

MOTKA Motion Companion

User's Manual

Revision 1.0

MOTKA LLP

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1. Introduction

This User Manual targets application developers. It provides complete information on how to use the MOTKA Motion Companion.

The MOTKA Motion Companion (MMC) is a proprietary MOTKA LLP software designed to help users to jump-start working with the list of supported MOTKA motion controller products. Its interactive GUI enables users to design the command script effortlessly while understanding the principles of the MOTKA Command set.

You are required to read and understand the syntax of the commands documented in the Command Reference prior to using this software.

Features

- Communicates with supported MOTKA motion controller products via Serial Port.
- Save history of received commands and designed script.
- Configurable timing interval(s) between sending of commands.
- Interactive scripting user interface to aid in developing command script.
- Standalone terminal to send commands individually to understand the principles of the commands.

System Requirements

- Microsoft Windows XP SP3, Vista, 7
- 512MB DDR2 RAM
- Additional 80 MB of HDD space

List of Supported Product

- MK-200
- MK-200C

Related documents

- Command Reference.
- MK-200 User's Manual.
- MK-200C User's Manual.

2. Getting Started

The MOTKA Motion Companion can be downloaded from the official MOTKA LLP website as a zipped file and it does not require any installation. Just unzip the file into our preferred folder and launch it by executing the “motkamotioncompanion.exe” file.

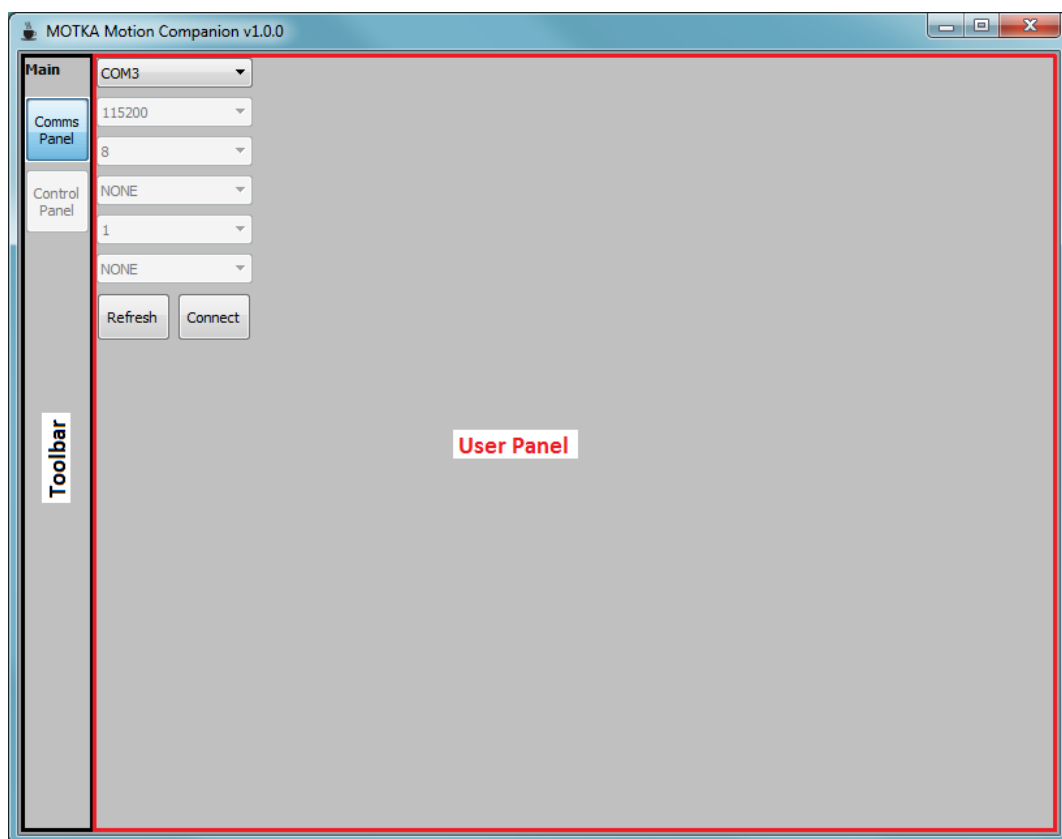


Figure 1: MOTKA Motion Companion

Upon successful launching the software, the *Comms Panel* will show up as depicted in Figure 1. In general, the GUI of MMC consists of mainly the *toolbar(s)* and the *user panel*. The name at the top of the toolbar(s) indicates the functionality of the current user panel.

The *Comms Panel* and *Control Panel* buttons in the *Main* toolbar will be selected and disabled respectively at the start. The *Control Panel* button

will only be enabled after the communication link with the connected motion controller has been established.

2.1. Connecting the Motion Controllers

Before we can start sending commands to motion controller, we need to establish a communication link. Currently, only serial communication (RS-232) with the configuration listed below is supported by the MK series¹ of motion controllers. We only need to select the respective Serial Port number available from the drop-down box and connect it by pressing the *Connect* button. See Figure 1.

- Baud rate: 115200 bps
- Data bit: 8
- Stop bit: 1
- Parity bit: None
- Flow control: None

Functional summary of the serial communication panel is tabulated in Table 1.

Serial port drop-down box	Select the Serial port that is associated to the port that is being used to communicate with the MK series motion controller.
Refresh button	Re-detects the Serial ports that are available.
Connect button	Connects to the selected Serial port with the pre-defined settings. This button will only be shown if the Serial communication has not been established.
Disconnect button	Disconnects from the Serial port. This button will only be shown if the Serial communication has been established.

Table 1: Functional summary of the Serial communication panel.

¹ Refer to list of supported products.

2.2. Configure How Commands are Sent

Figure 2 shows the default screen after the communication link has been established. This is the *Config* panel, a sub-panel of the *Control* panel, and it can be identified through the *Control Panel Toolbar* name.

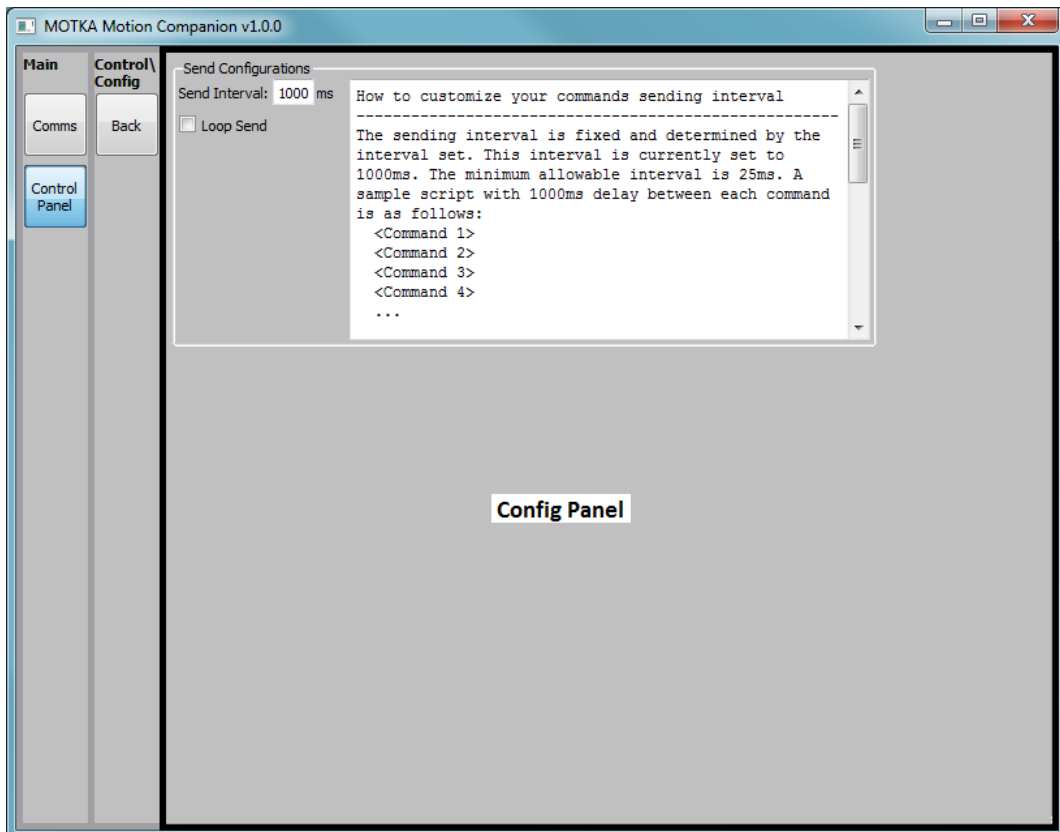


Figure 2: Config panel

By default, commands in a script (we will learn how to script and send to motion controller in Section 2.3.1 and Section 2.3.2) will be sent with 1 second interval, and will stop sending until the last command has been sent in the script, as shown in Figure 2. If we want to loop the commands endlessly, we can check the *Loop Send* checkbox. If we wish to alter the time interval between each command is sent, we can set it (in milliseconds) in the *Send Interval* edit box.

There would be cases where we need to have different time interval between commands within one command script. For example, we may

need a longer delay for a long and slow motion stroke to complete before we send out a Get Position (GP) command. In such cases, we can use the MMC Command, *DELAY*, to override the preset interval. MMC Commands are commands used only by the MMC. These commands are not part of the commands used by the MK series of motion controllers, and hence will not be sent across the communication link. Here is an example.

```
SE T           ; Servo enable Axis 1
MA 15000      ; Move Axis 1 to absolute position 15000
DELAY 5000    ; Delay for 5 seconds
GP ?         ; Get position
```

In the above example, we assume the default *Send Interval* of 1000 ms is used. After MMC sends the first command (SE T) in the script, it waits for 1 seconds before the next command (MA 15000) is sent. The *DELAY 5000* command instructs MMC to override the 1 second interval and wait for 5 seconds instead before reading the motor position (GP ?).

Clicking on the *Back* button will reveal the *Control Panel* user interface as depicted in Figure 3. To return to this *Config Panel* to change the configurations, select the *Config* button.

Functional summary of the Config panel is tabulated in Table 2.

Back button	Back to the Control panel user interface.
Send Interval text box	Dictates the time interval between the sending of successive commands. Please note that the minimum and maximum time interval has been limited to 25 milliseconds and 9999 milliseconds respectively.
Loop Send checkbox	When checked, the entire script will be sent out indefinitely. When unchecked, the entire script will only be sent out once.
Instruction pane	Contains the instructions on how to customise the command script.

Table 2: Functional summary of the Config Panel.

2.3. Writing and Sending Commands

We can send commands to a motion controller using the MMC in two ways. The first way is to send one command at a time manually. This can be done using the *Terminal*, where we type in a command, send it, type the next, send it, and so on. We will discuss this in Section 2.3.3. The second way is to write a script and send it. A script is a text collection of valid commands, and it can be created by manually typing into the *Command Pane*, as shown in Figure 3, or with the help of the Visual Scriptor (VS). We will discuss scripting in the next two sections.

2.3.1. Scripting with Command Pane

We can write a script that contains a list of valid commands (refer to Command Reference complete list of commands) by typing directly into the *Command Pane* as shown in Figure 3. Each command must start with a new line.

For example, we can type the script below directly into the *Command Pane* to set the *KP* (Proportional gain), *KI* (Integral gain), *KD* (Deferential gain) and *SL* (Speed Limit) parameters to 100, 800, 2, 250000 respectively, enable the motor in Axis 2, move the motor to its relative position of 50000 counts, delay for 10 seconds instead of the fixed interval set in the Config, read the motor position and finally disable the motor.

```
KP ,100
KI ,800
KD ,2
SL ,250000
SE ,T
MR ,50000
```

DELAY 5000

GP ,?

SE ,F

To start sending these commands to the motion controller, press the *Start Send* button once. Each command will be sent out in a fixed interval (except between the *MR* and *GP* commands where we deliberately delay it for 5 seconds) and whether it will loop endlessly depend on the setting in the *Config Panel* as discussed in Section 2.2.

Commands sent to, and responds read from, the motion controller will be displayed in the *History Pane*.

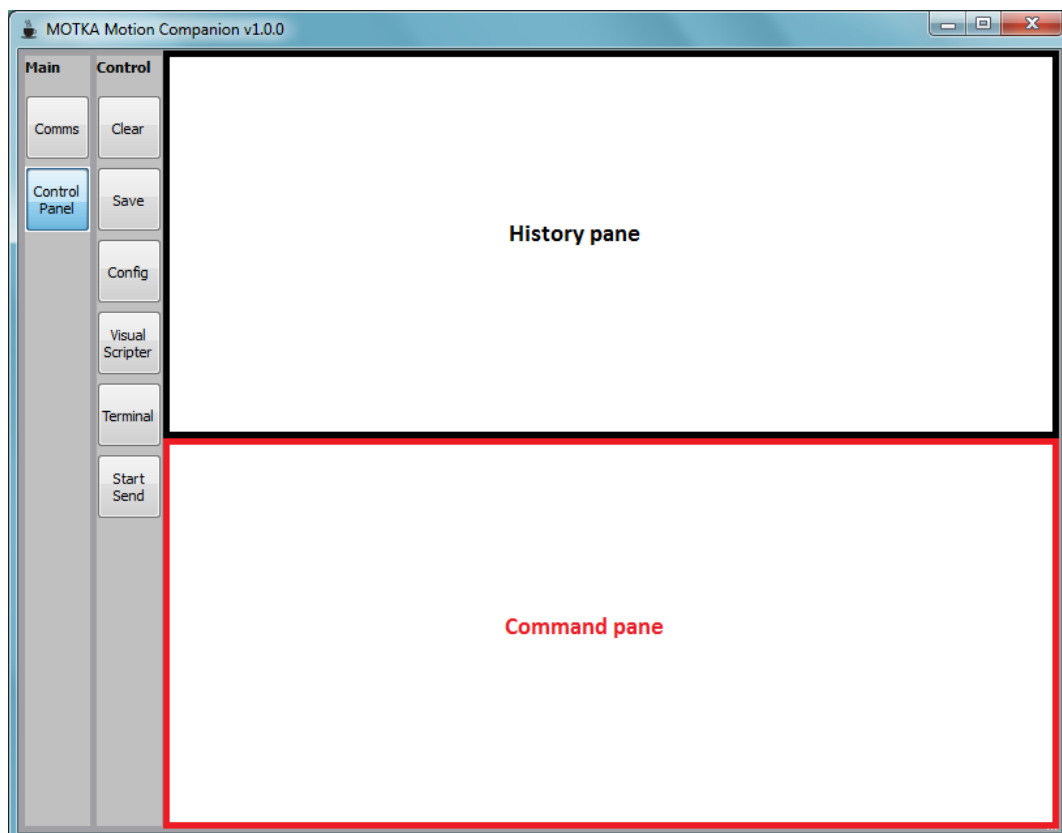


Figure 3: Control panel user interface

We can clear the panes anytime by pressing the *Clear* button as shown in Figure 3 and select which pane, Command or History, to be cleared as shown in Figure 4. Select the *Back* button to return to the earlier screen.

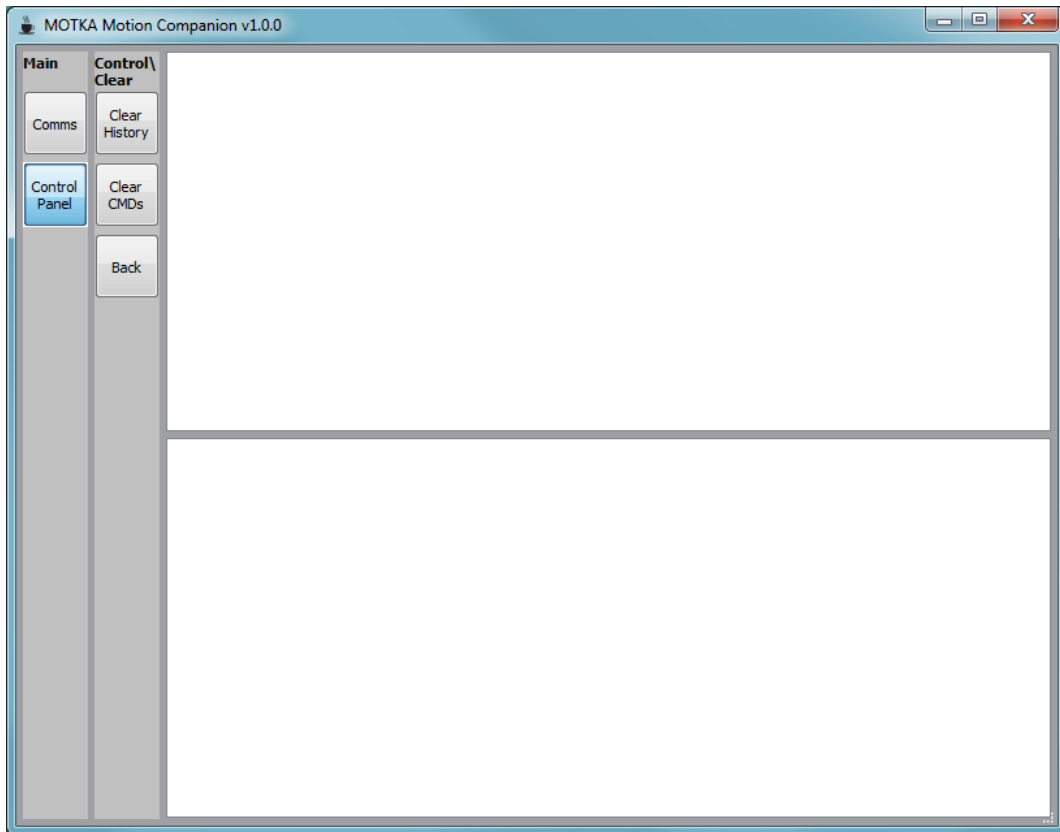


Figure 4: Clear panel user interface

Should we want to save our work, both the *History* and *Commands*, we can select the *Save* button as shown in Figure 3 and select which pane to be saved as shown in Figure 5. We can also load previously saved command script file to the *Command* simply by drag and drop the file onto the *Command*.

Functional summary of scripting with *Command Pane* is tabulated in Table 3.

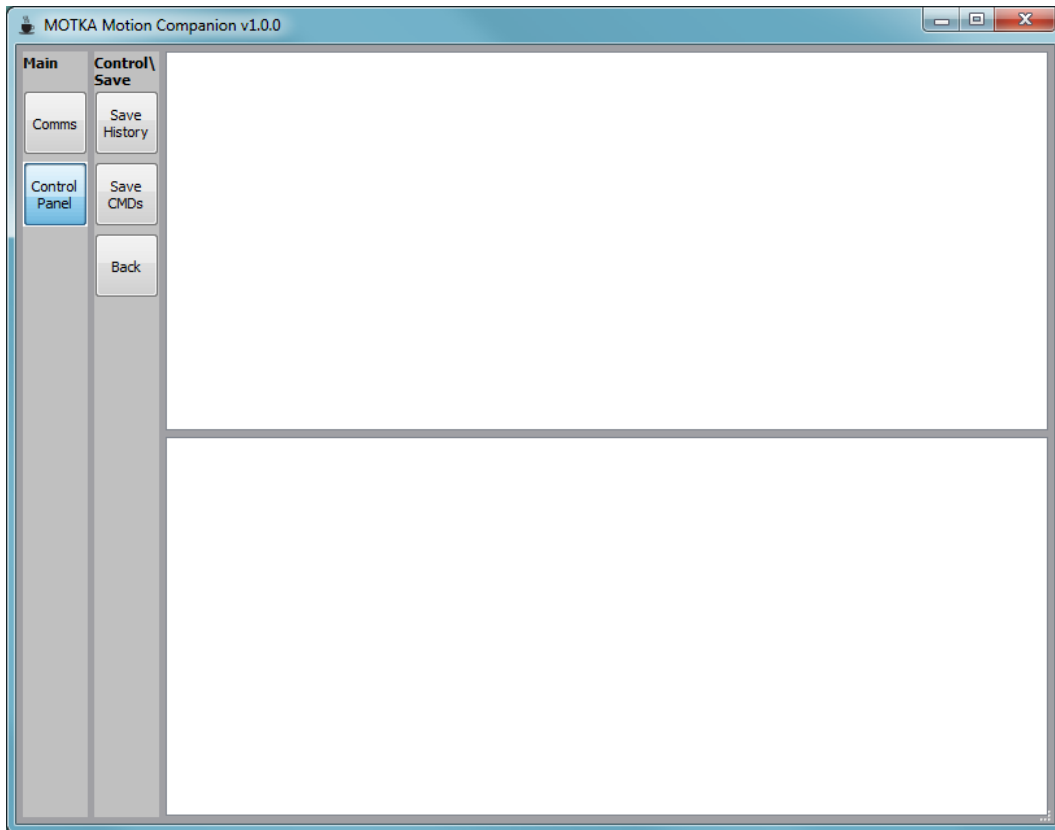


Figure 5: Save panel user interface

History pane	Displays all the commands sent out and received from the MK series motion controllers. It is disabled from any editing to its content.
Command pane	For entering the command script required for and application. User can choose to manually design the command script or via the <i>VS panel</i> which will be discussed in the <i>VS Panel</i> section.
Clear History button	Clears the History pane.
Clear Command button	Clears the Command pane.
Save History button	Saves the History pane.
Save Command button	Saves the Command pane.
Back button	Back to the Control panel user interface.

Table 3: Functional summary of scripting with the Control panel.

2.3.2. Scripting with Visual Scripiter

We can create script with the help of the Visual Scripiter (VS), an interactive feature that allows user to create command script visually and understand the principles of the commands listed in the *Command Reference*. The overview of the VS sub panel is as depicted in Figure 6.

The 2-letters buttons represent the commands used by the MK series of motion controller. The *Axis* buttons in the toolbar selects the axis (or both) we are working on.

Instead of creating the script by typing directly into Command pane as described in Section 2.3.1, we can create the same script using the VS as follow:

- Select *Axis 1* and un-select *Axis 2* button.
- Select the *KP* button, enter 100 in the edit field. The *KP ,100* command will be created in the *Command Pane* (see Figure 7) once we *Set* it. Close the dialog box.
- Do the same with *KI*, *KD* and *SL* commands. Note that when we select these commands, the respective edit field is displayed with a number which is the current value set in the attached motion controller.
- Select the *SE* button, check the checkbox prompted in a popped dialog box. The *SE ,T* will be created in the *Command Pane* (see Figure 8) once we *Set* it. *Close* the dialog box.
- Select the *MR* button, enter 50000 in the edit field. *The MR ,50000* will be created in the *Command Pane* (see Figure 9) once we *Set* it. *Close* the dialog box.
- Type directly into the Command pane, under the *MR ,50000* command, *DELAY 5000*. Do not type <enter> to create a new line. MMC will create a new line for we automatically.

- Select the *GP* button, check the checkbox prompted in a popped dialog box. The *GP ,?* will be created in the *Command Pane* once we *Set* it. *Close* the dialog box.
- Select the *SE* button, uncheck the checkbox prompted in a popped dialog box. The *SE ,F* will be created in the *Command Pane* once we *Set* it. *Close* the dialog box. The final script generated is shown in Figure 10.
- Select *Back* button to go back and click the *Start Send* button to run the script.

We can always make changes to the script directly in the *Command Pane*.

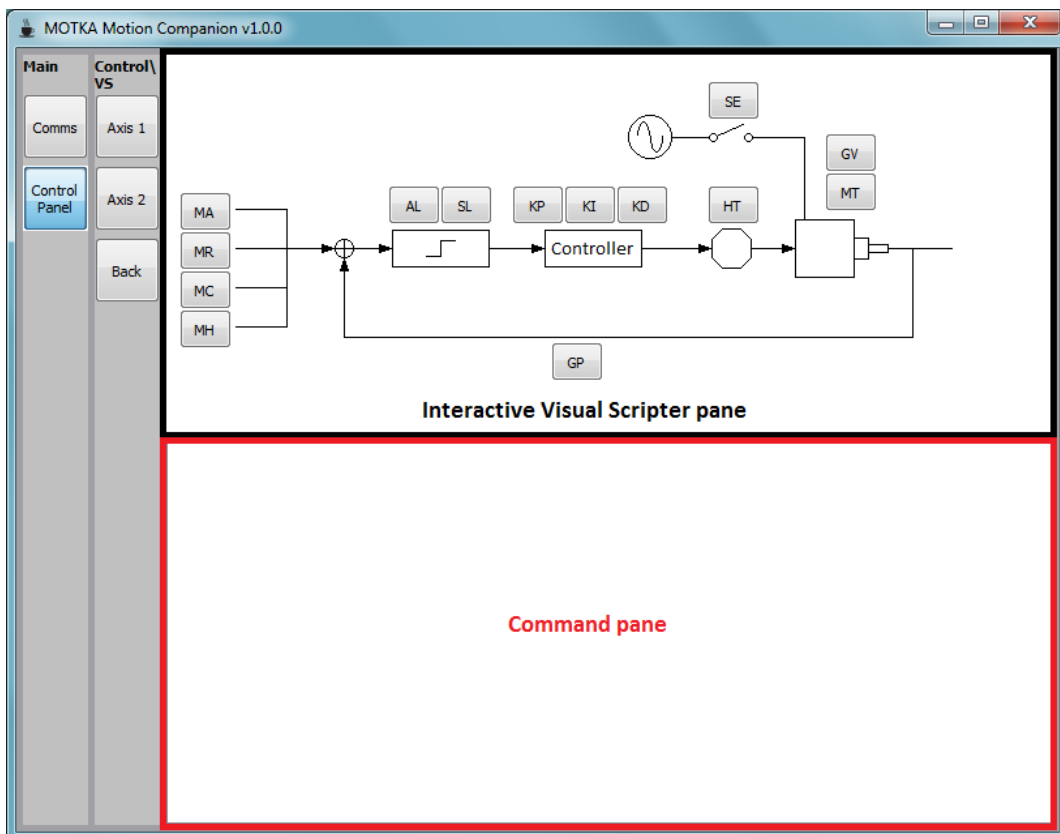


Figure 6: Visual Scripeter panel user interface

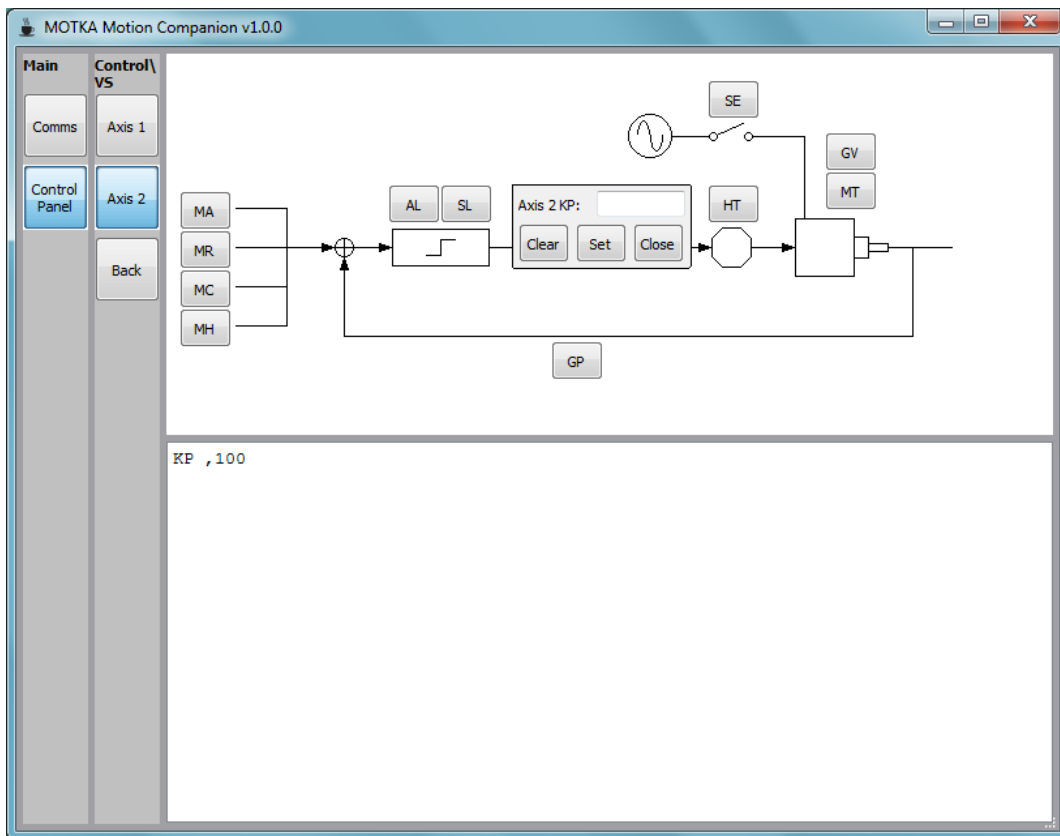


Figure 7: Generate the Proportional Gain (KP) command for Axis 2

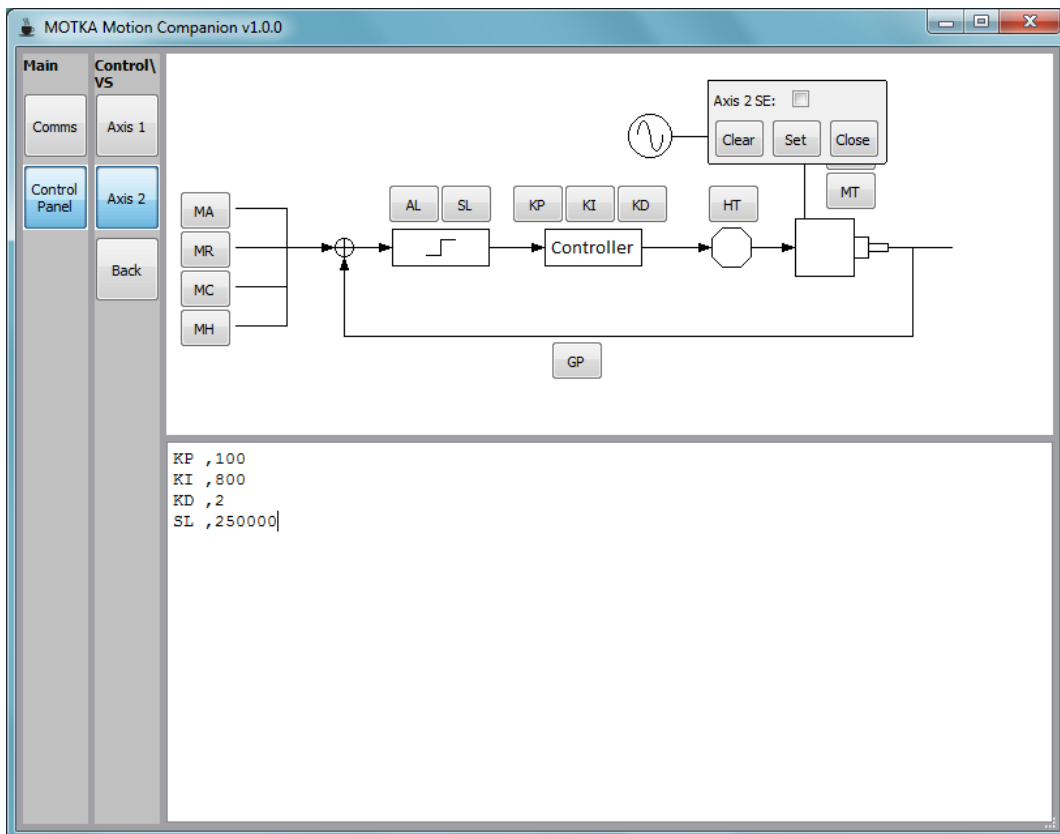


Figure 8: Generate the Servo Enable (SE) command for Axis 2

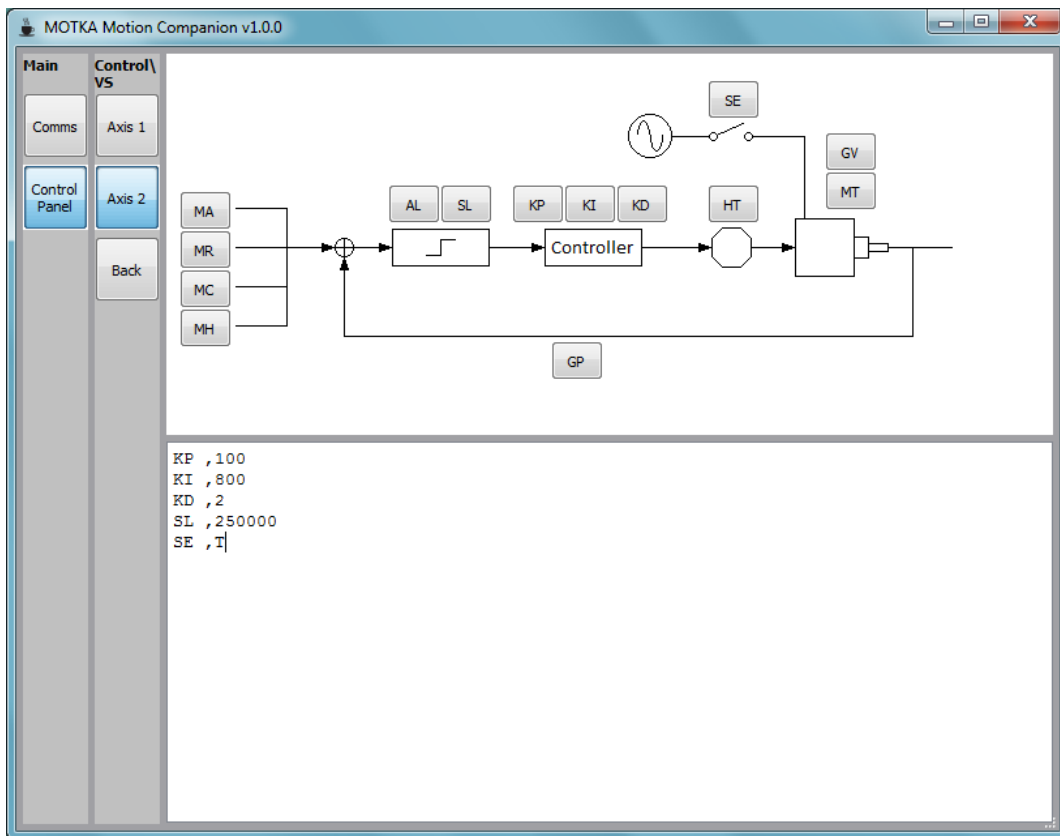


Figure 9: Generate the Move Relative (MR) command for Axis 2

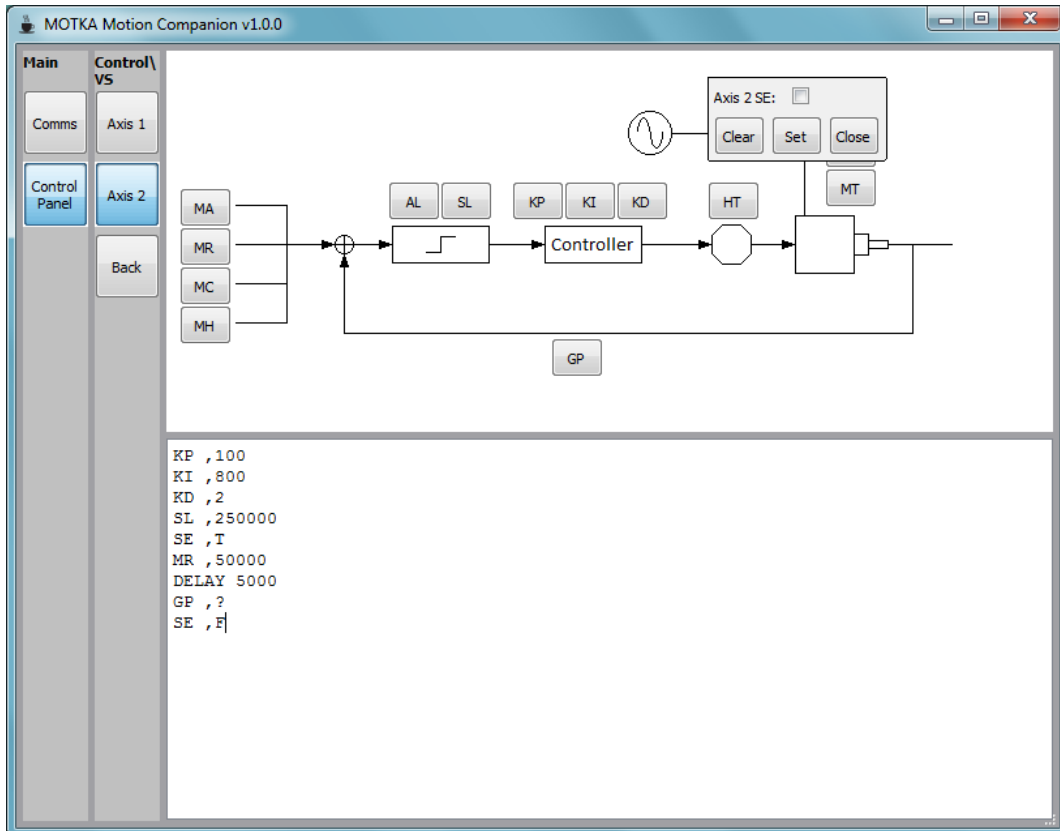


Figure 10: Final script generated.

Functional summary of the *Visual Scripter* is tabulated in Table 4.

Axis 1 button	Show or hide the argument inputs in the <i>Command</i> buttons for Axis 1 of the motion controller for VS.
Axis 2 button	Show or hide the argument inputs in the <i>Command</i> buttons for Axis 2 of the motion controller for VS.
Back button	Back to the Control panel user interface.
Clear button	Clears all the user input arguments in the <i>Command</i> button.
Set button	Translate the current input arguments in the <i>Command</i> button into command and appends it to the existing command script in the Command pane. The input arguments will be cleared after clicking it.
Close button	Collapsed the <i>Command</i> button into its original state. This will clear the input arguments as well.

Table 4: Functional summary for the Visual Scripter

2.3.3. Sending Commands using Terminal

The *Terminal*, shown in Figure 11, allows us to send one command at a time to a motion controller by typing directly into the Command textbox. Each command can be sent with the <Enter> key or clicking on the *Send* button. The *Command* textbox will be cleared after the command has been sent.

Functional summary of the Terminal is tabulated in Table 5.

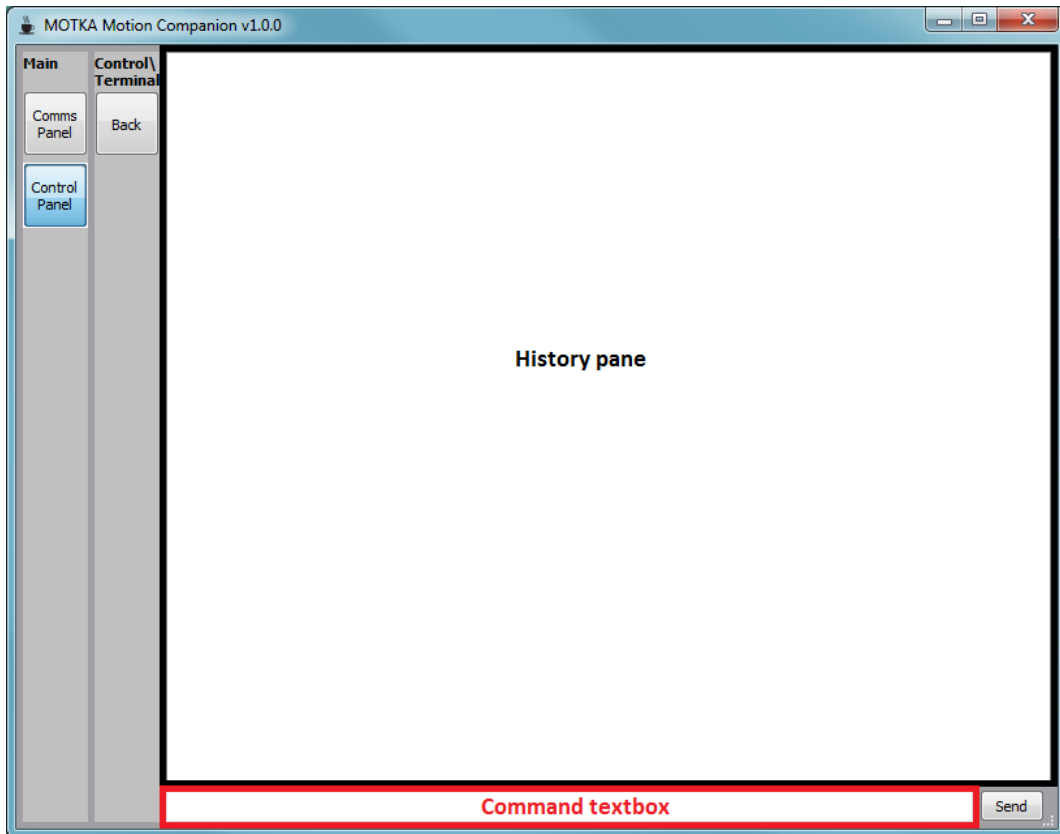


Figure 11: Terminal panel user interface

Back button	Back to the Control panel user interface.
Command textbox	Editing of single line command.
Send button	Send the single line command in the <i>Command</i> textbox out to the connected controller.

Table 5: Functional summary of the Terminal pane.

3. Revision History

Date	Revision	Changes
02-Aug-2015	1	Initial release.

Table 6: Document revision history

