

## QATCH openQCM Real-Time SW Change Control Document

Release Version	Date	Author	Description
<b>v2.6b1</b>	06/18/2023	A. Ross	<b>SWEEP PERFORMANCE:</b> <b>FW: 1.5-7.5ms E2E: 1.5-7.5ms CAL: &lt;2s</b>  <ul style="list-style-type: none"> <li>- Initial beta version for the v2.6 branch</li> <li>- Updated build information</li> <li>- Add traceback if error occurs during Back/Next step</li> <li>- Adjust smooth factor after 90s when downsampled</li> <li>- Adjust velocities for initial fill region [1/2, 1/1.5, 1/1]</li> <li>- Adjust shear_rate calculation to remove 'n' factor</li> <li>- Bug Fix: Read all available bytes from serial replies</li> <li>- Stop Temp Control even when locked on app exit</li> <li>- Bug Fix: Wait for TEC thread to quit when locking it</li> <li>- Switch order of version check during 'identify' cmd</li> <li>- Parse serial replies to 'identify' command to confirm</li> <li>- Bug Fix: Check for any() data in vector1 to end CAL</li> <li>- Add upgrade support for v2.6x builds from Dropbox</li> <li>- Move Temp Control stability checks for FW solely</li> <li>- Change TEC task update period from 3 to 5 secs</li> <li>- Bug Fix: Disable TEC task when changing modes</li> </ul>
<b>v2.6b2</b>	06/23/2023	A. Ross	<b>SWEEP PERFORMANCE:</b> <b>FW: 1.5-7.5ms E2E: 1.5-7.5ms CAL: &lt;2s</b>  <ul style="list-style-type: none"> <li>- Updated build information</li> <li>- Bug Fix: Temp Control task could hang main task</li> <li>- Include v2.5b46 in build for non-LCD hardware</li> </ul>
<b>v2.6b3</b>	07/12/2023	A. Ross	<b>SWEEP PERFORMANCE:</b> <b>FW: 1.5-7.5ms E2E: 1.5-7.5ms CAL: &lt;2s</b>  <ul style="list-style-type: none"> <li>- Updated build information</li> <li>- DevMode file moved to local data (persistent)</li> <li>- Warn if DevMode not enabled in new builds</li> <li>- Deduce smooth factor to 75% of what it was</li> <li>- Load icon made transparent, for disabled view</li> <li>- Analyze mode "Cancel" changed to "Close"</li> <li>- Advanced settings layout modified for usability</li> <li>- First and last dots greyed out in Analyze mode</li> <li>- Added table view to analyze results</li> <li>- Embed Figure 4 and table view in slider view</li> <li>- Allow for custom POIs by user in Advanced</li> <li>- Disable toolbar buttons when Analyze is busy</li> <li>- Removed debug traces from Analyze console</li> <li>- Improve warning and error messages</li> <li>- Add a cubic fit for the normalized plot</li> <li>- Reduce debug during lower mode interp</li> <li>- Add percent error and temperature to output file</li> <li>- Check CRCs of output files, delete duplicates</li> <li>- When downsampling, reduce plotting samples</li> <li>- Add Temp Control timeout after 15 minutes</li> </ul>

# SW Changes

<b>v2.6b4</b>	07/18/2023	A. Ross	<b>SWEEP PERFORMANCE:</b> <b>FW: 1.5-7.5ms E2E: 1.5-7.5ms CAL: &lt;2s</b> <ul style="list-style-type: none"> <li>- Updated build information</li> <li>- Downsample plots to one in every 3 samples</li> <li>- Detect HW errors during FW checks</li> <li>- Bug Fix: Remove expiration date of DevMode</li> <li>- Rescan filesystem each load of Analyze mode</li> <li>- Add and remove runs from list upon file search</li> <li>- Remove debug messaging from file search</li> <li>- Add warnings if a timestamp cannot be parsed</li> <li>- Plot normalized curve fit as position on Figure 1</li> <li>- Bug Fix: Flip avg viscosity from initial fill data</li> <li>- Bug Fix: Raise PermissionError if port open fails</li> <li>- Bug Fix: Temp set to 0.25 when set to 0.00</li> <li>- Disable Temp Control timeout if DevMode on</li> <li>- Bug Fix: Temp Control does not stop if port busy</li> <li>- Add ability to define "release" builds in Dropbox</li> <li>- Only offer beta build updates if DevMode is on</li> <li>- Background color yellow on auto-off to read it</li> <li>- Disallow Temp Control if no device is connected</li> <li>- Bug Fix: Stop setting offsets if TEC update fails</li> <li>- Detect when device is open in another program</li> <li>- Disable mode-hopping by default (in Advanced)</li> </ul>
<b>v2.6b5</b>	08/24/2023	A. Ross	<b>SWEEP PERFORMANCE:</b> <b>FW: 1.5-7.5ms E2E: 1.5-7.5ms CAL: &lt;2s</b> <ul style="list-style-type: none"> <li>- Updated build information</li> <li>- Get MEIPASS path from architecture when frozen</li> <li>- Replace 'progressbar' with custom implementation</li> <li>- Handle post-firmware update messaging better</li> <li>- Use 'progress mode' to do firmware progress bar</li> <li>- Pull resource files from MEIPASS path when available</li> <li>- Catch and report exceptions during Analyze runs</li> <li>- Suppress AutoGraph warnings from tensorflow</li> <li>- Use 'progress mode' for software download progress</li> <li>- Use the appropriate bundled splash screen per build</li> </ul>
<b>v2.6b6</b>	09/12/2023	A. Ross	<b>SWEEP PERFORMANCE:</b> <b>FW: 1.5-7.5ms E2E: 1.5-7.5ms CAL: &lt;2s</b> <ul style="list-style-type: none"> <li>- Updated build information</li> <li>- Add 'rev' and 'err' to DEV_INFO in config data</li> <li>- Parse 'rev' from INFO command reply at FW check</li> <li>- Remove 'all_velocity' corrections for distances 2/3/4</li> <li>- Moved creation of TECTask() in MainWindow init()</li> <li>- Force splitter set during initialization to set UI state</li> <li>- Verify user session is still active/valid once an hour</li> <li>- Add warning to stop run before Temp Control edit</li> </ul>

# SW Changes

<b>v2.6b7</b>	09/17/2023	A. Ross	<b>SWEEP PERFORMANCE:</b> <b>FW: 1.5-7.5ms E2E: 1.5-7.5ms CAL: &lt;2s</b>  <ul style="list-style-type: none"> <li>- Updated build information</li> <li>- Support for setting both TEMP_CAL factors in FW</li> <li>- Verify checksum from launch.bat for EXE builds</li> <li>- Cache set cal values in SW (once, not per device)</li> </ul>
<b>v2.6b8</b>	09/25/2023	A. Ross	<b>SWEEP PERFORMANCE:</b> <b>FW: 1.5-7.5ms E2E: 1.5-7.5ms CAL: &lt;2s</b>  <ul style="list-style-type: none"> <li>- Updated build information</li> <li>- Analyze table shows light red when too few points</li> <li>- Create CAL output file during Analyze in DevMode</li> <li>- Detect voltage error when Temp Control starts</li> <li>- Improvements to updater to detect bundle type</li> <li>- Ask user to ignore voltage errors if running old HW</li> <li>- BUG FIX: Batch number cannot be changed</li> </ul>
<b>v2.6b9</b>	10/03/2023	A. Ross	<b>SWEEP PERFORMANCE:</b> <b>FW: 1.5-7.5ms E2E: 1.5-7.5ms CAL: &lt;2s</b>  <ul style="list-style-type: none"> <li>- Updated build information</li> <li>- BUG FIX: Conflicting DEVINFO stales init/cal</li> <li>- Check for and resolve any conflicting device infos</li> <li>- Generate CAL file output when Analyze in DEVMODE</li> <li>- CAL file output messaging is INFO level (not red text)</li> <li>- Detect conflicted DEVINFO on port connect/change</li> </ul>

<b>v2.6b10</b>	10/10/2023	A. Ross	<p><b>SWEEP PERFORMANCE:</b>  <b>FW: 1.5-7.5ms E2E: 1.5-7.5ms CAL: &lt;2s</b></p> <ul style="list-style-type: none"> <li>- Updated build information</li> <li>- FlasherX.log should be in logged_data folder in EXE</li> <li>- Find resource files relative to working path in EXE</li> <li>- Allow return of ALL params for given BATCH number</li> <li>- Keep track of step direction during Analyze points</li> <li>- Sort points of interest when opening Advanced view</li> <li>- Treat unused markers on right of plot as missing</li> <li>- After Step 2 sort all poi markers by timestamp</li> <li>- Move next marker ahead of last one if out-of-order</li> <li>- Skip over Steps that are for "unused" markers</li> <li>- Do not process skipped points on marker move</li> <li>- Store all found batch params in the audit XML file</li> <li>- Always apply 'CA_offset' regardless of input type</li> <li>- Add axes markers to Figure 1 top plot for readability</li> <li>- Remove debug traces from Figure 1 top plot PDF</li> <li>- Modify calculation of 15MHz high shear datapoint</li> <li>- Update resource files to v3, 2023-10-10</li> <li>- Support update checks for resource files</li> <li>- Retain build type "_py" vs "_exe" in folder name</li> <li>- BUG FIX: Pull auto calculated values when editing</li> <li>- Highlight manual parameter entries in Run Info</li> <li>- Show a "reset" button for manual Run Info entries</li> <li>- Default contact angle for non-water solvents is 55</li> <li>- Require audit signature if batch number now found</li> <li>- Indicate batch 'found' bool in audit XML file</li> <li>- Warn if save or close Run Info with bad batch num</li> <li>- Update SW unbundled version to Python 3.10.11</li> </ul>
<b>v2.6b11</b>	10/11/2023	A. Ross	<p><b>SWEEP PERFORMANCE:</b>  <b>FW: 1.5-7.5ms E2E: 1.5-7.5ms CAL: &lt;2s</b></p> <ul style="list-style-type: none"> <li>- Updated build information</li> <li>- BUG FIX: High-shear calculation off when 'bad' points</li> <li>- Support flexible array formatting in params lookup file</li> <li>- Use 'all_times' to keep point index order when 'bad'</li> <li>- Refer to 'all_times' instead of 'times' to reference IDX</li> <li>- BUG FIX: Update resource files (see flexible format)</li> <li>- Catch errors extracting resources, still check server</li> <li>- BUG FIX: Download SW zips relative to install folder</li> <li>- Do not extract SW zips relative to working directory</li> <li>- Suppress "Checking entries..." warning in Run Info</li> </ul>

# SW Changes

v2.6b12	10/31/2023	A. Ross	<p><b>SWEEP PERFORMANCE:</b>  <b>FW: 1.5-7.5ms E2E: 1.5-7.5ms CAL: &lt;2s</b></p> <ul style="list-style-type: none"> <li>- Updated build information and resources</li> <li>- Support for updating multiplex devices</li> <li>- Show progress bar during FW updates</li> <li>- Set 'ethernet_speed' to 3ms for multiplexing</li> <li>- Support multiplex plotting within Worker class</li> <li>- Calibration class uses a single ParserProcess</li> <li>- Support multiple data streams within Serial</li> <li>- Support for multiple plots within MainWindow</li> <li>- Add Multiplex section to Advanced Settings</li> <li>- Pre-query device info for unknown ports at boot</li> <li>- Show progress bar during SW updates</li> <li>- Specify minimumSize of main layout windows</li> <li>- BUG FIX: Auto sign-out failed to revert to login</li> <li>- Add advanced setting "Auto-detect channel count"</li> <li>- Do not print duplicate log messages to console</li> <li>- Refactor get_web_info() to start_download()</li> <li>- <b>NOTE: Multiplex devices are not fully supported</b></li> </ul>
v2.6b13	11/03/2023	A. Ross	<p><b>SWEEP PERFORMANCE:</b>  <b>FW: 1.5-7.5ms E2E: 1.5-7.5ms CAL: &lt;2s</b></p> <ul style="list-style-type: none"> <li>- Updated build information and resources</li> <li>- Additional support structures added for multiplex</li> <li>- Firmware update support for multiplex devices</li> <li>- Indicate "Checking device firmware version" at end</li> <li>- Remove 20% and 40% initial fill points from results</li> <li>- Add 30% error bars to high shear rate calculations</li> <li>- Retain 20% and 40% in the calibration output file</li> <li>- Calibration only supports single device for now***</li> <li>- Serial adds initial support for multiplex file writes</li> <li>- BUG FIX: Ignoring voltage issues stops FW task</li> <li>- BUG FIX: Do not ask user for FW updates on boot</li> <li>- BUG FIX: Indicate session expired on auto logout</li> <li>- Modify Temp Control slider range from 8 - 40 C</li> <li>- <b>NOTE: Multiplex devices are not fully supported</b></li> </ul>

<b>v2.6b14</b>	11/10/2023	A. Ross	<p><b>SWEEP PERFORMANCE:</b>  <b>FW: 1.5-7.5ms E2E: 1.5-7.5ms CAL: &lt;2s</b></p> <ul style="list-style-type: none"> <li>- Updated build information and resources</li> <li>- Only indicate SW update as successful on last one</li> <li>- Modified Surface Tension calculation in Analyze</li> <li>- Modified initial samples drop as max of 5 or (y / 30)</li> <li>- Removed 1.1*DENSITY*300 limitation from Analyze</li> <li>- BUG FIX: Error may occur when generating CAL file</li> <li>- Treat exception on port open as a failure in Serial</li> <li>- BUG FIX: Do not show "up-to-date" if user says no</li> <li>- Query temp offsets when setting advanced configs</li> <li>- Look for KeyStore dynamically for update queries</li> <li>- BUG FIX: Show set temp offsets, never "0" (if set)</li> <li>- On session expiration, persist error message on UI</li> <li>- <b>NOTE: Multiplex devices are not fully supported</b></li> </ul>
<b>v2.6b15</b>	11/28/2023	A. Ross	<p><b>SWEEP PERFORMANCE:</b>  <b>FW: 1.5-7.5ms E2E: 1.5-7.5ms CAL: &lt;2s</b></p> <ul style="list-style-type: none"> <li>- Updated build information and resources</li> <li>- Get Device returns the most recently modified PID</li> <li>- Primary put into bootloader when updating PID devs</li> <li>- Max speed 20ms/sample when running in multi-mode</li> <li>- Allow for graceful thread close, only terminate if need</li> <li>- Several Analyze bugs fixed causing analyze failures</li> <li>- Calibration refactored to support multiple serial devs</li> <li>- Add support for read_all() to the Device processor</li> <li>- Add support for read_until() to the Device processor</li> <li>- Refactor Serial.py to support multiple serial devices</li> <li>- Allow for multiple Run Info windows after multi run</li> <li>- Prevent 'config' folder stagnation on PID change</li> <li>- Force re-write DEV_INFO file on change of PID</li> <li>- Send a 'MULTI INIT 0' to refresh LCD on PID change</li> <li>- Get age of calibration returns the oldest age for multi</li> <li>- Concentration supports float text format, not just ints</li> <li>- BUG FIX: Some "auto" values are shown as "manual"</li> <li>- <b>NOTE: Multiplex devices are FULLY SUPPORTED</b></li> </ul>
<b>v2.6b16</b>	12/12/2023	A. Ross	<p><b>SWEEP PERFORMANCE:</b>  <b>FW: 1.5-7.5ms E2E: 1.5-7.5ms CAL: &lt;2s</b></p> <ul style="list-style-type: none"> <li>- Updated build information and resources</li> <li>- Improved parsing of "INFO" cmd on update check</li> <li>- Variable MAX SPEED parameters for single vs multi</li> <li>- Log USB serial number only on get_source_ports()</li> <li>- BUG FIX: Analyze can throw error if len(visc) is off</li> <li>- Improved parsing of initialization data streams</li> <li>- Indicate on LCD Initialize result: PASS/ERROR/FAIL</li> <li>- Log USB serial number only on query new dev info</li> <li>- Clear MSGBOX on LCD when user clicks "Reset"</li> <li>- BUG FIX: Updating _py installs creates nested dir</li> <li>- Added support for plate configuration on multiplex</li> </ul>

# SW Changes

<b>v2.6b17</b>	12/19/2023	A. Ross	<b>SWEEP PERFORMANCE:</b> <b>FW: 1.5-7.5ms E2E: 1.5-7.5ms CAL: &lt;2s</b> <ul style="list-style-type: none"> <li>- Updated build information and resources</li> <li>- Update from using Python 3.10.11 to 3.11.7</li> <li>- Refactor code to align with Python 3.11 syntax</li> <li>- Initialize sweep runs from 2.5MHz to 17.5MHz</li> <li>- Initialize results only expects to find 2 peaks now</li> <li>- Resend STREAM on multi if device does not start</li> <li>- Correctly log ambient temperature on multi runs</li> <li>- Clear MSGBOX on primary device only for multi</li> <li>- Reconstruct curve for multi runs with common X</li> <li>- Reduce plot printing for multi devices for speed</li> <li>- Queue TEC state during multi runs to update UI</li> <li>- Process serial bytes one line at a time, not 1 byte</li> <li>- Silently ignore serial lines that do not start with "Q"</li> <li>- Remove debug log about stopping serial streams</li> <li>- Refactor to allow mode hopping with 2 modes only</li> <li>- Disable Plate Configuration button during runs</li> <li>- Only print temperature data from primary device</li> <li>- Make Plate Configuration button a square on UI</li> </ul>
<b>v2.6b18</b>	01/05/2024	A. Ross	<b>SWEEP PERFORMANCE:</b> <b>FW: 1.5-7.5ms E2E: 1.5-7.5ms CAL: &lt;2s</b> <ul style="list-style-type: none"> <li>- Updated build information and resources</li> <li>- BUG FIX: Multiplex COM detection can get stuck</li> <li>- Base overtone frequency changed from 50 to 25</li> <li>- BUG FIX: Multiplex only measures 1st mode</li> <li>- Report PID when logging found device config</li> <li>- PY launcher creates symbolic link for logged data</li> </ul>
<b>v2.6b19</b>	01/15/2024	A. Ross	<b>SWEEP PERFORMANCE:</b> <b>FW: 1.5-7.5ms E2E: 1.5-7.5ms CAL: &lt;2s</b> <ul style="list-style-type: none"> <li>- Updated build information and resources</li> <li>- BUG FIX: Multiplex devices sent wrong frequencies</li> <li>- Auto-detect delimiter of batch params resource file</li> <li>- Apply polynomial correction to initial fill when <math>t &gt; 1s</math></li> <li>- Calibration and Serial passed wrong index for multi</li> <li>- Multi hopping missing base overtones per cycle</li> <li>- Batch params delimiter changed from tab to comma</li> <li>- Combine amplitude plots during multi measurements</li> </ul>

# SW Changes

<b>v2.6b20</b>	01/23/2024	A. Ross	<b>SWEEP PERFORMANCE:</b> <b>FW: 1.5-7.5ms E2E: 1.5-7.5ms CAL: &lt;2s</b>  <ul style="list-style-type: none"> <li>- Updated build information and resources</li> <li>- Prevent selection of uninitialized devices</li> <li>- Add ability to tune PID controller in Constants.py</li> <li>- Correctly set icon on Plate Configuration window</li> <li>- Skip non-existent folders when exporting runs</li> <li>- Add error when looking up device info post run</li> <li>- Check for and remove calibration file in config root</li> <li>- Send TUNE parameters to device on TEC start</li> <li>- Parse new line in TEMP reply with PID parameters</li> <li>- Add new warning text with PID tuning parameters</li> </ul>
<b>v2.6b21</b>	02/06/2024	A. Ross	<b>SWEEP PERFORMANCE:</b> <b>FW: 1.5-7.5ms E2E: 1.5-7.5ms CAL: &lt;2s</b>  <ul style="list-style-type: none"> <li>- Updated build information and resources</li> <li>- Retuned PID parameters in Constants.py</li> </ul>
<b>v2.6b22</b>	02/13/2024	A. Ross	<b>SWEEP PERFORMANCE:</b> <b>FW: 1.5-7.5ms E2E: 1.5-7.5ms CAL: &lt;2s</b>  <ul style="list-style-type: none"> <li>- Updated build information and resources</li> <li>- Added Analyze params to Constants.py to model</li> <li>- Added improved AI data modeling to Analyze</li> <li>- Auto-calculate POIs and jump to Summary</li> <li>- Allow user to "Modify" POIs to manually edit</li> <li>- Add Band-Aid #2 to drop more initial fill points</li> <li>- Comment out lines referencing "disabled" icons</li> <li>- Add icon 'modify.png' for use in Analyze mode</li> <li>- Add model 'ModelData.py' for use in Analyze</li> </ul>
<b>v2.6b23</b>	02/21/2024	A. Ross	<b>SWEEP PERFORMANCE:</b> <b>FW: 1.5-7.5ms E2E: 1.5-7.5ms CAL: &lt;2s</b>  <ul style="list-style-type: none"> <li>- Updated build information and resources</li> <li>- Revised 'avg_in', 'step_size', 'track_width_db'</li> <li>- Changes to ModelData to improve point placement</li> <li>- Increase difference factor to 2.0 all of the time</li> <li>- Run model after Step 1 and Step 2 of Analyze</li> <li>- Added 'MM231106_W7' to batch parameters v11</li> </ul>
<b>v2.6b24</b>	02/22/2024	A. Ross	<b>SWEEP PERFORMANCE:</b> <b>FW: 1.5-7.5ms E2E: 1.5-7.5ms CAL: &lt;2s</b>  <ul style="list-style-type: none"> <li>- Updated build information and resources</li> <li>- BUG FIX: Model data not processing long runs &gt;90s</li> <li>- BUG FIX: New points not applying if model fails</li> </ul>



SW Changes

<b>v2.6b25</b>	02/26/2024	A. Ross	<b>SWEEP PERFORMANCE:</b> <b>FW: 1.5-7.5ms E2E: 1.5-7.5ms CAL: &lt;2s</b> <ul style="list-style-type: none"> <li>- Updated build information and resources</li> <li>- BUG FIX: Analyze not asking for secondary audits</li> <li>- BUG FIX: Analyze errors if output or CAL file fails</li> <li>- BUG FIX: Clear marker flags on Back button press</li> <li>- BUG FIX: Do not do smoothing if too few fill points</li> </ul>
<b>v2.6b26</b>	02/27/2024	A. Ross	<b>SWEEP PERFORMANCE:</b> <b>FW: 1.5-7.5ms E2E: 1.5-7.5ms CAL: &lt;2s</b> <ul style="list-style-type: none"> <li>- Updated build information and resources</li> <li>- BUG FIX: Improve model detection of end-of-fill</li> <li>- BUG FIX: Ignore model partial fill if given stop point</li> <li>- BUG FIX: Trust ch1 more than 80% fill point if 'bad'</li> </ul>
<b>v2.6b27</b>	03/01/2024	A. Ross	<b>SWEEP PERFORMANCE:</b> <b>FW: 1.5-7.5ms E2E: 1.5-7.5ms CAL: &lt;2s</b> <ul style="list-style-type: none"> <li>- Updated build information and resources</li> <li>- Revert step_size and track_width_db</li> <li>- BUG FIX: Exit point selection is too early</li> </ul>
<b>v2.6r27</b>	03/05/2024	A. Ross	<b>SWEEP PERFORMANCE:</b> <b>FW: 1.5-7.5ms E2E: 1.5-7.5ms CAL: &lt;2s</b> <ul style="list-style-type: none"> <li>- Updated build information and resources</li> <li>- Release candidate build equivalent of v2.6b27</li> <li>- BUG FIX: Patch issue with install path of updates</li> </ul>
<b>v2.6b28</b>	03/13/2024	A. Ross	<b>SWEEP PERFORMANCE:</b> <b>FW: 1.5-7.5ms E2E: 1.5-7.5ms CAL: &lt;2s</b> <ul style="list-style-type: none"> <li>- Updated build information and resources</li> <li>- Extend developer mode expiration to 90 days</li> <li>- Modified Surface Tension and Contact Angle formulas</li> <li>- Band-Aid #2: Change thresholds to 15% and 40%</li> <li>- Increase decimal resolution of Surfactant to 5</li> <li>- Prevent scientific notation in XML for small numbers</li> </ul>
<b>v2.6r28</b>	03/13/2024	A. Ross	<b>SWEEP PERFORMANCE:</b> <b>FW: 1.5-7.5ms E2E: 1.5-7.5ms CAL: &lt;2s</b> <ul style="list-style-type: none"> <li>- Updated build information and resources</li> <li>- Release candidate build equivalent of v2.6b28</li> </ul>
<b>v2.6b29</b>	03/19/2024	A. Ross	<b>SWEEP PERFORMANCE:</b> <b>FW: 1.5-7.5ms E2E: 1.5-7.5ms CAL: &lt;2s</b> <ul style="list-style-type: none"> <li>- Updated build information and resources</li> <li>- Added option: Only ADMIN can update SW/FW</li> <li>- BUG FIX: Never offer B-build to R-build EXE</li> <li>- BUG FIX: R-build gets 'stuck' on run if no device</li> </ul>

# SW Changes

<b>v2.6r29</b>	03/19/2024	A. Ross	<b>SWEEP PERFORMANCE:</b> <b>FW: 1.5-7.5ms E2E: 1.5-7.5ms CAL: &lt;2s</b> <ul style="list-style-type: none"> <li>- Updated build information and resources</li> <li>- Release candidate build equivalent of v2.6b29</li> </ul>
<b>v2.6b30</b>	04/09/2024	A. Ross	<b>SWEEP PERFORMANCE:</b> <b>FW: 1.5-7.5ms E2E: 1.5-7.5ms CAL: &lt;2s</b> <ul style="list-style-type: none"> <li>- Updated build information and resources</li> <li>- Add "hid" module to project requirements</li> <li>- Renamed icon "analyze.png" to "advanced.png"</li> <li>- Added icon "user.png"</li> <li>- Remove strict dependency on "tensorflow" for AI</li> <li>- Add support for HID-compliant serial devices</li> <li>- Use ModelData() to determine good/bad runs</li> <li>- Rename "Info" button to "Run Info" in Analyze</li> <li>- Change "Analyze" icon from gear to start button</li> <li>- Add user icon and name to right side of toolbar</li> <li>- Change "Advanced settings" from text to button</li> <li>- Add support for Help Tutorials in docked sidebar</li> <li>- BUG FIX: Analyze fails if run length ~90 secs</li> <li>- Show relevant Help Tutorials based on app state</li> <li>- BUG FIX: Baseline coefficients are wrong (multi)</li> <li>- Search for HID devices when scanning USB ports</li> <li>- Indicate "Press start then apply drop" to user</li> <li>- Add "View Tutorials" to Help dropdown menu</li> <li>- BUG FIX: Software update check was freezing UI</li> <li>- Add filesystem configuration checks at startup</li> <li>- Add tutorial configuration logic at startup</li> <li>- Indicate "Drop applied!" in SW during measure</li> <li>- Do not preload "tensorflow" unless it is needed</li> <li>- BUG FIX: Cannot reliably clear PID to FF once set</li> <li>- Add ability to show tutorials on application start</li> <li>- Refactor "app_publiser" to "app_publisher"</li> <li>- Show error details if setting active device fails</li> <li>- Add support for using TyUpdater for FW updates</li> </ul>
<b>v2.6b31</b>	04/11/2024	A. Ross	<b>SWEEP PERFORMANCE:</b> <b>FW: 1.5-7.5ms E2E: 1.5-7.5ms CAL: &lt;2s</b> <ul style="list-style-type: none"> <li>- Updated build information and resources</li> <li>- BUG FIX: SW freezes on run with Temp Control on</li> <li>- BUG FIX: FW update "fails" on COM-&gt;HID update</li> <li>- BUG FIX: Hide popup window made by tyUpdater</li> <li>- Report friendly name when doing "Identify" calls</li> <li>- Detect and reassign port if it changes after update</li> <li>- Always use HID 'write_timeout' to avoid app hang</li> <li>- Only close HID port if it was previously opened</li> <li>- Check and open HID port if written to while closed</li> <li>- If using "no" timeout, set it to a max of 15 seconds</li> <li>- If port switches from COM to HID, close serial port</li> <li>- NOTE: Downgrade 'scipy' module to 1.12.0 (buggy)</li> </ul>

# SW Changes

<b>v2.6b32</b>	04/18/2024	A. Ross	<b>SWEEP PERFORMANCE:</b> <b>FW: 1.5-7.5ms E2E: 1.5-7.5ms CAL: &lt;2s</b> <ul style="list-style-type: none"> <li>- Updated build information and resources</li> <li>- BUG FIX: Hide console flashes on app boot</li> <li>- BUG FIX: Runs near 90 secs still cause error</li> <li>- If Analyze load fails, allow manual point selection</li> </ul>
<b>v2.6b33</b>	05/13/2024	A. Ross	<b>SWEEP PERFORMANCE:</b> <b>FW: 1.5-7.5ms E2E: 1.5-7.5ms CAL: &lt;2s</b> <ul style="list-style-type: none"> <li>- Updated build information and resources</li> <li>- New Dropbox keystore to allow file uploads</li> <li>- Remove 'platform' dependency from mainWindow</li> <li>- BUG FIX: Error during filesystem configuration</li> <li>- Check for 'targets.csv' when doing SW updates</li> <li>- Add 'subprocess' as global import in mainWindow</li> </ul>
<b>v2.6r33</b>	05/13/2024	A. Ross	<b>SWEEP PERFORMANCE:</b> <b>FW: 1.5-7.5ms E2E: 1.5-7.5ms CAL: &lt;2s</b> <ul style="list-style-type: none"> <li>- Updated build information and resources</li> <li>- Remove strict dependency on "tensorflow" for AI</li> <li>- Add support for HID-compliant serial devices</li> <li>- Use ModelData() to determine good/bad runs</li> <li>- Add user icon and name to right side of toolbar</li> <li>- Add support for Help Tutorials in docked sidebar</li> <li>- BUG FIX: Analyze fails if run length ~90 secs</li> <li>- Search for HID devices when scanning USB ports</li> <li>- Indicate "Press start then apply drop" to user</li> <li>- BUG FIX: Software update check was freezing UI</li> <li>- Add filesystem configuration checks at startup</li> <li>- Indicate "Drop applied!" in SW during measure</li> <li>- Refactor "app_publiser" to "app_publisher"</li> <li>- Add support for using TyUpdater for FW updates</li> <li>- Report friendly name when doing "Identify" calls</li> <li>- If Analyze load fails, allow manual point selection</li> <li>- Check for 'targets.csv' when doing SW updates</li> </ul>
<b>v2.6b34</b>	05/17/2024	A. Ross	<b>SWEEP PERFORMANCE:</b> <b>FW: 1.5-7.5ms E2E: 1.5-7.5ms CAL: &lt;2s</b> <ul style="list-style-type: none"> <li>- Updated build information and resources</li> <li>- Add Factory Restore Defaults</li> <li>- Add Global AppSettings</li> <li>- Add "Apply Drop Now" to Plot UI</li> <li>- Add "Calibrating..." and "Press Stop" to Plot UI</li> <li>- Remember which Plots are enabled in View menu</li> <li>- Remove unused 'targets' from 'build' in updater</li> <li>- Don't offer dev_mode B-builds an R-build update</li> <li>- Always clear plot status message on stop</li> <li>- Check both frequency and dissipation y_range</li> </ul>

# SW Changes

<b>v2.6b35</b>	05/21/2024	A. Ross	<b>SWEEP PERFORMANCE:</b> <b>FW: 1.5-7.5ms E2E: 1.5-7.5ms CAL: &lt;2s</b> <ul style="list-style-type: none"> <li>- Updated build information and resources</li> <li>- Add temp adjusted factor to CA in Analyze</li> <li>- Track "run finished" during measurements</li> <li>- Compare plot limits to baseline deltas</li> <li>- Show "waiting on other channels..." until ALL done</li> </ul>
<b>v2.6r35</b>	05/13/2024	A. Ross	<b>SWEEP PERFORMANCE:</b> <b>FW: 1.5-7.5ms E2E: 1.5-7.5ms CAL: &lt;2s</b> <ul style="list-style-type: none"> <li>- Updated build information and resources</li> <li>- Add Factory Restore Defaults</li> <li>- Add Global AppSettings</li> <li>- Add "Apply Drop Now" to Plot UI</li> <li>- Add "Calibrating..." and "Press Stop" to Plot UI</li> <li>- Remember which Plots are enabled in View menu</li> <li>- Remove unused 'targets' from 'build' in updater</li> <li>- Don't offer dev_mode B-builds an R-build update</li> <li>- Always clear plot status message on stop</li> <li>- Check both frequency and dissipation y_range</li> <li>- Add temp adjusted factor to CA in Analyze</li> <li>- Track "run finished" during measurements</li> <li>- Compare plot limits to baseline deltas</li> <li>- Show "waiting on other channels..." until ALL done</li> </ul>
<b>v2.6b36</b>	05/23/2024	A. Ross	<b>SWEEP PERFORMANCE:</b> <b>FW: 1.5-7.5ms E2E: 1.5-7.5ms CAL: &lt;2s</b> <ul style="list-style-type: none"> <li>- Updated build information and resources</li> <li>- Reducing the fill region cut-off from 0.15-0.4 to 0.1</li> <li>- The correction for viscous materials is disabled</li> <li>- Breakout 'default_diff_factor' to constants.py</li> <li>- Revert 15MHZ high-shear viscosity calculation</li> </ul>
<b>v2.6r36</b>	05/23/2024	A. Ross	<b>SWEEP PERFORMANCE:</b> <b>FW: 1.5-7.5ms E2E: 1.5-7.5ms CAL: &lt;2s</b> <ul style="list-style-type: none"> <li>- Updated build information and resources</li> <li>- Reducing the fill region cut-off from 0.15-0.4 to 0.1</li> <li>- The correction for viscous materials is disabled</li> <li>- Breakout 'default_diff_factor' to constants.py</li> <li>- Revert 15MHZ high-shear viscosity calculation</li> </ul>

# SW Changes

<b>v2.6b37</b>	05/27/2024	A. Ross	<b>SWEEP PERFORMANCE:</b> <b>FW: 1.5-7.5ms E2E: 1.5-7.5ms CAL: &lt;2s</b> <ul style="list-style-type: none"> <li>- Updated build information and resources</li> <li>- BUG: Resolve requirements while honoring any constraints put on other module dependencies</li> <li>- Reduce CA offsets for protein formulations to from 7 and 5 to 5 and 3, respectively</li> <li>- BUG: SW updates not working in SW v2.6r36_exe due to improper version of 'requests' module for 'dropbox' API to work (constraint not honored)</li> <li>- Remove "Press Stop" from Plots UI until improved</li> <li>- BUG: Only call to '_dbx_connection' if it exists</li> <li>- BUG: Set a default value to 'res_download' if none</li> <li>- Update UUIP in targets database if it has changed</li> <li>- BUG: Only launch EXE after an update if the checksum verification passes</li> <li>- Show expected checksum while calculating actual</li> <li>- Remove inaccurate text from EXE launcher script</li> <li>- Offer to update local Python environment after updating requirements file</li> </ul>
<b>v2.6r37</b>	05/27/2024	A. Ross	<b>SWEEP PERFORMANCE:</b> <b>FW: 1.5-7.5ms E2E: 1.5-7.5ms CAL: &lt;2s</b> <ul style="list-style-type: none"> <li>- Updated build information and resources</li> <li>- BUG: Resolve requirements while honoring any constraints put on other module dependencies</li> <li>- Reduce CA offsets for protein formulations to from 7 and 5 to 5 and 3, respectively</li> <li>- BUG: SW updates not working in SW v2.6r36_exe due to improper version of 'requests' module for 'dropbox' API to work (constraint not honored)</li> <li>- Remove "Press Stop" from Plots UI until improved</li> <li>- BUG: Only call to '_dbx_connection' if it exists</li> <li>- BUG: Set a default value to 'res_download' if none</li> <li>- Update UUIP in targets database if it has changed</li> <li>- BUG: Only launch EXE after an update if the checksum verification passes</li> <li>- Show expected checksum while calculating actual</li> <li>- Remove inaccurate text from EXE launcher script</li> <li>- Offer to update local Python environment after updating requirements file</li> </ul>

SW Changes

<b>v2.6b38</b>	06/07/2024	A. Ross	<b>SWEEP PERFORMANCE:</b> <b>FW: 1.5-7.5ms E2E: 1.5-7.5ms CAL: &lt;2s</b>  <ul style="list-style-type: none"> <li>- Updated build information and resources</li> <li>- Initial support for GitHub update engine</li> <li>- Add progress bar when updating resource files</li> <li>- Make Amplitude plot for MULTI not clip at edges</li> <li>- Stop MULTI measurement run in FW on Stop in SW</li> <li>- Changes to Plots UI status label to work on MULTI</li> <li>- BUG FIX: Apply correct limits to plot2 for ch1 and 4</li> <li>- Do not adjust contact angle if 'concentration' &lt; 1</li> </ul>
<b>v2.6b39</b>	06/17/2024	A. Ross	<b>SWEEP PERFORMANCE:</b> <b>FW: 1.5-7.5ms E2E: 1.5-7.5ms CAL: &lt;2s</b>  <ul style="list-style-type: none"> <li>- Updated build information and resources</li> <li>- Narrow left and right bounds avoid overscanning</li> <li>- Warn user if they may experience tracking issues</li> <li>- Break multiple Run Info UIs into combined window</li> <li>- Only ask for one run name for entire multiplex run</li> </ul>
<b>v2.6b40</b>	06/25/2024	A. Ross	<b>SWEEP PERFORMANCE:</b> <b>FW: 1.5-7.5ms E2E: 1.5-7.5ms CAL: &lt;2s</b>  <ul style="list-style-type: none"> <li>- Updated build information and resources</li> <li>- Log errors to console during DEV_get_active()</li> <li>- 20x baseline for mode hopping</li> <li>- Increase sampling speeds for fast filling datas</li> <li>- Set 'temp_adjusted_CA_factor' to zero</li> <li>- ModelData throws exceptions that hard-stop</li> <li>- ModelData reports excessive warnings</li> <li>- Use a constant 72.0 for ST during Analyze</li> <li>- Hide user prompts and views of ST in Run Info</li> <li>- CA offsets based on 'concentration' removed</li> <li>- BUG FIX: Allow runs to analyze when 90 secs</li> <li>- Incorporate new QModel for point prediction</li> <li>- Revise shear rate calculation from prior builds</li> <li>- Hide p-points outside of +/-10% of visc-region</li> </ul>
<b>v2.6b41</b>	06/28/2024	A. Ross	<b>SWEEP PERFORMANCE:</b> <b>FW: 1.5-7.5ms E2E: 1.5-7.5ms CAL: &lt;2s</b>  <ul style="list-style-type: none"> <li>- Updated build information and resources</li> <li>- Add MODEL parameters to constants.py</li> <li>- Remove unused import from ModelData</li> <li>- Baseline from 0.5 - 2.5 secs in ModelData</li> <li>- Allow models to be disabled from constants.py</li> <li>- Disable the new QModel predictor until it is refined</li> <li>- Add option to bundle XGBoost.dll into compiled EXE</li> <li>- Revert existing modules to their v2.6b39 versions</li> </ul>

v2.6r41	06/28/2024	A. Ross	<p><b>SWEEP PERFORMANCE:</b>  <b>FW: 1.5-7.5ms E2E: 1.5-7.5ms CAL: &lt;2s</b></p> <ul style="list-style-type: none"> <li>- Updated build information and resources</li> <li>- Initial support for GitHub update engine</li> <li>- Add progress bar when updating resource files</li> <li>- Make Amplitude plot for MULTI not clip at edges</li> <li>- Stop MULTI measurement run in FW on Stop in SW</li> <li>- Changes to Plots UI status label to work on MULTI</li> <li>- BUG FIX: Apply correct limits to plot2 for ch1 and 4</li> <li>- Do not adjust contact angle if 'concentration' &lt; 1</li> <li>- Narrow left and right bounds avoid overscanning</li> <li>- Warn user if they may experience tracking issues</li> <li>- Break multiple Run Info UIs into combined window</li> <li>- Only ask for one run name for entire multiplex run</li> <li>- Log errors to console during DEV_get_active()</li> <li>- 20x baseline for mode hopping</li> <li>- Increase sampling speeds for fast filling datas</li> <li>- Set 'temp_adjusted_CA_factor' to zero</li> <li>- ModelData throws exceptions that hard-stop</li> <li>- ModelData reports excessive warnings</li> <li>- Use a constant 72.0 for ST during Analyze</li> <li>- Hide user prompts and views of ST in Run Info</li> <li>- CA offsets based on 'concentration' removed</li> <li>- BUG FIX: Allow runs to analyze when 90 secs</li> <li>- Incorporate new QModel for point prediction</li> <li>- Revise shear rate calculation from prior builds</li> <li>- Hide p-points outside of +/-10% of visc-region</li> <li>- Add MODEL parameters to constants.py</li> <li>- Remove unused import from ModelData</li> <li>- Baseline from 0.5 - 2.5 secs in ModelData</li> <li>- Allow models to be disabled from constants.py</li> <li>- Disable the new QModel predictor until it is refined</li> <li>- Add option to bundle XGBoost.dll into compiled EXE</li> <li>- Revert existing modules to their v2.6b39 versions</li> </ul>
v2.6b42	07/09/2024	A. Ross	<p><b>SWEEP PERFORMANCE:</b>  <b>FW: 1.5-7.5ms E2E: 1.5-7.5ms CAL: &lt;2s</b></p> <ul style="list-style-type: none"> <li>- Updated build information and resources</li> <li>- Remove speed limit on multiplex runs</li> <li>- Add scan.png to icons for Run Info</li> <li>- Move QueryRunInfo from popUp.py to runInfo.py</li> <li>- Show run name from XML not from path name</li> <li>- Add "Rescan" button to Analyze UI to update runs</li> <li>- Release handle earlier when renaming output files</li> <li>- Call new RunInfoWindow for multiplex runs</li> <li>- Add support for barcode scanning batch number</li> <li>- Add support for renaming runs in Run Info view</li> <li>- Add support for storing Notes in Run Info view</li> </ul>

# SW Changes

<b>v2.6b43</b>	07/26/2024	A. Ross	<b>SWEEP PERFORMANCE:</b> <b>FW: 1.5-7.5ms E2E: 1.5-7.5ms CAL: &lt;2s</b>  <ul style="list-style-type: none"> <li>- Updated build information and resources</li> <li>- Update to latest QModel version</li> <li>- QModel predict on by default</li> <li>- Apply High Shear correction factor</li> <li>- Hide initial fill points when &gt;1.25x</li> <li>- Add shear correction to resources</li> <li>- Updates to Plate Configuration</li> <li>- Do not identify if no port available</li> <li>- Confine multiplex plots to 1-4</li> <li>- Allow PID from 1-4 and A-D, 0xFF</li> <li>- Do not start TEC task if no port</li> </ul>
<b>v2.6b44</b>	07/30/2024	A. Ross	<b>SWEEP PERFORMANCE:</b> <b>FW: 1.5-7.5ms E2E: 1.5-7.5ms CAL: &lt;2s</b>  <ul style="list-style-type: none"> <li>- Updated build information and resources</li> <li>- Use ST = 60 when concentration &gt; 20mg/ml</li> <li>- Simplify limits on initial fill trendline check</li> <li>- Check the point_factor_limit is valid</li> <li>- Increase debug messaging for initial fill trendline check</li> <li>- Add region limits to QModel predict of CH1 and CH2</li> <li>- Use QModel for all points except for the first point</li> </ul>
<b>v2.6b45</b>	08/01/2024	A. Ross	<b>SWEEP PERFORMANCE:</b> <b>FW: 1.5-7.5ms E2E: 1.5-7.5ms CAL: &lt;2s</b>  <ul style="list-style-type: none"> <li>- Updated build information and resources</li> <li>- Use ST = 60 when concentration &gt; 5mg/ml</li> </ul>



# SW Changes

v2.6r45	08/01/2024	A. Ross	<p><b>SWEEP PERFORMANCE:</b>  <b>FW: 1.5-7.5ms E2E: 1.5-7.5ms CAL: &lt;2s</b></p> <ul style="list-style-type: none"> <li>- Updated build information and resources</li> <li>- Remove speed limit on multiplex runs</li> <li>- Add scan.png to icons for Run Info</li> <li>- Move QueryRunInfo from popUp.py to runInfo.py</li> <li>- Show run name from XML not from path name</li> <li>- Add "Rescan" button to Analyze UI to update runs</li> <li>- Release handle earlier when renaming output files</li> <li>- Call new RunInfoWindow for multiplex runs</li> <li>- Add support for barcode scanning batch number</li> <li>- Add support for renaming runs in Run Info view</li> <li>- Add support for storing Notes in Run Info view</li> <li>- Update to latest QModel version</li> <li>- QModel predict on by default</li> <li>- Apply High Shear correction factor</li> <li>- Hide initial fill points when &gt;1.25x</li> <li>- Add shear correction to resources</li> <li>- Updates to Plate Configuration</li> <li>- Do not identify if no port available</li> <li>- Confine multiplex plots to 1-4</li> <li>- Allow PID from 1-4 and A-D, 0xFF</li> <li>- Do not start TEC task if no port</li> <li>- Use ST = 60 when concentration &gt; 20mg/ml</li> <li>- Simplify limits on initial fill trendline check</li> <li>- Check the point_factor_limit is valid</li> <li>- Increase debug messaging for initial fill trendline check</li> <li>- Add region limits to QModel predict of CH1 and CH2</li> <li>- Use QModel for all points except for the first point</li> <li>- Use ST = 60 when concentration &gt; 5mg/ml</li> </ul>
v2.6b46	08/18/2024	A. Ross	<p><b>SWEEP PERFORMANCE:</b>  <b>FW: 1.5-7.5ms E2E: 1.5-7.5ms CAL: &lt;2s</b></p> <ul style="list-style-type: none"> <li>- Updated build information and resources</li> <li>- Updated userguide to latest version</li> <li>- Tread PIDs A-D as secondary devices</li> <li>- DevMode expires after 365 days, was 90 days</li> <li>- DevMode will persist across different versions</li> <li>- Import/export notes.txt for each run (if set)</li> <li>- Allow "Don't ask again" at sign (DevMode only)</li> <li>- Ask to renew DevMode after expired at sign-in</li> <li>- BUG FIX: User must provide run name for multi</li> <li>- Rename new tool script "clear tokens"</li> </ul>

## SW Changes

<b>v2.6r46</b>	08/18/2024	A. Ross	<b>SWEEP PERFORMANCE:</b> <b>FW: 1.5-7.5ms E2E: 1.5-7.5ms CAL: &lt;2s</b> <ul style="list-style-type: none"><li>- Updated build information and resources</li><li>- Updated userguide to latest version</li><li>- Tread PIDs A-D as secondary devices</li><li>- DevMode expires after 365 days, was 90 days</li><li>- DevMode will persist across different versions</li><li>- Import/export notes.txt for each run (if set)</li><li>- Allow "Don't ask again" at sign (DevMode only)</li><li>- Ask to renew DevMode after expired at sign-in</li><li>- BUG FIX: User must provide run name for multi</li><li>- Rename new tool script "clear tokens"</li></ul>
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