CAM622 Applications User Guide

Description

CambridgeIC's CAM622 IC inductively detects the position of a resonant target relative to a sensor. They are designed to be embedded inside a customer's electromechanical product, typically for motion control.

The CAM622 includes quadrature encoder interface outputs ("ABN"), which emulate those of an optical encoder. ABN signals are fully programmable, including the number of AB cycles per revolution and position of the N index pulse. Settings are programmed over a separate SPI interface, and can be stored in non-volatile memory for standalone operation.

To assist demonstration, evaluation and development, CambridgeIC provides hardware and software that works with a PC. A Streaming Adapter enables a PC to communicate with a CAM622 IC by converting between SPI and USB interfaces at high speed.

The CAM622 Read Position Application is for taking and analysing measurements over the CAM622's SPI interface. In use, the ABN interface is disabled.

The CAM622 Configuration Tool Application is for programming the ABN interface. Settings are transferred to the CAM622 over its SPI interface. The user can view the effects of these settings on the ABN interface separately, for example using an oscilloscope to view these signals. Settings can be written to non-volatile memory, so that the ABN interface runs autonomously with SPI disconnected.

CAM622 Read Position

- Performs all CAM622 communication over SPI
- Takes measurements at up to 33kHz
- Animates position measurements as rotary scale
- Plots position, velocity, linearity, diagnostic data
- Saves measurements to file

CAM622 Configuration Tool

- Allows user to fully configure ABN signals
- Writes configuration to CAM622 over SPI
- Volatile or non-volatile write options
- Reads and displays position and diagnostics (SPI)
- Reads and displays ABN state (SPI)
- Saves and loads settings to and from file
- While running, a user can observe the effect of ABN settings on the signals themselves, for example using an oscilloscope.

Firmware Update Tool

- Updates the CAM622's on-chip Application Code over SPI

System Requirements

- Windows 10 or 11 PC
- Available USB port

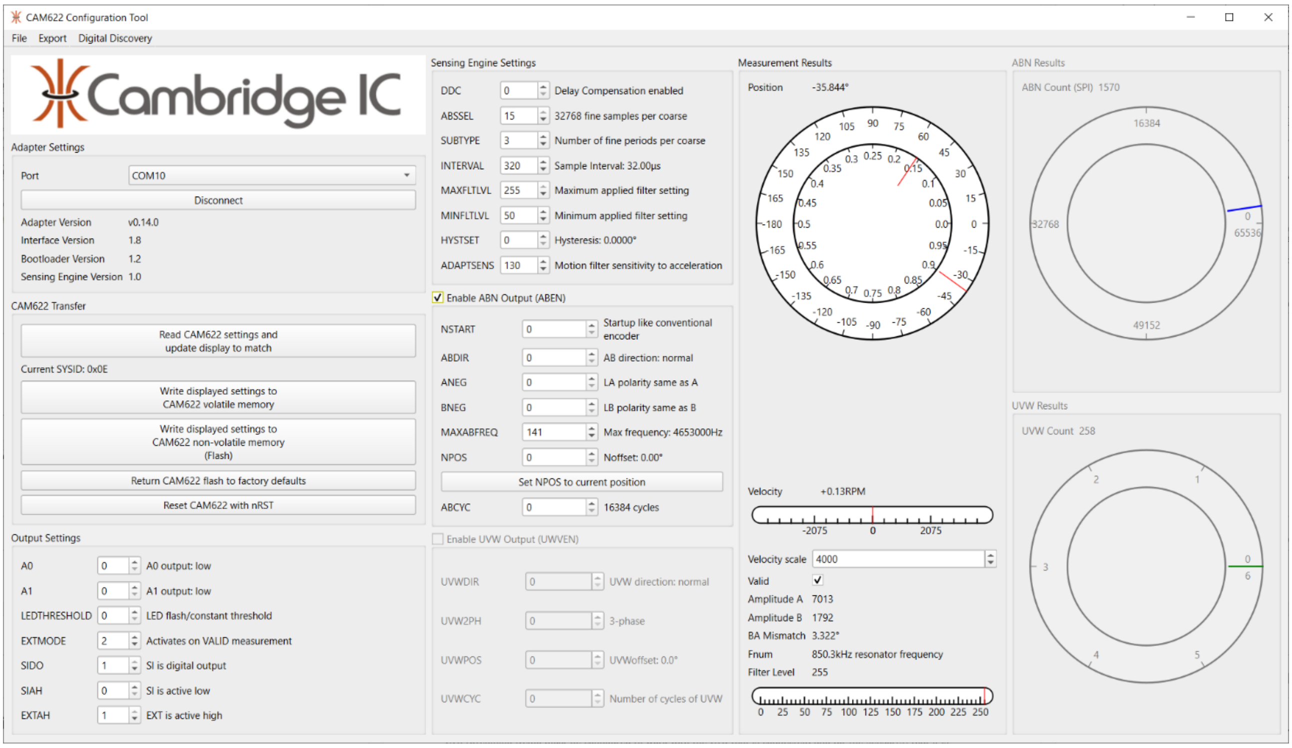

Figure 1 CAM622 Configuration Tool Main Window

1 Hardware Configuration

This section explains what hardware is required to run CAM622 applications.

1.1 Streaming Adapter

The CAM622 Read Position, CAM622 Configuration Tool and Firmware Update Tool applications require a Streaming Adapter to work. The Streaming Adapter communicates with the PC over USB, and with the CAM622 over SPI. It includes a processor that acts as a host device for the CTU. This processor configures the CTU and takes measurements in real time, streaming results to the PC over USB at high speed.

The processor's firmware can be updated from the PC. Please refer to its datasheet for how to do this.

1.2 Connections for CAM622 Configuration Tool

The CAM622 IC to be configured must have its SPI interface and the nRST line connected to a Streaming Adapter. The CAM622 must be powered, for example by the Streaming Adapter. These are the minimum requirements for writing configurations to the CAM622.

For most purposes it also makes sense to connect a sensor to the CAM622, so that the CAM622 can take measurements while running.

If a user wishes to view the effects of settings on the CAM622's ABN outputs then these should be connected to a suitable device for viewing and/or interpreting them, for example an oscilloscope.

Figure 2 illustrates typical hardware configuration for evaluation purposes. The parts shown in Figure 2 are all supplied as part of the CAM622 ABN Bundle, apart from the chosen Type B Sensor and Target.

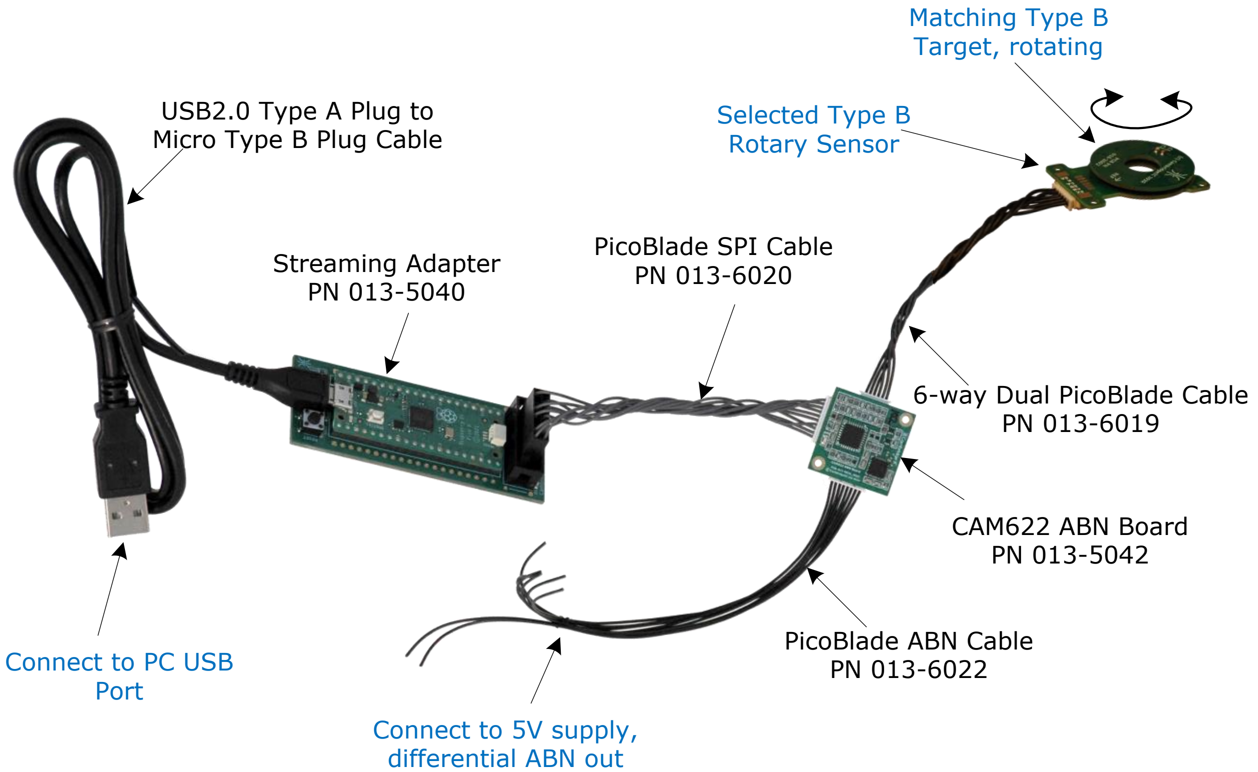

Figure 2 CAM622 ABN Board Connections for the CAM622 Configuration Tool

When connecting a CAM622 ABN Board to a Streaming Adapter with a PicoBlade SPI Cable like this, the Streaming Adapter supplies 3.3V power to the CAM622 directly. The CAM622 ABN Board's 5V to 3.3V regulator is disabled. The ABN signals and their inverses are generated by a line driver IC, and this is powered by the 5V input. Therefore in order to view ABN signals, 5V power must be connected, for example from a 5V power supply. Please see Table 1 for details of the PicoBlade ABN Cable's connections.

Table 1 PicoBlade ABN Cable Signals

Pin	Signal	Description	Cable Colour
1	5VIN	Supply voltage input (5V)	Red
2	0V	Ground, supply voltage return (0V)	Black
3	A	Quadrature A signal, positive	Brown
4	nA	Quadrature A signal, negative	White
5	B	Quadrature B signal, positive	Blue
6	nB	Quadrature B signal, negative	Green
7	N	Index pulse, positive	Orange
8	nN	Index pulse, negative	Yellow

Please refer to the CAM622 ABN Board's datasheets for more details of its design and interfaces.

1.3 Connections for CAM622 Read Position

The CAM622 Read Position Application communicates with the CAM622 over SPI alone. The ABN interface is not functional and its connections may be omitted.

Figure 3 illustrates the typical hardware configuration for evaluation purposes. This is the same as Figure 2 with the PicoBlade ABN Cable connection omitted.

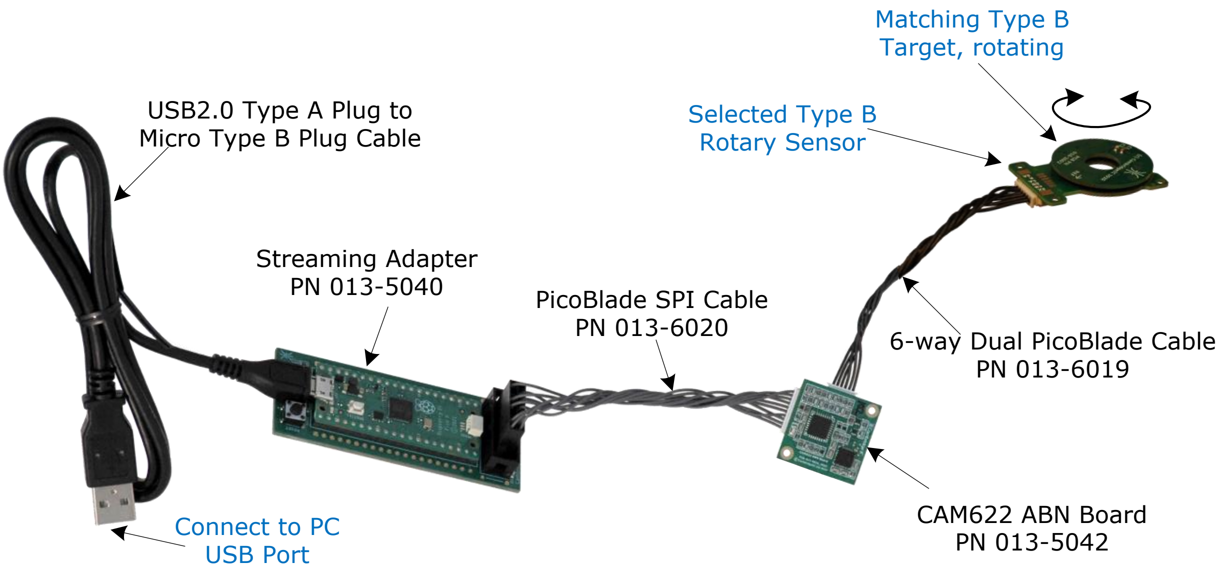

Figure 3 CAM622 ABN Board Connections for CAM622 Read Position

2 Download and Installation

2.1 Downloading from Web Site

The CAM622 Applications are available as a download from CambridgeIC's web site. They are only visible once a user is logged in – visit the CambridgeIC login page.

To obtain a login, please visit https://www.cambridgeic.com/register. Select a user name and password and submit. An email will be sent to the address provided. Please check spam folders. If it does not arrive in a few minutes then please email info@cambridgeic.com and request a manual activation.

Once logged in, applications are available as a download from https://www.cambridgeic.com/products/dev-tools/streaming-adapter.

Download and save the zip file to the target PC. Extract its contents to a local drive on the PC.

2.2 Connecting the Streaming Adapter to the PC

The Streaming Adapter should install automatically when connected to a Windows PC over USB for the first time. It appears as a COM Port. CAM622 applications should automatically detect which COM Port to use.

If it is necessary to check that the Streaming Adapter has installed correctly then please refer to its datasheet for detailed instructions.

2.3 Installation

No installation is required – just launch the executable file to run.

3 CAM622 Read Position

The CAM622 Read Position application configures the CAM622 for taking measurements, captures measurements at high speed and displays results and analysis. Its main window is illustrated in Figure 4.

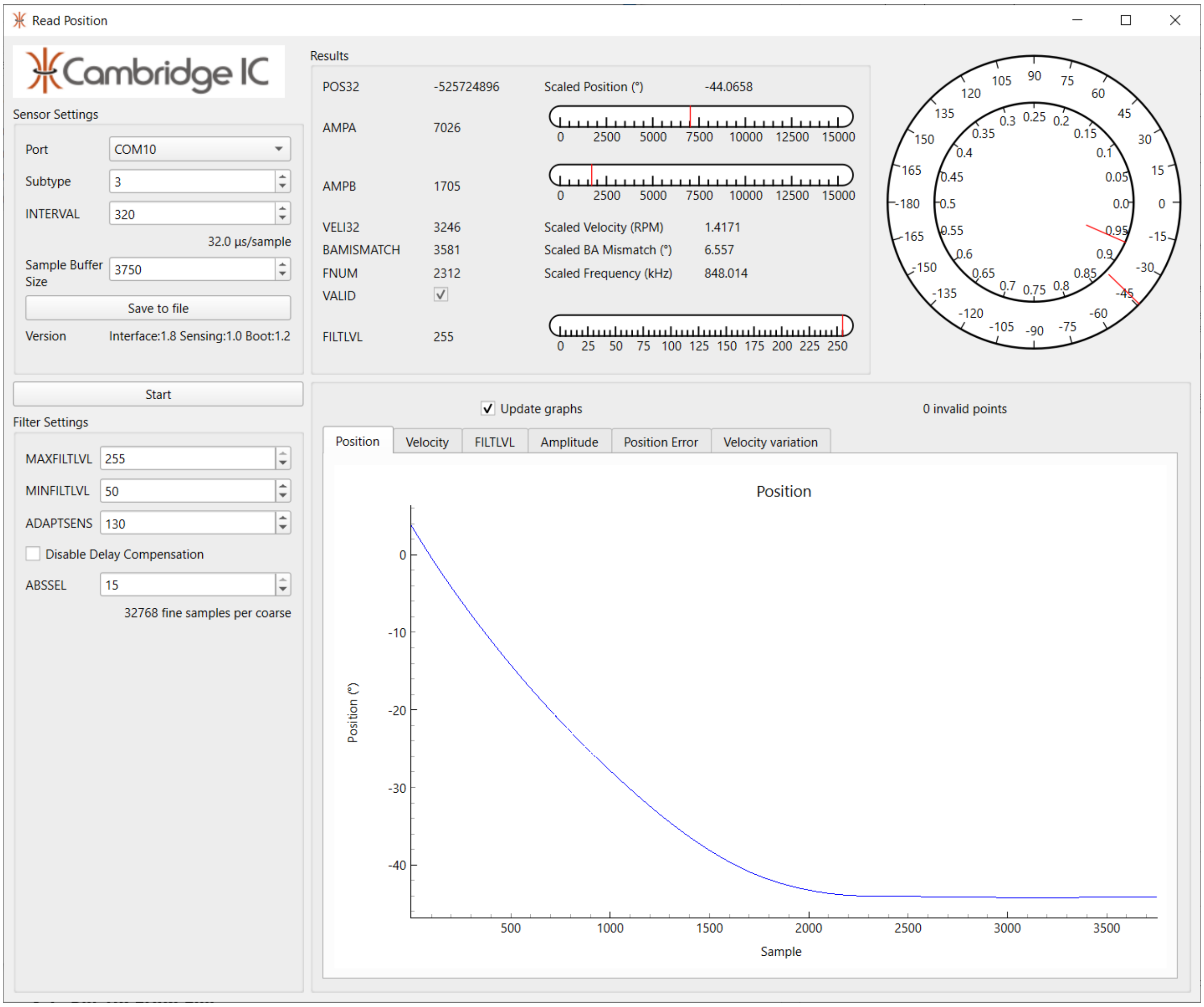

Figure 4 CAM622 Read Position Main Window

3.1 Connecting to a Streaming Adapter

When a Streaming Adapter is plugged into the PC, it should appear as a virtual COM port. CAM622 Read Position should detect this automatically and display the COM port, as illustrated in Figure 5.

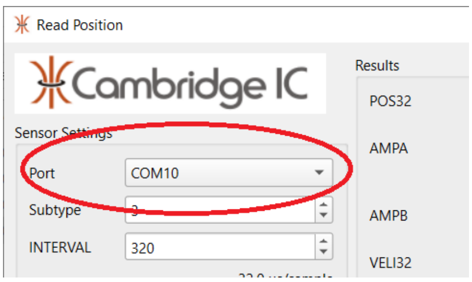

Figure 5 COM Port Display

If the COM Port display is blank, this means CAM622 Read Position has not detected the Streaming Adapter. It may not be connected properly, or a Streaming Adapter firmware update may have failed. Please refer to its datasheet for more assistance with fault finding.

3.2 Setting Subtype

The Subtype control MUST be set to match the sensor's Subtype. Its location is shown in Figure 6. The Subtype is the number of fine COS/SIN periods per coarse COS/SIN period. For a rotary sensor this corresponds to the number of fine COS/SIN periods around a circle. A Type B sensor's name includes its subtype after "B". For example a 25mm B3 Rotary Sensor has Subtype=3.

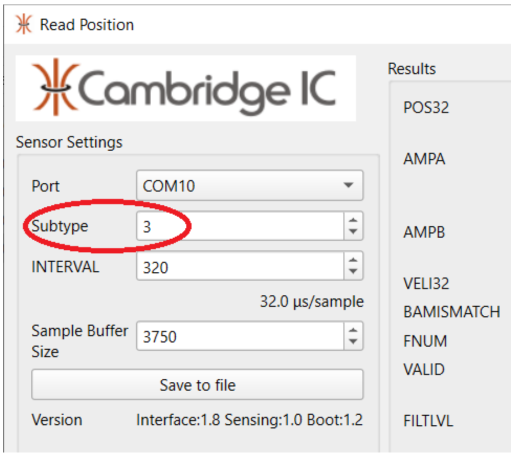

Figure 6 Setting Subtype

If Subtype is not set correctly, the reported position will always be wrong, and its value may jump erratically even when the target is stationary or moving slowly.

3.3 Basic Measurements

Click "Start" to begin taking measurements, located as shown in Figure 7.

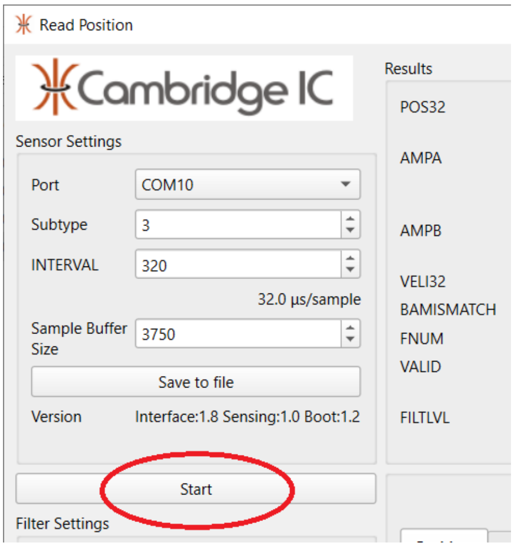

Figure 7 Starting measurements

The CAM622 will start taking regular measurements. The status of those measurements, whether VALID or not, is displayed as shown in Figure 8. Measurements must be VALID (tick in box as shown) for the CAM622 to report position and other data.

If the CAM622 does not report VALID when taking measurements, check connections to the sensor, and check the target is present and in range.

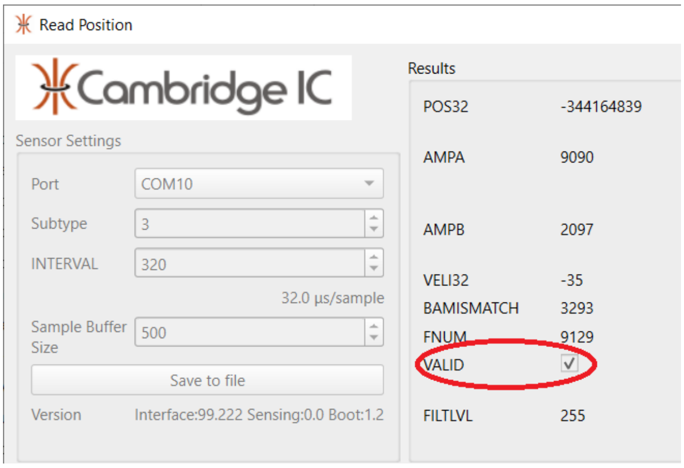

Figure 8 VALID display

If VALID, the position dial to the top right of the main window and illustrated in Figure 9 should follow the position of the target relative to the sensor. The outer dial indicates absolute position across 360°. The inner dial rotates once for every 1° of angle change. It is useful for observing small changes in position, including position noise.

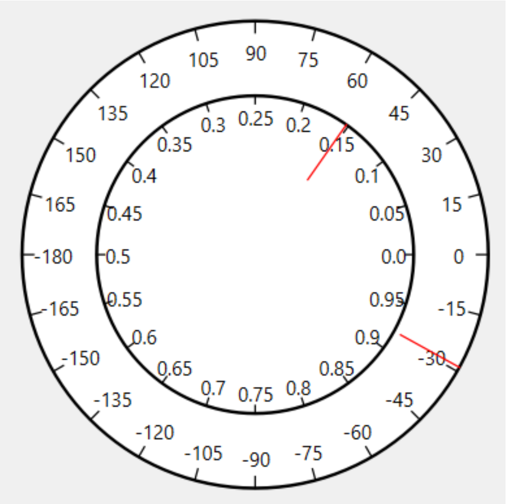

Figure 9 Dial indicator for position

INTERVAL sets the CAM622's measurement interval, in multiples of 0.1µs. The default is 320, corresponding to 32.0µs. The minimum value is 300 (30.0µs). Depending on a PC's speed and the behaviour of its USB port, operation at this minimum value is not always reliable, and the PC may not capture all results in this case. The default value of 320 is recommended for most applications.

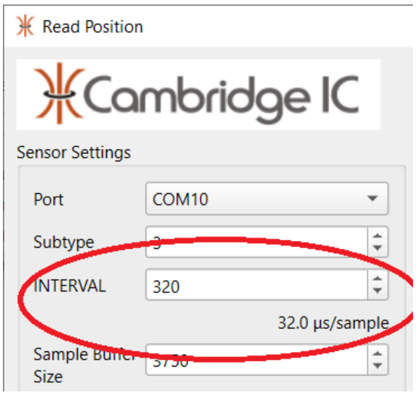

Figure 10 INTERVAL setting

3.4 Measurement Results Detail

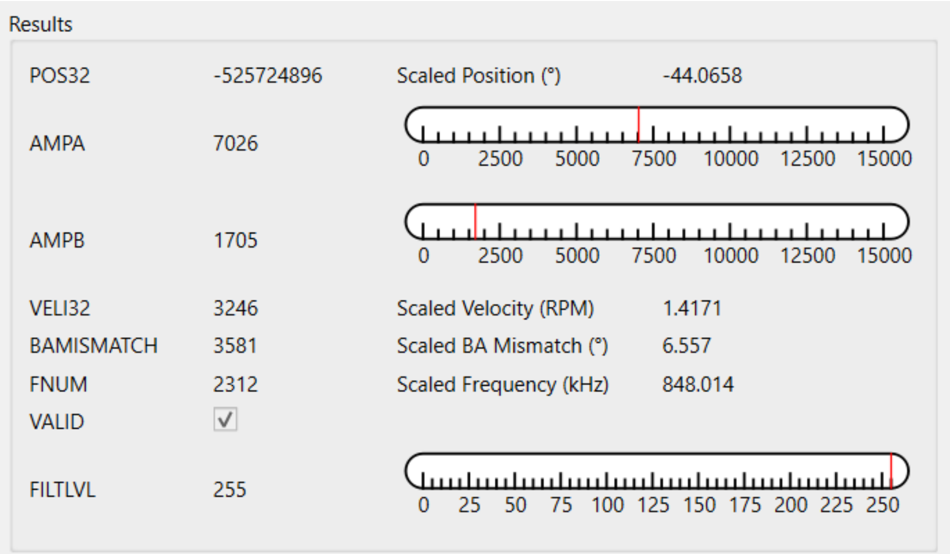

Figure 11 Raw results and their interpretation

The top middle of the results window is illustrated in Figure 11, and shows measurement results in detail. The first column is the name of the CAM622 results register. The second column is the raw data collected from the CAM622. The third column is interpreted results, in physical units where appropriate.

AmplitudeA is a measure of signal strength measured from the fine COS/SIN sensor coils. It decreases as the gap between sensor and target increases, and with nearby metal. The recommended minimum for design purposes is 3000, while greater values are preferred for higher resolution. AmplitudeB is a measure of signal strength measured from the coarse COS/SIN sensor coils, and is typically 3 to 6 times smaller. AmplitudeB (and BA Mismatch) is updated less frequently than AmplitudeA, under the control of ABSSEL, see section 3.7.

VELI32 is measured velocity, as measured by the CAM622's Motion Filter. Note that it is not calculated from the difference in successive position measurements. It is filtered somewhat more than position readings. It is a signed value.

BA Mismatch is the difference in position reading between the fine and coarse sensor coils. It is a signed value and its nominal value should be close to zero. Small departures caused by errors mainly from the coarse coil are normal. Larger errors can be caused by misalignment or metal placed behind the sensor or target in a highly asymmetric way.

FNUM is a signed value approximately indicating the target resonator's frequency. A raw value of zero indicates the resonator frequency matches the CAM622's centre frequency, nominally 833.3kHz. Resonator frequency is an important measure of signal health. Large departures from zero (scaled frequency far from nominal) can be caused by incorrect resonator tuning and/or metal nearby.

FILTLVL is the current filter level for the CAM622's Motion Filter. Higher values indicate a greater amount of filtering. When adaptive filtering is being used, the reported FILTLVL value will normally be between MINFILTLVL and MAXFILTLVL. It will vary with acceleration, and is reported to allow the behaviour of the Motion Filter to be monitored.

For more details of how measurement results are reported and the significance of the diagnostic data that is reported, please refer to the CAM622 datasheet and to the Type B Sensor Reference Manual.

3.5 Viewing and Adjusting Position Graph

The CAM622 Read Position application plots position by default. Figure 12 illustrates the plot area during measurements, for the case of a stationary target. Graphs will update continuously as long as "update graphs" is activated, see the highlighted control in Figure 12. Uncheck this box to freeze the current data, for example to examine it in detail.

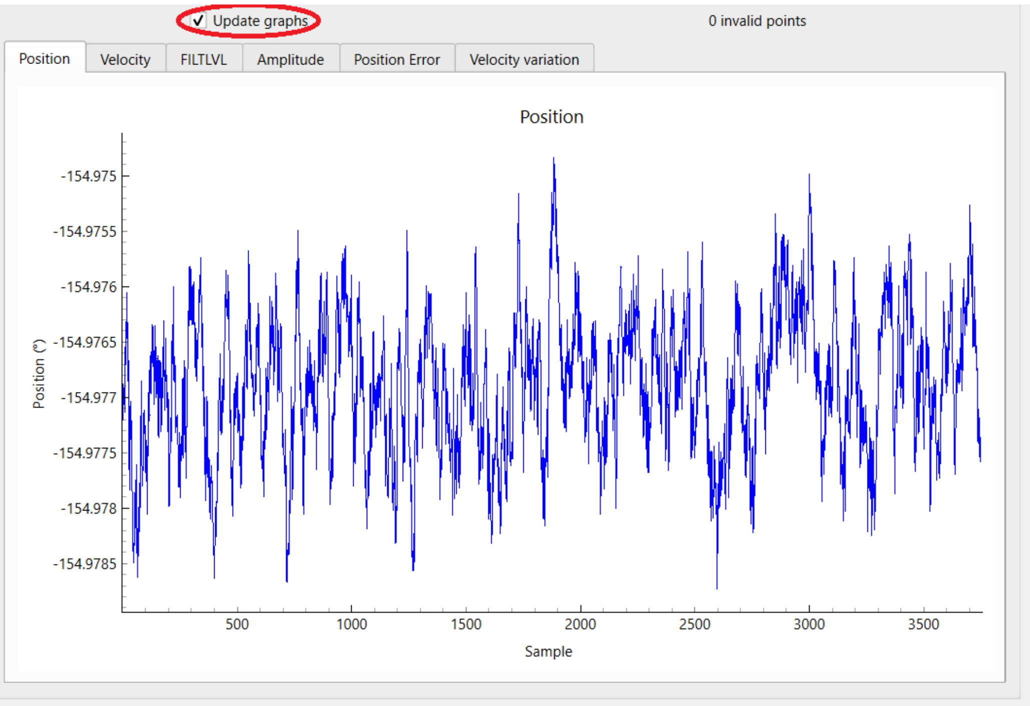

Figure 12 Position plot with static target, autoscaled

The graph's y-axis scaling may be changed using a mouse with a mouse wheel. Position the cursor over the graph and scroll to change scaling. Figure 13 illustrates the effect of scrolling out on Figure 12.

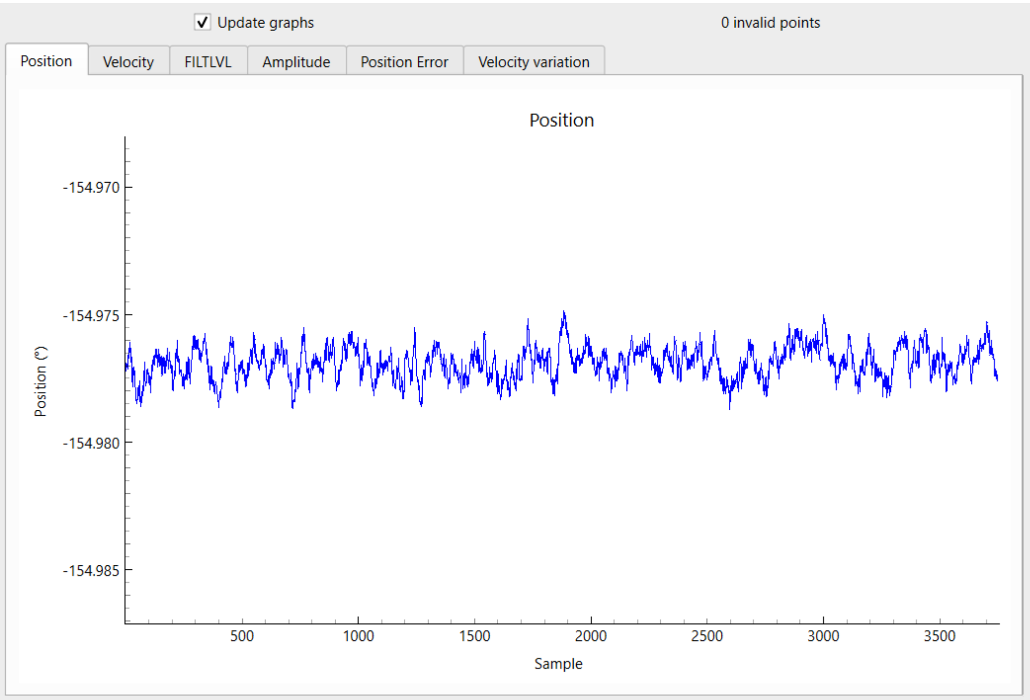

Figure 13 Position plot with static target, scaled

The graph axes may also be scaled manually, by right clicking a mouse over the graph area, selecting the relevant axis, then filling in the desired manual control over minimum and maximum axis values. This is illustrated in Figure 14.

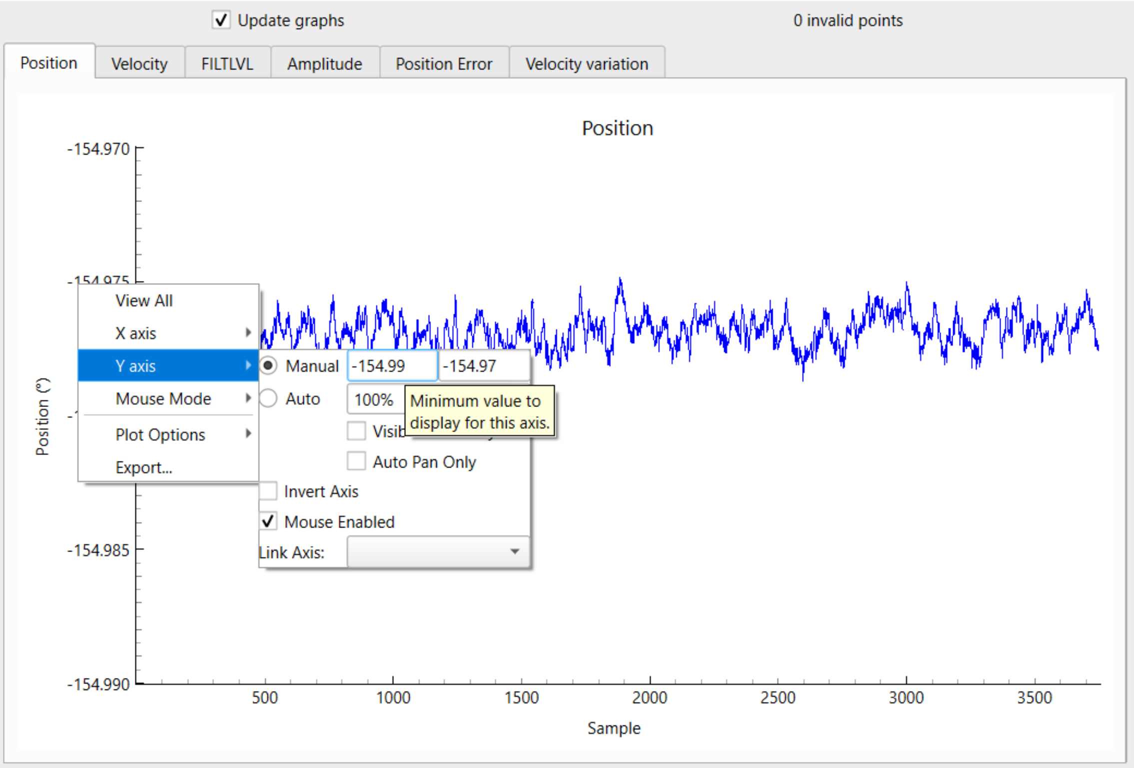

Figure 14 Position plot with static target, manual scaling

To revert to an autoscaled graph, click on the "A" symbol to the bottom left of the graph, highlighted in Figure 15. The "A" only appears when a mouse curor is nearby, so if it is not immediately visible move the cursor to the bottom left of the graph area.

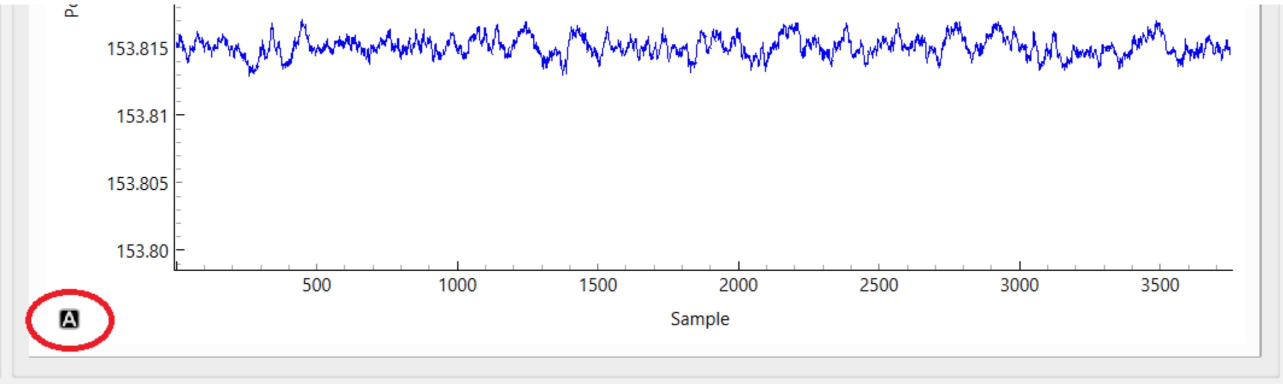

Figure 15 Graph autoscale control

The x-axis of the position graph is sample number. One sample corresponds to one measurement interval, 32.0μs by default. In this case the number of samples collected ("sample buffer size") is 3750, which corresponds to 0.12 seconds of capture.

Note that successive graphs do not necessarily include contiguous data. There may be "missing" data from one graph to the next.

Breaks in a graph's plot line represent either invalid points or points missing due to the PC's USB port being unable to keep up with the data rate. In the latter case, increase the INERVAL value to resolve this issue.

3.6 Graphs with Rotating Target

This section illustrates how to use graphs to plot position and position error using a target rotating at constant speed. Figure 16 illustrates the position graph when the target is rotated at approximately 4000rpm in the negative direction.

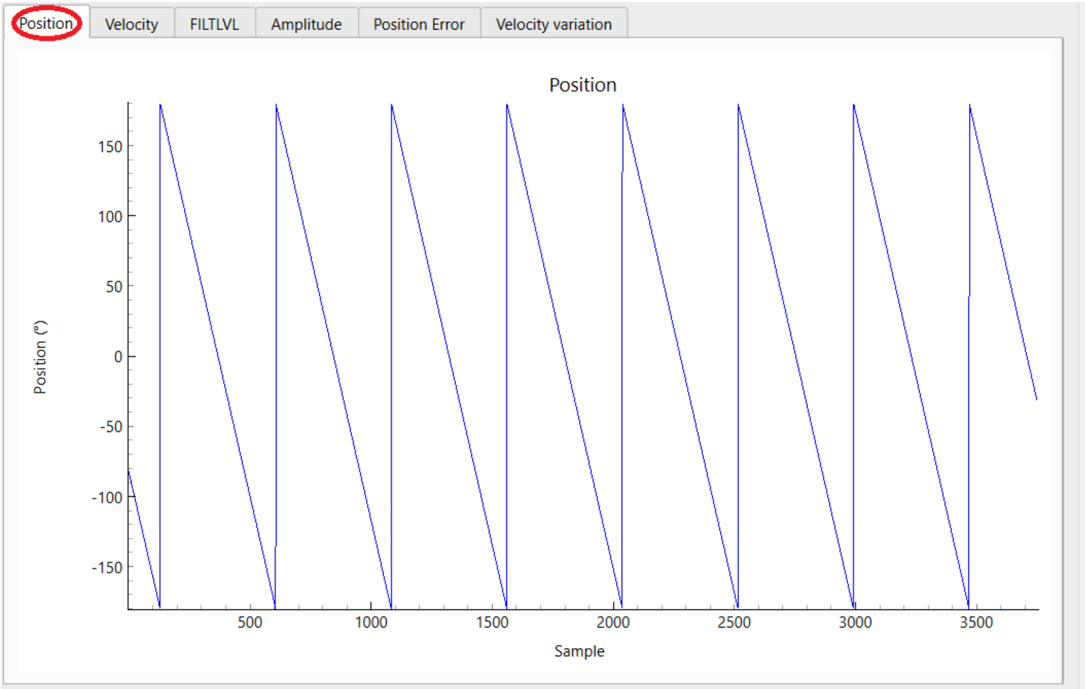

Figure 16 Position graph with target rotating at 4000rpm.

The position value is interpreted as a signed value, hence in the range -180° to +180°.

It is possible to analyse the linearity error of the sensing system by assuming that the target is rotating at constant speed. Click on the "Position Error" tab to view a plot of linearity error against position.

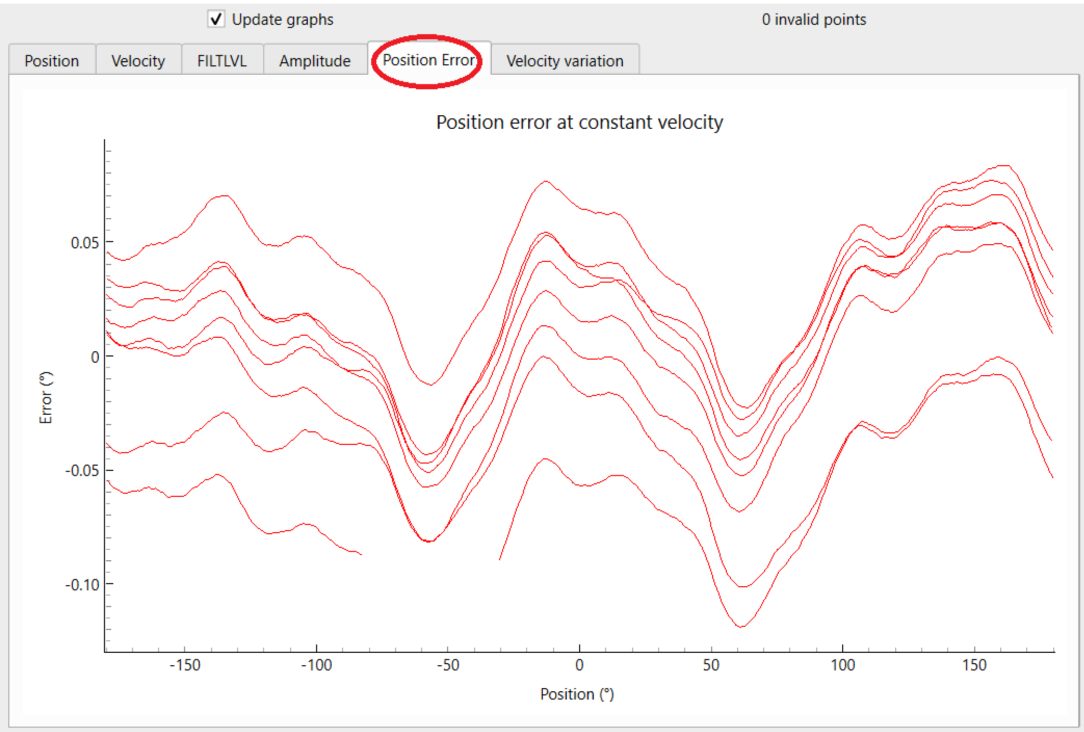

Figure 17 Position Error, overlay of multiple rotations

Note that when Position Error is displayed, the x-axis is now in units of position in degrees. Figure 17 illustrates the Position Error graph corresponding to the position plot of Figure 16. Note how Position Error includes data from multiple rotations of the target, each at a slightly different offset in the y-direction.

When the plots do not overlay, as illustrated here, it is because the rotation speed is not quite constant. To view a clearer position error plot, reduce the sample buffer size as highlighted in Figure 18.

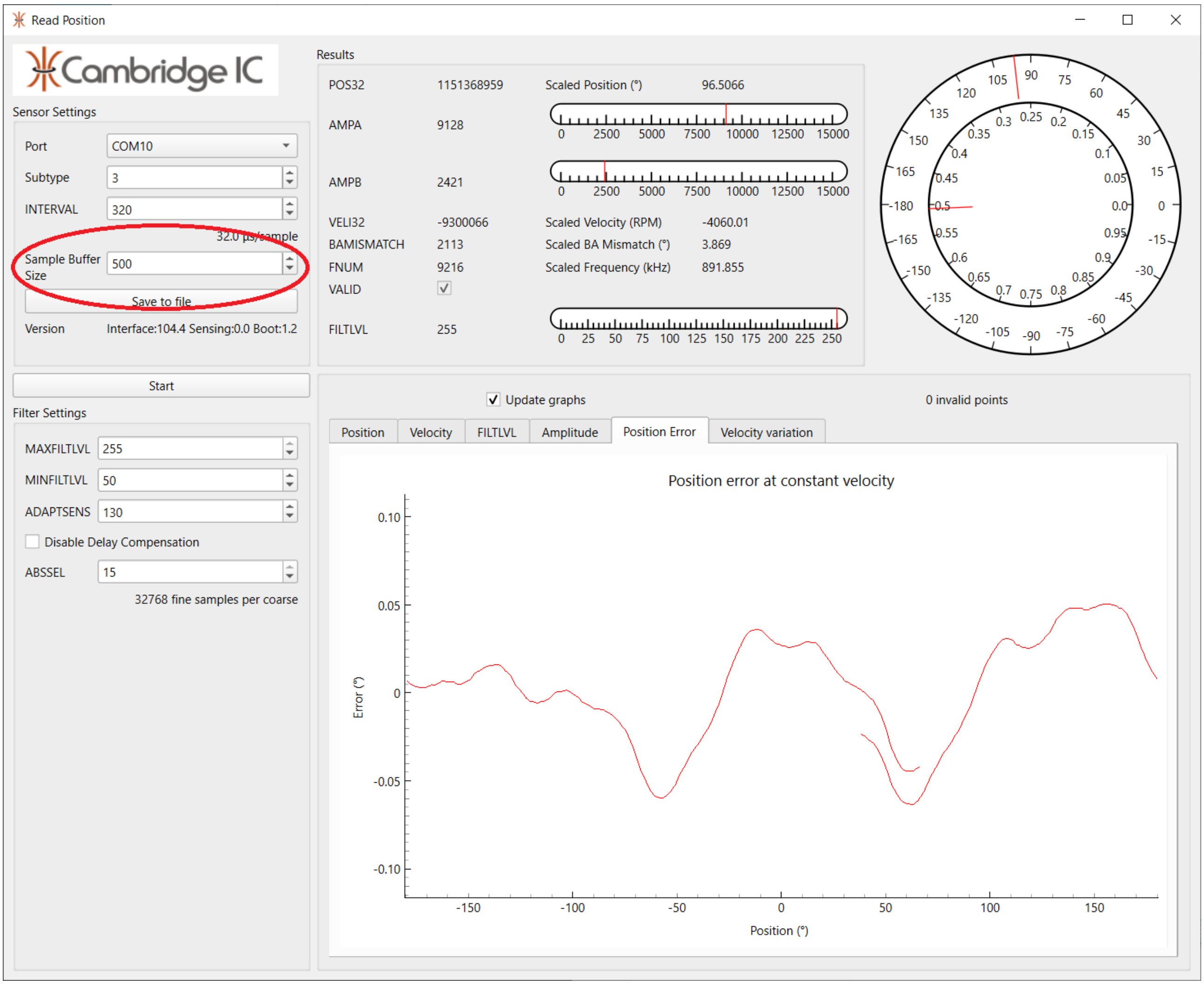

Figure 18 Reducing sample buffer size for clearer position error plot

This can yield a clear position error plot. There is a break in the line between about 40° and 70° above, but this is a relatively insignificant artefact.

Click on the "Velovity" tab to view a plot of velocity measurement against sample number. Figure 19 illustrates a velocity plot with the target spinning at approximately 4000rpm in the reverse direction, scaled to include y=0.

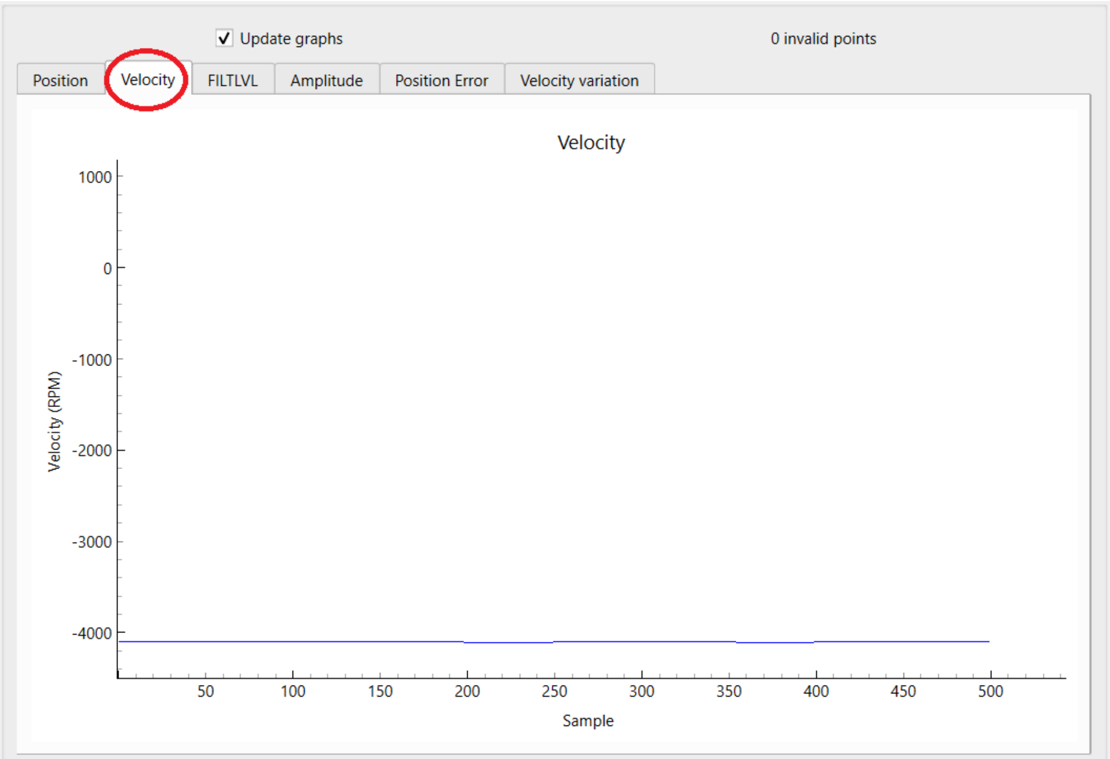

Figure 19 Velocity graph

Figure 20 illustrates the contents of the Velocity Variation graph for the same rotational speed. The y-axis is now in units of % and the x-axis is in degrees (assuming actual velocity is constant). This plot of percentage variation in velocity from average is equivalent to the sensor's differential non-linearity.

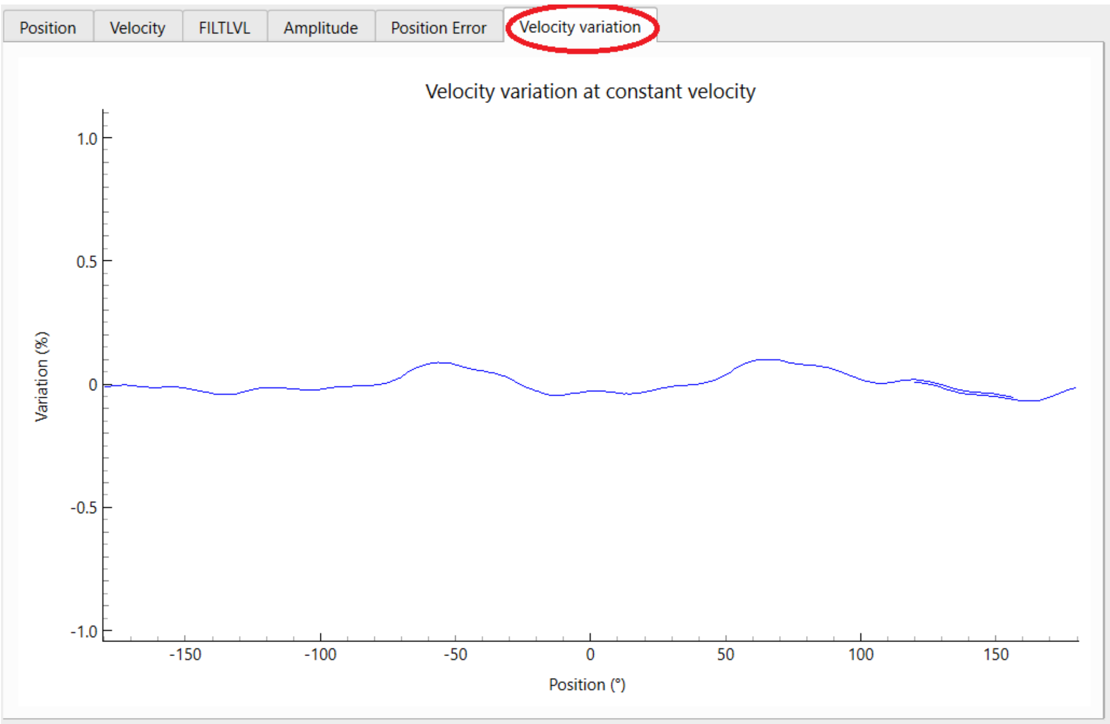

Figure 20 Velocity variation graph

Figure 21 shows how the Motion Filter's FILTLVL value varies with angle for the same speed rotation. Note how FILTLVL is generally 255 (=MAXFILTLVL), but sometimes dips slightly in response to apparent acceleration. In this case there is no actual acceleration. Instead, the Motion Filter is responding to peaks of linearity error as if they were acceleration. In most applications this behaviour is acceptable because it only occurs with a fast moving target, but the Motion Filter's parameters can be adjusted to avoid it, see section 3.7.

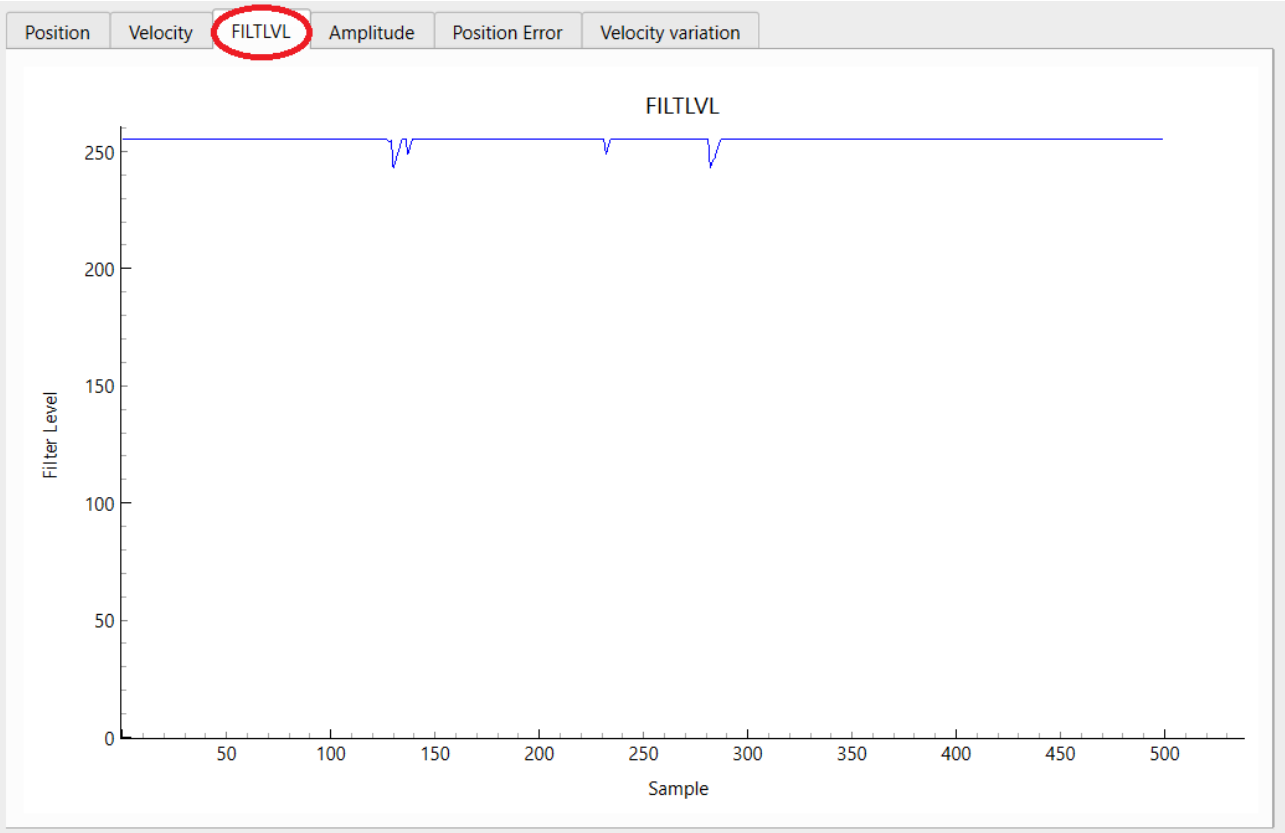

Figure 21 FILTLVL graph

Figure 22 shows the Amplitude (AmplitudeA) graph in the case of a rotating target with good alignment between target rotation axis and sensor axis. Figure 23 shows a similar situation except with target rotation axis misaligned by 1mm. Note how Amplitude varies with angle in the case of Figure 23. This variation is a sign of misalignment. Note that there is a high-frequency "sawtooth" variation in Amplitude which can be ignored.

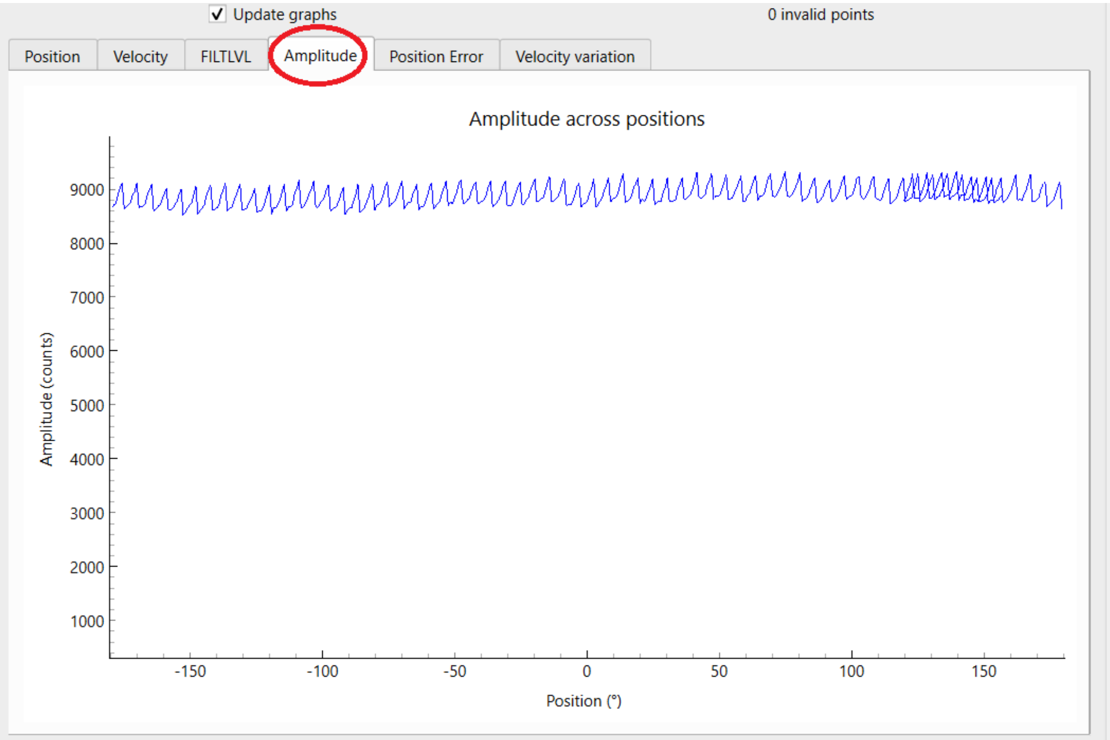

Figure 22 Amplitude plot, aligned

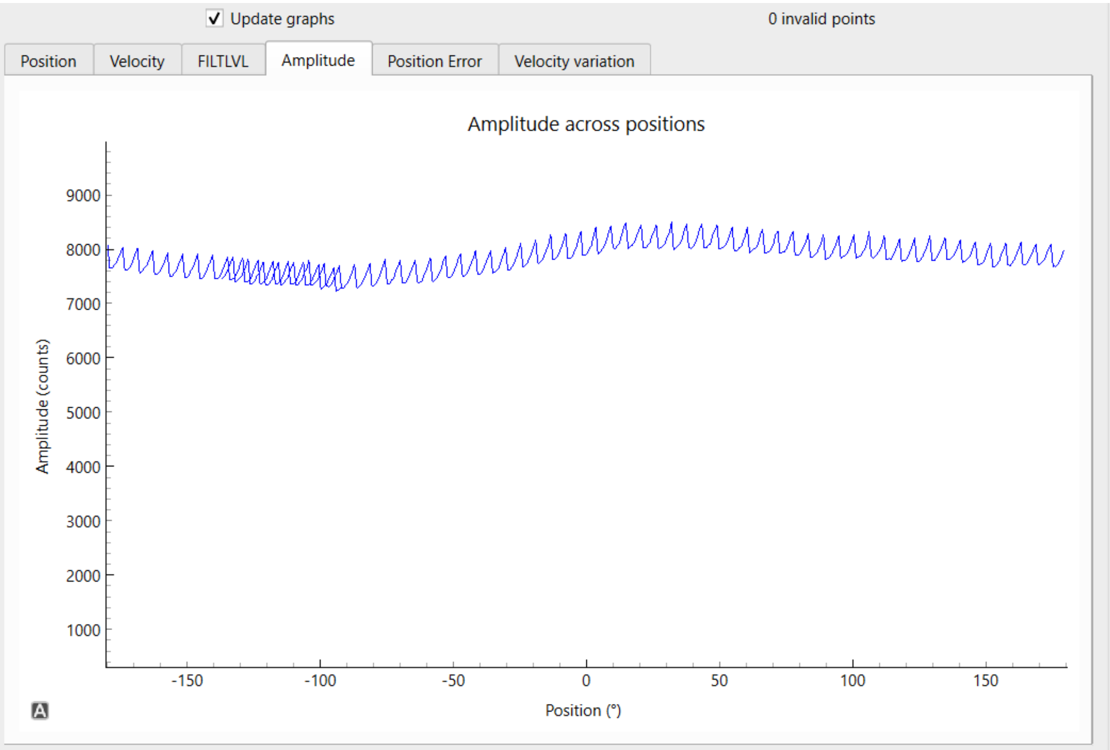

Figure 23 Amplitude plot, misaligned 1mm

3.7 Configuring Motion Filter Settings and ABSSEL

The CAM622 includes a motion filter which reduces reported noise at the expense of a small delay in response to velocity changes. Its parameters may be adjusted to best suit the application. Figure 24 illustrates filter controls set to their default values.

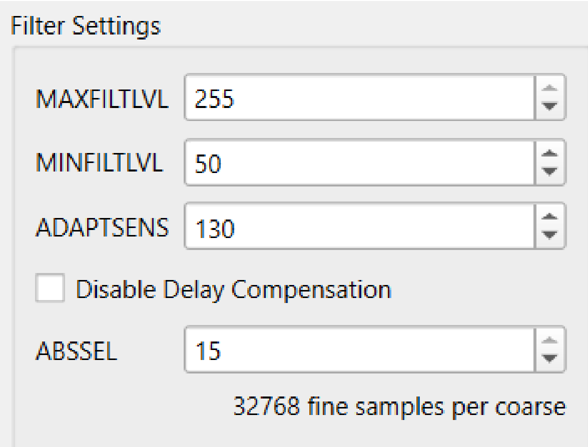

Figure 24 Motion Filter and ABSSEL settings

These default values are suitable for almost all applications. They apply maximum filtering when no acceleration is detected (MAXFILTLVL=255). When acceleration is detected the amount of filtering is reduced (down to a minimum of MINFILTLVL=50). ADAPTSENS sets how sensitive the Motion Filter is to acceleration. Since acceleration and noise are generally impossible to distinguish, a larger value of ADAPTSENS (more sensitivity to acceleration) will tend to make the system more sensitive to noise too, and this may cause unwanted reductions in filtering in systems with high noise. Please refer to the CAM622's datasheet for details of the Motion Filter and its settings.

The Motion Filter includes compensation for delays in the measurement path, so that the apparent delay between actual and reported position is nominally zero. Check the box next to its control to disable this feature.

To disable the Motion Filter completely to view raw measurement data, select Disable Delay Compensation and set MAXFILTLVL=MINFILTLVL=0. To return a value to default, hover over the control, right click and select "Return to default".

The ABSSEL control sets how often a coarse measurement occurs. By default its value is 15, corresponding to 32768 fine measurements in between every coarse. Please refer to the CAM622's datasheet for details.

3.8 Saving Measurement Results

To save the most recent sample buffer's results to file, click "Stop" to stop measurements then click "Save to file". The most recent set of measurement data is saved in a file "sample_data.csv" in the application's directory location. Each row in the data corresponds to one measurement in the measurement buffer. The first column is for diagnostic purposes, and is usually 0. Each subsequent column is raw data collected from the CAM622's registers, starting from CTRL and ending in CRC, in order. The final two columns are position in degrees and velocity in rpm, based on the raw values.

4 CAM622 Configuration Tool

The CAM622 Configuration Tool is for configuring the CAM622's digital quadrature ABN outputs, which emulate the outputs of an optical encoder. Its main window is shown in Figure 1. Please refer to section 1.2 for how to connect hardware. Figure 2 illustrates connections to a CAM622 ABN Board.

4.1 Starting and Initial Configuration

Launch the CAM622 Configuration Tool executable to get started. When a Streaming Adapter is plugged into the PC, it should appear as a virtual COM port. The CAM622 Configuration Tool should detect this automatically and display the COM port. Click "Connect" as highlighted in Figure 25.

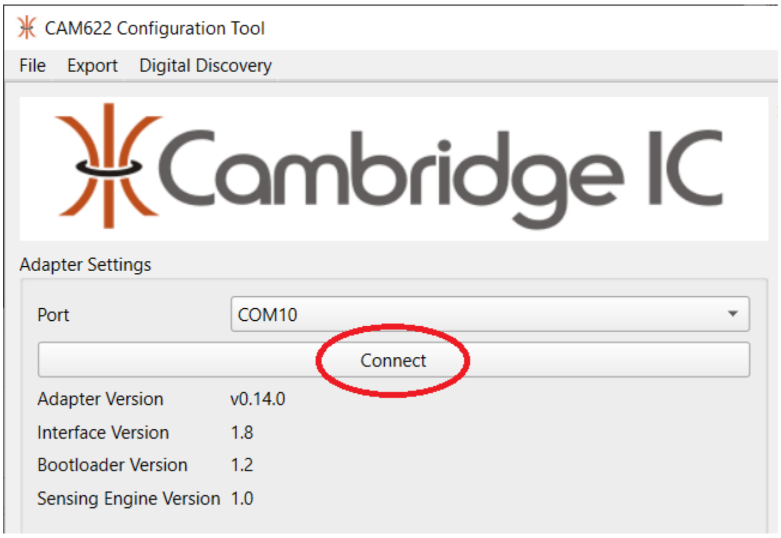

Figure 25 Connect control

The CAM622 Configuration Tool displays version numbers for the Streaming Adapter and CAM622.

The Subtype control MUST be set to match the sensor's Subtype. Its location is shown in Figure 26. The Subtype is the number of fine COS/SIN periods per coarse COS/SIN period. For a rotary sensor this corresponds to the number of fine COS/SIN periods around a circle. A Type B sensor's name includes its subtype after "B". For example a 25mm B3 Rotary Sensor has Subtype=3.

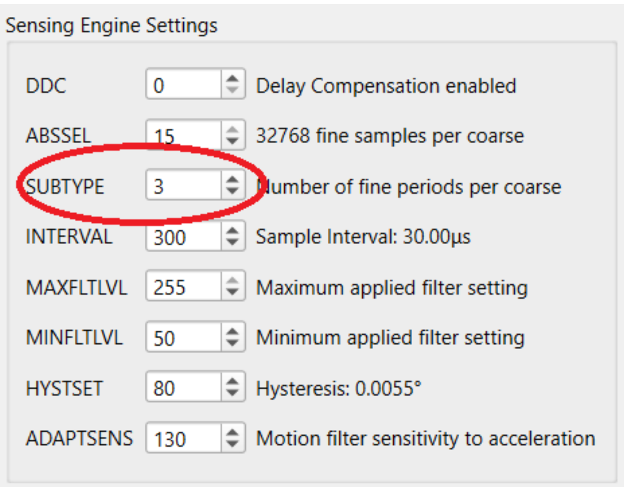

Figure 26 Subtype control

If Subtype is not set correctly, the reported position will always be wrong, and its value may jump erratically even when the target is stationary or moving slowly.

Changes made to controls including Subtype will be highlighted in yellow when they differ from the current CAM622 register settings. The CAM622 Transfer Controls are illustrated in Figure 27. They control the transfer of data between the application window and CAM622.

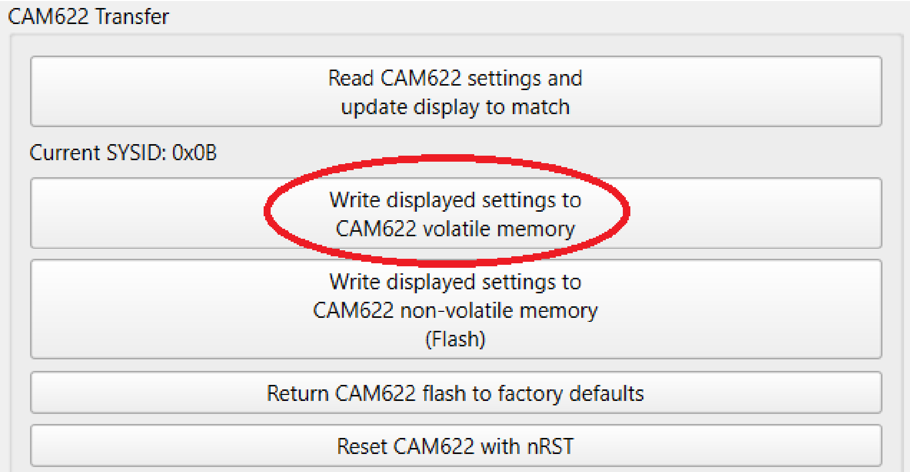

Figure 27 "Write displayed settings to CAM622 volatile memory"

Click on the highlighted control "Write displayed settings to CAM622 volatile memory". This transfers the current settings to the CAM622, including the Subtype setting. Controls previously highlighted in yellow should no longer be highlighted because they now match the CAM622 register settings.

The CAM622 Configuration Tool reads the CAM622's results registers while connected. To keep SPI activity to a minimum, so as not to interfere with ABN synthesis, results are only captured occasionally. Captured results include position. The Measurements Results indicator shown in Figure 28 should now reflect the position of the target. The outer pointer indicates absolute position across 360°. The inner dial rotates once for every 1° of angle change. It is useful for observing small changes in position, including position noise.

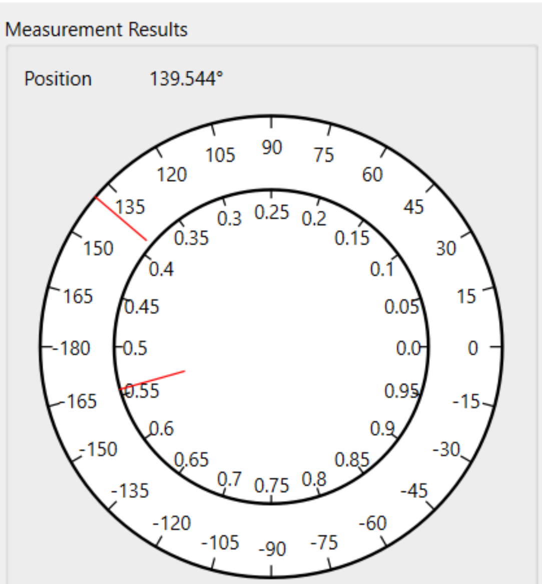

Figure 28 Measurement Results dial display

The CAM622 Configuration Tool reads diagnostic results in addition to position, and displays them below as shown in Figure 29. This diagnostic data is the same as reported by the Read Position application, and is described in section 3.4.

Note that the velocity display records velocity measured over SPI, which is the Motion Filter's estimate of velocity.

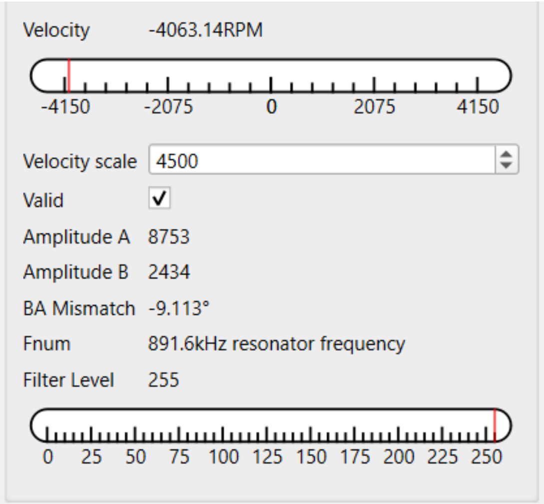

Figure 29 Disgnostic data display

4.2 Sensing Engine Settings

The CAM622 Configuration Tool includes a group of settings that control the CAM622's Sensing Engine, illustrated in Figure 30. Please refer to section 4.1 for how to set Subtype. For ABN synthesis, INTERVAL MUST be set to 300 (30.0µs measurement interval). For simplicity, other controls may be left at the default values shown in Figure 30.

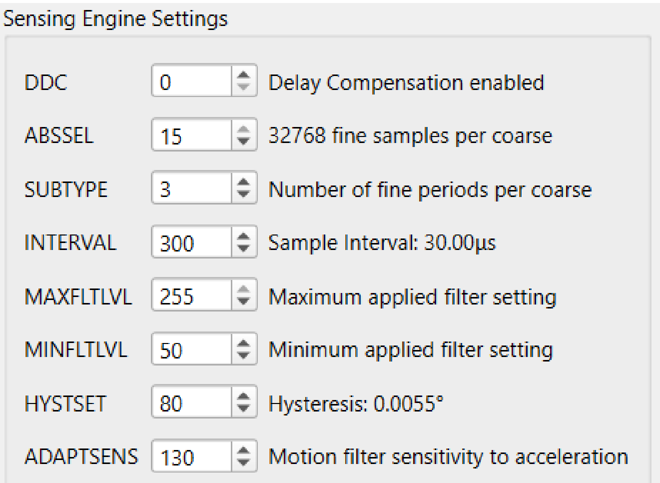

Figure 30 Sensing Engine Settings

The effects of DDC, MAXFILTLVL, MINFILTLVL and ADAPTSENS are described in 3.7, and in more detail in the CAM622 datasheet.

HYSTSET controls the amount of hysteresis deliberately added to position data to reduce noise in the ABN signals, if required. Set this to 0 for zero hysteresis. Please refer to the CAM622 datasheet for more details on hysteresis, including the relationship between HYSTSET and the actual amount of hysteresis added. A value of 80 corresponding to 0.0055° of hysteresis is typically appropriate, corresponding to 1 bit of hysteresis when outputting ABN at 16 bit resolution.

Having made changes to Sensing Engine settings, click on "Write displayed settings to CAM622 volatile memory" to update the CAM622 with the chosen values.

4.3 Output Settings

Figure 31 shows the CAM622 Configuration Tool's output settings. The entries shown in Figure 31 are recommended for getting started, when connected to a CAM622 ABN Board.

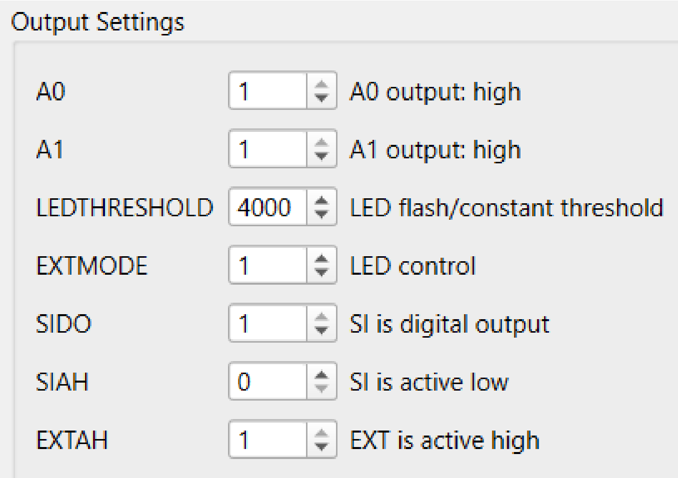

Figure 31 Output Settings controls

In the CAM622 ABN Board, the A0 output of the CAM622 controls whether the line driver is differential or single ended. It should be set to 1 for normal (differential) operation.

In the CAM622 ABN Board, the A1 output of the CAM622 controls whether the line driver is enabled. It should be set to 1 for normal (enabled) operation.

EXTMODE controls the behaviour of the CAM622's EXT output. In the CAM622 ABN Board, EXT directly drives an LED. The LED is active with EXT high, so EXTAH=1. EXTMODE controls the behaviour of EXT, with EXTMODE=1 recommended for driving an LED. In this case the LED lights continuously when the reported Amplitude (AmplitudeA) exceeds the LEDTHRESHOLD value. It flashes when the reported Amplitude is less than the LEDTHRESHOLD value, and is still VALID, as a warning of low signal level. It is off when the CAM622 reports not VALID. The ideal LEDTHRESHOLD value depends on the application and the connected sensor, and a value of 4000 is broadly appropriate for getting started.

SIDO and SIAH control the CAM622's SI Sample Indicator output.

Having made changes to Sensing Engine settings, click on "Write displayed settings to CAM622 volatile memory" to update the CAM622 with the chosen values.

4.4 ABN Settings

Figure 32 illustrates the controls for the ABN signals themselves. Click to activate "Enable ABN Output" to prepare for ABN synthesis. Note that this control is highlighted in yellow until settings are next transferred to the CAM622.

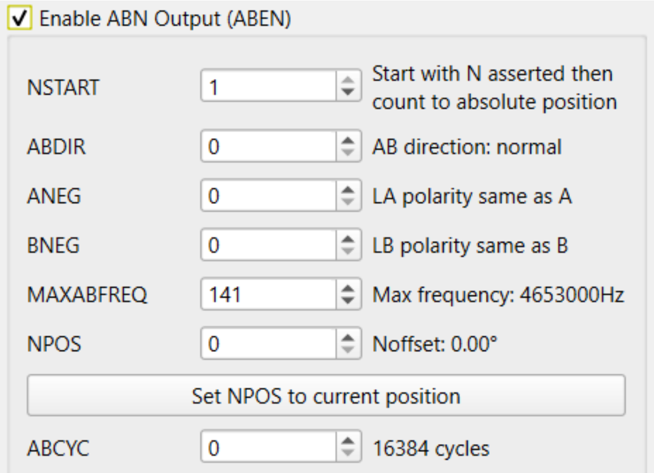

Figure 32 ABN Settings

NSTART controls whether the CAM622's ABN outputs behave like a traditional optical encoder when first started (NSTART=0) or whether the CAM622 starts counting from an N pulse to yield an absolute value after start-up (NSTART=1).

ABDIR controls the direction of the quadrature AB outputs.

ANEG and BNEG control the polarity of the A and B signals respectively, in particular their states when N is asserted.

MAXABFREQ sets the maximum toggle rate for the AB signals. By default (MAXABFREQ=141) the CAM622's maximum AB edge rate is 4.65MHz. This value can be reduced should a host have a lower limit for its maximum count frequency. Note that the value of MAXABFREQ controls the maximum rotation speed of the target. For example the maximum speed is 4170rpm with MAXABFREQ set to its maximum value of 141 and with ABCYC=0 (65536 edges per revolution).

NPOS controls the position of the index ("N") pulse. It is a 16-bit integer value representing 360° of rotation. Enter a desired value of NPOS, or click "Set NPOS to current position" to set the index pulse to the target's current position.

ABCYC controls the number of AB cycles per revolution, with a value of 0 corresponding to 16384 cycles, which is 65536 edges per revolution and hence "16 bit".

For more details on these settings please refer to the CAM622 datasheet.

Having made changes to Sensing Engine settings, click on "Write displayed settings to CAM622 volatile memory" to update the CAM622 with the chosen values. Alternatively, to write current settings to non-volatile memory for subsequent autonomous operation, click on "Write displayed settings to CAM622 non-volatile memory" highlighted in Figure 33.

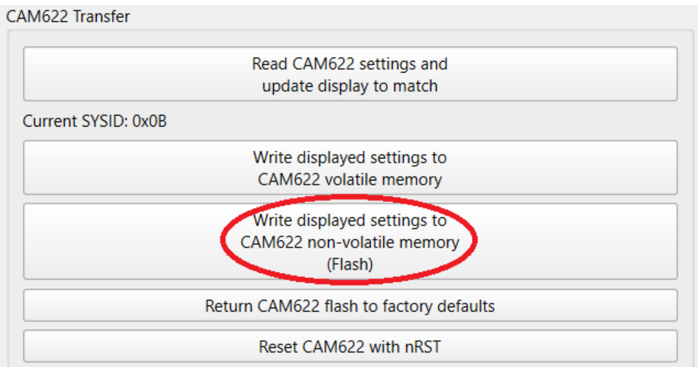

Figure 33 "Write displayed settings to CAM622 non-volatile memory"

The CAM622 should now be generating ABN signals. When a system is connected as shown in Figure 2, ABN signals and their inverses are available from the PicoBlade ABN connector. 5V power must be applied, so that the line driver is powered.

If appropriate CAM622 settings are saved to non-volatile memory then the ABN signals will start up autonomously following a reset, including when the SPI interface is disconnected.

When the ABN output is enabled and the CAM622 Configuration Tool is connected to a CAM62 over SPI, it also reads the ABN count value over SPI and displays it as a dial, as shown in Figure 34.

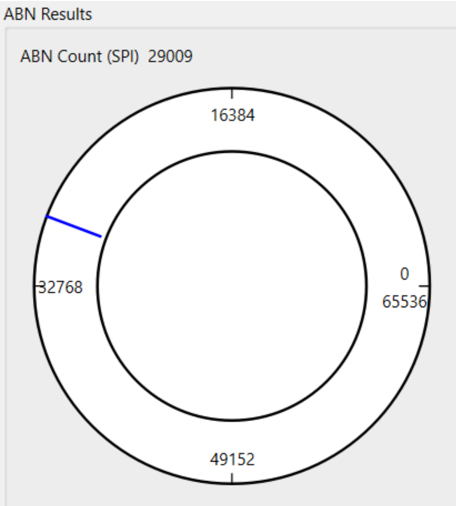

Figure 34 ABN results dial

4.5 CAM622 Transfer Operations

Figure 35 illustrates the set of available options for transferring data to and from the CAM622's memory.

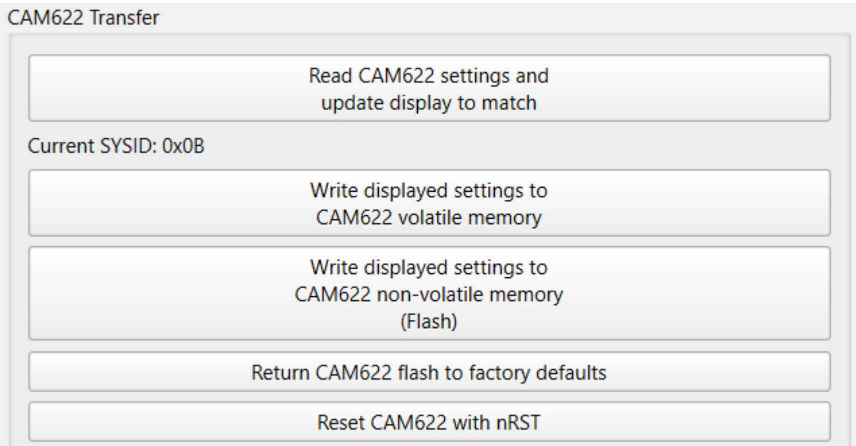

Figure 35 CAM622 Transfer Options

Controls for writing displayed settings to volatile and non-volatile memory are described above.

The "Read…" control reads the contents of the CAM622's memory and displays the results. This can be used to display the non-volatile configuration of a CAM622 part that has previously been programmed. Note that the CAM622's contents are always read when "Connect" is clicked to start the CAM622 Configuration Tool running.

Clicking "Return CAM622 flash to factory defaults" restores all factory defaults, including ABEN=0.

"Reset CAM622 with nRST" causes the Streaming Adapter to toggle the CAM622's nRST line to reset it. Note that the CAM622's memory contents are always read back after this type of reset. The CAM622 Configuration Tool's window will therefore be populated with any settings that have been saved to non-volatile memory.

4.6 Saving and Loading Configurations from File

Click File → Save and select a file name and location to save the current displayed settings to file. By default settings are saved to a file with extension ".cicconfig". This is a human readable text file listing settings.

Click File → Load and select a file and location to load displayed settings with values from file.

4.7 Exporting Configuration as a C Array

Displayed settings may also be exported in the form of a C array suitable for incorporation into customer code such as when a host microcontroller is to be used to apply the configuration. Click Export → A Array → To Clipboard, then paste the resulting text where the code is needed.

5 Firmware Update Tool

The CAM622 includes a bootloader that allows a host to update its internal software ("Application Code") over SPI.

The Firmware Update Tool updates the CAM622's Application Code using the Streaming Adapter for communication between a PC and the CAM622.

If other CAM622 Applications are open then ensure they are disconnected before using the Firmware Update Tool.

When a Streaming Adapter is plugged into the PC, it should appear as a virtual COM port. The Firmware Update Tool should detect this automatically and display the COM port, as shown in Figure 36.

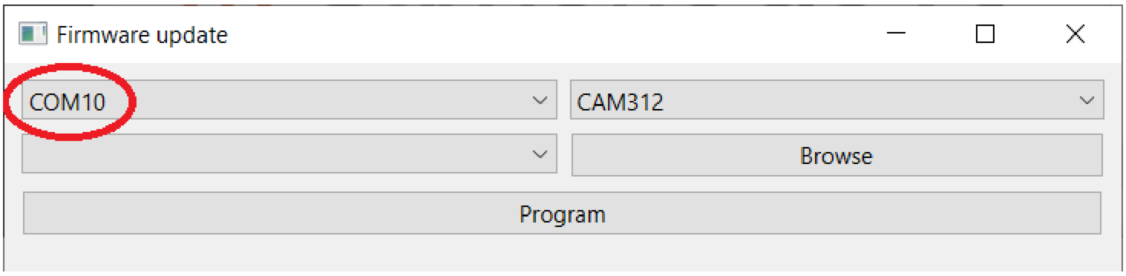

Figure 36 Checking Streaming Adapter COM POrt

The Firmware Update Tool supports other CambridgeIC processor ICs. Select the CAM622 as shown in Figure 37.

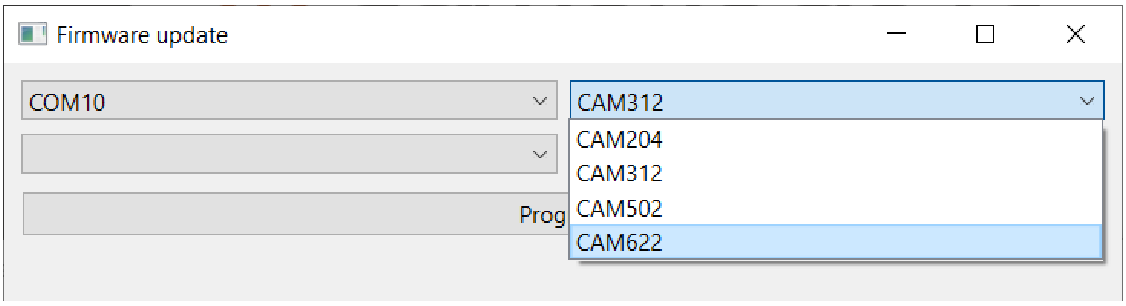

Figure 37 Selecting CAM622

Click "Browse" and navigate to the location of the chosen Application Code. This will hve the file suffix ".cff". For example file 020-0020_001-008.cff is V 1.8 Application Code for the CAM622.

Click "Program" to program the CAM622 with the selected Application Code. If successful the window will display previous and new versions and "transfer complete" as shown in Figure 38.

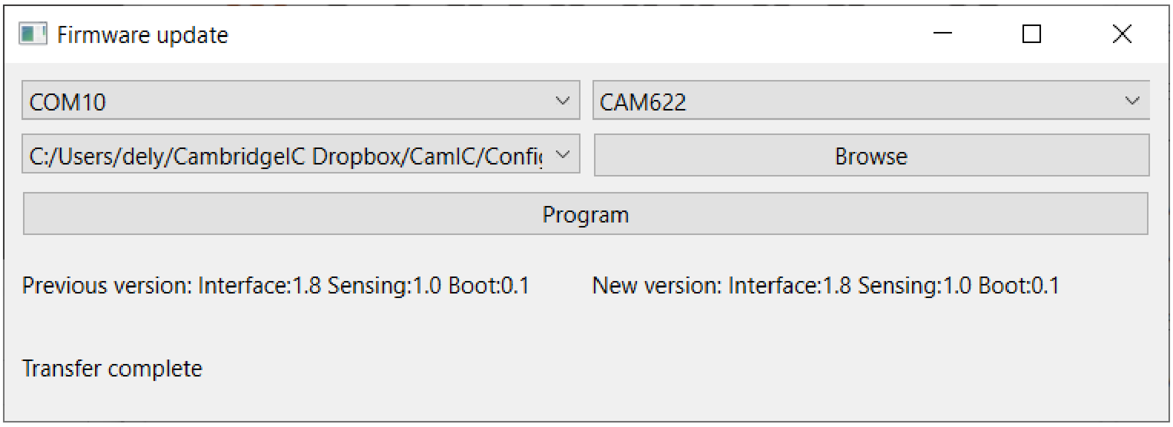

Figure 38 Update Firmware following successful transfer

6 Document History

Revision	Date	Description
0001		First draft

7 Contact Information

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