



MAP 201

Greetings from ECD-U!

The session will begin at the scheduled time.

As a courtesy to others on the session **PLEASE** be sure:

1. Your audio is connected via phone or VoIP before the scheduled class time,
2. Your phone is on MUTE during the session.
Please do NOT put your phone on HOLD

If you would like to ask a question, please use the "chat" feature on your Go-To-Meeting dialog

*This session may be recorded for training or distribution

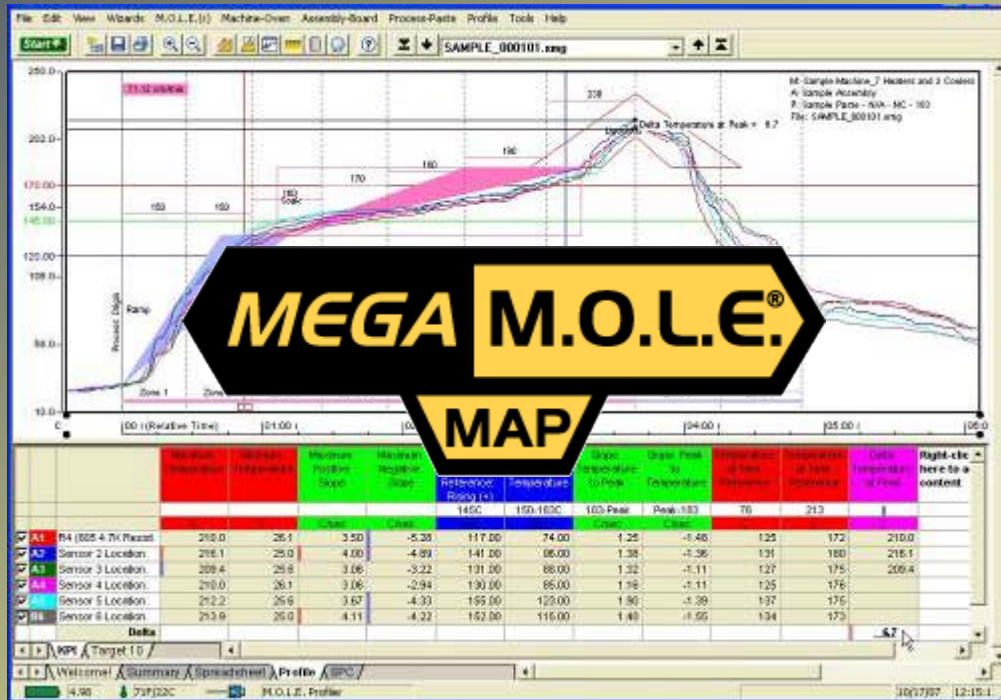




Home of the M.O.L.E.® Profiler

MAP 201

Current version
 MAP 2.20d
 Download at
www.ECD.com





Where ECD - University

Product Design
& Development

New Product
Introduction

Production

Machine
Maintenance

Requirements

Characterization

Verification



Profile
Specification

Recipe
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Profiling A to Z

Profiling 201

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Profiling 101

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OvenRIDER®

M.A.P. 101

WaveRIDER®

Profiling 301

M.A.P. 301

OvenCHECKER®



MAP 201

Thermal Quality Management

Reduce Scrap and Increase Yields

Requirements

Characterization

Verification

Stage 1 Define Requirements

Why do we profile?

- Identify heat sensitive components
- Choose soldering technology

Stage 2 Machine Recipe Development

What is the oven recipe?

- Develop machine settings required for production that meet the above requirements
- Assure all solder joints experience the required temperature profile
- Assure sensitive components do not experience long term damage

Stage 3 Collect Data

How are we doing?

- Assure the temperature profile developed during characterization is being repeated
- Proof your thermal process is in control





MAP 201

Agenda

- **Introduce Wizards:**
 - **"Create T10 Spec"**
 - **"Verify Process"**
- **Data Extractions**
- **Profile Setup**
- **MAP "Preferences"**



MAP 201

What is MAP?

MAP is an ECD acronym for “Machine, Assembly, Process.”



Machine is the Reflow Oven.



Assembly is the Printed Circuit Board.



Process is the thermal “profile” specified by the Solder Paste manufacturer for proper reflow.

At ECD, our mission is to help the Process Engineer to “Optimize Machine, Assembly, and Process.”



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MAP 201

MAP “Engineer” Work Flow Options

MAP “Verify” Work Flow Options

Fresh
Start

Enter MAP information before performing the data run.

Tweak
Existing

Copy MAP information before performing the data run.

Create
T10 Spec

Create a specification file from an existing data run.

Download
Data

Enter MAP information after performing the data run.

Verify
Process

Set up a M.O.L.E. to verify a process by pressing the “OK” button.



MAP 201

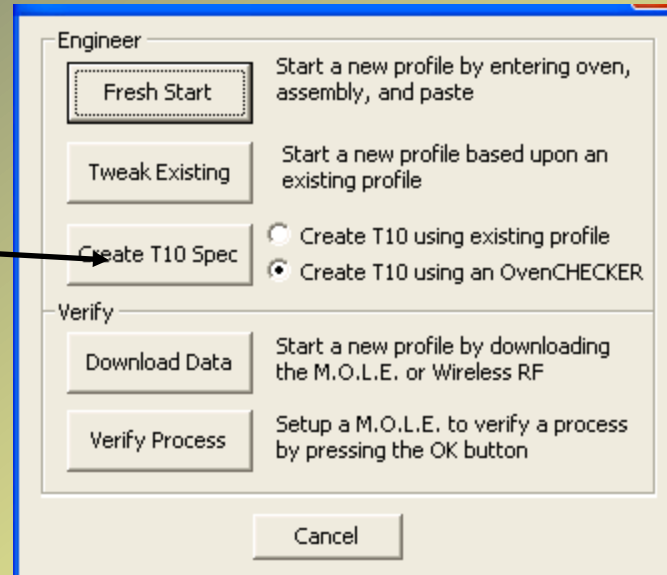
"Create T10 Spec" Wizard



MAP 201

Create Specification

The engineer can create a verification specification file in engineer mode by clicking here





MAP 201

Select an instrument to be used for the verification process here.

Then click on next

The screenshot shows a software window with a blue border. On the left side, there is a vertical list of options: a yellow square next to 'Select Instrument Type', a green square next to 'Select Data Run', and a blue square next to 'Select Verification Channels'. Above this list is a small image of a handheld electronic device. To the right of the image is a dropdown menu labeled 'Select Instrument Type:' with 'V-M.O.L.E.' selected. At the bottom of the window, there are four buttons: 'Help', '<< Previous', 'Next >>', and 'Cancel'. Two black arrows point from the text on the left to the 'Select Instrument Type:' dropdown and the 'Next >>' button.



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Select a file from the list to use for the target profile.

NOTE:

As you hover over the file, an image of the assembly used to create this file is shown, (if previously saved) to assist in file selection. When the desired file is highlighted, click "Next"

Select Data Run:

File Name	M
CMPTRNAME3.xmg	
ECD_20ch_Sample1.xmg	
ECD_6ch_Sample1.xmg	
ECD_6ch_Sample2.xmg	
ECD_6ch_Sample3.xmg	
Glara MTBT-2-8S1.xmg	
Lon_test1.xmg	
MM_LON_.xmg	
MM_LON_1.xmg	
MM_LON_10.xmg	Your Assembly Number
MM_LON_11.xmg	Your Assembly Number
MM_LON_12.xmg	Your Assembly Number
MM_LON_13.xmg	Your Assembly Number
MM_LON_14.xmg	Your Assembly Number
MM_LON_15.xmg	Your Assembly Number
MM_LON_16.xmg	Your Assembly Number

Buttons: Help, << Previous, Next >>, Finish, Cancel



MAP 201

A dialog box will appear that allows the engineer to select which channels of the profile run to use in Target10 file. You can use as many channels for the target file as you have in the MOLE to do the verify process.

Select channels to verify:

Channel	Location	X	Y	Z	Verify Channel
A1	Sensor 1	7.41	8.28	0.00	
A2	Sensor 2	5.13	5.47	0.00	
A3	Sensor 3	3.12	1.72	0.00	
A4	Sensor 4	7.52	4.74	0.00	
A5	Sensor 5	4.96	2.26	0.00	
B6	Sensor 6	7.08	7.37	0.00	
B7	Sensor 7	6.16	6.24	0.00	
B8	Sensor 8	3.45	2.23	0.00	
B9	Sensor 9	7.16	4.42	0.00	
B10	Sensor	3.59	5.07	0.00	
C11	Sensor	6.88	8.47	0.00	
C12	Sensor	5.71	5.95	0.00	
C13	Sensor	3.01	2.74	0.00	
C14	Sensor	7.97	5.04	0.00	
C15	Sensor	3.93	3.83	0.00	
D16	Sensor	7.00	7.74	0.00	

Legend:

- Select Instrument Type
- Select Data Run
- Select Verification Channels

Buttons: Help, << Previous, Next >>, Finish, Cancel



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As each channel is selected, a dropdown list appears to allow the user to select channel assignment for the verify profiler.

Select channels to verify:

Channel	Location	X	Y	Z	Verify Channel
A1	Sensor 1	7.41	8.28	0.00	
A2	Sensor 2	5.13	5.47	0.00	
A3	Sensor 3	3.12	1.72	0.00	
A4	Sensor 4	7.52			
A5	Sensor 5	4.96			
B6	Sensor 6	7.08			
B7	Sensor 7	6.16			
B8	Sensor 8	3.45	2.23	0.00	
B9	Sensor 9	7.16	4.42	0.00	
B10	Sensor	3.59	5.07	0.00	
C11	Sensor	6.88	8.47	0.00	
C12	Sensor	5.71	5.95	0.00	
C13	Sensor	3.01	2.74	0.00	
C14	Sensor	7.97	5.04	0.00	
C15	Sensor	3.93	3.83	0.00	
D16	Sensor	7.00	7.74	0.00	

The dropdown menu for channel A4 is open, showing options 1, 2, and 3. An arrow points from the dropdown to the 'Verify Channel' column header.

Buttons: Help, << Previous, Next >>, Finish, Cancel



MAP 201

After the verify channels are OK as is and assigned, click "Finish"

Select channels to verify:

Channel	Location	X	Y	Z	Verify Channel
A1	Sensor 1	7.41	8.28	0.00	
A2	Sensor 2	5.13	5.47	0.00	3
A3	Sensor 3	3.12	1.72	0.00	
A4	Sensor 4	7.52	4.74	0.00	2
A5	Sensor 5	4.96	2.26	0.00	
B6	Sensor 6	7.08	7.37	0.00	1
B7	Sensor 7	6.16	6.24	0.00	
B8	Sensor 8	3.45	2.23	0.00	
B9	Sensor 9	7.16	4.42	0.00	
B10	Sensor	3.59	5.07	0.00	
C11	Sensor	6.88	8.47	0.00	
C12	Sensor	5.71	5.95	0.00	
C13	Sensor	3.01	2.74	0.00	
C14	Sensor	7.97	5.04	0.00	
C15	Sensor	3.93	3.88	0.00	
D16	Sensor	7.00	7.74	0.00	

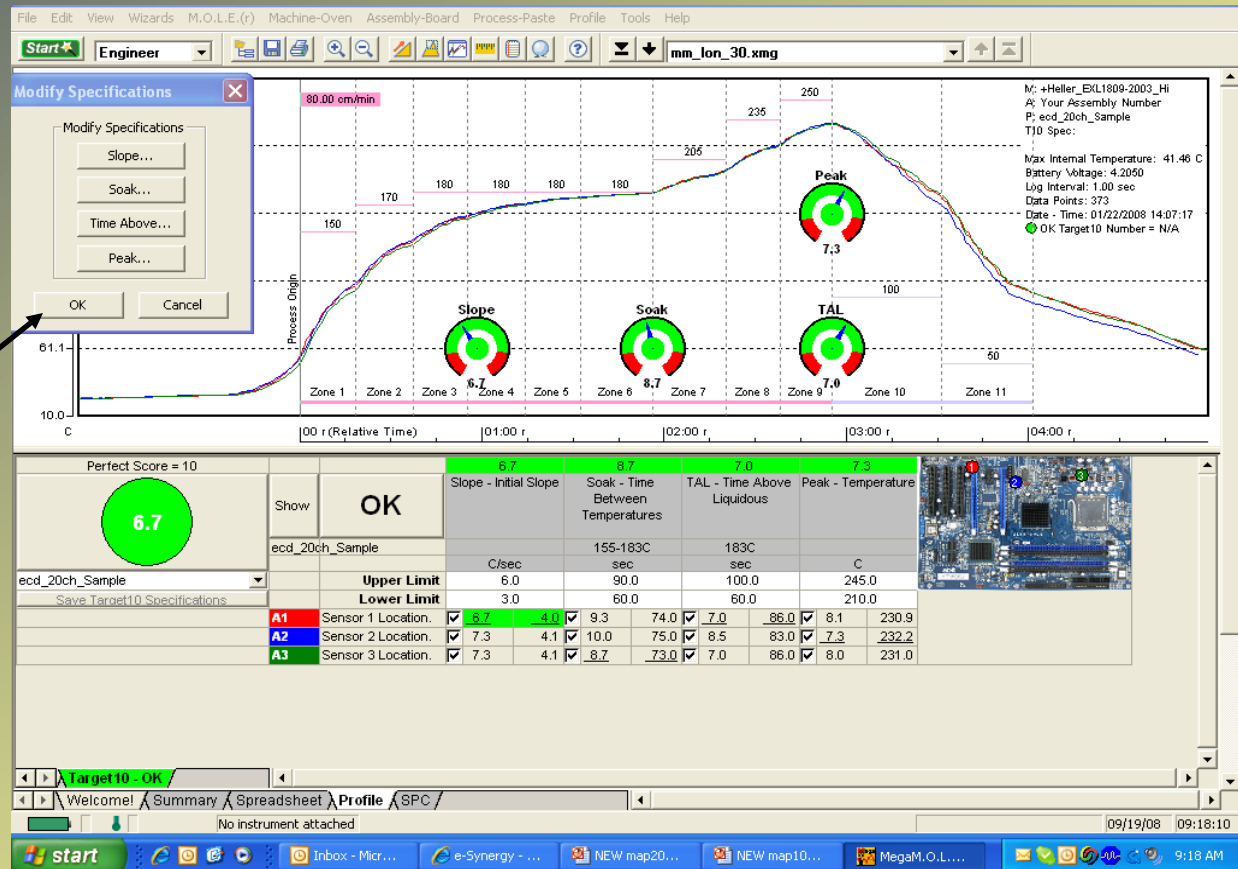
Buttons: Help, << Previous, Next >>, Finish, Cancel



MAP 201

The engineer gets a another chance to make adjustment to the Target10 profile.

When the desired Target10 file is ready, click OK





MAP 201

The "Setup Verification Specification File" dialog box will appear showing the Target10 value.

If desired and the verification MOLE is connected, (USB or RF), the file can be loaded to the MOLE here by clicking "Sent to MOLE"

The screenshot shows the 'Setup Verification Specification File' dialog box with a large green circle containing the value '1.3'. An arrow points from the text on the left to this circle. The dialog box contains the following information:

- File: mm_jon_18.xmg
- Machine Name: +Heller_EXL1809-2003_HI
- Assembly Part Number: UCLA
- Process Name: UCLA_SPEC
- Buttons: Send to MOLE, Help, << Previous, Next >>, Finish, Cancel

Below the dialog box, a data table is visible with the following columns and values:

	1.3	7.3	9.0	7.9
Slope - Initial Slope	1.3	5.6	9.3	76.0
Soak - Time Between Temperatures	3.3	5.5	8.7	77.0
TAL - Time Above Liquidous	3.0	60.0	60.0	9.0
Peak - Temperature	8.7	4.3	7.3	71.0
Upper Limit	6.0	90.0	100.0	245.0
Lower Limit	3.0	60.0	60.0	210.0
Sensor 1 Location	1.3	5.6	9.3	76.0
Sensor 2 Location	3.3	5.5	8.7	77.0
Sensor 3 Location	8.7	4.3	7.3	71.0

The interface also shows a graph on the right with a 'Zone 11' label and a 'Target 10 - OK' status bar at the bottom.



MAP 201

A dialog box appears which allows the engineer to save the Target10 file.

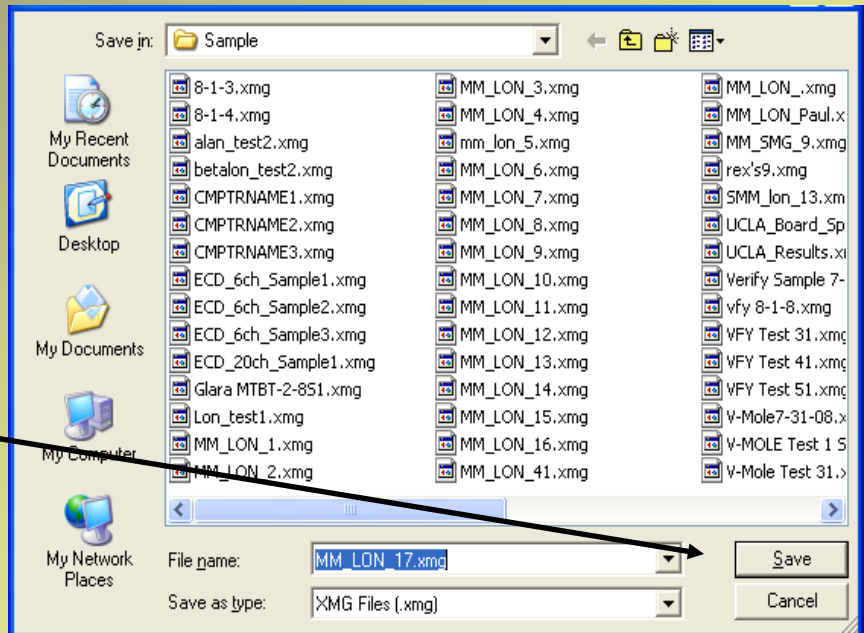
Any naming convention can be used.

This file will also include all the information about the profile including:

Oven settings, Assembly information and image and Target10 specifications

Click "Save"

This makes a file containing only the selected channels from the previous step





MAP 201

"Verify Process" Wizard



MAP 201

VERIFY PROCESS

The operator can start the Verify Process here

Engineer	
<input type="button" value="Fresh Start"/>	Start a new profile by entering oven, assembly, and paste
<input type="button" value="Tweak Existing"/>	Start a new profile based upon an existing profile
<input type="button" value="Create T10 Spec"/>	<input type="radio"/> Create T10 using existing profile <input checked="" type="radio"/> Create T10 using an OvenCHECKER
Verify	
<input type="button" value="Download Data"/>	Start a new profile by downloading the M.O.L.E. or Wireless RF
<input type="button" value="Verify Process"/>	Setup a M.O.L.E. to verify a process by pressing the OK button
<input type="button" value="Cancel"/>	



MAP 201

The operator selects the Target10 file developed during the "Create T10 Spec" wizard.

NOTE: the assembly image will appear when the file is the mouse passes over the file to assist in proper file selection

Select Data Run:

File Name	Machine	
alan_test2.xmg	+ATS_XLA10-9_On	
betalon_test2.xmg	+Heller_EXL1809-200	
ECD_20ch_Sample1.xmg	+Heller_EXL1809-200	
Glara MTBT-2-8S1.xmg	Vitronics_XPM3-1240	
Lon_test1.xmg	+Vitronics_XPM2_XA	
MM_LON_.xmg	+Electrovert_OmniFlo	
MM_LON_1.xmg	+ATS_XLA10-9_On	
MM_LON_11.xmg	+ATS_XLA10-9_On	
MM_LON_13.xmg	+ATS_XLA10-9_On	
MM_LON_14.xmg	+ATS_XLA10-9_On	
MM_LON_15.xmg	+Heller_EXL1809-200	
MM_LON_16.xmg		
MM_LON_2.xmg	+ATS_XLA10-9_On	Your Assembly Number
MM_LON_3.xmg	ATS_XLA10-9_On	Your Assembly Number

Lon_test1.xmg

Help << Previous Next >> Read Cancel



MAP 201

This dialog provides setup confirmation for the M.O.L.E.

It displays all relevant settings and conditions for the upcoming data run.

“**Stop**” means something needs attention. Items shown in **RED** need attention

“**Go**” means the profiler is ready to record

The screenshot displays the MAP 201 software interface. On the left, a list of steps is shown with colored squares: green for 'Select Instrument', 'Select Target10 Spec', and 'Show Results'; yellow for 'Verify Instrument Status'; and blue for 'Perform Data Run' and 'Read Data Run'. A red 'STOP' sign is visible in the top right corner, indicating a warning. The central display shows a profiler device with a thermometer icon and the text '76F/24C' and '4.17 Volts'. The device is connected via USB. The right side of the interface shows setup details: 'Setup T10: MAP 201.T10', 'Date: Apr 02, 2010', 'Time: 16:28:56', 'Interval:00:00:01.0', 'Record Pts: Continuous', 'Trigger: None', 'Delay: 0 points', 'Channels On: 3', 'History Information', 'Firmware: 10.51', 'Cal. date: Nov 18 2009', 'Mole Serial: 10000002', 'Mole run count: 171', 'Mole Runtime: 245 hr'. A 'Refresh' button is located in the top right corner. At the bottom, there are buttons for 'Help', '<< Previous', 'Next >>', 'Finish', and 'Cancel'.

Note: Display of T/C status, Internal Temp., Battery Status., Cal date.



MAP 201

The wizard then instructs to perform the actual data run.
At this screen Oven Set Points can also be confirmed

Place the assembly with the instrument into the machine.
Once the run is completed, reconnect the instrument to the computer.

- Select Instrument
- Select Data Run
- Verify Instrument Status
- Perform Data Run
- Read Data Run

HELLER

Temperature Units: C Conveyor Speed: 70.0 cm/min

	1	2	3	4	5	6	7	8	9	10	11
Top	300	300	300	300	300	300	350	350	350	102	102
Bottom	300	300	300	300	300	300	350	350	350	102	102

Help << Previous Next >> Read Cancel



MAP 201

After removing the assembly from the oven and the profiler from the barrier, the operator hits the "OK" button.

The led flashes Red/Green while "thinking"

This OK Test is only done on the most recent data run stored in the MOLE.

If the light comes back **green**, the process is ready for production.

If the light comes back **red**, the operator can elevate the issue to an engineer





MAP 201

After the profile run, plug the profiler back into the computer to download but hitting Next

Place the assembly with the instrument into the machine.
Once the run is completed, reconnect the instrument to the computer.

- Select Instrument
- Select Data Run
- Verify Instrument Status
- Perform Data Run
- Read Data Run

Temperature Units: C Conveyor Speed: 70.0 cm/min

	1	2	3	4	5	6	7	8	9	10	11
Top	300	300	300	300	300	300	350	350	350	102	102
Bottom	300	300	300	300	300	300	350	350	350	102	102

Help << Previous Next >> Read Cancel

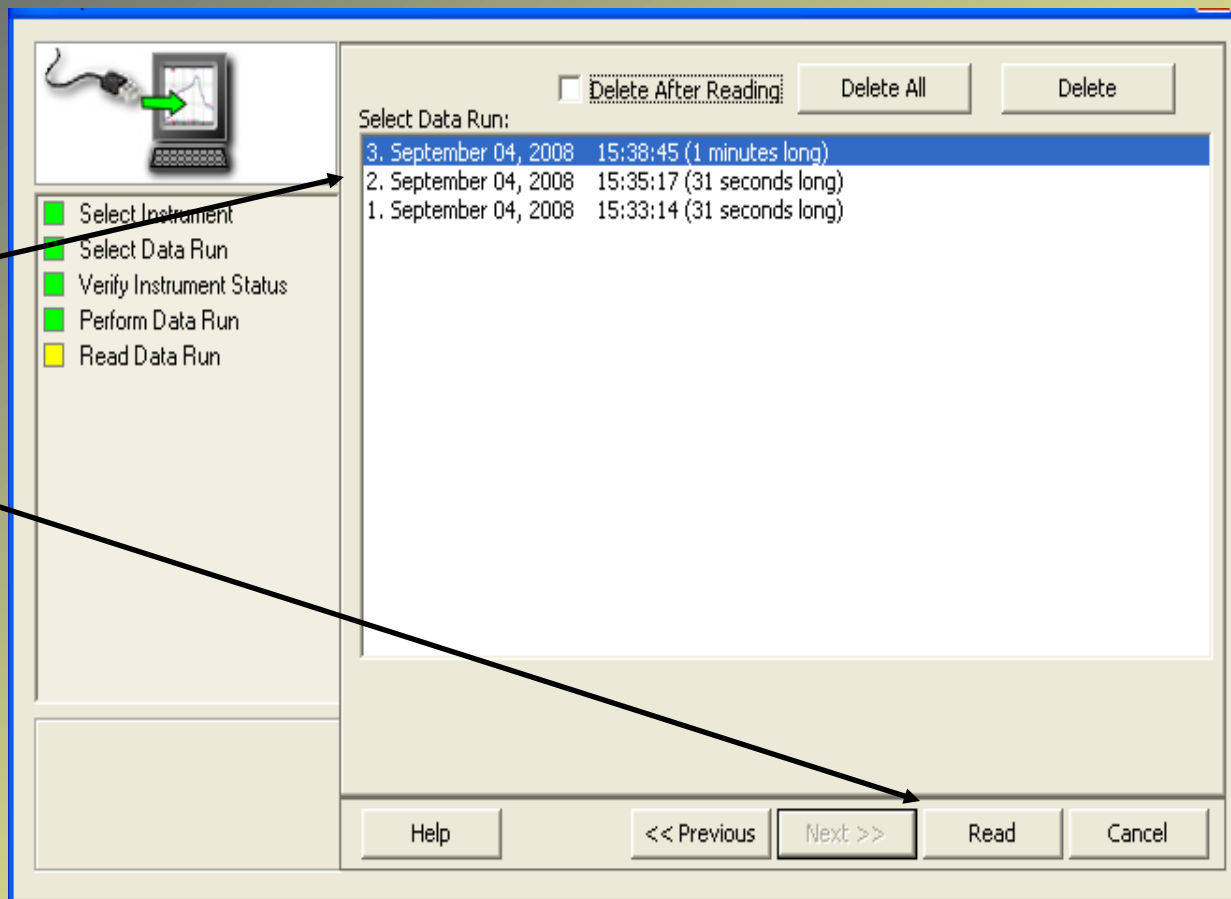


MAP 201

This dialog prompts you to download the data.

Choose the desired run, and press the "Read" button to continue.

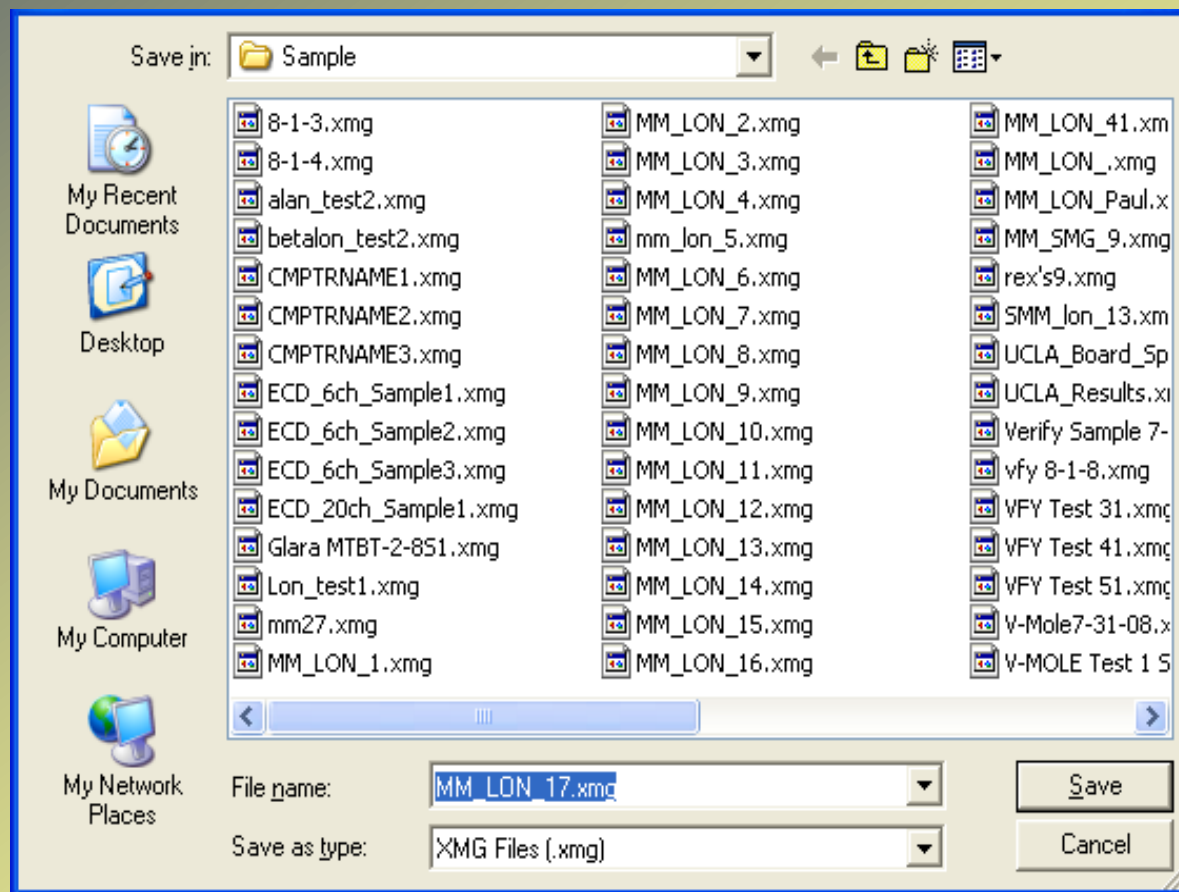
This dialog box also gives the user the option to erase files after download. Or delete all files





MAP 201

After the download is complete you will be prompted to enter a unique name for the verify results data file. If you choose not to enter a file name, the default generic name will be applied automatically.





MAP 201

The "Verify Process" dialog box will appear showing the verify run results including Target10 value.

Click "Finish" to continue

The screenshot shows the M.O.L.E.(r) software interface. The 'Verify Process' dialog box is the central focus, displaying a red octagonal stop sign with the value '-80.7' in white. The dialog text reads: 'The following file has been saved. File: mm_save_ok.xmg. Machine Name: +Heller_EXL1809-2005_Hi. Assembly Part Number: Enter part number here. Process Name: ecd_20ch_Sample'. Below the dialog is a table with sensor data.

Read from MOLE	Send to MOLE	A1	Sensor 1 Location.												
		A2	Sensor 2 Location.	✓	-11.3	1.3	✓	-54.0	171.0	✓	8.3	80.0	✓	4.3	217.5
		A3	Sensor 3 Location.	✓	-11.3	1.3	✓	-57.3	176.0	✓	8.3	80.0	✓	4.6	218.0
		A4	Sensor 4 Location.												
		A5	Sensor 5 Location.												
		B6	Sensor 6 Location.	✓	-11.3	1.3	✓	-66.0	189.0	✓	10.0	84.0	✓	5.4	219.5
		B7	Sensor 7 Location.	✓	11.3	1.3	✓	68.7	193.0	✓	9.6	85.0	✓	5.7	220.0

At the bottom of the dialog, there are buttons for 'Help', '<< Previous', 'Next >>', 'Finish', and 'Cancel'. A black arrow points from the text 'Click "Finish" to continue' to the 'Finish' button.

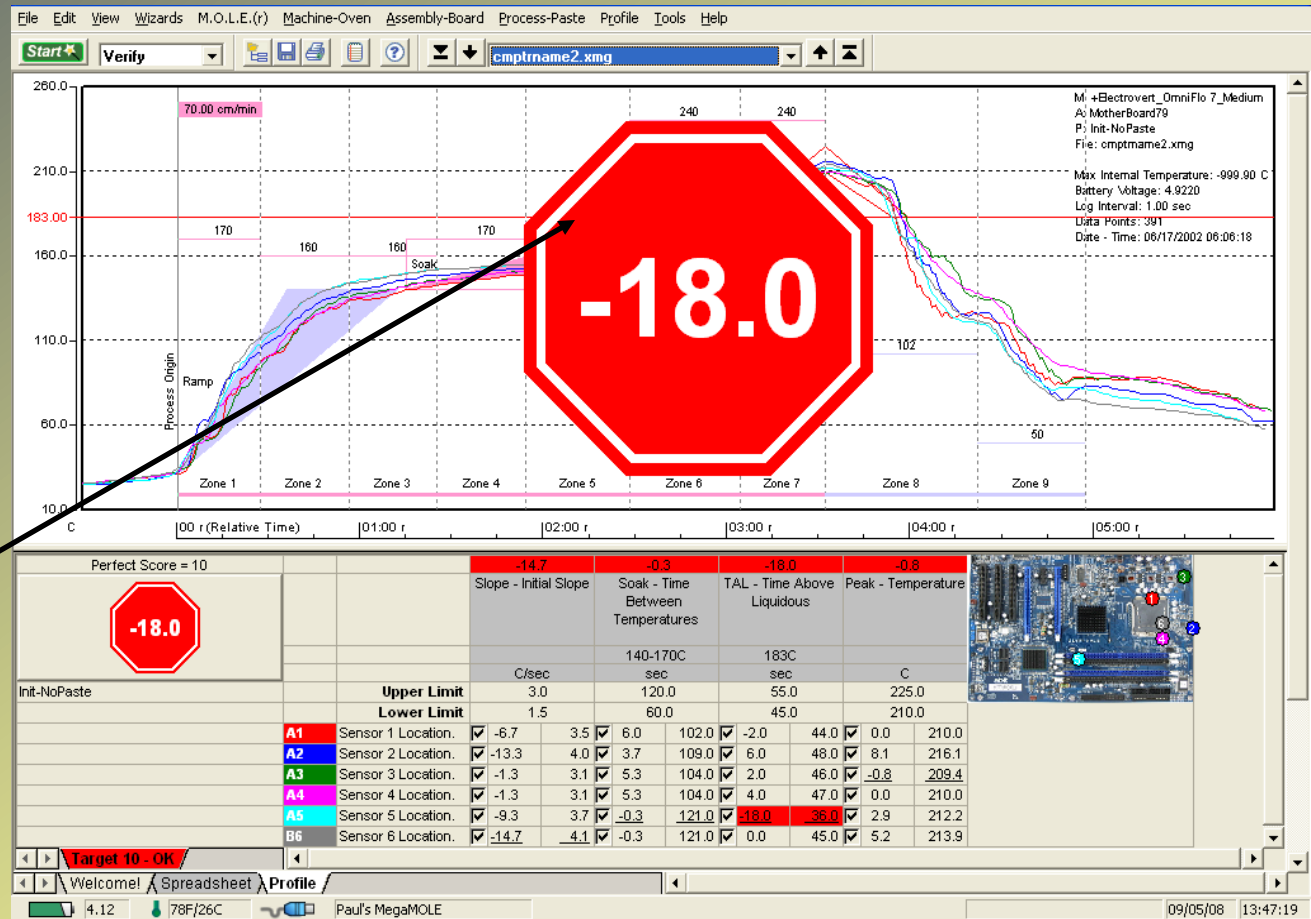
IMAGE NOT AVAILABLE



MAP 201

The verification profile will be displayed in the Target10 Tab for the operator to store or print out with a report if "OK" or Ready for the engineer to use to drill down to resolve issues of RED

Click on the red or green figure to dig down deeper into the data

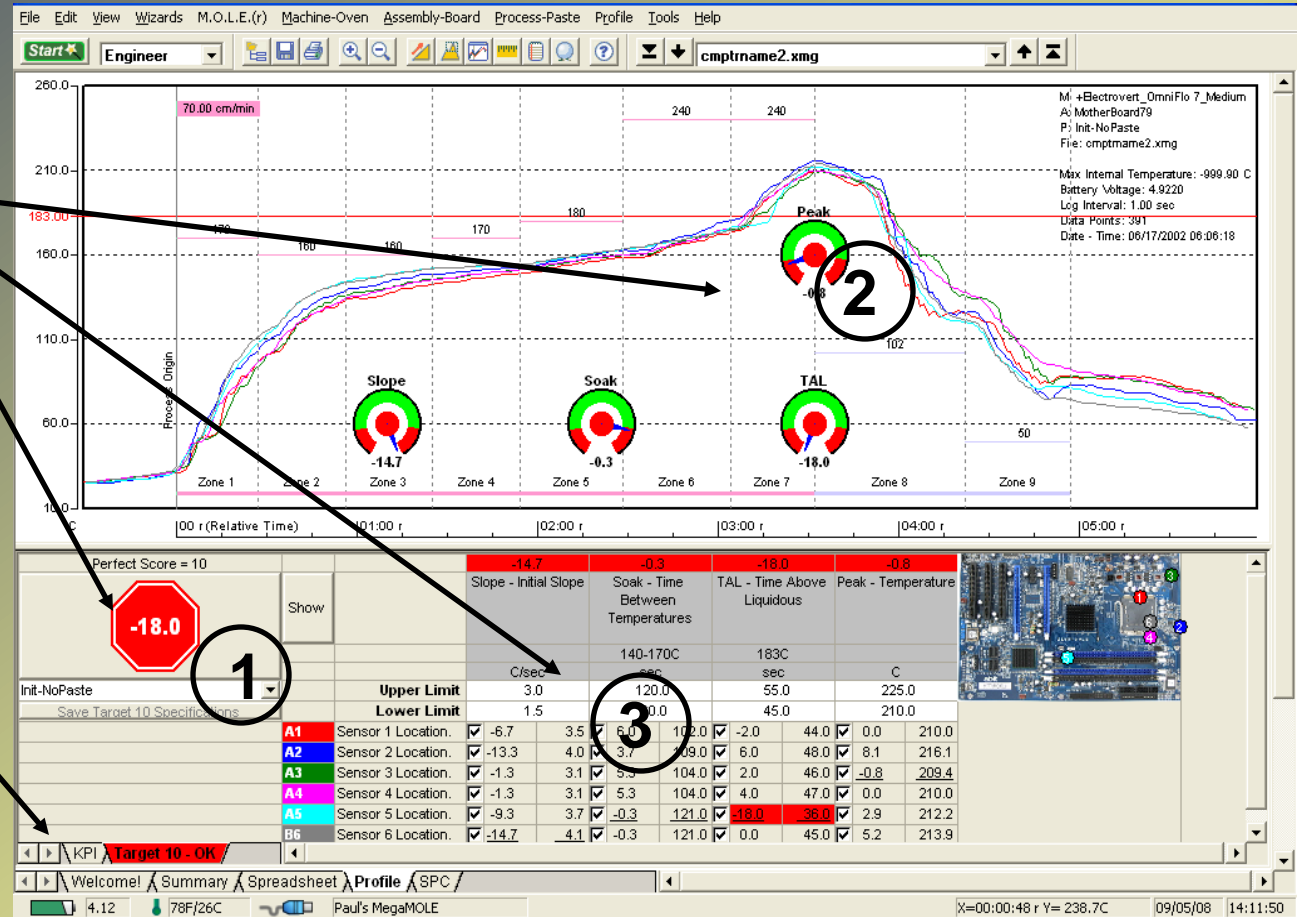




MAP 201

The engineer can now use the three levels of detail to evaluate the area/s of concern.

Or click the KPI TAB for customizable data extraction





MAP 201

Data Extractions



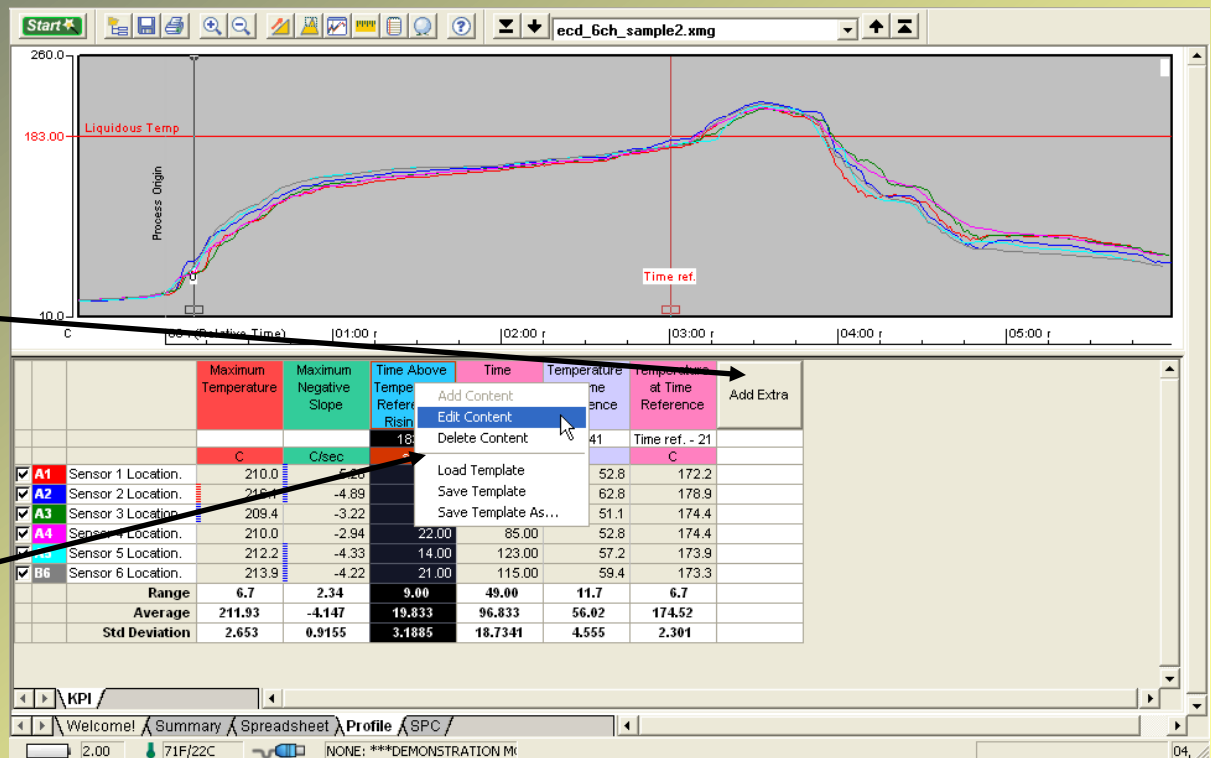
MAP 201

Extracting data from your profile...

The Data Tab is customizable to extract specific data from each profile.

To add a calculation press the “Add Extra” button to launch the calculation wizard.

To edit existing calculations, right click the title bar of the data column.





MAP 201

The Calculation Wizard

Data Extractions:

❖ Time

1. Minimum
2. Peak
3. At time reference

❖ Temperature

1. Time to Temp.
2. Time between Temps
3. Time above Temp.

❖ Slopes

1. Minimum
2. Maximum
3. Between Time references
4. Between Temperatures
5. In oven zones

❖ Deltas

1. Maximum
2. At peak
3. At Time reference

❖ Integral

1. Total Heat Between Temperatures

Select your calculation category:

Y-Axis values are usually for a specific point or extremes.
X-Axis values are typically times or times between events.
Slopes are typically the rates things are changing.

Text

Temperature Value (Y): Minimum, Peak, At Time Reference

Time Value (X): Time To, Time Between, Time Above

Slope (dY/dX): Maximum, Minimum, Between Time References

Temperature (Y) Delta: Maximum Delta, Delta at Peak

Speed (distance/time): Conveyor Speed

Integral (Y*time): Total Heat, Area Under Curve

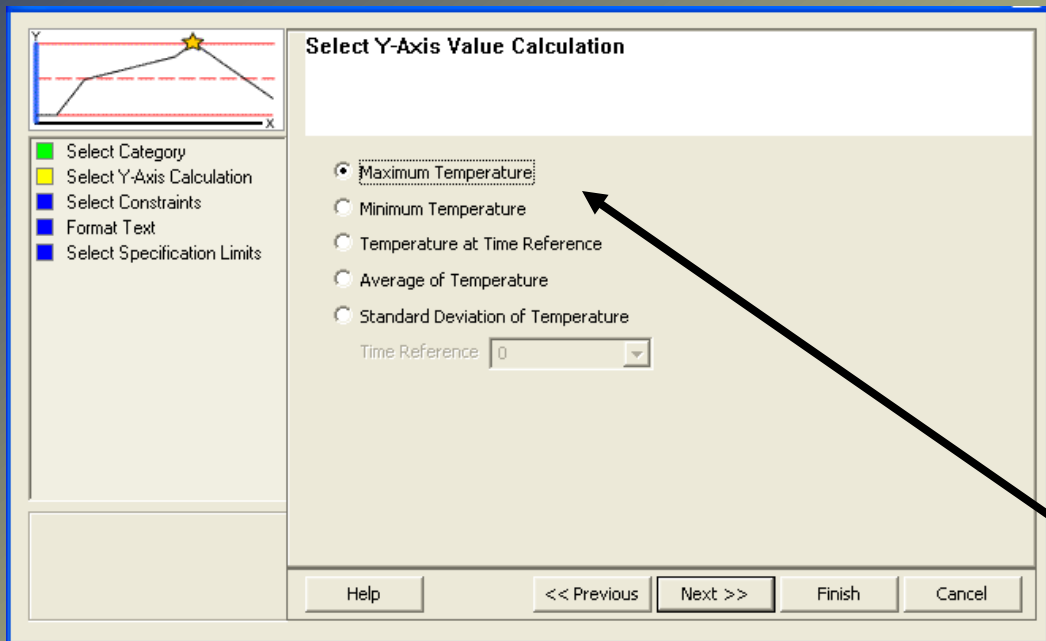
Special Values

Channel Number
1-Type-K

Help << Previous Next >> Finish Cancel



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After choosing the data type you want, the wizard will walk you through the steps of specifying the type of calculation, the constraints, and the spec limits associated with that data.

Here we have chosen to extract the peak temperature.



MAP 201

We can constrain the calculation by several criteria including...

- Process Origin
- Magnified Window
- Machine
- Zone
- Temperature

Select Calculation Constraints

None

After Process Origin: |

Within Magnified Window: []

Within Machine: | |

Within Machine Zone: || ||

Zone Number: 1

Between Temperature: = =

Temperature to Peak: / /

Upper Value: 0.0 C

Lower Value: 0.0 C

Buttons: Help, << Previous, Next >>, Finish, Cancel



MAP 201

We have the ability to change the appearance of the title cell to de-emphasize or bring attention to the particular values

YOUR TEXT

- Select Category
- Select Y-Axis Calculation
- Select Constraints
- Format Text
- Select Specification Limits

Text Label and Format

Label
Maximum Temperature

Font Size
12 points

Font Style
Regular

Horizontal Alignment
Center

Vertical Alignment
Top

Text Color
[Color Selection Box]

Cell Color
[Color Selection Box]

Help << Previous Next >> Finish Cancel



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Select Specification Limits and Resolution

Calculation: Maximum Temperature -)

Upper Specification Limit (USL) 230 C

Lower Specification Limit (LSL) 215 C

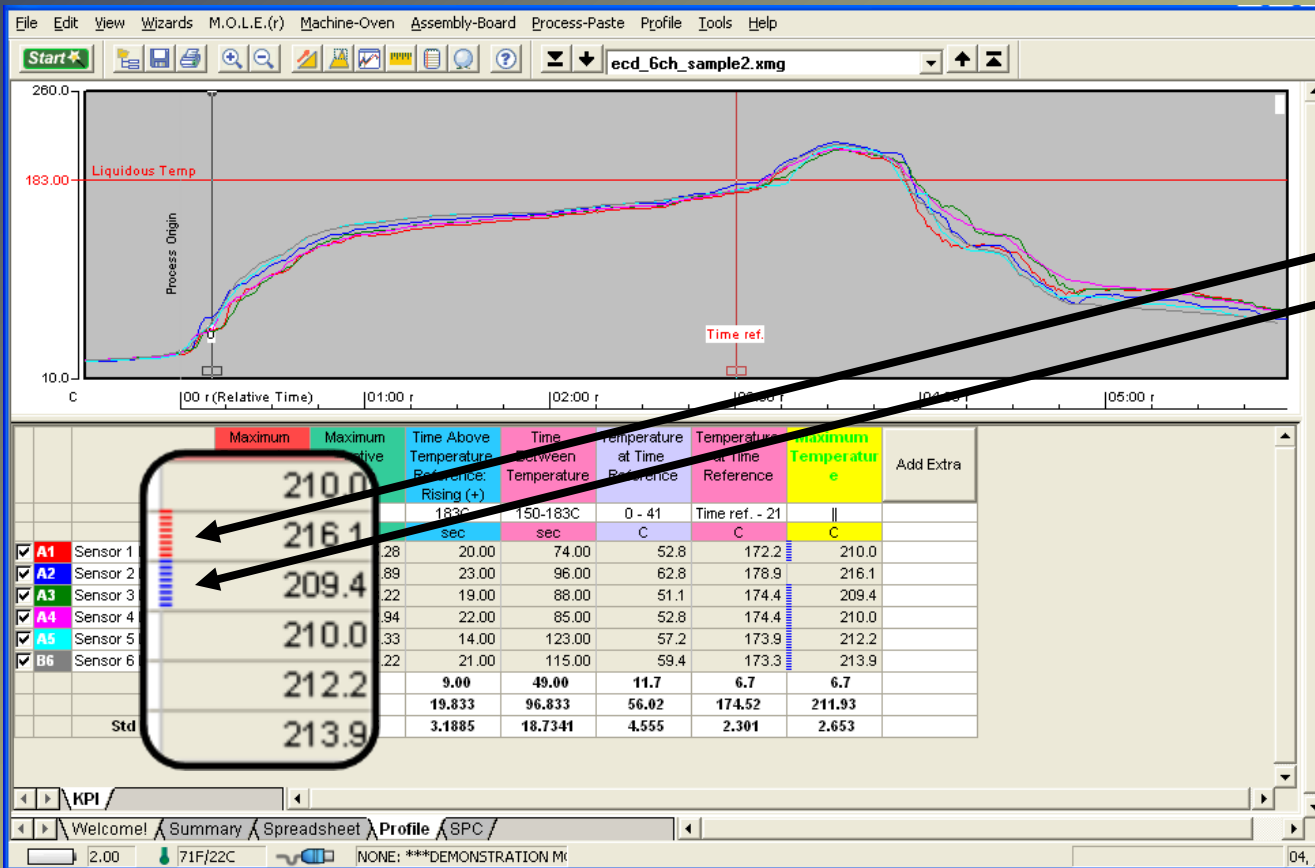
Decimal Places: 1

Buttons: Help, << Previous, Next >>, Finish, Cancel

Here we input the specification limits. You can select the resolution from 0 to 6 decimal places.



MAP 201



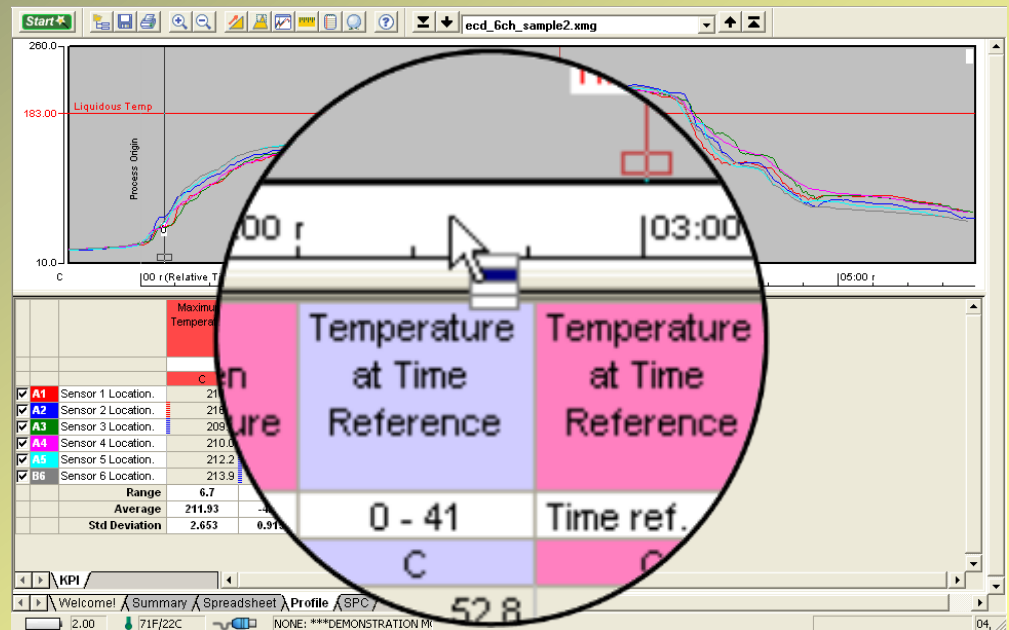
NOTE: Values that are above (red) or below (blue) the spec limit are displayed with an indicator bar to left of the value.



MAP 201

Setting time and temperature scale and reference lines:

When your cursor is near either axis of the profile, you see a drop down graphic displayed which tells you that a right click option is available. When you click, you are given options to set scale and add reference lines.



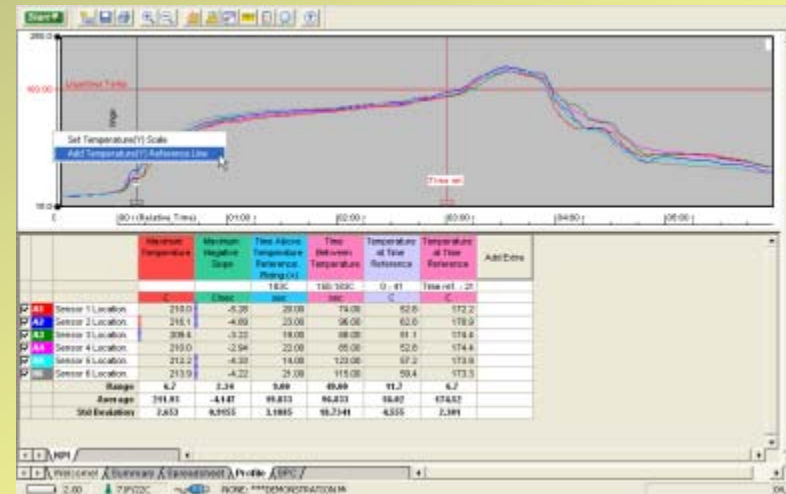
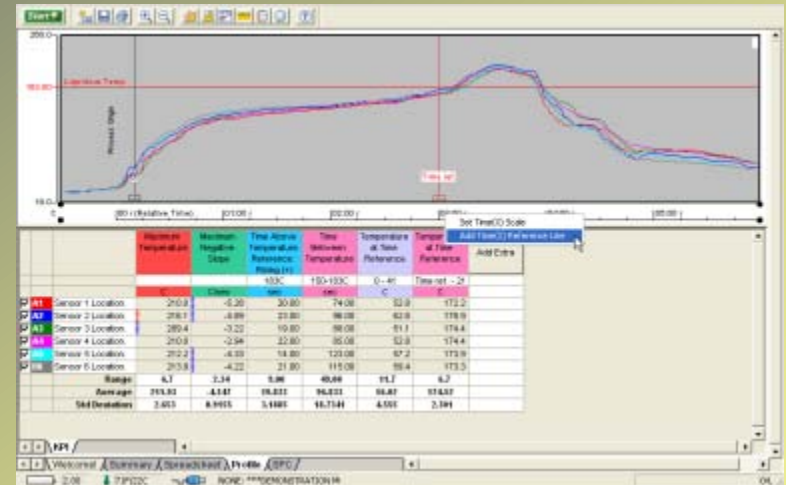


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Here are the examples of the drop downs for each axis.

An unlimited number of reference lines can be added to either axis.





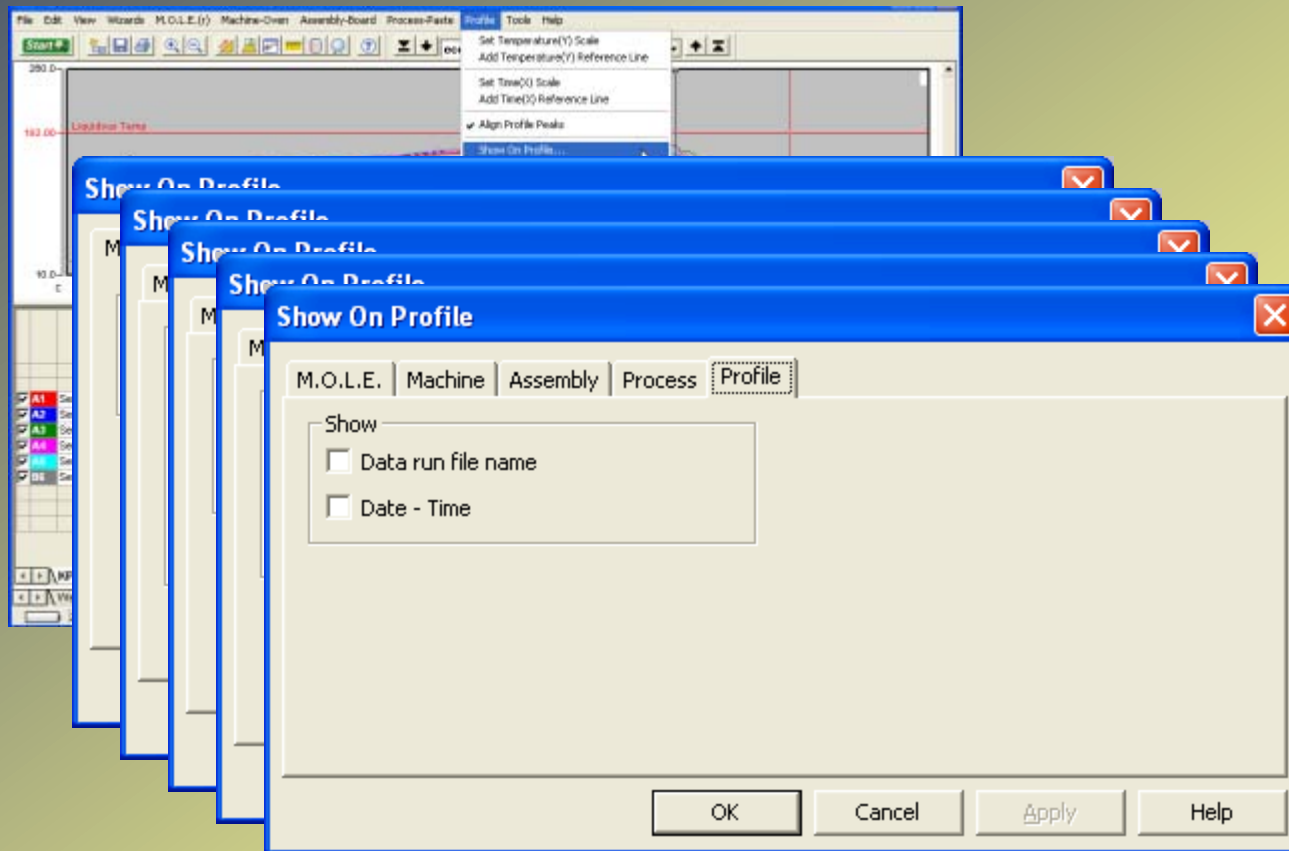
MAP 201

Profile Setup



MAP 201

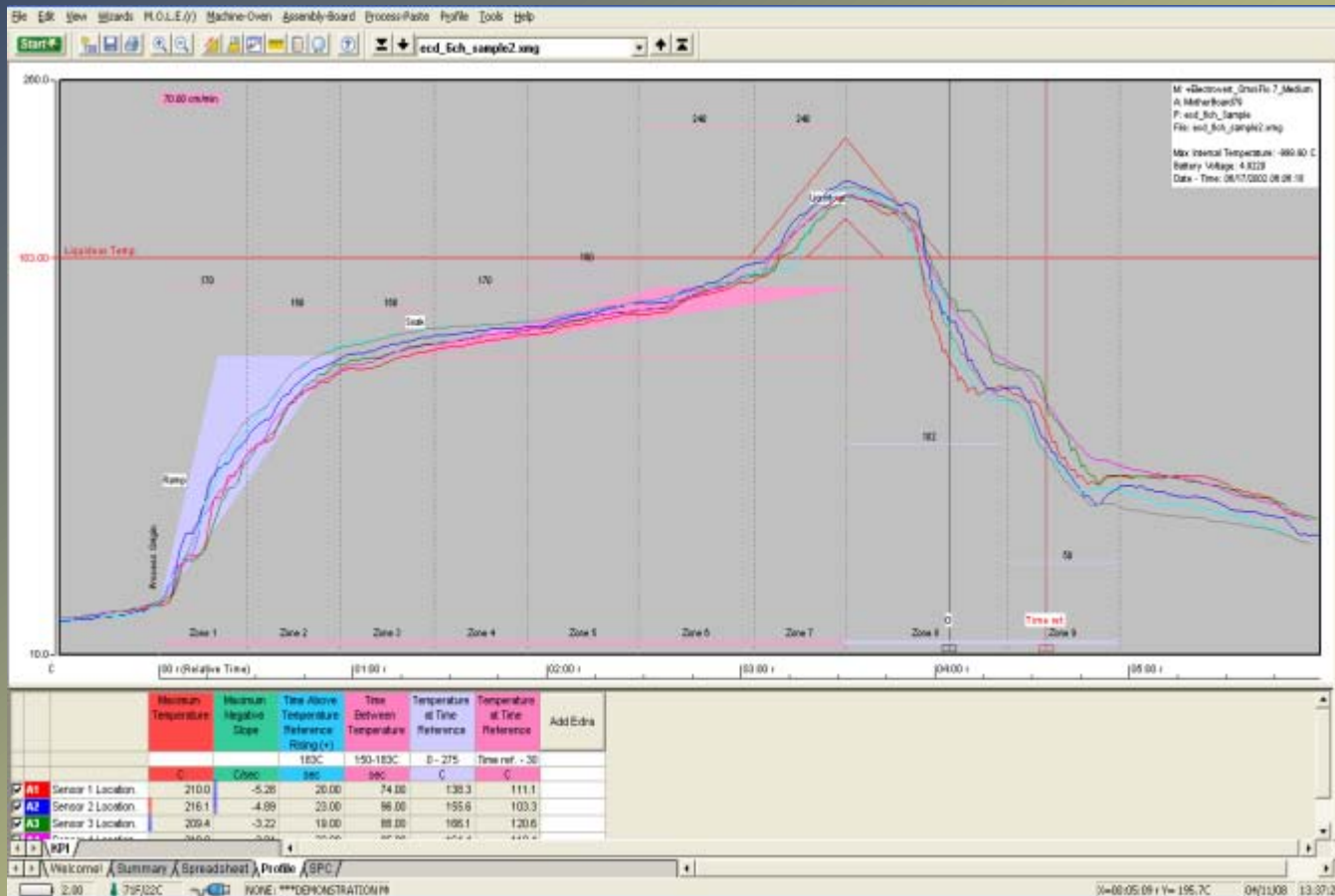
Choosing the visible details on the profile.





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Here is an example showing the following details on the profile...

- M- Oven name
- Zones
- Recipe
- A- Assembly name
- P- Process Name
- Process specs
- File name
- Internal max temp.
- Battery voltage
- Date and time



MAP 201

Preferences



MAP 201

Preferences:

The preferences window sets the defaults for the MAP software.

Here the default directories, templates, etc. can be set along with language, units, and security.

The screenshot shows the MAP 201 software interface with the Preferences window open. The window is titled "Profile" and contains various settings for Y-Axis Value Units, X-Axis Units, Profile, Show, Colors, Report, and Password. The Y-Axis Value Units section includes Temperature (C), LW (mW/sqcm), AERO (m/min), and Humidity (%). The X-Axis Units section includes Type (Relative Time) and Distance (cm). The Profile section includes Target 10 Data Tab and Auto align peaks. The Show section includes # Y-Axis Grid Lines (0). The Colors section includes Background. The Report section includes Include and Protect. The Password section includes Password. The Files section includes File name includes (Machine, Assembly, Process), Computer Name, and Default template file (C:\ecd\MegaMoleMAP\Template\DataT).

	Maximum Temperature	Maximum Negative Slope
A1	210.0	-5.2
A2	216.1	-4.8
A3	209.4	-3.2
A4	210.0	-2.9
A5	212.2	-4.3
A6	213.9	-4.2
Range	6.7	2.34



MAP 201

Review

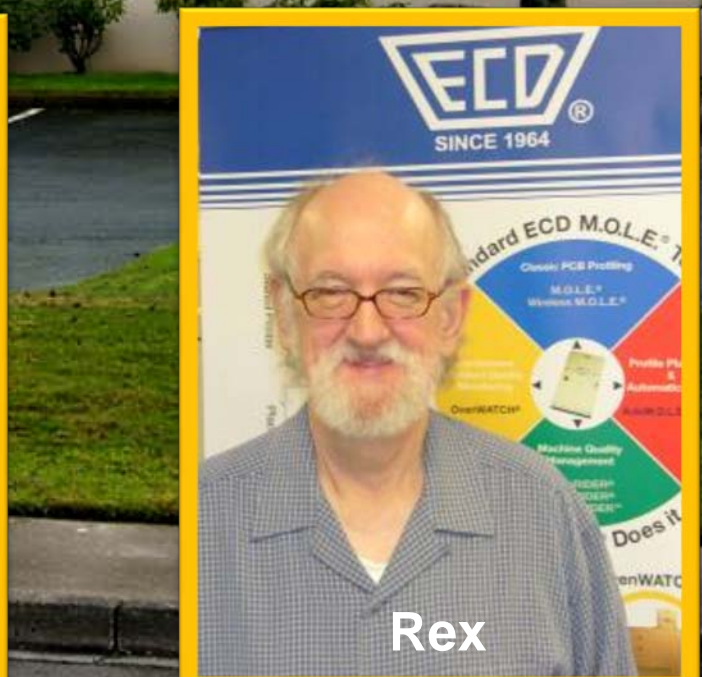
- **Introduce Wizards:**
 - **"Create T10 Spec"**
 - **"Verify Process"**
- **Data Extractions**
- **Profile Setup**
- **MAP "Preferences"**



Mark



Paul



Rex



MAP 201

Thank you for attending today's class

Questions? Contact: Support@ECD.com

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