

# SoMachine Basic Software V1.3

## Release Notes

Software Version: 1.3

Firmware Version: 1.3.1.0

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## 1. SYSTEM REQUIREMENTS

This software can be installed on a personal computer having the following hardware:

- Processor Core 2 duo or higher
- RAM Memory 2 GBytes recommended or higher
- Hard Disk 600 MBytes
- Display 1280 x 768 pixels resolution or higher
- Peripherals Mouse or compatible pointing device
- Peripherals USB interface
- Web access Web registration requires Internet access

Having the following operating systems:

- Microsoft Windows XP Professional SP3 32 Bit & 64 Bit
- Microsoft Windows 7 Professional Edition 32 Bit & 64 Bit
- Microsoft Windows 8 Professional Edition 32 Bit & 64 Bit
- Microsoft Windows 8.1 Professional Edition 32 Bit & 64 Bit

SoMachine Basic requires Administrator rights to be installed.

Remove any USB connection to a M221 Logic Controller when installing or uninstalling SoMachine Basic.

For further information contact your Schneider Electric support center.

## 2. IMPORTANT INFORMATION

### 2.1. Provided templates and project examples

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## 2.2. New features in V1.3

Refer to the "Documentation update" below in this document

Remote Graphic Display support:

- Configuration of display
- Creation of Operator interface pages

Synchronization retained after modifying only symbol/comment or animation table

Modem support on controller

Modem connection from SoMachine Basic

Communication function blocks

Improvements on the PID auto tuning algorithm (filter added)

Support for up to 4 mono-phase HSC

Extension of Memory bits from 512 to 1024

New instructions to allow immediate read/write update of embedded I/O

Add Advise or Error icon in Task Tab and in Tasks tree

Pre-symbolization (Tesy objects, safety-related objects and System objects)

Backup of online modification to boot application in Flash memory while in RUNNING state

Improvements to SoMachine Basic program editor usability

- Undo/Redo in Ladder editor
- Drag'n'drop data from Detailed View to Ladder
- Symbolization of bits extracted from words

Contextual help (through Shift-F1 key)

## 2.3. New features in V1.2

Functional level management: your system could include logic controllers with different firmware versions, and therefore with different capability levels. SoMachine Basic supports functional level management to allow you to control the differences between your application and the target controller.

PTO (Pulse Train Output) function blocks controls the positioning or speed of one or two independent linear single-axis stepper or servo drives.

%S49 (output rearming) enables automatic rearming of embedded outputs following a short-circuit.

## 2.4. Main features

### 2.4.1. Software features

8 languages are available: English, French, German, Italian, Spanish, simplified Chinese, Portuguese and Turkish

Automatic conversion of Twido project (TwidoSoft projects, TwidoSuite projects and archives)

Several sessions can be opened at the same time

Copy/Paste of rungs or POUs in the same or different sessions (see restrictions below)

Symbols, comments, animation tables are downloaded to the controller with the application (see restrictions below)

Limited protection of project file or controller application

Instruction List and Ladder programming languages (including Grafcet List)

Ladder program animation

Save / Restore backup data by SoMachine Basic,  
Backup firmware and backup user program with SD card

### 2.4.2. Controller features

USB communication (application download, firmware update, Monitoring)

Ethernet communication (application download, monitoring, Modbus TCP/IP client & server, DHCP BOOTP client)

Serial line communication (application download, Modbus and ASCII protocols)

RTC (Real Time Clock)

Firmware update with M221 Firmware Update tool

SD card management: Firmware update and Clone application (see details below)

Powerless download (firmware and application)

Digital and analog output fallback management

PLS, PWM, PTO

Event tasks

Fast Counters and High Speed Counters

PID with Autotuning

### 2.4.3. Simulator Features

The following features can be simulated: all Booleans and complex instructions, Grafcet instructions, Function Blocks like Drum, Counter, FIFO/LIFO, Shift Bit Register, Step Counter, Timer, and Schedule, Mast and Fast tasks and subroutines, Events for Inputs %I0.2, %I0.3, %I0.4, %I0.5, TM3 and TM2 expansion modules, Cartridges, RTC, LEDs, Embedded I/Os and Online Modification.

Two Ethernet server connections are available: one of them is dedicated for SoMachine Basic link.

Output trace screen.

Time management screen.

## 2.5. Limitations and Restrictions

### 2.5.1. SoMachine basic Documentation and Help

Refer to the online help Addendum for the latest corrections to the documentation/help.

### 2.5.2. SoMachine Basic Software

When updating M221 firmware with "Firmware Update" tool, ensure to be offline in SoMachine Basic.

Refrain from having more than 500 rungs in one POU: separate rungs between different POUs to increase performance of SoMachine Basic.

Avoid online modifications when the controller scan time is close to the configured watchdog value: you may trigger a watchdog timeout and bring your controller to the HALT state, creating a desynchronization between the program in SoMachine Basic and the controller.

Adding or deleting a line in Instruction List will require you to download your application after disconnection.

When an output is reserved by an I/O function block (HSC reflex output, PLS, PWM or PTO):

- Its on-screen animation value is not refreshed (neither in the program editor nor animation table)
- A force action is not valid

Configurable software object types (Drums, Scheduler, PID) have the following restrictions:

- They appear in search results but are not replaceable
- They are not dynamically updated when module configuration is modified

Programming messages prefixed with "Compiler Message" are only refreshed when doing a new compilation at login time or by launching the simulator.


When you copy/paste a part of your user logic in another session of SoMachine Basic, only the code is copied. The symbols and comments associated to software objects are not copied.

In powerless mode, the values in animation tables may not be valid.

When updating variables from SoMachine basic project to Vijeo Designer, verify that previous configured variable in Vijeo Designer are still valid.

### 2.5.3. M221 Logic Controller

During a controller reset when the controller first enters an EMPTY state, all outputs are set to zero for the first cycle of the controller. If you set the default (fallback) value of an output to one in the configuration, it will not take effect until after this first cycle, the duration of which is dependent on your application (size, communications, etc.). You may, given you intend a default (fallback) value of 1 for any or all outputs, take this into consideration. Thoroughly test your application and ascertain whether a reset of the controller, followed by an EMPTY state and the setting of outputs to zero, would cause your machine or process to react in ways that would have adverse consequences.

 <b>WARNING</b>
<b>UNINTENDED EQUIPMENT OPERATION</b> <ul style="list-style-type: none"><li>• Be sure your machine is brought to a known, safe state before initiating a reset of the controller.</li><li>• Account for an EMPTY state as you would for the interruption of power to your outputs, such as in the case of a power outage.</li></ul> <b>Failure to follow these instructions can result in death, serious injury or equipment damage.</b>

Force states are maintained in case of a warm start and cleared in case of a cold start.

Some controller input LEDs are ON in power less mode.

When the PLC is in HALT and configured in "START in RUN", after the first power cycle, it starts in STOP (correct behavior), however after the second power cycle the M221 also starts in STOP (it should start in RUN).

On overloaded networks (more than 300 frames per second received by the controller), the error LED may not be ON to signal a duplicate IP address.

If there are more modules in the physical configuration than in the SoMachine Basic software configuration, only the bit corresponding to the first module missing is set to 1.

When at least one module does not answer correctly to the M221 during runtime (meaning the configuration step succeeded) the corresponding bit in %SW120 is set to 1 and the bit 13 of the %SW118 is set to 0. Even if it is the same error information as it is for a configuration mismatch (see above), the behavior is different as the expansion bus is still refreshed by the M221.

If you make a connection with a defective or otherwise nonstandard USB cable, and power cycle the controller, it may stay locked in boot phase. This is usually because there is a short circuit between pins 4 & 5. Replace the USB cable or at least disconnect it in case of a power cycle.

When using Vijeo Designer prior to version 6.2 SP1, and using a M221 Logic Controller with I/O cartridges, the values of the I/O from the cartridges cannot be directly accessed by the HMI. To access these values, write them programmatically to controller memory addresses so that they can be used by the HMI. To avoid this situation, upgrade your Vijeo Designer to version 6.2 SP1 or above.

When doing a program backup (after an online change), or a memory backup, communication to and from the controller may be interrupted.

The INIT command may disconnect the Ethernet connection with SoMachine Basic.



#### 2.5.4. Remote Graphic Display

The controller is protected by a password randomly generated by the controller firmware to prevent unauthorized modifications to the application or state of the controller. In order to access protected pages, it is mandatory to configure a Remote Graphic Display in your application. This allows defining a password to access these pages.

The system language of the Remote Graphic Display can only be modified using the Remote Graphic Display.

Do not disconnect the Remote Graphic Display in the following situations:

- while the controller is transferring the application to the Remote Graphic Display (~10 seconds after connection),
- during a firmware update or an application download to the controller

If the message “Connection in progress” continues to be displayed on the Remote Graphic Display: verify that the Remote Graphic Display is correctly connected to the logic controller. You may also need to disconnect and reconnect the Remote Graphic Display to reestablish communication with the controller.

Do not use Modbus exchange instructions on the Remote Graphic Display serial port in your controller application when using the Remote Graphic Display.

The Remote Graphic Display does not dynamically allocate memory in the controller application, although you can create pages with memory references that have not been allocated.

#### 2.5.5. Embedded Simulator

You may only launch one simulator instance on the same PC.

An error message could appear when starting the simulator, you can ignore it.

If the simulator is being used with the Vijeo Designer Simulator, the SoMachine Basic Simulator must be launched first.

The minimum time base for the simulator is **50 ms**. All tasks with a period lower than 50 ms will be configured at 50 ms.

Down-counters (%SW76-%SW79) have 50 ms resolution.

Event task priorities are not taken into account (tasks are executed in the order in which they were activated).

You cannot simulate hardware features like Fast Counter, PID, EXCH, PWM, PLS, PTO, HSC, filters and latches.

Serial Lines and Ethernet communications are not simulated.

SD card functionality is not simulated.

Security parameter settings are not simulated.

### 2.5.6. System objects

Refer to the online help for more information on system objects definitions.

%SW33 to %SW36 may be incorrect when the M221 is configured in BOOTP or DHCP and the BOOTP/DHCP server does not answer during the IP address assignment.

%SW59: Bits 0 and 8 (day of week) and bits 7 and 15 (Centuries) cannot be used.

### 2.5.7. Compatibility with the Schneider Electric legacy controller offer

Quantum DHCP and BOOTP server is not compatible with M221 and cannot be used.

### 2.5.8. Clone management

Windows 8 or 8.1 creates hidden files on SD cards.

Using these cards may result in disabling actions that depend on the SD card being empty.

### 2.5.9. Twido conversion

After converting a Twido application, verify that the system objects on the M221 are valid as some of these legacy system objects are now obsolete.

In some cases, there is no error reported after the conversion.

Verify your serial line configuration after conversion such that it will operate as intended relative to the original application.

### 2.5.10. Simulation between SoMachine Basic and Vijeo Designer on the same PC

In order to operate both the SoMachine Basic simulation together with Vijeo Designer simulation, start the SoMachine Basic simulation first and then launch Vijeo Designer simulation. Vijeo Designer simulation execution is limited in time, so you may want to re-launch it if you face any issues.

### 2.5.11. Upgrading applications

User updating firmware from V1.0.1.1 should reconfigure any existing Post Configuration file.

When updating project from SoMachine Basic V1.1, verify that the Modbus TCP remote server table properties are still valid.

## 2.6. Documentation update

### 2.6.1. Evolution of the HSC from previous versions

In order to be compliant with the VFC in Twido, the behavior of HSC between previous versions (V1.1 & V1.2) and version V1.3 has been modified as follows:

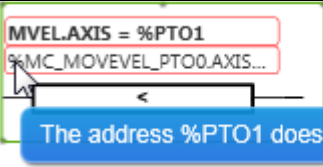
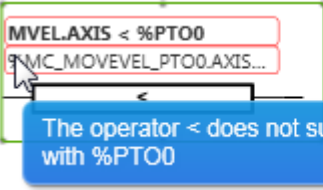
- HSC Dual Phase [Quadrature X2]: HSC Starts counting from the Preset Value. (was starting from 0 in previous versions),
- HSC Dual Phase [Quadrature X2]: Threshold Events are triggered once if a HSC is executed: If Threshold values are less than the Preset value, an event is triggered when the HSC is enabled.

## 2.6.2. Upgrading applications with PTO from V1.2


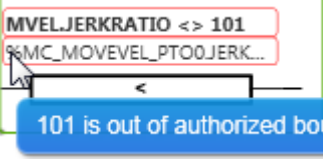

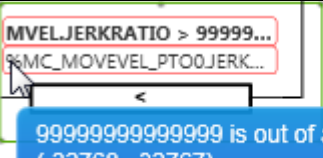
Some restrictions have been implemented in V1.3 regarding PTO function blocks and operations on variables of PTO function blocks.

### Compare Block

- Axis Parameter:** comparing the parameter Axis with the existing address of a PTO is now possible. Note that the only authorized comparison operators are "<>" and "=". The following table presents the errors that are detected. These examples assume that only the %PTO0 is defined.

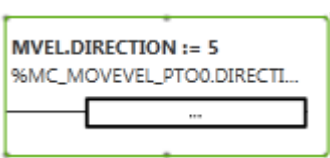
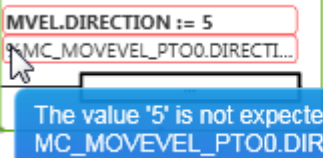
V1.2	V1.3
	
Not relevant since the operation was not supported	

- Enumeration parameters:** No verification (no change compared with V1.2)
- Range parameters:** The configured bounds and the limits fixed by the type of the parameter are both verified after validating the instruction


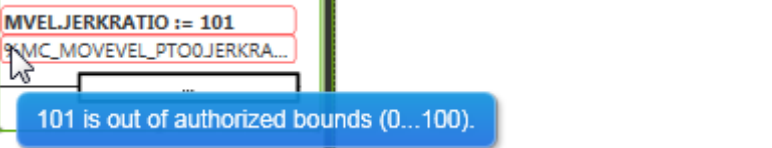

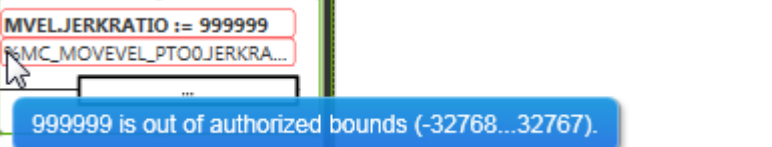
V1.2	V1.3
	
	

### Operation Block

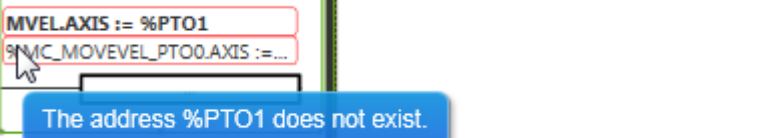
- Enumeration parameters:** The entered value must be one of the enumeration values

V1.2	V1.3
	

- **Range parameters:** The configured bounds and the limits fixed by the type of the parameter are both verified after validating the instruction

V1.2	V1.3
 <p>MVELJERKRATIO := 101 %MC_MOVEVEL_PTO0.JERKRA...</p>	 <p>MVELJERKRATIO := 101 %MC_MOVEVEL_PTO0.JERKRA...</p> <p>101 is out of authorized bounds (0..100).</p>
 <p>MVELJERKRATIO := 999999... %MC_MOVEVEL_PTO0.JERKRA...</p>	 <p>MVELJERKRATIO := 999999 %MC_MOVEVEL_PTO0.JERKRA...</p> <p>999999 is out of authorized bounds (-32768...32767).</p>

- **Axis Parameter:** Assign the parameter Axis with the existing address of a PTO is now possible.

V1.2	V1.3
<p>Not relevant since the operation was not supported</p>	 <p>MVEL.AXIS := %PTO1 %MC_MOVEVEL_PTO0.AXIS :=...</p> <p>The address %PTO1 does not exist.</p>