Version

2.0.7

MICROSTRAIN, INC.

Microminiature Sensors

FAS-A Data Acquisition & Display Software

MicroStrain, Inc.

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<u>About</u>

<u>Main</u> > Help > About

The About screen is for information purposes only and relates 1) the software name and version, 2) the copyright, and 3) the company name, address, website and telephone.

To return to Main screen:
- Click <OK> to return to Main screen.

Calibrate

Main > *Tools* > *Calibrate*

The Calibrate screen allows the user to calibrate the FAS-A. Individual accelerometers may be calibrated as well as both accelerometers simultaneously. Calibration gain and offset values are written to the on-board memory of the FAS-A.

To calibrate a unit:
Carefully read and follow the directions contained in the FAS-A Users Manual before you attempt to calibrate the accelerometers of an FAS-A. The following instructions describe the steps you follow in the software only.
- Click <Tools>.
- Click <Calibrate>.
- The Calibrate screen will appear.
- Click <File>.
- Click <Read>.
- The application will begin continuous sampling of the accelerometer bits and will display these in the Current Bit frame.
- Physically rotate the unit about its axis as described in the Users Manual.
- Select (by clicking the checkboxes with your mouse) the Ax or Ay accelerometer to calibrate accelerometers individually or All if you want to calibrate both together.
- Click <File>.
- Click <Write>.
- You will receive a confirming message box. Click <OK>.

To return to Main screen:
- Click <File>.
- Click <Return>.
- **Note:** If you click <Return> without clicking <Write>, the current calibration on-board the FAS-A will remain unchanged.

Communication Ports

Main > *File* > *Comm Port*

The Communication Ports screen allows the user to either select a specific serial port to connect to the FAS-A or to find (auto-detect) an FAS-A already connected to the computer's serial ports.

Note: When the software is launched, the application automatically searches for a configuration file and if found, sets the serial port found in the configuration file as the default. If this setting occurs, a check will appear next to the <Comm Port> menu item on the Main screen. The configuration file is named 'FASASettings.ini' and is found in a sub-folder under the application directory named 'Logs'.

To specify a serial port:
- Click <File>.
- Click <Comm Port>.
- Using you mouse, click the "radio" button of the communications port where the FAS-A is connected.
- Click <OK>. The selected port will now be used for all communications between the computer and the FAS-A.
- **Note:** You must select a communication port in order to proceed with the application. If you select a serial port that doesn't exist or is used by another device, you will receive errors.

To auto-detect an FAS-A:
- Click <File>.
- Click <Comm Port>. The Communication Port screen will appear.
- Click the <Auto Detect> button.
- The software will poll each of the available serial ports on your computer and find any FAS-A that is connected to the computer. If an FAS-A is found, the user will receive a message indicating 'FAS-A found on serial port X'. At the same time the radio button of the communication port where the FAS-A was found will be clicked.
- Click <OK> to set the communication port and return to the Main screen.
- **Note:** If an FAS-A is not found on any of the computer's available serial ports, the user will receive a message indicating 'FAS-A not found on serial ports 1-4'. If this occurs, a hardware problem exists either with the computer or the FAS-A.

To return to Main screen:
- Click <OK>.

<u>Configure</u>

<u>Main</u> > Tools > Configure

The Configure screen allows the user to read and write certain settings maintained in memory on-board the FAS-A. These settings include gains, offsets, filtering, manual tare and so forth. The settings are used to condition the FAS-A for particular situations and should only be changed after a thorough understanding of their effect on the device.

Note: See the *Using the Settings on the Configure Screen* section of this Help file for details of each setting.

To read settings:
- Click <File>.
- Click <Read>. The program will retrieve the settings from the on-board memory of the FAS-A and display them.
- **Note:** If a particular setting isn't initialized on-board the FAS-A, a message box will appear indicating an address hasn't been initialized. A default value for that address will be displayed.

To write settings:
- Enter a new value for a particular setting by typing the value in the scroll box or by scrolling the value up/down using the scroll box arrows.
- Click <File>.
- Click <Write>. You will be asked to confirm the Write.
- If you choose <Yes>, the new settings will be written to the on-board memory of the FAS-A. You will receive a confirming message. Click <OK> and the screen will return to the Read state.
- If you choose <No>, the new settings will NOT be written to the on-board memory of the FAS-A. You will receive a confirming message. Click <OK> and the screen will return to the Read state.

To show addresses:
- Click <Tools>.
- Click <Show Addresses>. The memory locations and internal offsets of the settings on-board the FAS-A will be displayed.

To show EEPROM:
- Click <Tools>.
- Click <EEPROM>. Follow the instructions for EEPROM screen given elsewhere in this Help file.

To see default values:
- Click <Tools>.
- Click <Default Values>. The default value for each of the settings on the configure screen will be displayed in the appropriate scroll box.
- **Note:** The settings are only being displayed, they are not being set. To set them, follow the 'to write settings' function described above. To return to the actual settings, follow the 'to read settings' function described above.

To return to Main screen:
- Click <File>.
- Click <Return>.

Display

Main > Display

The Display screen allows the user to display and save to file the data resulting from any of five sampling methods including 1) one angle, 2) two angles, 3) accelerometer bits, 4) one angle and bits and 5) two angles and bits.

To sample one angle:
- Click <Data>.
- Click <Sample One Angle>. Sampling will begin and the current angle will be displayed on the dial. If the <Save> function has been initiated, angular data will be saved to the selected data file.
- **Note:** To stop sampling, click <Sample One Angle> again and the sampling (and data saving) will end.

To sample two angles:
- Click <Data>.
- Click <Sample Two Angles>. Sampling will begin and the current angles will be displayed on the dials. If the <Save> function has been initiated, angular data will be saved to the selected data file.
- **Note:** To stop sampling, click <Sample Two Angles> again and the sampling (and data saving) will end.

To sample bits:
- Click <Data>.
- Click <Sample Bits>. Sampling will begin and the current accelerometer bits will be displayed on the gauges. If the <Save> function has been initiated, bits data will be saved to the selected data file.
- **Note:** To stop sampling, click <Sample Bits> again and the sampling (and data saving) will end.

To sample one angle and bits:
- Click <Data>.
- Click <Sample One Angle and Bits>. Sampling will begin. The current angle will be displayed on the dial and the current accelerometer bits will be displayed on the gauges. If the <Save> function has been initiated, angular and bits data will be saved to the selected data file.
- **Note:** To stop sampling, click <Sample One Angle and Bits> again and the sampling (and data saving) will end.

To sample two angles and bits:
- Click <Data>.
- Click <Sample Two Angles and Bits>. Sampling will begin. The current angles will be displayed on the dials and the current accelerometer bits will be displayed on the gauges. If the <Save> function has been initiated, angular and bits data will be saved to the selected data file.
- **Note:** To stop sampling, click <Sample Two Angles and Bits> again and the sampling (and data saving) will end.

To save data to a file:
- Click <Data>.
- Click <Save>.
- A "common dialog" box named Save As will appear.
- You may create a new name for the data file in the File Name textbox and select a file type in the Save As Type textbox or you may select an existing file as the data file. Click the Save button. The common dialog will disappear.
- A check will now appear to the left of the <Save> menu item indicating that a file is in place to receive data anytime sampling is active.

To stop saving data to a file:
- Click <File>.
- Click <Save>. The check to the left of the menu item will disappear indicating saving has stopped.

To tare the FAS-A:
Carefully read and follow the directions contained in the FAS-A Users Manual before you attempt to tare the FAS-A. The following instructions describe the steps you follow in the software only. **Note:** The tare function is available on only those sampling methods which contain angle(s). The tare 'box' appears after sampling has begun and disappears when sampling ends.

- Start sampling for an angle(s).
- The tare box appears with only the <No Tare> button enabled.
- Click <No Tare>. Any tare will be removed (zero'd). The 'zero' tare will be written to the FAS-A and remain in place during future sessions until otherwise changed.
- The <No Tare> button will disable and the <Tare> button will enable.
- Click <Tare>. The current angular offset from 'zero' will be captured. The new tare will be written to the FAS-A and remain in place during future sessions unless otherwise changed.

To return to Main screen:
- Click <Data>.
- Click <Return>.

EEPROM

Configure > Tools > EEPROM
Allows direct reading and writing of values in the FAS-A's on-board memory
(EEPROM).

**Note: This function writes the exact value selected. It does not provide for any
offsets.**

To read a value:
- Enter an EEPROM address in the Address scroll box. Refer to the FAS-A
  EEPROM Memory Map for particulars.
- Click <Read>.
- Value in address will appear in Value text box.

To write a value:
- Enter an EEPROM address in the Address scroll. Refer to the FAS-A EEPROM
  Memory Map for particulars.
- Enter a numeric value in the Value text box.
- Click <Write>.
- Value will be written to the selected address.

To exit EEPROM:
Click <OK>.

Main

First screen on program launch

The Main screen allows the user to navigate to all program functions including communication port selection, configuration, calibration, display modes and program exit.

To select a communications port:
- Click <File>.
- Click <Comm Port>. Follow the instructions for Communication Ports screen given elsewhere in this Help file.

To initialize connection:
- Click <File>.
- Click <Initialize Connection>. The application will establish communications with the FAS-A and retrieve certain settings from on-board the FAS-A including tares. If successful, a confirming message box will appear indicating 'FAS-A has been initialized'. A check will also appear to the left of the < Initialize Connection > menu item. If communications can't be established, a message box will appear indicating 'FAS has not been initialized. Check serial connection, power adapter, etc. for problem'.

To display a sampling mode:
- Click <Display>. Follow the instructions for Display screen given elsewhere in this Help file.

To calibrate:
- Click <Tools>.
- Click <Calibrate>. Follow the instructions for Calibrate screen given elsewhere in this Help file.

To configure:
- Click <Tools>.
- Click <Configure>. Follow the instructions for Configure screen given elsewhere in this Help file.

To set time save method:
- Click <Tools>.
- Click <Set Time Save>. Follow the instructions for Set Time Save Method screen given elsewhere in this Help file.

To exit the program:
- Click <File>.

- Click <Exit>. The program will terminate and communication between the FAS-A and the host computer will cease.

Set Time Save Method

Main > *Tools* > *Set Time Save*

The Set Time Save Method allows the user to save sampling data to file either with an 'elapsed seconds' format or a 'system time' format.

To set time save method:
- Click <Tools>.
- Click <Set Time Save>. The Set Time Save method screen will appear.
- Using your mouse, click the radio button for either the <Elapsed Seconds> option or the <System Time> option.
- Click <OK> to accept option and exit screen or click <Cancel> to exit screen without change to method.
- **Note:** Each time you make a selection on this screen, the choice is written to the 'FASASettings.ini' file and will become the default selection the next time the application is run.

Appendix

Using the Settings on the Configure Screen

Ax Offset   0-4096

The value in bits that the Ax sensor reads when 0 G is applied. This value generally does not need to be changed.

Ay Offset   0-4096

The value in bits that the Ay sensor reads when 0 G is applied. This value generally does not need to be changed.

Ax Gain   0-4096

The full scale swing in bits when the Ax sensor is moved throughout earth's field. This value generally does not need to be changed.

Ay Gain   0-4096

The full scale swing in bits when the Ay sensor is moved throughout earth's field. This value generally does not need to be changed.

Tare 360   0-360

Applied only in one angle mode, the Tare 360 value is an angular value that is subtracted from the absolute angle reading of the sensor. This allows the user to zero the sensor in any orientation relative to gravity.

Polarity   0-1

This is the direction of increasing angle as measured by the 360 degrees axis.

Filter   0-5

This is the level of averaging applied to the data by a weighted moving average low-pass filter.

A/D Average   0-15

The number of digital points averaged at each sample.

DAC   0-1

This value enables/disables the analog output. 1 is enabled, 0 is disabled.

Angle Mode   0-1

This value sets the device to one angle mode or two angles mode. 1 is one angle mode, 0 is two angles mode.

Tare Ax   -70 to +70

Applied only in two angles mode, the Ax Tare value is an angular value that is subtracted from the absolute Ax angle reading of the sensor. This allows the user to zero the sensor in any orientation relative to gravity.

Tare Ay   **-70 to +70**

Applied only in two angles mode, the Ay Tare value is an angular value that is subtracted from the absolute Ay angle reading of the sensor. This allows the user to zero the sensor in any orientation relative to gravity.