/03                              | 9:37:37 AM     | -19,59 | -19,46 | -58,77 | -39,18 | Ok | Door opens |  |  |
| 27/08/03                              | 9:37:38 AM     | -19,52 | -19,56 | -58,56 | -39,04 | Ok |            |  |  |
| 27/08/03                              | 9:37:39 AM     | -19,52 | -19,46 | -58,56 | -39,04 | Ok |            |  |  |
| 27/08/03                              | 9:37:40 AM     | -19,62 | -19,38 | -58,86 | -39,24 | Ok |            |  |  |

The decimal separator for analog values is chosen according to the regional configuration of the computer.

The column with “Ok” certifies that the value has been correctly read. If a problem occurred (especially if too many variables are polled within a too short time), “Error” is written instead of “Ok”, and the last correct value is used.

Finally, the last column displays markers.

## **DIRECT-TO-DISK RECORDING**

If the computer is switched off, crashes, or runs out of battery during a recording, no data is lost : the recording samples are written in file one by one.

## **PERFORMING OTHER ACTIONS WHILE RECORDING**

It is possible to watch an overview window while a recording is running. It is also possible to start a test mode, set the clock, read a memory...

Depending on the load of the serial link (ie on the global number of variables to read), the response time may be more or less longer.

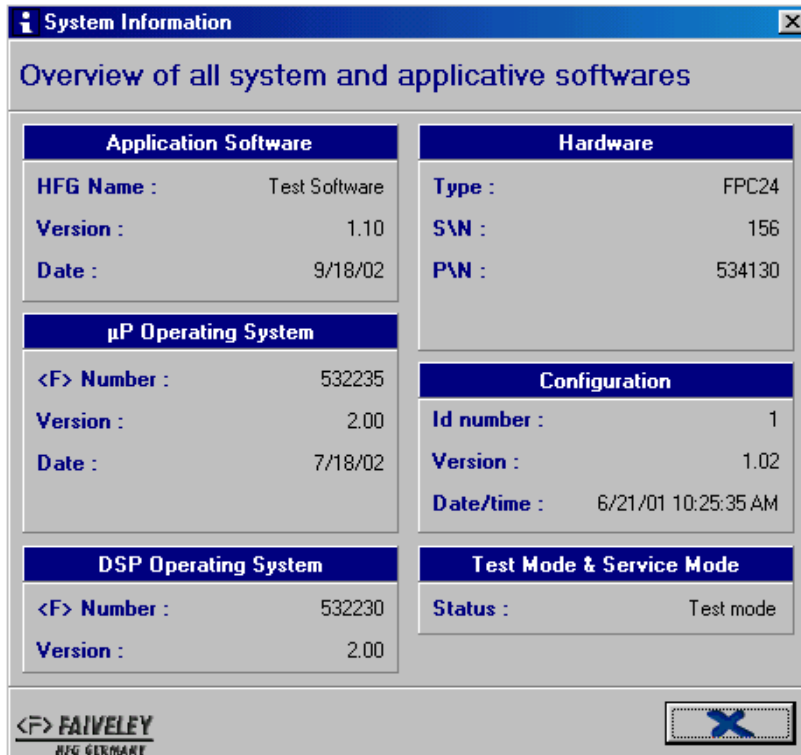
The more the progress indicator in the status bar moves slowly, the more the response time will increase.

To avoid too long delays, close unused windows.

## CONTROLLER INFORMATION

Mona is able to return accurate configuration data about the controller.

In View menu, or in short cut bar, select System Information .



| Application Software |               | Hardware |        |
|----------------------|---------------|----------|--------|
| HFG Name :           | Test Software | Type :   | FPC24  |
| Version :            | 1.10          | S\N :    | 156    |
| Date :               | 9/18/02       | P\N :    | 534130 |

| µP Operating System |         | Configuration |                     |
|---------------------|---------|---------------|---------------------|
| <F> Number :        | 532235  | Id number :   | 1                   |
| Version :           | 2.00    | Version :     | 1.02                |
| Date :              | 7/18/02 | Date/time :   | 6/21/01 10:25:35 AM |

| DSP Operating System |        | Test Mode & Service Mode |           |
|----------------------|--------|--------------------------|-----------|
| <F> Number :         | 532230 | Status :                 | Test mode |
| Version :            | 2.00   |                          |           |

<F> FAIVELEY  
HFG GERMANY

On the left side, software configuration is indicated: controllers running with Mona may be equipped with one to three softwares.

➤ Application Software

➤ Operating System Microprocessor µP

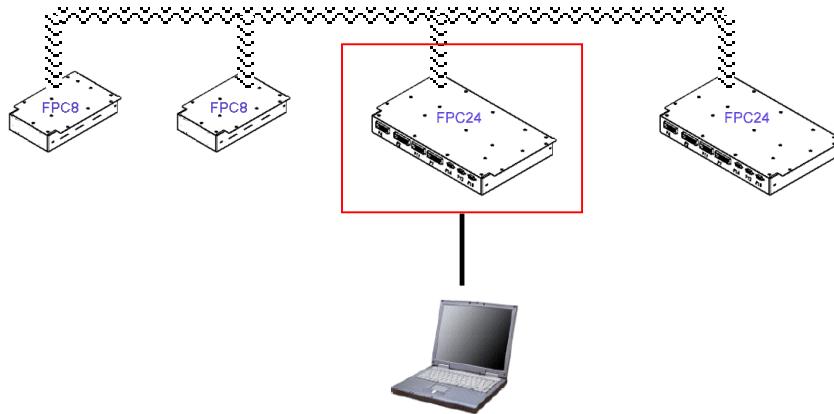
➤ Operating System DSP

On the right side, Hardware info identify accurately which controller is used, and which serial number it has. Configuration is only for <F> internal purpose.

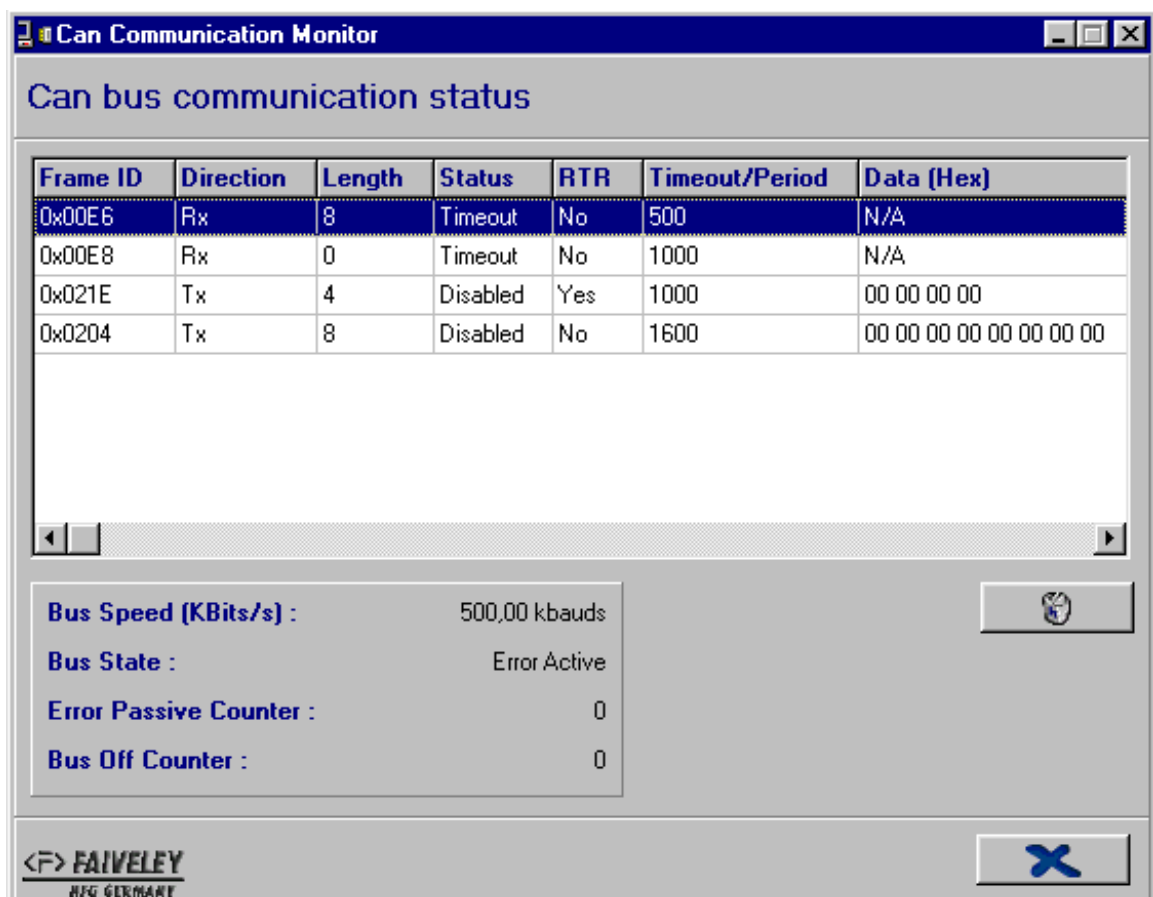
Finally, the current working mode of the controller is give: Service, Test or normal Running.

## CAN BUS STATUS

The main controller may be connected to other equipments through a CAN bus.



In the View Menu, or in the shortcut bar, open the CAN monitor 



It displays the status of the CAN driver of the current controller.

## CAN FRAME CONFIGURATION

Each controller has a Can frame configuration. It means that all incoming and outgoing messages are pre-declared in a table.

↗ **Frame Id** : Code that identify the frame

↗ **Direction** :

- Rx for incoming frames, from other controllers
- Tx for outgoing frames, heading to other controllers.

↗ **Length** :

- Size of the frame in bytes (between 0 and 8).

↗ **Status** : Different meaning according to frame direction

● Received Frame (Rx)

- Timeout : the frame hasn't been received since a certain time and a timeout has been declared.
- Ok : the frame has been received in a provided time

● Transmitted Frame (Tx)

- Enabled : the frame is released and sent periodically
- Disabled : the frame is cancelled and isn't sent.

↗ **RTR** : Remote mode status. This refers to a specific sending and receiving mode based upon Request / Response mechanism.

↗ **Timeout/period** : indicates the timeout value (for a RX frame) or the sending period (for a TX one).

↗ **Data** : return data field contents for RX or TX frame. If a TX frame is not sent at this moment, N/A indicates that no valuable data is available.

 The frame status applies only to the controller that is connected to Mona.

## BUS STATUS

 **Bus speed** : Indicates the current bus speed.

 **Bus state** :

● “Error Active” : No error.

● “Error Passive” or “Bus Off”: Bus is disturbed.

 **Error Passive and Bus Off counters** : informs about the occurrence of bus problems. This values may be temporary different of 0, but shouldn't increase in nominal working mode.

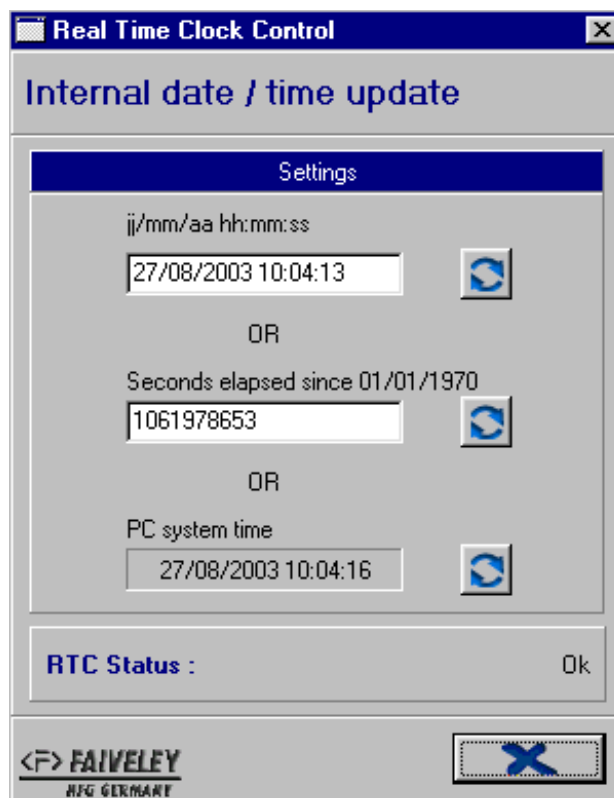
## REFRESH

The  button refreshes the configuration displays.

## REAL TIME CLOCK

After being disconnected from power supply during a long time, the internal real time clock may need to be set again.

In the menu View, select the Real Time Clock control function. 



## SET RTC

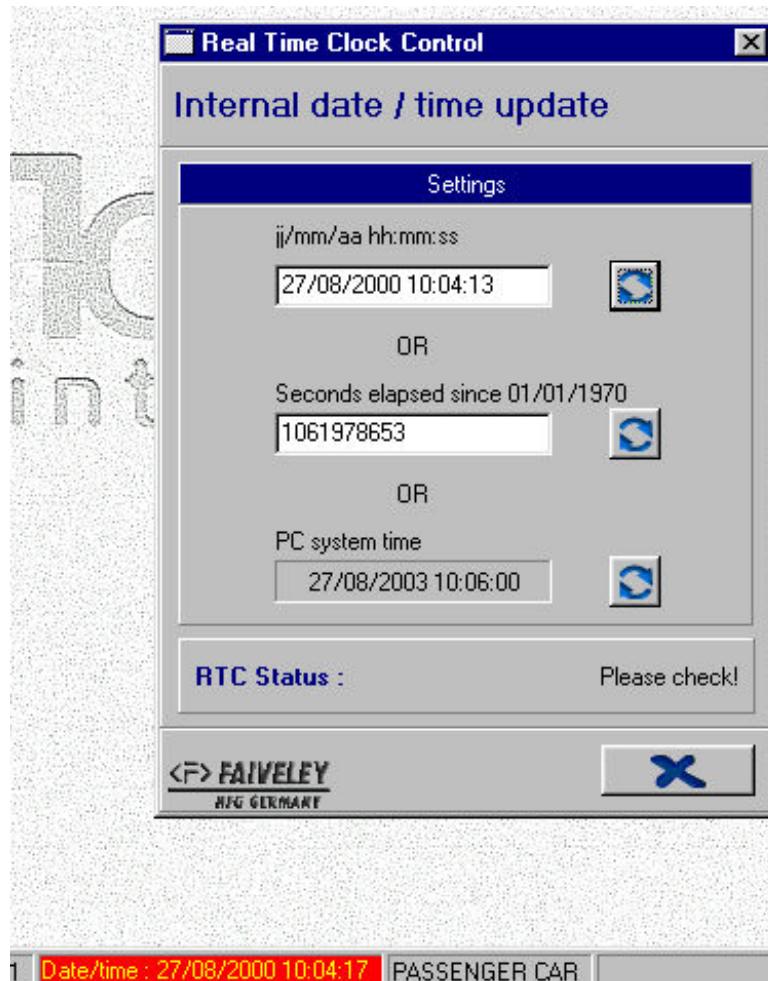
Three methods are available to set the internal clock:

-  Direct input dd/mm/yy hh:mm:ss
-  Unix time (number of seconds elapsed since 01/01/1970 00:00:00)
-  With PC time.

Choose one of these 3 methods and click on the corresponding 

## RTC STATUS

A message indicates that the RTC is running ok. In case of backup capacitor loss, the message “please check” is displayed, instead of Ok. Moreover, the D/T indication in the status bar blinks red to warn the user.



## EVENT MEMORY

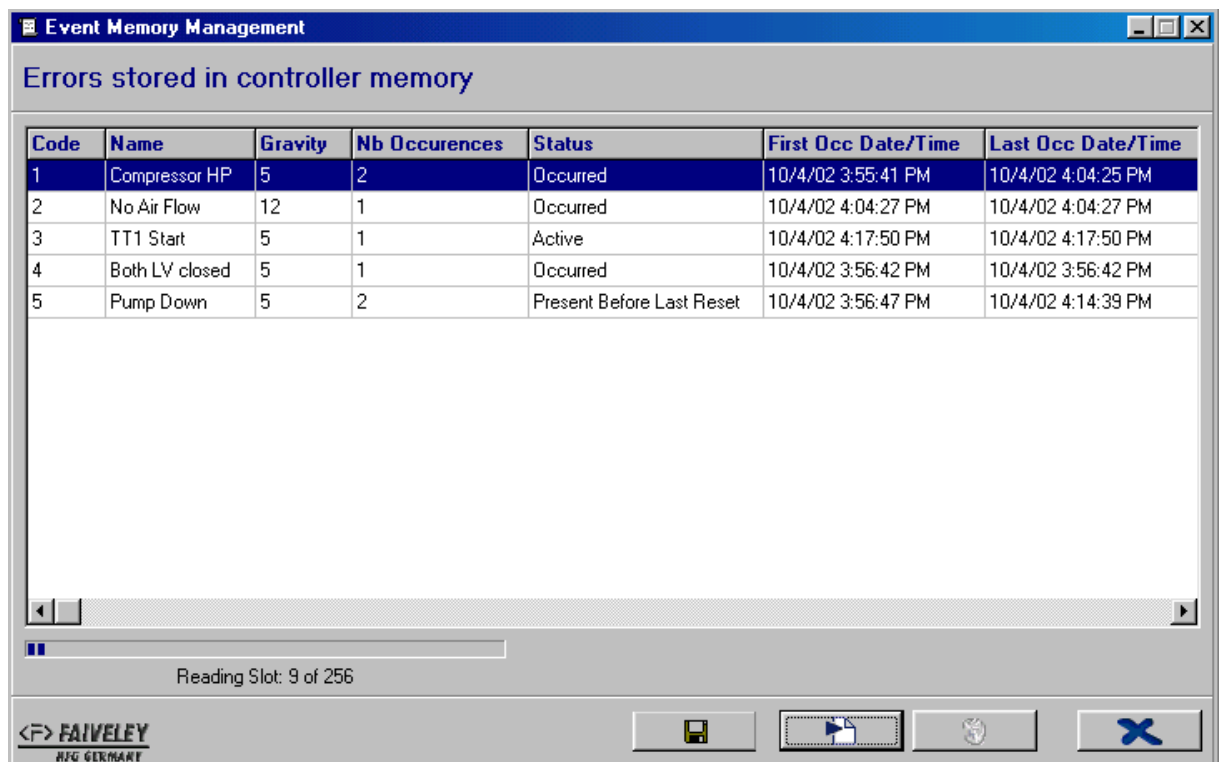
Some controllers are equipped with an non-volatile memory dedicated to event storage.

The controller is thus able to save contexts of the occurrence : inputs, outputs, date/time, and other specific data.

Mona can display a first level of contexts, and to dump the complete amount of data to a file on the PC. This file can be processed later thanks to a macro application.

### READING FIRST LEVEL CONTEXTS

In the menu View, select sub-menu Event Memory and click on Quick Overview. 



**Event Memory Management**

Errors stored in controller memory

| Code | Name           | Gravity | Nb Occurences | Status                    | First Occ Date/Time | Last Occ Date/Time |
|------|----------------|---------|---------------|---------------------------|---------------------|--------------------|
| 1    | Compressor HP  | 5       | 2             | Occurred                  | 10/4/02 3:55:41 PM  | 10/4/02 4:04:25 PM |
| 2    | No Air Flow    | 12      | 1             | Occurred                  | 10/4/02 4:04:27 PM  | 10/4/02 4:04:27 PM |
| 3    | TT1 Start      | 5       | 1             | Active                    | 10/4/02 4:17:50 PM  | 10/4/02 4:17:50 PM |
| 4    | Both LV closed | 5       | 1             | Occurred                  | 10/4/02 3:56:42 PM  | 10/4/02 3:56:42 PM |
| 5    | Pump Down      | 5       | 2             | Present Before Last Reset | 10/4/02 3:56:47 PM  | 10/4/02 4:14:39 PM |

Reading Slot: 9 of 256

**FAIVELEY**  
HFG GERMANY

The following items are available:

✚ **Code** : corresponds to the event code as specified in the software documentation.

✚ **Name** : explicit description of the event

✚ **Gravity** : comprised between 1 (low incidence) and 16 (important issue).

✚ **Nb occurrences** : Occurrence counter of the event.

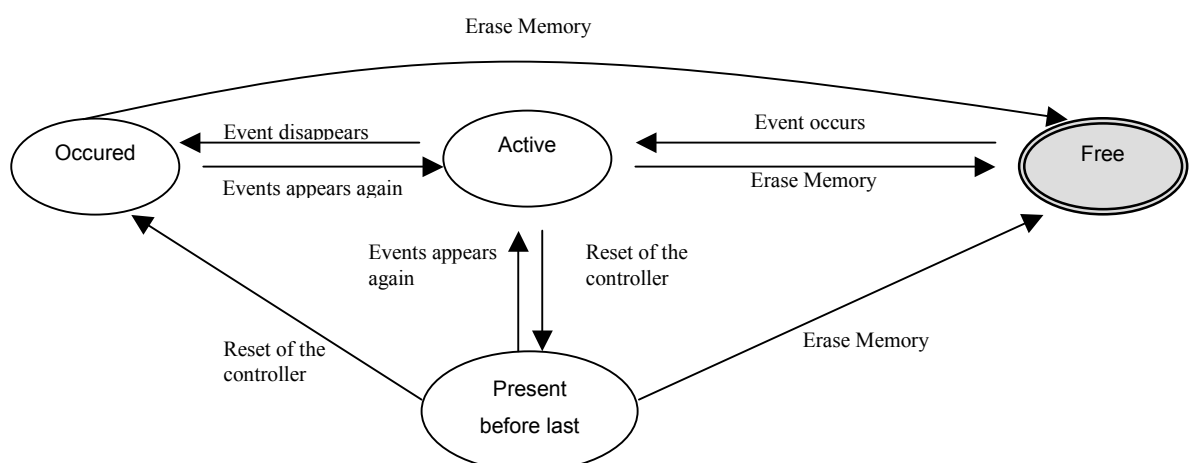
✚ **Status** : Four states are possible:

● *Active*: The event cause is still present.

● *Occurred*: The event occurred, but disappeared.

● *Present before last reset*: The event occurred, and was still present when the controller was reset.

● *Free*: Event never occurs since last memory erase. (but free slots are not displayed under Mona).



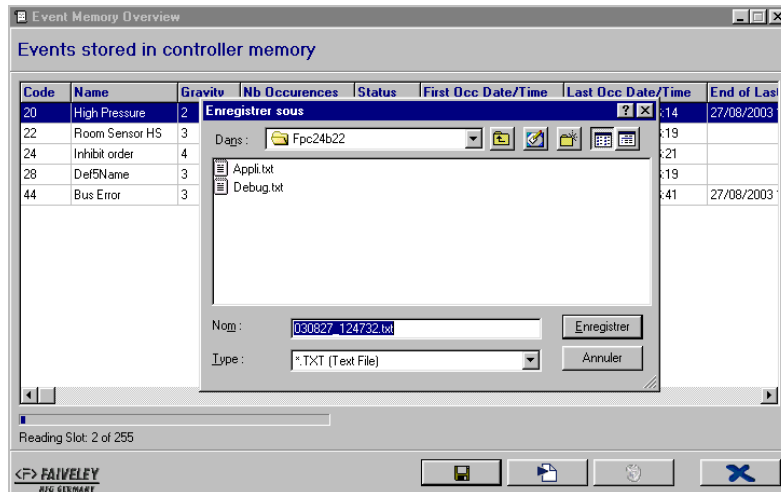
✚ **D/T of first occurrence**

✚ **D/T of last occurrence**

## D/T of end of last occurrence

To save these first level contexts, click on the  button.

A file browser opens to select path and filename. As default, the name is made of the current timestamp : yymmdd\_hhmmss.txt.



The file can be opened later under any software such as MS Excel.

| Code | Name           | Gravity | Nb Occurrences | Status   | Occ Date/Time | First Occ Date/Time | Last Occ Date/Time |
|------|----------------|---------|----------------|----------|---------------|---------------------|--------------------|
| 20   | High Pressure  | 2       | 1              | Occurred | #####         | 27/08/2003 11:46    | 27/08/2003 11:49   |
| 22   | Room Sensor HS | 3       | 1              | Active   | #####         | 27/08/2003 11:46    |                    |
| 24   | Inhibit order  | 4       | 1              | Active   | #####         | 27/08/2003 11:46    |                    |
| 28   | Def5Name       | 3       | 1              | Active   | #####         | 27/08/2003 11:46    |                    |
| 44   | Bus Error      | 3       | 1              | Occurred | #####         | 27/08/2003 11:46    | 27/08/2003 11:49   |

## DUMPING COMPLETE EVENT HISTORY

Select Dump Event Contexts in the Event Memory sub-menu. 

A file is generated which contains all event structures. Another application, called Eva, shall be used to extract effective information. Refer to Annex.

## ERASE EVENT MEMORY

Click on Erase Memory in the Event Memory sub-menu. 

Wait for controller reset (after app. 30s) before performing other actions.

## EVENT HISTORY

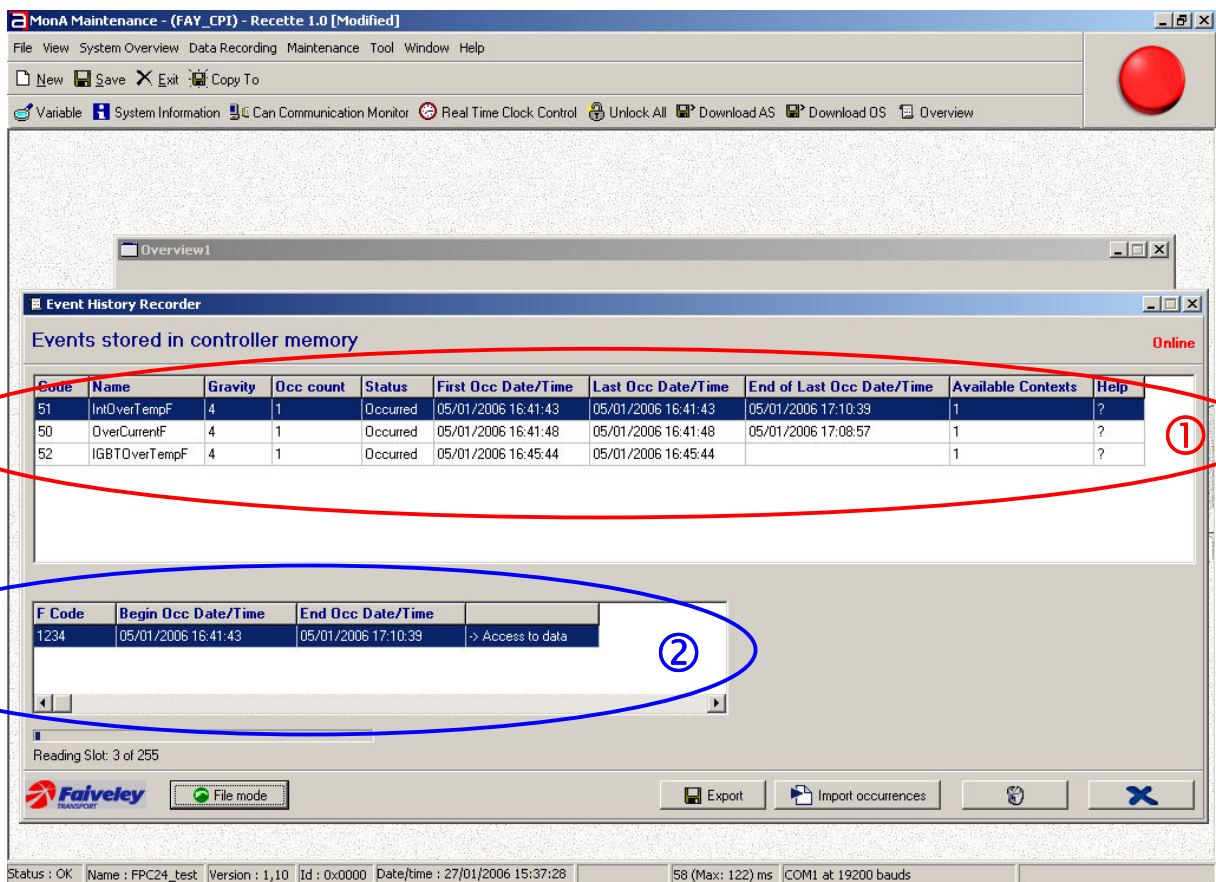
Some controllers are equipped with a non-volatile memory dedicated to event storage.

The controller is thus able to save contexts of the occurrence : inputs, outputs, date/time, and other specific data.

Mona can display these contexts, allowing to reconstitute the system history before, during and after the event occurrence. This provides a powerful troubleshooting help, especially in operational service.

## READING FIRST LEVEL CONTEXTS

In the menu View, select sub-menu History and click on Overview. 



**Event History Recorder**

Events stored in controller memory

| Code | Name          | Gravity | Occ count | Status   | First Occ Date/Time | Last Occ Date/Time  | End of Last Occ Date/Time | Available Contexts | Help |
|------|---------------|---------|-----------|----------|---------------------|---------------------|---------------------------|--------------------|------|
| 51   | IntOverTempF  | 4       | 1         | Occurred | 05/01/2006 16:41:43 | 05/01/2006 16:41:43 | 05/01/2006 17:10:39       | 1                  | ?    |
| 50   | OverCurrentF  | 4       | 1         | Occurred | 05/01/2006 16:41:48 | 05/01/2006 16:41:48 | 05/01/2006 17:08:57       | 1                  | ?    |
| 52   | IGBTOverTempF | 4       | 1         | Occurred | 05/01/2006 16:45:44 | 05/01/2006 16:45:44 |                           | 1                  | ?    |

①

| F Code | Begin Occ Date/Time | End Occ Date/Time   |                   |
|--------|---------------------|---------------------|-------------------|
| 1234   | 05/01/2006 16:41:43 | 05/01/2006 17:10:39 | -> Access to data |

②

Reading Slot: 3 of 255

Status: OK Name: FPC24\_test Version: 1,10 Id: 0x0000 Date/time: 27/01/2006 15:37:28 58 (Max: 122) ms COM1 at 19200 bauds

If Mona is connected to a controller, the status of each event is automatically retrieved and displayed with relevant information (See ①):

➤ **Code** : a code is defined in accordance with TMS programming for instance.

➤ **Name** : to identify in a convenient manner the event.

➤ **Gravity** : defines the criticality of the event. Allows then a sorting of serious events first.

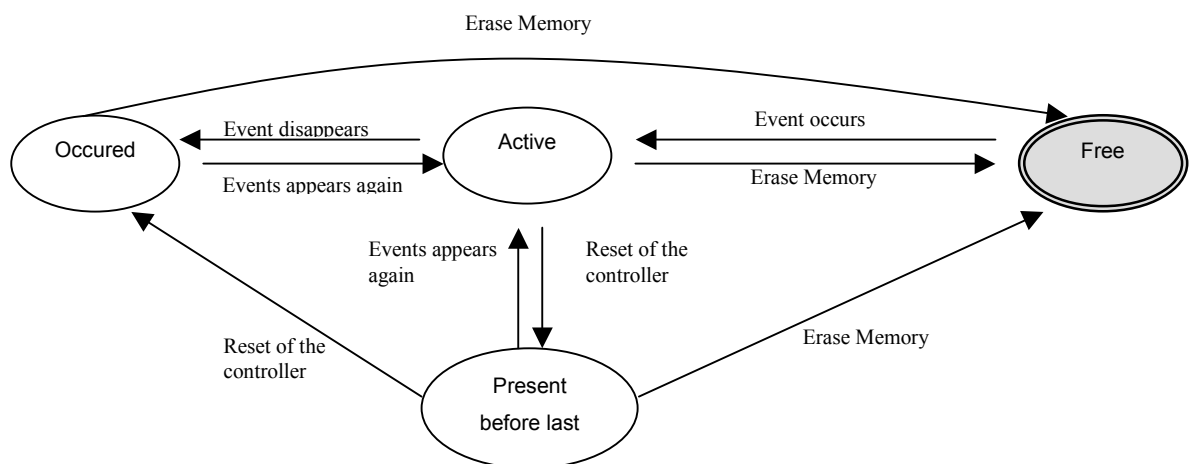
➤ **Status** : returns the current state of the event :

● *Active*: The event cause is still present.

● *Occurred*: The event occurred, but disappeared.

● *Present before last reset*: The event occurred, and was still present when the controller was reset.

● *Free*: Event never occurs since last memory erase. ("free" slots are not displayed under Mona).



➤ **Occ count** : counter of occurrence of the event since the last memory clear.

➤ **First occ Date/Time** : Timestamp of the first occurrence of the event.

➤ **Last occ Date/Time** : Timestamp of the last occurrence of the event.

↗ **End of last occ Date/Time** : Timestamp of the end of last event occurrence.

↗ **Available context** : a limited number of contexts is saved, for evident memory space reasons. This figure indicates the number of available contexts. It will be smaller or equal to the occ count field.

↗ **Help** : by clicking on the ‘?’ character, a html help file will open, showing information about the event and way to perform first maintenance action for instance.

To save these first level contexts in a text file (Excel readable), click on the



A file browser opens to select path and filename. As default, the name is made of the current timestamp : yymmdd\_hhmmss.txt.

| Code | Name           | Gravity | Nb Occurences | Status   | Occ Date/Time | First Occ Date/Time | Last Occ Date/Time |
|------|----------------|---------|---------------|----------|---------------|---------------------|--------------------|
| 20   | High Pressure  | 2       | 1             | Occurred | #####         | 27/08/2003 11:46    | 27/08/2003 11:49   |
| 22   | Room Sensor HS | 3       | 1             | Active   | #####         | 27/08/2003 11:46    |                    |
| 24   | Inhibit order  | 4       | 1             | Active   | #####         | 27/08/2003 11:46    |                    |
| 28   | Def5Name       | 3       | 1             | Active   | #####         | 27/08/2003 11:46    |                    |
| 44   | Bus Error      | 3       | 1             | Occurred | #####         | 27/08/2003 11:46    | 27/08/2003 11:49   |

Additionally, by selecting of one event (click on the corresponding line), additional data related to a defined occurrence are given in the lower side of the window ②:

↗ **Fcode** : reserved use for specific applications.

↗ **Begin Occ Date/Time** : Timestamp at start of the event occurrence.

↗ **End Occ Date/Time** : Timestamp when event ended.

↗ **Access to data**. See section “Advanced contexts” below.

## ERASE EVENT MEMORY

Click on Erase Memory in the Event Memory sub-menu. 

Wait for controller reset (after app. 30s) before performing other actions.

## FILE MODE

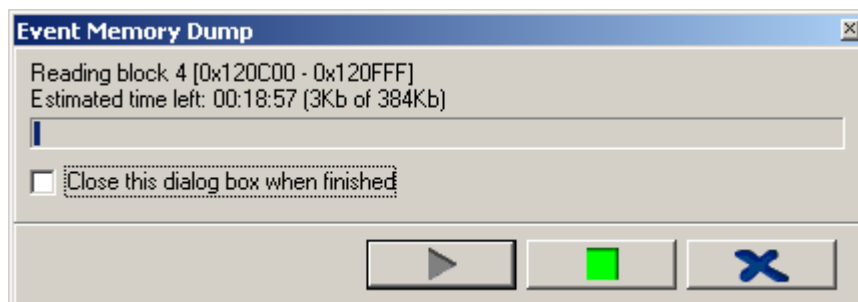
It is also possible to dump the complete area in a file, that can be processed off site, for instance by engineering office people. To do this, click on the



button. Two new buttons appear :



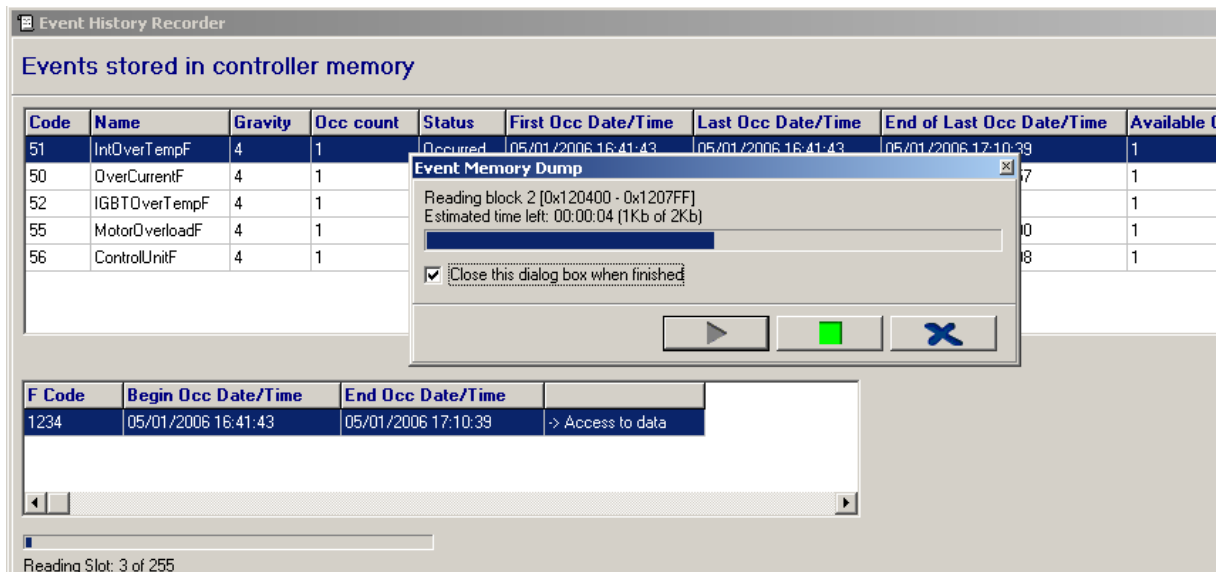
: to proceed to dump of the controller's memory contents into a file on the laptop.



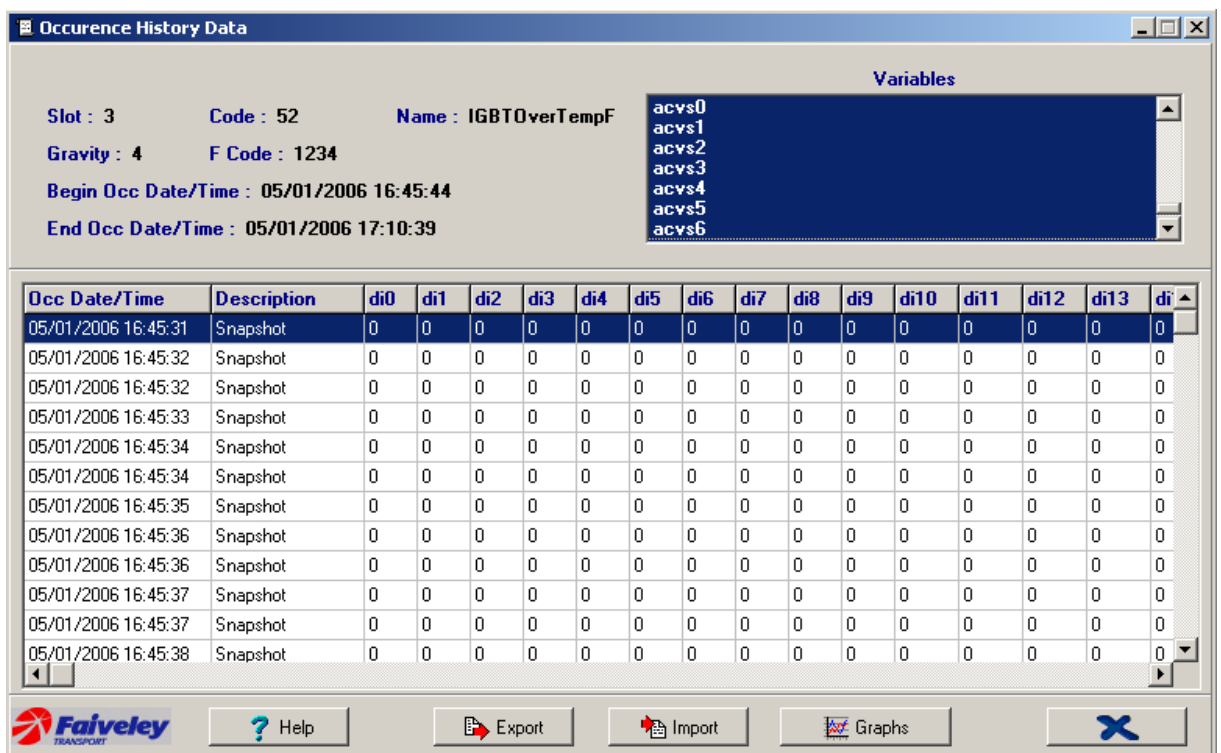
: to import the previously saved file. Once loaded, the behaviour will be exactly the same as in online mode (event list, context call...).

## ADVANCED CONTEXT READING

By clicking on "access to data" in an occurrence detail, Mona will automatically retrieve the data to reconstitute the system history before, during and after the event. This is done by means of a quick memory dump :



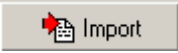
Once completed, the data is displayed in a new window :



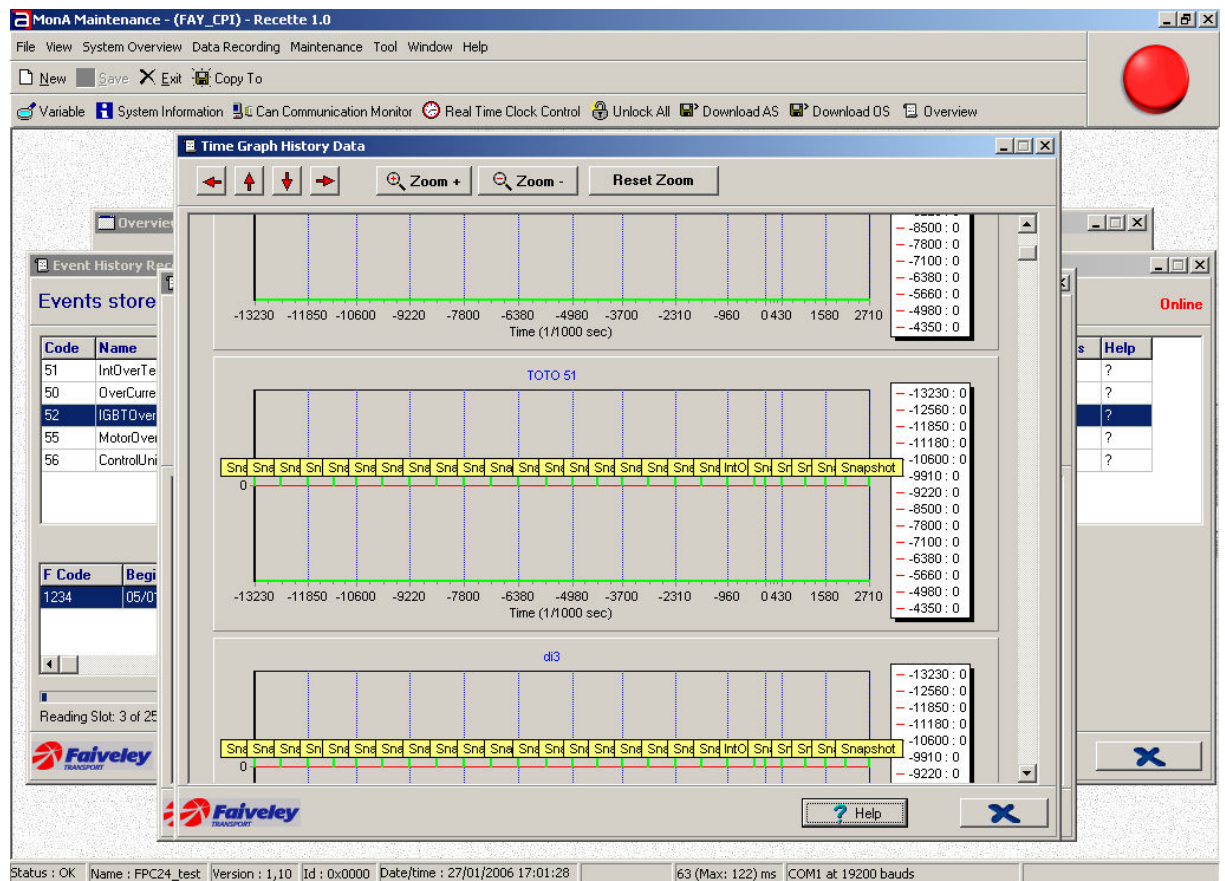
➤ On the upper side of the window, the user can find general info about the event type, as shown in the first level context area (name, gravity, code, timestamping).

➤ The table in the lower side contains all context data. Each line corresponds to a sample. All samples taken before, during and after the occurrence make the complete context data. The sampling trigger may be any change of the

system, or a periodic time. To identify this, the timestamp and the description fields shall give valuable information about this trigger. Finally, all other columns indicate the status of the system at each sampling point (for instance di0 to di13 signals).

➤ To store data related to an occurrence, press . The file can be reloaded later by clicking on .

➤ To get a convenient time graph representation of these signals, select the wished signals (default : all), and press .



## COMPONENT SLOT SUPERVISION

### LIFECYCLE MONITOR

Controllers implement a hardware component lifecycle supervision.

This embedded system monitors during the whole life of the system the status of several actuators. Thus, important data as working hour counter and number of starts can be kept in a non volatile memory.

Choose the Quick Overview in the Component supervision sub-menu, View menu. 

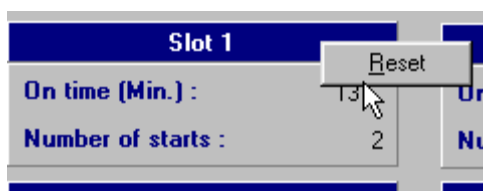
| Component life supervision                                                                                                                                                |                                                                    |                                                                    |                                                          |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------------|
| <b>Compressor</b><br>On time (Min.) : 27399<br>Number of starts : 43                                                                                                      | <b>Slot 4</b><br>On time (Min.) : 2810<br>Number of starts : 34150 | <b>Slot 8</b><br>On time (Min.) : 2848<br>Number of starts : 17220 | <b>Slot 12</b><br>On time (Min.) :<br>Number of starts : |
| <b>Slot 1</b><br>On time (Min.) : 2721<br>Number of starts : 67192                                                                                                        | <b>Slot 5</b><br>On time (Min.) : 2835<br>Number of starts : 22892 | <b>Slot 9</b><br>On time (Min.) : 2826<br>Number of starts : 26371 | <b>Slot 13</b><br>On time (Min.) :<br>Number of starts : |
| <b>Slot 2</b><br>On time (Min.) : 2715<br>Number of starts : 67192                                                                                                        | <b>Slot 6</b><br>On time (Min.) : 2834<br>Number of starts : 22892 | <b>Slot 10</b><br>On time (Min.) :<br>Number of starts :           | <b>Slot 14</b><br>On time (Min.) :<br>Number of starts : |
| <b>Slot 3</b><br>On time (Min.) : 2811<br>Number of starts : 34150                                                                                                        | <b>Slot 7</b><br>On time (Min.) : 2849<br>Number of starts : 17221 | <b>Slot 11</b><br>On time (Min.) :<br>Number of starts :           | <b>Slot 15</b><br>On time (Min.) :<br>Number of starts : |
| <br>Reading Slot: 10 of 16                                                             |                                                                    |                                                                    |                                                          |
|   |                                                                    |                                                                    |                                                          |

Sixteen slots are available (press the arrow on the right to see the 4 last ones).

Each of them contains the number of running minutes and the total amount of starts, since last erase action.

## SLOT RESET

To reset a defined slot after replacement of a component (compressor, fan...),



do a right click on the selected slot, and click on "Reset".

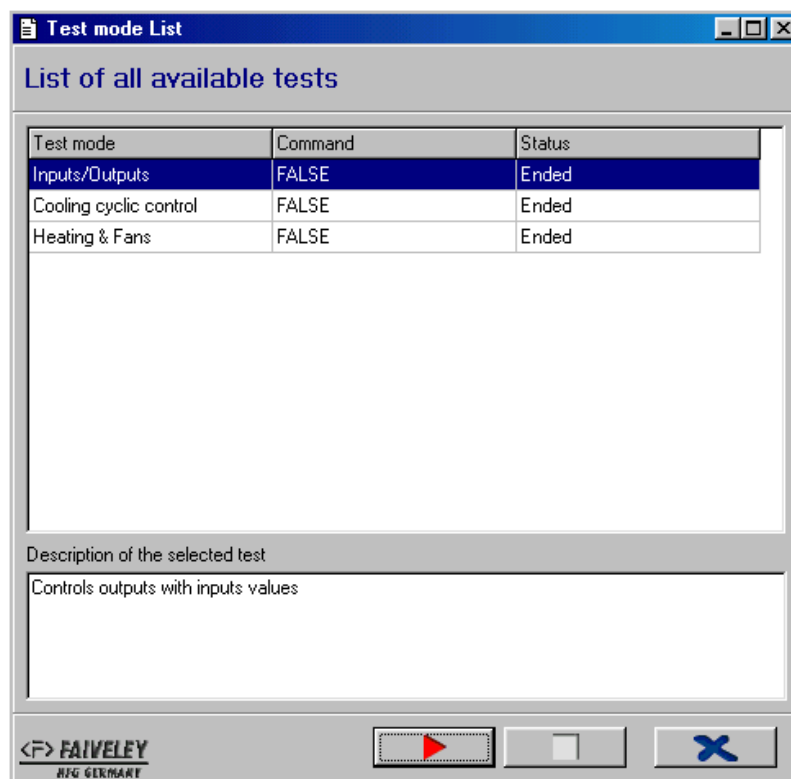
## MAINTENANCE

### TEST MODES

Mona gives opportunity to perform in a convenient and safe way enhanced system functional and performance checks.

During test modes, the software guarantees that nominal mode safeties are still active, and that no dangerous action will be allowed for the system.

⚠ Therefore, take care that starting of components won't harm persons or damage material, especially during maintenance tasks and initial operations tasks !



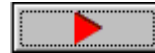
A list of foreseen tests is available in Test menu. 

### *Exclusive Test Modes :*

Some test modes need to run individually, they are called “Exclusive”. If test is already active, no exclusive test can be called, and if an exclusive test mode is active, no other test modes can be started.

### *Start a Test Mode :*

Select the test mode in the list, and click on



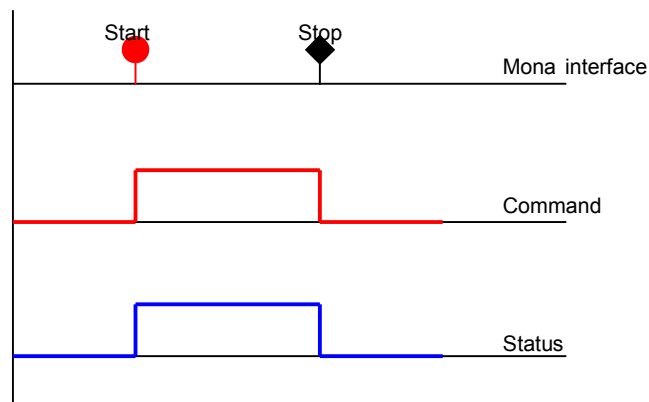
### *Stop a Test Mode :*

To end a test mode, select it, and click on



### *Command / Status :*

The test mode list shows two fields, command and status. Command represents the direct Mona demand, as status is the real status of the test mode. This is particularly useful for timing sequenced test modes.



**Figure 1 : Test mode with direct control ON/OFF**

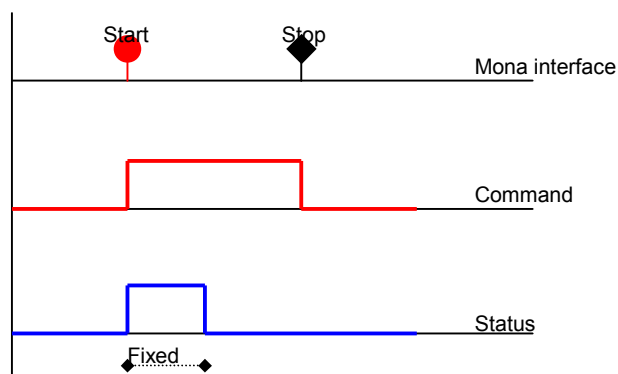
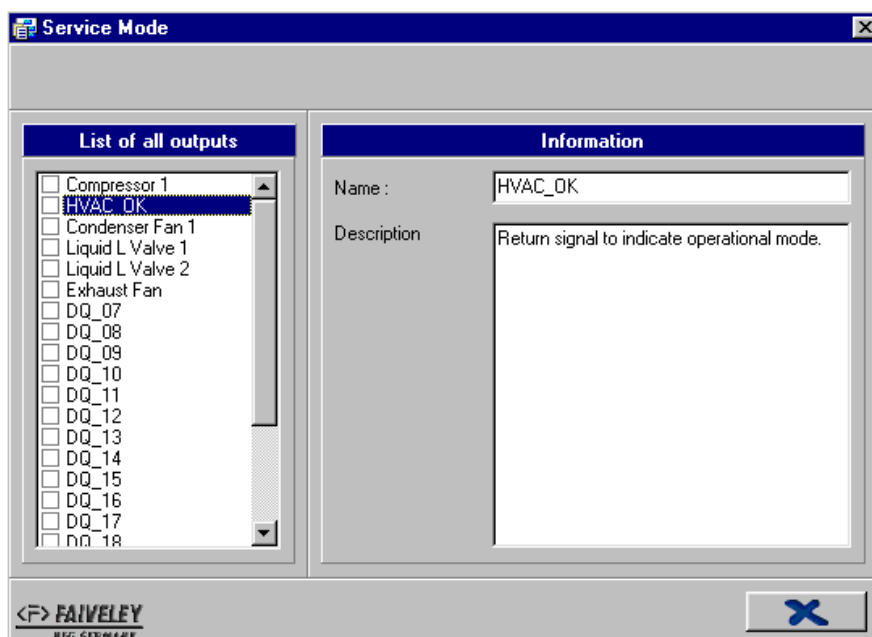


Figure 2 : Test mode with fixed time sequence

## SERVICE MODE

This is another maintenance mean, but this one allows user to control directly the outputs of the system. Check the box corresponding to each output to switch on/off the corresponding actuator.



⚠ Actions on outputs of the system may endanger persons or damage material, thus using of Service Mode must be reserved to trained, authorized person, under the control of a safety authority.

## CONFIGURATION ITEMS

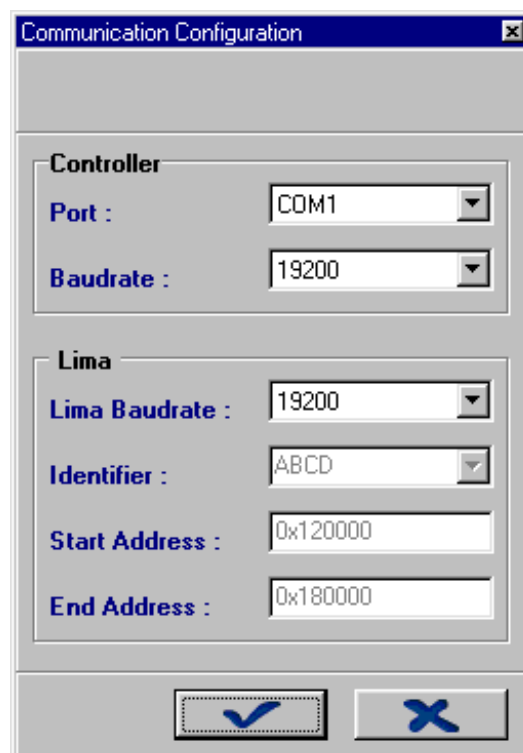
---

### COMMUNICATION SETTINGS

In Tool menu, select Communication 

Choose a Com port present on your computer. Mona accepts all compatible Com ports, including USB-COM additional modules, if they are well configured on the computer.

👉 It is recommended not to modify the “Baudrate” or “Lima Baudrate” parameters, without specific request from Faiveley.



The image shows a 'Communication Configuration' dialog box with the following fields:

- Controller**
  - Port : COM1
  - Baudrate : 19200
- Lima**
  - Lima Baudrate : 19200
  - Identifier : ABCD
  - Start Address : 0x120000
  - End Address : 0x180000

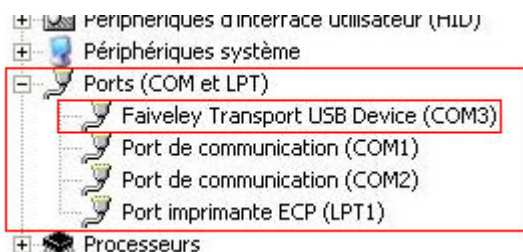
At the bottom, there are two buttons: a checkmark button and a close button (X).

## USE OF USB LINK (OPTION)

If the USB link is available on the controller, connect it to the computer by means of a cable compliant with the USB standards. The PC shall identify the device and setup automatically the connection.

👉 The USB drivers delivered by Faiveley must be installed prior to connect the controller to the computer !

Then, according to your computer, a free COM port will be emulated by the driver. To know which one, start the Windows Device Manager and find the item “Ports (Com & Lpt)” within. The Faiveley Transport USB shall be present in the list, indicating the selected COM Port (in the example below, COM3 has been retained).



Then, just select the same COM port in the Communication Settings of Mona, as explained above.

## SHORTCUTS

The user can define a set of keyboard shortcuts for all functions of the Mona software. These shortcuts are saved in a separate file and are not project specific.

To attrib a hotkey, choose a category and an action, type the shortcut (eg. Ctrl+G), and click on  to validate choice.

## ADMINISTRATOR ROLE

The Administrator is a person of the customer company who has the responsibility of software licenses and registration management, and password releasing to the authorized people.

## SOFTWARE LICENSE

It is strictly forbidden to make illegal copies of Mona software. The number of licenses to be released shall be agreed between customer and Faiveley Transport.

A license contract is delivered with each unique Mona CD. This sheet contains the Name and Serial Number to be entered during installation.

## ACCESS LEVELS

According to the specified level of the MPF or user login (according to the project type), the following table gives an overview of the allowed functions :

| Access Level Configuration                         |         |         |         |
|----------------------------------------------------|---------|---------|---------|
| Access Level Configuration                         |         |         |         |
| Function                                           | Level 1 | Level 2 | Level 3 |
| Open Project                                       | ✓       | ✓       | ✓       |
| Download                                           |         | ✓       | ✓       |
| Unlock                                             |         |         | ✓       |
| Can Bus Monitor                                    | ✓       | ✓       | ✓       |
| Get/Set Real Time Clock                            | ✓       | ✓       | ✓       |
| System Information (limited)                       | ✓       | ✓       | ✓       |
| Overview : Watch an overview                       | ✓       | ✓       | ✓       |
| Overview : Direct Variable Forcing                 |         |         | ✓       |
| Overview : Print Screen                            | ✓       | ✓       | ✓       |
| Recording : Start a recording                      | ✓       | ✓       | ✓       |
| Recording : Load a previous recording for analysis | ✓       | ✓       | ✓       |
| Component Slot : Read                              | ✓       | ✓       | ✓       |
| Component Slot : Erase (individual)                |         |         | ✓       |
| Event Memory : Read                                | ✓       | ✓       | ✓       |
| Event Memory : Dump                                | ✓       | ✓       | ✓       |
| Event Memory : Erase                               |         | ✓       | ✓       |
| Event Recorder : Read                              | ✓       | ✓       | ✓       |
| Event Recorder : Dump                              | ✓       | ✓       | ✓       |
| Event Recorder : Erase                             |         | ✓       | ✓       |
| Maintenance : Test Mode Control                    |         | ✓       | ✓       |
| Maintenance : Service Mode Control                 |         |         | ✓       |
| Configuration : Baudrate & Port change             | ✓       | ✓       | ✓       |
| Configuration : Hotkey change                      | ✓       | ✓       | ✓       |

## PASSWORD ADMINISTRATION (OPTION)

Reserved for Administrator, this section explains how to modify a set of passwords.

Mona is delivered with a standard set but it is strongly recommended to assign a new one.

☛ Maintaining passwords, giving them to people according to their education level, skills and certification level is the responsibility of the Administrator.

Once logged as Administrator, select in the Tools menu, the User administration icon .

First select the level, and then enter the new password in both text area. Then select other levels and proceed identically. Finally confirm and quit.

## ACCESS LOG ANALYSIS

A log file named “users.log” contains history of all previous logins.

It is located within the same directory as mona.exe. (Typically c:\Program Files\Faiveley\Mona).

Each line contains **Name**, **date and time** of login, and opened **project**.

This file also contains the history of Component Slot erasing (date/time).

## TROUBLESHOOTING

---

### PROBLEMS WHILE STARTING MONA

If a message box with the text below appears :

`Microsoft Script Control is not installed.`

Run the sct10en.exe setup, located on the install CD.

Ensure that you have a version of Internet Explorer 5.5 or higher.

### COMMUNICATION PROBLEMS

#### **“Status” always indicates “disconnected”**

- 1) Check the connection between controller and PC
- 2) Ensure that the controller is powered on.
- 3) Check that the controller is running ok (Led blinking).
- 4) Ensure that the COM port of the computer corresponds to the one selected in Mona (Menu Tools / Communication).

#### **Com port already open by another application**

An other program is already running and was not correctly closed.

- 1) Ensure that Mona is the only software using the selected com port.
- 2) Eventually restart computer to close any unwanted application and run Mona again.

#### **Bad Symbols**

“Bad symbols” in the status bar mean that the application running in the controller is not compatible with the current Mona project files : this discrepancy

induces that Mona cannot read variables. Only the Application Software version is available.

Check this AS version, and ensure that it is the last released by Faiveley, and that it is not a test version.

- 1) If AS is not correct (too old for instance), start a download.
- 2) If AS is correct, you may have an older Mona configuration file, or old appli.tst or <project>.s19. Please contact your Faiveley correspondent to recover the last MPF.

#### **No running Application**

Means that the downloaded Application Software cannot run with the Operating System of the controller. Please ensure that current target controller, Operating System and Application Software are as specified in the Faiveley release.

## **OVERVIEW PROBLEMS**

#### **Cannot force a variable**

Some variables are not forceable. This is a part of the MPF desing to allow forcings or not on variables. If not allowed, it means that it is not useful (or dangerous) to force this variable.

## **RECORDING PROBLEMS**

#### **Two many errors in generated files**

Recording configuration timings are set up and tested for a given Mona environment. Number of read variables and cycle time are specified. To avoid any problems, we recommend that you close all unused windows, such as overviews. If the problem persists, it means that the recording file has not been designed to work under these serial link bandwidth conditions.

## GRAPHIC RESOURCES

### Not enough GDI (Win 95/98)

Mona warns the user that the computer has reach its graphic resources limit and cannot display anymore windows. Close other programs running on the computer and any unused Mona window.

## ANNEX : EVA HANDBOOK

Eva allows to extract and display contexts of events. It is dedicated to HVAC and LVPS products, and only on supported projects.

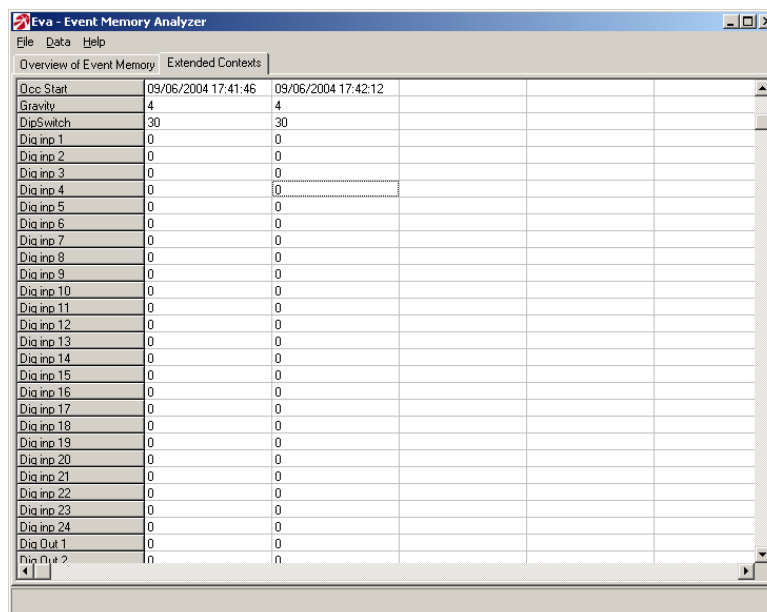
### PRESENTATION

Eva is composed of three files :

- Eva.exe : main program.
- Eva.ini : configuration file dedicated to your project.
- dll\_lima.dll : additional data required for some applications.

### ANALYZE OF A DUMP FILE (\*.DMP)

After a dump has been completed under Mona, its contents can be read subsequently. Once started, select File/Open, and select the corresponding file. In the “Extended Contexts” sheet, all event occurrences are displayed in the table with associated contexts.



| Overview of Event Memory |                     | Extended Contexts   |  |
|--------------------------|---------------------|---------------------|--|
| Occ Start                | 09/06/2004 17:41:46 | 09/06/2004 17:42:12 |  |
| Gravity                  | 4                   | 4                   |  |
| DipSwitch                | 30                  | 30                  |  |
| Dig inp 1                | 0                   | 0                   |  |
| Dig inp 2                | 0                   | 0                   |  |
| Dig inp 3                | 0                   | 0                   |  |
| Dig inp 4                | 0                   | 0                   |  |
| Dig inp 5                | 0                   | 0                   |  |
| Dig inp 6                | 0                   | 0                   |  |
| Dig inp 7                | 0                   | 0                   |  |
| Dig inp 8                | 0                   | 0                   |  |
| Dig inp 9                | 0                   | 0                   |  |
| Dig inp 10               | 0                   | 0                   |  |
| Dig inp 11               | 0                   | 0                   |  |
| Dig inp 12               | 0                   | 0                   |  |
| Dig inp 13               | 0                   | 0                   |  |
| Dig inp 14               | 0                   | 0                   |  |
| Dig inp 15               | 0                   | 0                   |  |
| Dig inp 16               | 0                   | 0                   |  |
| Dig inp 17               | 0                   | 0                   |  |
| Dig inp 18               | 0                   | 0                   |  |
| Dig inp 19               | 0                   | 0                   |  |
| Dig inp 20               | 0                   | 0                   |  |
| Dig inp 21               | 0                   | 0                   |  |
| Dig inp 22               | 0                   | 0                   |  |
| Dig inp 23               | 0                   | 0                   |  |
| Dig inp 24               | 0                   | 0                   |  |
| Dig Out 1                | 0                   | 0                   |  |
| Dig Out 2                | 0                   | 0                   |  |

## EXPORT TO EXCEL FILE

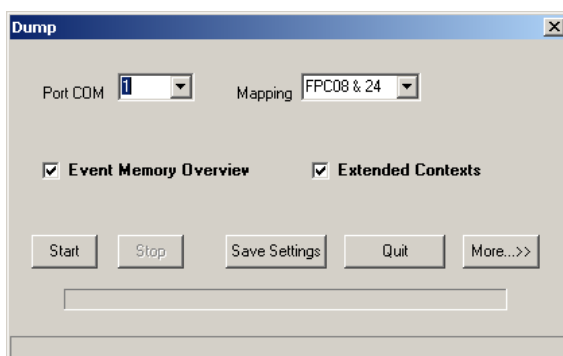
To allow advanced statistic and graphic analyzing of the data, it is possible to export the dump file to an Excel compatible data. This can be done by clicking on Export Extended Contexts in the File menu.

While importing under Excel, select Tab separators, and all columns shall remain as “standard” format.

## DUMP (OPTIONAL)

It is also possible to proceed to dump directly from Eva, without using of Mona. This is an advanced mode that is reserved to advanced users.

To proceed with dump, click on Dump in the Data menu. The following window appears :



Select Com port according to your computer configuration. Identify your controller type within Mapping field. It is also possible to read “Extended context” (this is the mode embedded in Mona), or also the “Event Memory Overview” that gives a quick overview of the event stored in controller memory. Finally, click on Start to trigger dump.

Refer to Eva’s help for more info about advanced setting up of the dump parameters.

Once dump is completed, the data are shown directly in the corresponding tables.

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