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Release Notes for EAS II 2.5

Version 2.5

November 2018 (Ver. 1.000)

www.elmomc.com



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Revision History

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Chapter 1: General

These release notes detail the modifications incorporated in EASII version 2.5. They indicate the changes and fixes performed since the previous EASII 2.4 release notes.

Some of the features described here may have already been incorporated in the latest EASII 2.4 version releases.

This release is for the use of all customers.



Chapter 2: General Notes

Upgrading from EASII 2.4

EASII 2.5 includes changes in the Maestro Script file structure. The file structure was simplified in order to allow the Maestro to read those files internally.

EASII 2.4 is not able to open Maestro Script files saved in EASII 2.5. EASII 2.5 is of course able to open any script files from previous EAS versions.

Apart from this, EASII 2.4 is able to open any file created in EASII 2.5 version (and vice versa).

Updates and News Page Issue

The Ribbon's *File* tab contains an inner tab called Updates and News, which should display the Elmo web site (www.elmomc.com).

However, the new Elmo web site is not displayed properly on this page. It is therefore recommended to use a regular browser to access the Elmo web site (www.elmomc.com).



Chapter 3: New Tools & Features Added

G-Code Editor

The G-Code editor tool allows you to open, edit, translate, simulate and run G-code scripts on the Maestro device.

The G-Code editor contains a text editor which allows you to view and edit the G-Code script.

The tool's Translate button translates the G-Code script to a format recognized by the Maestro, called PRT. The tool presents the translated script on a table of Function Blocks, which shows the motion commands executed on the Maestro when this script is run.

The tool's Simulate button simulates the motion done in the script and displays the simulation results in the charts below the translated table view. You can choose to see a Position Plot only, or perform a Full Simulation, which produces the full motion data, including the velocity, acceleration and jerk. Very large G-Code files can only be simulated with the position plot.

The tool's Apply button downloads the PRT file to the Maestro, and the Run button runs this file on the Maestro. While the file is run you can perform any recording and view it in the charts embedded in the tool's Runtime tab.

Maestro SIL Tool

The Maestro SIL (Software In the Loop) tool contains the pages detailed below.

Maestro SIL Parameter Explorer

Using this page, you can start and stop the SIL process. When the SIL process is running, you can upload an XML file from the process, which describes the parameters used by the process. The page displays the parameters in a hierarchical view, and you can read and write the parameter values from the process.

SIL Configuration

This page displays the axis' OP mode and allows you to change it.

It also shows the injection points available for this axis, which are the objects controlling the axis motion (like Target Velocity (0x60FF) etc.). The page also allows you to change the source of each injection point relevant to the current axis OP mode.

Maestro Identification

This page allows you to perform sine sweep identification experiments for the axes located under the Maestro.

During the sine sweep identification experiment the page injects a sine motion signal generated by the Maestro profiler into one of the axis injection points, using a set of frequencies set by the user.

In every frequency, the page records the experiment input and output signals (defined by the user), and calculates a plant from those signals.



Drive Capture Page

Capture is the ability of the drive to obtain the absolute position with respect to an event. The possible events are typically an index signal and/or a strobe signal (home input).

The Capture page, added to the Application Tools tool, enables you to set and activate the drive Capture mechanism.



Chapter 4: Robot Gain Scheduling

The Automated Identification (AI) tool was changed to enable design of high level scheduling methods, which can also include multiple axes.

Experiment Process Settings

The AI tool now allows you to perform experiments on multiple axes in a single process. You can conduct an experiment on each of the base axes at each experiment point.

Design and Gain Scheduling

The tool allows you to design the experiment results using the following 3 scheduling methods: By Object 0x2E00 (low and high bits), and By Position.

The design algorithm is being run separately on the plants identified at each experiment point, identified by its multi-axis position. The subsequent controller is entered to the relevant place in the drive's scheduling table. The tool fills in the missing indexes by linear interpolating the controller parameters.

Scheduling By Object 0x2E00

The scheduling object 0x2E00 methods are meant to be activated by the EtherCAT master (the Maestro) in order to respond to mechanical changes in the machine or the robot.

When a scheduling by object 0x2E00 method is selected, you manually define the scheduling index of each experiment point. After that you design the experiment result plants. As written above, the plants belong to a certain experiment point are designed together and the subsequent controller is entered to the index defined in the scheduling table.

Scheduling By Position

When the By Position scheduling method is active, the drive automatically switches its controller parameters according to the motor position.

When the By Position scheduling method is used, the tool automatically selects the scheduling index of each experiment point.

The tool assigns the experiment boundaries to the scheduling low and high position boundaries. The tool then assigns the plants to the scheduling table, spreading them according to their experiment position values. i.e. each set of plants is assigned to an index which matches the relative position of the point where those plants were created.



Chapter 5: Maestro Script Manager Changes

Script Variables

Variables were added to the Maestro Script Managers (MSM) scripts. Now you can add variables to the script and use them.

Variables can be of type real (64 bits floating point number, or double), int (64 bits integer), or int HEX (int with HEX value presentation).

You can set each variable as any input value of any MSM command, regardless of its type. The MSM will adjust the types and send the correct type to the command.

Some "Get" methods (detailed below) were also added, allowing you to read various parameters from the Maestro or the devices in its network and put them into variables.

A variable can also be used as a loop index.

Calling Between Scripts

The ability to call from one script to another was added to the MSM tool. The command "Call Script" calls the script whose name is mentioned inside, and can also pass variables to and from the script it's calling.

Variables can have different scopes: Var (internal), In, Out and Inout. In variables are sent to the inner script but cannot be sent back, Out variables are only sent back to the calling script and Inout variables are sent into the inner script, and can also be modified and sent back out.

You can debug the calls between the scripts using the new Step Into and Step Out buttons, which can dive into the inner (called) script and back out to the outer (calling) script.

Script File Format Changes

The script file format was changed, and is now written in a more simplified XML format. This change was done in parallel with a new feature developed in the Maestro allowing it to read and run scripts created in EASII by the MSM tool. i.e. you can now actually download the script file to the Maestro and run it there.

Watch Window

A Watch window was added to the MSM tool. You can control the appearance of this window by toggling the Debug Panel ribbon button. When it appears, it shows all the variables defined in this script and their values during the script runtime. This window shows only the variables of the current script that is now running (the current scope).

Output Window & Print Command

The Output window appears together with the Watch window. Using the Print command, you can print any text to the Output window, including variable content.



Retain Command Parameters

An option was added to retain the command parameter values when changing the command target axis or group. Until now the command parameters were reset when changing the command target. An option to retain those parameters was added. This is the default option and EASII remembers the user's choice.

Miscellaneous

New Blending Transition Modes

2 new blending transition modes, that are supported in the latest Maestro FW versions, are now also supported in Script Manager and all other relevant EASII tools.

The 2 new transition modes, called MC_TM_DIST_VEL_END_POINTS_MOVED_PLN6/8, generally allow you to use blending while assuring the motion path moves through the motion end points. For more specific details please refer to the relevant Maestro documentation.

8 Bytes SDO

The latest Maestro FW versions support sending 8 bytes SDO objects. Using the Send SDO and Read SDO commands, you can now send and receive 8 bytes SDO objects to and from the Maestro network slaves.

Additional Commands

The following commands were added:

- **Print** – prints some text to the Output window (can also print variables content)
- **Set Variable** – sets a numeric value into a variable
- **Get Global Parameter** – gets the value of a global parameter from the Maestro and assigns it to a variable
- **Get Parameter** – gets the value of a device (or group) related parameter from the Maestro and assigns it to a variable
- **Read Digital Input** – reads the value of a drive's digital input value (0 or 1) and assigns it to a variable
- **Read Digital Inputs** – reads the value of the drive's digital inputs register and assigns it to a variable. This value can optionally be masked
- **Read Digital Output** – reads the value of a drive's digital output value (0 or 1) and assigns it to a variable
- **Read SDO** – sends an Upload SDO command to the target device and assigns the result to a variable
- **Read PI Variable** – reads the value of a PI variable from the process image data related to the target device



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- Start G-Code Runtime – starts the G-Code runtime process on the Maestro
- Stop G-Code Runtime – stops the G-Code runtime process running on the Maestro



Chapter 6: Changes in Existing Tools

EtherCAT Configuration Tool

EL6692 EtherCAT Bridge Support

The EtherCAT bridge terminal EL6692 enables data exchange between EtherCAT strands with different masters. It also enables synchronization of the distributed clocks of the individual strands.

The EL6692 device has 2 parts: the primary device, which sits on a coupler and is connected to the 1st EtherCAT master, and the secondary device, connected to the 2nd EtherCAT master using a dedicated RJ45 slot.

The EtherCAT configurator allows you to define a set of parameters that will be transferred between the primary and the secondary devices, thus transferring information between the 2 EtherCAT networks.

No DC

The latest Maestro FW versions include the ability to operate the EtherCAT network with no Distributed Clock (DC). You can set this feature from the master's Distributed Clock page.

System Configuration Tool

Change Maestro IP Address

Using a new interface supported by the Maestro, you can now change the Maestro IP address from EASII. Press the Change IP button in the System Configuration ribbon in order to do that. This button works only when you're connected to the Maestro.

This feature is supported by the Platinum Maestro only, starting from its firmware version 2.0.0.3.

Recorder Tool

Manual Zoom

The Manual Zoom dialog allows you to manually define the X and Y axis borders in the charts (currently not applicable for 3D charts).

"Zero" Scale Signals

Usually, when a signal is displayed in a chart, the Recorder adds vertical positive and negative margins to the chart's Y axis above and below the signal drawing.

Zero scale signals are signals that are displayed with the Y axis 0 value in the chart, regardless of their values.

Some of the drive signals, like Temperature and velocity, are defined as "zero scale" signals by default, but you can change these settings in the Signals dialog and in the Chart Editor.

Default Signal Name Change



Using the context menu on the right pane of the Signals dialog, you can now change the signal names that appear for the current device. Changing a signal name this way will take effect for all devices of the same type and version, and will be persistent through EASII sessions.

Recording Properties Dialog Changes

The properties in the Properties dialog were divided into global properties, and properties per chart, which can now be set for each chart separately.

See Trigger Location

When this feature is enabled (from the Settings dialog), the Recorder shows the trigger X and Y (when relevant) locations in the charts. The trigger location mark is also saved into the recording file and displayed when you open and view it in the tool.

Consistent Freeze Y

The Freeze Y feature used to work only during Normal and Automatic recording sessions. Now this feature stays active also when recording is completed, until you disable it.

Added the Power Consumption signal

The power consumption signal, added to the drive signals under the System category, shows the instantaneous power output to the motor coming from the drive.

Tuner Tool

Motor R/L and Ke Parameters

From the Motor Settings page, now you can enter the motor's R (resistance), L (inductance) and Ke (back emf constant). These parameters are not mandatory for regular applications, but are used for some applications such as the Velocity Observer IR sensor (see below).

Sine Sweep Identification and Bode Verification – Controlling the Experiment

2 new options were added to the Sine Sweep Identification and the Verification tabs in the Tuner page in the Settings dialog.

These options allow you to better control the sine sweep identification and the Bode Verification experiments:

- Min Frequency Resolution – allows you to control the resolution of the frequencies used for conducting the experiments
- Min Quality Factor Threshold – allows you to control the minimum quality factor used for filtering out points where the identification process was poor or unsuccessful

Velocity Observer IR Sensor

Support was added for the new Velocity Observer IR sensor, which is supported in the latest gold drive FW versions.

This sensor estimates the velocity of the motor for DC Brush and Voice Coil motors.

Drive Reset Action



In EASII 2.5, when a drive user program exists in the drive, the drive reset action (called when the "Reset" ribbon button is pressed) also kills the user program, and asks you if you wish to erase it from the drive.

Find Hiperface Correlation

When this checkbox is set, the commutation process searches, in addition to the commutation, the relation between the analog & serial signals of the Hiperface sensor (CA[24] in the Gold Drive).

EtherCAT Diagnostics Tool

Register Page

The new Register page enables you to view the registers in the EtherCAT module of the slave devices, and change their values if necessary. Please use extreme caution changing register values, as they may disrupt the EtherCAT network.

Maestro Configuration Tool

Name Change

The Maestro Configuration tool's name was changed from "Maestro Axes Configuration" to the current name.

Dynamic 3D Robots

Like in the Group Motion tool, dynamic 3D robot images were added to the Maestro Configuration tool.

Currently EASII draws images of the Scara, 3 Link and the Delta robots. The robot image is painted with scales matching the kinematic parameters defined in the tool. You can rotate the image and zoom in and out into and out of the image. You can also view and edit the kinematics transformation parameters directly on the image.

I/O Extension Board Configuration – Emulation Page

The Emulation page allows you to set the emulation parameters for emulation signals going out of the Maestro through the RS485 output ports.

I/O Extension Board Configuration – Miscellaneous

The following small changes were done in the I/O Extension Board Configuration pages:

- Extended I/Os page: added buttons allowing you to change the input logic
- Extended I/Os page: added controls allowing you to configure the analog outputs
- RS485 Port Configuration page: added buttons allowing you to change the port logic, and changed the RS485 port configuration restrictions according to the latest changes in the Maestro

Supporting Group MCS User Units



A support for the group MCS User Units (UU) was added to the Maestro Configurator. You can set the desired group MCS UU either through User Units page on the group node, or through the Kinematic Editor page.

The selected units are displayed in the relevant tools that have group MCS data, i.e. the Group Motion tool and the G-Code editor.

Group Motion Tool

Dynamic 3D Robot Image

Dynamic 3D robot images were added to the Group Motion tool.

Currently EASII draws images of the Scara, 3 Link and the Delta robots. The robot image is painted with scales matching the kinematic parameters defined in the Maestro, and it dynamically moves when the robot moves, so the image keeps track of and illustrates the actual robot position in real-time.

Supporting Group MCS User Units

If group MCS User Units (UU) are defined for the target group, they are presented near the MCS position indication and motion fields in the tool.

PVT / Splines Table Editor

Spline Types

A "Variable Time" spline type was added to the PT Online Spline types.

This type was misinterpreted in the previous versions, so this type was already supported in the Maestro.

The PT Offline Spline has a single type which was wrongly assumed to be "Fixed Time", but it's actually of type "Variable Time". Hence this type was also changed in this EASII version.

Settings Dialog

Send Log File

A new button was added to the Logger tab, called "Send as Attachment", which zips the log file and attaches the it to an email, ready to send.

Trace Maestro Commands

This new option allows you to trace the commands sends from EASII to the Maestro in the EASII log file.

Motion Tools

Homing Method 37 Support

The latest gold drive FW versions support the homing method 37, which is the new home immediate method that replaced the homing method 35.



EASII now also allows you to use this method, both in the drive and in the Maestro motion tools.