## Overview:

The software described here is compatible with Microsoft's Windows7™ and XP operating systems. The code was created using Microsoft's Visual Studio 2010™. The source code may be made available on request, but is not supported through additional documentation. The software when downloaded and installed may appear differently than that shown here.

This code implements the Motion Mind 3 ASCII communication protocol. The MOTM3 should be using at least firmware revision 3.

Figure 1: Software screen
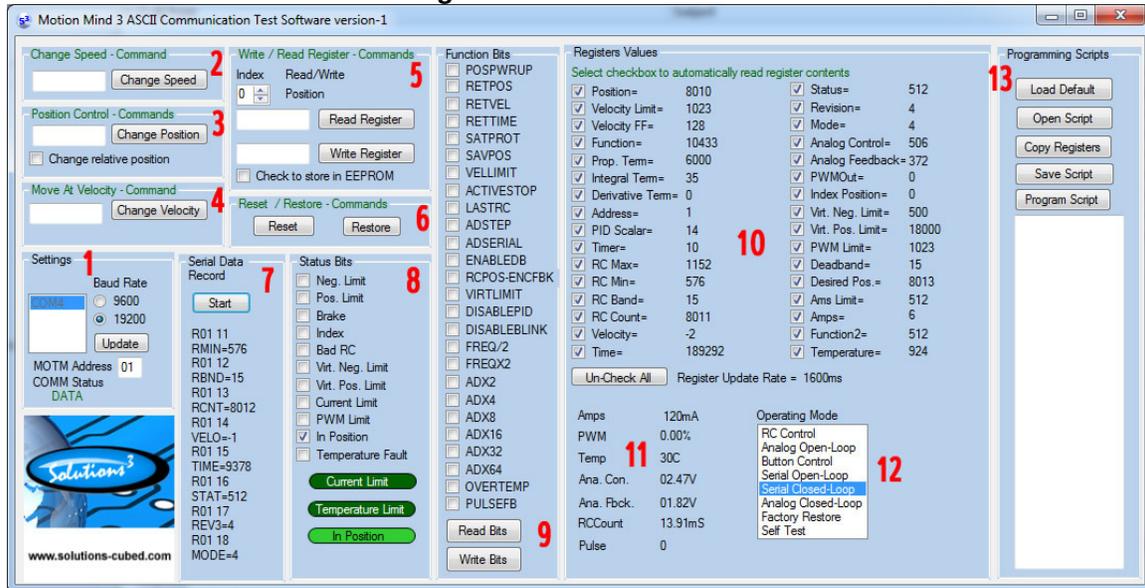
In order to use this software you should have access to a serial port, or a USB to serial converter.

1. COMM Port Settings:
In the settings box you may select the COMM port from the list box of available ports. You may also select the baud rate, and adjust the address of the MOTM3 you're attempting to communicate with. When the software is launched the "Update" button will be red and will have the word "Initiate" on it. Press the button to verify serial communication to the MOTM3 is possible. The COMM Status text will display messages related to serial communication. "DATA" indicates that communication is successful. "PORT" indicates no COMM port is present. Other indications of failure may be displayed as well.

2. Change Speed:
Used in serial open-loop control mode (3). You can enter a speed of -1023 to 1023 and press the button to adjust the motor speed. Negative values cause the motor to reverse speed,

3. Position Control:
Used in serial closed-loop control mode (4). Enter the desired position and press the change position button and the MOTM3 will move to the desired position. If you select the "Change relative position" checkbox the value in the box is added or subtracted from the existing position. PID settings may need to be adjusted to fine-tune position control.

4: Move-At Velocity
Used in serial closed-loop control mode (4). Enter the desired velocity (positive or negative), press the change velocity button, and the MOTM3 will move at the desired velocity. PID settings may need to be adjusted to fine-tune position control.

5. Read / Write Register:
Use the up/down arrows to select the index value of the register you want to read from or write to. Some registers are read only. To read the register press the read button and the register's contents will be displayed in the adjacent textbox. To write a value to a register select the index value of the register and enter the desired value in the textbox next to the write button, then press the write button. To store a value in EEPROM so that it is retained at the next power-up, select the Check to store in EEPROM checkbox before pressing the write button.

6. Reset and Restore Commands:
Press the reset button to force a software reset to occur. Press the restore button to replace all register settings with the factory default settings.

7. Serial Data Record:
A record of recent ASCII communication occurring is displayed here. If communication errors occur some messages may be displayed here as well. You may pause or start the display of data by pressing the pause/start button. Text at the bottom of the box is the most recent.

8. Status Bits Display:
The individual status bits are shown. This display will only be updated if the Status register "read" checkbox is checked (see section 10). If a bit is set the checkbox with be checked. Additionally, there are three visual indicators showing the over-current status, over-temperature status, and the in position status bits. These will change color when asserted.

9. Function Bits:
You may read or write the individual bits of the Function and Function2 registers. When written the register settings are stored in EEPROM.

10. Register values:
You can use the software to continually read specific registers. Check the checkbox next to the specific register you'd like to see the contents of. You can also select all or none of the registers using the button below the register list. Each register is read every 25-50ms in a round-robin style. The more registers you select the longer it takes to update the information. An estimate of this update rate is shown below the register list.

11. Number Conversions:
Some of the registers have number conversions associated with them. If the register is selected to be updated (see 10.) then the contents of the register will be converted to a value that might be more commonly used to display the specific register contents (volts, degrees C, etc).

12. Operating Mode:
If the mode register is selected to be read and updated this list box will indicate the current operating mode.

13. Programming Script:
The software can create, save, and program scripts to the Motion Mind. This makes it easier for you to organize and program custom settings into the product for production runs. More information on this is included in the following section.

Programming Scripts:

The Motion Mind 3 ASCII test software may be used to create, open, save, and program custom register settings.

Figure 2: Programming Scripts
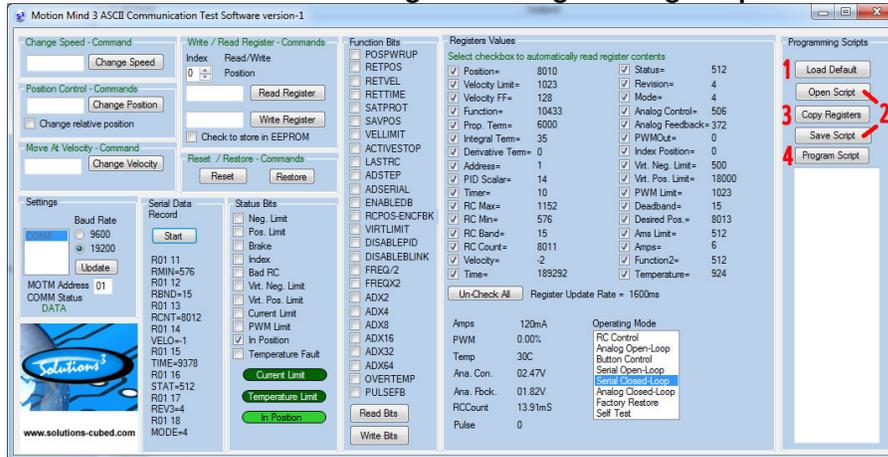
1. Loading Default Values:

Pressing the "Load Default" button will copy a script into the text box that is designed to store the default settings into each writeable register of the Motion Mind. The format follows the ASCII communication protocol for the Motion Mind. For instance, the first line implements a Store command sent to a unit at address "01" destined for register "00" (the Position register), and sends a value of 0.

2. Open Script – Save Script:

Pressing the "Open Script" button allows you to open *.txt files that have been saved that contain programming scripts. Pressing the "Save Script" button allows you to save the contents of the text box to a *.txt file on your computer.

3. Copy Registers: If you have read the contents of the Motion Mind registers with the software

(this will occur if all check boxes are checked) you can copy them to the script text box with this button.

4. Program Script:

Pressing this button programs the contents of the text box into the Motion Mind.

Example:

Press the "Load Default" button to start creating a custom programming script. A script will be generated in the text box that contains the default settings for the Motion Mind.

Next, modify the register values to those you desire. In this example we changed the P, I, and D terms ("12000","125", and "6000", respectively). Then we set the Function register bit to enable velocity limits ("64") and set the velocity limit to "50". All of these are underlined in red.

Next, press the "Save Script" button to save the text file shown in the text box. In the future you will just have to open this file using the "Open Script" button.

Finally, with the Motion Mind connected via RS232 and powered, press the "Program Script" button. The new settings will be stored in EEPROM on the Motion Mind.