

What's New in OPEN 6.3

A summary of software changes for the LI-6400XT

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Match Mode Changes

Match is a Log Option

Matching is now one of the Log Options, so the option to automatically match is a part of logging *all* the time, whether manually logging, or using an AutoProgram. The sequence of events triggered by log is illustrated in Figure 1.

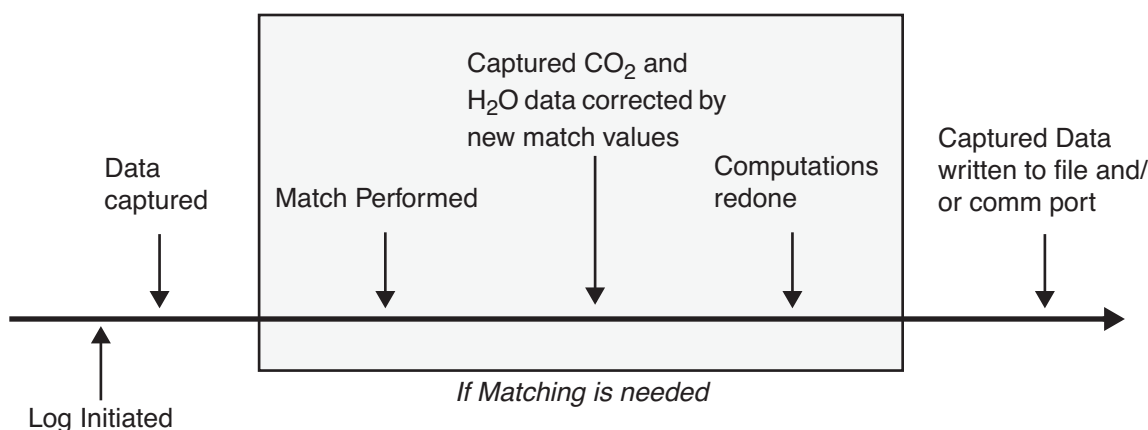


Figure 1: The sequence of events between the time Log is initiated, and data is recorded. If the log options and conditions dictate a match, data is not actually written to file until the match is done. Instead, data captured before the match is adjusted for the new match values, all computations are redone, and results written to file.

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LI-COR Biosciences • 4647 Superior Street • P.O. Box 4425 • Lincoln, Nebraska 68504
Phone: 402-467-3576 • FAX: 402-467-2819
Toll-free 1-800-447-3576 (US & Canada)
envsales@licor.com • envsupport@licor.com
www.licor.com

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A big advantage of this (especially during most AutoPrograms) is that one of two equilibration wait times is removed. Prior to 6.3, the procedure would be to wait for stability, then match, then wait for stability again, then log. In version 6.3, you wait for stability once, then log. If matching is needed, it happens right then, and the logged results automatically corrected. Eliminating that second wait for equilibration can make for significant time savings.

Version 6.3 also does away with the built-in “recovery” time between the actual match and when match mode is exited, for both manual and autoprogram matching.

We illustrate this new sequence with strip charts recorded while running A-CiCurve2 (Figure 2).

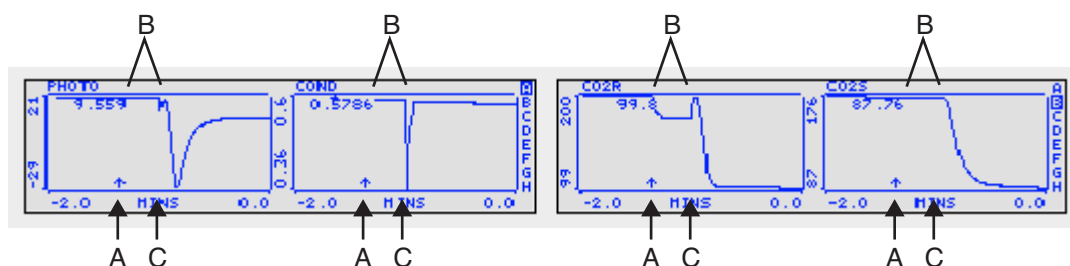


Figure 2: The single log event (A) is shown as an \uparrow on each chart. Match mode (B) only shows up on the CO2R chart. CO2S doesn't change because it shouldn't. Notice that PHOTO and COND don't change either until match is done, because user computations are not updated during matching. When the 10 second average in match mode is over (C), match mode ends immediately, the logged values are actually written to file, and CO2R goes to the next concentration.

In the Log Options interface, the match configuration presents three options: **always**, **never**, or **conditional** (Figure 3).

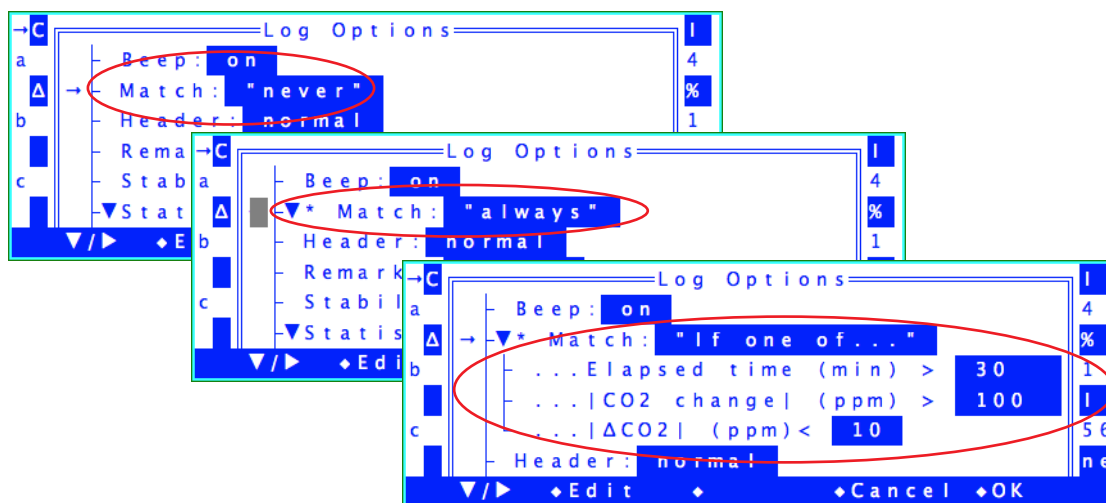


Figure 3: Matching can be always (every time log occurs, whether manual or automatic), never, or conditional: Match if a) it's been more that x seconds since the last match, or b) if CO₂ reference has changed more than y ppm, or (c) if the CO₂ differential is less than z ppm.

Match Uses an Average

Prior to 6.3, matching was based on a single reading¹. Now, you can specify an averaging time to determine the match value, and the default value is 10 seconds. This is accessible in the matching settings node of the system configuration (Figure 4).

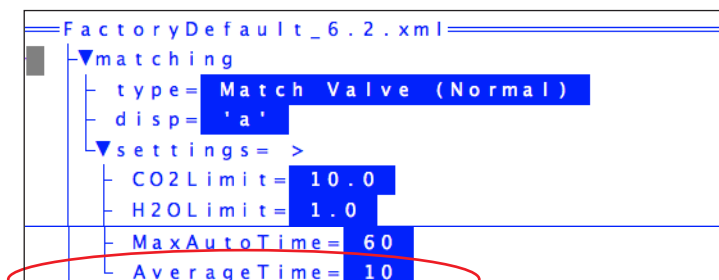


Figure 4: Matching options found in the configuration tree now includes the averaging time when comparing sample and reference readings.

Standard deviations of **CO2R**, **CO2S**, **H2OR**, and **H2OS** during the averaging time of the most recent match are available as system variables **CrMchSD**, **CsMchSD**, **HrMchSD**, and **HsMchSD** (IDs -116 through -119). These are part of the manual match display after a match is performed and are logged in data files (Figure 5). They are also available in the new Diagnostic Display (Figure 6). These standard deviations are useful for determining the quality of a particular match, or seeing which channel(s) were not stable during a match, etc.

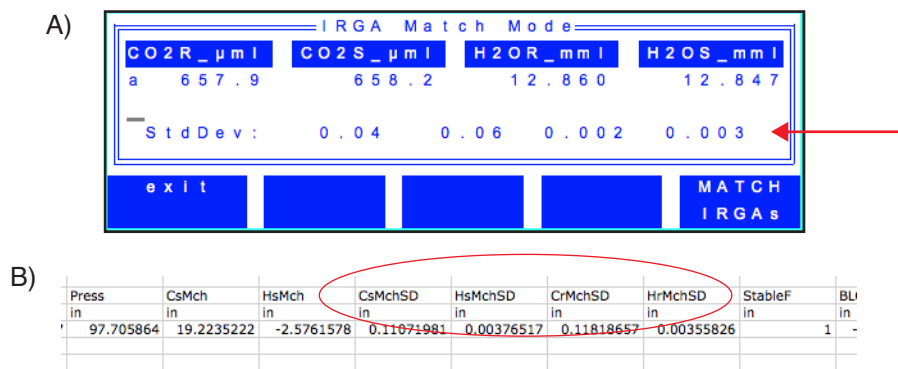


Figure 5: The standard deviations of the CO₂ and H₂O reference and sample readings during the match averaging period can be viewed A) in match mode following a match, prior to exiting, or B) in the log file.

1. Well, not really a single reading, since each reading is a running average (4 seconds by default) of hundreds of samples.

New Diagnostic Display

version 6.3 adds a New Measurements Diagnostic display at level J that contains a number of system variables related to matching. (Figure 6).

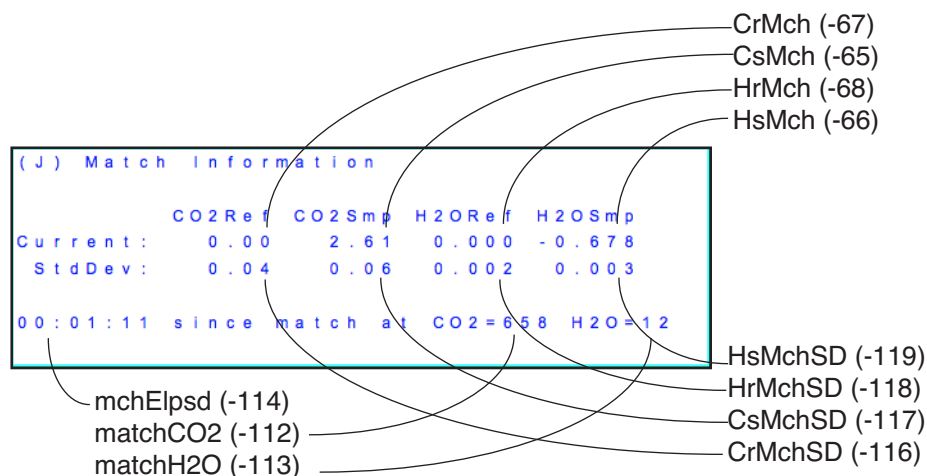


Figure 6: The new Match Mode diagnostic display shows the value of 11 system variables, shown here with system IDs and display labels.

Matching in AutoPrograms

OPEN 6.3 makes no changes to any AutoPrograms from version 6.2, but they do appear and behave slightly differently. Specifically, when setting up a 6.2 generation AutoProgram (A-CiCurve2, LightCurve2, etc.), matching will no longer appear in the Summary node, but instead will be in the Log Opts node (Figure 7).

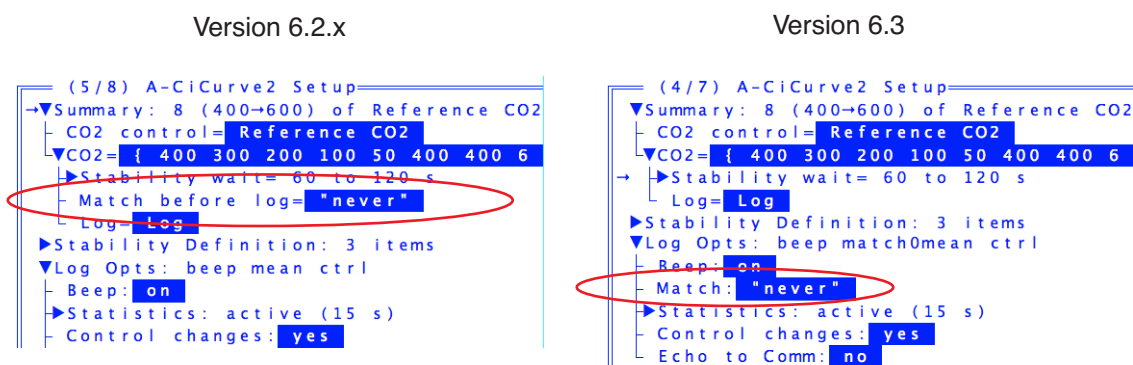


Figure 7: Comparison of the setup for A-CiCurve2 under version 6.2 (left) and 6.3 (right): The match node moves down into the Log Opts node.

Table 1 shows the AutoProgram commands available in version 6.3 for matching and logging.

Table 1: OPEN 6.3 AutoProgram match and log commands

Command	Change	Comments
LPLog	Changed	Logs, followed by match, depending how match is set in Log Options
LPLogWithMatch	New in 6.3	Logs, followed by match, regardless of how match is set in Log Options.
LPLogWithoutMatch	New in 6.3	Logs without match, regardless of how match is set in Log Options.
LPMatch	No Change	Does a match. No logging.
LPMatchIf	Disabled	This unpublished command appears in A-CiCurve2, LightCurve2, AutoLog2, CO2Curve_MultipleLight, and LightCurve_MultipleCO2. In 6.3 it is disabled, since LPLog now includes that same functionality.

Miscellaneous Changes

CO₂ Control Resolution

Version 6.3 increases the effective control resolution of the CO₂ mixer by a factor of 5. This along with some tweaks to the algorithm make the CO₂ control smoother, and all but eliminates the 1.5 ppm jumps that one might see whenever the mixer drifted slightly and needed to get back on target.

Temperature Control Resolution

The temperature control resolution (block and leaf) used to be 0.2°C. It is now < 0.1°C.

Remarks and Excel Files

Starting in version 6.3, if remarks are directed to a separate remarks file (a Log Option), then they will *not* appear in the Excel file.

/User full Warning

If the /User disk becomes more than 90% full, OPEN's main screen will bring this to your attention (Figure 8).



Figure 8: /User disk space is shown in inverse when > 90% full. Above 95%, the message will be blinking as well.