MICRO-CIRRUS 3 INTERFACE



micromeritics®



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Micromeritics Instrument Corporation is the world's leading supplier of high-performance systems to characterize particles, powders and porous materials with a focus on physical properties, chemical activity, and flow properties. Our technology portfolio includes: pycnometry, adsorption, dynamic chemisorption, particle size, intrusion porosimetry, powder rheology, and activity testing of catalysts. The company has R&D and manufacturing sites in the USA, UK, and Spain, and direct sales and service operations throughout the Americas, Europe, and Asia. Micromeritics systems are the instruments-of-choice in more than 10,000 laboratories of the world's most innovative companies and prestigious government and academic institutions. Our world-class scientists and responsive support teams enable customer success by applying Micromeritics technology to the most demanding applications. For more information, please visit www.Micromeritics.com.

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ABOUT THIS MANUAL



All references to FR-series Flow Reactors in this document encompass the FR-100 and FR-200 unless otherwise noted.

Parts and accessories are located on the Micromeritics web page.

The following symbols or icons indicate safety precautions and/or supplemental information and may appear in this manual:



NOTE — Notes contain important information applicable to the topic.



<u>**CAUTION**</u> — Cautions contain information to help prevent actions that may damage the analyzer or components.



WARNING — Warnings contain information to help prevent actions that may cause personal injury.

General Safety



Do not modify this instrument without the authorization of Micromeritics Service Personnel.

Any piece of laboratory equipment can become dangerous to personnel when improperly operated or poorly maintained. All employees operating and maintaining Micromeritics instruments should be familiar with its operation and should be thoroughly trained and instructed on safety.

- Read the operator manual for any special operational instructions for the instrument.
- Know how the instrument functions and understand the operating processes.



- Wear the appropriate personal protective equipment when operating this instrument — such as eye protection, lab coat, protective gloves, etc.
- When lifting or relocating the instrument, use proper lifting and transporting devices for heavy instruments. Ensure that sufficient personnel are available to assist in moving the instrument.
- Always pay attention to the safety instructions provided on each label affixed to the instrument and do not alter or remove the labels. When inspecting the instrument, ensure that the safety labels have not become worn or damaged.
- Proper maintenance is critical to personnel safety and smooth instrument operation and performance. Instruments require regular maintenance to help promote safety, provide an optimum end test result, and to prevent costly down time. Failure to practice proper maintenance procedures can lead to unsafe conditions and shorten the life of the instrument.
- Improper handling, disposing of, or transporting potentially hazardous materials can cause serious bodily harm or damage to the instrument. Always refer to the MSDS when handling hazardous materials. Safe operation and handling of the instrument, supplies, and accessories is the responsibility of the operator.

INTENDED USE



The instrument is intended to be operated by trained personnel familiar with the proper operation of the equipment recommended by the manufacturer and as well as relevant hazards involved and prevention methods. Other than what is described in this manual, all use is seen as unintended use and can cause a safety hazard.



The instrument is intended to be used as per applicable local and national regulations.

TRAINING

It is the customer's responsibility to ensure that all personnel operating or maintaining the equipment participate in training and instruction sessions. All personnel operating, inspecting, servicing, or cleaning this instrument must be properly trained in operation and machine safety before operating this instrument.

SYMBOLS THAT MAY APPEAR ON YOUR INSTRUMENT

The following symbols or icons indicate safety precautions and/or supplemental information and may appear on your instrument:



Use extreme caution when working on the instrument where one of these symbols may be displayed. These symbols indicate the part may be hot and cause serious burns.



Use the cotton gloves provided in the accessory when handling heated surfaces. These cotton gloves are not intended to protect hands when heated surfaces are above 60 $^\circ$ C.



When working on the instrument where this symbol is displayed, refer to your Micromeritics' instruction manual for additional information.



When this symbol is displayed, toxic or flammable gases require proper venting of exhaust.

This symbol can also indicate the instrument uses mercury which is an extremely toxic substance. Read the Material Safety Data Sheet (MSDS) and be aware of the hazards of mercury and know what to do in the event of a spill or an exposure incident

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1 ABOUT THE SOFTWARE

The MKS Process Eye Professional software must be installed prior to using the Micromeritics-Cirrus Interface Software and the MKS Cirrus mass spectrometer. Refer to the Micro-Cirrus 3 Interface Installation Instructions for more information [*part number 004-42805-00*].

The *Micromeritics-Cirrus Interface Software* is used with select Micromeritics analyzers integrated with an MKS Cirrus 3 mass spectrometer. This software runs within the *MKS Process Eye Professional* application. The Micromeritics-Cirrus Interface Software will perform the following tasks:

- Automatically collect data with the Cirrus 3 mass spectrometer via trigger signal from the Micromeritics analyzer
- Customize Peak Jump recipes
- Access standard operations such as analog scan, barchart scan, peak jump scan, leak check, and data storage
- Calibrate detectors
- Scale the Micromeritics analyzer sample thermocouple signal

RECIPES

The interface software controls the analyzer via recipes. A recipe is a list of mass fragments, or mass-to-change ratios (m/z), to be analyzed, along with detector selection and resolution setting. Micromeritics has included preset parameters in the software, enabling users to create *Peak Jump* recipes quickly. Recipes can be saved for future use.

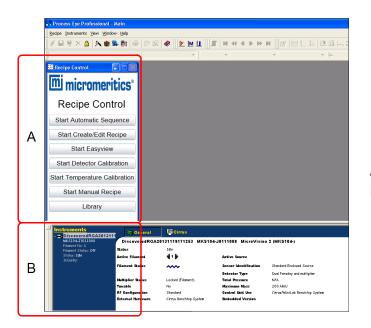
DOCUMENTATION

This user guide provides a description of the commands included in the *Micromeritics-Cirrus Interface Software* and instructions on how to use them. It does not include descriptions for all commands related to the Cirrus software. Refer to the MKS documentation supplied with the MKS Cirrus 3.

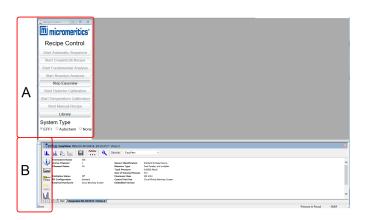
START THE INTERFACE SOFTWARE

Double click the *Process Eye Professional* desktop shortcut, or go to *Windows > Start* command to open the *Process Eye Professional* software to display:

- Recipe Control
- Recipe Information



- A. Recipe Control window
- B. Instrument dashboard



- A. Recipe Control window
- B. Instrument dashboard

EXIT THE INTERFACE SOFTWARE

Go to **Recipe > Exit** on the Process Eye Professional main menu.

2 RECIPE CONTROL

All functions for the *Micromeritics-Cirrus Interface Software* are accessed via the *Recipe Control* window.

E Recipe Control
Recipe Control
Start Automatic Sequence
Start Create/Edit Recipe
Start Fundamental Analysis
Start Reaction Analysis
Start Easyview
Start Detector Calibration
Start Temperature Calibration
Start Manual Recipe
Library
System Type [®] EFFI [©] Autochem [©] None

Recipe Control Window Options Table

Option	Description
Start Automatic Sequence	Collect data automatically via the Micromeritics analyzer digital trigger.
Start Create/Edit Recipe	Create <i>Peak Jump</i> recipes for the <i>Automatic Sequence</i> mode.
Start Easyview	Access a number of operations, including different scan modes and diagnostics.
Start Detector Calibration	Calibrate the Faraday and SEM detectors. Refer to the Cirrus 3 Operator Manual for additional details.
Start Temperature Calibration	Calculate the scaling equation for the Micromeritics analyzer sample thermocouple signal. Refer to the Cirrus 3 Operator Manual for additional details.
Start Manual Recipe	Start and stop recipes created using a recipe wizard.
Library	View mass spectral data for a variety of compounds.
System Type	Sets the trigger behavior for the selected instrument.

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3 AUTOMATIC SEQUENCE

Click **Start Automatic Sequence** in the *Recipe Control* window to display the *Automatic Sequence*.

E MI	rome	ritics Sequence					
			Automatic Seque	ence			
	ID	Recipe Name	Save As	Export As Text ?	Filament Enabled ?	Status	
Þ	1	leb2 ·	leb2	\checkmark			
5							
	Re	start After Sequence Completion?)				
	Beg	in Automatic Sequence Abort Au	tomatic Sequence Save Automa	tic Sequence Loa	d Automatic Sequence		

Use the Automatic Sequence window to:

- Automatically collect data via the Micromeritics analyzer digital trigger.
- Automatically save data files, which can be imported into the Micromeritics analyzer application.
- Enable the filament for each recipe.

This window displays the current sequence configuration, which includes a list of recipes and associated run conditions.

Automatic Sequence Options Table

Options	Description				
(–) Sign	Click to remove recipes.				
(+) Sign	Click to add recipes below the current recipe.				
Abort Automatic Sequence [button]	Stops the sequence run. Enabled when the <i>Automatic Sequence</i> has started.				
Begin Automatic Sequence [button]	Starts the recipe.				
Export As Text [check box]	Select for each recipe to be exported to a text file. Text files are saved to the default <i>Process Eye</i> data directory with a .TXT file extension.				
Filament Enabled [check box]	Select to have the filament turned on during recipe initialization.				
	The filament must be turned on for data collection.				

Automatic Sequence Options Table (continued)

Options	Description				
ID	Unique number given for each recipe selected.				
Load Automatic Sequence [button]	Enabled when a sequence is not running. Click to display the <i>Load Sequence</i> window to load another sequence. Click OK to save the options.				
	Load Sequence				
Recipe Name [selection]	Select from the list of recipes.				
Restart After Sequence Completion [check box]	Select to have the sequence restart upon completion of the last recipe in the list. Use this option when collecting data in more than one experiment.				
Save As [button]	Unique file name for each analysis. Enter a name for each <i>Process Eye</i> data file in this column. If a name is not specified, the data file will default to the option selected in the <i>Recipe Name</i> column. A sequential 6-digit tag is appended to each file name. For example, <i>Air</i> will be saved as <i>Air_000001.SI-d</i> if no previous versions exist. The file is saved to the default <i>Process Eye</i> Data directory.				

Options	Description			
Save Automatic Sequence [button]	Enabled when a sequence is not running. Displays the <i>Save Sequence</i> window to save the current sequence. Select a file from the drop-down list (the file will be overwritten with the current data) or enter a new file name. Click OK to save the options.			
	Save Sequence			
Status	Displays recipe run statuses during an automatic sequence.			

Automatic Sequence Options Table (continued)

To begin an automatic sequence after recipes have been selected and configured:

- 1. Select *Restart After Sequence Completion* to have the sequence restart upon completion of the last recipe in the list (if applicable).
- 2. Click Begin Automatic Sequence.



If prompted to select an instrument, select one from the list, then click Connect.

Recipe Status	Recipe Information						
Instruments	Alarms						
- BoliscoveredRGA2013111	Category Ack	EventText	UserText				
MKS104-J0111008 Filoment No: 1	0	Wizard Message	Connected to DiscoveredRGA20131119171253 (MKS104-J0111008)				
Filament Status: Off	6	Message	Waiting for trigger				
Stotus: Idle		ow latest Alarm(s) 🚽 Acknewledge All					
<u> </u>	eritics Sequence	leb2					

- The first recipe is initialized and a tab with the recipe name is added to the *Recipe Information* pane.
- A status of *Waiting* displays in the *Status* column until the Micromeritics analyzer *Digital Trigger 1* is set to the high (1) state.

🔛 Micron	eritics Sequence				
		Auton	natic Sequence		
ID	Recipe Name	Save As	Export As Text	? Filament Enabled ?	Status
▶ 1	leb2	 leb2 			Waiting
					Status
					Waiting
					-
R	estart After Sequence Con	npletion ?			
Be	gin Automatic Sequence	Abort Automatic Sequence	Save Automatic Sequence	Load Automatic Sequen	ce

ENABLE THE TRIGGER FOR FLEX 3500 CHEMISORPTION

The trigger can be enabled using one of two methods:

- Preset in the analysis conditions parameter file, or
- Set manually using the analyzer schematic

PRESET IN ANALYSIS CONDITIONS

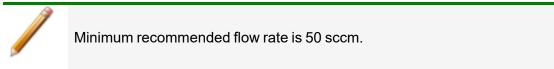
- 1. Go to *File > New Sample*.
- 2. On the New Sample Type window, select Chemical Adsorption.
- 3. On the Analysis Conditions tab, click Preparation.

							- 0 ×
				Analı Condi			leport Iptions
	Analysis Conditions: Run Conditions						
	Pre-ar	Adsorptive:		i0 h			Edit
		Starting Pressure (kPa)	Pressure Increment (kPa)	Dose Amount (mmol/g)	Equilibration Interval (s)	Ending Pressure (kPa)	
	1	0.0000000			5	0.0000001	
	2	0.0000001			5	0.0000002	
	3	0.0000002			5	0.0000001	Insert
	4	0.0000001			5	0.0000000	Delete
							Clear
							Append
	Prepar	ration Free	Space	Temperature	e Dosinc	Tern	nination
-							
		at analysis uation time:	1.00 h				
	Save	Δc	Close		Advanced	~	Preview
	June		ciose				

4. On the Preparation Options window, click Insert.

Reparation Options	- • ×		
Preparation Options Backfil gas: *No Selection * Evacuation rate: 0.67 kPa/s Unrestricted evac Vacuum level: 6.7e-03 kPa Evacuation time: In situ activation Task Gas Temp. Rate Time Pressure (*C) (*C/min) (min) (kPa) Step Detail	from: 0.67 kPa	Select a task Formulation Leak fest Soak Insert Cancel	Flow Task Gas: Hydrogen Value of the state o
ОК	Cancel		

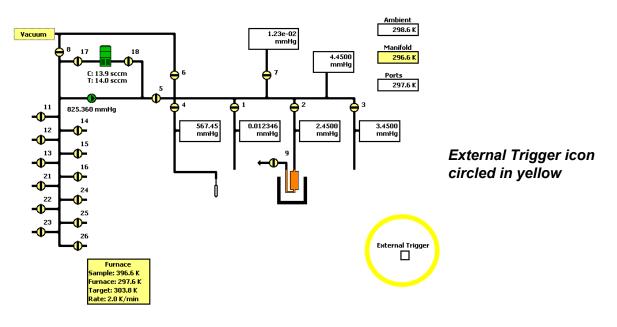
- 5. On the Select a task window, select Flow, then click Insert.
- 6. On the *Flow Task* window, ensure *Set external trigger* is selected, then click **OK**.



- 7. On the *Preparation Options* window, click OK.
- 8. On the *Analysis Conditions* window, click **Save As** to save the sample file parameter changes.

SET MANUALLY IN THE ANALYZER SCHEMATIC

- 1. Go to Unit [n] > Chemical Adsorption (if not already selected).
- Use Enable Manual Control to enable the manual control of certain system valves and pump components on the analyzer schematic. When this option is enabled, a checkmark appears to the left of Unit [n] > Enable Manual Control. If the analyzer schematic is not immediately visible, go to Unit [n] > Show Instrument Schematic.
- 3. Right-click the *External Trigger* icon, then select *On*. Alternately, double click the *External Trigger* icon.



The *External Trigger* icon changes to a solid black box to indicate the external trigger is enabled.

ENABLE THE TRIGGER FOR ASAP 2020 PLUS CHEMISORPTION

The trigger can be enabled using one of two methods:

- Preset in the analysis conditions parameter file, or
- Set manually using the analyzer schematic

PRESET IN ANALYSIS CONDITIONS

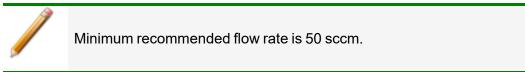
- 1. Go to *File > New Sample*.
- 2. On the Analysis Conditions tab, click Preparation.

								- • •
		scription	Degi Condit	as ions		Analysis Conditions		Report Options
Ar	nalysis	conditions: R	un Conditions			~		
Ac	dsorptiv	ve:	No Selection *			~		Edit
6	Pre-ana	alysis evacuation	time: 0.50	h				
		Starting Pressure (kPa)	Pressure Increment (kPa)	Ending Pressure (kPa)				
	1	0.0000000		0.000	0001	Insert		
						Delete		
						Clear		
						Append		
						Equilibration inter	rval: [5 s
P	repara	tion Free	Space T	emperature.		Dosing	Ter	mination
		t analysis ation time:	1.00 h					
5	Save As	5	Close			Advanced ~		Preview

3. On the Preparation Options window, click Insert.

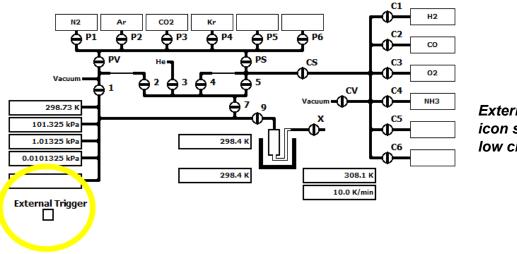
mi Preparation Options	
Baddill gas: * No Selection * Fast evacuation Unrestricted evac. from: 0.67 kPa Vacuum level: 6.7 Pa Evacuation time: 0.10 h ✓ In situ activation Task Gas Temp. Rate Time Pressure Insert (K) (K/min) (min) (kPa) Insert Edit Delete Clear Step Detail Clear	Flow Task Gas: Hydrogen Time: 60 min Temperature: 323.1 K Temperature rate: 10.0 K/min Soak Set external trigger Insert Cancel
OK	

- 4. On the Select a task window, select Flow, then click Insert.
- 5. On the *Flow Task* window, ensure *Set external trigger* is selected, then click **OK**.



- 6. On the *Preparation Options* window, click **OK**.
- 7. On the *Analysis Conditions* window, click **Save As** to save the sample file parameter changes.
- Use *Enable Manual Control* to enable the manual control of certain system valves and pump components on the analyzer schematic. When this option is enabled, a checkmark appears to the left of *Unit [n] > Enable Manual Control*. If the analyzer schematic is not immediately visible, go to *Unit [n] > Show Instrument Schematic*.
- 9. Right-click the *External Trigger* icon, then select *On*. Alternately, double click the *External Trigger* icon.

SET MANUALLY IN THE ANALYZER SCHEMATIC



External Trigger icon shown in yellow circle

The *External Trigger* icon changes to a solid black box to indicate the external trigger is enabled.

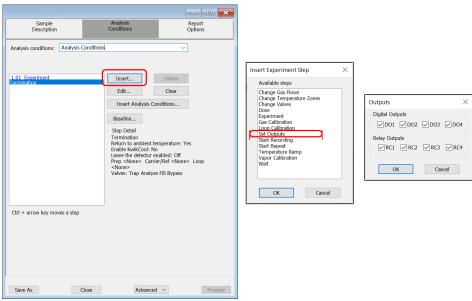
ENABLE THE TRIGGER FOR AUTOCHEM 2920 AND 2950

The trigger can be enabled on the AutoChem using one of two methods:

- Preset in the analysis conditions parameter file, or
- Set manually using the analyzer schematic

PRESET IN ANALYSIS CONDITIONS

- 1. On the Analysis Conditions tab, insert a Set Outputs step before the Start Recording step.
 - a. Click Insert.
 - b. Select Set Outputs.
 - c. Click OK.
 - d. Select digital output *D01* to be enable the trigger.
 - e. Click OK.



- 2. Enter a *Start Recording* step.
 - a. Click Insert.
 - b. Select Start Recording and enter the recording interval.

Start Recording	×
One measurement every	1.0 seconds
ОК	Cancel
Enter a value between 0.1	and 10.0.

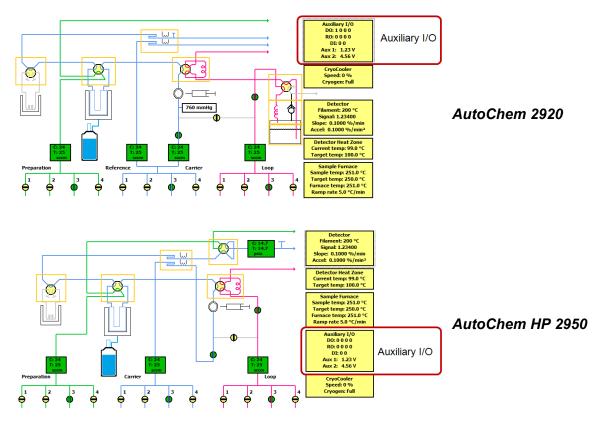
- c. Click OK.
- 3. A *Stop Recording* step is automatically entered after the *Start Recording* step. After the *Stop Recording* step, insert a *Set Outputs* step following the steps shown above.
- 4. Disable digital output *D01*.

SET MANUALLY IN THE ANALYZER SCHEMATIC



The *External Trigger* icon changes to a solid black box to indicate the external trigger is enabled.

- 1. Enable manual control to display the schematic, then right-click in the Auxiliary I/O display window.
- 2. Select Digital Output 1.



ENABLE THE TRIGGER FOR AUTOCHEM III

The trigger can be enabled on the AutoChem III using one of two methods:

- Preset in the analysis conditions parameter file, or
- Set manually using the analyzer schematic

PRESET IN ANALYSIS CONDITIONS

The external trigger for the mass spectrometer can be enabled in either the:

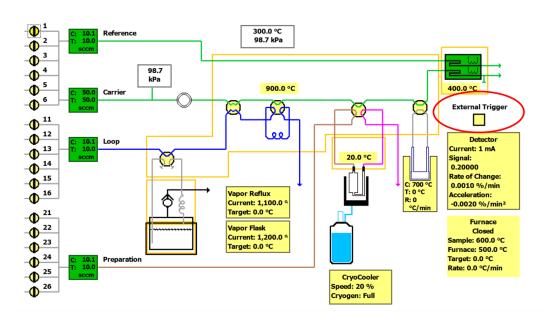
- Start Recording step
- Gas Calibration step
- Vapor Flow Calibration step, or
- Vapor Pulse Calibration step

On the *Analysis Conditions* tab, insert one of the above steps and enable the *Set external trigger* option and enter other settings as needed.

SET MANUALLY IN THE ANALYZER SCHEMATIC

The *External Trigger* icon changes to a solid black box to indicate the external trigger is enabled.

Enable manual control to display the schematic, then double-click (or right-click) the *External Trigger* checkbox on the schematic and select ON.



ENABLE THE TRIGGER FOR BTA OR FR-SERIES

The trigger can be enabled on the Breakthrough Analyzer or FR-series using one of two methods:

- Preset in the Session tab by enabling GC01
- Set manually in the Panel tab by enabling the GC01 signal

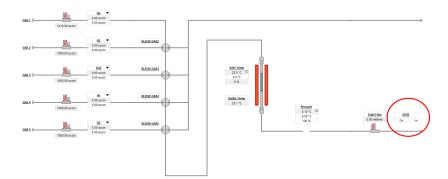
PRESET IN THE SESSION TAB

The external trigger to the mass spectrometer can be enabled by setting the parameter *GC01 ON* to *1* in a session file. Setting the value to *0* will disable the external trigger. By default, the GC01 external trigger will be set to the last value if the column is left blank during a session.

Exp	eriment	✓ Set	tings	START		
					Exp. Time:	
Open	Save (Clean Exp	oort	STOP	00:00	0:00
				-	-	
	Session 1	Session 2	Session 3	Session 4	Session 5	Session
NAME	Start	Est Flow	BT 1	Purge	End	
SESSION TIME (min)	1	10	30	5	1	
NEXT SESSION	2	3	4	5	END	
RESERVE						
He SP	20.00	20.00	0.00	20.00	20.00	
CO2 SP	0.00	10.00	10.00	0.00	0.00	
N2 SP	0.00	10.00	10.00	0.00	0.00	
BLEND GAS2 ON	0	0	1	0	0	
BLEND GAS3 ON	0	0	1	0	0	
Inlet Temp SP	35.0	35.0	35.0	35.0	0.0	
Pressure SP	0.20	0.20	0.20	0.20	0.00	
GC01 ON	0	1		0	0	

SET MANUALLY IN THE PANEL TAB

The external trigger to the mass spectrometer can be manually enabled by pressing the ON/OFF GC01 button on the main panel screen. The ON/OFF button will turn green when the external trigger is enabled.



DATA COLLECTION

After the trigger is enabled, the recipe is launched and data collection begins. A message on the *Recipe Information* window states that data collection has started and displays the directory where the data file is saved.

🖞 Recipe Control 💿 🖲 🗮 🗮 Malapon	e Analysis					o 0 💌	
micromericics' Recipe Control Sur Advantus: Sequence Sur Createries Recipe Sur Createries Recipe Sur Createries Sur Createries	Method Sector ID 2 2 ID ID ID ID ID ID ID ID ID ID ID ID ID	ds @ method from list Air iliaitation Factors @ Type: here isates @ Analysis Name ations @ Calibration Name	Multi-Point Analysis Description Britait Fabrier 1 Last Run Last Run	Status Status Status	• • • • • • • • • • • • • • • • • • •		А
Recipe Recipe Informa	tion					X	Ĩ
- D: 30-013117 Cirves 2 action-zoolisoss researches 1 researches 2 filosent fortal de fortal 20e	EventText Venange	Loading sattin Eyeli	UserText ps file Crüsers/PublicDocuments/Process Recipeel_IllutPoint Analysis.xnl		StartTime 2019-07-02 05:50:31	No Time Specified	
⊗ Abusys Show latest.	llarm(s) 🏾 Asknowledge All					Record 1 of 1	в
						Pressure in Pascal NUM	1

- A. Area showing where settings are loaded
- B. Message area indicating stored data location

Two windows are opened, one with atomic mass trends and one with the scaled analyzer sample temperature, where mass spectra parameters and temperature axes can be edited. See <u>Recipe</u> <u>Control on page 2 - 1</u>.

🔛 Recipe Control	_ 🗆 🗵	Air:1 As	Trend									_ D ×	
mi micromeri	tics	LIVE Day 00 00:00:22	Mass 14 3.00e-007	Mass 10 5.25e-008	Mass 18 7.50e-008	Mass 28 #Skipped	Mass 32 1.43e-008	Mass 40 7.50e-008	Mass 44 1.12e-009	Tempera 0.00e+0			
Recipe Cont	rol	Temperature 0001										-	A
Stop Automatic Sequ	uence	Ĕ,	_									_	
Start Create/Edit Re	ecipe		[
Start Easyview		1x10 ⁻⁰⁰											
Start Detector Calibr	ration	1x10 ⁻⁰⁷ —	-										
Start Temperature Cali	ibration	1x10 ⁻⁰⁸											В
Start Manual Reci	ipe	1x10 ⁻⁰⁹	_										
Library		00:0	0.00	00:0	2:00	00:04	Elapsed	00:06 Time	:00	00.08	:00	00:10:00	
												•	
Recipe Status	Recipe	Inform	ation									×	
Instruments	Alarms	0			2.4								
- === MV Plus	Category 4	lck	Event				erText		StartTi		EndTime	-	
Filanezt No: 1	8	_	Wizard M Messi		Contr		Plus (LM76-9 for trigger		5/5/2011 7:11		No Time Specified No Time Specified	-	
Filament Status On Status Scanning PeakTump1		-	Mess	ige	_		tor trigger		5/5/2011 7:11	DZ AN	No Time Specified	-	
craits ocaning reak unpt	0		Data F	les		Jsers\Public	Documents\P Air_000002		5/5/2011 8:04	:36 AM	No Time Specified		
	Always		it Alarm(s)	Ackn	owledge Al					R	ecords 1 to 3 of	3 🗸	

- A. Sample temperature
- B. Atomic mass trends

CLOSE THE DATA FILE

When the Micromeritics analyzer *Digital Output 1* is set to low (0), the recipe stops running and closes the data file. The *Trend View* windows are closed.

Automatic Sequ	uence		
	Export As Text ?	Filament Enabled ?	Status
			Completed 🔂 🗢 🕯 Waiting
			00
58 Macroment Sex Sex prove	Automatic Se	quence	
ID Recipe Name	Save As	Export As Text ? Filamer	t Enabled ? Status
* 1 peo2	- Jeoz		Status Waiting
Restart After Sequence Completion	0	omatic Sequence] Load Autor	natic Sequence

On the *Automatic Sequence* window, the *Status* column shows *Completed* for the completed recipe. If there is more than one recipe in the sequence list, the next recipe in the sequence initializes and *Waiting* displays. Once the digital trigger is enabled for the recipe with a *Waiting* status, the recipe launches and data collection begins.

Axes AND LEGEND PROPERTIES

To change the axes and legend properties:

1. Right-click on the graph where changes are to be made.

		Trend Pane 1	•	
Channel	Display	Name	Measurement	Add Pane
User defined	\sim	Mass 14	PeakJump1	
User defined	~	Mass 16	PeakJump1	Remove Pane
User defined	~	Mass 18	PeakJump1	
User defined	~	Mass 28	PeakJump1	Edit Channel >>
User defined	~	Mass 32	PeakJump1	
User defined	~	Mass 40	PeakJump1	
User defined	~	Mass 44	PeakJump1	
User defined	~	Temperature	UserMeasure.	Use Standard
Mass 28	~	Nitrogen	< <auto>></auto>	View >>
Mass 32	~	Oxygen	< <auto>></auto>	
Mass 36	\sim	Argon 36	< <auto>></auto>	
Mass 40	~	Argon	< <auto>></auto>	
Mass 44	~	Carbon dioxide	< <auto>></auto>	
Mass 64		Photoresist 64	< <auto>></auto>	
Mass 69	~	Fluorocarbon	< <auto>></auto>	Check All
4				Un-check All
Mass 32 Mass 36 Mass 40 Mass 44 Mass 64 Mass 69	that are not	Oxygen Argon 36 Argon Carbon dioxide Photoresist 64	< <auto>> <<auto>> <<auto>> <<auto>> <<auto>> <<auto>> <<auto>></auto></auto></auto></auto></auto></auto></auto>	View >> Check All Un-check Al

- 2. On the *Trend Display Pane and Channel Properties* windows, select the check-boxes in the *Channel* column to display or hide a mass.
- 3. From the Trend Pane, select:
 - Trend Pane 1. Select for the atomic mass spectra.
 - Trend Pane 2. Select for the Micromeritics analyzer sample temperature.
- 4. Click Next.

	properties that define its Y-axis scale and its appearance
Show P	Properties for Trend Pane 1
Scale properties for the s	selected pane
	measurement properties to set the Y-axis scale (range determined by the measurements / accuracy)
Use the following e Max value 3.33e-006	Applicit settings (Current maximum value is 3.3e-006) Min value 3.33e-010 Value Units of pressure
Restrict the Stack channels of e	ese values to the maximum bounds of the acquired data digital data
General properties for the	e selected pane
Grid Grid	Y-axis Title
Y-axis Minor ticks	Percentage of total window height for this pane 66.7
Subsequent Y-Axis autor	ranging strategy for the selected pane
If the bounds of the d	ata subsequently change during the lifetime of this view
C Leave the Y-ax	vis unchanged
Autorange the	Y-axis based on the current and recommended bounds
C Expand the Y-a	axis to include the new recommended bounds
	ecommended bounds
Use the new re	

5. On the *Properties for Trend View Pane Y-axis* window, edit the values in the *Max value* and *Min value* fields.



These value changes apply limits to the partial pressure for the mass spectra (*Trend Pane 1*) and temperature scale for the Micromeritics analyzer (*Trend Pane 2*).

- 6. Select *Log scale* to display the y-axis in logarithmic form. Leave it unchecked to display the y-axis in linear form.
- 7. Edit other window parameters as needed, then click Next.

Each pane shares	a common se	t of p	roperties f	or the Tim	e Axis	
Time Axis						
and the second	Clock start	5/	5/2011	- 12	08:30 PN+	
Display clock time Display elaosed time	Elapsed start	0	dd 4	hh 3	mm 55	5
	Span	0	dd 0	hh 10	mm 0	s
Scroll display			Display da Minor time		Annotatio	ns
Elapsed Time Origin						
• View creation time						
C Time of my choice:		5/	5/2011	¥ 8	04:36 AN	
C Specific data source s	start time	Pea	skJump1			
Key Legend						
C None						
Top le						
C Side le	gend					

- 8. On the *Time Axis Display and Legend Properties* window, select *Display elapsed time* to change the elapsed time displayed on the time axis (x-axis).
- 9. Edit the *Elapsed start* and *Span* fields, if applicable. The default span time is 10 minutes.
- 10. Select *Save all the settings as a new or modified view definition* to have the modified settings saved as the defaults.
- 11. Click **Finish** to save changes and return to the graph display.

DATA AND RGA RECALL

Only a limited amount of spectra and temperature data is stored in the data buffer used for the live display; therefore, some data may appear truncated when viewing in *Process Eye*. An auxiliary program called *RGA Recall* has been included so that the entire set of data can be reviewed. To access *RGA Recall*:

- 1. In Windows Explorer, navigate to the applicable data directory, then locate the data file.
- 2. Right-click the data file, then select Open with RGA Recall from the menu.

😽 CaOx_000001.SI-d	AIGI	2911 5:56 PM
CaOx_000001.txt	Open with RGA Recall Open with	11 5:56 PM
CaOx_000002.SI-d	 Always available offline Sync 	11 9:09 PM
🕞 CaOx_000003.SI-d	Restore previous versions	11 10:28 PM
CaOx_000003.txt	Send to	11 10:28 PM
🙀 CaOx_000004.SI-d	Cut	11 1:06 AM
CaOx_000004.txt	Сору	11 1:06 AM
CaOx_000005.SI-d	Create shortcut Delete	11 2:24 AM 11 2:23 AM
🙀 CaOx_000006.SI-d	Rename	11 7:59 AM
CaOx_000006.txt	Properties	11 7:59 AM

The entire data set displays. Certain parameters of the mass spectra and temperature axes panes can then be edited.



If the data file being opened is currently running, the file will not open. A prompt displays indicating either to open a copy of the file or wait until the file is inactive before trying *RGA Recall* again.

4 CREATE / EDIT RECIPE

Use to create, configure, or edit *Peak Jump Recipes* for the *Automatic Sequence* mode. A recipe specifies the actions that the Cirrus software is to take during data acquisition.

Create Edit Recipe	23
Either select an existing recipe from the drop down list for editing:	
-	
Or enter a name for a new recipe:	
Oreate Peak Jump Recipe	
○ Create Barchart Recipe	
OKCanc	el



The Micromeritics analyzer sample thermocouple signal is included in each *Peak Jump* recipe created.

1. Select a recipe from the drop-down list, or enter the name for a new one. Click OK.

Rec	ipe S	ettings					22
	ID	Mass	Detector		Skip On Saturation ?	Accuracy	
•	1	2	Mult 1	•		5	- OO
	2	18	Mult 1			5	- 00
	3	1	Faraday	•		7	- 00
100 m 100							
(Cycle	Time : 4.92	20			ОК	Cancel

- 2. On the *Recipe Settings* window, use (+) and (-) buttons to add or delete a mass to the *Peak Jump* scan.
 - (+) sign. Adds a mass below the selected one. The ID is added automatically. All fields contain program defaults.
 - (-) sign. Deletes the selected mass.
- Select and edit the Mass field as needed. See <u>Library on page 9 1</u> if mass spectra information is needed.

4. Click the down arrow in the *Detector* column to choose the detector to be used for the selected mass. Select the *Faraday* detector or any of the three gain configurations from the detector options.



Scanning for concentrated species (> 20% of mixture composition) on the Mult1, Mult2, or Mult3 detector is not recommended. For recipes where a short cycle time is crucial, use only one detector (Faraday, Mult1, Mult2, or Mult3). Switching between detectors involves changing settings for internal electrical components, resulting in a high cycle time.

5. Select the *Skip On Saturation* checkboxes (recommended). When selected, masses that saturate the SEM detector (Mult1, Mult2, or Mult3) will be removed from the recipe after five consecutive saturated measurements.



Saturating the SEM detector with a high concentration of ions may damage the detector.

 Click the down arrow on options in the *Accuracy* column, then select the accuracy level. This parameter controls the time for converting the signal in the analog to digital electronics. The range is 0 (fastest scan and cycle rate with the lowest noise filtering) to 8 (longest scan with the highest noise filtering).



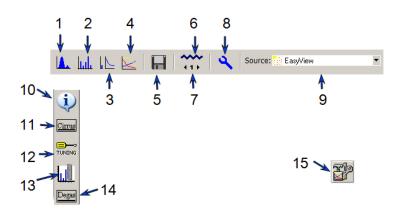
For recipes where a short cycle time is crucial, select the same accuracy level for all masses.

7. Click **OK** to save changes and close the window. Click **Cancel** to discard all changes.

5 EASYVIEW

To launch the *Easyview* software suite, click **Start Easyview** on the *Recipe Control* window to access typical RGA operations. When *EasyView* is activated, the **Start Easyview** button on the *Recipe Control* window changes to **Stop Easyview**. Click **Stop Easyview** to exit the *Easyview* application.

For additional information on the following toolbars, refer to the *Easyview* and *Process Eye User Guides*.



Easyview Functions Table

Legend	Description
Legena	Beschption
1	Starts or stops Analog scan mode.
2	Starts or stops Barchart scan mode.
3	Starts or stops Leak Check scan mode.
4	Starts or stops Peak Jump scan mode. When started, adds the Peak Settings button to the <i>Easyview</i> window. See legend item 15 for Peak Settings button information.
5	Disk store. Allows data to be saved.
6	Filament status. Turns active filament off (blue) and on (red).
7	Filament number. Toggles between filaments.
8	Performs a diagnostic on the Cirrus electronics and associated sensor.
9	Select an option to change the electron energy for ionization (generally, 40eV or 70 eV).
10	Returns the status window to the General Information page.
11	Displays the status of the turbo pump, manifold heater, and capillary heater.

Easyview Functions Table (continued)

Legend	Description
12	Activates <i>Tuning</i> mode. Use to adjust the tuning of the RGA (peak alignment and resolution).
13	Calibration mode. Provides a calibration factor calculated for converting the measured ion-current to the gas being used. It is recommended to use the Start Detector Calibration on the <i>Recipe Control</i> pane for this calibration.
14	Opens the <i>Degas Settings</i> page for degassing the ion source of selected MKS RGAs.
15	Visible when <i>Peak Jump</i> mode is activated. Use to edit recipe parameters.

6 DETECTOR CALIBRATION

Use *Start Detector Calibration* to calibrate the Faraday and SEM detectors. Detector calibration is recommended at the beginning of each workday when the Cirrus analyzer is used on a daily basis.

- Faraday calibration. Compares the Faraday detector ion current associated with a particular mass against the known partial pressure of that mass. A Faraday calibration defines the basic ion source sensitivity in amps per pressure unit for a given set of ion source conditions.
- Multiplier calibration. Uses the basic ion source sensitivity to find a voltage that amplifies the ion source signal by a given gain setting. The multiplier calibration uses mass fragments with signals less intense than the fragment used for the Faraday calibration.

				(Calibrati	on			
Selec	t Gas A	ir	•						
Farad	ay Calibra	ition							
Pressu	ire 760	N	lass 28	P	ercentage 78		Status : N/A		
Multip	lier 1 Calil	bration							
Mass	29	Gain	50	Status :	N/A				
Multip	lier 2 Calil	bration							
Mass	29	Gain	500	Status :	N/A				
Multip	lier 3 Calil	bration							
Mass	29	Gain	1000	Status :	N/A				
							Save	Run	Stop



The calibration may be performed with a variety of gas species, both pure and mixtures. The composition of the gas must be well known.

CONFIGURATION SETTINGS

Before specifying calibration parameters, review the recommended calibration configuration settings.

Gas	Pressure	Faraday Mass	Percentage	Multiplier Mass
Air	760	28	78	29
Pure nitrogen	760	28	100	29
Pure argon	760	40	100	36
Pure helium	760	4	100	8

Calibration Configuration Settings Table

CALIBRATION PARAMETERS

- 1. Click the Select Gas down arrow, then choose the applicable gas.
- 2. Follow the instructions in the following *Calibrations Instructions Table* for each calibration entered.

Calibration Instructions Table

Туре	Instructions
Faraday	 Enter the inlet pressure (in Torr) in the <i>Pressure</i> field. The typical atmospheric pressure entry of <i>760</i> is used. Enter the mass in the <i>Mass</i> field. Typically, this is the mass of dominant species in the calibration gas. If using pure argon as the calibration gas, the entered mass would be <i>40</i>. If using air as the calibration gas, the entered mass would be <i>28</i> for nitrogen. In the <i>Percentage</i> field, enter the percentage contribution of the partial pressure of the selected mass to the inlet pressure entered previously. If using pure argon as the calibration gas, enter <i>100</i> for the contribution of mass <i>40</i>. If using air as the calibration gas, enter <i>78</i> for the contribution of mass <i>28</i> (diatomic nitrogen).
Multiplier	 Enter a mass that will not saturate the SEM detector. This is the mass used to perform a calibration against the comparative Faraday detector reading. If using pure argon as the calibration gas, enter mass 36 (has a 0.337% contribution to the partial pressure of pure argon). If using air as the calibration gas, enter mass 29 (has a 0.57% contribution to the partial pressure of air). Use the same mass for all three multiplier detectors. The values in the <i>Gain</i> fields are appropriate in most cases and should remain unchanged.

BEGIN CALIBRATION

1. Click **Run** to begin calibration. The Faraday calibration and SEM calibrations will run sequentially.



The *Status* field will change from *N/A* to *Passed* if the calibrations completed a successful run.

			Calibr	ation			
Select Gas	Nitrogen	•					
Faraday Cal	ibration						
Pressure 760		lass 28	Percentage	100	Status : Passe	d	
Multiplier 1 C	alibration						
Mass 29	Gain	50	Status : Passed				
Multiplier 2 0	alibration						
Mass 29	Gain	500	Status : Passed				
Multiplier 3 C	alibration						
Mass 29	Gain	1000	Status : Passed				

2. Click Save.

This will overwrite the curren	ve the new calibration?
	OK Cancel

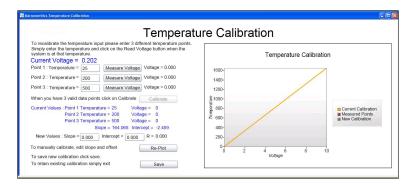
- 3. On the *Save Confirmation* window, click **OK** to overwrite the current calibration and close the window.
- 4. Click Stop Detector Calibration to close the Calibration window.

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7 TEMPERATURE CALIBRATION

START TEMPERATURE CALIBRATION

Use *Start Temperature Calibration* to calibrate the Micromeritics analyzer sample thermocouple signal.



When using the standard Micromeritics analyzer-MKS Cirrus interface cable, the thermocouple signal is transmitted to the Cirrus on analog input channel 4. To collect temperature data, the analog input signal (in volts) must be scaled to temperature in degrees Celsius (°C).

The Micromeritics analyzers only use a single Digital I/O interface cable to connect to the mass spectrometer.

FLEX AND ASAP 2020 PLUS CHEMISORPTION ANALYZERS

The Flex 3500 Chemisorption analyzer and the ASAP 2020 Plus Chemisorption analyzer do not provide an analog temperature signal to the mass spectrometer, so there is no corresponding temperature calibration necessary. These analyzers transmit elapsed time versus sample temperature data in ASCII format every half second while the mass spectrometer signal is active via Ethernet on TCP/IP port 54200. This data can be captured using any TCP/IP capable data capture software or with a Python script. The captured data must then be combined with the mass spectrometer data for use.

AUTOCHEM 2920 AND 2950 ANALYZERS

- 1. Ensure that the AutoChem analyzer furnace is closed and a sample tube is installed.
- 2. Start the AutoChem application.
- 3. Go to **Unit [n] > Enable Manual Control**.

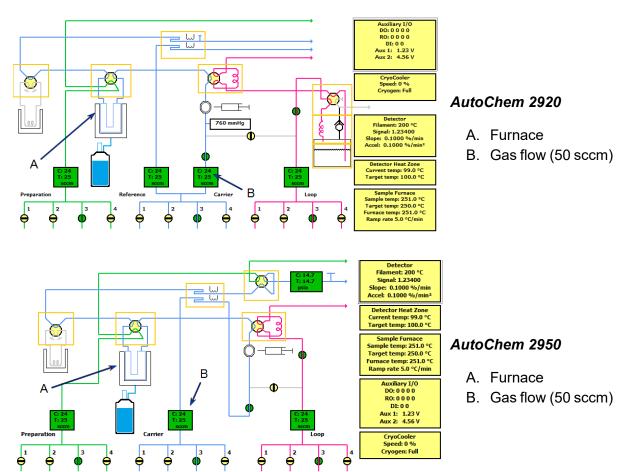
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- 4. Set the analysis valve to Analyze.
- 5. Ensure gas is flowing at a rate similar to experimental conditions.



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POINT 1: TEMPERATURE CALIBRATION

- 1. Right-click the furnace icon on the schematic, then select Set Temperature.
- 2. On the Sample Furnace window, enter 100 in the Set point field, then enter 20 in the Ramp rate field.

Sample Furnace		×
<u>S</u> et point	100 °C	
Ramp rate	20.0 *C/min	
0 <u>K</u>	<u>C</u> ancel	
Enter a value between 0.1 and 9	0.0.	

- 3. Click OK.
- 4. Observe the *Sample Temperature* reading on the schematic. When the sample temperature reaches approximately 100 °C and stabilizes, enter the sample temperature in the *Point 1: Temperature* field on the *Process Eye Professional Temperature Calibration* window.
- 5. Click **Measure Voltage** for Point 1. The analog input voltage will be associated with the AutoChem analyzer sample temperature and the measured voltage displayed at the end of the row.

POINT 2: TEMPERATURE CALIBRATION

- 1. Right-click the furnace icon on the schematic, then select Set Temperature.
- 2. On the Sample Furnace window, enter 450 in the Set point field, then enter 50 in the Ramp rate field.

🔜 Sample Furnace			×
Set point	450	*C	
Ramp rate	50.0	*C/min	
0 <u>K</u>	<u>C</u> ar	icel	
Estas and a hole on 100 and	1100		
Enter a value between -120 and	1100.		

- 3. Click OK.
- 4. Observe the Sample Temperature reading on the schematic. When the sample temperature reaches approximately 450 °C and stabilizes, enter the sample temperature in the *Point 2: Temperature* field on the *Process Eye Professional Temperature Calibration* window.
- 5. Click **Measure Voltage** for Point 2. The analog input voltage will be associated with the analyzer sample temperature and the measured voltage displayed at the end of the row.

POINT 3: TEMPERATURE CALIBRATION

- 1. Right-click the furnace icon on the schematic, then select Set Temperature.
- 2. On the *Sample Furnace* window, enter 800 in the *Set point* field, then enter 50 in the Ramp rate field.

🔲 Sample Furnace	د	ĸ
<u>S</u> et point	800 °C	
Ramp rate	50.0 *C/min	
0 <u>K</u>	<u>C</u> ancel	
Enter a value between -120 and	1100.	

- 3. Click OK.
- 4. Observe the Sample Temperature reading on the schematic. When the sample temperature reaches approximately 800 °C and stabilizes, enter the sample temperature in the *Point 3: Temperature* field on the *Process Eye Professional Temperature Calibration* window.
- 5. Click **Measure Voltage** for Point 3. The analog input voltage will be associated with the analyzer sample temperature and the measured voltage displayed at the end of the row.

RETURN THE FURNACE TO ROOM TEMPERATURE

- 1. Right-click the furnace icon, then select Set Temperature.
- 2. On the *Sample Furnace* window, enter 25 in the *Set point* field, then enter 50 in the *Ramp rate* field.

Sample Furnace		×
<u>S</u> et point	25 [•] C	
Ramp rate	50.0 *C/min	
0 <u>K</u>	<u>C</u> ancel	
Enter a value between -120 and	1100.	

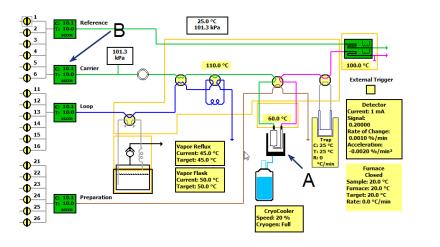
3. Click OK.



Attaching the CryoCooler will speed up this process.

AUTOCHEM III ANALYZERS

- 1. Ensure that the analyzer furnace is closed and a sample tube is installed.
- 2. Start the AutoChem application.
- 3. Go to **Unit [n] > Enable Manual Control**.
- 4. Set the analysis valve to *Analyze*.
- 5. Ensure gas is flowing at a rate similar to experimental conditions.



- A. Furnace
- B. Gas flow (50 sccm)

POINT 1: TEMPERATURE CALIBRATION

- 1. Right-click the furnace box on the schematic, then select Set.
- 2. On the Set Furnace window, select Enable temperature control and change the Target temperature to 50 °C.

Set Furnace	\times		
The furnace is closed.			
Enable temperature control			
Control sample temperature			
○ Control furnace temperature			
Target temperature: 50.0 °C			
Ramp rate: 0.1 °C/min			
○ Cool to less than 50 °C			
O Disable temperature control			
0//			
OK Cancel			
Enter a value between 0.1 and 100.0.			

- 3. Click OK.
- 4. Observe the Sample Temperature reading on the schematic. When the sample temperature reaches approximately 100 °C and stabilizes, enter the sample temperature in the *Point 1: Temperature* field on the *Process Eye Professional Temperature Calibration* window.
- 5. Click **Measure Voltage** for Point 1. The analog input voltage will be associated with the analyzer sample temperature and the measured voltage displayed at the end of the row.



POINT 2: TEMPERATURE CALIBRATION

- 1. Right-click the furnace box on the schematic, then select Set.
- 2. On the Set Furnace window, select Enable temperature control. and change the Target temperature to 450 °C and 50 °C in the Ramp rate field.

Set Furnace	Х			
The furnace is closed.				
Enable temperature control Ontrol sample temperature				
Target temperature:450.0°C				
Ramp rate: 50.0 °C/min				
⊖ Cool to less than 50 °C				
○ Disable temperature control				
OK Cancel				
Enter a value between 0.1 and 100.0.				

- 3. Click OK.
- 4. Observe the *Sample Temperature* reading on the schematic. When the sample temperature reaches approximately 400 °C and stabilizes, enter the sample temperature in the *Point 2: Temperature* field on the *Process Eye Professional Temperature Calibration* window.
- 5. Click **Measure Voltage** for Point 2. The analog input voltage will be associated with the analyzer sample temperature and the measured voltage displayed at the end of the row.

POINT 3: TEMPERATURE CALIBRATION

- 1. Right-click the furnace box on the schematic, then select Set.
- 2. On the Set Furnace window, select Enable temperature control. and change the Target temperature to 450 °C and 50 °C in the Ramp rate field.
- 3. Click OK.
- 4. Observe the *Sample Temperature* reading on the AutoChem instrument schematic. When the sample temperature reaches approximately 800 °C and stabilizes, enter the sample temperature in the *Point 3: Temperature* field on the *Process Eye Professional Temperature Calibration* window.
- 5. Click **Measure Voltage** for Point 3. The analog input voltage will be associated with the AutoChem analyzer sample temperature and the measured voltage displayed at the end of the row.

Set Furnace	\times	
The furnace is closed.		
Enable temperature control		
Control sample temperature		
\bigcirc Control furnace temperature		
Target temperature: 450.0 °C		
Ramp rate: 50.0 °C/min		
○ Cool to less than 50 °C		
○ Disable temperature control		
OK Cancel		
Enter a value between 0.1 and 100.0.		



RETURN THE FURNACE TO ROOM TEMPERATURE

- 1. Right-click the furnace box on the schematic, then select Set.
- 2. On the Set Furnace window, select Enable temperature control. and change the Target temperature to 25 °C and 50 °C in the Ramp rate field.

Set Furnace	\times		
The furnace is closed.			
Enable temperature control			
Control sample temperature			
○ Control furnace temperature			
Target temperature: 25.0 °C			
Ramp rate: 50.0 °C/min			
○ Cool to less than 50 °C			
○ Disable temperature control			
OK Cancel			
Enter a value between 0.1 and 100.0.			

3. Click OK.



Attaching the CryoCooler will speed up this process.

ENABLE CALIBRATION

After all three temperatures have been entered and associated with input voltages, the **Calibrate** button on the *Process Eye Professional Temperature Calibration* window is enabled.

1. Click **Calibrate**. A linear fit is applied to the collected points to determine a scaling equation. The temperatures, associated analog voltage values, and the Slope and Intercept results are displayed.

Micromerities Temperature Calibration				
Temperature Calibration				
To salarisate the sample hermoscopie temperature input, add three different temperature To add a pair inter the current sample thermoscopie temperature in the tox tox and a Current Voltage = 1.408 Port 1: Temperature = [47] Measure Voltage Voltage = 1.400 Port 3: Temperature = [44] Measure Voltage Voltage 1.400 Port 3: Temperature = [44] Measure Voltage Voltage 1.400 After three temperature Voltage in the sample voltage = 1.400 Port 3: Temperature = [44] Measure Voltage Voltage = 0 Port 3: Temperature = 147 Voltage = 0 Port 3: Temperature = 447 Voltage = 0 Port 3: Temperature = 447 Voltage = 0 Port 3: Temperature = 447 Voltage = 0 Stope = 137.580 Intercept = 0.33 New Values: Stope = [69:230] Intercept = [67:300] R = 0.315 To manually cultarithe the scaling equation. exit = 157 and Intercept in the tox toxes and press "Sevi" To retain the existing calibration, exit Temperature Calibration Mode	s/voltage points.			

- 2. Click Save.
- 3. On the *Save Confirmation* window, click **OK** to overwrite the current calibration and close the window.
- 4. Click **Stop Temperature Calibration** on the *Recipe Control* pane to close the calibration window.

ENTER A SCALING EQUATION

As an alternative to fitting a line to three temperature and analog signal values, a scaling equation can be manually entered for the thermocouple signal.

1. Where *New Values* is displayed, enter the applicable values in the *Slope* and *Intercept* fields.

New Values : Slope = 3279141 Intercept = -461867 R = 0.364

- 2. Click **Re-Plot** to display the new scaling function on the chart.
- 3. Click Save.
- 4. Click **OK** to overwrite the current calibration and close the window.
- 5. Click **Stop Temperature Calibration** on the *Recipe Control* window to close the calibration window.

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8 MANUAL RECIPE

The *Start Manual Recipe* option provides access to recipes created using the *Recipe Wizard*. For detailed instructions on using the *Recipe Wizard*, refer to the *Recipe Wizard User Guide* included with the Cirrus II documentation.

Manual Recipe Selection	on X
	I recipe from the list and start. This will close any
recipe that is cu	intentity running.
	•

- 1. Click the down arrow to select the applicable recipe from the list.
- 2. Click Run.
- 3. Click **Stop Manual Recipe** on the *Recipe Control* window to close the window.

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9 LIBRARY

The Library provides access to mass spectra for a variety of compounds.

RGA Information Recall - Acet	aldehyde						
Ele Edit Scan View Window He	slp						
📽 🖿 A 🖪 🔲 🗗 A	🖻 🖌 🔊 🖪 🕺 🖻	6 6 8 8 8	र 🖌 🖉	∐⊠∣% \$ ∭⊈∣⊞1	1 Q 3	, 🕁 🕼 🗍 H	
<u>×</u>	🙀 Acetaklehyde : Alan	ms					_ 🗆
File Name	Show All Alarms and Eve	unle 🔽	<< >>				
Acetaldehyde	Solution (Second Second						
Acetic Acid Acetone	Date/Time	Sevenity Ev	ent M	essage	Duration	Data Set	Recipe file
Acetylene	11/16/2001 08:26:05		ta Files SI	toring data to C:\Documents and Se		DataSet1	Library Files.SI-r
ir (dry)	11/16/2001 08:26:05			pectrum: Mass = 29 Intensity = 100.		DataSet1	Library Files.SI-r
mmonia							
irgon							
Arsine	11						
Benzene							
oron Trifluoride							
lutane							
arbon Dioxide arbon Disulphide							
arbon Disupnice arbon Monoxide							
arbon Tetrachloride	11						
borane							
iphosphine	11						
isilane							1200000000
P Oil DC705	•						
P OI PPE	<u>, </u>						
thane	🙀 Acetaldehyde : BarO						_ 0
thanol thylene							
thylene Glycol	Mass 1						
omblin	1x10 ⁻⁰⁴	18					
armic Acid							
eon 11	1 3						
eon 12							
eon 13	jē 1x10 00						
elium	12 1						
elium ydrogen	sare						
elium xdrogen xdrogen Chloride	200 S S S S S S S S S S S S S S S S S S						
elium xdrogen xdrogen Chloride xdrogen Sulphide	1x10-05						
elium ydrogen ydrogen Chloride ydrogen Sulphide opropyl Alcohol	1x10 ⁻⁰⁰						
lelium (vdrogen vdrogen Chloride (vdrogen Sulphide opropyl Alcohol vypton	3						
elium ydrogen Chovide ydrogen Sulphide oprosyl Alcohol rypton ethane	1x10 ⁻⁰⁷						
elium ydrogen Chloride ydrogen Sulphide oprogyl Alcohol yypton ethane ethanol	3						
leium ydrogen Chloride ydrogen Sulphide oprogrij Alachol yption lethane lethane lethane	3						
elum lydrogen Chkvide lydrogen Sulphide oprogyl Alcohol lyption lethanol lethanol lethadol IP Dil eon	3	10 15	20 25 ;	1	50 55 6		70 75
telium tydrogen Chloride tydrogen Chloride soprosyl Alschol soprosyl Alschol telhano	1x10 ⁻⁰⁷	10 15	20 25 :	1	50 55 6	D 65 7	70 75 ;
lelum lydrogen Chloride lydrogen Sulphide cyctogen Sulphide cypton lefhane lefhanol lefhanol lefhy Efty Ketone HP Oil	1x10 ⁻⁰⁷	10 15	20 25 :		50 55 61	0 65 7	70 75 8

- 1. In the File Name list, double click the applicable compound to display mass spectral data.
- 2. Click the \mathbf{X} in the upper right corner to close the window.

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10 POWER OFF THE MASS SPECTROMETER

The mass spectrometer should be allowed to run continuously unless it will not be used for an extended period of time or needs to be powered down for maintenance.

- 1. Power OFF the capillary and system heaters.
- 2. Power OFF the filaments.

Instruments	Ceneral 🐺 Cirrus
 Entries LM92-S0909000 Filament No: 1 Filament Status: Off Status: Idle In/UseBy: 	Cirrus LM92-90909090 MicroVision IP <u>Click for homepage</u> Chamber Pressure 6.2E-006 Torr Pump Heater Offer Capillary Heater Selected Valve Valve 1 Offer

- 3. Wait 10 minutes to allow the filaments to cool.
- 4. Click the **Pump** button to stop the turbo. The pumps will stop and the vent valve will open after a few minutes.
- 5. Wait 5 minutes for the system to cool further and come to a full stop.

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