QATCH openQCM Real-Time SW Change Control Document			
Release Version	**Date**	**Author**	**Description**
v2.6b1	06/18/2023	A. Ross	**SWEEP PERFORMANCE:** **FW: 1.5-7.5ms E2E: 1.5-7.5ms CAL: <2s** - Initial beta version for the v2.6 branch - Updated build information - Add traceback if error occurs during Back/Next step - Adjust smooth factor after 90s when downsampled - Adjust velocities for initial fill region [/2, /1.5, /1] - Adjust shear_rate calculation to remove 'n' factor - Bug Fix: Read all available bytes from serial replies - Stop Temp Control even when locked on app exit - Bug Fix: Wait for TEC thread to quit when locking it - Switch order of version check during 'identify' cmd - Parse serial replies to 'identify' command to confirm - Bug Fix: Check for any() data in vector1 to end CAL - Add upgrade support for v2.6x builds from Dropbox - Move Temp Control stability checks for FW solely - Change TEC task update period from 3 to 5 secs - Bug Fix: Disable TEC task when changing modes
v2.6b2	06/23/2023	A. Ross	**SWEEP PERFORMANCE:** **FW: 1.5-7.5ms E2E: 1.5-7.5ms CAL: <2s** - Updated build information - Bug Fix: Temp Control task could hang main task - Include v2.5b46 in build for non-LCD hardware
v2.6b3	07/12/2023	A. Ross	**SWEEP PERFORMANCE:** **FW: 1.5-7.5ms E2E: 1.5-7.5ms CAL: <2s** - Updated build information - DevMode file moved to local data (persistent) - Warn if DevMode not enabled in new builds - Deduce smooth factor to 75% of what it was - Load icon made transparent, for disabled view - Analyze mode "Cancel" changed to "Close" - Advanced settings layout modified for usability - First and last dots greyed out in Analyze mode - Added table view to analyze results - Embed Figure 4 and table view in slider view - Allow for custom POIs by user in Advanced - Disable toolbar buttons when Analyze is busy - Removed debug traces from Analyze console - Improve warning and error messages - Add a cubic fit for the normalized plot - Reduce debug during lower mode interp - Add percent error and temperature to output file - Check CRCs of output files, delete duplicates - When downsampling, reduce plotting samples - Add Temp Control timeout after 15 minutes

v2.6b4	07/18/2023	A. Ross	**SWEEP PERFORMANCE:** **FW: 1.5-7.5ms E2E: 1.5-7.5ms CAL: <2s** - Updated build information - Downsample plots to one in every 3 samples - Detect HW errors during FW checks - Bug Fix: Remove expiration date of DevMode - Rescan filesystem each load of Analyze mode - Add and remove runs from list upon file search - Remove debug messaging from file search - Add warnings if a timestamp cannot be parsed - Plot normalized curve fit as position on Figure 1 - Bug Fix: Flip avg viscosity from initial fill data - Bug Fix: Raise PermissionError if port open fails - Bug Fix: Temp set to 0.25 when set to 0.00 - Disable Temp Control timeout if DevMode on - Bug Fix: Temp Control does not stop if port busy - Add ability to define "release" builds in Dropbox - Only offer beta build updates if DevMode is on - Background color yellow on auto-off to read it - Disallow Temp Control if no device is connected - Bug Fix: Stop setting offsets if TEC update fails - Detect when device is open in another program - Disable mode-hopping by default (in Advanced)
v2.6b5	08/24/2023	A. Ross	**SWEEP PERFORMANCE:** **FW: 1.5-7.5ms E2E: 1.5-7.5ms CAL: <2s** - Updated build information - Get MEIPASS path from architecture when frozen - Replace 'progressbar' with custom implementation - Handle post-firmware update messaging better - Use 'progress mode' to do firmware progress bar - Pull resource files from MEIPASS path when available - Catch and report exceptions during Analyze runs - Suppress AutoGraph warnings from tensorflow - Use 'progress mode' for software download progress - Use the appropriate bundled splash screen per build
v2.6b6	09/12/2023	A. Ross	**SWEEP PERFORMANCE:** **FW: 1.5-7.5ms E2E: 1.5-7.5ms CAL: <2s** - Updated build information - Add 'rev' and 'err' to DEV_INFO in config data - Parse 'rev' from INFO command reply at FW check - Remove 'all_velocity' corrections for distances 2/3/4 - Moved creation of TECTask() in MainWindow init() - Force splitter set during initialization to set UI state - Verify user session is still active/valid once an hour - Add warning to stop run before Temp Control edit

v2.6b7	09/17/2023	A. Ross	**SWEEP PERFORMANCE:** **FW: 1.5-7.5ms E2E: 1.5-7.5ms CAL: <2s** - Updated build information - Support for setting both TEMP_CAL factors in FW - Verify checksum from launch.bat for EXE builds - Cache set cal values in SW (once, not per device)
v2.6b8	09/25/2023	A. Ross	**SWEEP PERFORMANCE:** **FW: 1.5-7.5ms E2E: 1.5-7.5ms CAL: <2s** - Updated build information - Analyze table shows light red when too few points - Create CAL output file during Analyze in DevMode - Detect voltage error when Temp Control starts - Improvments to updater to detect bundle type - Ask user to ignore voltage errors if running old HW - BUG FIX: Batch number cannot be changed
v2.6b9	10/03/2023	A. Ross	**SWEEP PERFORMANCE:** **FW: 1.5-7.5ms E2E: 1.5-7.5ms CAL: <2s** - Updated build information - BUG FIX: Conflicting DEVINFO stales init/cal - Check for and resolve any conflicting device infos - Generate CAL file output when Analyze in DEVMODE - CAL file output messaging is INFO level (not red text) - Detect conflicted DEVINFO on port connect/change

v2.6b10	10/10/2023	A. Ross	**SWEEP PERFORMANCE:** **FW: 1.5-7.5ms E2E: 1.5-7.5ms CAL: <2s** - Updated build information - FlasherX.log should be in logged_data folder in EXE - Find resource files relative to working path in EXE - Allow return of ALL params for given BATCH number - Keep track of step direction during Analyze points - Sort points of interest when opening Advanced view - Treat unused markers on right of plot as missing - After Step 2 sort all poi markers by timestamp - Move next marker ahead of last one if out-of-order - Skip over Steps that are for "unused" markers - Do not process skipped points on marker move - Store all found batch params in the audit XML file - Always apply 'CA_offset' regardless of input type - Add axes markers to Figure 1 top plot for readability - Remove debug traces from Figure 1 top plot PDF - Modify calculation of 15MHz high shear datapoint - Update resource files to v3, 2023-10-10 - Support update checks for resource files - Retain build type "_py" vs "_exe" in folder name - BUG FIX: Pull auto calculated values when editing - Highlight manual parameter entries in Run Info - Show a "reset" button for manual Run Info entries - Default contact angle for non-water solvents is 55 - Require audit signature if batch number now found - Indicate batch 'found' bool in audit XML file - Warn if save or close Run Info with bad batch num - Update SW unbundled version to Python 3.10.11
v2.6b11	10/11/2023	A. Ross	**SWEEP PERFORMANCE:** **FW: 1.5-7.5ms E2E: 1.5-7.5ms CAL: <2s** - Updated build information - BUG FIX: High-shear calculation off when 'bad' points - Support flexible array formatting in params lookup file - Use 'all_times' to keep point index order when 'bad' - Refer to 'all_times' instead of 'times' to reference IDX - BUG FIX: Update resource files (see flexible format) - Catch errors extracting resources, still check server - BUG FIX: Download SW zips relative to install folder - Do not extract SW zips relative to working directory - Suppress "Checking entries..." warning in Run Info

v2.6b12	10/31/2023	A. Ross	**SWEEP PERFORMANCE:** **FW: 1.5-7.5ms E2E: 1.5-7.5ms CAL: <2s** - Updated build information and resources - Support for updating multiplex devices - Show progress bar during FW updates - Set 'ethernet_speed' to 3ms for multiplexing - Support multiplex plotting within Worker class - Calibration class uses a single ParserProcess - Support multiple data streams within Serial - Support for multiple plots within MainWindow - Add Multiplex section to Advanced Settings - Pre-query device info for unknown ports at boot - Show progress bar during SW updates - Specify minimumSize of main layout windows - BUG FIX: Auto sign-out failed to revert to login - Add advanced setting "Auto-detect channel count" - Do not print duplicate log messages to console - Refactor get_web_info() to start_download() - **NOTE: Multiplex devices are not fully supported**
v2.6b13	11/03/2023	A. Ross	**SWEEP PERFORMANCE:** **FW: 1.5-7.5ms E2E: 1.5-7.5ms CAL: <2s** - Updated build information and resources - Additional support structures added for multiplex - Firmware update support for multiplex devices - Indicate "Checking device firmware version" at end - Remove 20% and 40% initial fill points from results - Add 30% error bars to high shear rate calculations - Retain 20% and 40% in the calibration output file - Calibration only supports single device for now*** - Serial adds initial support for multiplex file writes - BUG FIX: Ignoring voltage issues stops FW task - BUG FIX: Do not ask user for FW updates on boot - BUG FIX: Indicate session expired on auto logout - Modify Temp Control slider range from 8 - 40 C - **NOTE: Multiplex devices are not fully supported**

v2.6b14	11/10/2023	A. Ross	**SWEEP PERFORMANCE:** **FW: 1.5-7.5ms E2E: 1.5-7.5ms CAL: <2s** - Updated build information and resources - Only indicate SW update as successful on last one - Modified Surface Tension calculation in Analyze - Modified initial samples drop as max of 5 or (y / 30) - Removed 1.1*DENSITY*300 limitation from Analyze - BUG FIX: Error may occur when generating CAL file - Treat exception on port open as a failure in Serial - BUG FIX: Do not show "up-to-date" if user says no - Query temp offsets when setting advanced configs - Look for KeyStore dynamically for update queries - BUG FIX: Show set temp offsets, never "0" (if set) - On session expiration, persist error message on UI - **NOTE: Multiplex devices are not fully supported**
v2.6b15	11/28/2023	A. Ross	**SWEEP PERFORMANCE:** **FW: 1.5-7.5ms E2E: 1.5-7.5ms CAL: <2s** - Updated build information and resources - Get Device returns the most recently modified PID - Primary put into bootloader when updating PID devs - Max speed 20ms/sample when running in multi-mode - Allow for graceful thread close, only terminate if need - Several Analyze bugs fixed causing analyze failures - Calibration refactored to support multiple serial devs - Add support for read_all() to the Device processor - Add support for read_until() to the Device processor - Refactor Serial.py to support multiple serial devices - Allow for multiple Run Info windows after multi run - Prevent 'config' folder stagnation on PID change - Force re-write DEV_INFO file on change of PID - Send a 'MULTI INIT 0' to refresh LCD on PID change - Get age of calibration returns the oldest age for multi - Concentration supports float text format, not just ints - BUG FIX: Some "auto" values are shown as "manual" - **NOTE: Multiplex devices are FULLY SUPPORTED**
v2.6b16	12/12/2023	A. Ross	**SWEEP PERFORMANCE:** **FW: 1.5-7.5ms E2E: 1.5-7.5ms CAL: <2s** - Updated build information and resources - Improved parsing of "INFO" cmd on update check - Variable MAX SPEED parameters for single vs multi - Log USB serial number only on get_source_ports() - BUG FIX: Analyze can throw error if len(visc) is off - Improved parsing of initialization data streams - Indicate on LCD Initialize result: PASS/ERROR/FAIL - Log USB serial number only on query new dev info - Clear MSGBOX on LCD when user clicks "Reset" - BUG FIX: Updating _py installs creates nested dir - Added support for plate configuration on multiplex

v2.6b17	12/19/2023	A. Ross	**SWEEP PERFORMANCE:** **FW: 1.5-7.5ms E2E: 1.5-7.5ms CAL: <2s** - Updated build information and resources - Update from using Python 3.10.11 to 3.11.7 - Refactor code to align with Python 3.11 syntax - Initialize sweep runs from 2.5MHz to 17.5MHz - Initialize results only expects to find 2 peaks now - Resend STREAM on multi if device does not start - Correctly log ambient temperature on multi runs - Clear MSGBOX on primary device only for multi - Reconstruct curve for multi runs with common X - Reduce plot printing for multi devices for speed - Queue TEC state during multi runs to update UI - Process serial bytes one line at a time, not 1 byte - Silently ignore serial lines that do not start with "Q" - Remove debug log about stopping serial streams - Refactor to allow mode hopping with 2 modes only - Disable Plate Configuration button during runs - Only print temperature data from primary device - Make Plate Configuration button a square on UI
v2.6b18	01/05/2024	A. Ross	**SWEEP PERFORMANCE:** **FW: 1.5-7.5ms E2E: 1.5-7.5ms CAL: <2s** - Updated build information and resources - BUG FIX: Multiplex COM detection can get stuck - Base overtone frequency changed from 50 to 25 - BUG FIX: Multiplex only measures 1st mode - Report PID when logging found device config - PY launcher creates symbolic link for logged data
v2.6b19	01/15/2024	A. Ross	**SWEEP PERFORMANCE:** **FW: 1.5-7.5ms E2E: 1.5-7.5ms CAL: <2s** - Updated build information and resources - BUG FIX: Multiplex devices sent wrong frequencies - Auto-detect delimeter of batch params resource file - Apply polynomial correction to initial fill when t > 1s - Calibration and Serial passed wrong index for multi - Multi hopping missing base overtones per cycle - Batch params delimeter changed from tab to comma - Combine amplitude plots during multi measurements

v2.6b20	01/23/2024	A. Ross	**SWEEP PERFORMANCE:** **FW: 1.5-7.5ms E2E: 1.5-7.5ms CAL: <2s** - Updated build information and resources - Prevent selection of uninitialized devices - Add ability to tune PID controller in Constants.py - Correctly set icon on Plate Configuration window - Skip non-existent folders when exporting runs - Add error when looking up device info post run - Check for and remove calibration file in config root - Send TUNE parameters to device on TEC start - Parse new line in TEMP reply with PID parameters - Add new warning text with PID tuning parameters
v2.6b21	02/06/2024	A. Ross	**SWEEP PERFORMANCE:** **FW: 1.5-7.5ms E2E: 1.5-7.5ms CAL: <2s** - Updated build information and resources - Retuned PID parameters in Constants.py
v2.6b22	02/13/2024	A. Ross	**SWEEP PERFORMANCE:** **FW: 1.5-7.5ms E2E: 1.5-7.5ms CAL: <2s** - Updated build information and resources - Added Analyze params to Constants.py to model - Added improved AI data modeling to Analyze - Auto-calculate POIs and jump to Summary - Allow user to "Modify" POIs to manually edit - Add Band-Aid #2 to drop more initial fill points - Comment out lines referencing "disabled" icons - Add icon 'modify.png' for use in Analyze mode - Add model 'ModelData.py' for use in Analyze
v2.6b23	02/21/2024	A. Ross	**SWEEP PERFORMANCE:** **FW: 1.5-7.5ms E2E: 1.5-7.5ms CAL: <2s** - Updated build information and resources - Revised 'avg_in', 'step_size', 'track_width_db' - Changes to ModelData to improve point placement - Increase difference factor to 2.0 all of the time - Run model after Step 1 and Step 2 of Analyze - Added 'MM231106_W7' to batch parameters v11
v2.6b24	02/22/2024	A. Ross	**SWEEP PERFORMANCE:** **FW: 1.5-7.5ms E2E: 1.5-7.5ms CAL: <2s** - Updated build information and resources - BUG FIX: Model data not processing long runs >90s - BUG FIX: New points not applying if model fails

v2.6b25	02/26/2024	A. Ross	**SWEEP PERFORMANCE:** **FW: 1.5-7.5ms E2E: 1.5-7.5ms CAL: <2s** - Updated build information and resources - BUG FIX: Analyze not asking for secondary audits - BUG FIX: Analyze errors if output or CAL file fails - BUG FIX: Clear marker flags on Back button press - BUG FIX: Do not do smoothing if too few fill points
v2.6b26	02/27/2024	A. Ross	**SWEEP PERFORMANCE:** **FW: 1.5-7.5ms E2E: 1.5-7.5ms CAL: <2s** - Updated build information and resources - BUG FIX: Improve model detection of end-of-fill - BUG FIX: Ignore model partial fill if given stop point - BUG FIX: Trust ch1 more than 80% fill point if 'bad'
v2.6b27	03/01/2024	A. Ross	**SWEEP PERFORMANCE:** **FW: 1.5-7.5ms E2E: 1.5-7.5ms CAL: <2s** - Updated build information and resources - Revert step_size and track_width_db - BUG FIX: Exit point selection is too early
v2.6r27	03/05/2024	A. Ross	**SWEEP PERFORMANCE:** **FW: 1.5-7.5ms E2E: 1.5-7.5ms CAL: <2s** - Updated build information and resources - Release candidate build equivalent of v2.6b27 - BUG FIX: Patch issue with install path of updates
v2.6b28	03/13/2024	A. Ross	**SWEEP PERFORMANCE:** **FW: 1.5-7.5ms E2E: 1.5-7.5ms CAL: <2s** - Updated build information and resources - Extend developer mode expiration to 90 days - Modified Surface Tension and Contact Angle formulas - Band-Aid #2: Change thresholds to 15% and 40% - Increase decimal resolution of Surfactant to 5 - Prevent scientific notation in XML for small numbers
v2.6r28	03/13/2024	A. Ross	**SWEEP PERFORMANCE:** **FW: 1.5-7.5ms E2E: 1.5-7.5ms CAL: <2s** - Updated build information and resources - Release candidate build equivalent of v2.6b28
v2.6b29	03/19/2024	A. Ross	**SWEEP PERFORMANCE:** **FW: 1.5-7.5ms E2E: 1.5-7.5ms CAL: <2s** - Updated build information and resources - Added option: Only ADMIN can update SW/FW - BUG FIX: Never offer B-build to R-build EXE - BUG FIX: R-build gets 'stuck' on run if no device

v2.6r29	03/19/2024	A. Ross	**SWEEP PERFORMANCE:** **FW: 1.5-7.5ms E2E: 1.5-7.5ms CAL: <2s** - Updated build information and resources - Release candidate build equivalent of v2.6b29
v2.6b30	04/09/2024	A. Ross	**SWEEP PERFORMANCE:** **FW: 1.5-7.5ms E2E: 1.5-7.5ms CAL: <2s** - Updated build information and resources - Add "hid" module to project requirements - Renamed icon "analyze.png" to "advanced.png" - Added icon "user.png" - Remove strict dependency on "tensorflow" for AI - Add support for HID-compliant serial devices - Use ModelData() to determine good/bad runs - Rename "Info" button to "Run Info" in Analyze - Change "Analyze" icon from gear to start button - Add user icon and name to right side of toolbar - Change "Advanced settings" from text to button - Add support for Help Tutorials in docked sidebar - BUG FIX: Analyze fails if run length ~90 secs - Show relevant Help Tutorials based on app state - BUG FIX: Baseline coefficients are wrong (multi) - Search for HID devices when scanning USB ports - Indicate "Press start then apply drop" to user - Add "View Tutorials" to Help dropdown menu - BUG FIX: Software update check was freezing UI - Add filesystem configuration checks at startup - Add tutorial configuration logic at startup - Indicate "Drop applied!" in SW during measure - Do not preload "tensorflow" unless it is needed - BUG FIX: Cannot reliably clear PID to FF once set - Add ability to show tutorials on application start - Refactor "app_publiser" to "app_publisher" - Show error details if setting active device fails - Add support for using TyUpdater for FW updates
v2.6b31	04/11/2024	A. Ross	**SWEEP PERFORMANCE:** **FW: 1.5-7.5ms E2E: 1.5-7.5ms CAL: <2s** - Updated build information and resources - BUG FIX: SW freezes on run with Temp Control on - BUG FIX: FW update "fails" on COM->HID update - BUG FIX: Hide popup window made by tyUpdater - Report friendly name when doing "Identify" calls - Detect and reassign port if it changes after update - Always use HID 'write_timeout' to avoid app hang - Only close HID port if it was previously opened - Check and open HID port if written to while closed - If using "no" timeout, set it to a max of 15 seconds - If port switches from COM to HID, close serial port - NOTE: Downgrade 'scipy' module to 1.12.0 (buggy)

v2.6b32	04/18/2024	A. Ross	**SWEEP PERFORMANCE:** **FW: 1.5-7.5ms E2E: 1.5-7.5ms CAL: <2s** - Updated build information and resources - BUG FIX: Hide console flashes on app boot - BUG FIX: Runs near 90 secs still cause error - If Analyze load fails, allow manual point selection
v2.6b33	05/13/2024	A. Ross	**SWEEP PERFORMANCE:** **FW: 1.5-7.5ms E2E: 1.5-7.5ms CAL: <2s** - Updated build information and resources - New Dropbox keystore to allow file uploads - Remove 'platform' dependency from mainWindow - BUG FIX: Error during filesystem configuration - Check for 'targets.csv' when doing SW updates - Add 'subprocess' as global import in mainWindow
v2.6r33	05/13/2024	A. Ross	**SWEEP PERFORMANCE:** **FW: 1.5-7.5ms E2E: 1.5-7.5ms CAL: <2s** - Updated build information and resources - Remove strict dependency on "tensorflow" for AI - Add support for HID-compliant serial devices - Use ModelData() to determine good/bad runs - Add user icon and name to right side of toolbar - Add support for Help Tutorials in docked sidebar - BUG FIX: Analyze fails if run length ~90 secs - Search for HID devices when scanning USB ports - Indicate "Press start then apply drop" to user - BUG FIX: Software update check was freezing UI - Add filesystem configuration checks at startup - Indicate "Drop applied!" in SW during measure - Refactor "app_publiser" to "app_publisher" - Add support for using TyUpdater for FW updates - Report friendly name when doing "Identify" calls - If Analyze load fails, allow manual point selection - Check for 'targets.csv' when doing SW updates
v2.6b34	05/17/2024	A. Ross	**SWEEP PERFORMANCE:** **FW: 1.5-7.5ms E2E: 1.5-7.5ms CAL: <2s** - Updated build information and resources - Add Factory Restore Defaults - Add Global AppSettings - Add "Apply Drop Now" to Plot UI - Add "Calibrating..." and "Press Stop" to Plot UI - Remember which Plots are enabled in View menu - Remove unused 'targets' from 'build' in updater - Don't offer dev_mode B-builds an R-build update - Always clear plot status message on stop - Check both frequency and dissipation y_range

v2.6b35	05/21/2024	A. Ross	**SWEEP PERFORMANCE:** **FW: 1.5-7.5ms E2E: 1.5-7.5ms CAL: <2s** - Updated build information and resources - Add temp adjusted factor to CA in Analyze - Track "run finished" during measurements - Compare plot limits to baseline deltas - Show "waiting on other channels..." until ALL done
v2.6r35	05/13/2024	A. Ross	**SWEEP PERFORMANCE:** **FW: 1.5-7.5ms E2E: 1.5-7.5ms CAL: <2s** - Updated build information and resources - Add Factory Restore Defaults - Add Global AppSettings - Add "Apply Drop Now" to Plot UI - Add "Calibrating..." and "Press Stop" to Plot UI - Remember which Plots are enabled in View menu - Remove unused 'targets' from 'build' in updater - Don't offer dev_mode B-builds an R-build update - Always clear plot status message on stop - Check both frequency and dissipation y_range - Add temp adjusted factor to CA in Analyze - Track "run finished" during measurements - Compare plot limits to baseline deltas - Show "waiting on other channels..." until ALL done
v2.6b36	05/23/2024	A. Ross	**SWEEP PERFORMANCE:** **FW: 1.5-7.5ms E2E: 1.5-7.5ms CAL: <2s** - Updated build information and resources - Reducing the fill region cut-off from 0.15-0.4 to 0.1 - The correction for viscous materials is disabled - Breakout 'default_diff_factor' to constants.py - Revert 15MHZ high-shear viscosity calculation
v2.6r36	05/23/2024	A. Ross	**SWEEP PERFORMANCE:** **FW: 1.5-7.5ms E2E: 1.5-7.5ms CAL: <2s** - Updated build information and resources - Reducing the fill region cut-off from 0.15-0.4 to 0.1 - The correction for viscous materials is disabled - Breakout 'default_diff_factor' to constants.py - Revert 15MHZ high-shear viscosity calculation