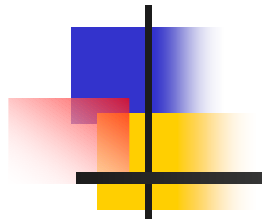


'Atomic'

Development environment for customized applications



ATOMIC
by **Ever**
ELETTRONICA

Introduction

- ✓ Atomic is a micro programming language designed for the **'full digital'** EVER SDM, MD, SW and SM family drives.
- ✓ The scope of this language is to give the user the freedom to create his own simple application without having to switch to more complex and more expensive drives.
- ✓ Atomic's philosophy is to have few but powerful instructions.
- ✓ The programming of Atomic is done by means of user friendly Personal Computer with the Atomic environment and an SDM, MD, SW or SM drives with 'Atomic Ready' logo and Atomic firmware (c0499).

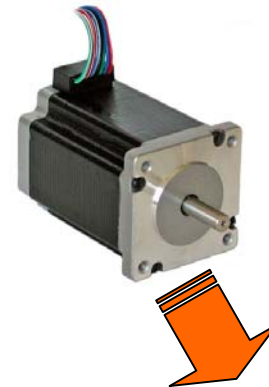


Introduction

- ✓ The user program Atomic is developed by means of a simple software interface supplied by Ever Elettronica Co. for the windows operating system Personal Computer.



**'Atomic'
software
interface**



**SDM, MD, SW and SM drives
with 'Atomic' firmware**

Hardware - Software components

Hardware and software components table compatible with 'Atomic':

Drives	Software kit
- SDMWD180vA133c0499 - SDMWD180vA143c0499 - SDMWA180vA133c0499 - SDMWT180vA133c0499	SDM_ATM-00
- SDMWD170vB231c0499 - SDMWD170vB242c0499 - SDMWA170vB231c0499 - SDMWA170vB242c0499 - SDMWA170v2231c0499 - SDMWA170v2242c0499 - SDMWA170v4231c0499 - SDMWA170v4242c0499	SDM_ATM-00
- SDMWA130vA136c0499	S130_ATM-00
- MDK3AxxxNvPA36c0499 - MDK3AxxxHvPA36c0499 - MDK3BxxxNvPA36c0499 - MDK3BxxxHvPA36c0499 - MDK3CxxxNvPA36c0499 - MDK3CxxxHvPA36c0499 - MDK3DxxxNvPA36c0499 - MDK3DxxxHvPA36c0499	MD_ATM-00
- SW1D4080N361-00c0499	SW_ATM-00
- SM2Ax60PNx43Ax0c0499 - SM2Ax60PNx43Bx0c0499 - SM2Ax60PNx43Dx0c0499 - SM2Ax60PNx43Ex0c0499	SM_ATM-00

The software kits include:

- the **CD ATOMIC** to install the PC environment
- the **RS232 cable** adapted to the requested drives

Technical specifications

- ✓ These are the specifications and the supported application functions :
 - 15 powerful macro instructions
 - 8 storable user applications
 - 640 bytes of max program size
 - 6 bytes of medium length instructions
 - 32 user variables
 - Supports 4 bytes integer numbers
 - Access to all the controlling objects of the drives
 - Access to all the I/O's of the drives
 - Multitasking support up to 8 user tasks
 - A medium execution time of <math><1\text{ ms}</math> per instruction

Atomic advantages

- ✓ Atomic introduces a new way to create an own application:
 - Simple, fast and complete building of the user's cycle
 - A broad versatility for different application requirements
 - The user doesn't have to learn the instructions syntax
 - Functions on all drives of the SDM, MD, SW and SM series with c0499 firmware
 - Integrates all advantages of the f⁴d² technology
 - Simplifies the debugging of the application
 - It benefits from all the power of the DSP's integrated in the drives
 - Complete support and training by EVER Elettronica's support dept.

Instructions set

Motor handling instructions:

Instruction	Description	Parameters
MOVE ⁽¹⁾	Starts the motor according to the given parameters	1) Type of movement (steps/target/homing...).
		2) [optional] Movement Parameter (steps #, position...).
		3) [optional] Profile velocity.
		4) [optional] Acceleration ramp.
		5) [optional] Deceleration ramp.
STOP ⁽¹⁾	Stops the motor according to the given parameters	1) Type of stop (no ramp,with ramp,with steps).
		2) [optional] Stop parameter (# of steps).

(1) The functionality of these instructions is the same as in the CANopen/Modbus SDM drives.

Instructions set

Arithmetical instructions:

Instruction	Description	Parameters
ADD	<p>Performs an addition between two (objects/user variables/numerical constants) storing the result into an (objects/user variable)</p> <p>Destination = 1st operand + 2nd operand</p>	1) Destination (User Variable/Object).
		2) First Operand (Numerical Constant,User Variable,Object).
		3) Second Operand (Numerical Constant,User Variable, Object).
SUB	<p>Performs a subtraction between two (objects/user variables/numerical constants) storing the result into an (objects/user variable)</p> <p>Destination = 1st operand - 2nd operand</p>	1) Destination (User Variable/Object).
		2) First Operand (Numerical Constant,User Variable,Object).
		3) Second Operand (Numerical Constant,User Variable, Object).
MUL	<p>Performs a multiplication between two (objects/user variables/numerical constants) storing the result into an (objects/user variable)</p> <p>Destination = 1st operand * 2nd operand</p>	1) Destination (User Variable/Object).
		2) First Operand (Numerical Constant,User Variable,Object).
		3) Second Operand (Numerical Constant,User Variable, Object).
DIV	<p>Performs a division between two (objects/user variables/numerical constants) storing the result into an (objects/user variable)</p> <p>Destination = 1st operand / 2nd operand</p>	1) Destination (User Variable/Object).
		2) First Operand (Numerical Constant,User Variable,Object).
		3) Second Operand (Numerical Constant,User Variable, Object).

Instructions set

Application flow control instructions:

Instruction	Description	Parameters
WAIT	Arrests the user application execution until the specified event occurs	1) Event (Time delay, Motor running/at standstill, Input open/close). 2) [optional] Time, input #.
TEST	Changes the next instruction pointer depending on the test result	1) Type of Test (Input open/close, Object/User Variable < > = !=). 2) Object/User Variable. 3) [optional] Comparison Value. 4) Line number if the test result is true.
JUMP	Changes the next instruction pointer	1) Line number.
CONTEX_SWITCH	Switches to a different user application stored in the drive	1) Application number.
END	End of user application	None.

Instructions set

Set instructions:

Instruction	Description	Parameters
SET	Sets the destination equal to the source	1) Destination (User Variable, Object, Digital Output).
		2) Source (Constant value, User Variable or Object).

Boolean instructions:

Instruction	Description	Parameters
BOOL	Performs a Boolean Operation : (AND, OR, Shift Right, Shift Left)	1) Destination (User Variable, Object).
		2) First operand (User Variable or Object).
		3) Second operand (Constant value, User Variable or Object).

Application execution

At switch-on the SDM drive:

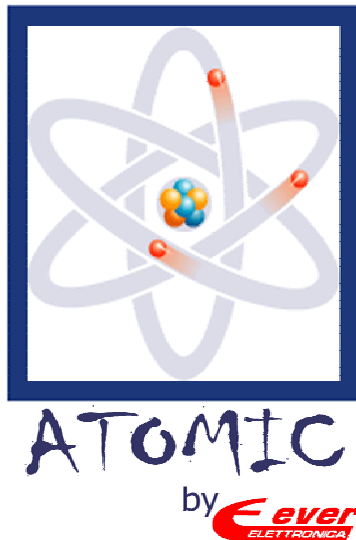
- retrieves the startup parameters (Settings, motor currents, ramps...) stored in NVRAM checking if a valid user application is stored;
- starts the program execution from the first line.

During the normal functioning the drive:

- **runs** the user application;
- **continues to act** as a CANopen/MODBUS standard slave and all the checkings enabled in the 'Drive_Working_Settings' object are active.
- **detects** if there is an emergency condition (hardware or software), in this case the user application is arrested until the emergency situation is cleared.

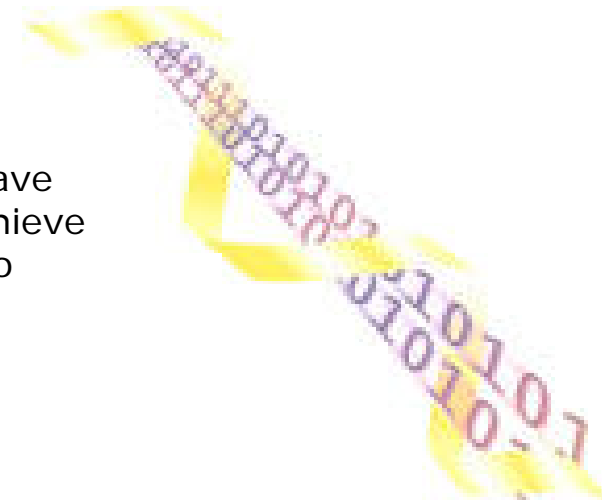
Language syntax introduction

The Atomic software development environment is a Microsoft Windows^(tm) application that enables to build the user application by means of wizards and dialog boxes so it will not be necessary to write a single line of instruction.



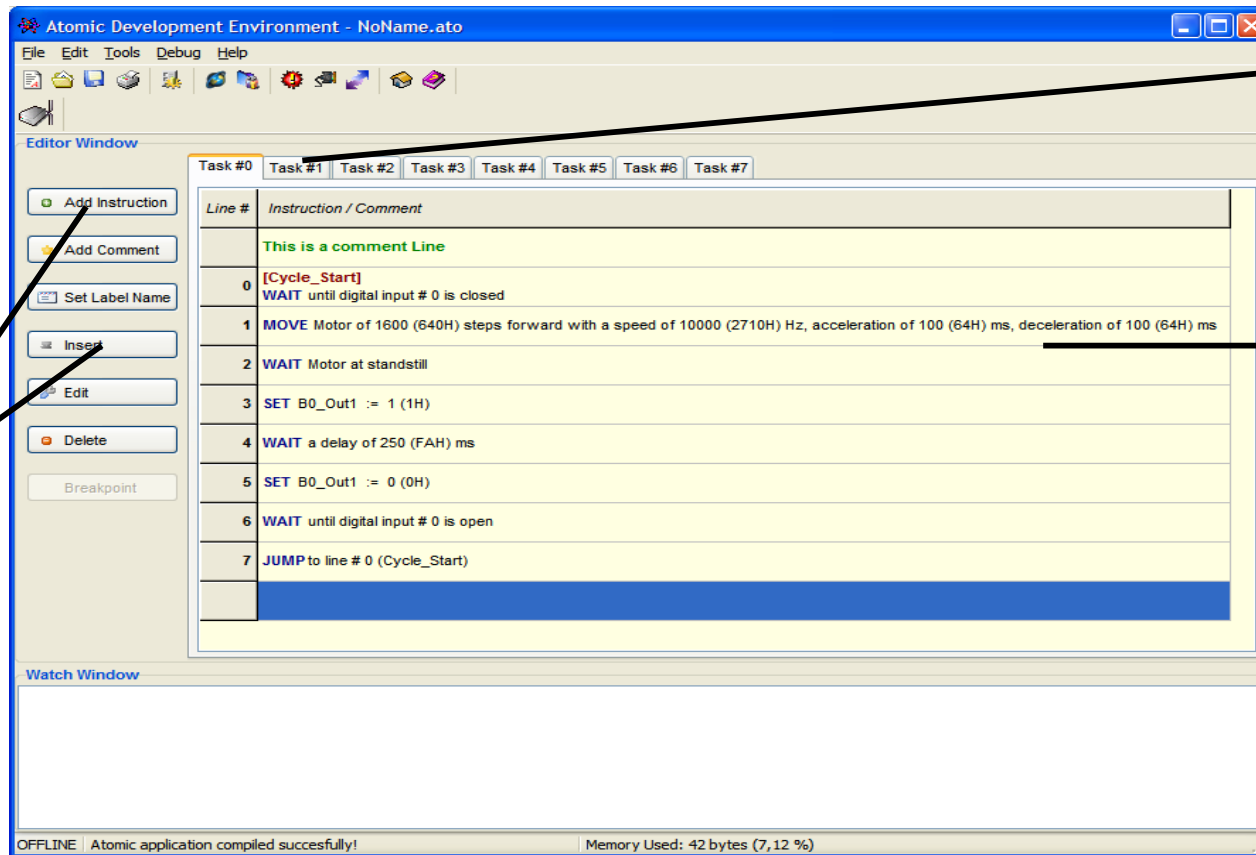
This means that the user doesn't have to learn the syntax of the Atomic instructions that are completely handled by the Personal Computer software.

The configuration windows have been designed in order to achieve a fast compilation time and to offer versatile instructions.



Language syntax

The user program written in Atomic appears as in the example below:



Tab of user task

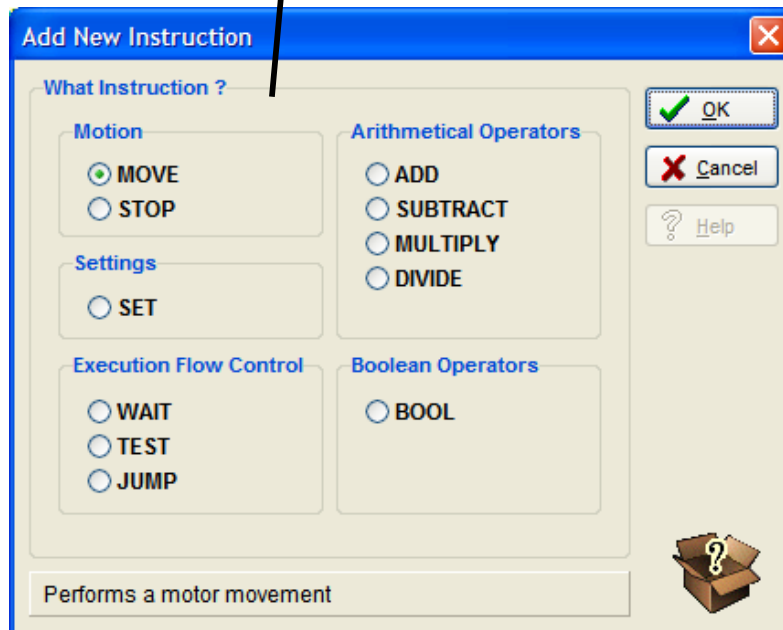
User's application instructions area

Buttons to add and edit the macroinstructions

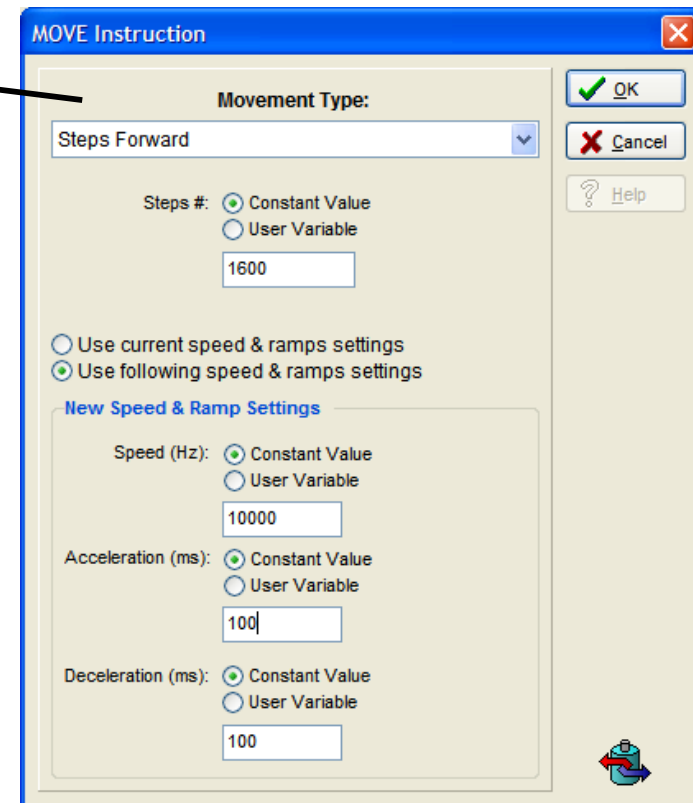
Language syntax

The function buttons to add or edit macro instructions open the following windows:

To add a new instruction



To set the parameters of a MOVE instruction



Language syntax

The function buttons to add or edit macro instructions open the following windows:

SET Instruction

Set What ?

User Variable Digital Output

Drive Object

B0_Out1

Equal To

User Variable Digital Output

Drive Object Digital Input

Constant Value

1

OK Cancel Help

To set the parameters of a SET instruction

WAIT Instruction

Wait for: Digital Input Close

Digital Input: B0_In0

OK Cancel Help

To set the parameters of a WAIT instruction

BOOL Instruction

Set What ?

User Variable Drive Object

Input_Mask

Equal To

User Variable Drive Object

B0_Digital_Inputs

BOOLEAN Operation

Logical AND

Of value

User Variable Constant Value

Drive Object

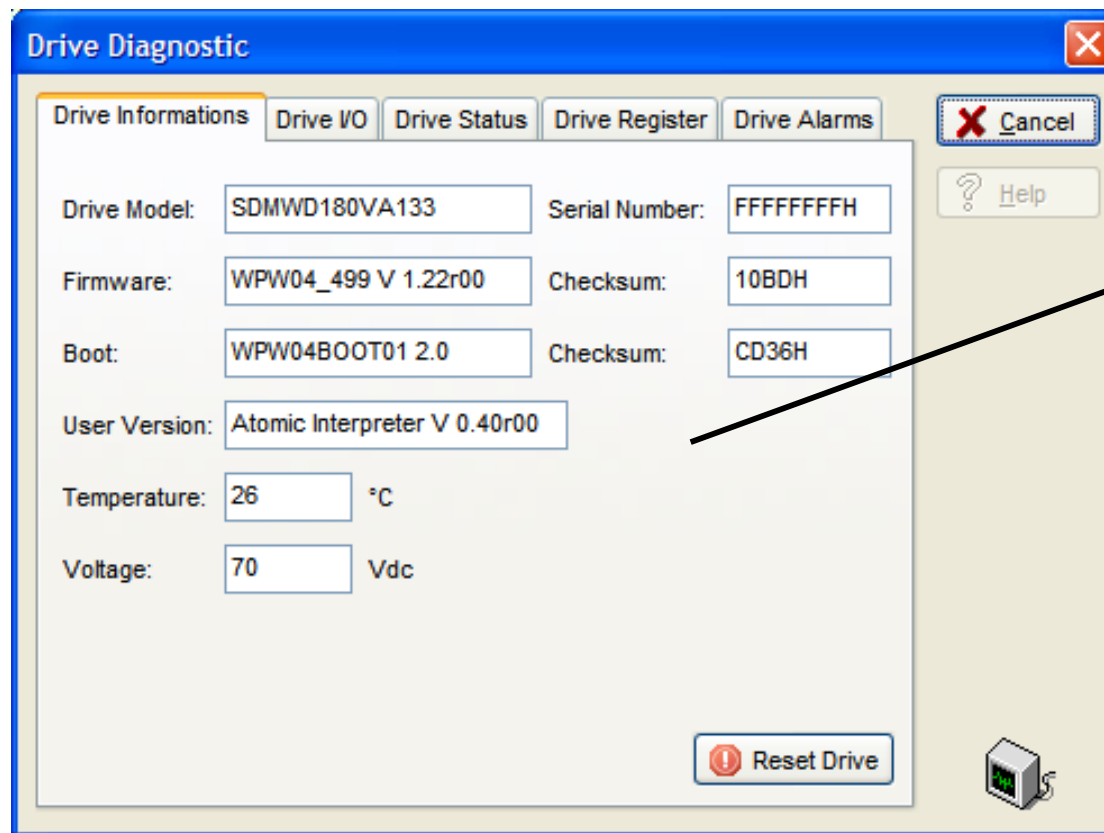
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OK Cancel Help

To set the parameters of a BOOL instruction

System diagnostic

The diagnostic button opens the following window:



The screenshot shows a software window titled "Drive Diagnostic" with a blue title bar and standard Windows window controls. The window contains several tabs: "Drive Informations" (selected), "Drive I/O", "Drive Status", "Drive Register", and "Drive Alarms". On the right side of the window, there are buttons for "Cancel" (with a red X icon) and "Help" (with a question mark icon). The main area displays various system parameters in a grid-like format:

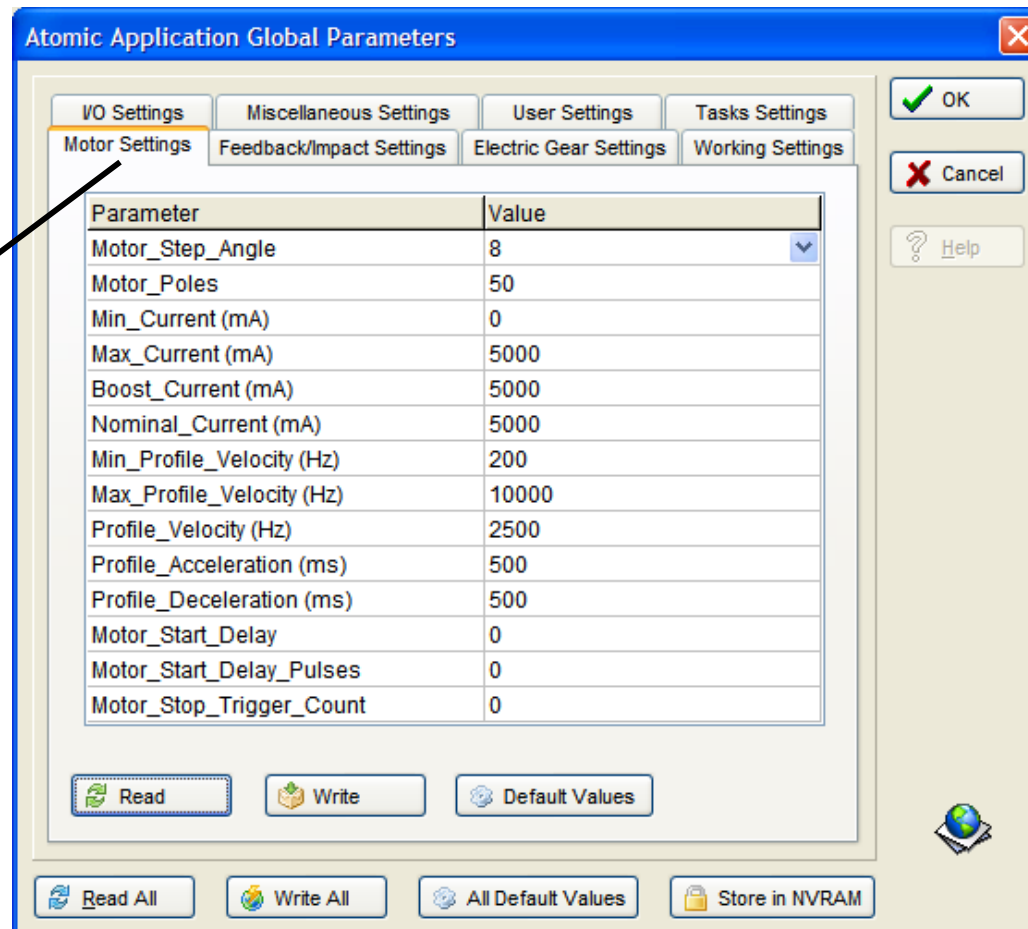
Drive Model:	SDMWD180VA133	Serial Number:	FFFFFFFFH
Firmware:	WPW04_499 V 1.22r00	Checksum:	10BDH
Boot:	WPW04BOOT01 2.0	Checksum:	CD36H
User Version:	Atomic Interpreter V 0.40r00		
Temperature:	26	°C	
Voltage:	70	Vdc	

At the bottom of the window, there is a "Reset Drive" button with a red warning icon and a small icon of a drive unit.

Information about the system in use

System configuration

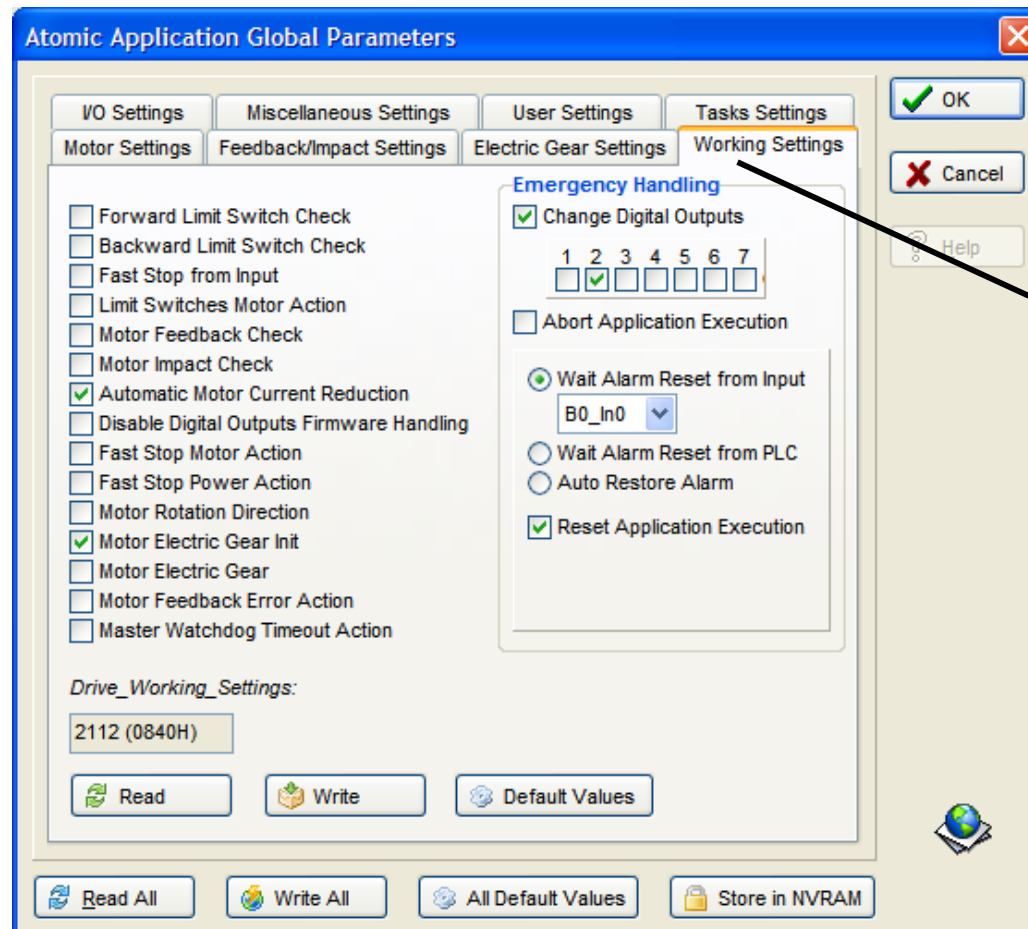
Thanks to the following window it is possible to set the start drive parameters:



Tab that shows the start drive parameters

System configuration

Thanks to the following window it is possible to set the start drive parameters:



Tab to set the start drive parameters

System configuration

Other utility windows:

Atomic Application User Variables

Variable #	Alias	Starting Value
User_Long_Var[0]	Input_Mask	0
User_Long_Var[1]	Position0	1000
User_Long_Var[2]	Position1	2000
User_Long_Var[3]	Position2	3000
User_Long_Var[4]	Position3	4000
User_Long_Var[5]	Position4	5000
User_Long_Var[6]	Position5	6000
User_Long_Var[7]	Position6	7000
User_Long_Var[8]	Position7	8000
User_Long_Var[9]		0
User_Long_Var[10]		0
User_Long_Var[11]		0
User_Long_Var[12]		0
User_Long_Var[13]		0

Buttons: Read All, Write All, Store in NVRAM, OK, Cancel, Help

Window to manage the user variables

Window to control the user's application language syntax

Atomic Application Check

Application: NoName.ato
 Errors: 0
 Size: 42 bytes (7%)

Atomic application compiled successfully!

Buttons: Start, Cancel

Atomic Application Download

Application: NoName.ato
 Size: 42 bytes (7%)
 Drive: Generic SDM / MD
 Id: 1
 Interface: Serial at 57600 baud

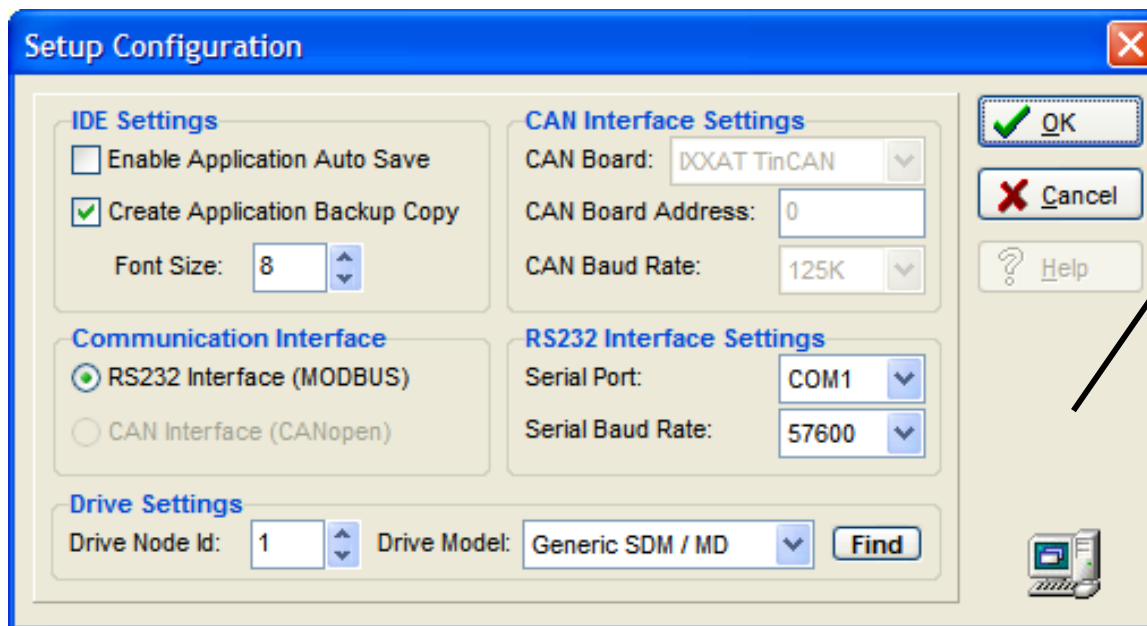
Update drive parameters & user variables

Buttons: Start, Cancel

Window to transfer the program application to the drive

PC environment configuration

Other utility windows:



Window to set the Atomic software parameters