



Motor Controls – Release Notes

Version 3.5.0.3 – March 2, 2018



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All users are strongly encouraged to upgrade to this release.

Motor Controls (3.5.0.3)

New

- New default screen layout using four columns. As part of this redesign, the Scanning window now spans two columns and allows scans to be initiated directly from the window. The previous three column layout is still available from the Program Settings dialog.
- The previous window position and state are now restored when starting the program.
- Text size on the main window now scales with the window size.
- Additional INI file options, described in the documentation

Fixed

- The TELLPWR command would fail if the detected voltage was negative.
- Improved support for high DPI screens.
- Error in HTML documentation for SETSPD command.

Changed

- Scanning history is now stored and by default displayed in order of most recently used values. The displayed history can be sorted by value by selecting the appropriate option in the Scanning Setup dialog, but this does not change the order of the stored values.

MotorSendCmd (1.0.8.0)

Fixed

- Usage instructions output now matches current console background color.
- Minor updates to usage instruction text.

Version 3.4.3.0 – December 12, 2015

Motor Controls (3.4.3.0)

- Changed the timing of the optional notification sent over RS-232 at the end of a Go To operation. When initially implemented in 2003 the behavior was to send the notification as soon as the tuning motor ended movement, before reduction of position errors for other motors had completed. In version 3.3.0.12 (2012) the behavior was changed so that the notification would be sent only after reduction of motor errors had completed. On request, the timing of this notification has been reverted to the original (2003) behavior. This reversion has the benefit of effectively decreasing the total time taken by externally controlled scans that rely on this notification without impacting the power output of the system. While important for maintaining alignment over the long-term, we have found that there is no difference in power output before or after motor position error reduction has occurred under normal scanning conditions. Of note, if the scanning speed is set too fast for the distance traveled the motors can overshoot, leading to larger errors that can impact power output.
- Fixed minor CSS bug in software manual.

MotorSendCmd (1.0.7.0)

- No changes.

Version 3.4.2.0 – September 26, 2015

Motor Controls (3.4.2.0)

- Fixed a buffer overflow that would cause a TCP/UDP error message to crash the program.
- Fixed a bug that kept the program from accepting concurrent TCP connections. Note: using multiple connections to control movement is not recommended due to the possibility of a race condition. Effort should be made to ensure only one connection at a time is used to set system movement.

MotorSendCmd (1.0.7.0)

- No changes.

Version 3.4.1.3b – June 15, 2015

LabVIEW™ Ethernet sample revised to reduce CPU usage while idle.

Motor Controls (3.4.1.3)

- No changes.

MotorSendCmd (1.0.7.0)

- No changes.

Version 3.4.1.3 – January 1, 2015

Motor Controls (3.4.1.3)

Fixed

- In the event of a power failure to both the computer and the motion controller motor positions would erroneously be set to a value of 0.
- Bad detection of Motor Calibration / Spectrum chart auto scale values for the Averaged/Binned data view.
- Assume you have just begun recording a new data set or have switched to a new motor in the Motor Calibration / Spectrum window with the Forward/Reverse data view. The first motion you make is momentarily in the reverse direction and at a speed slow enough that the reported motor position doesn't change but long enough that the chart recognizes active motion in the reverse direction. Next move in the forward direction to create some length of curve. Now move in the reverse direction, the vertical line will move but the reverse curve won't be drawn until the motor moves past the first reverse point.
- If an external program enabled the tuning motor the scanning window buttons would become enabled while the tuning motor window would stay disabled. If a scan was started under this scenario all but the tuning motor would move, leading to system misalignment. The new behavior is to leave both scanning and tuning motor windows disabled.
- The Power Output display of the power meter windows didn't update.
- The minimum and maximum Go To scanning limits had a rounding error.
- Power meter charts wouldn't update when auto scale was activated for just one axis and the current data point was outside the visible chart area.

New

- Integration with newly released system manual.

Changed

- Improved proportional gain value for MultiFlex controllers.
- A loss of connection with the MultiFlex controller while using the MultiFlex BNC voltmeter now won't automatically clear the selection of the MultiFlex BNC as the voltage device.
- Motor status notifications are now only shown for currently active motors.
- Scanning and individual motor speeds are now always checked when the corresponding scanning or motor settings dialog is closed (even when the value hasn't changed or the dialog was cancelled). This makes it easier to identify potentially unsafe speeds.
- The software documentation folder has been renamed 'Software Documentation'.
- Small number of code improvements.

MotorSendCmd (1.0.7.0)

- No changes.

Version 3.4.0.2 – May 6, 2014



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Motor Controls (3.4.0.2)

Fixed

- The program would fail to load (would enter an infinite loop) if the last line of the cubic spline fitting file was a motor heading.
- Crash when a motor was individually moved and the user attempted to open the settings dialog for a different motor.
- Crash when a file selection dialog was opened, cancelled, and then opened again and a file with a longer path & name length was specified.
- Crash when Ctrl+S was pressed in one of the power meter windows and the only data is from previously saved files.
- If a backlash value was specified in the INI file for a motor number greater than the highest motor used by the program an error dialog would be displayed.
- Invalid COM port numbers saved in CURRENT.MRG weren't detected and with a bad value the default port wasn't set correctly. This could cause an inability to configure the COM port settings.
- Internal backlash values wouldn't be saved correctly for motors greater than what were in use by the program when closed.
- The '[Scanning to #]' text in the scanning window shown during a scan didn't include the NIR wavelength offset.
- If a scan was started while individual motors were reducing errors the corresponding status bit would become stuck until the error reduction routine completed at some future point or the program was restarted.
- The Calibration / Spectrum View window wouldn't correctly rescale the data when selecting a new unit.
- The power meter save menu item wasn't always disabled when there was no data to save.
- In Forward/Reverse view the Calibration / Spectrum View chart curve sub menus would show 'Remove Data Set' instead of 'Remove Curve'.
- The View Fits and Generate Fits charts lacked a highlight color for the spline curves.
- The power meter Data Set Info dialog wasn't wide enough for some dates to be completely visible.
- The power meter Open dialog didn't properly detect a cancel operation in Windows XP.
- Power meter chart auto scale would only expand the display area.
- The Motor Settings Dialog charts would turn black if the user opened the fitting type selection dropdown and selected the already active fitting type.
- After using the Generate Fits wizard focus wouldn't be returned to the main program window.
- The tooltip used in the Generate Fits wizard could become stuck when switching motors.
- The Generate Fits wizard would proceed to the Save Fitting Parameters page despite a file with no fitting data.
- Changing the polynomial order of a motor in the Generate Fits wizard wouldn't redraw the chart (bug introduced in 3.3.2.4).
- Scanning in the out-of-bounds direction wouldn't be enabled in a scenario in which more than one motor was out-of-bounds, but both were disabled.
- If a motor is moving and the user attempts to change the settings of a higher motor the property sheet dialog initializes with the wrong page.
- The RS-232 setting dropdown controls wouldn't be initialized correctly in some cases.
- Motor warnings for the highest motor weren't being consolidated into one dialog with the other motors.
- Limit error text warning when using a spline fit for the tuning motor specified the wrong scanning direction was disabled.
- Disabled non-tuning motors would keep scanning from being enabled when the out-of-bounds movement direction was the same for both the disabled motor and the tuning motor.

- Possibly fixed: Some chart right context menus would fail to function.
- Memory leaks in the power meter routines.
- Zooming/un-zooming now generate a mouse movement to update chart position and any highlighted point.
- Generate Fits: Cubic fit $\sum (y-f(x))^2$ value wasn't formatted with the current locale.
- Chart curves off by 1px vertically.
- Windows XP UI bugs.

New

- Support added for the MultiFlex Ethernet motion control card from PMC, including MultiFlex based voltmeter.
- Program now detects the number of servo axes available on the motion control card and will load in Demo Mode if the DEVICE parameter in the INI file is set higher than is supported by the controller.
- The program now monitors the motion controller for axis errors. Necessary as the MultiFlex controller will disable an axis when it detects an error. Errors will be displayed on the bottom two lines of text on the motor windows.
- A power button has been added for Motor #1. Necessary to allow the user to re-enable it if it becomes disabled by the MultiFlex controller.
- After a crash the program will offer the option to restore positions to the values held by the controller if the controller hasn't power cycled and the values differ from those stored.
- Demo Mode now simulates the backlash correction used by motors
- Support added for monitor configurations up to 200 DPI.
- The mouse scroll wheel now functions to adjust the horizontal trackbar while the cursor is over a selected scanning/motor window. Previously the horizontal trackbar had to be selected for the wheel to act.
- The mouse scroll wheel can now be used to scroll and zoom the power meter charts.
- New power meter chart zooming options: horizontal only and vertical only zooms using Ctrl + Shift and Ctrl + Alt with the left mouse button, respectively.
- Calibration / Spectrum View charts now remember any curve color/style customizations while the data set is open.
- Trailing commas are now removed when reading lines from power meter data files. This was done because Excel pads each line with commas until the maximum number of columns used by the file have been explicitly defined as empty. Files opened and saved with Excel would exhibit this behavior, which would affect the four header lines.
- Added support for tuning motor cubic spline fits that don't monotonically increase to CheckLimits()

Changed

- The values displayed and entered in the Go To scanning dialog now match the current wavelength display mode (ie, IIR). Previously, the values were always either Near IR wavelength or Near IR wavenumbers. (requested feature)
- The Red and Blue scan buttons now scan red/blue according to the current wavelength display mode instead of only relative to NIR values. The SCRED and SCBLUE external commands have not been changed and still scan relative to NIR.
- The Forward/Reverse view of the Spectrum display in the Motor Calibration / Spectrum chart now uses the status of the RED and BLUE button scanning buttons to determine the direction of motion, instead of the motor direction buttons for the tuning mirror, fixing a problem with slow scans populating both Forward and Reverse curves as well as error reduction causing points to be added on the opposite curve at the end of faster scans.
- Motor Calibration / Spectrum data in the Forward/Reverse view wasn't correctly deleted when pulsing movement of a motor. However, the fix means that if the motor position is manually changed in the motor settings dialog while collecting data the points between the old and the new positions for the current curve will be cleared.
- Power meter data files now save the full system status instead of just motor movement. The bit field format is the same as used by the TELLSTAT external command. Older data file can still be opened but will not make use of the new Forward/Reverse data discontinuity detection.
- The motor power buttons now enable/disable the corresponding axis on the motion control card.

- Program no longer assumes axes 1-8 on the motion control card correspond to servo motors.
- In Calibration / Spectrum View plots Forward/Reverse curves now show discontinuities where the data changes movement iterations.
- Curve inversion for the tuning motor is now accomplished using [Newton's Method](#), followed by [Ridder's Method](#) if the inversion fails. If Ridder's Method also fails [Brent's Method](#) will be used.
- Opening a power meter data file no longer requires that the file not be already open in a program which has write access to the same file.
- Chart text is now pixel-aligned on Vista+ making for clearer labels.
- The F4 save motor positions dialog is now titled "Record Positions" to be consistent with the menu item name.
- Global keyboard shortcuts now work in both of the power meter windows.
- Motor movement now clears the "Positions Saved" message in the Scanning Window.
- Power Meter Power Output window (black with orange background) errors are now more descriptive.
- Numerous code improvements.

MotorSendCmd (1.0.7.0)

- No changes.

Version 3.3.3.3 – October 4, 2013



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Motor Controls (3.3.3.3)

Fixed

- The Forward/Reverse view mode of Motor Calibration / Spectrum window would clear data prematurely when switching directions when not using Spectrum View for the calibration selection. This was a bug introduced in the previous version.
- ΔP values for motors added through the main settings window are now set to zero upon addition.
- Fixed a bug that caused the TCP connection timeout preference and value not to be saved.
- Fixed a bug that caused improper RS-232 port detection on some systems.

New

- The Etalon Adjust software is now part of the Motor Controls software. It has the ability to adjust either a piezo controller or motor in response to changes in the etalon rings from the laser output. Numerous improvements have been made the Etalon Adjust code from the 1.0.0.0 release. Due to the changes, this version is not backwards compatible with the settings files from the previous version.
- A software backlash correction has been introduced to compensate for the limitations of the servo motor gearheads. The amount of correction is set in the INI file under the [MOTORS] heading and the BACKLASH_N keys, where N is the motor number (1-8). New systems will come with these values set, existing customers should see the documentation for instructions on how to set up their systems.
- The program can now detect unexpected terminations and will report any unsaved motor activity at the time.

Changed

- Due to the presence of camera drivers there are now x86 and x64 versions of the installer.
- The initial position of the diagnostics display has been adjusted to take advantage of the new window snapping feature.
- Motor names can no longer be set to an empty string.
- More detailed error messages when opening the settings file fails.
- The diagnostics display no longer has a maximize or minimize box.
- Numerous code improvements.

MotorSendCmd (1.0.7.0)

- No changes.

Version 3.3.2.4 – February 21, 2013



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Motor Controls (3.3.2.4)

Fixed

- Power Meter windows didn't include Near IR wavelength offset in recorded wavelengths.
- Adding motors through the Settings dialog added an extra menu item for the additional motors
- Chart would fail to draw if a segment with zero slope extended on either side of visible area.
- Under certain conditions dialog windows would open outside of visible monitor area.
- Saving power meter data now works better when dealing with multiple unsaved data sets.
- The program now blocks automatic timer computer sleeps, and no longer crashes on resume.
- Improved chart panning.
- (XP) Save file dialogs wouldn't append the default file extension.

New

- Added external command, TELLPWR, that returns the current laser power.
- Added calibration selection for Motor Calibration tool: Spectrum View. Use to visualize power data vs. wavelength/wavenumber in the current display mode.
- Saved power meter data now includes the pump wavelength.
- Motor Calibration now supports reading files with data for a different number of motors than in use by the program.
- All motor position/wavelength charts now respond to changes in wavelength/wavenumber display modes.
- A separate install of the USBMeasure DLLs is no longer required to enable use of the USB voltmeter.
- Motor positions are now saved 15 seconds (default) after all system motion ceases instead of every 5 minutes (or [CONTROL]POS_UPDT_TIME). The wait time can be adjusted using the [CONTROL]POS_SAVE_WAIT setting in the INI file, which specifies the approximate wait in seconds. A notice is shown for 5 seconds on the Scanning window after positions are saved.
- More tips have been added to the status bars of the power meter windows.
- (Vista and above) Menu item icons have been added for some commands.
- (Vista and above) Vista-style file open/save dialogs are now used.
- Minor code improvements

Changes

- Renamed Power Meter menu items: "Power Meter" to "Chart Recorder" and "Motor Calibration" to "Motor Calibration / Spectrum" to better represent the functions of the two viewers.

MotorSendCmd (1.0.7.0)

- Added support for the TELLPWR command.

Version 3.3.1.0 – November 16, 2012

Motor Controls (3.3.1.0)

- Fixed a bug in the cubic spline calculation routine that would sometimes occur when a motor was switched to a cubic spline fit through the motor setup dialog. When the index of the lowest spline wavelength value greater than the user-defined max signal wavelength is far enough from the index of the lowest wavelength greater or equal to the current wavelength the ΔP value will be incorrect. Usually the problem will occur when the wavelength is less than the midpoint between the user-defined min and max signal wavelengths. Versions 3.2.0.0 through 3.3.0.12 are affected.
- Minor code improvements.

MotorSendCmd (1.0.6.0)

- No changes

Version 3.3.0.12 – September 21, 2012



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Motor Controls (3.3.0.12)

- The program can be interfaced with a laser power meter to chart power output vs. time and/or motor position to aid in calibration and general use.
- It is now possible to use a cubic spline fit with the tuning motor.
- Major interface updates:
 - All motor and scanning values are now reported and set using physical units instead of controller units.
 - The main interface is no longer based on overlapped windows. To deactivate a motor for a scan use the corresponding power button.
 - During a scan motor windows display their (average) ΔP adjusted fit velocities and the individual movement speed slider is disabled.
 - Motor setup windows have been merged into a single dialog that includes a simplified fit comparison.
 - External communications setups (TCP/UDP/Serial) have been merged into a single dialog and the serial setup has been redesigned.
 - The Program Settings dialog can now be used to set motor fitting files.
 - Renamed “MASTER” to “Scanning”, the window now includes a status display. Scanning setup now displays the max safe scanning speed.
 - Motors support a custom name to aid in their functional identification.
 - The menu for the main interface has been updated to better reflect the categories of items.
 - Data inspection in the View Fits window is now possible for non-topmost curves.
 - The update check in the About dialog has been moved to a separate thread to avoid hanging on a slow connection.
 - Message boxes (used in Windows XP) are preferentially drawn in a similar style to dialog messages (used in Windows Vista and above).
 - Non-editable numbers now include digit grouping and are formatted based on the user locale.
 - The Diagnostics window is no longer shown by default.
 - Motor and Scanning buttons are drawn in a modified system style.
 - “Delta P” is now “ ΔP ”.
- The return of the TELLSTAT command has been adjusted to indicate when the program is in the process of reducing motor errors after the completion of a scan. This is indicated when the two least significant bits are set. See documentation for details.
- It is now possible to instruct individual motors to reduce ΔP .
- It is now possible to set or disable the timeout for TCP connections (requested feature).
- If a user attempts to close the program while motors are in motion or while waiting to reduce errors it will wait for all motion to cease before exiting.
- If a MCAPAPI error is encountered on a motor the program will now switch to Demo Mode.
- Output wavelength/wavenumber is now calculated using [Ridder's Method](#).
- If MCAPAPI isn't installed the program will now load in Demo Mode instead of failing to start.
- Motor acceleration, gain, and velocity multiplier are now auto-detected by default.
- The LabVIEW™ TCP/UDP communications sample VI has been updated.
- Completed transition to internal use of Unicode.
- Numerous small bug fixes, performance enhancements, and code cleanups.

MotorSendCmd (1.0.6.0)

- Minor bug fix.

Version 3.2.2.0 – April 27, 2012

Motor Controls (3.2.2.0)

- Added an external command: TELLSTAT which reports the current status of motor movement and any scanning operation as a hexadecimal number prefixed with "0x". The bits of this number are set to indicate motion; a value of 0x0 indicates the system is at rest. For a complete description of how the bits are set in this number please see the full program documentation.
- The LabVIEW™ sample has been updated.
- There is no longer a preceding space before the wavelength/wavenumber returned by the TELLWL/TELLWN commands.

MotorSendCmd (1.0.5.0)

- Added support for the TELLSTAT command.
- Code cleanup.

Version 3.2.1.0 – February 8, 2012

Motor Controls (3.2.1.0)

- Fixed a bug where ΔY wouldn't be calculated when using the Generate Fits wizard with data that included a zero valued position.
- The width of the motor setup windows has been increased to allow more visible space for entering position related values. Additionally, position related entry boxes now scroll automatically and allow entry of values that exceed the available screen space for the box.
- Adjusted the magnitude at which labels on the y-axis of charts are written in scientific notation.
- Motor and MASTER setup windows now appear over their corresponding motor/ MASTER interface window (when present).
- The notification of an available update at startup now retains focus until it is closed.

MotorSendCmd (1.0.4.0)

- No changes

Version 3.2.0.0 – January 9, 2012

Motor Controls (3.2.0.0)

- It is now possible to generate the polynomial and cubic spline fitting files from the program using the wizard accessed from the *Generate Fits* option of the *File* menu.
- Active motor fits can now be viewed and compared with the *View Fits* window accessible from the *File* menu.
- The cubic spline interpolation routine has been replaced with one that produces a smooth and continuous derivative and a continuous second derivative.
- A confirmation dialog is now displayed when reducing motor errors.
- If *Motor Controls.ini* is not found the program will now attempt to read *MDRIVE.INI* before failing. If *MDRIVE.INI* is found it will be copied to *Motor Controls.ini* and renamed *MDRIVE.INI.BAK*.
- The install wizard will now replace files that already exist in the installation directory which weren't installed by a previous wizard.
- The program will now read *CURRENT.MRG* files created in versions prior to 3.0.0.0 that are 377 bytes in size (most versions prior to 3.0.0.0).
- Motor and MASTER setup windows will now warn that changing settings while a motor is moving (possible if an external command is sent while a setup window is open) will stop the movement of the motor/and or scanning operation.
- Which motor buttons are lit during a scanning operation now reflect the direction of motor travel.
- The sign of the velocity values in the *Diagnostics* window now reflect the direction of motor travel.
- When using the Settings dialog to change the number of motors of the system the program will revert to the original number and coefficients if it fails to read the polynomial data file.
- Polynomial and cubic spline data values no longer require two spaces at the end of the files. Additionally, spaces are now optional between motor sections.

- Window focus is no longer lost when using the context menu on motor and MASTER windows.
- A menu item has been added for reducing motor errors under the *Motor* heading.
- The menu items for reducing and zeroing motor errors are now disabled when the MASTER window is not present.
- Demo mode simulated velocities have been improved.
- Fixed a display abnormality for the Diagnostics window where an average of any metric of zero would cause “0” to flash on the screen.
- The cubic spline data file no longer requires the values to be in order of increasing wavelength.
- When a motor moves out of bounds further movement in the out-of-bounds direction is now disabled.
- The text of the *Diagnostics* window is now greyed when the *MASTER* window is absent, reflecting that the information in that window is only related to scanning operations.
- Fixed a bug in RS-232 communications where an error would not be reported if a GOTO command was sent but a Go To operation was already in progress.
- There is now a space between the wavelength/wavenumber in the *MASTER* window and the unit.
- The wavenumber unit (cm^{-1}) is now properly displayed in Windows XP.
- A bug in how versions were compared for update notifications has been fixed.
- Checking for updates at startup has been moved to a separate thread.
- The timer used for calculating Delta P values during a scanning operation has been improved on supported systems. The new timer does not suffer from rollover and is more accurate.
- Demo Mode motion for relative movement now simulate the motor moving at the specified velocity, instead of simply moving the motor to the specified position instantly.
- Manually moving a motor within two seconds of ending a scan no longer causes the Delta P for that motor to be reset when the two seconds have elapsed.
- Motor, MASTER, Diagnostics, and the progress window for waiting for motors to stop can no longer be resized by double-clicking on their window frame.
- Dialogs have been updated to use the current Windows style for Vista/Win7.
- Dialog box notifications for invalid text field entry have been replaced with balloon tips.
- The default system font is now used in Windows XP.
- Screen flicker further reduced.
- Fixed an error where using the right mouse button to activate the context menu when the cursor was positioned on the far right pixel of a secondary display to the left of the main would cause incorrect positioning of the menu.
- Numerous code improvements

MotorSendCmd (1.0.4.0)

- Minor code cleanup.

Version 3.1.0.0 – September 13, 2011



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Motor Controls (3.1.0.0)

- The program is now distributed as a MSI package. The program will be installed in C:\LaserVision and include all files required for immediate use except for midir.dat and cubicfit.dat. Existing CURRENT.MRG, POSITION.MOT, POSITION.BAK, and Motor Controls.ini files will not be overwritten. A Start Menu and Desktop shortcut will also be created.
- A demo mode has been added. While in this mode the program will simulate motor movements and position changes won't be saved. This has been added to facilitate testing of external communication programs as well as to allow a user to become familiar with the program.
- A Settings dialog has been added under the File menu. Using this it is possible to change many of the program settings stored in the INI file. Any changes are saved and immediately applied. This does not apply to changes

made to the file directly while the program is running. It is not possible to change settings while any motor is moving.

- Fixed a longstanding bug where when opening the *Go To* dialog if the user cancels the operation before previously starting a go to operation there would be approximately a 25% chance any subsequent go to operation would stop instantly until the program was restarted.
- Fixed a related longstanding bug that would cause the same symptoms as above when attempting to scan to a wavelength extremely close to the current wavelength (within about seven picometers). An error is reported if the user attempts this and valid go to wavelengths are given.
- Added a new value to INI file, [CONTROL]NEAR_IR_WAVELENGTH_CORRECTION, that allows an offset (in nm) to be added to the wavelength/wavenumber reported by the program.
- Commanding a motor to move during a scanning operation, even in the direction it is already traveling in, now cancels the scanning operation before moving the motor.
- The Diagnostics window now displays average values during a scanning operation. This is the default behavior; the setting can be changed in the window's context menu.
- It is no longer possible to resize the motor, MASTER, and Diagnostics windows.
- It is no longer possible to open or close a motor window during a scanning operation.
- It is no longer possible to change the setup of a motor or the MASTER window while the motor is in motion or a scanning operation is in progress. This change is also present in the external commands and the SETSURL command will fail under the same circumstances. A new Ethernet error code has been added: 7 indicates that the setting can't be changed due to active motor movement or scanning operation.
- Delta P values for all motors can now be zeroed through the menu *Motors – Reset All Motor Errors*.
- Context menus have been added to the motor, MASTER, and Diagnostics windows.
 - It is now possible to automatically adjust the positions of all motors to a delta p value of less than 0.5 by selecting *Reduce Errors* from the context menu of the Diagnostics window.
- The program will now read all CURRENT.MRG files created with version 3.0.0.0 and higher. If an older file version is opened a notification is displayed and a backup of the original file is saved.
- Shortcut keys have been added for most menu options.
- The ability to use the left and right arrow keys to move a motor has been improved so that the keys always function while a motor window has focus. Using these keys will also set focus within the motor window to the corresponding button.
- The R, G, and B keys now function in the MASTER window to scan red, go to, or scan blue, respectively.
- Double-clicking an old go to wavelength will now scan to that wavelength.
- When an invalid parameter has been entered in a dialog box the (first) erroneous field is now selected following the notification.
- The text box in the dialog that appears when F4 is pressed to record current motor positions now contains the wavelength as currently displayed in the MASTER window (when present). The position of the dialog has been adjusted to always be centered under the Master window (when present).
- A menu option for the calibration window opened on pressing F4 has been added: *Motor – Record Positions*.
- A menu item has been added to open MOTPARAM.DAT: *Motor – View Stored Positions*. This will only function if the .DAT extension is registered to open with a default program.
- Cubic spline coefficients are now calculated only when the wavelength has changed enough during a scanning operation to necessitate it.
- Motor positions are now updated every 100 milliseconds, instead of 110.
- The program will check on startup and on opening the About dialog for available updates. If an update is found a notification will be displayed. It is possible to disable to check on startup.
- The *File – Open / Save / Save As* menu items have been removed.
- While a dialog box is active all other program windows are now disabled.
- Dialog boxes are now centered on the main program window, except for the Go To and Motor Calibration dialogs which are centered under the MASTER window (if present).
- The old go to wavelengths/wavenumbers in the *Go To* dialog are now displayed in ascending order. Typing a value into the text box will scroll the selection window to the old go to values that the user is anticipated to type.

- The text box in the *Go To* dialog now has keyboard focus by default.
- The default settings of the options in the INI file have been updated to reflect current practice. Many of these options are now unnecessary for normal use.
- Removed INI value [CONTROL]DIAGNOSTICS_REFRESH. Updating of the Diagnostics window is now tied to the refresh of motor positions.
- If no INI file is found one is now created with the default values of the most useful settings.
- If POSITION.MOT isn't found one is created with default values.
- When a dialog is closed the previously active window now retains focus.
- The top three windows, Motor #1, MASTER, and Motor #2, are now sized to fit exactly within the top frame.
- The style of the dialog windows has been updated to a more contemporary style.
- The grey buttons in the motor and MASTER windows now displayed more appropriately at high vertical resolutions (much greater than 768).
- All fonts are now drawn in the face of the current Windows theme.
- The Diagnostics window now acts as a static display. It is no longer possible to resize columns or select items.
- The drawing of the top frame no longer assumes a white background when drawing.
- Error notifications have been updates to be more informative.
- Only one trailing zero is displayed for decimal numbers in editable text fields.
- Screen flicker has been reduced.
- Code improvements have been made.
- Program documentation has been rewritten and is now provided as an HTML document.
- A link www.deanguyer.com has been added to the *About* dialog.

MotorSendCmd (1.0.3.0)

- Fixed a bug where displaying a Winsock error would cause the program to crash.
- Updated command window usage information to reflect the change in the SETSPD command.

Version 3.0.4.2b – June 8, 2011

Source diagrams for the LabVIEW™ Ethernet sample .vi's are now included.

Motor Controls (3.0.4.2)

- No changes

MotorSendCmd (1.0.2.0)

- No changes

Version 3.0.4.2 – March 24, 2011

Motor Controls (3.0.4.2)

- Corrected two errors in the cubic fit interpolation routine: One that would cause an interpolation failure past the highest wavelength supplied in the cubic fit data file for a motor, and another that caused an offset in data that was used for the fit.
- Updated remaining obsolete Win16 functions to Win32 equivalents.
- Minor code improvements.

MotorSendCmd (1.0.2.0)

- No changes

Version 3.0.4.1 – February 21, 2011

Motor Controls (3.0.4.1)

- It is no longer possible to run more than one instance of the program at once.

MotorSendCmd (1.0.2.0)

- No changes

Version 3.0.4.0 – February 4, 2011



The settings file (CURRENT.MRG) used in this version is not compatible with prior versions. If a downgrade is desired please record all program settings and manually restore them in the older version. You may also [send us](#) your current file and the version you are downgrading to and we will send you a file compatible with the older version.

Motor Controls (3.0.4.0)

- Added the ability to supply a data file that the program uses to construct a cubic spline fit on-the-fly of the desired motor position rather than the polynomial fit. This is useful for motors 2 and higher, but most worthwhile for motor #2. Once the required data file has been constructed and listed in the Motor Controls.ini file the cubic spline fit is enabled using the setup dialog for the desired motor. See the help documentation for more information.
- Corrected a bug that made it impossible to use the SETSCL command over RS-232 for the Master window.

MotorSendCmd (1.0.2.0)

- No changes

Version 3.0.3.0 – December 20, 2010

Motor Controls (3.0.3.0)

- Four new external commands have been added: MOVE, STOP, TELLPOS, and SETSCL. SETSPD now supports setting the base speed of individual motors, however the syntax for setting the Master base speed has not changed. Please see help file or MotorSendCmd output for details.
- Additional error notifications have been added for reading and saving motor positions. A backup position file POSITION.BAK is now saved each time POSITION.MOT is successfully written. This file can be used to restore position data on starting the program in the event that reading POSITION.MOT fails. In this event a notification will instruct the user to manually set the motor positions from the information contained in the backup file.
- Motor setup windows now show the motor number as the title of the window.
- Code improvements.

MotorSendCmd (1.0.2.0)

- Updated --check option to support new commands.
- The default instructional output now uses color to improve readability.
- Winsock errors will now display as a message instead of a number.
- Code adjustments for new commands and minor improvements.
- Fixed a minor code error, no change in behavior.

Version 3.0.2.1 – November 11, 2010

Motor Controls (3.0.2.1)

- Changed behavior of TCP communications to timeout after 5 minutes of command inactivity.
- Decimal values for GOTO and SETSPD for Ethernet communications are now handled correctly.
- Updated default motor minimum and maximum position values.
- Minor code improvements.
- Updated LabVIEW™ sample to reflect decimal point change. The sample is now only provided in version 8 format.

MotorSendCmd (1.0.1.1)

- Updated --check option to support decimal values for GOTO and SETSPD.
- Fixed error where --check on GOTO repeated validation as if command was SETSPD.

Version 3.0.2.0 – November 7, 2010

Motor Controls (3.0.2.0):

- Ethernet communications now support receiving more than one command in a single packet. Any character other than a letter, number, or space serves as a delimiter. For example, GOTO 760;TELLWL will be interpreted as two separate commands.
- Error codes returned by Ethernet communications are now terminated with a carriage return followed by a line feed. This makes TCP communications compatible with LabVIEW™.

- A sample LabVIEW™ program is now included that demonstrates Ethernet communications with Motor Controls.
- Code cleanups.

MotorSendCmd (1.0.1.0)

- Updated to support sending multiple Ethernet commands.
- The --check option now verifies that the secondary argument for SETSPD and GOTO is a number.
- Corrected the number of minimum arguments.

Version 3.0.1.0 – October 28, 2010

Motor Controls (3.0.1.0):

- Added ability to set an offset from 1064.000 nm for the YAG wavelength, [CONTROL]1064_OFFSET, see *To Change Advanced Program Settings* in the help file for details.
- Fixed an error in TCP communications where any Winsock error was defined to be WSAEWOULDBLOCK.
- Ethernet connections are now handled by separate threads, response times for both TCP and UDP commands should decrease. Additionally, third-party programs used for sending TCP commands, such as LabVIEW™, which aren't as quick to send commands after a connection is established will now work properly. However, TCP commands must be sent within 5 seconds of establishing a connection or the connection will timeout. UDP commands are not affected by timeouts as UDP is a connectionless protocol.
- If a potentially unsafe Base Speed is set in the Master setup dialog, clicking Cancel on the resulting warning will now reset the value in the dialog box to the previous setting.
- Updated default motor values to current usage.

MotorSendCmd (1.0.0.1):

- Will now return the Winsock error code as an exit code on a Winsock failure. Winsock errors are 6, 8, 87, and 995-11031. See <http://msdn.microsoft.com/en-us/library/ms740668.aspx> for error codes.

Version 3.0.0.0 – October 20, 2010

Motor Controls (3.0.0.0):

- First release using the MCAPI and supporting 32-bit Windows.
- Ethernet communications added.
- The SETSPD command will now fail (return a ? over RS-232, 1 for Ethernet) when the specified scanning speed may lead to velocities greater than 1e+6. The *Diagnostics* window has been redone.
- The following options have been added for use in the .ini file:
 - [SCREEN]FONT SIZE: Change the size of the program's display font.
 - [CONTROL]DIAGNOSTICS_REFRESH: Set the refresh time for the *Diagnostics* window. See *To Change Advanced Program Settings* in the help documentation for details.
- If a valid datafile is not specified for the [MODEL]DATAFILE value the program will generate an error message and close.
- The arrow button arrows are now drawn with anti-aliasing.
- Controls are now drawn with Visual Styles enabled (ex: scrollbars will look visually similar to those in other applications).
- The *About* dialog has been redone.
- Help documentation has been transitioned to the Compiled HTML Help format (.chm).
- The *Setup – Communications* command has been renamed *RS-232 Communications* to distinguish it from Ethernet based communications.
- New program and window icons.
- Application has been renamed *Motor Controls*.
- The behavior of *Save As*, *Save*, and *Open* commands has been altered so they function according to contemporary expectations: *Save* will no longer prompt for a file name if one was not previously specified and will always save to the current .mrg file; *Save As* will cause the current .mrg file to change to that specified; *Open* will default to the current .mrg file. The .mrg file used at startup is still CURRENT.MRG.
- The program no longer has the ability to control single-frequency systems.

MotorSendCmd (1.0.0.0):

- Initial release.

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