Software for Gas Chromatographs
3-9000-745, Rev F
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MON2020

Applies to all Emerson XA Series Gas Chromatographs

ROSEMOUNT® Analytical

EMERSON™ Process Management

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1 Getting started

Welcome to MON2020—a menu-driven, Windows-based software program designed to remotely operate and monitor the Daniel® Danalyzer™ XA series and the Rosemount® Analytical XA series of gas chromatographs.

MON2020 operates on an IBM-compatible personal computer (PC) running the Windows XP operating system or later.

MON2020 can initiate or control the following gas chromatograph (GC) functions:

- Alarm parameters
- Alarm and event processing
- Analog scale adjustments
- Analyses
- Baseline runs
- Calculation assignments and configurations
- Calibrations
- Component assignments and configurations
- Diagnostics
- Event sequences
- Halt operations
- Stream assignments and sequences
- Valve activations
- Timing adjustments

MON2020 can generate the following reports:

- 24-Hour Averages
- Analysis (GPA)
- Analysis (ISO)
- Calibration
- Final Calibration
- Validation
- Final Validation
- Hourly Averages
- Monthly Averages
- GC Configuration
- Raw Data
- Variable Averages
- Weekly Averages

- Dew Temperature Calculation (optional)

MON2020 can access and display the following GC-generated logs:

- Alarm Log
- Event Log
- Parameter List
- Maintenance Log

1.1 MON2000 and MON2020

Users familiar with MON2000 or MON2000 Plus will find a few changes when using MON2020:

- Login security is at the gas chromatograph level instead of at the software level. This means that you no longer have to log in after starting MON2020—but you do have to log in to the gas chromatograph to which you are trying to connect. For more information, see *Section 1.2.12*.
- An "administrator" role has been added to the list of user roles. This new role has the highest level of authority and is the only role that can create or delete all other roles. For more information, see *Section 7.3*.
- Multiple users can connect to the same gas chromatograph simultaneously. By default, the first user to log in to the GC with "supervisor" authority will have read/write access; all other users, including other supervisor-level users, will have read access only. This configuration can be changed so that all supervisor-level users have read/write access regardless of who logs in first. For more information, see *Section 4.1*.
- Users can display multiple windows within MON2020.
- Automatic re-connection. If MON2020 loses its connection with the GC, it automatically attempts to reconnect.
- Users can view multiple instances of certain windows. To aid in data processing or troubleshooting, MON2020 is capable of displaying more than one instance of certain data-heavy windows such as the Chromatogram Viewer and the Trend Data window.
- Enhanced Chromatogram Viewer. The following enhancements have been made to the Chromatogram Viewer:
  - Users can view an unlimited number of chromatograms, in any configuration. For example, a user can view an archived chromatogram and a live chromatogram. For more information, see *Section 2.1*.
  - The "Keep Last CGM" option. Upon starting a new run, MON2020 can keep the most recently completed chromatogram on the graph for reference.
  - Overview window. When zoomed in to a smaller section of a chromatogram, the user can open a miniature 'overview' window that displays the entire chromatogram, for reference. For more information, see *Section 2.3.2*.

  - Older chromatograms available. MON2020 has access to archived chromatograms as old as four or five days. For more information, see *Section 2.1.3*.
  - Full screen mode. For more information, see *Section 2.2*.
  - Protected chromatograms. Chromatograms that you designate as “protected” will not be deleted. For more information, see *Section 2.1.4*.
- The “Invert Polarity “option. This feature reverses a device’s effect. For more information, see *Section 3.2.4* and *Section 3.5.4*.
- Streamlined variables-picking menu. The method for selecting variables for calculations and other purposes is contained within one simple, self-contained menu. For more information, see *Section 1.11*.
- GC Time. The GC Status Bar displays the date and time based on the GC’s physical location, which may be different than the PC’s location. For more information, see *Section 2.6*.
- Daylight savings time. You have option of enabling a GC’s daylight savings time feature. Also, there are two options for setting the start and end times for daylight savings time on the GC. For more information, see *Section 2.6.1*.
- Baseline offsetting. In some situations that involve TCD detectors the baseline may be displayed either too high on the graph, in which case the tops of the peaks are cut off, or too low on the graph, so that the bases of the peaks are cut off. If this occurs it is possible to offset the baseline either up or down so that the entire peak can be displayed on the graph. This offset will be applied to all traces—live, archived and saved—that are displayed thereafter. For more information, see *Section 2.5.7*.
- Microsoft Excel-based Parameter List. The Parameter List has been expanded to offer seven pages of information, and is Microsoft® Excel-based to allow for access outside of MON2020. The document can be imported to and exported from GCs. For more information, see *Section 5.3*.
- Optional FOUNDATION fieldbus variables. If your GC is installed with a Foundation fieldbus, you can map up to 64 GC variables to monitor using the AMS Suite. For more information, see *Section 4.14*.
- Optional local operator interface (LOI) variables. If your GC is installed with an LOI, you can configure up to 25 GC parameters to monitor using the LOI’s *Display* mode. For more information, see *Section 4.13*.
- Access to GC-related drawings such as flow diagrams, assembly drawings, and electrical diagrams.
- Validation runs. During a validation run, the GC performs a test analysis to verify that it is working properly. For more information, see *Section 4.4* and *Section 6.4*.

1.2 Getting started with MON2020

This section covers such issues as installing, registering and setting up the software, as well as configuring MON2020 to meet your specific needs.

1.2.1 System requirements

To achieve maximum performance when running MON2020, ensure your PC meets the following specifications:

Compatible operating systems	Windows® XP (Service Pack 2 or later), Windows® Vista, or **Windows® 7**.
Compatible browser	**Internet Explorer® 6.0** or later.
Minimum hardware specifications	A PC with a **400 MHz Pentium** or higher processor. At least **256 MB** of RAM. At least **100 MB** of available hard disk space. On Windows XP, if NET 2.0 is not installed, an additional 280 MB of hard disk space will be needed. A Super VGA monitor with at least **1024 x 768** resolution. One **Ethernet port** for connecting remotely or locally to the gas chromatograph.

1.2.2 Install MON2020

You must install MON2020 from the CD-ROM onto your hard drive; you cannot run the program from the CD-ROM.

Double-click the **Setup** file and follow the on-screen installation instructions.

Upon successful installation, MON2020 creates a shortcut icon on the computer's desktop.

Note

MON2020 is not an upgrade to MON2000; therefore, MON2020 should be installed to its own directory, separate from the MON2000 directory.

Note

You must be logged onto the computer as an administrator to install MON2020. Windows® Vista and Windows® 7 users, even with administrator privileges, will be prompted by the operating system's User Account Control feature to allow or cancel the installation.

1.2.3 Start MON2020

To launch MON2020, double-click its desktop icon or click the **Start** button and select *Emerson Process Management → MON2020*.

1.2.4 Register MON2020

Each time you start MON2020 it will prompt you to register if you have not already done so. You can also register by selecting **Register MON2020...** from the *Help* menu.

Registering your copy of MON2020 allows you to receive information about free updates and related products.

1. Complete the appropriate fields on the *Register MON2020* window.

Note
The software's serial number is located on the back of its CD case.

2. Click **Next** to continue.
3. Choose the desired registration method by clicking the corresponding checkbox.
4. Click **Finish**.

1.2.5 Set up the data folder

The data folder stores GC-specific files such as reports and chromatograms. The default location for the data folder is **C:\Users*user_account_name*\Documents\GCXA Data**. If you want MON2020 to store its data in a different location—on a network drive, for instance—do the following:

1. Move the data folder to its new location.
2. Select **Program Settings...** from the **File** menu.
3. The current location of the data folder displays in the *Data Folder* field.

   To change the data folder's location, click on the **Browse** button that is located to the right of the *Data Folder* field.
4. Use the *Browse for Folder* window to navigate to the **GCXP Data** folder's new location and click **OK**.

Note
Another method for changing the folder location is to type the folder's location into the *Data Folder* field and press ENTER. When the "Create the folder?" message appears, click **Yes**.

5. The *Data Folder* field updates to display the new location.

1.2.6 Set up MON2020 to connect to a gas chromatograph

To configure MON2020 to connect to a GC, do the following:

1. Select **GC Directory...** from the **File** menu.

   If this is the first time that this option was selected, you will get the following error message:

Figure 1-1: "GC directory file not found" message

If you get the "GC directory file not found" message, click **OK**. The *GC Directory* window appears and displays a table containing an inventory of the GCs to which MON2020 can connect.

2. If you are configuring the first GC connection for MON2020, there will be only one generic GC record listed in the window. To add another record, select **Add** from the *GC Directory* window's **File** menu. A new row will be added to the bottom of the table.
3. Click in the *GC Name* field and enter the name for the GC to which you want to connect.
4. Optionally, you can click in the *Short Desc* field and enter pertinent information about the GC to which you want to connect, such as its location. You can enter up to 100 characters in this field.
5. Click **Ethernet**. The *Ethernet Connection Properties for New GC* window appears.
6. In the *IP address* field, enter the IP address of the GC to which you want to connect.

Note
The default address for the GC's RJ-45 port in DHCP mode is **192.168.135.100**.

Note
If you type in an invalid IP address, you will get an error message when MON2020 attempts to connect to the GC.

7. Click **OK**. When the **Save changes?** message appears, click **Yes**.
8. Repeat steps 2 through 7 for any other GCs to which you want to connect.
9. To delete a GC from the table, select the GC and then select **Delete** from the **File** menu.
10. To copy a GC's configuration information into a new row, select the row to be copied and then select **Insert Duplicate** from the **File** menu.
11. To insert a row below a GC, select the GC and then select **Insert** from the **File** menu.
12. To sort the table alphabetically, select **Sort** from the **Table** menu or click **Sort** from the *GC Directory* window.
13. To copy the list of GCs to the clipboard to be pasted into another application, select **Copy Table to Clipboard** from the **Table** menu.

14. To print the list of GCs, select **Print Table...** from the **Table** menu.
15. To save the changes and keep the window open click **Save** from the *GC Directory* window. To save the changes and close the window, click **OK**. When the **Save changes?** message appears, click **Yes**.

    For more details about configuring MON2020 connections, see *Section 4.12*.

1.2.7 Export a GC directory

The *GC Directory*, which contains the list of networked GCs that are currently configured for your copy of MON2020, can be saved as a DAT file to a PC or other storage media such as a compact disk or flash drive.

To save the *GC Directory* to the PC, do the following:

1. Click **Export**.

   The *Export GC Directory* window displays.

2. Select the checkbox for each gas chromatograph whose information you want to save.

   Note
   If you want to save the entire list, click **Select All**.

3. Click **OK**.

   The *Export GC Directory File* save as dialog displays.

4. Choose a save location.

   The default location is **C:\Users*user_account_name*\Documents\GCXA Data**.

   Note
   The file is automatically given the name of **GC_DIRECTORY_EXPORT.DAT**. If you prefer a different name, type it into the *File name* field.

5. Click **Save**.

1.2.8 Import a GC Directory file

A GC Directory file can be used to restore GC directory information to your copy of MON2020, or it can be used to quickly and easily supply other copies of MON2020 that are installed on other computers with the profiles of the GCs that are in your network.

To import a GC Directory file, do the following:

1. Select **GC Directory...** from the **File** menu.

   If this is the first time that this option was selected, you will get the following error message:

Figure 1-2: "GC directory file not found" message

If you get the "GC directory file not found" message, click **OK**. The *GC Directory* window appears

2. Click **Import**.

   The *Import GC Directory File* dialog displays.

3. Locate the GC directory file and select it.
4. Click **Open**.

   The newly configured *GC Directory* window reappears with the list of networked GCs displayed in the *GC Directory* table.

1.2.9 Launch MON2020 from the SNAP-ON for DeltaV

This section assumes that DeltaV is installed on the PC along with MON2020.

Note

To successfully use MON2020 SNAP-ON for DeltaV, you must be familiar with using the DeltaV digital automation system.

To start MON2020, do the following:

1. Start the DeltaV Explorer by clicking on its desktop icon or by clicking the **Start** button and selecting *DeltaV → Engineering → DeltaV Explorer*.
2. In the *Device Connection View*, open device icons by clicking once on each icon. Follow the path of connections until you locate the desired gas chromatograph icon.
3. Right-click on a connected gas chromatograph icon to display the context menu.
4. Select *SNAP-ON/Linked Apps → Launch MON2020*.

   MON2020 starts and connects automatically to the GC.

1.2.10 Launch MON2020 from the AMS Device Manager

This section assumes that DeltaV and AMS are installed on the PC along with MON2020.

To start MON2020, do the following:

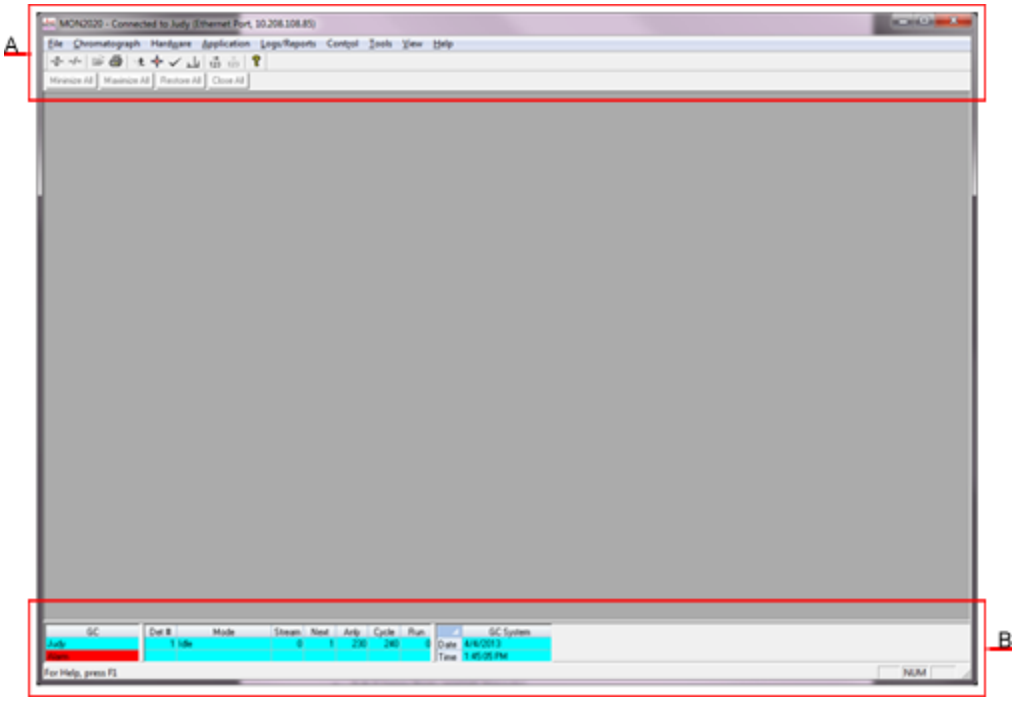
1. Start the AMS Device Manager by clicking on its desktop icon or by clicking the **Start** button and selecting *AMS Device Manager* → *AMS Device Manager*.
2. In the *Device Connection View*, open device icons by clicking once on each icon. Follow the path of connections until you locate the desired gas chromatograph icon.
3. Right-click on a connected gas chromatograph icon to display the context menu.
4. Select *SNAP-ON/Linked Apps* → *Launch MON2020*.

   MON2020 starts and connects automatically to the GC.

1.2.11 The MON2020 user interface

MON2020 has two areas of interaction: the Control Area, at the top of the program's main window, and the GC Status Bar, located at the bottom of the program's main window.

Figure 1-3: The MON2020 window

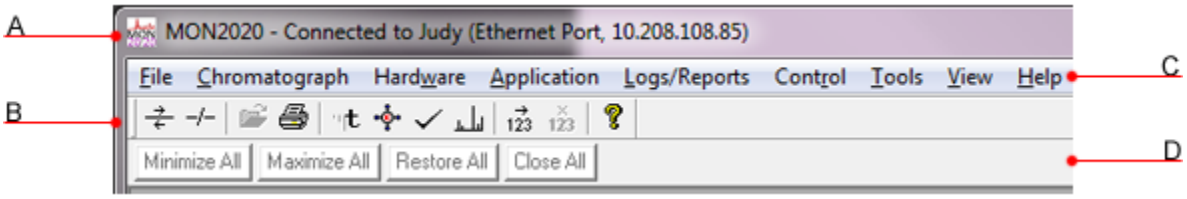


A. Control Area
B. GC Status Bar

The main user interface

The main user interface of the main window contains the menus and icons that allow you to control MON2020 and the GC to which MON2020 is connected.

Figure 1-4: The Control Area



A. Title bar
B. Toolbar
C. Menu bar
D. Dialog Control Tabs

- **Title bar** - The Title bar displays the name of the program, as well as the program's connection status. MON2020 has the following three overall status modes:
  - Not connected - If MON2020 is not connected to a GC, then "MON2020" displays in the Title bar.
  - Connected - If MON2020 *is* connected to a GC, then "MON2020 - Connected to" and the name of the GC and the connection type displays in the Title bar.
  - Offline Edit - If MON2020 is in offline edit mode, then "MON2020 - Offline Edit <*filename*>" displays in the Title bar.
- **Menu bar** - The Menu bar contains the commands that allow you to control and monitor gas chromatographs.
- **Toolbar** - The Toolbar contains shortcut icons for the most important and/or most often used MON2020 commands. From the Toolbar you can do such things as connect to and disconnect from a GC, view chromatographs, and view help files.

	Connect to a gas chromatograph.
	Disconnect from a gas chromatograph.
	Open a configuration file.
	Print a GC configuration report.
	View the Timed Events window.
	View the Component Data window.
	Clear or acknowledge alarms.
	Open the CGM Viewer window.

	Begin auto sequencing.
	Halt auto sequencing.
	Open the About MON2020 window.

- **Dialog Control Tabs bar** - The Dialog Control Tabs bar contains four buttons that allow you to manage the behavior of all windows that are open in the main window. The four buttons are **Minimize All**, **Maximize All**, **Restore All**, and **Close All**. The bar also displays a button for each open window that allows you to select or deselect that window.

You can hide or display the Toolbar and the Dialog Control Tabs bar by clicking the appropriate option from the **View** menu.

The GC Status Bar

The GC Status Bar of the main window displays useful information about the status and functioning of the gas chromatograph to which MON2020 is connected.

The GC Status Bar contains the following sections:

GC	The first row displays the name of the GC to which MON2020 is connected. If MON2020 is not connected to a GC, “Not Connected” displays in this row. If MON2020 loses its connection to the GC, “Comm Fail” displays in this row, and the program will automatically try to reconnect. The second row displays status flags such as active alarms (with red background), unacknowledged alarms (with yellow background), or File Edit modes.
Det #	A GC can have a maximum of two detectors.
Mode	Potential modes are: Idle, Warmstart Mode, Manual Anly, Manual Cal, Manual Validation, Auto Anly, Auto Cal, Auto Validation, Auto Valve Timing, Module Validation, CV Check, Manual Purge, Auto Purge, and Actuation Purge.
Stream	The current stream being analyzed.
Next	The next stream to be analyzed.
Anly	The analysis time.
Cycle	The total cycle time, in seconds, between successive analyses.
Run	The amount of time, in seconds, that has elapsed since the current cycle began.
GC System	Displays the date and time according to the GC to which MON2020 is connected. The date and time displayed may be different from the user’s date and time, depending on the physical location of the GC.

FID Flame Status	Displays the status of the FID flame. Options are OFF with red background, ON with green background, and OVER TEMP with red background. The FID Flame Status indicator only displays on the GC Status Bar when the GC to which MON2020 is connected has an FID detector.

You can hide or display the GC Status Bar by clicking **GC Status Bar** from the **View** menu.

1.2.12 Connect to a gas chromatograph

Before connecting to a GC you must create a profile for the it on MON2020. See *Section 1.2.6* to learn how to do this.

Also, to connect to a gas chromatograph you must log on to it first. Most of MON2020's menus and options are inactive until you have logged on to a GC.

To connect to a GC, do the following:

1. There are two ways to start the process:

   a. On the Toolbar, click  .

   b. Select **Connect...** from the **Chromatograph** menu.

   The *Connect to GC* dialog, which displays a list of all the GCs to which you can connect, appears.

   Note
   If you want to edit the connection parameters for one or all GCs listed in the *Connect to GC* window, click Edit Directory. The GC Directory window will appear. See *Section 1.2.6* for more information.

2. Click the **Ethernet** button beside the GC to which you want to connect.

   The *Login* dialog appears.

3. Enter a user name and user PIN and click **OK**.

   Once connected, the name of the GC appears under the *GC* column in the GC Status Bar.

   Note
   All GCs are shipped with a default user name: **emerson**. A user password is not required when using this administrator-level user name. To add a user password to either of these user names or for information about creating and edit user names in general, see *Section 7.3*.

   Note
   If you enter an invalid user name or password, the *Login* dialog will close without connecting to the GC.

1.2.13 Disconnect from a gas chromatograph

Disconnecting from a GC will automatically log you off of the GC.

To disconnect from a gas chromatograph, do one of the following:

- On the Toolbar, click  .
- Select **Disconnect** from the **Chromatograph** menu.

Note

If you are connected to a GC and want to connect to a different GC, it is not necessary to disconnect first; simply connect to the second GC, and in the process MON2020 will disconnect from the first GC.

1.3 Keyboard commands

You can use the following keyboard keystrokes throughout the program:

Arrow keys	Moves cursor: • Left or right in a data field. • Up or down in a menu or combo box. • Up or down (column), left or right (row) through displayed data entries.
Delete	• Deletes the character after cursor. • Deletes selected rows from a table or return row values to the default settings.
Enter	Activates the default control element (e.g., the OK button) in current window.
Esc	Exits application or active window without saving data.
F1	Accesses context-sensitive help topics.
Insert	• Toggles between insert and type-over mode in selected cell. • Inserts a new row above the highlighted row.
Tab	Moves to the next control element (e.g., button) in the window; to use Tab key to move to next data field, select **Program Settings...** from the **File** menu and clear the **Tab from spreadsheet to next control** check box.
Shift+Tab	Moves to previous control element (e.g., button) or data field in window; see Tab description.
Space	Toggles settings (via radio buttons or check boxes).

You can use the following function keys from the main window:

F2 Starts the Auto-Sequencing function. See *Section 6.1* for more information.

F3 Halts the GC (e.g., an analysis run) at the end of the current cycle. See *Section 6.1* for more information.

F5 Displays the Timed Events table per specified stream. See *Section 4.3* for more information.

F6 Displays the Component Data table per specified stream. See *Section 4.2* for more information.

F7 Displays the chromatogram for the sample stream being analyzed. See *Section 2.1.2* for more information.

F8 Displays any chromatogram stored in the GC Controller. See *Section 2.1.3* for more information.

1.4 Procedures guide

Use the following table to look up the related manual section, menu path and, if appropriate, the keystroke for a given procedure.

Table 1-1: MON2020 Task List

Task or Data Item	Section(s)	Menu Path [Keystroke]
24-hour average, component(s) measured	*Section 4.5.2*	Application → Calculations → Averages...
Add a gas chromatograph	*Section 1.2.6*	File → GC Directory
Alarms, related components	*Section 4.2* *Section 4.7* *Section 3.5*	Application → Component Data... [**F6**] Application → Limit Alarms → User... Hardware → Discrete Outputs...
Alarms, stream number(s) programmed	*Section 4.7*	Application → Limit Alarms → User...
Analysis Report (on/off)	*Section 5.7.3*	Logs/Reports → Printer Control...
Analysis time	*Section 4.3.4*	Application → Timed Events... [**F5**]
Starting or ending auto-calibration	*Section 4.9*	Application → Streams...
Auto-calibration interval	*Section 4.9*	Application → Streams...
Auto-calibration start time	*Section 4.9*	Application → Streams...
Autocal time	*Section 4.9*	Application → Streams...
Baseline	*Section 4.9*	Application → Streams...
Base pressure used for calculations	*Section 4.9*	Application → Streams...
Calibration concentration	*Section 4.2*	Application → Component Data... [**F6**]
Calibration cycle time	*Section 4.3.4*	Application → Timed Events... [**F5**]

Table 1-1: MON2020 Task List *(continued)*

Task or Data Item	Section(s)	Menu Path [Keystroke]
Calibration runs, number averaged	*Section 4.9*	Application → Streams...
Calibration runs, number of	*Section 4.9*	Application → Streams...
Calibration stream number	*Section 4.9*	Application → Streams...
Change the default C6+ mixture ratio	*Section 4.2.6*	Application → Compnent Data Table...
Communications	*Section 4.11*	Application → Communication... Application → Ethernet Ports...
Component code and name	*Section 4.2*	Application → Component Data... [**F6**]
Component full scale (for output)	*Section 4.1* *Section 3.7*	Application → System... Hardware → Analog Outputs...
Component(s) programmed for input	*Section 3.6* *Section 3.4*	Application → Analog Inputs... Application → Discrete Inputs...
Component(s) programmed for output	*Section 4.7* *Section 3.7* *Section 3.5*	Application → Limit Alarms → User... Hardware → Analog Outputs... Hardware → Discrete Outputs...
Component, retention time	*Section 4.2*	Application → Component Data... [**F6**]
Component zero (for output)	*Section 3.7*	Hardware → Analog Outputs...
Compressibility (on/off)	*Section 4.5.1*	Application → Calculations → Control...
Configure the valve timing	*Section 6.5*	Control → Auto Valve Timing...
Current date	*Section 2.6*	Chromatograph → View/Set GC Time...
Current time	*Section 2.6*	Chromatograph → View/Set GC Time...
Cycle time	*Section 4.3.4*	Application → Timed Events... [**F5**]
Delete alarms	*Section 4.7* *Section 5.1*	Application → Limit Alarms... Logs/Reports → Alarms → Alarm Log...
Delete component from component list	*Section 4.2*	Application → Component Data... [**F6**]
Delete inhibit, integration, peak width	*Section 4.2*	Application → Timed Events... [**F5**]
Delete output(s)	*Section 3.7* *Section 3.5*	Hardware → Analog Outputs... Hardware → Discrete Outputs...
Enable or disable multi-user write	*Section 4.1*	Application → System...
Existing alarm(s)	*Section 5.1*	Logs/Reports → Alarms → Alarm Log...

Table 1-1: MON2020 Task List *(continued)*

Task or Data Item	Section(s)	Menu Path [Keystroke]
Full-scale value (for input)	*Section 3.6*	Hardware → Analog Inputs...
Generate a repeatability certificate	*Section 5.12*	Logs/Reports → Repeatability Certificate...
GPM liquid equivalent (on/off)	*Section 4.5.1*	Application → Calculations → Control...
Height or area measurement method	*Section 4.2*	Application → Component Data... [**F6**]
High alarm	*Section 4.7*	Application → Limit Alarms → User...
(Analyzer) I.D.	*Section 4.1*	Application → System...
Inhibit on-off times	*Section 4.3.4*	Application → Timed Events... [**F5**]
Input(s) being used	*Section 3.6* *Section 3.4*	Hardware → Analog Inputs... Hardware → Discrete Inputs...
Integration on-off times	*Section 4.3.4*	Application → Timed Events... [**F5**]
Low alarm	*Section 4.7*	Application → Limit Alarms → User...
Manage the GC's pressure	*Section 3.3*	Hardware → EPC...
Mole percent (on/off)	*Section 4.5.1*	Application → Calculations → Control...
Normalization (on/off)	*Section 4.5.1*	Application → Calculations → Control...
Outputs being used	*Section 4.7* *Section 3.7* *Section 3.5*	Application → Limit Alarms → User... Hardware → Analog Outputs... Hardware → Discrete Outputs...
Peak width, on time	*Section 4.3.4*	Application → Timed Events... [**F5**]
Relative density (on/off)	*Section 4.5.1*	Application → Calculations → Control...
Response factor	*Section 4.2*	Application → Component Data... [**F6**]
Response factor, percent deviation	*Section 4.2*	Application → Component Data... [**F6**]
Retention time, percent deviation	*Section 4.2*	Application → Component Data... [**F6**]
Spectrum gain	*Section 4.3.3*	Application → Timed Events... [**F5**]
Stream number(s) (for output)	*Section 4.7* *Section 3.7* *Section 3.5*	Application → Limit Alarms → User... Hardware → Analog Outputs... Hardware → Discrete Outputs...
Stream sequences skipped, number	*Section 4.1* *Section 4.9*	Application → System... Application → Streams...
Streams analyzed, number	*Section 4.1* *Section 4.9*	Application → System... Application → Streams...

Table 1-1: MON2020 Task List *(continued)*

Task or Data Item	Section(s)	Menu Path [Keystroke]
Streams analyzed, sequence	*Section 4.1* *Section 4.9*	Application → System... Application → Streams...
Valve on/off times	*Section 4.3.1*	Application → Timed Events... [**F5**]
Weight percent (on/off)	*Section 4.5.1*	Application → Calculations → Control...
Wobbe value (on/off)	*Section 4.5.1*	Application → Calculations → Control...
Zero value (for input)	*Section 3.6*	Hardware → Analog Inputs...

1.5 Configuration files

Use the **File** menu to edit, save, and restore configuration files.

1.5.1 Edit a configuration file

To edit a configuration file, do the following:

1. Disconnect from the GC.
2. Select **Open Configuration File...** from the **File** menu.

   The *Open* dialog displays. Configuration files are saved with the **.xcfg** extension.

3. Locate and select the configuration file that you want to edit and click **Open**.

   MON2020 opens the file in offline edit mode.

4. Use the **Application** and **Hardware** menu commands to edit the configuration file. For more information on these commands, see *Chapter 3* and *Chapter 4*.
5. When finished editing the configuration file, click  to save the changes to the configuration file and to leave offline edit mode.

1.5.2 Save the current configuration

Configuration files are saved with the .xcfg extension. To save a GC's current configuration to a PC, do the following:

1. Select **Save Configuration (to PC)...** from the **File** menu.

   The *Save as* dialog displays.

2. Give the file a descriptive name or use the pre-generated file name and navigate to the folder to which you want to save the file.

3. Click **Save**.

1.5.3 Import a configuration file

⚠ CAUTION!

The current configuration will be overwritten, so be sure to save it before importing a new or previous configuration. See *Section 1.5.2* to learn how to save a configuration.

⚠ CAUTION!

The GC must be in Idle mode while performing this task.

To import a configuration into a GC, do the following:

1. Select **Restore Configuration (to GC)...** from the **File** menu.

   The *Open* dialog displays. Configuration files are saved with the .**xcfg** extension.

2. Locate and select the configuration file that you want to import and click **Open**.

   The file's data is loaded into the GC.

1.5.4 Restore the GC's factory settings

The GC's default timed event, component data and validation data tables are created at the factory and are not accessible by users. To restore these tables to their default values, do the following:

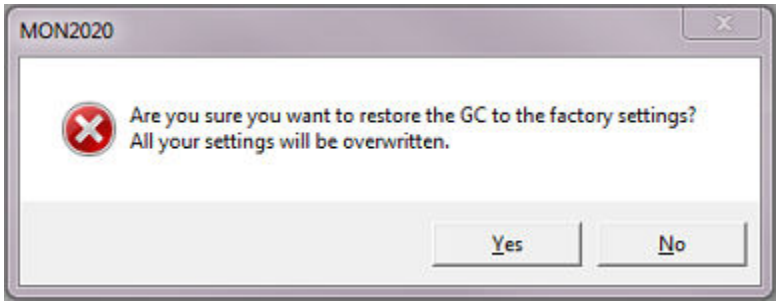
⚠ CAUTION!

The GC must be in Idle mode while performing this task.

1. Select **Restore to Factory Settings...** from the **File** menu.

   The following warning message displays:

Figure 1-5: Restore to Factory Settings warning message



2. Click **Yes**.

   MON2020 restores the default values to the GC's data tables. When the process is completed, a confirmation message displays.

3. Click **OK**.

1.6 Configure your printer

Select **Print Setup...** from the **File** menu to configure the settings for the printer connected to your PC. These settings will apply to any print job queued from MON2020, such as the reports that are configured by the Printer Control. See *Section 5.7.3* for information.

The settings available depend on the printer model. Refer to the printer manufacture's user manual for more information.

Note

Your new configuration will be cleared, i.e., the settings will return to the default values, when you exit MON2020.

1.7 Online help

Currently, the online help feature contains all user information and instructions for each MON2020 function as well as the MON2020 system.

To access the online help, do one of the following:

- Press **F1** to view help topics related to the currently active dialog or function.
- Select **Help Topics** from the **Help** menu to view the help contents dialog.

1.8 Operating modes for MON2020

The GC supports two different operating modes. Each mode allows the GC to analyze data from a given number of detectors, streams, and methods, as detailed in below.

Table 1-2: Operating Modes for MON2020

Mode ID Number	Detectors Supported	Streams Supported	Methods Supported
0	1	1	1
1	2	1	1

1.9 The Physical Name column

Most MON2020 hardware windows, such as the analog inputs or the valves, contain a hidden column called *Physical Name* that lists the default name of the associated GC device. It might be useful to know a device's physical name while troubleshooting.

To view the hidden column, do the following:

1. Select **Program Settings...** from the **File** menu.

   The *Program Settings* window displays.

2. Select the **Show Physical Names** checkbox.
3. Click **OK**.

   The *Physical Name* column now will be visible on all windows that have the column, such as the *Heater* window or the *Valves* window.

1.10 Select the GC's networking protocol

MON2020 can connect to the GC using one of two networking protocols: PPP or SLIP. If the version level of the GC's firmware is 1.2 or lower, MON2020 should be configured to use the SLIP protocol; otherwise, the PPP protocol should be used.

To select the GC's networking protocol, do the following:

1. Select **Program Settings...** from the **File** menu.

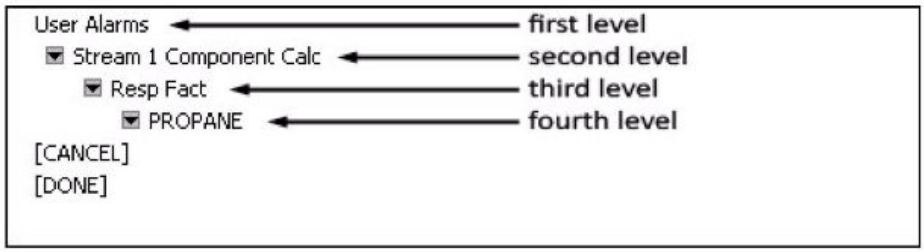
   The *Program Settings* window displays.

2. To use the PPP protocol, make sure the *Use PPP protocol for serial connection (use SLIP if unchecked)* checkbox is selected; to use the SLIP protocol, make sure the *Use PPP protocol for serial connection (use SLIP if unchecked)* checkbox is not selected.
3. Click **OK**.

1.11 The context-sensitive variable selector

The MON2020 method for selecting variables for calculations and other purposes is based on a simple, self-contained system.

Figure 1-6: Example of a context-sensitive variable selector



The context-sensitive variable selector consists of a first-level element, called the *context element*, that is followed by a series of tiered, drop-down lists. The options available from the drop-down lists depend upon the context element.

The following example explains how to use the context-sensitive variable selector to select a user alarm variable:

1. Click on the **second-level** drop-down list.

   The full list of available streams displays.

2. Select the stream you want to use for the alarm.
3. Click the **third-level** drop-down list.

   The full list of available user alarm variables displays.

4. Select the variable you want to use for the alarm.

   If there are components associated with the variable, the **fourth-level** drop-down list will display.

5. If displayed, click the **fourth-level** drop-down list.

   The full list of available components displays.

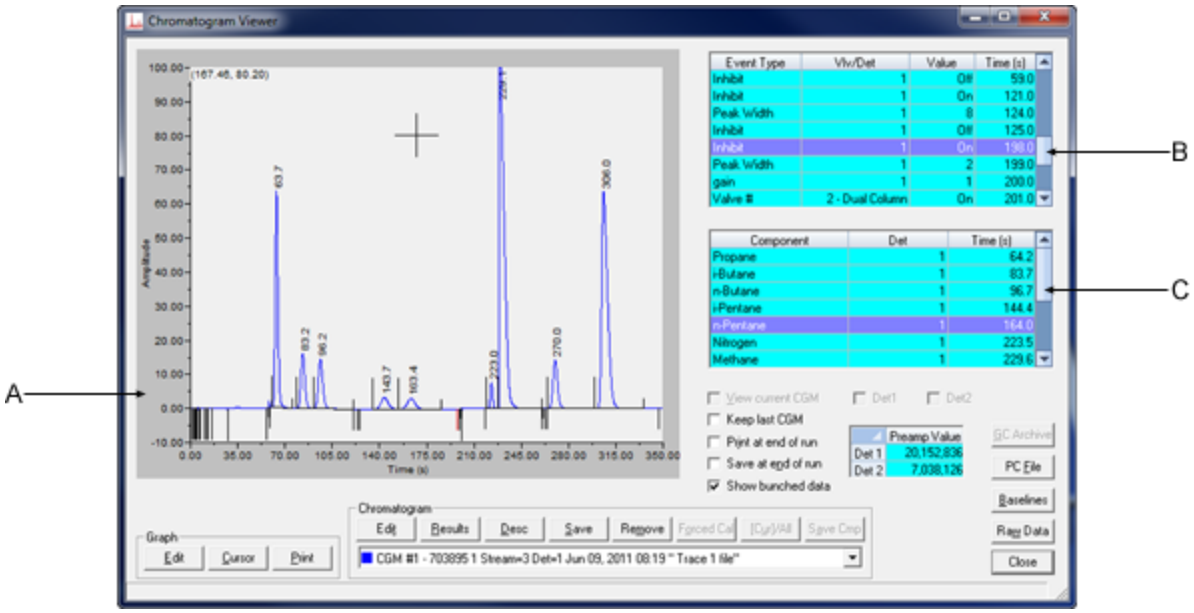
6. Select the component you want to use for the alarm.
7. Click **[Done]**.

   The context-sensitive variable selector closes and the variable displays in the *Variable* field.

2 Chromatograph

When it comes to viewing and managing chromatograms, MON2020 is flexible and straightforward. This chapter shows you how to access the Chromatogram Viewer, as well as how to use the viewer to display, print, and manipulate live, archived, or saved chromatograms. There is no limit to the number of archived and saved chromatograms that can be displayed at once. The Chromatogram Viewer can display all three types of chromatograms together, alone, or in any combination.

Figure 2-1: The Chromatogram Viewer

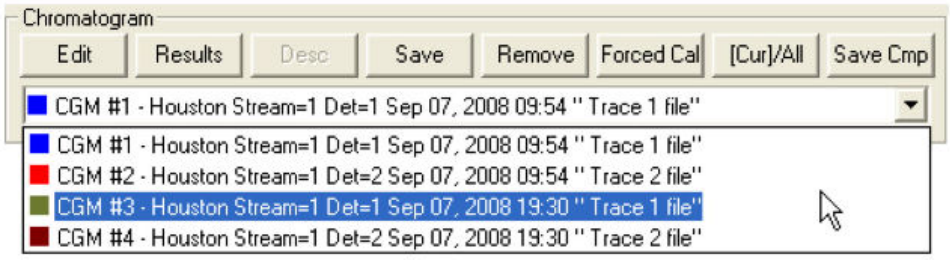


A. Chromatogram window
B. Time events table
C. Component data table

A chromatogram displays in the *chromatogram window*. If the chromatogram contains one trace, the *Det1* checkbox is automatically checked; if the chromatogram contains two traces, the *Det1* and *Det2* checkboxes are automatically checked. To remove a trace, uncheck its detector checkbox.

Each trace that displays is color-coded; use the Chromatogram pull-down menu to select a specific trace.

Figure 2-2: Chromatogram pull-down menu



The list of GC events associated with the production of the chromatogram, along with each event's status and time, displays in the *Timed Events* table to the right of the chromatogram display window. The *Component Data* table, to the lower right of the chromatogram display window, lists the components measured during the analysis. These tables are updated in real-time, just as the chromatogram is.

Note

By default, the timed events and component data tables are configured to scroll to and highlight the next occurring event in the analysis cycle. To disable this feature, right-click on one of the tables and uncheck the **Auto Scroll** option on the pop-up menu.

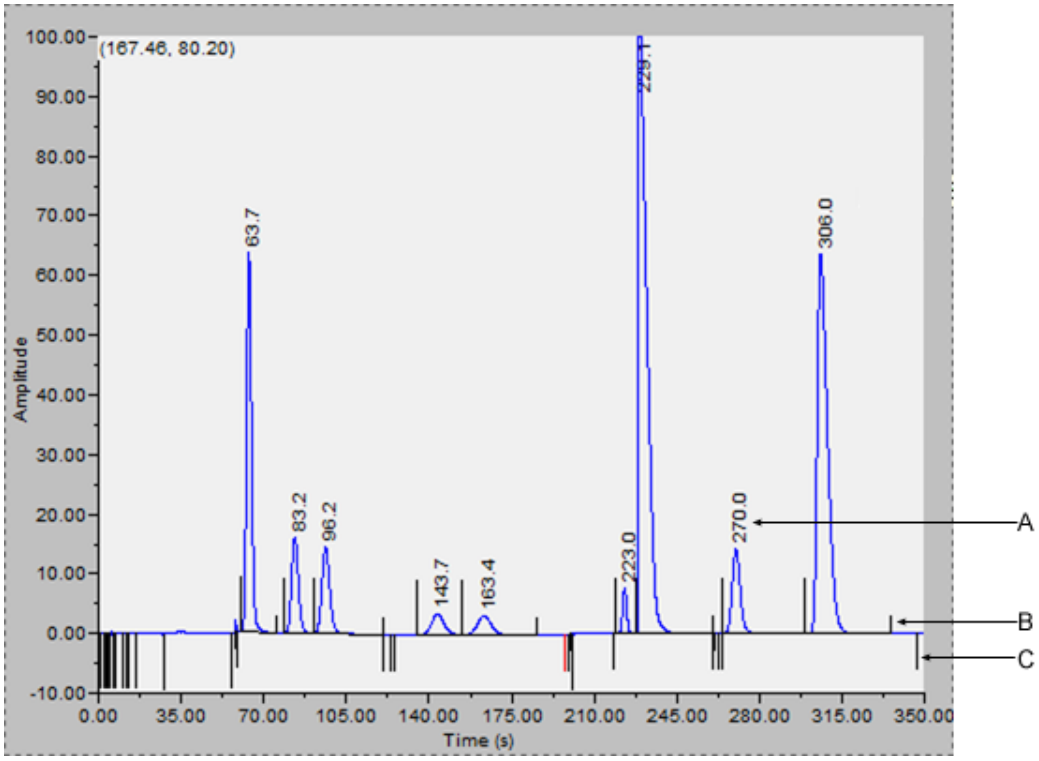
2.1 The Chromatogram Viewer

Use the Chromatogram Viewer to display and print live, archived, or saved chromatograms. There is no limit to the number of archived and saved chromatograms that can be displayed at once; however, to maximize performance, the number of chromatograms displayed should be limited to 25 or less. The Chromatogram Viewer can display all three types of chromatograms together, alone, or in any combination.

The Chromatogram Viewer contains a host of information about both current and past GC analyses, and it contains just as many ways of editing and manipulating that data.

2.1.1 Data displayed in the chromatogram window

Figure 2-3: The chromatogram window



A. Retention time
B. Peak detection marker
C. Timed event marker

The following elements are displayed in the chromatogram window:

The chromatogram	A *trace* is the graphical representation of the detector output from a single detector; a *chromatogram* is the collection of all traces and associated data that are generated by a gas chromatograph's detector or detectors. Each trace displays in a different color.
Retention times	The retention time, which displays above each component's peak, is the time that elapses between the start of an analysis and the sensing of the maximum concentration of that component by the detector.
Baselines	The baseline extends from the beginning to the end of a peak. You can turn the baseline on or off by clicking **Baselines**.
Timed event markers	These markers, which correspond to events from the Timed Events table, display on the chromatogram as black vertical lines below the trace-line. There are three types of timed event markers: • Valve events display as long vertical lines. • Integration events display as medium vertical lines.

- Spectrum gain events display as short vertical lines.

Peak detection markers These markers display on the chromatogram as black vertical lines above the trace-line. Each peak has two peak detection markers: one at its beginning and one at its end.

2.1.2 Display a live chromatogram

To view a live chromatogram, do the following:

1. Connect to the GC.
2. Select **Chromatogram Viewer...** from the **Chromatograph** menu.

Note

Another way to display the Chromatogram Viewer is to click  , which is located on the Toolbar.

3. From the Chromatogram Viewer window, select the **View current CGM** check box.

2.1.3 Display an archived chromatogram

Archived chromatograms are stored on the GC, so you must be logged in to access them.

Archived chromatograms are sorted and displayed on four tabbed panes:

Chromatograms This view displays all chromatogram types sorted by time so that the newest file is always listed first. This view can be further configured to display only the files from the last five runs for each stream, or to display all the files that are stored on the GC.

Protected chromatograms Protected chromatograms are never deleted from the GC. To protect a chromatogram, see *Section 2.1.4*.

Note

Protected chromatogram files have a “lock” icon () displayed beside them.

Final Calibration chromatograms As long as there is space, MON2020 will store all final calibration chromatograms; once space runs out, MON2020 will delete the oldest non-protected final calibration chromatogram for each new final calibration chromatogram that is created. If multiple final calibration chromatograms are created on the same day, the last chromatogram created is archived, unless MON2020 has been configured to archive all final calibration chromatograms.

Note
See *Section 4.1* to learn how to configure MON2020's archiving behavior.

Final Validation chromatograms	These chromatograms are treated in the same manner as final calibration chromatogram files.

-

To view one or more archived chromatograms, do the following:

1. Click **GC Archive**.

   The *Select archive file(s)* window appears. The files can be sorted by date, file name, analysis type, time, or stream number by clicking the appropriate column header. By default, they are sorted by date, with the newest file listed first.

   Note
   By default, only recent chromatograms—that is, the last five runs for each stream—are displayed. To view all archived chromatograms, click **All**. To return to viewing only recent chromatograms, click **Recent**.

2. Select one or more archive files by clicking them.

   Use the SHIFT and CTRL keys to make multiple selections.

   Note
   To save the selected files to the PC without displaying them first, select the *Download and save selected chromatograms* check box and click **Download & Save**.

3. Click **Download & Show**.

   The *Select* window displays for each chromatogram that contains data from more than one detector.

   Figure 2-4: The Select window

4. For each chromatogram, double-click either "Detector 1", "Detector 2", or "Both" from the *Select* window.

   MON2020 plots the archived chromatogram(s) and the corresponding data displays in the timed event and component data tables.

2.1.4 Protected chromatograms

By default, archived chromatograms are not saved indefinitely. Once the GC's storage capacity for archived chromatograms has been reached, the oldest archived chromatograms are deleted to make room for the newest archived chromatograms.

If you have a chromatogram that you would like to preserve, it is possible to "protect" it. Protected chromatograms will not be deleted to accommodate newer chromatograms. To delete a protected chromatogram, it must first be unprotected. See *Unprotect a protected chromatogram*for more information. MON2020 will save up to 100 protected chromatograms.

Note

Protected chromatograms have a "lock" icon () displayed beside them.

Note

To protect an archived chromatogram you must be logged in as a supervisor or administrator.
To protect a chromatogram, do the following:

1. Click **GC Archive**.

   The *Select Archive File(s)* window appears. The chromatograms can be sorted by date, file name, analysis type, time, or stream number by clicking the appropriate column header. By default, they are sorted by date, with the newest chromatogram listed first.

   Note

   By default, only recent chromatograms—that is, the last five runs for each stream—are displayed. To view all archived chromatograms, click **All**. To return to viewing only recent chromatograms, click **Recent**.

2. Make sure the *Chromatogram* tab is selected and then select the appropriate archived chromatogram by clicking it. Use the SHIFT or CTRL key to make multiple selections.
3. Click **Protect**.

   The *Edit Description* window displays.

4. Enter any information that you would like to have associated with the chromatogram and then click **OK**. If you do not want to enter any information, click **Cancel**.

   MON2020 will place a "lock" icon () beside the selected chromatogram to verify its protected status. You can also click on the *Protected Chromatograms* tab to view your newly protected archived chromatogram.

2.1.5 Display a saved chromatogram

To view a chromatogram that was saved to disk, do the following:

1. Click **PC File**.

   The *Open* dialog appears.

2. Navigate to the desired .xcgm file or .xcmp comparison file and select it.

   To make multiple selections, use the SHIFT or CTRL key.

3. Click **OK**.

   The *Select* window displays for each chromatogram that contains data for more than one detector.

Figure 2-5: The Select window

4. For each chromatogram, double-click either “Detector 1”, “Detector 2”, or “Both” from the *Select* window.

   MON2020 plots the archived chromatogram(s) and the corresponding data displays in the timed event and component data tables.

2.2 Options for displaying chromatograms

Right-clicking on the graph brings up the following commands:

Command Name	Shortcut	Description
Zoom In	“+” (NUMPAD)	Zooms in on the entire graph. **Note**: Another way to zoom in is by clicking and dragging your mouse to select the region of the graph that you want to zoom in on.
Zoom Out	“-” (NUMPAD)	Zooms out from the entire graph.
Zoom X In	“6” (NUMPAD)	Zooms in on the X axis.
Zoom X Out	“4” (NUMPAD)	Zooms out from the X axis.
Zoom Y In	“8” (NUMPAD)	Zooms in on the Y axis.
Zoom Y Out	“2” (NUMPAD)	Zooms out from the Y axis.

Command Name	Shortcut	Description
Save State	CTRL + HOME	Saves current or archived display settings for the selected chromatogram. **Note**: The Save State function is available only when viewing a live or archived chromatogram.
Restore State	HOME	Restores the last saved display settings for the selected chromatogram. **Note**: Pressing **HOME** returns the user to the saved state.
Toggle Full Screen	F11	Toggles the display of the Chromatogram Viewer's tables and buttons and maximizes the chromatogram window.
Cursor to Nearest Point	F8	Snaps the cursor to the nearest point on the chromatograph in both the X and Y directions.
Toggle Coarse/Fine Cursor	F4	Toggles the cursor from coarse and less accurate to fine and more accurate.
Toggle Lines/Dots Displays	F9	Toggles the chromatographs from lines to dots, or dots to lines.
Toggle Mouse Position Tip	CTRL + F4	The graph's cursor follows the movement of the mouse while a hovering tool-tip displays the exact coordinates of the current point.
Toggle Nearest Position Tip	CTRL + F9	The graph's cursor follows the movement of the mouse cursor.
Print	CTRL + P	Prints the chromatogram.
Copy to clipboard	CTRL + C	Copies from the graph the raw detector data that was used to plot the selected chromatogram. This data can be pasted into another application such as Microsoft Word or Microsoft Excel.
Paste from clipboard	CTRL + V	Plots a range of points copied from another application such as Microsoft Word or Microsoft Excel.

2.3 Configure the appearance of the chromatograph

MON2020 allows you to change the appearance of many of the chromatogram's elements, such as its x-axis and y-axis values, the color of the chromatograph's background, and the display status of its labels.

2.3.1 The Graph bar

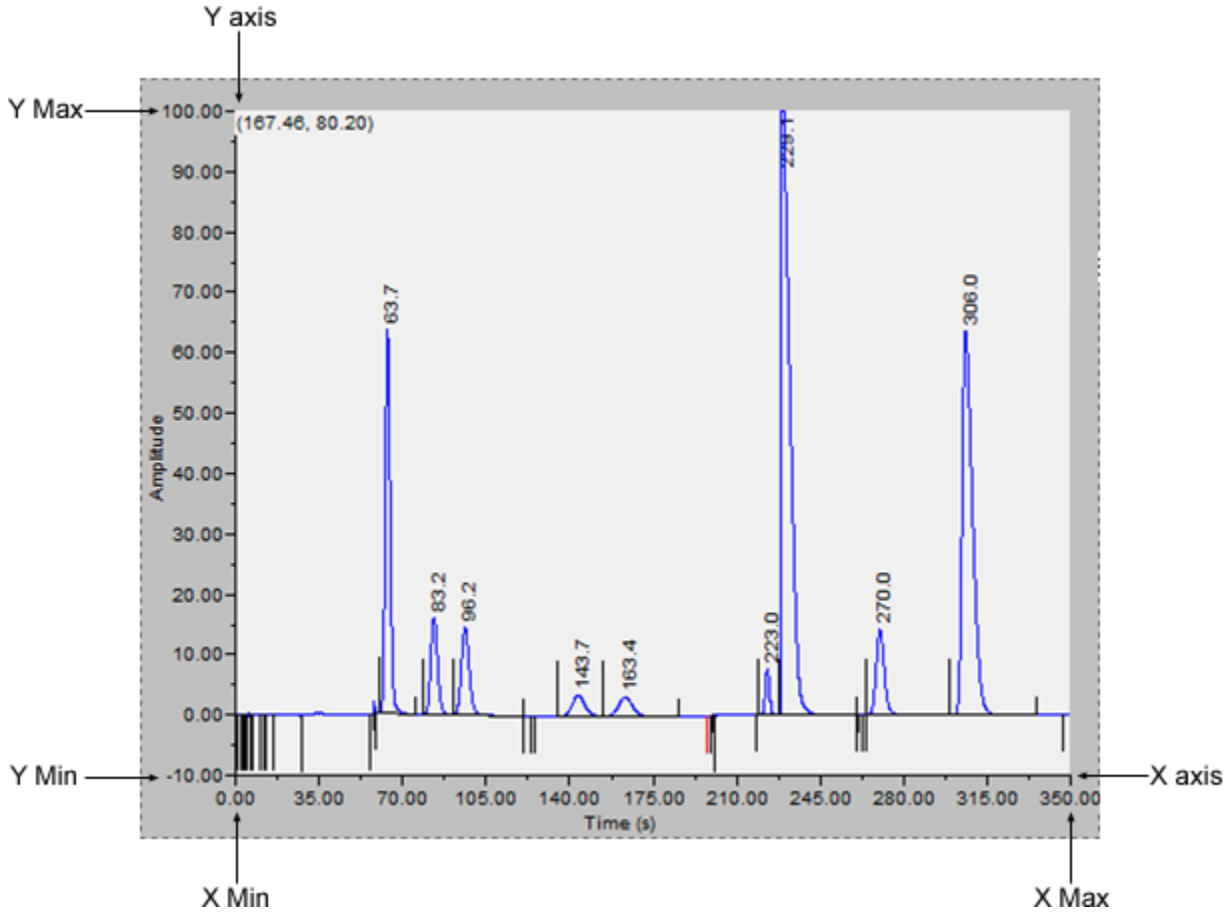
Use the Graph bar buttons to change the display parameters of the chromatogram.

Click **Edit** from the **Graph** bar. The *Edit Scales* window displays.

The following table lists the parameters that can be edited:

Command	Description	Default Value
X Min	Sets the minimum value, in seconds, for the X axis.	0
X Max	Sets the maximum value, in seconds, for the X axis. The is value is determined by the Timed Events table.	100
Y Min	Sets the minimum value for the Y axis.	-10
Y Max	Sets the maximum value for the Y axis.	100
Print Speed	Sets the number of inches per second for the x-axis while printing a chromatogram, similar to an XY plotter.	0
X Intervals	Sets the number of intervals to be displayed on the graph for the X axis.	10
Y Intervals	Sets the number of intervals to be displayed on the graph for the Y axis.	11
Display Option	Determines whether the chromatograph is displayed as a solid line or as a dotted line. Lines is checked by default.	Lines
Show labels	Toggles the display of the graph labels.	Checked
Scroll newest X	Determines whether the graph's window moves to focus on the most recent data point along the x axis. This feature only applies to live chromatograms.	Unchecked

Figure 2-6: A chromatograph



To see how your changes affect the graph, click **Apply**. To accept your changes, click **OK**.

- Click **Cursor** to toggle the cursor size from coarse movement (less accurate) to fine movement (more accurate).
- Click **Print** to print the chromatogram window.

2.3.2 Additional plot commands

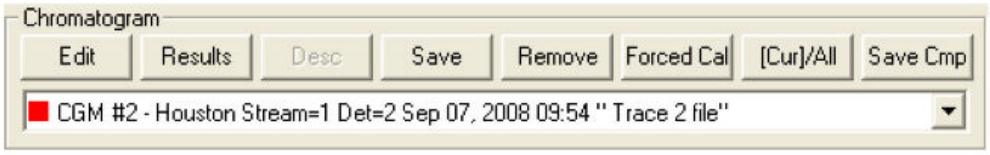
In addition to the Graph bar, there are a few other commands available that allow you to manipulate the look and feel of the graph. To access the additional plot commands menu, right-click on the Chromatogram Viewer anywhere except on the graph or the timed event and component data tables. The additional commands are:

Set Plot Area Color	Changes the color of the graph's background. This may be necessary to make the chromatograms more visible. The default RGB color values are 236, 233, and 216.
Auto Resize Series	Scales down the X-axis and the Y-axis to fit the entire chromatogram onto the window.

Show Mini Plot	Toggles the display of a smaller version of the chromatogram in a separate, smaller, and resizable window. This allows you to keep an overview of the entire graph at all times, especially when zoomed in. This window automatically displays whenever you zoom in on the original chromatogram.
Rearrange Series	Resizes and offsets two or more traces so that they can both be fully displayed on the graph. To offset a trace means to raise its Y-axis relative to the Y-axis of the previous trace so that one trace is not drawn over the other but instead one trace is drawn above the other.
Trace Offset Settings	Indicates the amount of offset between two or more traces. To offset a trace means to raise its Y-axis relative to the Y-axis of the previous trace so that one trace is not drawn over the other but instead one trace is drawn above the other. If two detectors are in use, each set of traces can be offset independently--that is, the traces for one detector can be offset relative to each other, but independent of the traces from the second detector.

2.4 Change how a chromatogram displays

Figure 2-7: The Chromatogram bar



The Chromatogram bar contains a row of buttons that allows you to manipulate a single chromatogram. Below the row of buttons is the Chromatogram bar's pull-down menu, which contains a list of all of the currently displayed chromatograms/traces. Before you can work with a chromatogram you must first select it from the pull-down menu.

2.4.1 Edit a chromatogram

You can use the Edit function to change the X and Y offset values for a trace, as well as its color. These changes may be necessary to make the trace more distinguishable from those that surround it, or to align a trace with a different trace for comparison.

To edit a trace, do the following:

1. Select the trace that you want to edit from the Chromatogram pull-down menu.
2. Click **Edit**.

   The *Edit Chromatogram* dialog appears.

X Offset	Enter a positive number to move the trace to the right, or a negative number to move the trace to the left.
Y Offset	Enter a positive number to move the trace up, or a negative number to move the trace down.
# points	Number of data points in the trace. This field is read-only.
Color	Assigns a color to the trace.

3. To see how your changes affect the trace, click **Apply**. To accept your changes, click **OK**.

2.4.2 Display chromatogram results

To display a table of calculation results for a chromatogram, do the following:

1. From the Chromatogram bar's pull-down menu, select the appropriate trace.
2. Click **Results**.

   A window appears displaying the calculation results for the selected trace.

- Click **Save** to save these results in one of the following formats: tab-delimited (.txt), comma-delimited (.csv), Microsoft Excel (.xls), HTM (.htm), or XML (.xml).
- Click **Clipboard** to copy the data to the Windows® clipboard, where it can be pasted into another document.
- Click **Print** to print a tab-delimited version of the results.

2.4.3 Save a chromatogram

To save a chromatogram, do the following:

1. From the Chromatogram bar's pull-down menu, select the trace that you want to save.
2. Click **Save**.

   The **Save As** window displays.

   For convenience the file is given an auto-generated file name that includes the trace's creation date and time; however, you can give the file any name that you choose.

3. Click **Save**.

2.4.4 Remove a chromatogram from the Chromatogram Viewer

To remove a live trace from the chromatogram window, do one of the following:

- If you want to remove all live traces, click the *View current CGM* check box to uncheck it.

- If you want to remove a single live trace, click the appropriate detector checkbox beside the *View current CGM* check box.

To remove a saved or an archived chromatogram from the chromatogram window and to close the file, do the following:

1. From the Chromatogram bar's pull-down menu, select the trace that you want to remove.
2. Click **Remove**.

2.4.5 Initiate a forced calibration

The Forced Cal command uses an archived chromatogram's raw data to calibrate the GC. The calculation results are stored in the component data table for the corresponding stream number.

A major benefit of a forced calibration is increased efficiency. Using a previously validated chromatogram removes the necessity for the GC to perform a calibration and a validation before performing an analysis.

To perform a forced calibration, do the following:

1. From the Chromatogram bar's pull-down menu, select the trace that you want to use to calibrate the GC.
2. Click **Forced Cal**.

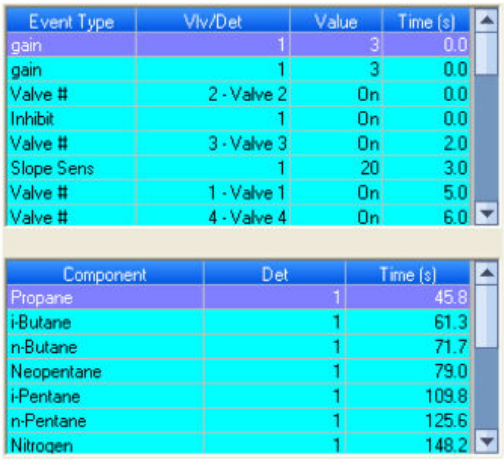
2.4.6 Chromatogram Viewer tables

MON2020 can display two levels of information in the Chromatogram Viewer's timed events and component data tables:

- All timed events and all components for all open chromatograms.
- Timed events and components for the currently selected chromatogram.

By default, the two tables show only the timed events and components for the currently selected chromatogram.

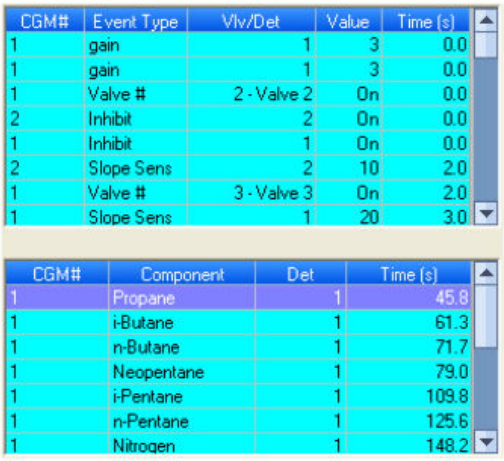
Figure 2-8: Timed events and component data tables showing data for a currently selected trace



Event Type	Vlv/Det	Value	Time (s)
gain	1	3	0.0
gain	1	3	0.0
Valve #	2 - Valve 2	On	0.0
Inhibit	1	On	0.0
Valve #	3 - Valve 3	On	2.0
Slope Sens	1	20	3.0
Valve #	1 - Valve 1	On	5.0
Valve #	4 - Valve 4	On	6.0

Component	Det	Time (s)
Propane	1	45.8
i-Butane	1	61.3
n-Butane	1	71.7
Neopentane	1	79.0
i-Pentane	1	109.8
n-Pentane	1	125.6
Nitrogen	1	148.2

Figure 2-9: Timed events and component data tables showing data for all open traces



CGM#	Event Type	Vlv/Det	Value	Time (s)
1	gain	1	3	0.0
1	gain	1	3	0.0
1	Valve #	2 - Valve 2	On	0.0
2	Inhibit	2	On	0.0
1	Inhibit	1	On	0.0
2	Slope Sens	2	10	2.0
1	Valve #	3 - Valve 3	On	2.0
1	Slope Sens	1	20	3.0

CGM#	Component	Det	Time (s)
1	Propane	1	45.8
1	i-Butane	1	61.3
1	n-Butane	1	71.7
1	Neopentane	1	79.0
1	i-Pentane	1	109.8
1	n-Pentane	1	125.6
1	Nitrogen	1	148.2

Note

The brackets ([ ]) on the Cur/All button indicate which mode is being displayed in the tables.

1. To view the data for a different chromatogram, select the trace from the Chromatogram bar's pull-down menu.
2. To view all timed events and all components for all open chromatograms, click **Cur/All**.
3. To toggle back to viewing only the timed events and components for the currently selected chromatogram, click **Cur/All** again.

2.4.7 Open a comparison file

A comparison file contains two or more chromatograms and their associated data. To open a comparison file, do the following:

1. Click **PC File**. The *Open* dialog displays.
2. Select **XA CMP Files (*.xcmp)** from the *Files of type* drop-down menu.
3. Navigate to the folder that contains the comparison file that you want to open and select the file.
4. Click **Open**.

2.4.8 Save a comparison file

A comparison file allows you to save your current view, including all open chromatograms, for later review and reuse. To save a comparison file, do the following:

1. Click **Save Cmp**.

   The *Save As* dialog appears.

2. Navigate to the folder in which you want to save the file.

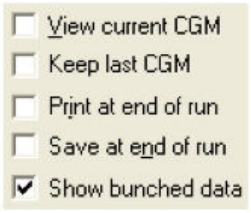
   Note
   For convenience the file is given an auto-generated file name that includes the current date and time; however, you can give the file any name that you choose.

3. Click **Save**.

2.5 Miscellaneous commands

The series of check boxes to the right of the graph have the following functions:

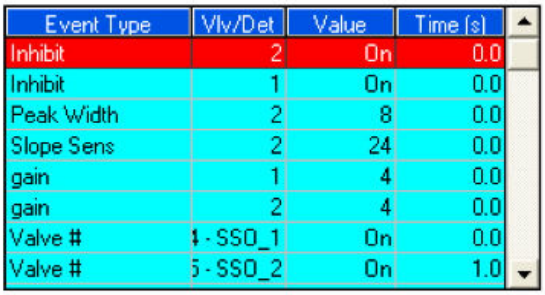
Figure 2-10: Miscellaneous options



Keep last CGM When viewing a live chromatogram, upon starting a new run, MON2020 keeps the most recently completed chromatogram on the graph for comparative purposes.

Print at end of run	Prints the chromatogram to the PC's default printer at the end of the run and is unchecked by default.
Save at end of run	Saves the chromatogram to the GC's **Data** folder at the end of the run and is unchecked by default.
Show bunched data	If this box is unchecked, then all of the raw data points are plotted to the chromatogram window; if this box is checked, which is the default option, then each point plotted on the graph represents the average of a group of raw data values. The size of the data group is determined by the peak width value listed in the Timed Events table.

2.5.1 The Chromatogram Viewer's Timed Events table



Event Type	Vlv/Det	Value	Time (s)
Inhibit	2	On	0.0
Inhibit	1	On	0.0
Peak Width	2	8	0.0
Slope Sens	2	24	0.0
gain	1	4	0.0
gain	2	4	0.0
Valve #	4 - SSO_1	On	0.0
Valve #	5 - SSO_2	On	1.0

The Chromatogram Viewer displays a compact version of the Timed Events table, located on the upper right side of the window. The events displayed in the table are sorted by time. See *Section 4.3* for more information.

The Timed Event table displays the following data for each event:

Event Type	The type of timed event. These events are mapped to the Time Events window and include Valve, Integration and Gain events.
Vlv/Det	Identifies which valve or detector is involved in the event.
Value	Setting of the event; for example, a valve was turned ON, or the gain was set to **4**.
Time (s)	The number of seconds into the cycle that the event occurred or will occur.

Timed events from live or archived chromatograms can be edited from the Chromatogram Viewer by double-clicking on the Timed Events table. The changes will affect the next analysis run. The following commands are available by right-clicking on the table:

Auto Scroll	When checked, if a live trace has been selected from the Chromatogram bar's pull-down menu, the Timed Event table will keep its focus on the event closest in time by highlighting that event in dark blue.
Save Sheet	Allows you to save the table to the PC in one of the following formats: TXT, CSV, XLS, HTM, or XML.
Copy to Clipboard	Allows you to copy the table to the clipboard. This data can be pasted into another application such as Microsoft Word or Microsoft Excel.

Print Sheet Allows you to print the table to your default printer.

2.5.2 Launch the Timed Events table from the Chromatogram Viewer

To launch the *Timed Events* dialog directly, right-click on the Chromatogram Viewer's Timed Events table and select **Edit Timed Events Table**. The *Timed Events* dialog displays. See *Section 4.3* for more information.

2.5.3 Edit Timed Events from the Chromatogram Viewer

To edit timed events from the Chromatogram Viewer, do the following:

1. From the Chromatogram bar's pull-down menu, select the chromatogram whose timed events you want to edit.
2. Right-click on the Timed Events table and select **Edit**.

   The cells that can be edited turn white.

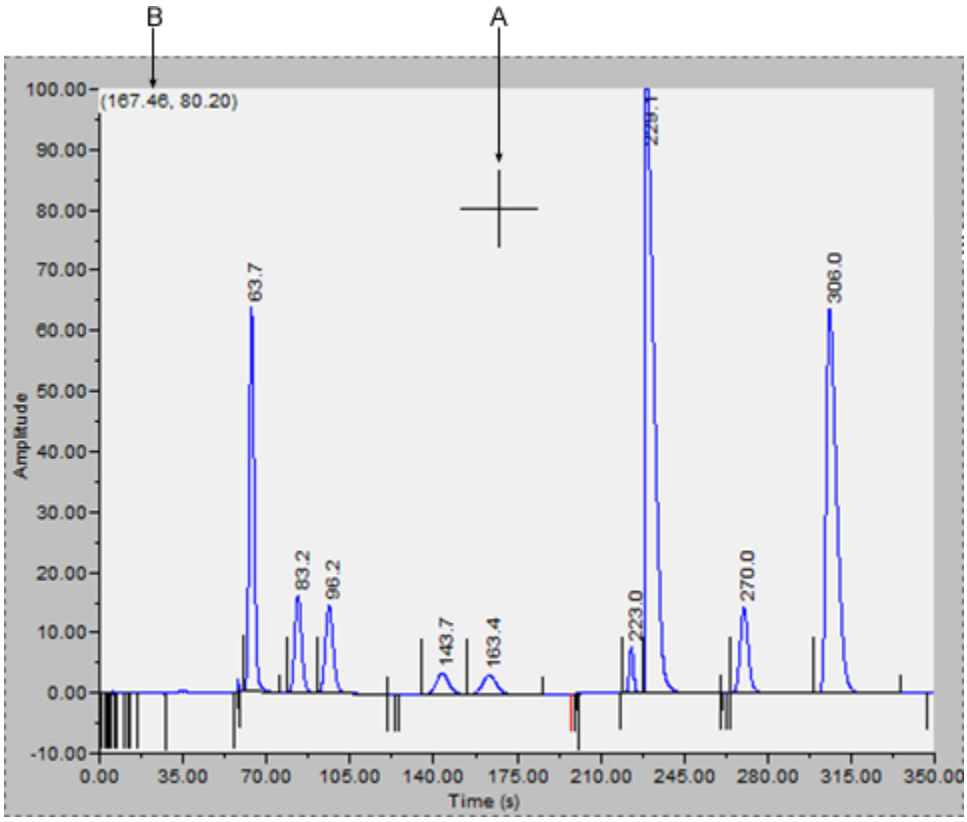
3. Edit the appropriate event.
4. Right-click on the Timed Events table and select **Save Changes**.

   The data will be saved and the table's cells will turn blue, indicating that they are read-only. The changes will affect the next analysis run.

Note
To return to the Timed Events table *without* saving your changes, select **Discard Changes**.

2.5.4 Use the Chromatogram Viewer's cursor to update a Timed Event

Figure 2-11: Chromatograph cursor



The Chromatogram Viewer's cursor (A) can be dragged to any point on the graph, or it can be relocated by double-clicking within the boundaries of the graph.

As the cursor moves across the chromatogram, the Timed Events table automatically scrolls to the event that corresponds to the cursor's coordinates. The cursor's coordinates (B) display in the upper left corner of the graph.

The cursor can be useful if you want to change a timed event based on the data displayed by the chromatogram.

To update a timed event based on the location of the Chromatogram Viewer's cursor, do the following:

1. Select the live or archived trace that you want to use as the source for changing the timed event.
2. Drag the cursor to the desired location.

You can track the cursor's location by watching the coordinates that display in the upper left corner (B). The x-coordinate represents the analysis time in seconds. When you see the desired time displayed, stop dragging the cursor.

Note

To toggle the cursor's size between coarse movement (less accurate) and fine movement (more accurate), click the **Cursor** button on the Graph bar.

3. Go to the Time Events table and right-click on the appropriate event.
4. Select **Update Time from Cursor**.

   The event's time will be changed to match the cursor's time (x-coordinate).

5. To save your changes, right-click on the Timed Events table and select **Save Changes**.

   The changes will affect the next analysis run.

Note

To return to the Timed Events table without saving your changes, select **Discard Changes**.

2.5.5 The Chromatogram Viewer's Component Data table

The Chromatogram Viewer displays a compact version of the Component Data table beneath the Timed Events table. See *Section 4.2* for more information.

The Component Data table displays the following data for each component:

Component	The name of the component.
Det	Identifies the detector associated with the component.
Time (s)	The retention time for the component.

Retention times for components from live or archived chromatograms can be edited from the Chromatogram Viewer by double-clicking on the Component Data table. The changes will affect the next analysis run. The following commands are available by right-clicking on the table:

Auto Scroll	When checked, if a live trace has been selected from the Chromatogram bar's pull-down menu, the Component Data table will keep its focus on the component closest in time by highlighting that it in dark blue.
Save Sheet	Allows you to save the table to the PC in one of the following formats: TXT, CSV, XLS, HTM, or XML.
Copy to Clipboard	Allows you to copy the table to the clipboard . This data can be pasted into another application such as Microsoft Word or Microsoft Excel.
Print Sheet	Allows you to print the table to your default printer.

2.5.6 Edit retention times from the Chromatogram Viewer

To edit the retention time for a component, do the following:

1. Double-click on the Component Data table or right-click on the table and select **Edit Retention Times**.

   The *Ret Time* column turns white, indicating that its cells are editable.

2. Click on the appropriate cell for the component that you want edit, and enter a new retention time, in seconds. The value must be less than the analysis time.
3. To save your changes, right-click on the table and select **Save Changes**.

   The changes will affect the next analysis run.

Note

To return to the Component Data table without saving your changes, select **Discard Changes**.

2.5.7 Display raw data from the Chromatogram Viewer

Use the Raw Data button to display the Raw Data table for the selected trace.

1. Use the Chromatogram bar's pull-down menu to select a specific trace.

Note

Even though you are selecting a *trace*, the data that is displayed will be for the *chromatogram*, which may include more than one trace.

2. Click **Raw Data**.

   The *Raw Data* window displays and shows the raw data for the selected chromatogram. The following data displays for each peak from the trace:

No.	Numerical identifier for the peak, listed by the order of discovery.
Ret Time	Time, in seconds, that the component eluted.
Peak Area	The area under the peak.
Peak Height	The maximum height of the peak.
Det	The detector associated with the peak.
Method	Method of peak end detection. Options are: • 1 (Baseline) • 2 (Fused Peak) • 3 (Last Fused Peak) • 4 (Tangent Skim) • 100 (Inhibit)

- 300 (Forced Integration)
- 500 (Summation)

Integ. Start	Time, in seconds, when integration started.
Integ. Stop	Time, in seconds, when integration stopped.
Peak Width Half Height	The width of the peak taken at half of the peak's height.
Is Partial Peak	If Y, then the Partial Peak value is used in the summation calculation; if N, then the Partial Peak value is not used in the summation calculation.

2.6 Set the gas chromatograph's date and time

When MON2020 connects to a gas chromatograph, the Status Bar displays the gas chromatograph's date and time.

Note
The date and time displayed for the GC may be different from the user's date and time, depending on the physical location of the GC.

To set the gas chromatograph's date and time, do the following:

1. Select **View/Set Date Time...** from the **Chromatograph** menu.

   The *View/Set Date Time* window displays.

2. Use the drop-down menus to set the date and time.

   To enable or adjust daylight savings, see *Section 2.6.1*.

3. Click **OK**.

2.6.1 Set daylight savings

Daylight savings time is the practice of temporarily advancing clocks so that afternoons have more daylight and mornings have less. Typically clocks are adjusted forward one hour near the start of spring and are adjusted backward in autumn. Since the use of daylight savings time is not universal, you have the option of enabling or disabling it in MON2020.

To configure MON2020 to use daylight savings time, do the following:

1. Select **View/Set Date Time...** from the **Chromatograph** menu.

   The *View/Set Date Time* window displays.

   Note
   Make sure the GC is set to the current date and time before enabling the daylight savings feature.

2. Click the **Enable Daylight Savings** checkbox.

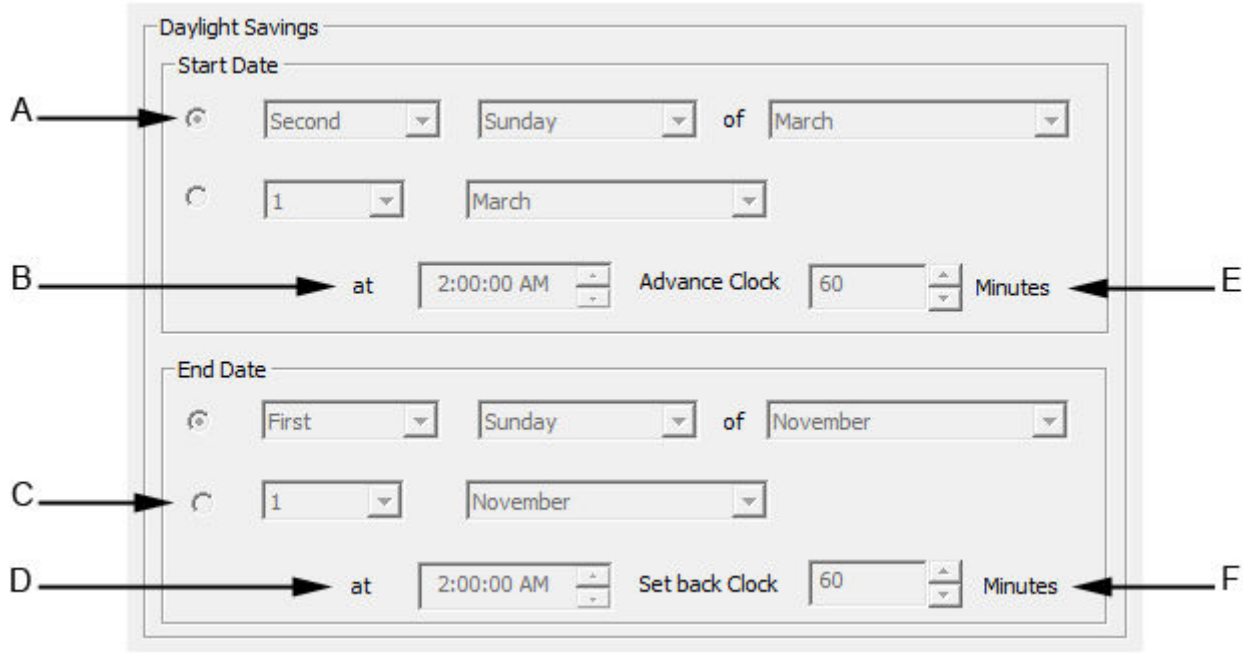
   The *Daylight Savings* section will be enabled, giving you the following two options for setting the start and end times for daylight savings:

   - Week format. You can specify on which week day, of what week, and of what month DST to start and end.
   - Month/Day format. You can specify the exact day of the month and the month number for which you want daylight savings to start and end.

Note

These formats can be used interchangeably; for example, the Week format can be used to specify the start date, and the Month/Day format can be used to specify the end date.

Figure 2-12: The Daylight Savings options



A. Week format
B. Start time
C. Month/day time
D. End time
E. Advance time
F. Set back time

3. Set the start date for daylight savings time.
4. Set the start time and the advance time.
5. Set the end date for daylight savings time.
6. Set the end time and the setback time.
7. Click **OK** to implement your changes and close the *View/Set Date Time* window.

Note

To implement your changes without closing the *View/Set Date Time* window, click **Save**.

Note

Daylight savings time should be configured each time the feature is enabled; thereafter, each year MON2020 will automatically compute the start and end times based on the initial configuration.

3 Hardware

Many of a gas chromatograph's hardware components—such as its heaters, valves, and discrete outputs—can be easily managed through MON2020.

This chapter shows you how to view and administer each of a gas chromatograph's major hardware components.

This chapter also shows you how to view an inventory of all of a gas chromatograph's installed hardware components.

3.1 Heater configuration

MON2020 allows you to do the following from the *Heaters* window:

- Name each heater.
- Monitor the heaters' performance.
- Set a target temperature.

3.1.1 Set the temperature of the gas chromatograph's heaters

You can set a heater's desired temperature or fix its power output by selecting **Heaters...** from the **Hardware** menu.

Each heater can be set to one of the following modes:

Auto	Allows you to set the desired temperature for the heater.
Fixed On	Allows you to set the power output for the heater without regard to temperature.
Not Used	Removes the heater from service.

3.1.2 Rename a heater

To assign an identifying label to a heater, do the following:

1. Select **Heaters...** from the **Hardware** menu.

   The *Heaters* window displays.

2. Double-click on the appropriate row under the *Label* column for the heater that you want to name.
3. Type in a descriptive name for the heater. This name must be unique; two heaters cannot share the same label.
4. Click **OK**.

3.1.3 Set a heater's voltage type

To set a heater's voltage type, do the following:

1. Select **Heaters...** from the **Hardware** menu.
2. Click on the appropriate *Heater Type* cell and select **AC** or **DC** from the drop-down list.
3. Click **OK** to save the changes and close the window.

Note
To save the changes without closing the window, click **Save**.

3.1.4 Monitor the temperature of a heater

To check a heater's temperature, select **Heaters...** from the **Hardware** menu.

The current temperature of each heater displays under the *Temperature* column, and updates in real time. The percentage of the GC's power output that is being used by each heater displays under the *Current PWM* column.

3.1.5 Monitor the operational status of a heater

To check a heater's status, select **Heaters...** from the **Hardware** menu.

The status of each heater displays under the *Status* column. There are four possible status states, and their meanings are as follows:

OK	The heater's control card is installed and is working correctly.
Not Installed	The heater's control card is not installed.
Out of Control	The heater is running and is in the process of reaching its temperature set point.
Error	The GC cannot communicate with the heater.

3.1.6 Set the desired temperature

To set the desired temperature for a heater, do the following:

1. Select **Heaters...** from the **Hardware** menu.

   The *Heaters* window displays.

2. For each heater that you want to set, select **Auto** from the appropriate row under the *Switch* column.
3. For each heater that you want to set, double-click on the appropriate row under the *Setpoint* column, and enter the desired temperature, in degrees Celsius. You can enter a value between **20** and **500**.

Note
Heaters 1 and 2 should never exceed 150 °C.

4. To exclude a heater from the Warm Start process, select its *Ignore Warm Start* check box.

Note
A *warm start* occurs when the GC restarts after having been shut down during an auto sequence analysis run. The GC will activate the heaters and wait until they reach their setpoints and the temperature stabilizes; the GC will then resume the auto sequence run.

5. The appropriate rows under the *PID Gain*, *PID Integral*, and *PID Derivative* columns can also be edited by double-clicking and entering a new value. The value ranges for each column is as follows:

PID Gain	0 - 500
PID Integral	0 - 500
PID Derivative	0 - 50000

Note
You should not deviate from the default settings for these variables, which were determined by experienced personnel.

6. Click **OK** to save the changes and close the window.

Note
To save the changes and leave the window open so that you can monitor the heaters' status, click **Save**. The current temperature of each heater displays in the *Temperature* column, and is updated in real time.

3.1.7 Set PWM Output

Note
Pulse-Width Modulation (PWM) is a technique for providing intermediate amounts of electrical power between fully on and fully off.

A heater needs voltage to operate. The amount of voltage that is delivered to a heater can be controlled manually when the heater is set to **Fixed On** mode. Setting a heater to **Fixed On** mode can be useful when troubleshooting heater issues.

⚠ CAUTION!

Fixed On mode is not recommended for general GC operations. Switching a heater to Fixed On mode removes its ability to maintain a constant temperature because the power delivered to the heater will not fluctuate based on the temperature setpoint, but will instead remain at the level set by the user.

To set a heater's PWM Output, do the following:

1. Select **Heaters...** from the **Hardware** menu.

   The *Heaters* window displays.

2. For each heater that you want to set, select **Fixed On** from the appropriate row under the *Switch* column.
3. For each heater that you want to set, double-click on the appropriate row under the *Fixed PWM Output* column, and enter the desired percentage of output. You can enter a decimal value between **0** and **100**.
4. Click **OK** to save the changes and close the window, .

Note

To save the changes and leave the window open so that you can monitor the heaters' status, click **Save**. The current temperature of each heater displays in the *Temperature* column, and is updated in real time.

3.1.8 Take a heater out of service

To remove a heater from service, do the following:

1. Select **Heaters...** from the **Hardware** menu.

   The *Heaters* window displays.

2. For each heater that you want to set, select **Not Used** from the appropriate row under the *Switch* column.

   The row turns turquoise, indicating that it is no longer in service.

3. To save the changes and close the window, click **OK**.

Note

To save the changes without closing the window, click **Save**.

3.2 Valve configuration

MON2020 allows you to do the following from the *Valves* window:

- Assign identifying labels to each valve.

- Monitor valve operation.
- Control the operation modes for each valve.

3.2.1 Rename a valve

Give each valve a descriptive label to avoid confusing one valve for another. To assign an identifying label, do the following:

1. Select **Valves...** from the **Hardware** menu.

   The *Valves* window displays.

2. Double-click on the appropriate row under the *Label* column for the valve that you want to name.

   Note
   The valves are labeled **Valve 1** - **Valve** *N* by default, where *N* equals the total number of valves available to the GC.

3. Type in a new descriptive name for the valve.
4. Click **OK**.

3.2.2 Set a valve's operational mode

A valve has three operational modes: **Auto**, **On**, and **Off**.

- Setting the valve to **Off** means that the valve will turn off and remain off until the operational mode is changed.
- Setting the valve to **Auto** means that the valve will turn on and off according to the Timed Events table.
- Setting the valve to **On** means that the valve will turn on and remain on until the operational mode is changed.

Note
The GC's switch panel or LOI settings override MON2020's valve settings.

To set a valve's operational mode, do the following:

1. Select **Valves...** from the **Hardware** menu.

   The *Valves* window displays.

2. Select the desired mode from the drop-down menu under the *Switch* cloumn for the valve.
3. Click **OK** to save the changes and close the window.

Note

To save the changes and leave the window open so that you can monitor the valve's progress, click **Save**. The current state of the valve displays in the *State* column, and is updated in real time.

3.2.3 Monitor the operational status of a valve

To check a valve's status, select **Valves...** from the **Hardware** menu.

The status of each valve displays under the *Status* column. There are five possible status readings, and their meanings are as follows:

OK	The valve is installed and is working correctly.
Not Installed	The valve is not installed.
Under/Over Current Error	Unable to switch the solenoid on or off. There is a potential problem with the solenoid.
Error	The Heater/Solenoid board is installed but the GC cannot communicate with it.

3.2.4 Invert the polarity of a valve

The **Invert Polarity** option reverses the effect of switching a valve on or off. By default, the **Invert Polarity** option is set to FALSE, which means that switching a valve to ON activates it, and switching the valve to OFF deactivates it. Setting **Invert Polarity** to TRUE means that switching a valve to ON *deactivates* it, and switching the valve to OFF *activates* it.

To set the polarity of a valve, do the following:

1. Select **Valves...** from the **Hardware** menu.

   The *Valves* window displays.

2. If the *Invert Polarity* checkbox is selected, it is set to **True**; to set it to **False**, uncheck the box by clicking it. If the *Invert Polarity* checkbox is not selected, it is set to **False**; to set it to **True**, click the box.

3.2.5 Set the usage mode for a valve

A valve's usage mode determines its general function, or role, during an analysis run. A valve can be assigned one of the following usage modes:

- Unused
- DO (700XA and 1500XA only.)
- FID H2 Valve (700XA and 1500XA only.)
- Common Alarm (700XA and 1500XA only.)
- Stream
- Analyzer01

...

- Analyzer016

The usage mode is set at the factory and under ordinary circumstances it should not be changed.

To set the usage mode for a valve, do the following:

1. Select **Valves...** from the **Hardware** menu.

   The *Valves* window displays.

2. Select the desired mode from the drop-down menu under the *Usage* column for the valve.
3. Click **OK** to save the changes and close the window.

Note
To save the changes and leave the window open so that you can monitor the valve's progress, click **Save**. The current state of the valve displays in the *State* column, and is updated in real time.

3.3 Managing the gas chromatograph's pressure

MON2020 allows you to do the following from the *EPC* window:

- Change the carrier pressure set point.
- Monitor the EPC's status.
- Switch EPC modes.

3.3.1 Change the carrier pressure set point

Note
This feature only works with the 370XA.

1. Select EPC on the Hardware menu.

   The EPC window opens.

2. Double-click the Set Point field and enter the desired value.

Note
If the field does not become active after double-clicking it, make sure the Switch field is set to Auto.

3. Click OK.

   The new set point will be accepted and the EPC window will close.

3.3.2 Check the status of the EPC

Note
This feature only works with the 370XA.

Select EPC on the Hardware menu. The EPC window opens.

Check the Status column to learn the current state of the EPC:

State	Description
Ok	EPC is working normally and controlling the pressure to the set point.
Pressure Low	The carrier pressure is too low.
Out of range	The EPC is not able to control the pressure to the desired set point.

3.3.3 Switch to a different EPC mode

Note
This feature only works with the 370XA.

1. Select EPC on the Hardware menu.

   The EPC window opens.

2. Click the Switch field.

   A drop-down listbox opens.

3. Select the appropriate mode.

Option	Description
Auto	Let's the GC control and maintain its pressure at the desired set point.
Manual	Allows you to control the power output for the EPC valve by entering a value, in the Fixed PWM Output field.
Not Used	Shuts off the EPC.

4. Click OK.

   The EPC will switch modes and the EPC window will close.

3.4 Detectors

Use the *Detectors* window to monitor the activity and status of the GC's detectors.

To view the *Detectors* window, select **Detectors...** from the **Hardware** menu.

Note

Before making any modifications to this window, halt the analysis. See *Section 6.7* for more information.

Note

Blue cells display read-only data; white cells display editable data.

The following data displays for each detector:

Det #	Numerical identifier for the detector to which the following data applies.
Detector	Options, which depend on your GC's configuration, are **TCD**, **FPD**, or **FID**.
FID Temp RTD	Applies to FIDs only. Select the appropriate RTD from the drop-down list. The RTD measures the temperature of the FID flame.
FID Ignition	Applies to FIDs only. Select **Manual** if you want to control the ignition of the FID; select **Auto** if you want the GC to control the ignition of the FID.
Ignition Attempts	Applies to FIDs only. Indicates the number of times the GC will try to light the flame. If an 'Auto' FID ignition sequence fails to light the flame after the specified number of attempts, the GC will close the hydrogen valve, switch the FID ignition parameter to Manual, and set an active alarm.
Wait Time Bet Tries	Applies to FIDs only. Indicates the amount of time, in seconds, the GC will wait between ignition attempts.
Igniter On Duration	Applies to FIDs only. Indicates the length of time that the igniter will remain on.
Flame On Sense Temp	Applies to FIDs only. The flame ignites when the FID internal temperature exceeds the value set in this field.
Flame Out Sense Temp	Applies to FIDs only. The flame is extinguished when the FID internal temperature falls below the value set in this field.
FPD Flame Status DI	Applies to FPDs only. Allows you to select from a list of available digital inputs. The digital input that is selected will receive the FPD's flame status value.
Preamp Val	FID count. Read-only. See *Section 3.4.3* for more information.
FID Flame Temp	Temperature of the FID flame as read by the RTD. Read-only.
Flame Status	Options are: **Off**, **On**, and **Over Temperature**. Read-only.
H2 Valve Cur State	Options are: **Open** and **Closed**. Read-only.
Scaling Factor	Preamp calibration factor.

Igniter Status	Options are: **Off** and **On**. Read-only.
Electrometer Voltage	Output at first stage of FID preamp. Read-only.
Pre Amplifier Voltage	Output at second stage of FID preamp. Read-only.
Polarizing Voltage	Igniter voltage. Read-only.
FID Gain Status	Options are: **Low** and **High**.
Status	Options are: **Ok**, **Not Installed** and **Internal Error**. Read-only.

3.4.1 Offset the baseline

In some situations that involve TCD detectors the baseline may be displayed either too high on the graph, in which case the tops of the peaks are cut off, or too low on the graph, so that the bases of the peaks are cut off. If this occurs it is possible to offset the baseline either up or down so that the entire peak can be displayed on the graph. This offset will be applied to all traces—live, archived and saved—that are displayed thereafter.

To offset the baseline, do the following:

1. Select **Detectors...** from the **Hardware** menu.

   The *Detectors* window displays.

2. Select the appropriate detector. It may be necessary to return to the Chromatogram Viewer to learn which detector is the source of the trace that needs to be offset.
3. To *lower* the baseline, click **Lower Baseline(*N*)**. Each time this button is clicked, N is incremented by -1. For example, is this is the first time the button has been clicked, Lower Baseline(0) will be increment to Lower Baseline(-1) and the baseline will be lowered one step. If Raise Baseline(*N*) was clicked previously, then that button will be incremented by -1 first, until it reached Raise Baseline(0); at the point, Lower Baseline(*N*) will be incremented by -1.

   Note

   To reset the baseline to its default setting, click Raise Baseline(*N*) and Lower Baseline(*N*) until they read Raise Baseline(0) and Lower Baseline(0).

4. To *raise* the baseline, click **Raise Baseline(*N*)**.
5. After the baseline has been raised or lowered to your satisfaction, click **OK**.

3.4.2 Ignite the FID flame

If the *FID Ignition* field on the *Detectors* window is set to “Manual” and if the *Flame status* field is set to “Off”, do the following to restart the flame:

1. Click **Open H2 Valve**.

   The *H2 Valve Cur State* field changes to “Open”.

2. Click **Ignite**.

The *Flame Status* field changes to “On” when the FID internal temperature exceeds the value set in the *Flame On Sense Temp* field.

Note

If the *FID Ignition* field is set to “Auto”, the GC will automatically restart the flame if it goes out.

3.4.3 Reset the preamp value

To reset the *Preamp Val* field on the *Detectors* window to 0, click **Auto-Zero**.

3.4.4 Balance the preamp

In some situations that involve TCD detectors the baseline may be displayed either too high on the graph, in which case the tops of the peaks are cut off, or too low on the graph, so that the bases of the peaks are cut off. If this occurs it is possible to offset the baseline either up or down so that the entire peak can be displayed on the graph. This offset will be applied to all traces—live, archived and saved—that are displayed thereafter.

To offset the baseline, do the following:

1. Select **Detectors...** from the **Hardware** menu.

   The *Detectors* window displays.

2. Select the appropriate detector.

   It may be necessary to return to the Chromatogram Viewer to learn which detector is the source of the trace that needs to be offset.

3. Balance the preamp:

   - To *lower* the baseline, click **Left(*N*)**. Each time this button is clicked, N is incremented by -1. For example, is this is the first time the button has been clicked, Left(0) will be increment to Left(-1) and the baseline will be lowered one step. If Right(*N*) was clicked previously, then that button will be incremented by -1 first, until it reached Right(0); at the point, Left(*N*) will be incremented by -1.

     Note

     To reset the baseline to its original setting, click Right(N) and Left(N) until they read Right(0) and Left(0).

   - To *raise* the baseline, click **Right(*N*)**. Each time this button is clicked, N is incremented by 1. For example, is this is the first time the button has been clicked, Right(0) will be increment to Right(1) and the baseline will be raised one step. If Left(*N*) was clicked previously, then that button will be incremented by 1 first, until it reaches Left(0); at the point, Right(*N*) will be incremented by 1.

     Note

     To reset the baseline to its original setting, click Right(N) and Left(N) until they read Right(0) and Left(0).

3.5 Discrete inputs

You can use MON2020 to assign labels to the GC's discrete inputs and to control the discrete inputs' operational modes. The number of discrete inputs available depends on the GC.

3.5.1 Rename a discrete input

Give each discrete input a descriptive label to avoid confusing one unit for another. To assign an identifying label, do the following:

1. Select **Discrete Inputs...** from the **Hardware** menu.

   The *Discrete Inputs* window displays.

2. Double-click on the appropriate row under the *Label* column for the discrete input that you want to rename.

   Note
   The discrete inputs are labeled **Discrete Input 1** - **Discrete Input** *N* by default, where *N* equals the total number of discrete inputs available to the GC.

3. Type in a new descriptive name for the discrete input.
4. Click **OK**.

3.5.2 Set a discrete input's operational mode

A discrete input has three operational modes: **Auto**, **On**, and **Off**.

- Setting the discrete input to **Off** means that it will interpret all incoming signals as OFF, despite the true nature of the signal.
- Setting the discrete input to **Auto** means that it will analyze the incoming signal to determine whether it is ON or OFF.
- Setting the discrete input to **On** means that it will interpret all incoming signals as ON, despite the true nature of the signal.

Note
The GC's switch panel settings override MON2020's settings.

To set a discrete input's operational mode, do the following:

1. Select **Discrete Input...** from the **Hardware** menu.

   The *Discrete Input* window displays.

2. Select the desired mode from the drop-down menu under the *Switch* column for the discrete input.

3. To save the changes and leave the window open so that you can monitor the discrete input's progress, click **Save**. The current state of the discrete input displays in the *State* column, and is updated in real time.
4. To save the changes and close the window, click **OK**.

3.5.3 Monitor the operational status of a discrete input

To check a valve's status, select **Discrete Input...** from the **Hardware** menu.

The status of each discrete input displays under the *Status* column. There are three possible status readings, and their meanings are as follows:

OK	The discrete input is installed and is working correctly.
Not Installed	The discrete input is not installed.
Error	The Heater/Solenoid board is installed but the GC cannot communicate with it.

3.5.4 Invert the polarity of a discrete input

The **Invert Polarity** option reverses the way a voltage signal is interpreted by the discrete input. By default, the **Invert Polarity** option is set to Normally Open, which means that a low voltage signal is interpreted by the discrete input as ON, and a high voltage signal is interpreted by the discrete input as OFF. Setting **Invert Polarity** to Normally Closed means that a low voltage signal is interpreted by the discrete input as OFF, and a high voltage signal is interpreted by the discrete input as ON.

To set the polarity of a discrete input, do the following:

1. Select **Discrete Input...** from the **Hardware** menu.

   The *Discrete Inputs* window displays.

2. Select **Normally Open** or **Normally Closed** from the drop-down menu under the *Invert Polarity* column.

3.6 Discrete outputs

You can use MON2020 to assign labels to the GC's discrete outputs and to control the discrete outputs' operational modes. The number of discrete outputs available depends on the GC.

3.6.1 Rename a discrete output

Give each discrete output a descriptive label to avoid confusing one unit for another. To assign an identifying label, do the following:

1. Select **Discrete Outputs...** from the **Hardware** menu.

   The *Discrete Outputs* window displays.

2. Double-click on the appropriate row under the *Label* column for the discrete output that you want to rename.

Note
The discrete outputs are labeled **Discrete Output 1** - **Discrete Output** *N* by default, where *N* equals the total number of discrete outputs available to the GC.

3. Type in a new descriptive name for the discrete output.
4. Click **OK**.

3.6.2 Set a discrete output's operational mode

A discrete output has three operational modes: **Auto**, **On**, and **Off**.

- Setting the discrete output to **Off** means that the discrete output will turn off and remain off until the operational mode is changed.
- Setting the discrete output to **Auto** means that the discrete output will turn on and off according to the Timed Events table or the Discrete Outputs table.
- Setting the discrete output to **On** means that the discrete output will turn on and remain on until the operational mode is changed.

To set a discrete output's operational mode, do the following:

1. Select **Discrete Output...** from the **Hardware** menu.

   The *Discrete Output* window displays.

2. Select the desired mode from the drop-down menu under the *Switch* cloumn for the discrete output.
3. Click **OK** to save the changes and close the window.

Note
To save the changes and leave the window open so that you can monitor the discrete output's progress, click **Save**. The current state of the discrete output displays in the *State* column, and is updated in real time.

3.6.3 Monitor the operational status of a discrete output

To check a discrete output's status, select **Discrete Output...** from the **Hardware** menu.

The status of each discrete output displays under the *Status* column. There are three possible status readings, and their meanings are as follows:

OK	The discrete output is installed and is working correctly.
Not Installed	The discrete output is not installed.
Error	The Heater/Solenoid board is installed but the GC cannot communicate with it.

3.6.4 Set the usage mode for a discrete output

A discrete output's usage mode determines which signals are routed to it via the Limited Alarm and Discrete Alarm functions. A discrete output can be assigned one of the following usage modes:

- DO
- Common Alarm
- Stream
- Analyzer01

  ...
- Analyzer016
- Calibration
- Maintenance
- Calibration or Maintenance
- Validation
- Calibration or Validation or Maintenance

To set the usage mode for a discrete output, do the following:

1. Select **Discrete Output...** from the **Hardware** menu.

   The *Discrete Output* window displays.

2. Select the desired mode from the drop-down menu under the *Usage* column for the discrete output.
3. If you select **DO** for *Usage*, then you must also set the *Start Time* and *Duration*.

   a. Click on the appropriate row under the *Start Time* column and enter the time that the digital output should be turned on.

   b. Click on the appropriate row under the *Duration* column and enter the amount of time, in seconds, that the digital output should remain on.

   c. Click on the appropriate row under the *Interval* column and enter the amount of time, in hours, that should pass before the digital output turns on again.
4. Click **OK** to save the changes and close the window.

Note

To save the changes and leave the window open so that you can monitor the discrete output's progress, click **Save**. The current state of the discrete output displays in the *State* column, and is updated in real time.

3.7 Manage your gas chromatograph's analog inputs

With MON2020 you can control analog inputs in the following ways:

- Assign identifying labels.
- Assign scale ranges.
- Calibrate analog inputs for zero and full scale values.

Note
Electrical current signals ranging from 4 to 20 mA (±10%) are accepted as analog inputs.

3.7.1 Rename an analog input

Give each analog input a descriptive label to avoid confusing one unit for another. To assign an identifying label, do the following:

1. Select **Analog Inputs...** from the **Hardware** menu.

   The *Analog Inputs* window displays.

2. Double-click on the appropriate row under the *Label* column for the analog input that you want to rename.

   Note
   The analog input devices are labeled Analog Input 1 and Analog Input *N* by default, where *N* equals the total number of analog inputs available to the GC.

3. Type in a new descriptive name for the analog input.
4. Click **OK**.

3.7.2 Set an analog input's operational mode

An analog input has two operational modes: **Variable** and **Fixed**.

- Var_Normal: The analog input will be set automatically, based on the signal it receives. This is the default setting.
- Var_Namur_NE43: Namur_NE43 uses the 3.8 to 20.5 mA signal range for measurement information, with ≥21 mA or ≤3.6 mA to indicate diagnostic failures.
- Setting the switch to Fixed means that the analog input will be set to the value that you enter in the appropriate row under the *Fixed Value* column.

To set an analog input's operational mode, do the following:

1. Select **Analog Input...** from the **Hardware** menu.

   The *Analog Input* window displays.

2. Select the desired mode from the drop-down menu under the *Switch* cloumn for the analog input.
3. Click **OK** to save the changes and close the window.

Note

To save the changes and leave the window open so that you can monitor the analog input, click **Save**. The current value of the analog input signal displays in the *Current Value* column, and is updated in real time.

3.7.3 Set the scale values for an analog input device

To set the zero scale and full scale, which are used when converting the analog input value, do the following:

1. Select **Analog Input...** from the **Hardware** menu.

   The *Analog Input* window displays.

2. Double-click on appropriate row under the *Zero Scale* column and enter a zero scale value.
3. Double-click on appropriate row under the *Full Scale* column and enter a full scale value.
4. Click **OK** to save the changes and close the window.

Note

To save the changes and leave the window open so that you can monitor the analog input, click **Save**.

3.7.4 Set the type of analog input signal

The GC's analog inputs can receive two types of signal: a 0 - 10 V current or the industry standard, which is a 4-20 mA current. To set the type of signal generated by the analog input device, do the following:

1. Select **Analog Input...** from the **Hardware** menu.

   The *Analog Input* window displays.

2. Select the signal type from the appropriate row under the *mA/Volt* column.
3. Click **OK** to save the changes and close the window.

Note

To save the changes and leave the window open so that you can monitor the analog input's progress, click **Save**. The type of signal being generated displays in the *mA/Volts* column, and is updated in real time.

3.7.5 Monitor the status of an analog input

To check an analog input's status, select **Analog Input...** from the **Hardware** menu.

The operational status of each analog input displays under the *Status* column. There are three possible status readings, and their meanings are as follows:

OK	The analog input is installed and is working correctly.
Not Installed	The analog input is not installed.
Error	The analog input is installed but the GC cannot communicate with it.

This window also displays other types of data, such as the following:

mA/Volts	The type of analog input signal being received.
mA	If **mA** displays in the *mA/Volts* column, then this column displays the amount of current being received, in milliamperes.
Volts	If **Volts** displays in the *mA/Volts* column, then this column displays the amount of current being received, in volts.
Cur Val	The current value of the analog input signal.

3.7.6 Calibrate an analog input

To calibrate an analog input, do the following:

1. Select **Analog Input...** from the **Hardware** menu.

   The *Analog Input* window displays.

2. Click on the analog input that you want to calibrate.
3. Set the analog input's *Zero Scale* by entering its minimum anticipated value.
4. Set the analog input's *Full Scale* by entering your maximum anticipated value.
5. Click **AutoCal...(F4)** or press **F4**.

   The *Analog Input Calibration Wizard* runs.

6. Click **Next**.

   Step 2 of the *Analog Input Calibration Wizard* displays.

7. 7. Click **Next**.

   Step 3 of the *Analog Input Calibration Wizard* displays.

8. 8. Click **Next**.

   Step 4 of the *Analog Input Calibration Wizard* displays.

9. 9. Click **Finish**.

   The calibration is complete.

3.8 Analog outputs

With MON2020 you can control the analog outputs in the following ways:

- Assign identifying labels.
- Assign scale ranges.
- Calibrate analog outputs for zero and full scale values.

3.8.1 Rename an analog output

Give each analog output a descriptive label to avoid confusing one unit for another. To assign an identifying label, do the following:

1. Select **Analog Outputs...** from the **Hardware** menu.

   The *Analog Outputs* window displays.

2. Double-click on the appropriate row under the *Label* column for the analog output that you want to rename.

   Note
   The analog output devices are labeled **Analog Output 1** - **Analog Output** *N* by default, where *N* equals the total number of analog outputs available to the GC.

3. Type in a new descriptive name for the analog output.
4. Click **OK**.

3.8.2 Set an analog output's operational mode

An analog output has two operational modes: **Variable** and **Fixed**.

- Setting the switch to **Var_Standard** means that the analog output will be proportional to the variable selected in from the *Variables* column. This is the default setting.
- Var_Namur_NE43: Namur_NE43 uses the 3.8 to 20.5 mA signal range for measurement information, with ≥21 mA or ≤3.6 mA to indicate diagnostic failures.
- Setting the switch to **Fixed** means that the analog output will be set to the value that is entered in the appropriate row under the *Fixed Value* column.

To set an analog output's operational mode, do the following:

1. Select **Analog Output...** from the **Hardware** menu.

   The *Analog Output* window displays.

2. Select the desired mode from the drop-down menu under the *Switch* column for the analog output.
3. Click **Save** to save the changes and leave the window open so that you can monitor the analog output.

Note

To save the changes and close the window, click **OK**. The current value of the analog output displays in the *Cur Val* column, and is updated in real time.

3.8.3 Set the scale values for an analog output device

To set the zero scale and full scale, which are used when converting the analog output value, do the following:

1. Select **Analog Output...** from the **Hardware** menu.

   The **Analog Output** window displays.

2. Click on appropriate row under the *Zero Scale* column and enter a zero scale value.
3. Click on appropriate row under the *Full Scale* column and enter a full scale value.
4. Click **OK** to save the changes and close the window.

   To save the changes and leave the window open so that you can monitor the analog output's progress, click **Save**.

3.8.4 Map a system variable to an analog output

To select the system variable on which to base the signal level of the analog output, do the following:

1. Select **Analog Output...** from the **Hardware** menu.

   The *Analog Output* window displays.

2. Select a new variable by clicking on the appropriate drop-down list under the *Variable* column.

   For a demonstration of how to use the context-sensitive variable selector, see *Section 1.11*.

3. Click **OK** to save the changes and close the window.

Note

To save the changes and leave the window open so that you can monitor the analog output's progress, click **Save**.

3.8.5 Monitor the status of an analog output

To check an analog output device's status, select **Analog Output...** from the **Hardware** menu.

The operational status of each analog output displays under the *Status* column. There are three possible status readings, and their meanings are as follows:

OK	The analog output device is installed and is working correctly.

Not Installed	The analog output device is not installed.
Error	The Heater/Solenoid board is installed but the GC cannot communicate with it.

This window also displays other types of data, such as the following:

mA	The amount of current being generated in milliamperes.
Cur Val	The current scaled value of the analog output signal.

3.8.6 Calibrate an analog output

To automatically calibrate an analog output, do the following:

1. Select **Analog Output...** from the **Hardware** menu.

   The *Analog Outputs* window displays.

2. Click on the analog output that you want to calibrate.
3. Click **AutoCal...(F4)** or press **F4**.

   The *Analog Output Calibration Wizard* runs.

4. Select the check box for the unit of measure you want to use for the calibration and then click **Next**.

   Step 2 of the *Analog Output Calibration Wizard* displays.

5. Enter the Zero Scale Adjustment value and then click **Next**.

   If the value entered is within tolerance, it is accepted and Step 3 of the *Analog Output Calibration Wizard* displays. If the value is not within tolerance, an error icon ( ) appears beside the field. Tolerance is set to ±1 mA of the analog output's default zero adjustment setting, which is 4 mA. Enter a different value and try again.

6. Enter the Full Scale Adjustment value and then click **Next**.

   If the value entered is within tolerance, it is accepted and Step 4 of the *Analog Output Calibration Wizard* displays. If the value is not within tolerance, an error icon ( ) appears beside the field. Tolerance is set to ±1 mA of the analog output's default full adjustment setting, which is 20 mA. Enter a different value and try again.

7. Click **Finish**.

   The calibration is complete.

3.9 The Hardware Inventory List

MON2020 can compile an inventory table of all hardware that is installed on the GC. To view this table, select **Installed Hardware...** from the **Hardware** menu.

The type of hardware installed is listed under the *Device Description* column. The other types of information available on this screen are the following:

IO Function Describes the function of the device.

Slot Number Describes the location of the hardware in the GC. The slot number refers to the card cage assembly, which is located in the GC's lower enclosure and which has eight slots. For the 700XA and 1500XA, the slots are labeled:

- Expansion Slot 1-2
- LOI
- Expansion Slot 1-4
- Base IO
- Foundation Field Bus

There are no slots in the 370XA, therefore this column will display "Analyzer" for all hardware.

Revision The revision number of the backplane.

4 Application

Many of the variables that a gas chromatograph uses during an analysis run—such as timed events, stream sequence, and calculation types—can be easily managed through MON2020.

This chapter explains how to do the following:

- View and edit general information about the GC to which MON2020 is connected, such as name, model, and default stream sequence.
- View and edit component data, validation data, and timed event tables.
- View and change control, average, and user-defined calculations.
- View and edit limit alarm data.
- View and change stream data.
- View and edit the stream sequence.
- View and edit communication and ethernet port data.
- View and map LOI status variables.
- View and map the FOUNDATION fieldbus process variables.

4.1 Configure the system

To view the System window, select System on the Application menu.

Use this window to select the default GC stream sequence and to set or edit system-wide variables such as the GC's name, serial number, and system description.

Analyzer Name	Defines the GC name that appears in the Status Bar on the main window when MON2020 is connected to the GC. Can contain up to 12 characters.
System Description	A field to record miscellaneous reference information to further identify the currently connected system. Can contain up to 28 characters.
Site Id	Holds customer-defined site identification information.
Company Name	The name of the company that operates the GC.
Location	The physical location of the GC to which MON2020 is connected.
Model	The model number of the GC to which MON2020 is connected.
Serial No	Serial number of the GC to which MON2020 is connected.
Firmware Version	Revision level of firmware of the GC to which MON2020 is connected.
Standard Component Table Version for GPA	Indicates which version of the GPA's standard component table is being used.

Standard Component Table Version for ISO	Indicates which version of the ISO's standard component table is being used.
CGM FCAL Archive	Sets the storage behavior for final calibration chromatograms. The options are: • Keep Last FCAL Per Day - Saves only the last final calibration chromatogram of the day. • Keep All FCAL Per Day - Saves all final calibration chromatograms.
CGM FVAL Archive	Sets the storage behavior for final validation chromatograms. The options are: • Keep Last FVAL Per Day - Saves only the last final validation chromatogram of the day. • Keep All FVAL Per Day - Saves all final validation chromatograms.
Date Format	Defines how the date will be displayed. The options are: • MM$$DD$$YYYY • MMDDYY • DDMMYYYY • DDMMYY • YYYYMMDD • YYMMDD $ is the Date Field Separator.
Date Field Separator	Defines the text symbol that will be used as the separator when displaying the date. The options are: • / • - • .
Time Format	Defines how the time will be displayed. The options are: • HH:MM:SS • HH:MM
Time Notation	Defines the cycle of time to use when displaying the time. The options are: • 12 Hr • 24 Hr
Show Advanced System Variables	Determines whether advanced system variables will be displayed along with basic system variables.
Allow Multiple Writers	Determines whether more than one user can connect to the GC.

Maintenance Mode	Switches the GC to maintenance mode and triggers an alarm that the GC is down for maintenance.
Ideal RF Order/ Limit Check	Applies to the 370XA only. If enabled the GC will verify the following during a calibration: • The order of magnitude of the response factors for all the components should be in a particular order. The GC will verify that the response factors follow this pattern. • The response factor ratio for each component with respect to a reference component should be within a pre-defined range. The GC will verify that the ratio is within acceptable limits.
Max Warmstart Delay	Applies to the 370XA only. This is the maximum time, after a GC recovers from a power failure during normal operation, that the GC will wait for the heaters and electronic pressure controller to reach their respective set points and stabilize before triggering the Warmstart Failure alarm.
EV Check	Applies to the 370XA only. If enabled, the GC analyzes the calibration gas as an unknown stream and computes its energy value. The GC then compares this value to the *Cal Gas Cert CV* and determines if the calibration gas' energy value is within the *CV Check Allowed Deviation*. If it isn't, the GC triggers the Energy Value Invalid alarm. The following conditions must be met before the GC can perform a EV Check: • The **EV Check** flag in the *System* window must be enabled. • At least one stream must be set up in the *Streams* window as a calibration stream and the **Auto** flag for this stream must be enabled. The EV Check is performed under any of the following circumstances: • During a warm start that follows a power failure during normal operation. The GC waits for the heater and electronic pressure controller to reach their respective set points and stabilize. It then analyzes the calibration gas as an unknown stream and identifies the peaks. If all the component peaks are identified, the GC computes the calibration gas' energy value and performs the EV Check. • After a successful calibration, the GC computes the gas' energy value with the new response factors and performs the EV Check.
GC Sales Serial Number	The sales order number for the GC. When contacting Customer Support, the customer should provide this number to the Customer Support agent.
Calibration Retry on Failure	If a calibration fails, the GC will re-run the calibration sequence.

Calibration Repeatability Check	If enabled, the GC will perform a check of the repeatability of calibration runs to the limits specified in ISO6974-1984(E) 8.2.1 Table 6. If the calibration fails to meet the conditions set forth in the table, then the calibration is deemed to have failed and the GC will rerun the calibration sequence.
Metrology Type	Shows the metrology type that the GC is configured for.
GC Id	
Identification Number	
Configuration Checksum at Lockout	The checksum of the configuration fields that is calculated when the security switch is locked.
Current Configuration Checksum	The GC will periodically recalculate and update the configuration checksum. This 'current' value will be the latest calculated value.
Checksum Update Time	The time that the configuration checksum was last updated.

GC Mode	Allows you to select an operating mode for the GC. See *Section 1.8* for more information.
Default Stream Sequence	Sets the default sequence to be used by the indicated detector during auto-sequencing. To create a new stream sequence or to edit an already-created sequence, click **Stream Sequence...**. See *Section 4.10* for more information.

After making changes, click **Save** to save the changes without closing the window. To save the changes and close the window, click **OK**.

4.2 The Component Data Tables

MON2020 allows you to view and edit the component data tables. The number of available component data tables depends on the GC unit configuration.

To assign a component data table to a stream, see *Section 4.9.2*.

1. To view a component data table, select **Component Data...** from the **Application** menu.

   The *Component Data Tables* window appears, displaying a list of available component data tables.

   Note

   Other ways of accessing the component data tables are by pressing **F6** or by clicking  from the Toolbar.

2. Select the table that you want to view.

The selected component data table displays.

Note
To see a different table, select it from the *Choose table* drown-down list.

Note
To sort the list of components by detector, and then by retention time, click **Sort RT**.

4.2.1 Edit a Component Data Table

Note
Table cells with a white background are editable; table cells with a turquoise background are not editable.

To edit a cell, do the following:

1. Click on the cell.

   Depending on the cell type, you will either be required to select a value from a drop-down list, or you will be able to type in the value directly.

2. To save the changes and close the window, click **OK**.

Note
To save the changes without closing the window, click **Save**.

The following table lists all of the editable parameters available on the *Component Data Table* window. The standard values for these parameters were taken from the second editions of the *Orifice Metering of Natural Gas and Other Related Hydrocarbon Fluids* and the *Compressibility Factors of Natural Gas and Other Related Hydrocarbon Gases*.

Component	This drop-down list contains the complete catalog of available components for the selected stream.
Usr Std	Indicates the source of the component: • **Usr** - The component was edited or defined by the user. • **Std** - The component was selected from the standard list of components and no changes were made to its standard data.
Det #	The component's detector number.
Ret Time	Time in seconds before the apex of the component's peak will appear. The rentention time can be set from **0** to **3600** seconds.

⚠ CAUTION!

Ensure that the component retention times do not exceed the analysis time, as defined by the Timed Events table. MON2020 does not automatically prevent the user from defining excessive component retention times.

Resp Fact A component's response factor is equal to the raw data of the component's peak divided by the component's concentration. The maximum value is 1.0E+38.

Calib Type MON2020 can perform four types of calibrations:

- **Single-Level** - Uses the standard calibration in which the response factor is needed to determine the mole percentage during the calibration.
- **Fixed** - During the calibration, the response factor is not updated.
- **Relative** - Calibration in which a reference component is used to compute the mole percentage.
- **Multi-Level** - Uses a polynomial equation to compute the mole percentage during the calibration. Values must be entered in the Mult-level Calib 'a', Mult-level Calib 'b', Mult-level Calib 'c', and Mult-level Calib 'd' cells.

Calib Conc The amount, in mole percent, parts per million (ppm) or parts per billion (ppb), of the component that is present in the calibration gas.

Unit Indicates the unit of measure used when calculating and displaying the component's calibration concentration. Options are **Mole%**, **ppm** and **ppb**.

Anly Meth Defines how the component concentration is computed. The analysis method can take one of the following values:

- **Area** - Calculates the component concentration by dividing the peak area by the response factor.
- **Height** - Calculates the component concentration by dividing the peak height by the response factor.
- **Fixed** - The component concentration equals the component's calibration concentration displayed in the *Calib Conc* column of the component data table. No calculation is performed using the response factor.
- **Analog Input** - The GC reads the analog input channel, scales the raw milliampere value to engineering values that were set in the *Analog Inputs* window, and uses this value as the component concentration. No calculation is performed using the response factor.

RT Secs Dev The maximum acceptable deviation time, in seconds, of the new retention time from the current retention time.

RT Upd Meth	Determines when the retention time will be updated. Options are: • **Cal** - Updates the retention time only during the final calibration run. • **Anly** - Updates after each analysis.
Resp Fact %	The maximum acceptable percent of deviation between the new response factor and the current response factor.
Gross Dry BTU	Gross energy content per cubic foot (ft^3), assuming no water is present.
Net Dry BTU	Net energy content per cubic foot, assuming no water is present.
Gross Dry BTU per lb	Gross energy content per pound, assuming no water is present.
HV Sup MJ/m^3	Gross heating value in megajoules per cubic meter.
HV Inf MJ/m^3	Net heating value in megajoules per cubic meter.
HV Sup MJ/kg	Gross heating value in megajoules per kilogram.
HV Inf MJ/kg	Net heating value in megajoules per kilogram.
Sum Factor Pri	Used to calculate the compressibility factor.
Sum Factor Sec	Used to calculate the compressibility factor.
CV Superior Pri	Gross caloric value per kilojoule (kJ).
CV Inferior Pri	Net caloric value per kilojoule (kJ).
CV Superior Sec	Gross caloric value per kilojoule (kJ).
CV Inferior Sec	Net caloric value per kilojoule (kJ).
Gals/1000 SCF	Liquid equivalent volume in gallons/1000ft^3.
Reid Vapor	The component's vapor pressure in pounds per square inch (psia) at 100.0 °F
LBs/Gallon	Liquid density for the component at base conditions.
Rel Dens Gas	The relative density of the gas phase for the component at base conditions.
Rel Dens Liquid	The relative density of the liquid phase for the component at base conditions.
Molecular Weight	The molecular weight of the component, which is used to calculate the weight percent of each component in the sample.
Carbon Weight	The molecular weight of the carbon atoms in the component.
AGA 8 Component	The name of the component according to the American Gas Association, which is used in the AGA 8 compressibility calculation.
Ref Comp	The component not found in the calibration gas but in the sample gas for indirect calibration. If 'none', normal (direct) calibration is used. Not editable unless the calibration type is set to **Relative**.

Rel Resp Fact	A fixed multiple of the response factor of the component found in the sample gas for indirect calibration. Not editable unless the calibration type is set to **Relative**.
Rel Dens Liquid 15C	The relative density in kilograms per cubic meter (kg/m^3) of the liquid phase for the component at 15 °C.
Molar Mass	The mass of one mole of the component.
Mult-level Calib 'a'	Third-order polynomial coefficient for multi-level calibrations. Not editable unless the calibration type is set to **Multi-Level**.
Mult-level Calib 'b'	Second-order polynomial coefficient for multi-level calibrations. Not editable unless the calibration type is set to **Multi-Level**.
Mult-level Calib 'c'	First-order polynomial coefficient for multi-level calibrations. Not editable unless the calibration type is set to **Multi-Level**.
Mult-level Calib 'd'	Zero-order polynomial coefficient for multi-level calibrations. Not editable unless the calibration type is set to **Multi-Level**.
Component Code	An index number that corresponds to the standard component numbers taken from the American Gas Association. Up to 20 components can be defined per data table.

4.2.2 Add a component to a Component Data Table

To add a component to a component data table, do the following:

1. Select **Component Data...** from the **Application** menu.

   The *Component Data Tables* window appears, displaying a list of available component data tables.

   Note

   Other ways of accessing the component data tables are by pressing **F6** or by clicking  from the Toolbar.

2. Select the table that you want to view.

   The selected component data table displays.

   Note

   To sort the list of components by detector, and then by retention time, click **Sort RT**.

3. If you want to add the component *above* the currently selected component, click **Insert before**. If you want to add the component *below* the currently selected component, select **Insert after** from the Insert arrow.

4. To save the changes and close the window, click **OK**.

Note
To save the changes without closing the window, click **Save**.

4.2.3 Remove a component from a Component Data Table

To remove a component from a component data table, do the following:

1. Select **Component Data...** from the **Application** menu.

   The *Component Data Tables* window appears, displaying a list of available component data tables.

Note

Other ways of accessing the component data tables are by pressing **F6** or by clicking  from the Toolbar.

2. Select the table that you want to view.

   The selected component data table displays.

Note
To sort the list of components by detector, and then by retention time, click **Sort RT**.

3. Select the component that you want to remove.
4. Click **Delete**.
5. To save the changes and close the window, click **OK**.

Note
To save the changes without closing the window, click **Save**.

4.2.4 View the standard values for a component

If a component's values have been changed by the user, it is still possible to view the standard values for that particular component. To view the standard values for a component, do the following:

1. Select **Component Data...** from the **Application** menu.

   The *Component Data Tables* window appears, displaying a list of available component data tables.

Note

Other ways of accessing the component data tables are by pressing **F6** or by clicking  from the Toolbar.

2. Select the table that you want to view.

   The selected component data table displays.

Note

To sort the list of components by detector, and then by retention time, click **Sort RT**.

3. Click **Std Values (F3)**.

   The *Standard Component Values* window displays.

4. When you are finished viewing the window, click **Close**.

4.2.5 Display raw data from the Component Data table

To view the raw data for the displayed component data table, do the following:

1. Select **Component Data...** from the **Application** menu.

   The *Component Data* window displays.

2. Click **Raw Data (F4)** or press **F4**.

   The *Select* dialog displays, listing the streams that are associated with the component data table.

3. Double-click the desired stream.

   The *Raw Data* window appears, listing the peak raw data from the last run of the stream represented by the component data table.

   The following data displays for each peak:

Peak No.	Numerical identifier for the peak, listed by the order of discovery.
Ret Time	Time, in seconds, that the component eluted.
Peak Area	The area under the peak.
Peak Height	The maximum height of the peak.
Det	The detector associated with the peak.
Method	Method of peak end detection. Options are: • 1 (Baseline). Baseline termination occurs when the absolute values of twelve successive slope calculations are less than the slope sensitivity.

- 2 (Fused Peak). A fused peak is found if a peak onset is detected subsequent to the discovery of a peak crest and before the baseline termination is detected.
- 3 (Last Fused Peak). The last peak in a group of fused peaks.
- 4 (Tangent Skim). Baseline termination occurs when the current level is lower than the Start Baseline value and the slope at the point is negative and smaller in magnitude than the average slope from the beginning of the peak.
- 100 (Inhibit). An *Inhibit On* event in the Timed Events table caused the peak to be terminated.
- 300 (Forced Integration). An *Integration Off* event in the Timed Events table caused the peak to be terminated.
- 500 (Summation). A *Summation Off* event in the Timed Events table caused the peak detection logic to sum together the peak areas under multiple peaks between the *Summation On* and *Summation Off* events and to add an entry for an artificial peak with its area set to the composite area under the constituent peaks.

Baseline Start The raw detector counts at the start of an integration. For example, if the peak starts at 10 seconds, then the raw detector counts at 10 seconds becomes the *Baseline Start* value.

Baseline End The raw detector counts at the end of an integration. For example, if the peak ends at 35 seconds, then the raw detector counts at 35 seconds becomes the *Baseline End* value.

Integration Start Time, in seconds, when integration started.

Integration Stop Time, in seconds, when integration stopped.

Peak Width @ Half Height The width of the peak taken at half of the peak's height.

Partial Peak If **Yes**, then the Partial Peak value is used in the summation calculation; if **No**, then the Partial Peak value is not used in the summation calculation.

4. Click **Close** to return to the *Component Data* window.

4.2.6 Change the default C6+ mixture ratio

The C6+ component that is detected by the GC is actually a mixture of up to four heavy hydrocarbons -- from hexane and above. When the energy value and other physical properties are calculated for the mixture, the GC assumes a ratio of heavy hydrocarbon components is used for the C6+ value. By default, there are four pre-defined ratios:

Component	C6/C7/C8 percentages
C6+ 47/35/17	47.466/35.34/17.194

Component	C6/C7/C8 percentages
C6+ GPA 2261-99	60.0/30.0/10.0
C6+ 57/28/14	57.143/28.572/14.285
C6+ 50/50/0	50.0/50.0/0

To define a different ratio, do the following:

1. Select Component Data on the Application menu.

   The Component Data window opens.

   Note
   You can also click F6 to open the Component Data window.

2. Click the first field in the Component column. This is the C6+ component field and it will display one of the four ratios described above.

   A drop-down list opens.

3. Select C6+ (User Def.) from the drop-down list.
4. Click Edit Percentage.

   The C6+ User Def. window opens.

5. Enter a composition percentage for each component.

   The *Total Percentage*, which must equal 100 and is displayed on the window's title bar, will update with the sum of the four ratios.

6. Click OK.

   The Component Data window closes. The C6+ row on the Component Data table will be updated based on the new ratio.

7. Click Save to accept the changes without closing the window; click OK to accept the changes and to close the window.

4.3 The Timed Events tables

Use this function to view and/or edit the timed events tables assigned to and used by particular gas streams. The number of available timed events depends on the GC unit configuration. The standard GC application contains four timed events tables.

Note
See *Section 2.5.2* for more information about editing timed events from the Chromatogram Viewer. To assign a timed events table to a stream, see *Section 4.9.2*.

1. Select **Timed Events...** from the **Application** menu. The *Timed Events Tables* selector window appears, displaying a list of available timed events tables.

Note

Other ways of accessing the timed event tables are by pressing **F5** or by clicking  from the Toolbar.

Note

If only one timed events table is available, it will display immediately, bypassing the *Timed Events Tables* selector window.

2. Select the table that you want to view.

   The selected timed events table displays.

Note

To sort events by time, click the appropriate **Sort** button.

3. To see a different timed events table, select it from the *Choose table* drop-down list.

4.3.1 Configure valve events

Valve-related events are grouped on the upper left side of the *Timed Events* window. To edit valve-related events, do the following:

1. Select **Timed Events...** from the **Application** menu.

   The *Timed Events Tables* selector window appears, displaying a list of available timed events tables.

Note

Other ways of accessing the timed event tables are by pressing **F5** or by clicking  from the Toolbar.

Note

If only one timed events table is available, it will display immediately, bypassing the *Timed Events Tables* selector window.

2. Select the table that you want to view.

   The selected timed events table displays.

Note

To sort events by time, click the appropriate **Sort** button.

3. Click on the cell that you want to edit.

Depending on the cell type, you will either be required to select a value from a drop-down list, or you will be able to type in the value directly. The following list describes the valve-related parameters that are available on the Timed Events window.

TEV Type The type of device associated with the event. You have the following choices:

- **Valve #**
- **DO #** - A discrete output.
- **Strm Sw** - Switches to the next stream in the sequence.
- **Cal Gas Save** - Sets the start or end time for the Cal-Gas Saver™ feature.

Valve/ DO # Use the drop-down menu to select the specific valve or discrete output that should be used for the event.
This column does not apply if **Strm Sw** was selected from the *TEV Type* column.

State Turns the valve or discrete output on or off, or sets the FID to high or low.
This column does not apply if **Strm Sw** was selected from the *TEV Type* column.

Time Indicates the time, in seconds, that the event should occur during the analysis. Enter a value between **0.0** and **3600.0**.

Note
Event times must be less than the analysis time.

4. To save the changes and close the window, click **OK**.

Note
To save the changes without closing the window, click **Save**.

4.3.2 Configure integration events

Integration-related events are grouped on the upper right side of the Timed Events window. To edit integration-related events, do the following:

1. Select **Timed Events...** from the **Application** menu.

   The *Timed Events Tables* selector window appears, displaying a list of available timed events tables.

Note

Other ways of accessing the timed event tables are by pressing F5 or by clicking  from the Toolbar.

Note

If only one timed events table is available, it will display immediately, bypassing the *Timed Events Tables* selector window.

2. Select the table that you want to view.

   The selected timed events table displays.

Note

To sort events by time, click the appropriate Sort button.

3. Double-click on the cell that you want to edit.

   Depending on the cell type, you will either be required to select a value from a drop-down list, or you will be able to type in the value directly. The following list describes the integration-related parameters that are available on the timed events window.

TEV Type The type of integration event. You have the following options:

- Inhibit: Set to **Off** to start look for a peak; set to **On** to stop looking for a peak.
- Integrate: Set to **On** and **Off** to set a region in which the area under the trace is computed as a peak regardless of peak onset discovery. The resulting area is added to the raw data as a peak with the retention time set to the Integration Off time.
- Summation: Set to **On** and **Off** to set a region in which the area of all peaks found will be added together to create a single summed value. The peaks that contribute to the summation are marked as partial peaks in the raw data table, and the summation total is added to the raw data as a new peak with the retention time set to the Summation OFF time.
- Slope Sens: The peak starts when the slope of six consecutive points is greater than the slope sensitivity value that is displayed in the Value column; the peak ends when the slope of six consecutive points is less than the slope sensitivity value that is displayed in the Value column.
- Peak Width: Each point displayed on the graph represents the average of *N* raw data points, where *N* is the value displayed in the corresponding *Value* column.
- Single Base: Determines how the baseline is drawn under a peak.
  - **Off**: The baseline is drawn from the point of peak onset to the point of peak termination. This is not necessarily horizontal and if fact usually has a slight slope. (Default)
  - **Bgn**: Draws a horizontal baseline from the point of peak onset to a point above or below the peak termination.
  - **End**: Draws a horizontal baseline from a point above or below the peak onset to the point of peak termination.
- Fused Ovrrd: Determines how the baseline is drawn when two or more peaks are ‘fused’ together.

- **Off**: A single baseline is drawn from the onset of the first peak of the fused group to the termination of the last peak of the group. (Default)
- **On**: Causes a separate baseline to be drawn for each peak in the fused group.

- Negative Peak: Determines whether peak detection will detect inverted peaks, which are peaks that point downward from the baseline. At any given moment we can detect positive or negative peaks but not both at once.
  - **Off**: Detect positive peaks. (Default)
  - **On**: Detective negative peaks.

TEV Type SW Auto Zero: Re-zeros the baseline of the trace at the specified time for the specified detector. Used after a FID gain change event or a spectrum gain change event.

Note
The **Single Base** and **Fused Override** events can act together to produce multiple horizontal baselines, at different heights, for a fused peak group.

Value The values available depend on the integration type selected from the *TEV Type* column.

- Slope Sensitivity and Peak Width: Enter the number of points, between **1** and **99**, to be used.
- Single Baseline: Select **Off**, **End**, **Bgn**.
- SW Auto Zero: No options.
- All other integration types: Select **On** or **Off**.

Det # The ID number of the detector that will be affected by the event. Valid values are **1** and **2**.

Time Indicates the time, in seconds, that the event should occur during the analysis. Enter a value between **0.0** and **3600.0**.

Note
Event times must be less than the analysis time.

4. To save the changes and close the window, click **OK**.

Note
To save the changes without closing the window, click **Save**.

4.3.3 Configure spectrum gain events

The spectrum gain feature graphically magnifies the size of a chromatogram's peaks. The data itself is not affected; only the presentation of the data. This feature can be useful for viewing peaks that are otherwise too small to examine or so large that the top of the peak can not be seen.

Spectrum gain-related events are grouped on the lower left side of the Timed Events window. To edit spectrum gain-related events, do the following:

1. Select **Timed Events...** from the **Application** menu.

   The *Timed Events Tables* selector window appears, displaying a list of available timed events tables.

   Note

   Other ways of accessing the timed event tables are by pressing F5 or by clicking  from the Toolbar.

   Note

   If only one timed events table is available, it will display immediately, bypassing the *Timed Events Tables* selector window.

2. Select the table that you want to view.

   The selected timed events table displays.

   Note

   To sort events by time, click the appropriate Sort button.

3. Click on the cell that you want to edit.

   Depending on the cell type, you will either be required to select a value from a drop-down list, or you will be able to type in the value directly. The following list describes the spectrum gain-related parameters that are available on the timed events window.

   Det # The ID number of the detector that will be affected by the event. Select **1** or **2**.

   Gain Enter a value between **0** and **64**. This is the exponent value in the following expression: $2^{gain\ value}$. For example, a value of 0 means no gain is applied; a value of 5 means the gain is increased to 32 times it's original value.

   Time Indicates the time, in seconds, that the event should occur during the analysis. Enter a value between **0.0** and **3600.0**.

   Note

   Event times must be less than the analysis time.

4. To save the changes and close the window, click **OK**.

Note
To save the changes without closing the window, click **Save**.

4.3.4 Set the cycle and analysis time

To set the cycle and analysis time, do the following:

1. Select **Timed Events...** from the **Application** menu.

   The *Timed Events Tables* selector window appears, displaying a list of available timed events tables.

Note

Other ways of accessing the timed event tables are by pressing F5 or by clicking  from the Toolbar.

Note
If only one timed events table is available, it will display immediately, bypassing the Timed Evetns Tables selector window.

2. Select the table that you want to view. The selected timed events table displays.

   The **Analysis Time** section is located on the lower right side of the *Timed Events* window.

Note
To sort events by time, click the appropriate **Sort** button.

3. Click on the *Analysis Time* cell and enter a value, in seconds, between **0** and **3600**.
4. Click on the *Cycle Time* cell and enter a value, in seconds, between **0** and **3620**.

Note
The Cycle Time must be at least 10 seconds greater than the Analysis Time.

5. To save the changes and close the window, click **OK**.

Note
To save the changes without closing the window, click **Save**.

4.3.5 Remove an event from the Timed Event Table

To remove an event from one of the Valve Events, Integrate Events, or Spectrum Gain Events tables on the *Timed Events* window, do the following:

1. Select **Timed Events...** from the **Application** menu.

   The *Timed Events Tables* selector window appears, displaying a list of available timed events tables.

   Note

   Other ways of accessing the timed event tables are by pressing F5 or by clicking  from the Toolbar.

   Note

   If only one timed events table is available, it will display immediately, bypassing the *Timed Events Tables* selector window.

2. Select the table that you want to view.

   The selected timed events table displays.

   Note

   To sort events by time, click the appropriate **Sort** button.

3. Select the event that you want to delete.
4. Click the appropriate **Delete** button.

4.3.6 Add an event to the Timed Event Table

To add an event to one of the Valve Events, Integrate Events, or Spectrum Gain Events tables on the *Timed Events* window, do the following:

1. Select **Timed Events...** from the **Application** menu.

   The *Timed Events Tables* selector window appears, displaying a list of available timed events tables.

   Note

   Other ways of accessing the timed event tables are by pressing F5 or by clicking  from the Toolbar.

   Note

   If only one timed events table is available, it will display immediately, bypassing the *Timed Events Tables* selector window.

2. Select the table that you want to view.

   The selected timed events table displays.

Note
To sort events by time, click the appropriate Sort button.

3. If you want to add the event *above* the currently selected event, click the appropriate **Insert before** button. If you want to add the event *below* the currently selected event, select **Insert after** from the **Insert** arrow and then click the button.

   The new event will be added to the table.

4. Select a *Type*, *Valve/DO#*, and *State* for the event, if necessary, and enter a new *Time* for the event also.
5. To save the changes and close the window, click **OK**.

Note
To save the changes without closing the window, click **Save**.

4.4 The Validation Data Tables

Use the validation data table to hold information about the composition of the gas that is used in the validation run. During a validation run, the GC performs a test analysis of a gas with a known component composition to verify that the GC is working properly.

To add a component to the validation data table, do the following:

1. Select **Validation Data** from the **Application** menu.

   The *Validation* Data window displays.

2. If the appropriate table is not displayed, select it from the *Choose Table* drop-down list.
3. Select a new variable by clicking on the appropriate drop-down list under the *Variable* column.

   For a demonstration of how to use the context-sensitive variable selector, see *Section 1.11*.
4. Enter the component's concentration percentage in the appropriate cell under the *Nominal Value* column.

   To ensure accuracy, this value, which is compared to the GC's analysis results at the end of the validation run, should be taken from the documentation provided with the gas cylinder.
5. Enter a value in the appropriate *Percent Deviation* cell.

   Example: If you enter **10** in this field, and the GC's analysis result for the component differs from the component's *Nominal Value* by ±10% or more, then an alarm is generated.

6. To copy a component variable to the next empty row, click **C + Copy**.

The component will be increment to the next available component—for example, from Ammonia to Benzene. The *Nominal Value* and *Percent Deviation* values will also be copied.

Note

You can select and copy more than one component at a time.

If there are no components available, instead of copying the component, MON2020 will display the following message:

7. To save the changes and close the window, click **OK**.

Note

To save the changes without closing the window, click **Save**.

4.5 Calculations

MON2020's **Calculations** submenu allows you to activate and define how the output of standard or user-defined chromatograph analysis data is used in various calculations.

You can configure the following types of calculations:

- **Control** - Allows you to designate, by streams, the standard calculations that should be performed from the analysis data.
- **Averages** - Allows you to designate, by streams and components, averages of standard calculations MON2020 should perform.
- **User Defined** - Allows you to create and edit customized calculations using analysis data. See *Appendix A* for more information.
- **Dewpoint** - This optional feature allows you to calculate dewpoint temperatures and to estimate the cricondentherm, which is the temperature above which no liquid will form at any pressure.

4.5.1 Set standard calculations by stream

To designate, by streams, the standard calculations—for example, mole percent, liquid volume, gas density, Wobbe index, etc.—that should be performed from the analysis data, do the following:

1. Select **Applications** → **Calculations** → **Control...**.

The *Control Calculations* window appears.

2. Select a check box for a given stream to turn the calculation ON for that stream; click to clear the check box for a given stream to turn the calculation OFF for that stream.

   You can use the arrow keys to move from one stream cell to another, and you can press the space bar to toggle the calculation on or off.

3. To save the changes and close the window, click **OK**.

Note
To save the changes without closing the window, click **Save**.

Note
To save the information on this screen to a tab-delimited text file, right-click on the table and select **Save Sheet** from the right-click menu.

Note
To copy the information on this screen to the clipboard so that it can be pasted into another application such Microsoft Word or Excel, right-click on the table and select **Copy** to clipboard from the right-click menu.

Note
To print the information on this screen, right-click on the table and select **Print Sheet** from the right-click menu.

4.5.2 Edit average calculations

To designate, by streams and components, averages of standard calculations the GC should perform, do the following:

1. Select **Applications** → **Calculations** → **Averages...**.

   The *Averages Calculations* window appears.

2. Select a new variable by clicking on the appropriate drop-down list under the *Variable* column.

   For a demonstration of how to use the context-sensitive variable selector, see *Section 1.11*.

Note
The averages will be assigned in the default Modbus map in the order that they appear in the table.

3. Select the type of average to be calculated from the *Average Type* drop-down list. You have the following options:

   Unused An average will not be calculated for the variable.

Hourly	Averages will be calculated at the start and end of every hour.
24 Hour	Averages will start and stop once a day at the time displayed in the *Reset Time* field from the **Averages Reset** section.
Weekly	Averages will start and stop once a week at the time displayed in the *Reset Time* field and on the day entered in the *Weekday* field, from the **Averages Reset** section.
Monthly	Averages will start and stop once a month at the time displayed in the *Reset Time* field and on the day of the month entered in the *Day* field, from the **Averages Reset** section.
Variable	Averages will start and stop for the duration entered in the *Hours* column starting from the Reset Time.
Everyrun	No average will be stored; instead, the current value at the end of the run will be stored.

4. To set a custom start and stop time for a particular calculation, set the *Average Type* for the calculation to **Variable** and enter the desired time in the *Hours* cell.

Note
The custom *Hours* setting overrides the *Reset Time* setting.

5. Set the appropriate **Restart Flag** to one of the following options:

NO	The current average will not be reset.
CUR	The current average will be cleared and a new average calculation will start.

6. To save the changes and close the window, click **OK**.

Note
To save the changes without closing the window, click **Save**.

Note
To save the information on this screen to a tab-delimited text file, right-click on the table and select **Save Sheet** from the right-click menu.

Note
To copy the information on this screen to the clipboard so that it can be pasted into another application such Microsoft Word or Excel, right-click on the table and select **Copy to clipboard** from the right-click menu.

Note
To print the information on this screen, right-click on the table and select **Print Sheet** from the right-click menu.

4.5.3 View an archive of averages for a given variable

To view an archive of averages for a given variable, do the following:

1. Select **Applications** → **Calculations** → **Averages...**.

   The *Averages Calculations* window appears.

2. Click on the desired variable to view its history.
3. Click **Archive**.

   The archive data screen appears.

Note
To copy the information in this table to the clipboard so that it can be pasted into another application such as Microsoft Word or Excel, select the cells that you want to copy and then press CTRL + C to copy the information to the clipboard.

4.5.4 Copy an average calculation configuration

To copy the average calculation configuration from a highlighted row and apply them to the next row, do the following:

1. Select **Applications** → **Calculations** → **Averages...**.

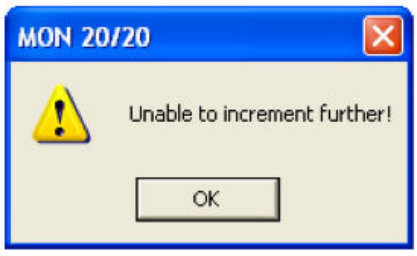
   The *Averages Calculations* window appears.

2. Select the row that you want to copy.
3. Click **S + Copy**.

   The stream will be copied to the next row and incremented to the next available stream—for example, from Stream 2 to Stream 3.

Note
You can select and copy more than one stream at a time.

If there are no streams available, instead of copying the stream, MON2020 will display the following message:



4. To save the changes and close the window, click **OK**.

Note
To save the changes without closing the window, click **Save**.

4.5.5 Copy component settings

To copy the component settings from a highlighted row and apply them to the next row, do the following:

1. Select **Applications** → **Calculations** → **Averages...**.

   The *Averages Calculations* window appears.

2. Select the row that contains the component that you want to copy.
3. Click the arrow beside the **S + Copy** button to switch it to **C + Copy**.
4. Click **C + Copy**. The component will be copied to the next row and incremented to the next available component—for example, from Ammonia to Benzene.

Note
You can select and copy more than one component at a time.

If there are no components available, instead of copying the component, MON2020 will display the following message:

5. To save the changes and close the window, click **OK**.

Note
To save the changes without closing the window, click **Save**.

4.6 Set the calculation method to GPA or ISO

MON2020 can be configured to perform GPA calculations, ISO calculations, or both.

To set which type of calculation method MON2020 should use, do the following:

1. Select **Applications** → **Calculations** → **Configuration...**.

   The *Calculations Configuration* window displays.

2. Select the method from the *Calculation Method* drop-down list.

   The options are:

   - GPA

- ISO
- GPA & ISO

3. Select a unit of measure from the *Base Pressure Units* drop-down list.

   The options are:

   - PSI
   - Bar
   - kPa

4. If you set the calculation method to **GPA** or **GPA & ISO**, you can also set the following options:

   - GPA Calculator Units (U.S. or S.I.)
   - GPA Pressure Display (PSI, Bar or kPa)

5. 5. If you set the calculation method to **ISO** or **GPA & ISO**, you can also set the following options:

   - ISO Pressure Display (Bar or kPa)
   - Pri ReferenceTemperatures
     - 0C/0C
     - 0C/15C
     - 0C/20C
     - 15C/0C
     - 15C/15C
     - 15C/20C
     - 20C/0C
     - 20C/15C
     - 20C/20C
     - 25C/0C
     - 25C/15C
     - 25C/20C

   Note
   Updating this field also updates the primary values—*Sum Factor Pri*, *CV Superior Pri* and *CV Inferior Pri*—that display in the Component Data table.

   - Sec Reference Temperatures (same options as Pri Reference Temperatures)

   Note
   Updating this field also updates the secondary values—*Sum Factor Sec*, *CV Superior Sec* and *CV Inferior Sec*—that display in the Component Data table.

   - Primary CV Units
     - kilojoules per cubic meter (kJ/m3)

- kilocalories per cubic meter (kCal/m3)
- kilowatt hours per cubic meter (kWhrs/m3)
- megajoule per cubic meter (MJ/m3)
- megajoule per kilogram (MJ/kg)
- megajoule per mole (MJ/mole)

- Secondary CV Units (same options as Primary CV Units)

6. Click **OK** to accept the changes and close the window.

Note
Click **Save** to accept the changes without closing the window.

4.7 Set alarm limits

Use this function to set threshold limits for GC analysis data. When a limit is exceeded, an alarm is activated and logged. See *Section 5.1.3* for information on Alarm Logs.

To set an alarm limit for a variable, do the following:

1. Select **Applications** → **Limit Alarms...**.

   The *Limit Alarms* window displays.

2. Select a new variable by clicking on the appropriate drop-down list under the *Variable* column.

   For a demonstration of how to use the context-sensitive variable selector, see *Section 1.11*.

3. To change the alarm type, click the appropriate cell under the *Type* column.

   You have the following the options:

   - **Off** - Turns off the alarm.
   - **All** - Use high and low limits to activate alarms. Enter the lower limit value in the appropriate cell under the *Low Limit* column. Enter the upper limit value in the appropriate cell under the *High Limit* column.
   - **High** - If the status value of the variable rises above the value set in the corresponding *High Limit* column, the high limit alarm is activated.
   - **Low** - If the status value of the variable falls below the value set in the corresponding *Low Limit* column, the low limit alarm is activated.

4. If you want a discrete output to activate when the alarm triggers, click on the appropriate cell under the *DO # to Set* column and select it from the drop-down list.

5. To prevent or allow averaging when the alarm triggers, double-click on the appropriate cell under the *Inhibit Avg* column, and select one of the following options:

   - **True** - Inhibits averaging when the alarm is active.

- **False** - Allows averaging when the alarm is active.

6. To customize the text of the alarm message, enter the new text in the appropriate cell under the *User Alarm Text* column.

   When the alarm triggers, this text will display under the *Alarm Message* column on the *Unack/Active Alarms* window.

Note

If an alarm message is changed, all affected alarm entries, including those previously recorded, will include that change.

7. To enable or disable the use of the customized alarm text, select **True** or **False** from the appropriate cell under the *Inhibit Alarm Text* column.
8. To apply the current limit alarm conditions to the stream, click **S + Copy**.

   The conditions will be applied to the next available stream--for example, from Stream 2 to Stream 3.

   If there are no streams available, instead of copying the stream, MON2020 will display the following message:

9. Click **C + Copy**.

   The alarm limit conditions will be copied to the next available component--for example, from Ammonia to Benzene.

   If there are no more components available, instead of copying the component, MON2020 will display the following message:

10. If you want the GC to halt after the current analysis when an alarm is triggered, do the following:

    a. Select the **Halt on Alarm?** checkbox.

b. Enter a value in the *Delay* column for the length of time, in seconds, that the alarm condition should exist before the Halt command is executed.

   You can enter a value between **0** and **1800**.

11. To save the changes and close the window, click **OK**.

Note
To save the changes without closing the window, click **Save**.

4.8 System alarms

To edit system alarms, do the following:

1. Select **System Alarms...** from the **Applications** menu.

   The *System Alarms* window displays.

2. If you want a discrete output to activate when the alarm triggers, click on the appropriate cell under the *DO # to Set* column and select it from the drop-down list.
3. To prevent or allow averaging when the alarm triggers, double-click on the appropriate cell under the *Inhibit Avg* column, and select one of the following options:

   - **True** - Inhibits averaging when the alarm is active.
   - **False** - Allows averaging when the alarm is active.

4. To enable the alarm check the checkbox under the *Is Alarm Enabled?* column; to disable the alarm, uncheck the checkbox under the *Is Alarm Enabled?* column; to disable the alarm.
5. To halt the GC after the current analysis when an alarm is triggered, check the **Halt on Alarm?** checkbox.
6. To set the amount of time that should pass between the recognition of an alarm condition and the display of the alarm, enter a value between **0** and **1800** in the *Delay* column.
7. To save the changes and close the window, click **OK**.

Note
To save the changes without closing the window, click **Save**.

4.9 Streams

MON2020 allows you to do the following:

- Assign component data tables, validation data tables, and timed events tables to a particular stream.
- Designate a stream for analysis, validation, or calibration.

- Control automatic calibration or validation parameters, such as the total number of runs, runs to be averaged, starting times, and time between automatic calibrations and baseline runs.

4.9.1 Designate how a stream will be used

To assign a function to a stream, do the following:

1. Select **Streams...** from the **Application** menu.

   The *Streams* window opens.

2. For the appropriate stream, select one of the following options from the *Usage* column:

   - **Unused** - Not used
   - **Cal** - Calibration
   - **Analy** - Analysis
   - **Validate** - Validation

3. To save the changes and close the window, click **OK**.

Note
To save the changes without closing the window, click **Save**.

4.9.2 Link a valve with a stream

Multiple streams can be linked to the same valve to allow for different uses of that stream—for example, the calibration gas can be assigned to both calibration and validation runs.

1. Select **Streams...** from the **Application** menu.

   The *Streams* window opens.

2. Go to the *Stream Valve* column for the corresponding stream and select the appropriate valve from the drop-down list.

   Details about the valves in the drop-down list can be viewed from the *Valves* window.

3. To save the changes and close the window, click **OK**.

Note
To save the changes without closing the window, click **Save**.

4. If the sample stream is selected when the valve is on, check the corresponding *Stream Valve On to Select* checkbox; if the sample stream is selected when the valve is off, uncheck the corresponding *Stream Valve On to Select* checkbox.

4.9.3 Assign a data table to a particular stream

To assign a component data table, a validation data table, or a timed events table to a stream, do the following:

1. Select **Streams...** from the **Application** menu.

   The *Streams* window opens.

2. For the appropriate stream, if *Usage* is set to **Cal** or **Analy**, select a component data table from the *CDT* column and a timed events table from the *TEV* column.
3. For the appropriate stream, if *Usage* is set to **Validate**, select a component data table from the *CDT* column, a timed events table from the *TEV* column, and a validation data table from the *VDT* column.
4. To save the changes and close the window, click **OK**.

Note
To save the changes without closing the window, click **Save**.

4.9.4 Change the base pressure for a stream

Base pressure is used for the GPA/AGA physical properties calculations.

Note
The base pressure for the ISO calculation is always **101.325 kPaA**.

To change the base pressure for a stream, do the following:

1. Select **Streams...** from the **Application** menu.

   The *Streams* window opens.

2. For the appropriate stream, double-click on the corresponding cell under the *Base Pressure* column and enter an new value.

Note
The GPA/AGA calculations can also be done at up to three additional optional pressures. Use the *Optional Pressure 1*, *Optional Pressure 2*, and *Optional Pressure 3* columns for this purpose.

3. To save the changes and close the window, click **OK**.

Note
To save the changes without closing the window, click **Save**.

4.10 Create a stream sequence for a detector

A stream sequence defines the order of stream analysis for a detector. You can create three sequences can be configured; each can be activated by a digital input device or via a Modbus link. To create or edit a stream sequence, do the following:

1. Select **Stream Sequence...** from the **Application** menu.

   The *Stream Sequence* window displays.

2. Each stream sequence table can contain up to three sequences--a primary, or default, sequence, and two auxiliary sequences.
3. Double-click the appropriate cell under the *Strm Seq Name* column to give your new sequence a name, or to edit the name of an existing sequence. Type in the new name.
4. To define which discrete input should activate the sequence, select it from the drop-down list of the appropriate cell under the *Seq Activate DI* column.

   Note
   No two sequences can be activated by the same discrete input.

5. To define the order of analysis, double-click the appropriate cell under the *Seq of Strms* column and enter the numbers for the streams, separated by commas, that should be analyzed.

   Example: For example **1,2** would continuously analyze stream 1 followed by stream 2. A sequence of **1,1,1,2** would analyze stream 1 three times and then analyze stream 2 every fourth time in the sequence.

6. To save the changes and close the window, click **OK**.

   Note
   To save the changes without closing the window, click **Save**.

4.11 Communications

Use this window to configure the GC's ports.

The following table lists the *Communication* window's parameters:

Note
During Modbus serial communications MON2020 can differentiate between RTU or ASCII protocols; however, the **data bit**, **stop bit**, and **parity** settings still need to be manually configured.

Label	The name of the group of settings.
Modbus Id	Identification number of the Modbus device.

Baud Rate	The baud rate setting. Options are: **1200**, **2400**, **9600**, **19200**, **38400**, and **57600**. For high performing PCs, set the baud rate to **38400**. If you experience a communications failure at this rate, set the baud rate to **9600**. Baud rate settings less than 9600 may result in real-time delivery that is unacceptably slow.
Data Bits	The number of data bits. Options are **7** (ASCII) and **8** (RTU). The default setting is 8.
Stop Bit	The number of stop bits. The only setting is **1**.
Parity	The parity check method. For use with the ASCII protocol only. Options are **None** (default), **Even** and **Odd**.
HW Flow Cntrl	Allows you to enable or disable hardware handshaking signals (RTS/CTS).
MAP File	Points to the file that contains the registers that should be used.
Port	Allows you to set the type of protocol to be used for the port: **RS232** or **RS485**. If the port is set to RS485, additional configuration steps are required; see your GC manual for more information.

4.11.1 Create or edit registers

You can map GC data to Modbus registers and generate MAP files, which can then be associated with communications ports.

For a list of variable assignments made to all registers, consult the "Communication" section of the *GC Config Report*, which can be accessed from the **Logs/Reports** menu.

To map GC data to Modbus registers, do the following:

1. Select **Communication...** from the **Application** menu.

   The *Communication* window appears.

2. Click **Registers**.

   The *Modbus Map Editor* window appears.

3. To view or edit registers that are contained in an existing MAP file, click on the *Select MAP File* drop-down list and select the appropriate file.

   The registers will load into the table.

   Note
   Not all parts of a MAP file can be edited. The parts that can be edited are white; the read-only parts are turquoise.

4. To edit a cell, double-click it.

   You can edit the following parameters:

Register Number Displays the number for the Modbus registers that will be polled by a connected data acquisition system.

Data Type Describes the type of data that is stored in the register.

Options are:

- BOOLEAN. Has two states ON (1) or OFF (0).
- INT. 16-bit unsigned integer.
- LONG. 32-bit signed integer

> **Note**
> If the Modbus data type is **Usr Modbus**, each long value uses two registers; if the data type is **SIM2251**, each long value uses a single register.

- ULONG. 32-bit unsigned integer
- FLOAT. 32-bit floating point.

> **Note**
> If the Modbus data type is **Usr Modbus**, each floating point value uses two registers; if the data type is **SIM2251**, each floating point value uses a single register.

- Bitmap(INT)
- Bitmap(LONG)
- SCALED_FP1
  ...
- SCALED_FP32

If one of the scaled floating point options is chosen, the **Zero Scale** and **Full Scale** values for that option will display in the appropriate column cells.

SIM_2251 registers use only the **FLOAT** data type.

Variable(s) Displays the variable(s) whose value is to be stored in the register. To change the variable, see *Section 4.11.3*.

Access Determines whether the register will be read-only (**RD_ONLY**) or read/write (**RD_WR**).

5. To copy the component settings from a highlighted row and apply them to the next row, click **C + Copy**.

   This feature also increments the Component value to the next available component (e.g., incrementing from Ammonia to Benzene), per the GC application. An error message displays when the last available component is reached.

6. To copy the stream settings from a highlighted row and apply them to the next row, click **S + Copy**.

This feature also increments the Stream value to the next available stream (e.g., incrementing from Stream 2 to Stream 3), per the GC application. An error message displays when the last available stream is reached.

7. To delete a row, click **Delete**.
8. To insert a row, click **Insert**.
9. To check for conflicting register assignments, click **Check**.

   MON2020 will check the table and if it encounters a conflict it will display the following message:

   Review the table to locate the conflicting registers and change one.

10. To save the MAP file, do the following:

    a. Click **Export**.

       MON2020 validates the table for errors—for instance, ensuring that no two registers share a register number. If any errors are found MON2020 displays the appropriate error message. When no errors are found, the *Save As* window displays.

    b. Enter a new name for the file or select the file that you want to overwrite.
    c. Click **Save**.

4.11.2 Create a MAP file

1. Select **Communication...** from the **Application** menu.

   The *Communication* window appears.

2. Click **Registers**.

   The *Modbus Map Editor* window appears.

3. Click **New**.

   A new row will be added to the table and the column headings will be empty.

4. From the *Register Type* drop-down list, select the type of PLC emulation protocol you want to use.

You have two options: **User_Modbus**, which is a PLC emulation Modbus protocol that can use scaling to convert floating point numbers to integers; and **SIM_2251**, which emulates the Daniel 2500 communication protocol and is a simulation of the 2251 GC controller.

Note
The table's column headers change based on which protocol is selected.

5. If you want to base the MAP file on an existing MAP file, do the following:

   a. Click **Import**.

      The *Open* window displays.

   b. Select the file that you want to import and click **Open**.

      The registers from the selected file will load into the table.

6. To edit a cell, double-click it.

   You can edit the following parameters:

Register Number	Displays the number for the Modbus registers that will be polled by a connected data acquisition system.
Data Type	Describes the type of data that is stored in the register. Options are: • BOOLEAN. Has two states ON (1) or OFF (0). • INT. 16-bit unsigned integer. • LONG. 32-bit signed integer **Note** If the Modbus data type is **Usr Modbus**, each long value uses two registers; if the data type is **SIM2251**, each long value uses a single register. • ULONG. 32-bit unsigned integer • FLOAT. 32-bit floating point. **Note** If the Modbus data type is **Usr Modbus**, each floating point value uses two registers; if the data type is **SIM2251**, each floating point value uses a single register. • Bitmap(INT) • Bitmap(LONG) • SCALED_FP1 ...

- SCALED_FP32

If one of the scaled floating point options is chosen, the **Zero Scale** and **Full Scale** values for that option will display in the appropriate column cells.

SIM_2251 registers use only the **FLOAT** data type.

Variable(s) Displays the variable(s) whose value is to be stored in the register. To change the variable, see *Section 4.11.3*.

Access Determines whether the register will be read-only (**RD_ONLY**) or read/write (**RD_WR**).

7. To copy the component settings from a highlighted row and apply them to the next row, click **C + Copy**.

   This feature also increments the Component value to the next available component (e.g., incrementing from Ammonia to Benzene), per the GC application. An error message displays when the last available component is reached.

8. To copy the stream settings from a highlighted row and apply them to the next row, click **S + Copy**.

   This feature also increments the Stream value to the next available stream (e.g., incrementing from Stream 2 to Stream 3), per the GC application. An error message displays when the last available stream is reached.

9. To delete a row, click **Delete**.
10. To insert a row, click **Insert**.
11. To check for conflicting register assignments, click **Check**.

    MON2020 will check the table and if it encounters a conflict it will display the following message:

    Review the table to locate the conflicting registers and change one.

12. To save the MAP file, do the following:

    a. Click **Export**.

       MON2020 validates the table for errors—for instance, ensuring that no two registers share a register number. If any errors are found MON2020 displays the appropriate error message. When no errors are found, the *Save As* window displays.

    b. Enter a new name for the file or select the file that you want to overwrite.

c. Click **Save**.

4.11.3 Assign a variable to a register

To assign a variable to a register, from the *Modbus Map Editor* window, double-click the appropriate *Variable(s)* cell and select a new variable.

For a demonstration of how to use the context-sensitive variable selector, see *Section 1.11*.

4.11.4 View or edit scales

MON2020 uses scales to convert floating point values to integers.

MON2020 supports 32 different scales that are labelled **SCALED_FP1** through **SCALED_FP32**. The *Data Type* column on the *Modbus Map Editor* window displays the type of scale, if any, that is being used for a particular register. If a scale is being used, the *Zero Scale* and *Full Scale* columns will display the lower and upper values for the chosen scale.

To view the list of scales, select **Application** → **Communication...** → **Registers** and click **Edit Scales** from the *Modbus Map Editor* window. The *Edit Scales* window displays all of the scales, along with each scales lower and upper values.

Use the following formula to calculate the variable's integer value:

$$integer = \left(\frac{R_F - R_Z}{S_F - S_Z}\right)(D_{fp} - S_Z) + R_Z$$

where:

R_F = Full Scale, range

R_Z = Zero Scale, range

S_F = Full Scale, scale

S_Z = Zero Scale, scale

D_{fp} = Floating Point value

For example:

RF = 65535

RZ = 0

SF = 100 (from SCALED_FP1)

SZ = 0 (from SCALED_FP1)

Dfp = 97.13 (scaled percent for methane)

$$63654 = \left(\frac{65535 - 0}{100 - 0}\right)(97.13 - 0) + 0$$

To edit or create your own scale, do the following:

1. Select **Application** → **Communication...** → **Registers** and click **Edit Scales** from the *Modbus Map Editor* window.

   The *Edit Scales* window displays.

2. Double-click on the appropriate cell and enter a new value.
3. Click **OK** to save the changes and close the window.

4.12 Configure an Ethernet port

To configure an Ethernet port, select **Ethernet Ports...** from the **Application** menu. The **Ethernet Ports** window displays.

The following list describes the Ethernet ports' parameters:

Ethernet 1 IP Address	IP address to use to connect to the GC's RJ-45 Ethernet port.
Ethernet 1 Subnet Mask	Subnet mask for the IP address of the GC's RJ-45 Ethernet port.
Ethernet 1 Gateway	Gateway address for the GC's RJ-45 Ethernet port.
Ethernet 2 IP Address	IP address to use to connect to the GC's wired Ethernet port.
Ethernet 2 Subnet Mask	Subnet mask for the IP address of the GC's wired Ethernet port.
Ethernet 2 Gateway	Gateway address for the GC's wired Ethernet port.

4.13 Local Operator Interface variables

Use this window to select and configure up to 25 GC parameters that you would like to monitor using the LOI's *Display* mode.

To set an LOI parameter, do the following:

1. Select **LOI Status Variables...** from the **Application** menu.

   The *LOI Status Variables* window appears.

2. Select a variable by clicking on the appropriate drop-down list under the *Variable* column.

   Note
   For a demonstration of how to use the context-sensitive variable selector, see *Section 1.11*.

3. To copy the stream settings from a highlighted row and apply them to the next row, click **S + Copy**.

   This feature also increments the *Stream* value to the next available stream—for instance, incrementing from Stream 2 to Stream 8, per the GC application.

4. To copy the component settings from a highlighted row and apply them to the next row, click **C + Copy**.

   This feature also increments the *Component* value to the next available component—incrementing from Ammonia to Benzene, per the GC application.

5. Enter a value in the *Precision* column to indicate the number of decimal places to display for this particular variable.

   The range of possible *Precision* values is between **0** and **6**.

6. Click **OK** to save the changes and close the window.

Note
To save the changes without closing the window, click **Save**.

4.14 Map a FOUNDATION fieldbus variable

To map a GC variable to a FOUNDATION fieldbus process variable (PV), do the following:

1. Take the GC out of service from the host.
2. Open MON2020 and select **FFB PV Mappings...** from the **Application** menu.

   The *FFB PV Mappings* window displays.

3. Select a new variable by clicking on the appropriate drop-down list under the *Variable* column.

Note
For a demonstration of how to use the context-sensitive variable selector, see*Section 1.11*.

Note
The *PV Value* column displays the current value of the GC variable indicated in the *Variable* column.

Note
The *PV Status* column indicates the state of the data displayed in the *PV Value* column. If the data was generated under predictable conditions without any alarms, then the status for all mapped process variables will be **Good**; if the data was generated under unpredictable conditions—that is, if any alerts were triggered during the analysis cycle—then the status for all mapped process variables will be **Bad**, because the GC cannot guarantee the results of the analysis.

4. To copy the stream settings from a highlighted row and apply them to the next row, click **S + Copy**.

   This feature also increments the *Stream* value to the next available stream—for instance, incrementing from Stream 2 to Stream 8, per the GC application.

5. To copy the component settings from a highlighted row and apply them to the next row, click **C + Copy**.

   This feature also increments the *Component* value to the next available component—incrementing from Ammonia to Benzene, per the GC application.

6. If necessary, enter a date or time format into the *Date/Time Format* column.
7. Click **OK** to save the changes and close the window.

Note

To save the changes without closing the window, click **Save**.

5 Logs and reports

The options in the Logs/Reports menu allow you to do the following:

- Keep a maintenance record.
- Keep a parameter record.
- View alarm, system and event logs.
- View and print trend data.
- View the GC Configuration report.
- View relevant drawings and diagrams.
- View archived analysis, calibration and averages reports.
- Configure how and when certain reports are printed.

5.1 Alarms

Use this menu to view and/or clear unacknowledged and active alarms, as well as to view the Alarm Log.

5.1.1 View unacknowledged and active alarms

To view unacknowledged and active alarms, select **Logs/Reports** → **Alarms** → **Unack/ Active Alarms...**. The *Unack/Active Alarms* window displays.

Note
Double-clicking on the GC Status Bar from the main window also displays the *Unack/Active Alarms* window.

There are three display options for viewing alarms on this window:

- To view both unacknowledged alarms and active alarms, check **All Alarms**. This is the default display option.
- To view unacknowledged alarms only, check **Unacknowledged Alarms**.
- To view active alarms only, check **Active Alarms**.

The *Unack/Active Alarms* window supplies the following data for each alarm:

Status	Indicates whether the alarm has been acknowledged or not.
State	Indicates whether the alarm is **ACTIVE** or **INACTIVE**.
Date	Indicates the date and time at the GC when the alarm condition began.
Alarm Message	Describes the alarm condition.
Type	Indicates whether a high limit or low limit alarm was triggered: • **HI** means a high limit alarm was triggered.

- **LO** means a high limit alarm was triggered.

Limit	Indicates the value that was set as the trigger for the alarm.
Value	Indicates the current status value being output by the device.
Name	Indicates the name of the variable that triggered the alarm.

Note
Discrete alarms do not display *Type*, *Limit*, or *Value* data.

5.1.2 Acknowledge and clear alarms

There are three ways to acknowledge and clear alarms:

- To acknowledge and clear alarms without viewing them, select **Logs/Reports** → **Alarms** → **Clear/Ack All Active Alarms**.
- Another method to acknowledge and clear alarms without viewing them is to click  from the Toolbar.
- To view the alarms before acknowledging and clearing them, select **Logs/Reports** → **Alarms** → **Unack/Active Alarms...** . The *Unack/Active Alarms* window provides several options:
  - To acknowledge an alarm, select it and then click **Ack Selected (F2)**.

    Note
    An alarm will continue to display as an active alarm until that value is no longer in the alarm state.

  - To acknowledge all the alarms displayed on the window, click **Ack All (F3)**.
  - To acknowledge all the alarms displayed on the window and then remove them from the table, click **Clear/Ack All (F4)**.

    Note
    If an alarm is cleared before the condition has been resolved, MON2020 redisplays the alarm entry as an active alarm.

5.1.3 View the alarm log

The Alarm Log records every alarm triggered from the GC. The *Alarm Log* window gives you the option of viewing the total list of alarms, or a date-filtered list.

To view the Alarm Log, select **Logs/Reports** → **Alarms** → **Alarm Log...**. The *Alarm Log* window displays.

The *Alarm Log* window supplies the following data for each alarm:

Date Time	Indicates the date and time at the GC when the alarm condition began.

Alarm Message	Describes the alarm condition.
State	Indicates whether the alarm is **SET** (active) or **CLR** (inactive).
Type	If applicable, indicates whether a high limit or low limit alarm was triggered: • **High** means a high limit alarm was triggered. • **Low** means a high limit alarm was triggered.
Limit	If applicable, indicates the value that was set as the trigger for the alarm.
Value	If applicable, indicates the current status value being output by the device.
Unit	If applicable, unit of measurement for the displayed values.
Name	Indicates the name of the variable that triggered the alarm.
User	Indicates which user made the change.

Note

Discrete alarms do not display *Type*, *Limit*, or *Value* data.

To view a list of alarms, do the following:

1. To view all alarms, select the *All* checkbox. Otherwise, select the *Select Range* checkbox and use the *Start Date* and *End Date* drop-down boxes to select a date range.
2. Click **Read Records**.

   The list of alarms display with the most recent alarm at the top and the oldest alarm at the bottom. The alarms are also sorted and color-coded by time so that alarms that occurred simultaneously are grouped together.

3. Click **Save** to save the list.

   The list can be saved in the following formats:

   - Tab-Delimited (.txt)
   - Comma-Delimited (.csv)
   - Microsoft Excel (.xls)
   - HTML File (.html)
   - XML File (.xml)
4. Click **Close** to close the window.

5.2 The maintenance log

Use this function to manually record and track maintenance activities performed on a given GC unit.

To view the maintenance log, select **Maintenance Log...** from the **Log/Reports** menu.

5.2.1 Add an Entry to the Maintenance Log

To add an entry to the maintenance log, do the following:

1. Select **Maintenance Log...** from the **Log/Reports** menu.

   The **Maintenance Log** window displays.

2. Click **Insert At Top**.

   A new row appears on the maintenance log table. The *Date* field contains the GC's current date and time, and is editable.

3. Double-click the *Message* cell and enter the relevant information for the log entry.

   Note
   To edit an old log entry, click on it and the cell will become editable.

4. Click **OK** to save the changes and close the window.

   Note
   To save the changes and keep the window open, click **Save**.

5.2.2 Delete an entry from the maintenance log

To delete an entry from the maintenance log, do the following:

1. Select **Maintenance Log...** from the **Log/Reports** menu.

   The **Maintenance Log** window displays.

2. Select the entry that you want to delete.
3. Click **Delete**.

   The entry is removed from the maintenance log.

4. Click **OK** to save the changes and close the window, .

   Note
   To save the changes and keep the window open, click **Save**.

5.3 The parameter list

Use this feature to keep a record of the hardware components and associated parameters for a given GC.

The *Parameter List* is a Microsoft® Excel document that can be viewed and edited from MON2020. Before attempting to edit the document, be sure to review it first to get an idea of what sorts of data it contains.

The Parameter List may contain one or all of the following pages:

- Cover Sheet
- TE Rework
- pp Data
- Programming
- Strm Data
- Col Data
- Cal Std Data

5.3.1 View and edit the parameter list

To view and edit the Parameter List, do the following:

1. Select **Parameter List...** from the **Logs/Reports** menu.

   The *Parameter List* window displays.

2. Make your changes to the Parameter List.
3. Click **OK** to save the changes and close the window.

Note
To save the changes and keep the window open, click **Save**.

5.3.2 Import the Parameter List

The Parameter List is a Microsoft® Excel document and is therefore saved with the .xls extension.

To import a Parameter List, do the following:

1. Select **Parameter List...** from the **Logs/Reports** menu.

   The *Parameter List* window displays.

2. Click **Import...**.

   The *Open* dialog displays.

3. Locate and select the Parameter List that you want to import.
4. Click **Open** and the document will be imported and displayed in the *Parameter List* window.
5. Click **OK** to save the changes and close the window.

   This version of the Parameter List will now be displayed by default.

Note
To save the changes and keep the window open, click **Save**.

5.4 Drawings and documents

Use this feature to access GC-related drawings and documents such as flow diagrams, the GC's sales order, assembly drawings, and electrical diagrams. These items can be stored on the GC in the following formats:

- PDF
- TIFF
- GC Trend file (.xtrd)
- XA CGM file (.xcgm)
- XA Comparison file (.xcpm)
- GC Configuration file (.xcfg)

To find out which documents are available on the GC, select **Drawings/Documents...** from the **Logs/Reports** menu. The *Drawings/Documents* window displays. If the list of available documents does not display under *Drawings/Documents* label, click the "+" beside the label.

Note
If no list displays under the *Drawings/Documents* label, and there is no "+" beside the label, then this GC does not contain any documents.

5.4.1 View drawings or documents

To view a drawing, do the following:

1. Select **Drawings/Documents...** from the **Logs/Reports** menu.

   The *Drawings/Documents* window displays.

2. Select the drawing to view from the drop-down list.

   Note
   If no list displays under the *Drawings/Documents* label, and there is no "+" beside the label, then this GC does not contain any documents.

3. Click **File Viewer (F3)**.

   The drawing displays.

4. Click **Close** to exit the window and to return to the *Drawings/Documents* window.

5.4.2 Add files to the GC

To add files, such as new or updated drawings, to the GC, do the following:

1. Select **Drawings/Documents...** from the **Logs/Reports** menu.

   The *Drawings/Documents* window displays.

2. Click **Add File(s) to GC**.

   The *Open* dialog displays.

3. Locate and select the file to add to the GC.
4. Click **Open**.

   The file will be saved to the GC and the *Drawings/Documents* list will be updated.

5.4.3 Delete files from the GC

To delete drawings from the GC, do the following:

1. Select **Drawings/Documents**... from the **Logs/Reports** menu.

   The *Drawings/Documents* window displays.

2. Select the file to delete from the GC.
3. Click **Delete File from GC**.

   The *Confirm* message displays.

4. Click **Yes**.

   The file will be deleted from the GC and the *Drawings/Documents* list will be updated.

5.5 The event log

Use this function to track the changes that are made to the various tables within the GC.

To view the Event Log, select **Logs/Reports** → **Event Log...**. The *Event Log* window displays.

The *Event Log* window gives you the option of viewing the total list of change events, or a date-filtered list of events. The *Event Log* window supplies the following data for each event:

User ID	Indicates which user made the change.
Date	Indicates the date at the GC when the event occurred.
Time	Indicates the time at the GC when the event occurred.
Event Message	Provides a description of the event.
Old Value	If applicable, indicates the value in the cell before the change.

New Value	If applicable, indicates the value in the cell after change.

To view the list of change events, do the following:

1. To view all events, select the *All* checkbox. Otherwise, select the *Select Range* checkbox and use the *Start Date* and *End Date* drop-down boxes to select a date range.
2. Click **Read Records**.

   The list of events display with the most recent event at the top and the oldest event at the bottom. The events are also sorted and color-coded by time so that events that occurred simultaneously are grouped together.

3. To save the list, click **Save**.

   The list can be saved in the following formats:

   - Tab-Delimited (.txt)
   - Comma-Delimited (.csv)
   - Microsoft Excel (.xls)
   - HTML File (.html)
   - XML File (.xml)

5.6 Reports

This function allows you to immediately display, print, or store pre-configured reports of GC analysis data. Data is reported in real-time from the GC or from saved files.

5.6.1 Report types

MON2020 can generate the following types of reports:

Analysis	Displays a list of the components that were detected, based on raw data. Displays a list of calculations for each component, based on the table located at **Application** → **Calculations** → **Control...**. See *Section 4.5.1* for more information. There are two types of analysis reports: *Analysis (GPA)* and *Analysis (ISO)*. See *Figure 5-1* for an example Analysis (GPA) report. See *Figure 5-2* for an example Analysis (ISO) report.
Calibration	Displays a list of the components that were detected, along with each component's calibration concentration, raw data value, new response factor, and new retention time. See *Figure 5-3* for an example report.
Final Calibration	The Final Calibration report displays the list of components along with each component's old and new response factors, and each component's old and new retention times, based on the averaged data. See *Figure 5-4* for an example report.

Validation For the most recent validation cycle, displays the Nominal Value, Allowed Percent Deviation, and the Measured Value of each variable in the Validation Data table. See *Figure 5-5* for an example report.

Note
If the actual deviation is beyond the allowed amount, then the row will be flagged with an asterisk (*).

Final Validation For the most recent validation run, shows the Nominal Value, Allowed Percent Deviation, and the Average Value of each variable in the Validation Data table. See *Figure 5-6* for an example report.

Note
If the actual deviation is beyond the allowed amount, then the row will be flagged with an asterisk (*).

Raw Data Displays a list of data for each peak that was detected during the run, including the retention time, peak area, and peak height. See *Figure 5-7* for an example report.

Every Run Displays a configurable list of calculations after each run. See *Section 4.5.2* for more information.

Hourly Displays a configurable list of average calculations each hour, beginning at the time set in the *Average Calculations* window at **Application** → **Calculations** → **Averages...** . See *Section 4.5.2* for more information.

24 Hour Displays a configurable list of average calculations each day, beginning at the time set in the *Average Calculations* window at **Application** → **Calculations** → **Averages...** . See *Section 4.5.2* for more information.

Weekly Displays a configurable list of average calculations each week, beginning on the day set in the *Average Calculations* window at **Application** → **Calculations** → **Averages...** . See *Section 4.5.2* for more information.

Monthly Displays a configurable list of average calculations each month, beginning on the day of the month set in the *Average Calculations* window at **Application** → **Calculations** → **Averages...** . See *Section 4.5.2* for more information.

Variable Displays a configurable list of average calculations every hour at the time entered in the *Hours* column in the *Average Calculations* window at **Application** → **Calculations** → **Averages...** . See *Section 4.5.2* for more information.

Auto Valve Timing Displays a *Auto valve Timing* report.

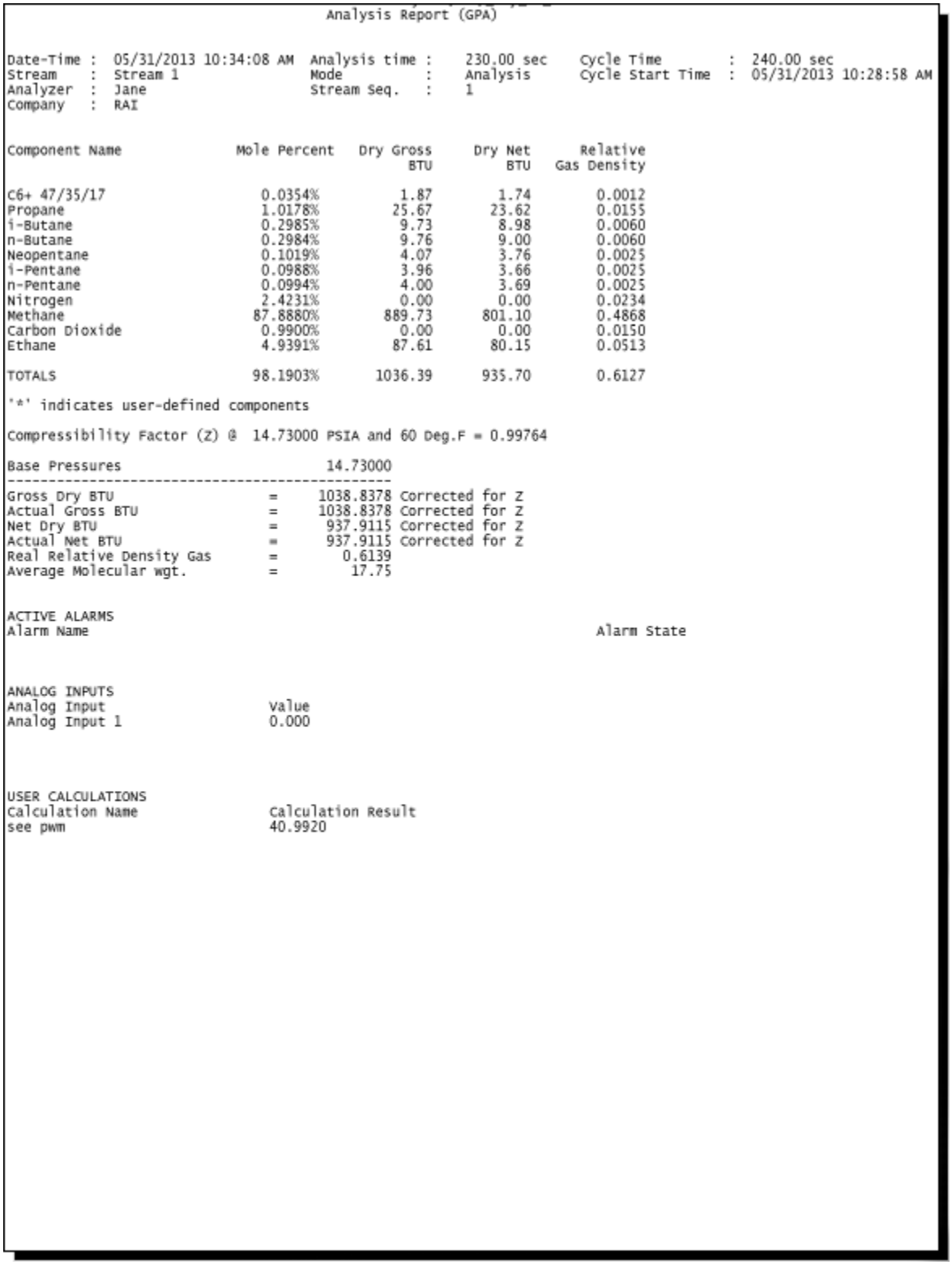
Module Validation Displays a *Module Validation* report.

Each report begins with the following header information:

Date-Time The GC's date and time when the report was generated.

Analysis Time	The duration, in seconds, of the analysis. Can be configured at **Application** → **Timed Events...**. See *Section 4.3.4* for more information.
Cycle Time	The duration, in seconds, between two consecutive analyses. Can be configured at **Application** → **Timed Events...**. See *Section 4.3.4* for more information.
Stream	The stream that was analyzed. Selected as part of the report generation process. See *Section 5.6.3* for more information.
Mode	Displays the operational status of the detector.
Cycle Start Time	The date and time that the cycle started.
Analyzer	Name of the GC that generated the data used for the report.
Stream Sequence	The identification and order of the streams that were analyzed. Can be configured at **Applications** → **Stream Sequence...**. See *Section 4.10* for more information.

Figure 5-1: Analysis (GPA) sample report



Analysis Report (GPA)

Date-Time : 05/31/2013 10:34:08 AM Analysis time : 230.00 sec Cycle Time : 240.00 sec
Stream : Stream 1 Mode : Analysis Cycle Start Time : 05/31/2013 10:28:58 AM
Analyzer : Jane Stream Seq. : 1
Company : RAI

Component Name	Mole Percent	Dry Gross BTU	Dry Net BTU	Relative Gas Density
C6+ 47/35/17	0.0354%	1.87	1.74	0.0012
Propane	1.0178%	25.67	23.62	0.0155
i-Butane	0.2985%	9.73	8.98	0.0060
n-Butane	0.2984%	9.76	9.00	0.0060
Neopentane	0.1019%	4.07	3.76	0.0025
i-Pentane	0.0988%	3.96	3.66	0.0025
n-Pentane	0.0994%	4.00	3.69	0.0025
Nitrogen	2.4231%	0.00	0.00	0.0234
Methane	87.8880%	889.73	801.10	0.4868
Carbon Dioxide	0.9900%	0.00	0.00	0.0150
Ethane	4.9391%	87.61	80.15	0.0513
TOTALS	98.1903%	1036.39	935.70	0.6127

'*' indicates user-defined components

Compressibility Factor (Z) @ 14.73000 PSIA and 60 Deg.F = 0.99764

Base Pressures 14.73000

Gross Dry BTU	=	1038.8378	Corrected for Z
Actual Gross BTU	=	1038.8378	Corrected for Z
Net Dry BTU	=	937.9115	Corrected for Z
Actual Net BTU	=	937.9115	Corrected for Z
Real Relative Density Gas	=	0.6139	
Average Molecular wgt.	=	17.75	

ACTIVE ALARMS

Alarm Name	Alarm State

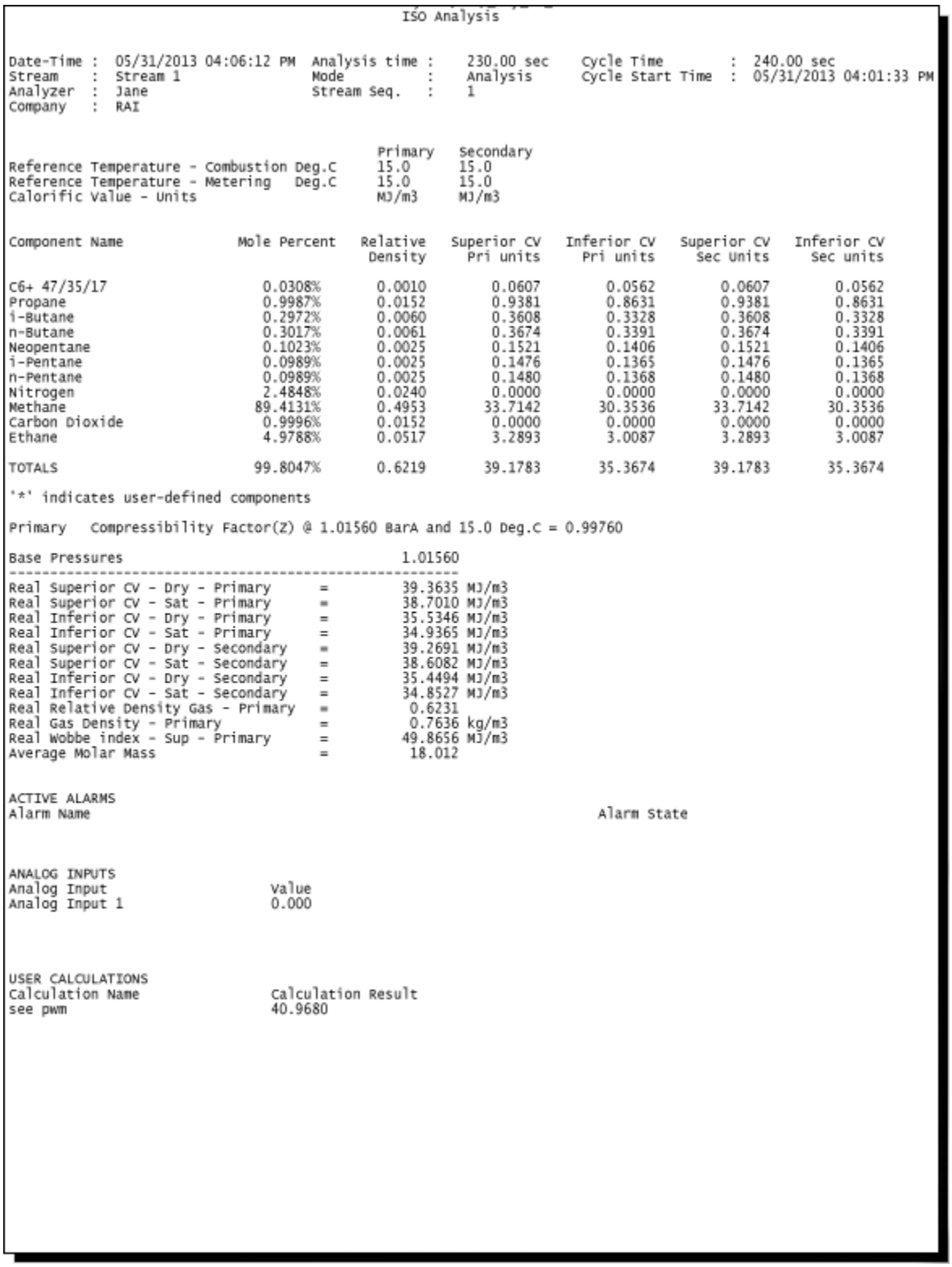
ANALOG INPUTS

Analog Input	Value
Analog Input 1	0.000

USER CALCULATIONS

Calculation Name	Calculation Result
see pwm	40.9920

Figure 5-2: Analysis (ISO) sample report



ISO Analysis

Date-Time : 05/31/2013 04:06:12 PM Analysis time : 230.00 sec Cycle Time : 240.00 sec
Stream : Stream 1 Mode : Analysis Cycle Start Time : 05/31/2013 04:01:33 PM
Analyzer : Jane Stream Seq. : 1
Company : RAI

	Primary	Secondary
Reference Temperature - Combustion Deg.C	15.0	15.0
Reference Temperature - Metering Deg.C	15.0	15.0
Calorific Value - Units	MJ/m3	MJ/m3

Component Name	Mole Percent	Relative Density	Superior CV Pri units	Inferior CV Pri units	Superior CV Sec Units	Inferior CV Sec units
C6+ 47/35/17	0.0308%	0.0010	0.0607	0.0562	0.0607	0.0562
Propane	0.9987%	0.0152	0.9381	0.8631	0.9381	0.8631
i-Butane	0.2972%	0.0060	0.3608	0.3328	0.3608	0.3328
n-Butane	0.3017%	0.0061	0.3674	0.3391	0.3674	0.3391
Neopentane	0.1023%	0.0025	0.1521	0.1406	0.1521	0.1406
i-Pentane	0.0989%	0.0025	0.1476	0.1365	0.1476	0.1365
n-Pentane	0.0989%	0.0025	0.1480	0.1368	0.1480	0.1368
Nitrogen	2.4848%	0.0240	0.0000	0.0000	0.0000	0.0000
Methane	89.4131%	0.4953	33.7142	30.3536	33.7142	30.3536
Carbon Dioxide	0.9996%	0.0152	0.0000	0.0000	0.0000	0.0000
Ethane	4.9788%	0.0517	3.2893	3.0087	3.2893	3.0087
TOTALS	99.8047%	0.6219	39.1783	35.3674	39.1783	35.3674

'*' indicates user-defined components

Primary Compressibility Factor(Z) @ 1.01560 BarA and 15.0 Deg.C = 0.99760

Base Pressures 1.01560

Real Superior CV - Dry - Primary	=	39.3635 MJ/m3
Real Superior CV - Sat - Primary	=	38.7010 MJ/m3
Real Inferior CV - Dry - Primary	=	35.5346 MJ/m3
Real Inferior CV - Sat - Primary	=	34.9365 MJ/m3
Real Superior CV - Dry - Secondary	=	39.2691 MJ/m3
Real Superior CV - Sat - Secondary	=	38.6082 MJ/m3
Real Inferior CV - Dry - Secondary	=	35.4494 MJ/m3
Real Inferior CV - Sat - Secondary	=	34.8527 MJ/m3
Real Relative Density Gas - Primary	=	0.6231
Real Gas Density - Primary	=	0.7636 kg/m3
Real Wobbe index - Sup - Primary	=	49.8656 MJ/m3
Average Molar Mass	=	18.012

ACTIVE ALARMS

Alarm Name	Alarm State

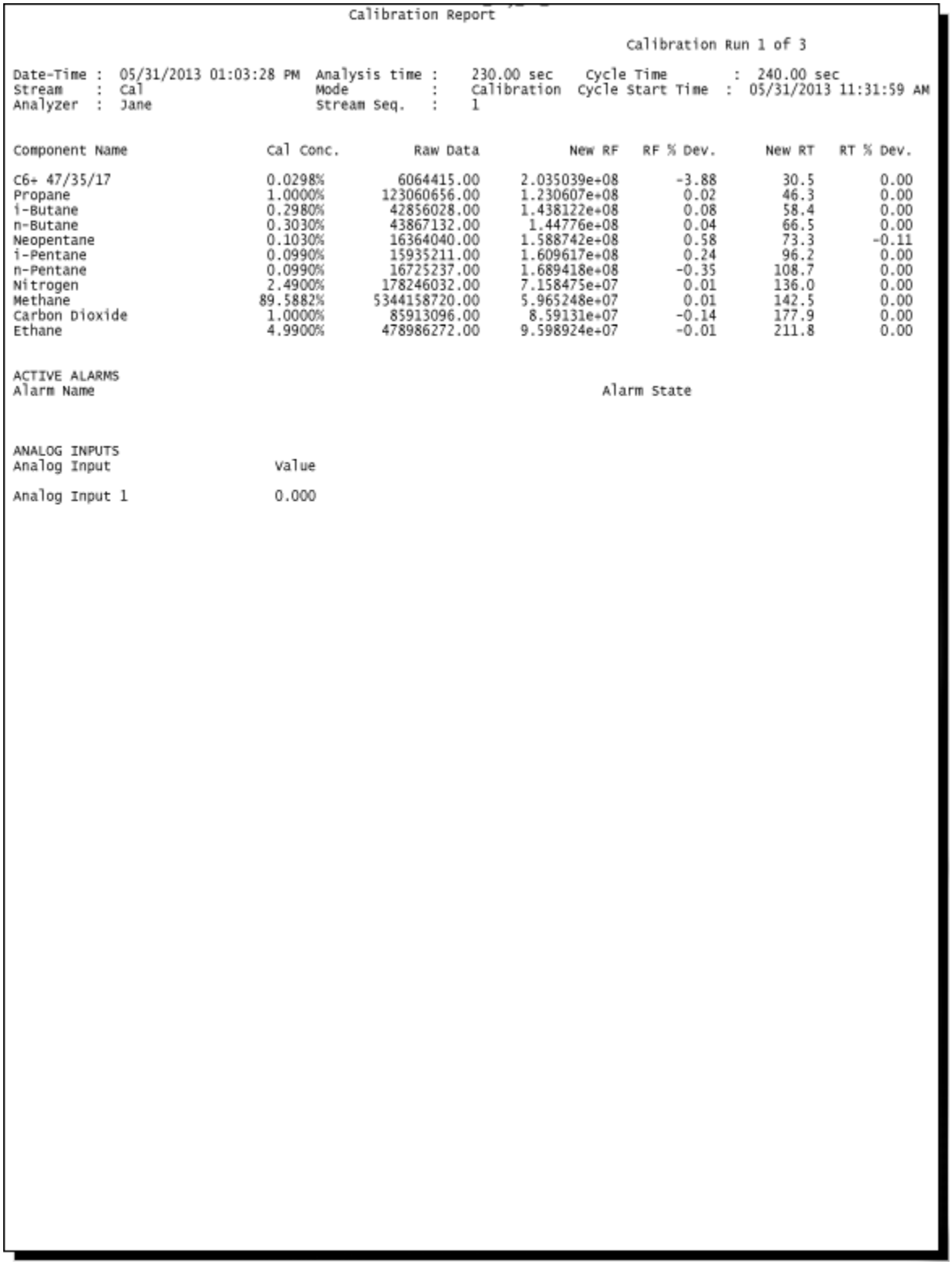
ANALOG INPUTS

Analog Input	Value
Analog Input 1	0.000

USER CALCULATIONS

Calculation Name	Calculation Result
see pwm	40.9680

Figure 5-3: Calibration sample report



Calibration Report

Calibration Run 1 of 3

Date-Time : 05/31/2013 01:03:28 PM Analysis time : 230.00 sec Cycle Time : 240.00 sec
Stream : Cal Mode : Calibration Cycle Start Time : 05/31/2013 11:31:59 AM
Analyzer : Jane Stream Seq. : 1

Component Name	Cal Conc.	Raw Data	New RF	RF % Dev.	New RT	RT % Dev.
C6+ 47/35/17	0.0298%	6064415.00	2.035039e+08	-3.88	30.5	0.00
Propane	1.0000%	123060656.00	1.230607e+08	0.02	46.3	0.00
i-Butane	0.2980%	42856028.00	1.438122e+08	0.08	58.4	0.00
n-Butane	0.3030%	43867132.00	1.44776e+08	0.04	66.5	0.00
Neopentane	0.1030%	16364040.00	1.588742e+08	0.58	73.3	-0.11
i-Pentane	0.0990%	15935211.00	1.609617e+08	0.24	96.2	0.00
n-Pentane	0.0990%	16725237.00	1.689418e+08	-0.35	108.7	0.00
Nitrogen	2.4900%	178246032.00	7.158475e+07	0.01	136.0	0.00
Methane	89.5882%	5344158720.00	5.965248e+07	0.01	142.5	0.00
Carbon Dioxide	1.0000%	85913096.00	8.59131e+07	-0.14	177.9	0.00
Ethane	4.9900%	478986272.00	9.598924e+07	-0.01	211.8	0.00

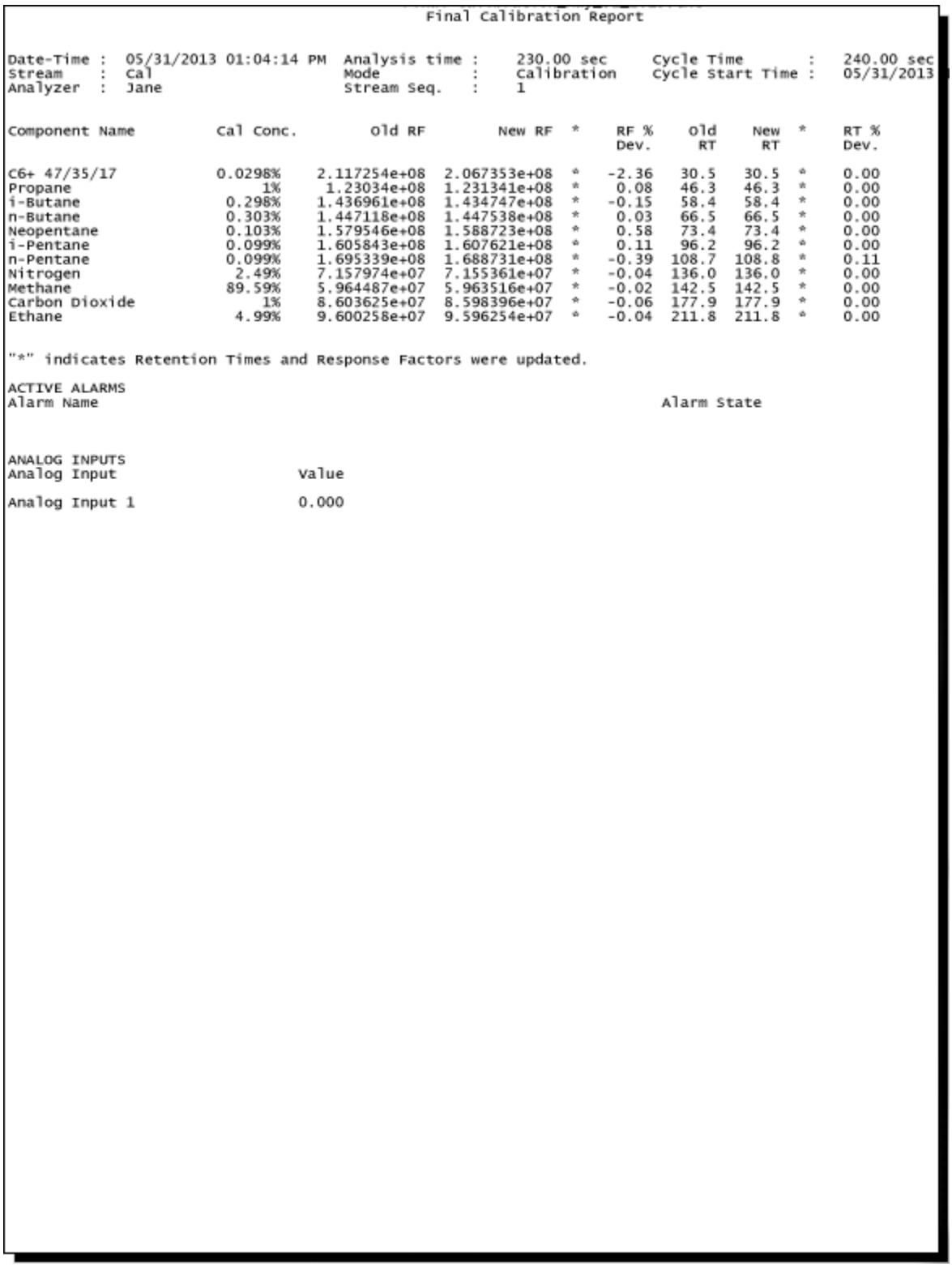
ACTIVE ALARMS

Alarm Name	Alarm State

ANALOG INPUTS

Analog Input	Value
Analog Input 1	0.000

Figure 5-4: Final Calibration sample report



Final Calibration Report

Date-Time : 05/31/2013 01:04:14 PM Analysis time : 230.00 sec Cycle Time : 240.00 sec
Stream : Cal Mode : Calibration Cycle Start Time : 05/31/2013
Analyzer : Jane Stream Seq. : 1

Component Name	Cal Conc.	Old RF	New RF	*	RF % Dev.	Old RT	New RT	*	RT % Dev.
C6+ 47/35/17	0.0298%	2.117254e+08	2.067353e+08	*	-2.36	30.5	30.5	*	0.00
Propane	1%	1.23034e+08	1.231341e+08	*	0.08	46.3	46.3	*	0.00
i-Butane	0.298%	1.436961e+08	1.434747e+08	*	-0.15	58.4	58.4	*	0.00
n-Butane	0.303%	1.447118e+08	1.447538e+08	*	0.03	66.5	66.5	*	0.00
Neopentane	0.103%	1.579546e+08	1.588723e+08	*	0.58	73.4	73.4	*	0.00
i-Pentane	0.099%	1.605843e+08	1.607621e+08	*	0.11	96.2	96.2	*	0.00
n-Pentane	0.099%	1.695339e+08	1.688731e+08	*	-0.39	108.7	108.8	*	0.11
Nitrogen	2.49%	7.157974e+07	7.155361e+07	*	-0.04	136.0	136.0	*	0.00
Methane	89.59%	5.964487e+07	5.963516e+07	*	-0.02	142.5	142.5	*	0.00
Carbon Dioxide	1%	8.603625e+07	8.598396e+07	*	-0.06	177.9	177.9	*	0.00
Ethane	4.99%	9.600258e+07	9.596254e+07	*	-0.04	211.8	211.8	*	0.00

"*" indicates Retention Times and Response Factors were updated.

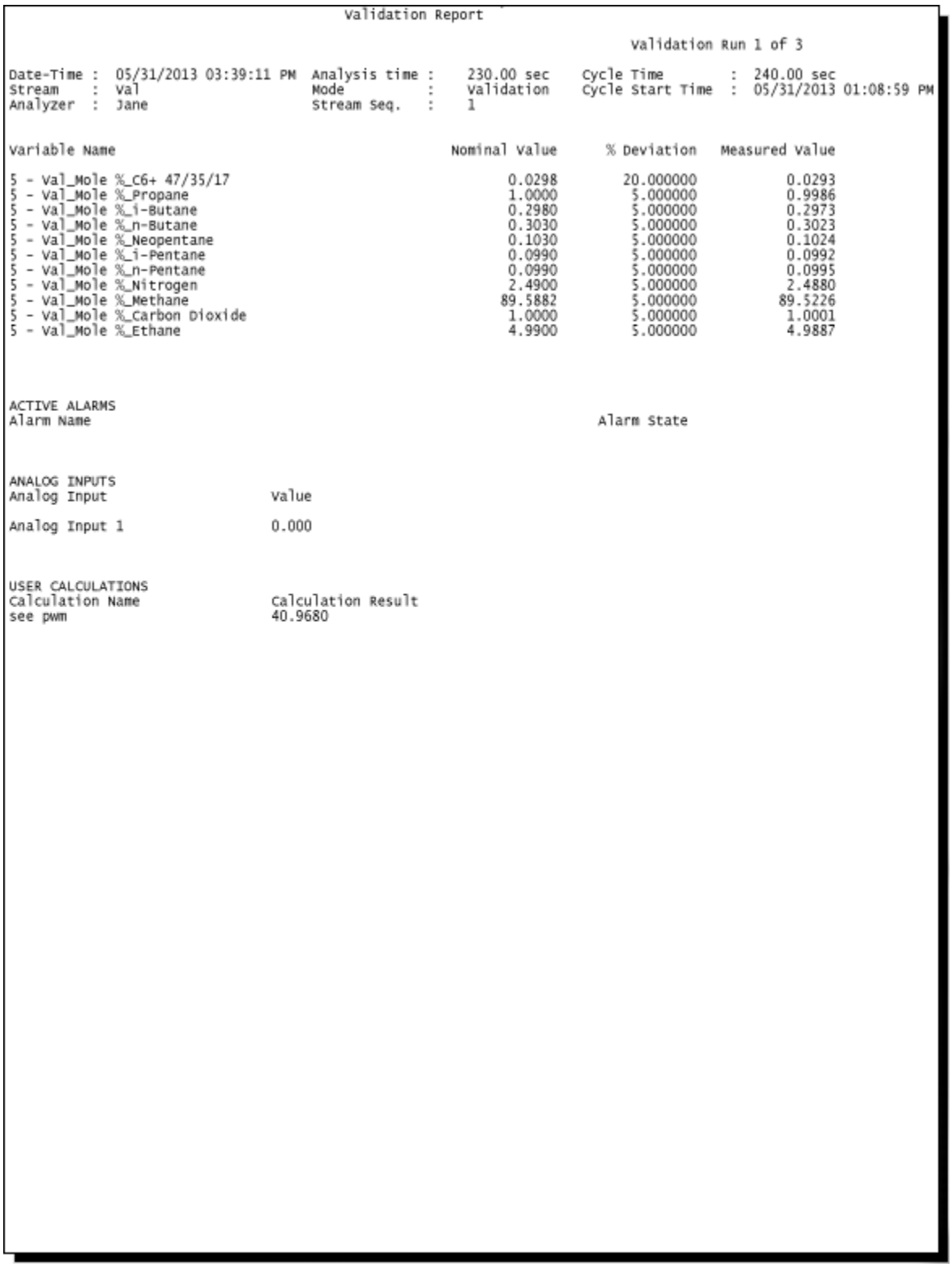
ACTIVE ALARMS

Alarm Name	Alarm State

ANALOG INPUTS

Analog Input	Value
Analog Input 1	0.000

Figure 5-5: Validation sample report



Validation Report

Validation Run 1 of 3

Date-Time : 05/31/2013 03:39:11 PM
Stream : Val
Analyzer : Jane
Analysis time : 230.00 sec
Mode : Validation
Stream Seq. : 1
Cycle Time : 240.00 sec
Cycle Start Time : 05/31/2013 01:08:59 PM

Variable Name	Nominal Value	% Deviation	Measured Value
5 - Val_Mole %_C6+ 47/35/17	0.0298	20.000000	0.0293
5 - Val_Mole %_Propane	1.0000	5.000000	0.9986
5 - Val_Mole %_i-Butane	0.2980	5.000000	0.2973
5 - Val_Mole %_n-Butane	0.3030	5.000000	0.3023
5 - Val_Mole %_Neopentane	0.1030	5.000000	0.1024
5 - Val_Mole %_i-Pentane	0.0990	5.000000	0.0992
5 - Val_Mole %_n-Pentane	0.0990	5.000000	0.0995
5 - Val_Mole %_Nitrogen	2.4900	5.000000	2.4880
5 - Val_Mole %_Methane	89.5882	5.000000	89.5226
5 - Val_Mole %_Carbon Dioxide	1.0000	5.000000	1.0001
5 - Val_Mole %_Ethane	4.9900	5.000000	4.9887

ACTIVE ALARMS

Alarm Name	Alarm State

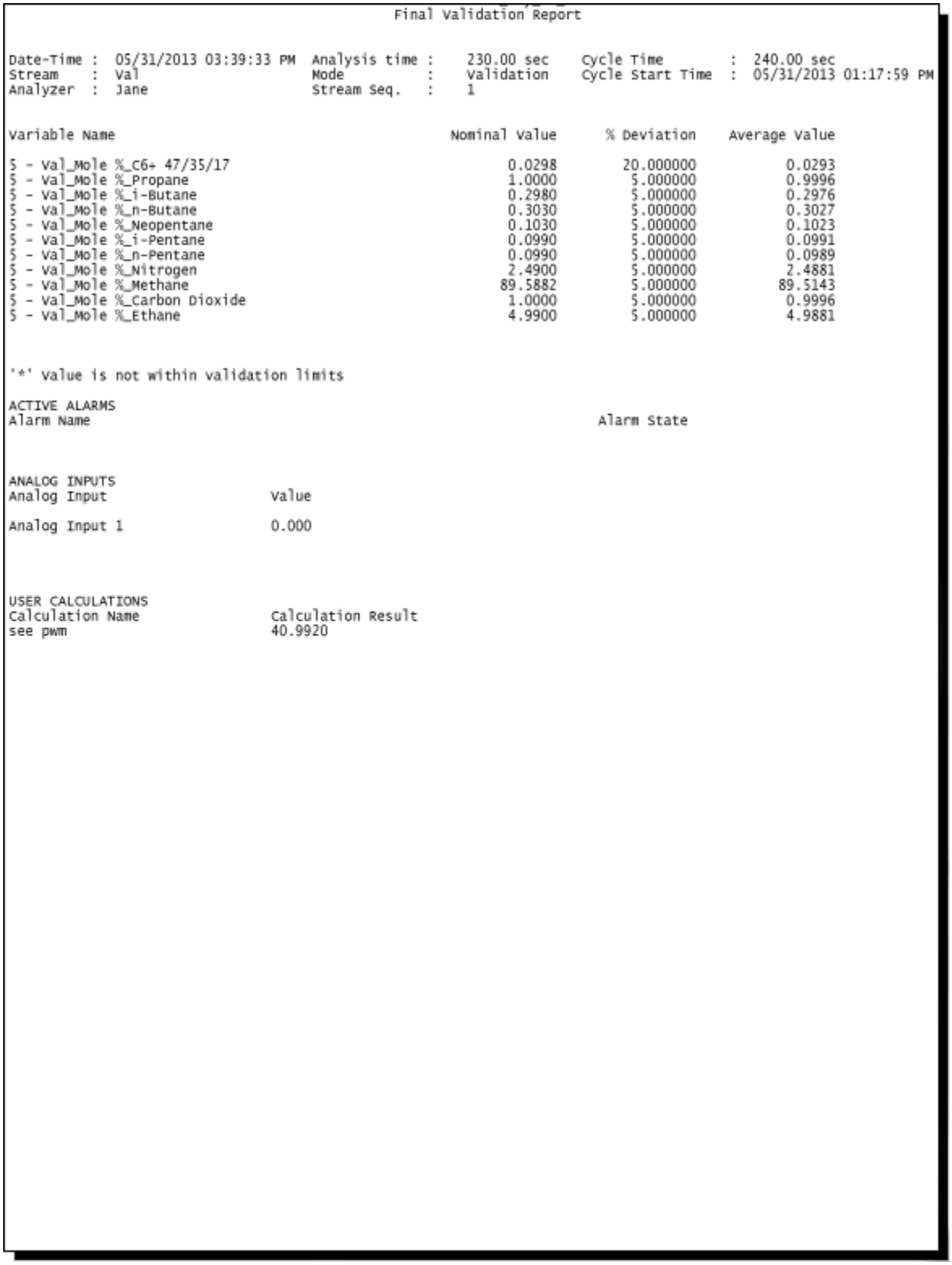
ANALOG INPUTS

Analog Input	Value
Analog Input 1	0.000

USER CALCULATIONS

Calculation Name	Calculation Result
see pwm	40.9680

Figure 5-6: Final Validation sample report



Final Validation Report

Date-Time : 05/31/2013 03:39:33 PM Analysis time : 230.00 sec Cycle Time : 240.00 sec
Stream : Val Mode : Validation Cycle Start Time : 05/31/2013 01:17:59 PM
Analyzer : Jane Stream Seq. : 1

Variable Name	Nominal Value	% Deviation	Average Value
$ - Val_Mole %_C6+ 47/35/17	0.0298	20.000000	0.0293
$ - Val_Mole %_Propane	1.0000	5.000000	0.9996
$ - Val_Mole %_i-Butane	0.2980	5.000000	0.2976
$ - Val_Mole %_n-Butane	0.3030	5.000000	0.3027
$ - Val_Mole %_Neopentane	0.1030	5.000000	0.1023
$ - Val_Mole %_i-Pentane	0.0990	5.000000	0.0991
$ - Val_Mole %_n-Pentane	0.0990	5.000000	0.0989
$ - Val_Mole %_Nitrogen	2.4900	5.000000	2.4881
$ - Val_Mole %_Methane	89.5882	5.000000	89.5143
$ - Val_Mole %_Carbon Dioxide	1.0000	5.000000	0.9996
$ - Val_Mole %_Ethane	4.9900	5.000000	4.9881

'*' Value is not within validation limits

ACTIVE ALARMS

Alarm Name	Alarm State

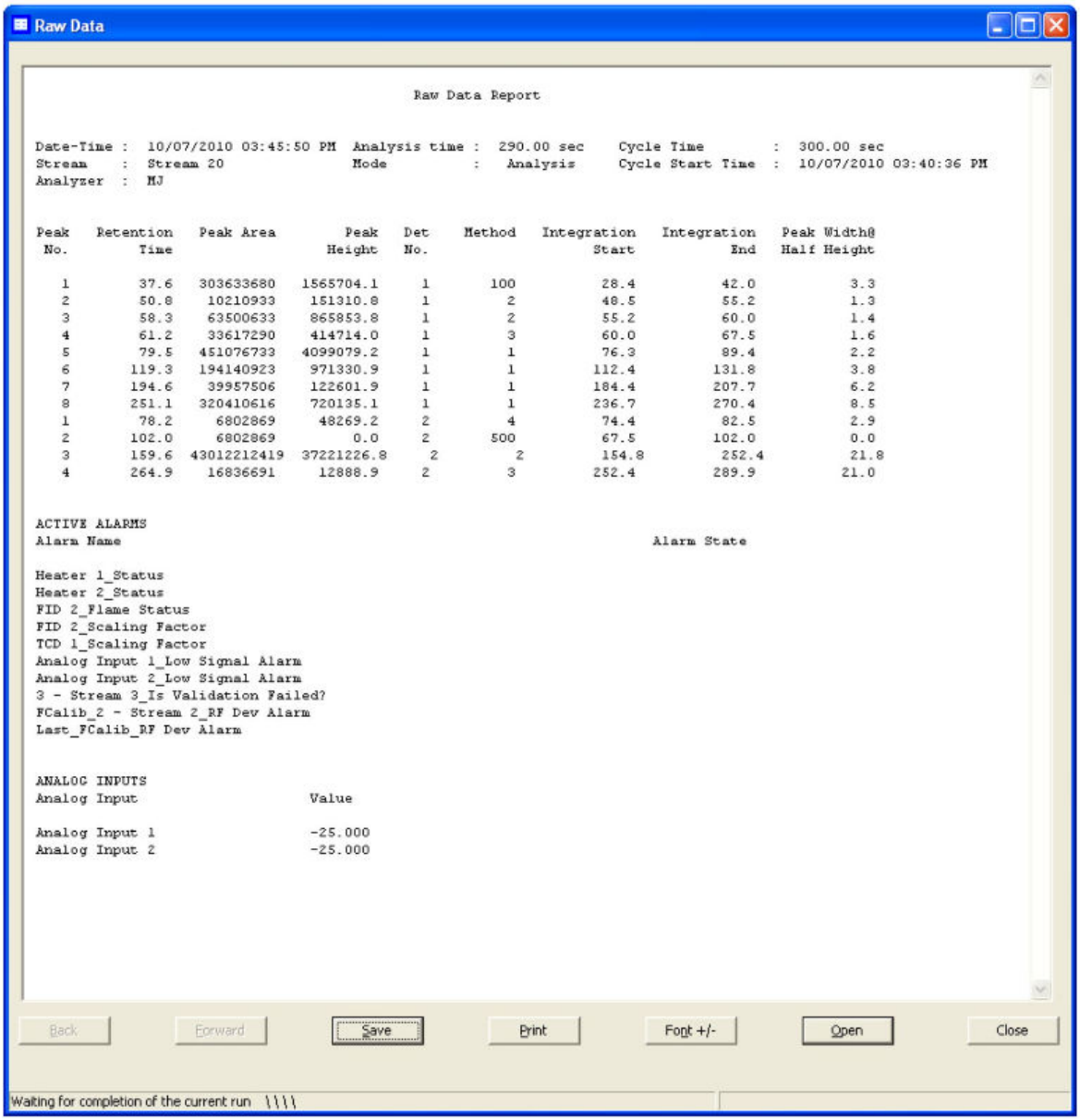
ANALOG INPUTS

Analog Input	Value
Analog Input 1	0.000

USER CALCULATIONS

Calculation Name	Calculation Result
see pwm	40.9920

Figure 5-7: Raw Data sample report



5.6.2 View reports from live data

To view a report created from the most recent data, do the following:

1. Select **Report Displays...** from the **Log/Reports** menu.

   The *Report Display* window appears.

Note

By default, the *Update automatically* checkbox is selected. This means that when viewing a report based on the most recent data, the report will refresh as new data is created, based on the type of report that you select. For example, in the *Report Display* window, if you select Analysis (GPA), the report display will refresh each time the GC finishes an analysis of the selected stream. The refresh function displays the newly generated report and deletes the previous report (unless already saved to disk).

2. Select the type of report to generate and display.

   For explanations of each report type, see *Section 5.6.1*.

3. Select the appropriate stream.
4. Click **Start (F2)**.

   The report is generated and displayed.

Note

If the report doesn't appear right away, check the status of the report generation process in the status bar, which is below the row of buttons on the report window.

Note

To change the font size, click **Font +/-**. There are five preset font sizes available. Continue to click **Font +/-** to cycle through the sizes until you are satisfied with the report's readability.

5. To save the file, click **Save**.

   The report can be saved in the following file formats: TXT, HTM, HTML, and MHT.

5.6.3 View a saved report

To view a saved report, do the following:

1. Select **Report Displays...** from the **Log/Reports** menu.

   The *Report Display* window appears.

2. Click **File Viewer (F3)**.

   The *Report file viewer* window displays.

3. Click **Open**.

   The *Open* dialog displays.

4. Locate and select the report that you want to view.

   Reports may be found in the following file formats: TXT, RPT, HTM, HTML, and MHT.

5. Click **Open**.

   The report displays.

Note

To change the font size, click **Font +/-**. There are five preset font sizes available. Continue to click **Font +/-** to cycle through the sizes until you are satisfied with the report's readability.

Note

To print the report, click **Print**.

5.7 Generate reports from archived data

Use the Archive Report commands to generate analysis, calibration, and average reports from archived GC runs.

5.7.1 Generate analysis and calibration reports from archived data

To generate and view an analysis or calibration report from archived data, do the following:

1. Select **Logs/Reports** → **Archive Report** → **Analysis/Calibration/Validation...**.

   The *Analysis/Calibration/Validation Archive Report* window displays.

2. Select a report type from the *Report* drop-down list.

   For an explanation of each report type, see *Section 5.6.1*.

3. Select a stream from the *Stream* drop-down list.

   By default, the *Archive Records* table displays all records for the selected report type and stream.

   Note

   To date-filter the list of records, select the *Time Period* checkbox and use the *Start Date* and *End Date* drop-down boxes to select a date range.

4. Select the record(s) that you want to view.

   To select several records, hold down **CTRL** and select each record. To select several records in a row, select the first record and then hold down **SHIFT** and select the last record in the series.

5. Click **Start (F2)**.

   The report displays. If more than one record was selected, each report displays after that previous report on the same page.

   Note

   To change the font size, click **Font +/-**. There are five preset font sizes available. Continue to click **Font +/-** to cycle through the sizes until you are satisfied with the report's readability.

Note
To print the report, click **Print**.

6. To save the file, click **Save**.

   The report can be saved in the following file formats: TXT, HTM, HTML, and MHT.

5.7.2 Generate an Average report from archived data

To generate and view an average report from archived data, do the following:

1. Select **Logs/Reports** → **Archive Report** → **Average...**.

   The *Average Archive Report* window displays.

2. Select a report type from the *Report* drop-down list.

   For an explanation of each report type, see *Section 5.6.1*.

3. Select a stream from the *Stream* drop-down list.

   By default, the *List of Averages* table displays all records for the selected report type and stream.

Note
To date-filter the list of records, select the *Time Period* checkbox and use the *Start Date* and *End Date* drop-down boxes to select a date range.

4. Select the record(s) that you want to view.

   To select several records, hold down **CTRL** and select each record. To select several records in a row, select the first record and then hold down **SHIFT** and select the last record in the series.

5. 6. Click **Start (F2)**.

   The report displays. If more than one record was selected, each report displays after that previous report on the same page.

Note
To change the font size, click **Font+/-**. There are five preset font sizes available. Continue to click **Font +/-** to cycle through the sizes until you are satisfied with the report's readability.

Note
To print the report, click **Print**.

6. To save the file, click **Save**.

   The report can be saved in the following file formats: TXT, HTM, HTML, and MHT.

5.7.3 Schedule the generation of reports

MON2020 can automatically generate and print each report according to the following schedule:

Analysis (GPA)	An analysis report will print after an analysis run is completed.

Note
If **ISO** is set in the *Calculations Configuration* screen, Analysis (ISO) will be listed under the *Report Name* column instead of Analysis (GPA); if **GPA & ISO** is set in the *Calculations Configuration* screen, the both Analysis (ISO) and Analysis (GPA) will be listed under the *Report Name* column.

Calibration	A calibration report will print after a calibration run is completed.
Final Calibration	A final calibration report will print after a final calibration run is completed.
Validation	A validation report will print after a validation run is completed.
Final Validation	A final validation report will print after a final validation run is completed.
Every Run	A report will be generated each time an Every Run average calculation is run.
Hourly	A report will be generated each time an Hourly average calculation is run.
24 Hour	A report will be generated each time a 24 Hour average calculation is run.
Weekly	A report will be generated each time a Weekly average calculation is run.
Monthly	A report will be generated each time a Monthly average calculation is run.
Variable	A report will be generated each time a Variable average calculation is run.
Raw Data	Each time raw data is generated, a report will be printed.

To configure MON2020 to generate and print a report of your choosing based on that report's schedule of availability, do the following:

1. Select **Printer Control...** from the **Logs/Reports** menu.

   The *Printer Control* window displays.

   Note
   MON2020 must be connected to the GC for the report to be printed.

2. To print a report after a run, check the appropriate checkbox from the *Print After Completion?* column.
3. To print a report at a fixed interval, check the appropriate checkbox from the *Print At Fixed Interval?* column.

a. Enter a start time in the *Start Time* column.

b. Enter an interval, in hours, in the *Interval* column.

4. Use the columns numbered 1 through 20 to select the streams that you want to use for data collection.

5. Click **OK** to save the changes and close the window.

Note

To save the changes without closing the window, click **Save**.

5.8 Trend data

This function allows you to view, print, or save graphical representations, or trend lines, of accumulated analysis data from the GC.

5.8.1 View live trend data

Note

You cannot view a live trend if the corresponding analysis record does not exist in the GC's memory.

To view live trend data, do the following:

1. Select **Trend Data...** from the **Logs/Reports** menu.

   The *Trend Data* window displays.

2. Click **Trend**.

   The *Select records for Trending* window displays.

3. Select the analysis or calibration records that you want to trend from the *Select Analysis/Calibration Records* selection menu. Click **>** to move your selection to the **Selected Records** queue.

4. If applicable, select the type of average record that you want to trend from the **Select Average Records** section. Click **>** to move your selection to the **Selected Records** queue.

Note

To remove a selection from the **Selected Records** queue, click **Remove**. To remove all selections from the **Selected Records** queue, click **Remove All**.

5. Click the *All Records* checkbox from the **Trend Record Selection** section to use all data for the trend report, or click the *Time Period* checkbox and select a *Start Date* and *End Date* for the data to be used.

6. Click **Trend**.

MON2020 reads the data from the GC and then closes the *Select records for Trending* window and plots the trend data on the graph section of the *Trend Data* window.

Each trend record is color-coded; use the *Trend* pull-down menu to select a specific trend record.

5.8.2 View saved trend data

Trend data files are saved with the XTRD file extension. To view a saved trend file, do the following:

1. Select **Trend Data...** from the **Logs/Reports** menu.

   The *Trend Data* window displays.

2. Click **PC File**.

   The *Open Trend File* window displays.

3. Select the file that you want to view and click **Open**.

   The trend graph displays.

5.9 Trend Graph options

Right-clicking with the mouse on the graph brings up the following commands and keyboard shortcuts:

Zoom In
Numpad Shortcut: "**+**"
Zooms in on the entire graph.

Note
Another way to zoom in is by clicking and dragging your mouse to select the region of the graph that you want to zoom in on.

Zoom Out
Numpad Shortcut: "**-**"
Zooms out from the entire graph.

Zoom X In
Numpad Shortcut: "**6**"
Zooms in on the X axis.

Zoom X Out
Numpad Shortcut: "**4**"
Zooms out from the X axis.

Zoom Y In
Numpad Shortcut: "**8**"
Zooms in on the Y axis.

Zoom Y Out
Numpad Shortcut: "**2**"
Zooms out from the Y axis.

Note

When the **Selected Data** checkbox is selected, the small table to the right of the graph displays the trend data for the visible area of the graph when zooming in and out.

Save State

Shortcut: **CTRL** + **HOME**

Saves current or archived display settings for the selected trend graph.

Note

The **Save State** function is available only when viewing a live or archived trend graph.

Restore State

Shortcut: **HOME**

Restores the last saved display settings for the selected trend graph.

Note

Pressing **HOME** returns the user to the saved state.

Toggle Full Screen

Shortcut: **F11**

Maximizes the display of the graph in the Trend Data window.

Cursor to Nearest Point

Shortcut: **F8**

Snaps the cursor to the nearest point on the trend graph in both the X and Y directions.

Toggle Coarse/ Fine Cursor

Shortcut: **F4**

Toggles the cursor from coarse and less accurate to fine and more accurate.

Toggle Lines/Dots Displays

Shortcut: **F9**

Toggles the trend graph from lines to dots, or dots to lines.

Toggle Mouse Position Tip

Shortcut: **CTRL** + **F4**

The graph's cursor follows the movement of the mouse while a hovering Tooltip displays the exact coordinates of the current point.

Toggle Nearest Position Tip

Shortcut: **CTRL** + **F9**

The graph's cursor follows the movement of the mouse cursor.

Print

Shortcut: **CTRL** + **P**

Prints the trend graph.

Copy to clipboard

Shortcut: **CTRL** + **C**

Copies from the graph the raw detector data that was used to plot the selected trend graph. This data can be pasted into another application such as Microsoft Word® or Microsoft Excel®.

Paste from clipboard

Shortcut: **CTRL** + **V**

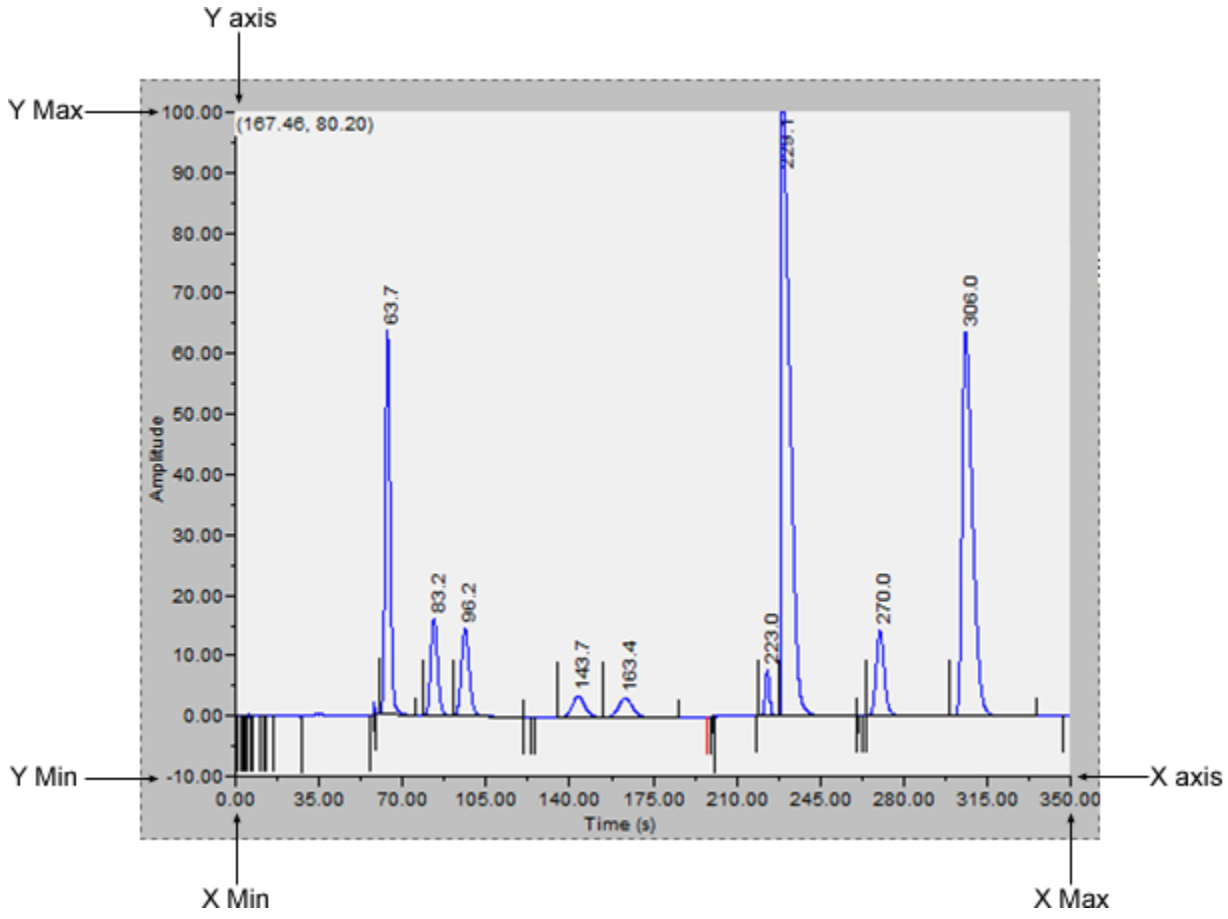
Plots a range of points copied from another application such as Microsoft Word® or Microsoft Excel®.

5.10 Properties of the trend graph

5.10.1 The trend graph bar

Use the graph bar buttons to change the display parameters of the graph.

Figure 5-8: The graph



Click **Edit** to view or change the display properties of the X and Y axes. The *Edit Graph* window displays.

The following list defines the parameters that can be edited:

Point Sets the X-axis values to points. For the purposes of this graph, each sample run is considered a data point. Therefore, if 2500 sample runs were used to generate the trend graph, then there are 2500 data points.

- **X Min** - Sets the minimum value for the X axis to the point number of the first sample you want to use in the plot. Default value is **0**.

- **X Max** - Sets the maximum value for the X axis to the point number of the last sample you want to use in the plot. Default value is *N* - 1, where *N* is the total number of points in the graph. Therefore, if there are 2500 points, then the X Max would be 2499.

Note

The X-axis value for the first sample, or point, in the trend graph is **0**, not 1. The X-axis value for the final point in the trend graph is N - 1, where N is the total number of points in the graph.

Date Time

Sets the X-axis values to the particular GC dates and times of each sample runs.

- **From** - Sets the minimum value for the X axis to the date of the first sample you want to use in the plot.
- **To** - Sets the maximum value for the X axis to the date of the last sample you want to use in the plot.
- **Date Format** - Options are MM-DD-YYYY or DD-MM-YYYY.

The primary Y axis, which is on the left side of the graph, is the default axis for displaying trend graphs. The secondary Y axis, which is on the right side of the graph, can be used to display a second graph whose minimum and maximum values are different than the minimum and maximum values of the first graph.

Note

If three or more graphs are displayed, only the second graph will be plotted using the secondary Y axis; all other graphs will be plotted with the primary Y axis.

Y axis Display Format

- Percent - Sets the Y-axis values to a percentage of the **Y Max** value.
- Value - Sets the Y-axis values to the sample run values.

The default value is **0**.

Y Min

Sets the minimum value for the Y axis.

Y Max

Sets the maximum value for the Y axis.

Y Intervals

Sets the number of intervals to be displayed on the graph for the Y axis.

Print Speed

Sets the number of inches per second for the x-axis while printing a chromatogram, similar to an XY plotter.

X Intervals

Sets the number of intervals to be displayed on the graph for the X axis.

The default value is **10**.

Display Option

Determines whether the chromatograph is displayed as a solid line or as a dotted line.

The default value is **Lines**.

Show labels

Determines whether each axis is labeled.

The default value is **Checked**.

Scroll newest X Determined whether the graph's window moves to focus on the most recent data point along the X-axis.
The default value is **Checked**.

To accept your changes, click **OK**.

Click **Cursor** to toggle the cursor size from coarse movement (less accurate) to fine movement (more accurate).

Click **Print** to print the graph window.

5.11 The Trend bar

The Trend bar contains a row of buttons that allows you to manipulate a single trend trace. Below the row of buttons is the trace pull-down menu, which contains a list of all of the currently displayed traces that make up the trend graph. Before you can work with a trend trace you must first select it from the pull-down menu.

5.11.1 Edit a trend graph

You can use the **Edit** window to change the X and Y offset values for a graph, change its color, and also set which Y axis should be used when plotting it. These changes may be necessary to make the trend more distinguishable from those that surround it, or to position a graph in relation to a different graph for comparison.

To edit a trend trace, do the following:

1. From the Trend pull-down menu, select the graph that you want to edit.
2. Click **Edit**.

   The *Edit Trend* dialog displays.

   X Offset Enter a positive number to move the trend to the right, or a negative number to move the trend to the left.

   Y Offset Enter a positive number to move the trend up, or a negative number to move the trend down.

   Color Assigns a color to the trend.

   Add Trace to Sets which Y axis should be used when plotting the graph. See *Section 5.10.1* for more information.

3. Click **OK** to accept your changes.

5.11.2 Enter a description for a trend graph

To add or change description text for a trend graph, do the following:

1. From the **Trend** bar, click **Desc**.

   The *Edit Description* window displays.

2. Type or edit a description and then close the window.

5.11.3 Save a trend

To save a trend, do the following:

1. From the *Trend* pull-down menu, select the trace that you want to save.
2. Click **Save**.

   The *Save Trend File* window displays.

   Note
   To save all currently displayed trend traces into one file, click **Save All**.

   Note
   For convenience the file is given an auto-generated file name that includes the current date and time; however, you can give the file any name that you choose.

3. Click **Save**.

5.11.4 View associated trend data

For each data point in a trend graph, it may be possible to view the associated report or chromatograph.

Note
The associate report will most likely exist, but the existence of the associated chromatogram depends on the age of the trend. If the trend is more than a few days old it is likely that its associated chromatogram has been deleted to make space for newer chromatograms.

1. Move the cursor to the desired trend point on the graph.
2. To view the associate report, click Archive Report.

   If the report exists, it will be displayed. If the report does not exist, the Archive records information is not available!! error message displays.

3. To view the associate chromatogram, click Archive Chromatogram.

   If the chromatogram exists, it will be displayed. If the it does not exist, the Archive chromatogram information is not available!! error message displays.

5.11.5 Remove a trend graph from view

To remove a trend graph from the graph display, do the following:

1. From the *Trend* pull-down menu, select the graph that you want to remove.
2. Click **Remove**.

5.11.6 Refresh a trend graph

1. From the *Trend* pull-down menu, select the trace that you want to refresh.
2. Click Refresh.

   The trend graph will be updated with any new data that was compiled since the most recent refresh.

5.11.7 Display trend data

The data used to plot the trend graphs displays in the table to the right of the graph display area.

The trend data table contains the following columns:

TRD Indicates the identification number of the trend graph. Useful if more than one trend is being displayed. The first trend that is displayed is #1, and so on.

Pt # For the purposes of trend graphs, each sample run is considered a data point. Therefore, if 2500 sample runs were used to generate the trend graph, then there are 2500 data points.

Note

The first sample, or point, is counted as 0, not 1. The final point is counted as *N* - 1, where *N* is the total number of points in the graph.

Value The data point's value.

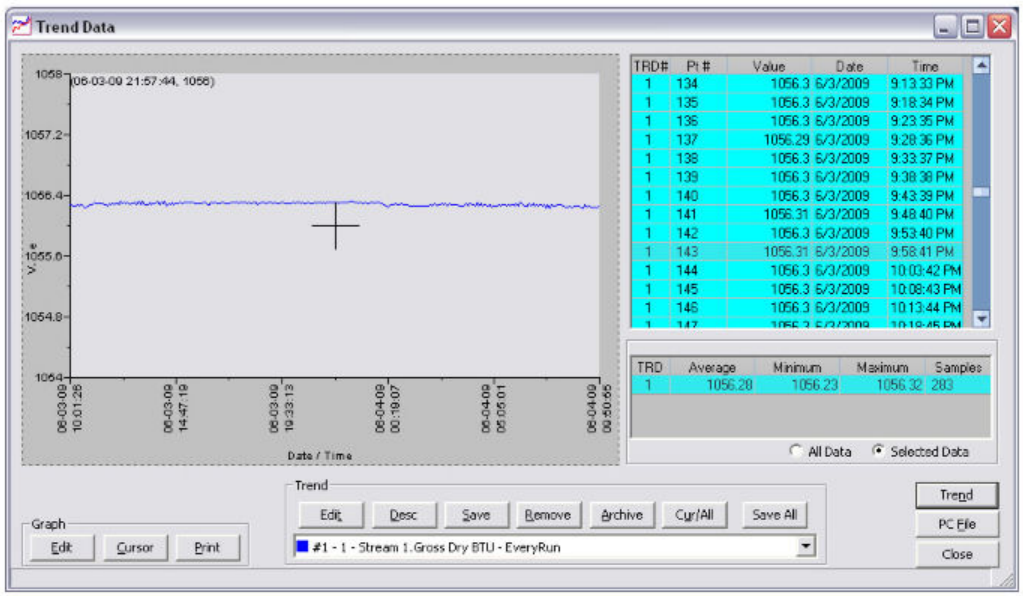
Data The GC's date when the sample was run and the value was calculated.

Time The GC's time when the sample was run and the value was calculated.

To view all trend data, click **Cur/All**. To view trend data for the trend graph selected from the Trend drop-down list, click **Cur/All** again.

The second trend data table is useful when zooming in to or out of the graph. When the *Selected Data* checkbox is selected, this table displays the trend data for the visible area of the graph. As the example shows, the table indicates that the trend data for five samples are visible after zooming in to the graph.

Figure 5-9: The Trend Data window



The table contains the following columns:

TRD	Indicates the identification number of the trend graph. Useful if more than one trend is being displayed. The first trend that is displayed is #1, and so on.
Average	Indicates the average data point value of the selected samples.
Minimum	The lowest data point value of the selected samples.
Maximum	The highest data point value of the selected samples.
Samples	The number of samples that were selected and that are displayed in the graph window.

5.12 Generate a repeatability certificate

- The report will be generated as a PDF so if your computer does not have the Adobe Reader installed, MON2020 will prompt you to install it.
- A Read-only user can generate a Repeatability Certificate Report but can't modify any of the fields that are used to generate the report. A Regular user or higher can generate a Repeatability Certificate Report and can modify the fields that are used to generate the report.

1. Select Repeatability Certificate from the Log/Reports menu.

   The Repeatability Certificate window opens.

2. Click Insert After.

   A row will be added to the Select Variables table.

3. Select a variable from the Variable column.

   You can select an unlimited number of variables.

Name	Description
Plot	If selected, a graph will be added to the report.
Description	The name that will be used to denote the selected variable on the report.
Limit	The maximum allowed variation of the selected variable. If the variation of the selected variable is greater than the Limit, the variable will fail the repeatability test.
Units	Unit of measure for the associated Limit value.
Calculation Method	Determines how the Limit will be treated when calculating the data. Absolute: The Limit will be subtracted from the average value to determine the minimum value and the Limit will be added to the average value to determine the maximum value. % of Avg: The Limit will be divide by 100 to create a percentage value that will be applied to the average value to calculate the minimum and maximum values.

Note

To copy a variable and increment the stream by one, select the variable and press S + Copy. For example, if you select Stream 1_Mole%_Propane and press S + Copy, Stream 2_Mole%_Propane will be added to the table.

Note

To copy a variable and increment the component by one, based on the list of components in the component data table, select the variable and press C + Copy. For example, if you select Stream 1_Mole%_Propane and press C + Copy, Stream 1_Mole%_ iButane will be added to the table.

4. To include all data in the report, select the All Records check box; to include a limited set of data in the report, select the Time Period check box and then select a Start Date and an End Date.
5. Use the Test Information fields to track data related to the generation of the certificate.

   This information will be displayed on the report beneath a Test Notes heading.

6. Click Create Report (F2).

The data in the Select Variables table will be saved and the certificate will be generated and displayed in Acrobat Reader. A table of repeatability values will be displayed first and then each variable that you selected to be plotted will have its own graph.

Name	Description
Repeat. Limit	This value will be taken from the Limit value that you entered on the Repeatability Certificate window.
Average Value	The average of all the data collected during the test.
Min Value	Based on the Average Value and the Limit, this is the lowest valid value that can be generated. If a value lower than this is generated, the result of the repeatability test for this variable is FAIL.
Max Value	Based on the Average Value and the Limit, this is the highest valid value that can be generated. If a value higher than this is generated, the result of the repeatability test for this variable is FAIL.
Tested Repeat (+/-)	
Std. Dev.	
PASS/FAIL	The result of the repeatability test for this variable.

Note

To save the data in the Select Variables table without generating the report, click OK. The next time you open the Repeatability Certificate window, the table will be populated with the saved data.

5.13 Generate a GC Configuration report

A GC Configuration report displays the current settings for the GC. This section explains how to produce a GC Configuration report and provides an example for reference.

To generate a GC Configuration report, do the following:

1. Select **GC Config Report...** from the **Logs/Reports** menu.

   The *GC Config Report* window displays.

2. Select the checkbox for each option that you want to include in the report.

Note

To select all the options, click **Select All (F2)**. To clear all options, click **Clear All (F3)**.

3. Select the type of output you want for the report.

Note

When choosing a Printer option, if you want to use a printer different from the one that you usually use, deselect the *Use default printer* checkbox and when the report is ready, the printer configuration window will display.

Note

When choosing the File option, the *Save* window will display, allowing you to name the text file and choose a location in which to save it.

4. Click **Start (F4)**.

MON2020 will generate the customized report and print or save it, according to the output option you selected.

Note

A GC Configuration report that includes all options can take several minutes to generate and save. If you press **Esc**, MON2020 will stop generating the report after the current option is completed.

Example: First page from a sample GC Configuration report

```
System Report from Model  Austin                [SAMPLE]
03/12/2009 12:51:58 PM

Description                 Value

Stream Sequence             1,2,3
Analyzer Name               Austin
GC Model                    GC700XA
System Description
Firmware Version
GC Serial Number
Company Name
GC Location
Number of Valves            3
Number of Serial Ports      3
Daylight Saving Time
CGM Analog O/P Cfg.         0
Baseline Offset
Archive Days                0
**************************************

Component Data Table Report from Model  Austin
03/12/2009 12:51:59 PM

Component Data Table #1

Component                 U/S  Det #      Retention        Response    Calibration Con
                                          Time (sec)         Factor

C6+ 47/35/17          Standard    1           38.00          891250          0.0000%
PROPANE               Standard    1           50.16    4.655095e+07          0.9995%
i-BUTANE              Standard    1           63.12    5.513906e+07          0.3000%
n-BUTANE              Standard    1           70.88    5.610726e+07          0.3000%
NEOPENTANE            Standard    1            0.00               0          0.0000%
i-PENTANE             Standard    1          101.92    6.363212e+07          0.1000%
n-PENTANE             Standard    1          113.84    6.487665e+07          0.1000%
NITROGEN              Standard    1          141.68    3.865339e+07          2.4990%
METHANE               Standard    1          145.80    2.679253e+07         89.5920%
CARBON DIOXIDE        Standard    1          178.68    3.795704e+07          0.9997%
ETHANE                Standard    1          206.20    4.166654e+07          5.0000%
n-NONANE              Standard    2           34.80    9.057038e+08          0.0100%
n-HEXANE              Standard    2          105.00    5.647477e+08          0.0598%
n-HEPTANE             Standard    2          148.08      7.3743e+08          0.0200%
n-OCTANE              Standard    2          255.96    7.554687e+08          0.0201%


Component              Analysis   RT Dev.   RT Dev.   Update   Gross BTU   Net Dry BTU
                         Method     (sec)       (%)   Method

C6+ 47/35/17              Fixed         3      0.00      Cal   5288.7002     4900.6001
PROPANE                    Area         3      5.00      Cal   2522.0000     2320.3999
i-BUTANE                   Area         3      5.00      Cal   3259.5000     3006.8999
```

5.14 Delete archived data from the gas chromatograph

To delete archived data and reset the GC memory, do the following:

1. Select **Reset Archive Data...** from the **Logs/Reports** menu.

The *Reset Archive Data* window displays.

2. Select the types of data that you want to delete.

Note
To select all the options, click **Select All**. To clear all options, click **Deselect All**.

3. Click **Reset**.

MON2020 displays a confirmation dialog.

4. Click **Yes**.

MON2020 clears the GC's memory. New archived records will begin accumulating again as analysis and calibration runs occur.

5.15 The molecular weight vs. response factor graph

The *Molecular Weight Vs. Response Factor* window generates a graph according to Appendix B in *GPA 2198-03 Selection, Preparation, Validation, Care and Storage of Natural Gas and Natural Gas Liquids Reference Standard Blends*. This graph can be useful in checking valve function, and consists of the following information:

- Log (Molecular Weight) vs. Log (Response Factor)plots the values for the selected calibration.
- A trend line (best fit straight line);

Note
The ideal trend line would be linear.

- R-squared correlation coefficient.

Note
The closer RSq is to 1, the better.

This graph is only available for calibration streams, which can be selected from the *Stream* drop-down list. By default, the newest final calibration data is used to generate the graph, but any archived final calibration file can be used by selecting it from the *Final Calibration Record* drop-down list.

To print the graph, click **Print**.

6 Analysis

The options in the Control pull-down menu allow you to manage analysis runs as well as calibration, validation and baseline runs. Control menu commands also allow you to stop an analysis run immediately or at the end of the run.

6.1 Auto sequencing

This is the normal mode for an online GC. Use this function to start continuous GC analysis runs that follow a predefined stream sequence. See *Section 4.10* for detailed instructions on configuring the predefined sequence.

Note
If an analysis run is in progress, it must be stopped before auto sequencing can be started. See *Section 6.8* for more information.

Note
If auto calibration or auto validation is enabled then they will be performed as part of the auto sequence.

To initiate auto-sequencing, do the following:

1. There are three ways of initiating auto sequencing:
   a. Select **Auto Sequence...** from the **Control** menu.
   b. Press **F2**.
   c. Click  on the Toolbar.

   The *Start Auto Sequence* dialog displays.
2. Decide whether to enable purging, then select or unselect the *Purge stream for 60 seconds* check box as necessary.

   Purging allows sample gas to flow through the sample loop for 60 seconds prior to beginning the first analysis. The checkbox is selected by default.
3. Click **OK** and auto sequencing starts.

   Use the *Mode* column on the **GC Status Bar** to monitor the status of the analysis run.

6.2 Analyze a single stream

If an analysis run is in progress, it must be stopped before single stream analysis can be started. See *Section 6.8* for more information.

Note
If auto calibration or auto validation is enabled then they will be performed as part of the auto sequence.

To start an analysis run on a single calibration or sample stream, do the following:

1. Select **Single Stream...** from the **Control** menu.

   The *Start Single Stream Analysis* dialog displays.

2. Select a stream from the **Stream** menu.
3. Decide whether to enable purging, then select or unselect the *Purge stream for 60 seconds* check box as necessary.

   Purging allows sample gas to flow through the sample loop for 60 seconds prior to beginning the first analysis. The checkbox is selected by default.
4. Check the *Continuous operation* check box to set or disable repetitive analysis. The checkbox is selected by default.
5. Click **OK**.

   The analysis starts. Use the *Mode* column on the **GC Status Bar** to monitor the status of the analysis run.

6.3 Calibrate the gas chromatograph

Calibration runs are determined by the CDT and Streams settings. See *Section 4.2* and *Section 4.10* for detailed instructions on how to edit these settings.

To calibrate a GC, do the following:

1. Select **Calibration...** from the **Control** menu.

   The *Start Calibration* dialog displays.

   Note
   If the GC is in *Auto Sequence* mode, calibration will not start until two or more analysis runs have been completed. This delay is required to complete the current analysis and the analysis of the stream currently purging through the valve.

2. Select a stream from the **Stream** menu.
3. Decide whether to enable purging, then select or unselect the *Purge stream for 60 seconds* check box as necessary.

   Purging allows sample gas to flow through the sample loop for 60 seconds prior to beginning the first analysis. The checkbox is selected by default.
4. Select the desired calibration type.

- Select **Normal** to perform a manual calibration in which the component data table for the selected stream(s) will be updated with calibration data *unless* the data is outside the acceptable deviations, as listed on the component data table. For more information, see *Section 4.2*.
- Select **Forced** to perform a manual calibration in which the component data table for the selected stream(s) will be updated with calibration data *even if* that data is outside the acceptable deviations, as listed on the component data table. For more information, see *Section 4.2*.

Note

A forced calibration will update the component data table's response factors even if there are no issues with the analysis; therefore, **manually check the results of the calibration before returning the unit to service**.

5. Click **OK**.

   The calibration starts. Use the *Mode* column on the **GC Status Bar** to monitor the status of the operation.

6.4 Validate the gas chromatograph

During a validation run, the GC performs a test analysis to verify that it is working properly. The test analysis is performed on a gas whose component concentrations are already known; if the GC's results deviate significantly from the predetermined data, an alarm is generated. Validation runs are determined by the validation data table and streams settings. See *Section 4.4* and *Section 4.10* for detailed instructions on how to edit these settings.

To validate the GC, do the following:

1. Select **Validation...** from the **Control** menu.

   The *Start Validation* window displays.

Note

If the GC is in *Auto Sequence* mode, validation will not start until two or more analysis runs have been completed. This delay is required to complete the current analysis and the analysis of the stream currently purging through the valve.

2. Decide whether to enable purging, then select or unselect the *Purge stream for 60 seconds* check box as necessary.

   Purging allows sample gas to flow through the sample loop for 60 seconds prior to beginning the first analysis. The checkbox is selected by default.

3. Click **OK**.

   The validation starts. Use the *Mode* column on the **GC Status Bar** to monitor the status of the operation.

6.5 Configure the valve timing

The function of valve timing is to switch the analytical flow path after all the peak of a “lighter” component has left a column, but before the next component comes out. The first image below shows the valve timing occurring in-between the C6+ and n-Pentane peaks correctly on a standard 4-minute C6+ application. The second image shows what happens when the valve timing is too early, and cuts off some of the first peak. The third image shows what happens when the valve timing is too late and cuts of some of the second peak. In the last two examples, not all of the component will reach the detector at the expected time, and therefore will not be measured correctly.

Figure 6-1: The effect of valve timing on component leaks.

Historically, a technician will monitor the peak areas of the two affected peaks while making changes to the valve timing, and determine the correct timing using personal judgement. The intention of the auto valve timing (AVT) process is to automatically make the adjustments and monitor the peak areas to determine the correct valve timing automatically, reducing the load on the technician to just selecting when to initiate the AVT process.

The AVT is a process that runs on the calibration gas stream. The process consists of the following activities:

- Correctly identify all the component peaks.
- Adjust the timed events based on peak retention times.
- Automatically adjust the valve time.
- Run a calibration cycle after the adjustments have been made.
- Check the range and order of response factors.

1. Select Auto Valve Timing on the Control menu.

   The Start Auto Valve Timing window opens.

2. If you are installing a new module, select the Use module default check box; otherwise, select the Use Current check box.
3. Click OK.

   The AVT process will run. When it completes, it will generate and display an Auto Valve Timing report.

Figure 6-2: Auto Valve Timing sample report

6.6 Auto valve timing alarms

Alarm Name	Description	Example
Excessive AVT Adjustment	If the valve timing adjustment exceeds the limit set in the configuration dialog this alarm will be triggered and the retention times and timed events will be set back to their pre-adjustment settings. The valve number(s) that did not find an ideal time will be reported with the alarm.	Exc AVT Adj: 2,3
AVT Timed Event Adjustment	If an adjustment of a timed event by the AVT process results in a timed event being within 0.5 seconds of another timed event, this alarm will be triggered and the retention times and timed events will be set back to their pre-adjustment values. The timed event and the time of the event will be reported with the alarm.	AVT Timed Evnt Adj: 32sec
AVT Missing Peak	If all of the component peaks can not be found during any of the calibration gas analysis runs, this alarm will be triggered and the retention times and timed events will be set back to their pre-adjustment values. The peak that could not be identified will be reported with the alarm.	AVT Missing Peak: Nitrogen

6.7 Halt an analysis

To stop the current analysis at the end of its cycle, do the following:

1. There are three ways to halt an analysis run:

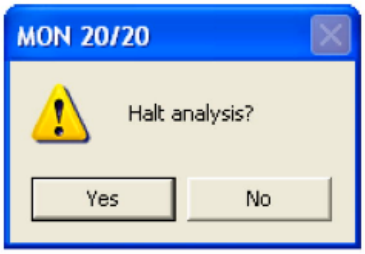
a. Select **Halt...** from the **Control** menu.

b. Press **F3**.

c. Click  on the Toolbar.

A confirmation message displays.

Figure 6-3: Confirmation message



2. Click **Yes**.

The analysis will stop at the end of the current cycle. Use the *Mode* column on the **GC Status Bar** to monitor the status of the operation. When the analysis has halted, the *Mode* value will be “Idle”.

6.8 Stop an analysis

This function forces the system into Idle mode. If Stop Now is performed while an analysis is in progress, the components may continue to elute from the columns during. No analysis data will be generated.

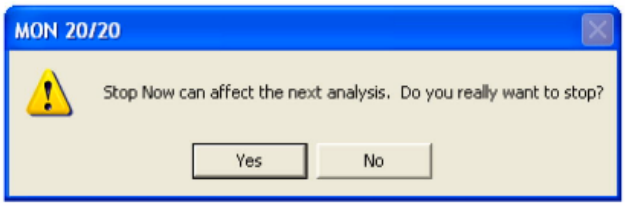
Do not perform a Stop Now unless absolutely necessary. Whenever possible, use the Halt function.

To *immediately* stop an analysis run, do the following:

1. Select **Stop Now...** from the **Control** menu.

A confirmation message displays.

Figure 6-4: Confirmation message



2. Click **Yes** and the current analysis stops.

7 Tools

The options in the Tools pull-down menu allow you to do the following:

- Use the Modbus Test program to confirm that data is being accurately relayed from the gas chromatograph to the PC.
- Manage users.
- Adjust the sensitivity of the LOI keys.
- Install upgrades to the GC.

7.1 The Modbus Test program

Use the Modbus program to poll the GC's Modbus registers (or registers from another device) to confirm that data is accurately relayed from the gas chromatograph to the PC. Then, as necessary, assign data types to the returned data. See *Section 7.1.9* for more information. You can save all settings to a file for future reference.

You can use this program to facilitate software debugging or for special installations. With this program, you can troubleshoot any device that employs registers including the GC, an ultrasonic meter, or a flow computer.

Traditionally, Modbus registers are polled by using a data collection system. To facilitate installation and debugging, the Modbus program emulates a Modbus master.

⚠ CAUTION!

Only one Modbus master should be connected to a single serial link at a time.

This section provides detailed instructions for using the Modbus program. Use this program only if you are familiar with Modbus communication protocol and the operation of MON2020.

7.1.1 Modbus protocol comparison

The GC and the Modbus test program can accommodate two different Modbus protocols: **SIM_2251** and **User_Modbus**. Some settings depend on which Modbus protocol is used.

The protocol you need depends, ultimately, on the hardware used for data acquisition from the GC Modbus register contents.

The following comparison should help clarify the differences between the two protocols as well as the utility of each.

Table 7-1: Comparing SIM_2251 and User_Modbus Protocols

SIM_2251	User_Modbus
A modified protocol that allows a floating point number to be assigned to a single register so that it can be transmitted over Modbus via 2251 emulation slave type.	Standard Gould protocol that accommodates PLC Emulation LO-HI or HI-LO word order for 32-bit values. The GC uses the LO-HI order.
Most register contents are predefined. The pre-configured maps conform to the SIM_2251 register designations that are the de facto standard for GC communications in custody transfer applications.	Predefined Boolean (coils) User-defined Numeric (registers)
Data types are predefined for the following register ranges: **1001-2999** discrete, coils **3001-4999** 16-bit integers **5001-6999** 32-bit integers **7001-8999** IEEE 32-bit floats	Data types are user-defined
When using the Modbus test program, set *Register Mode* to “DANIEL” to view register contents.	When using the Modbus test program, set *Register Mode* to “PLC- LH” or “PLC-HL” to view register contents.
It is not necessary to assign scales to registers.	It may be necessary to assign scales to registers, to convert floating point values to whole integer representations.

7.1.2 Set communication parameters

To determine or reset the communications parameters used by the Modbus program, do the following:

1. Select **Modbus Test...** from the **Tools** menu.

   The *Modbus Test Program* window displays. The current port settings display in the window’s title bar.

2. Click **Port Setup**.

   The *Port Setup* window appears.

3. Make the appropriate configuration changes to match the settings for the link you are trying to test. The following table lists the typical setting for each parameter:

Parameter	RTU	ASCII
Port	COM1 or COM2	COM1 or COM2
Baud Rate	9600	9600

Parameter	RTU	ASCII
Data Bits	8	7
Parity	None	Even
Stop Bits	1	1
Flow Control	None	None
Read Timeout	500 ms	500 ms
Try	2	2
Register Mode	Daniel (SIM_2251) or PLC-LH (User_Modbus)	Daniel (SIM_2251) or PLC-LH (User_Modbus)

4. 4. Click **OK**.

7.1.3 Obtain Modbus Data

To read or write register contents to the GC, or any other device, do the following:

Note
To learn the variable names that are assigned to the Modbus registers before retrieving the data, generate a GC Config Report and review the Communication section.

1. In the *Slave Addr* field, type the COM ID of the GC. The Modbus program will accept a slave address value of **1** to **247**.

   To use Broadcast Mode, which directs the Modbus program to poll all known devices, enter **0** in the *Slave Addr* field. Each device interprets this poll attempt as an instruction to read and take action; however, a response message may not be received by the Modbus program.

2. Select the desired read or write option from the *Function* pull down menu.

Function Code	Description	Broadcast
1 (Read Coil)	Reads one or more coil values.	
2 (Read Input Status)	Reads one or more input status values.	
3 (Read Multiple Regs)	Reads one or more register values.	
4 (Read Input Regs)	Reads one or more input register values.	
5 (Set Single Coil)	Set (write) one coil value	✓
6 (Set Single Reg)	Set (write) one register value	✓
15 (Set Multiple Coils)	Set (write) multiple coil values	✓
16 (Set Multiple Regs)	Set (write) multiple register values	✓

3. Type the starting register value in the *Data Addr* field.

Note
When the register mode is set to SIM_2251, the data type is set automatically by the Modbus program, based on the specified data address.

4. In the *Quantity* field, type the number of registers to be retrieved.

   The Modbus test program will accept a quantity value of **1** to **2016**. The requested number of registers cannot exceed the amount contained by the selected message block but you *can* retrieve a partial block. You cannot cross a message block boundary.

   Also, in Standard Modbus mode each register is 16 bits. Therefore, integers (SHORT) consist of 1 register while floats (FLOAT) and long integers (LONG) consist of 2 registers.

   Note
   Boolean registers are not user-defined (for either SIM_2251 or User_Modbus) and primarily contain alarm flags useful for debugging. To view the contents of Boolean registers, select the **1 (Read Coil)** function code.

   Numeric registers for User_Modbus can be user-defined. To view the contents of Numeric registers, select the **3 (Read Regs)** function code.

5. Type the desired repeat count, which is the number of times the Modbus program should read or set the specified registers before ceasing transmission, in the *Repeat* field.

   The Modbus program will accept a repeat value of **1** to **9999**. A value of **–1** produces an infinite polling loop that can be terminated by clicking **Stop**.

7.1.4 Transmit a single data type

To assign a data type to a group of registers you will read or edit, do the following:

Note
To learn the variable names that are assigned to the Modbus registers before retrieving the data, generate a GC Config Report and review the Communication section.

1. In the *Slave Addr* field, type the COM ID of the GC.

   The Modbus test program will accept a slave address value of **1** to **247**.

   To use Broadcast Mode, which directs the Modbus test program to poll all known devices, enter **0** in the *Slave Addr* field. Each device interprets this poll attempt as an instruction to read and take action; however, a response message may not be received by the Modbus test program.

   Note
   Changes are applied to the corresponding register value at each device.

2. Select the desired read or write option from the *Function* pull down menu.

Function Code	Description	Broadcast
1 (Read Coil)	Reads one or more coil values.	
2 (Read Input Status)	Reads one or more input status values.	
3 (Read Multiple Regs)	Reads one or more register values.	
4 (Read Input Regs)	Reads one or more input register values.	
5 (Set Single Coil)	Set (write) one coil value	✓
6 (Set Single Reg)	Set (write) one register value	✓
15 (Set Multiple Coils)	Set (write) multiple coil values	✓
16 (Set Multiple Regs)	Set (write) multiple register values	✓

3. Type the starting register value in the *Data Addr* field.

Note
The data type is set automatically by the Modbus test program, based on the specified data address.

4. In the *Quantity* field, type the number of registers to be retrieved.

   The Modbus test program will accept a quantity value of **1** to **2016**. The requested number of registers cannot exceed the amount contained by the selected message block but you *can* retrieve a partial block. You cannot cross a message block boundary.

   Also, in Standard Modbus mode each register is 16 bits. Therefore, integers (SHORT) consist of 1 register while floats (FLOAT) and long integers (LONG) consist of 2 registers.

Note
Boolean registers are not user-defined (for either SIM_2251 or User_Modbus) and primarily contain alarm flags useful for debugging. To view the contents of Boolean registers, select the **1 (Read Coil)** function code.

Numeric registers for User_Modbus can be user-defined. To view the contents of Numeric registers, select the **3 (Read Regs)** function code.

5. Type the desired repeat count, which is the number of times the Modbus program should read or set the specified registers before ceasing transmission, in the *Repeat* field.

   The Modbus test program will accept a repeat value of **1** to **9999**. A value of **–1** produces an infinite polling loop that can be terminated by clicking **Stop**.

6. Select the *Use* <data type> *to decode registers* check box.
7. Select a data type from the pull-down menu.

The following list displays the default data types for each block of SIM_2251 registers:

1000 – 2999	Boolean
3000 – 4999	Integer
5000 – 6900	Long
7000 – 8999	Float

Note
To ensure the best data type assignments, review a GC Config Report.

8. Click **Transmit** to retrieve the selected registers (i.e., the specified data addresses) from the GC.

   The transmitted/received packet data displays in the *Packet Input-Output* window.

9. Click **Stop** to end the transmission of the data and to return to the **Modbus Function Selection** options.

7.1.5 Transmit data using a template

Templates are best used when decoding mixed data types because the template contains data that the Modbus program can use to determine which data type should be assigned to which register.

To create a new template or to use an existing template, do the following:

Note
To learn the variable names that are assigned to the Modbus registers before retrieving data, generate a GC Config Report and review the Communication section.

1. In the *Slave Addr* field, type the COM ID of the GC.

   The Modbus program will accept a slave address value of **1** to **247**.

   To use Broadcast Mode, which directs the Modbus program to poll all known devices, enter **0** in the *Slave Addr* field. Each device interprets this poll attempt as an instruction to read and take action; however, a response message may not be received by the Modbus program.

Note
Changes are applied to the corresponding register value at each device.

2. Select the desired read or write option from the *Function* pull down menu.

Function Code	Description	Broadcast
1 (Read Coil)	Reads one or more coil values.	
2 (Read Input Status)	Reads one or more input status values.	

Function Code	Description	Broadcast
3 (Read Multiple Regs)	Reads one or more register values.	
4 (Read Input Regs)	Reads one or more input register values.	
5 (Set Single Coil)	set (write) one coil value	✓
6 (Set Single Reg)	set (write) one register value	✓
15 (Set Multiple Coils)	set (write) multiple coil values	✓
16 (Set Multiple Regs)	set (write) multiple register values	✓

3. Type the starting register value in the *Data Addr* field.

Note

The data type is set automatically by the Modbus program, based on the specified data address.

4. In the *Quantity* field, type the number of registers to be retrieved.

   The Modbus program will accept a quantity value of **1** to **2016**. The requested number of registers cannot exceed the amount contained by the selected message block but you *can* retrieve a partial block. You cannot cross a message block boundary.

   Also, in Standard Modbus mode each register is 16 bits. Therefore, integers (SHORT) consist of 1 register while floats (FLOAT) and long integers (LONG) consist of 2 registers.

Note

Boolean registers are not user-defined (for either SIM_2251 or User_Modbus) and primarily contain alarm flags useful for debugging. To view the contents of Boolean registers, select the **1 (Read Coil)** function code.

Numeric registers for User_Modbus can be user-defined. To view the contents of Numeric registers, select the **3 (Read Regs)** function code.

5. Type the desired repeat count, which is the number of times the Modbus program should read or set the specified registers before ceasing transmission, in the *Repeat* field. The Modbus program will accept a repeat value of **1** to **9999**. A value of **–1** produces an infinite polling loop that can be terminated by clicking **Stop**.
6. Depending on your intent, select *Use template to decode registers* or *Use template to decode logs*.

   The *Record No* field becomes active.

7. Enter the desired record number in the *Record No* field.

   To verify which record number should be entered, consult the Modbus specifications for your device.

The following table describes the relationship between templates and record numbers:

Data Type Setting	Other Setting(s)	Result
Register template	• Enter *Data Addr* value. • Enter *Record No.* value. • Enter *Quantity* value.	Read Quantity fields (i.e., the number of fields specified by the Quantity setting) from the specified Record No. of the register (Data Addr).
Log template	Enter *Record No.* value.	Read all fields associated with the Record No.
	• Enter *Data Addr* value. • Enter "0" for the *Record No.* value.	Read all fields in all records for the specified log register (Data Addr).

8. Click **Edit Template**.

   The *Template File* window displays with a new template.

9. To open an existing template file, click **Open**.

   The *Select Template Configuration File* dialog displays.

10. Locate and select the template file, and then click **Open**.

    Template files are saved with the .cfg extension.

11. To edit the template, select a data type for each desired offset.
12. To change all offsets to the same data type, change the first offset to the desired data type, and then click **Auto Reset**.

    The data type for the remainder of the offsets switch to the data type of the first offset.

13. To save the displayed file to disk, click **Save As...**.

    The *Select Template Configuration File* dialog appears. Type in a filename and click **Save**.

14. 14. Click **OK** to apply your selections and return to the main window.

7.1.6 Set the log parameters

The *Log Data* window allows you to log the polled data to a specified file.

Note

The Log Data function is not necessary to transmit Modbus data. To disable this function, clear the *Enable Logging 'Data' Registers and Values* check box on the *Log Data* window.

To set the log parameters for the Modbus program, do the following:

1. Click **Log Data**.

   The *Log Data* window displays.

2. Select the *Enable Logging 'Data' Registers and Values* check box to enable data logging and to activate the **Log Data Parameters** section.
3. Select a **Logging Mode** from the pull-down menu.

   You have the following options:

   - **Continuous** mode records the polled data continuously until the connection is terminated or data logging is disabled by clearing the *Enable Logging 'Data' Registers and Values* check box.
   - **Sampling** mode records the polled data based on the time interval that you set in the *Time Interval between consecutive logs* text box. Time intervals can be set in seconds, minutes, or hours.
4. Select a type of logging.

   You have the following options:

   - **Append** adds this log to the file specified, preserving previously logged data.
   - **Reset** deletes the previously-logged data and saves only this new log.
5. Click **Save As...**.

   The *Save As* window displays. The file can be saved as a tab-delimited text file or a Microsoft Excel file. Type in a filename and click **Save**.

7.1.7 Save Modbus data

To save the data table to a separate file, do the following:

1. Click **Save Data**.

   The *Save 'Data' Displayed As* dialog appears. The file can be saved as a tab-delimited text file, an HTML file or a Microsoft Excel file.

2. Type in a filename and click **Save**.

7.1.8 Print Modbus data

To print Modbus data, click **Print Data**. The standard print dialog displays.

MON2020 prints the report to your previously configured printer. See *Section 1.6* for more information about changing printers.

7.1.9 Assign scale ranges to User_Modbus registers

By assigning scale ranges, floating point data can be converted to integer values. This is an optional task that applies to applications using the User_Modbus protocol.

Use the **Register** command described in *Section 4.11.4* to assign scale ranges.

7.2 Communication errors

The Modbus program's Error Log is maintained in a circular buffer that holds up to 512 entries.

The Modbus program tracks the errors for a given session but does not store them. When you exit the Modbus program, all errors are cleared.

To view any communication errors that occurred during the data transfer, do the following:

1. Click **Error...**.

   The *Error* window appears.

   Note
   Double-click a *Description* cell to "scroll through" the displayed text.

2. To view all errors that have occurred in this session, click **Update**.
3. To delete all entries to date, click **Clear**.

7.3 Users

Utilize the User Administration commands to create or delete users, change passwords, and to monitor PC-to-GC connections.

Login security is at the gas chromatograph level instead of at the software level. This means that you have to log in to the gas chromatograph to which you are trying to connect. *This also means that if you create a new user, that user is only valid for the GC to which you are connected. You cannot connect to any other GC unless you create the same user on it first*.

MON2020 recognizes the following four user types, or roles, each with an increasing level of access to functionality:

Read-only	A read-only user has the lowest level of access and can view data but cannot make any changes. A read-only user can change his or her password only.
Regular	A regular user has all of the privileges of a read-only user, as well as the ability to acknowledge and clear alarms. A regular user can also control the GC through MON2020's Control menus. A regular user can change his or her password only and cannot create or delete other users.
Super User	A super user has all of the privileges of a regular user, as well as the ability to manage and control the GC through MON2020's Application and Hardware menus. A super user can change his or her password only and cannot create or delete other users.

Administrator An administrator has complete access to all of MON2020's commands and functions, as well as the ability to manage all other users by creating or deleting user accounts, and changing passwords.

Note

Each GC ships with one administrator account: **emerson**. By default, this account does not require a password, but a password can be added, if desired.

The following table lists in detail the functions and commands that are available to each user role:

Menu	Commands	Admin User	Super User	Regular User	Read-Only User
File	Connection Directory	Y	Y	Y	Y
	Program Settings	Y	Y	Y	Y
	Print Setup	Y	Y	Y	Y
Chromato-graph	Connect	Y	Y	Y	Y
	Disconnect	Y	Y	Y	Y
	Chromatogram Viewer	Y	Y	Y	Y
	Chromatogram - Forced Cal	Y	Y	N	N
	GC Time	Y	Y	read-only	read-only
Hardware	Heaters	Y	Y	read-only	read-only
	Valves	Y	Y	read-only	read-only
	Detectors	Y	Y	read-only	read-only
	Discrete Inputs	Y	Y	read-only	read-only
	Discrete Outputs	Y	Y	read-only	read-only
	Analog Inputs	Y	Y	read-only	read-only
	Analog Outputs	Y	Y	read-only	read-only
	Installed Hardware	read-only	read-only	read-only	read-only
Application	System	Y	Y	read-only	read-only
	Component Data	Y	Y	read-only	read-only
	Timed Events	Y	Y	read-only	read-only
	Calculations - Control	Y	Y	read-only	read-only
	Calculations - Averages	Y	Y	read-only	read-only
	Calculations - User De-fined	Y	Y	read-only	read-only
	Limit Alarms	Y	Y	read-only	read-only
	System Alarms	Y	Y	read-only	read-only

Menu	Commands	Admin User	Super User	Regular User	Read-Only User
	Streams	Y	Y	read-only	read-only
	Stream Sequence	Y	Y	read-only	read-only
	Communication	Y	Y	read-only	read-only
Logs/Reports	Unack/Active Alarms	Y	Y	Y	read-only
	Alarm Logs	read-only	read-only	read-only	read-only
	Ack/Clear Alarms	Y	Y	Y	N
	Maintenance Log	Y	Y	Y	read-only
	Event Log	read-only	read-only	read-only	read-only
	Report Display	read-only	read-only	read-only	read-only
	Archive Report	read-only	read-only	read-only	read-only
	Printer Control	Y	Y	Y	read-only
	Trend Data	read-only	read-only	read-only	read-only
	Reset Archive Data	Y	N	N	N
Control	Start Auto Seq	Y	Y	Y	N
	Start Single Stream	Y	Y	Y	N
	Halt	Y	Y	Y	N
	Calibration	Y	Y	Y	N
	Stop	Y	Y	Y	N
Tools	User Administration	Y	N	N	N
	Change User Password	Any	Own	Own	Own

7.3.1 Create a user

Note
You must be logged in as an administrator.

To create a user, do the following:

1. Select **Tools** → **Users** → **User Administration...**.

   The *User Administration* window appears, displaying a list of current users and their role levels.

2. To add a user, click **Add User**.

   The *Add User* window displays.

3. Enter the appropriate information into the text fields.
4. Click **OK**.

MON2020 creates the new user and adds it to the User table on the *User Administration* window.

7.3.2 Export a list of user profiles

To save a list of users, along with their role levels and passwords, do the following:

1. Select **Tools** → **Users** → **User Administration...**.

   The *User Administration* window appears, displaying a list of current users and their role levels.

2. Click **Export File**.

   The *Export User File* window displays.

3. Navigate to where you want to save the file, if necessary.
4. Type in a file name or use the pre-generated name provided.
5. Click **Save**.

7.3.3 Import a list of user profiles

To load a list of users, along with their role levels and passwords, do the following:

1. Select **Tools** → **Users** → **User Administration...**.

   The *User Administration* window appears, displaying a list of current users and their role levels.

2. Click **Import File**.

   The *Import User File* window displays.

3. Navigate to where the file is located, if necessary.

   Note
   User files have the .**xusr** extension.

4. Click on the file to be loaded.
5. Click **Open**. The users will be added to the *User Administration* window.

7.3.4 Edit a user profile

Note
You must be logged in as an administrator.

To edit a user's name, role level, or password, do the following:

1. Select **Tools** → **Users** → **User Administration...**.

The *User Administration* window appears, displaying a list of current users and their role levels.

2. Select the user whose role you want to edit and click **Edit User**.

   The *Edit User* window displays.

3. Change the appropriate information as required.
4. Click **OK**.

   MON2020 makes the requested changes and returns to the *User Administration* window.

7.3.5 Remove a user

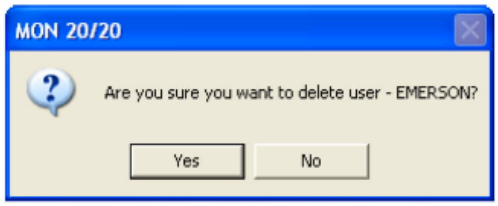
To remove a user, do the following:

1. Select **Tools** → **Users** → **User Administration...**.

   The *User Administration* window appears, displaying a list of current users and their role levels.

2. Select the user you want to delete and click **Remove User**.

   A confirmation message displays.



3. Click **Yes**.

   MON2020 deletes the user and returns to the *User Administration* window.

7.3.6 Change a user's password

A user without administrator-level access can only change his or her own password.

1. Select **Tools** → **Users** → **Change User Password...**.

   The *Change User Password* window displays.

2. Enter the appropriate information in the text fields and click **OK**.

7.3.7 Reset the administrator password

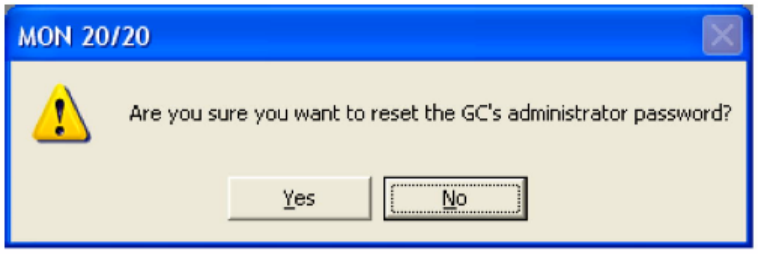
To reset an administrator password, do the following:

1. Start MON2020 and select **Users** → **Reset Administrator User / Password**.

Note
If MON2020 was already started, be sure to disconnect from all GCs before attempting to reset the administrator password.

The following warning displays:

Figure 7-1: Password reset warning message



2. Click **Yes**.

   The *Connect to GC* window displays.

3. Click the **Ethernet** button that corresponds to the GC whose password you want to reset.

   MON2020 will connect to the GC and generate a Password Reset Request ID. The *MON2020 - Password Reset* window displays.

4. Click **Copy to Clipboard** and email the Password Reset Request ID to **GC.CSC@emerson.com**. You will be sent a Password Reset Key.
5. After you receive the Password Reset Key, return to the Connect to GC window and again click the **Ethernet** button that corresponds to the GC whose password you want to reset.

   The Login window displays.

6. Enter the User Name and the Password Reset Key and click **OK**.

   MON2020 will connect to the GC. To change the Password Reset Key, see *Section 7.3.6*.

7.3.8 Find out who is connected to the gas chromatograph

To ascertain which users are connect to the GC, select **Tools** → **Users** → **Logged on Users...**. The *Logged on Users* window displays with a list of the users who are currently logged on to the GC, along with each user's IP address.

7.4 Upgrade the firmware

This command allows you to download upgrades to the GC's firmware.

To upgrade the firmware, do the following:

1. Select **Upgrade Firmware...** from the **Tools** menu.

   The *Upgrade Firmware* window displays. The Currently Install Versions section details the status of the currently-installed applications.

2. Click **Open**.

   The *Open File* dialog displays.

3. Locate and select the desired .zip file and click **Open**.

   The .zip file's content information displays in the **Upgrade** section of the *Upgrade Firmware* window. The *Information* column will alert you to the new files that should be selected and downloaded to the GC.

   Note
   If the upgrade file contains a program that is newer than what is currently installed on the GC, it will automatically be selected to download.

4. Select the check boxes for the files that you want and click **Upgrade**.

   While the files are transferring, you can monitor their status in the **Upgrade Progress** section.

   Note
   If you want to halt the upgrade, click **Cancel Upgrade**.

   When the upgrade completes successfully, a confirmation message displays.

5. Click **OK**.

   MON2020 disconnects from the GC and the GC reboots.

7.5 Cold booting

Cold booting the GC clears all its stored analysis files and logs and resets all the tables to the default settings. Take this step only after consulting the appropriate Rosemount Analytical, Inc. personnel. An entry will be made to the event log noting that the unit was cold booted.

7.6 View diagnostics

MON2020 provides a diagnostics window that displays diagnostic information about the following software boards' revision and voltage levels:

- Preamp board

- Heater/Solenoid board
- Base IO board

This information can be useful when troubleshooting maintenance issues and in deciding if further action is required.

To view the *Diagnostics* window, select **Diagnostics...** from the **Tools** menu.

7.7 Adjust the sensitivity of the LOI Keys

Note
This feature is not available for the 370XA gas chromatograph.

To adjust the sensitivity of the LOI keys, do the following:

1. Select **LOI Key Sensitivity** from the **Tools** menu.

   The *LOI Key Sensitivity* window displays.

2. Adjust the sensitivity for a key by sliding the bar up or down.

   Raising the bar *increases* the sensitivity or the key; lowering the bar *decreases* the sensitivity.

   Note
   To manipulate all of the sliders together, select the **Apply same key sensitivity to all keys** check box.

   Note
   Click **Restore Factory Defaults** to return the sliders to their original settings.

3. Click **OK** to save the changes and close the window.

   Note
   To save the changes without closing the window, click **Save**.

7.8 Set the I/O card type

To set the card type for a ROC card, do the following:

1. Select **I/O Cards...** from the **Tools** menu.

   The *I/O Cards* window displays.

2. Select the card type for the I/O card from the drop-down list.
3. Click **OK** to save the changes and close the window.

Note

To save the changes without closing the window, click **Save**.

Appendix A
Custom calculations

To create or edit a customized calculation using GC analysis data, do the following:

1. Select **Applications** → **Calculations** → **User Defined...**.

   The *User Defined Calculations* window appears, containing a list of all the user-defined calculations that are available to the GC.

2. Click **Insert before** to add a row to the *User Defined Calculations* table.

   Note
   To delete this--or any--row from the table, click **Delete**.

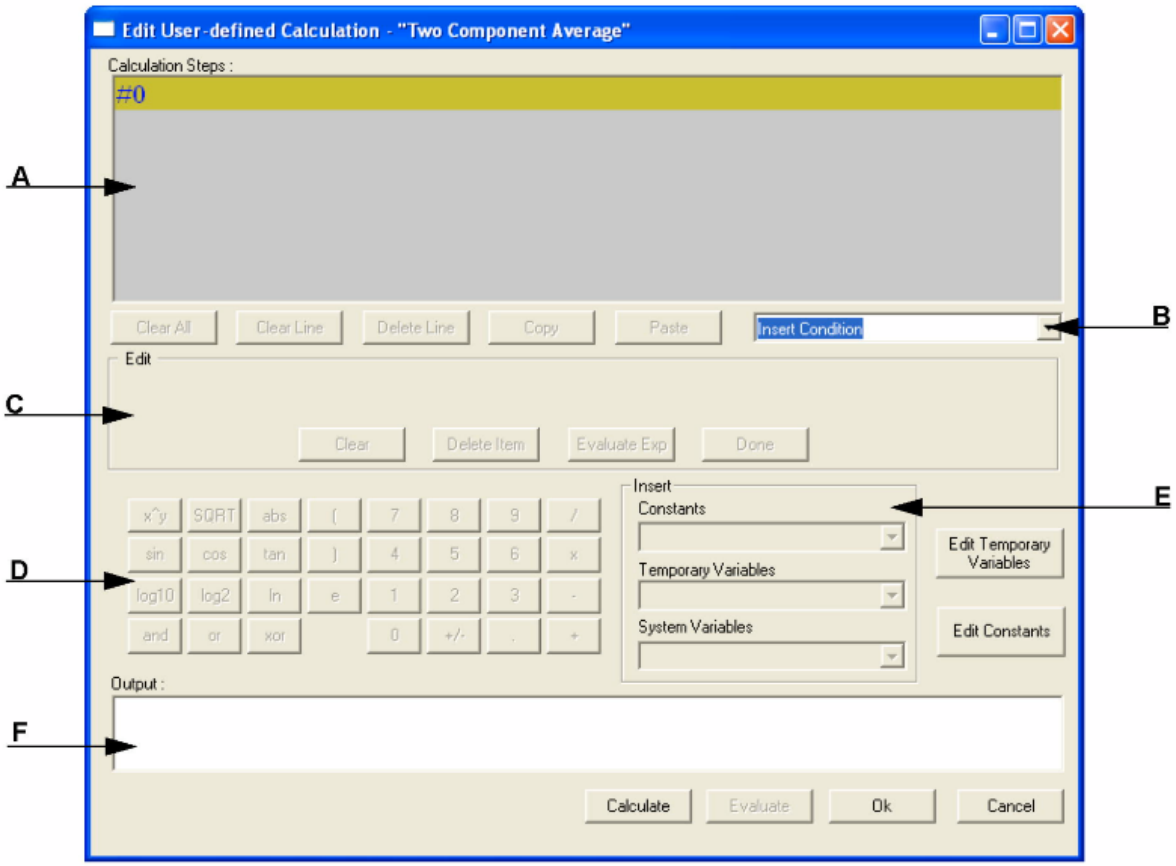
3. Double-click the *Label* cell and enter a name for the calculation you are about to create.

   Note
   If you want to enter a short description for the new calculation, double-click the *Comment* cell and enter it there.

4. Click **Edit**.

   The *Edit User-defined Calculation* window appears.

Figure A-1: The Edit User-defined Calculation window



In MON2020, building a calculation is similar to building a simple program. You have constants and two types of variables available, as well as two calculation-building commands. You can also add comments that will be ignored by the application but that can help you explain the logic and structure of the calculation you are designing.

The following is a description of the design elements of the *Edit User-defined Calculation* window:

Calculation Steps Viewer (A)

This element displays the line-by-line construction of the calculation as it is being built. The following commands allow you to interact with this area:

- Click **Clear All** to clear the content of the Calculation Steps Viewer.
- Click **Clear Line** to clear the content of the selected line.

Note

If the selected line is an "If-Then" statement, then the entire condition is cleared. This button is disabled when the cursor is on an "else" or "endif" condition.

- Click **Delete Line** to delete the selected line.

Note

If the selected line is the beginning of a conditional statement, then the entire "If-Then" block will be deleted along with the expressions that constitute the "If-Then" construct. If the selected line is part of the conditional "If-Then" construct—that is, the line only has "Else" or "Endif" in it—then the entire "If-Then" construct will be deleted.

- Click **Copy** to copy the selected line to the clipboard. You cannot copy keywords such as "**else**" or "**endif**."
- Click **Paste** to paste the content of the clipboard into a selected line. If the line already has a calculation in it, it is cleared before the content of the clipboard is pasted into it.

Commands list (B)

A drop-down list with the following three commands:

- **Insert Comment** - Adds a comment to the calculation. Each comment is preceded by "//."
- **Insert Condition** - Adds an "If-Then" statement to the calculation.
- **Insert Expression** - Adds a mathematical expression to the calculation.

Expression Editor (C)

This section is the work area where the comment, condition or expression is built before being added to the Calculation Steps Viewer. There are four modes of the Expression Editor, depending upon what action is being performed: **No Action** mode, **Insert Comment** mode, **Insert Condition** mode, and **Insert Expression** mode.

The following commands allow you to interact with the Expression Editor:

- Click **Clear** to clear the content of the entire line. The line itself is not deleted.
- Click **Delete Item** to delete the currently active token. Each mathematical function, numeric data, and mathematical operation is treated as a token. The token to the right of the current cursor location is treated as the currently active token.
- Click **Evaluate Exp** to check the validity of the expression. If any errors are detected in the syntax, then an error will be reported in the Output window.

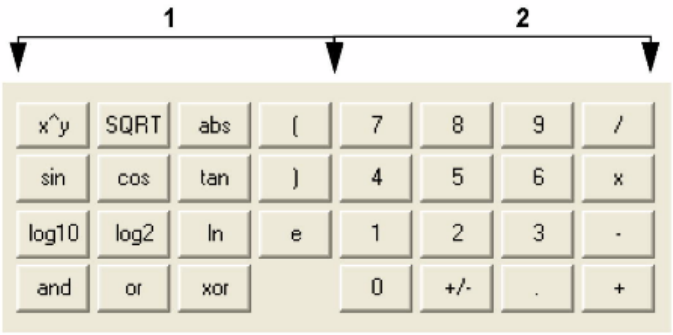
Note
This button is only active when the line being edited is an expression.

- Click **Done** to evaluate the expression and copy it to the Calculations Steps Viewer. If there are any errors in the expression, they are reported in the Output window.

Calculator (D)

This section contains calculator functions that can be used to build a mathematical expression. This section can be divided into two parts:

Figure A-2: Calculator functions



- **Section 1** - This section contains the following keys:

x^y	x to the power of y
SQRT	Square Root
abs	Absolute Value
sin	Sine
cos	Cosine
tan	Tangent
log10	Logarithm to the base 10
log2	Logarithm to the base 2
ln	Logarithm to the base e
and	Logical AND
or	Logical OR
xor	Logical XOR
(	Open bracket
)	Close bracket

- **Section 2** - This section contains the traditional calculator keys and can be used with your keyboard's **Numpad**, if it has one.

Note
Make sure to engage your keyboard's Numlock before using the Numpad.

Constants and Variables Creator (E)	This section contains drop-down menus and buttons that allow you to create and select constants and variables that can be added to your mathematical expressions. • **Constants** - Allows you to select constants from a drop-down list. • **Temporary Variables** - Allows you to select temporary, user-created variables from a drop-down list. • **System Variables** - Allows you to select system variables. • **Edit Temporary Variables** - Allows you to create variables. • **Edit Constants** - Allows you to create system-wide constants that can be used in user-defined calculations.
Output Display (F)	Displays status information.

5. Use the following procedures to build your calculation:
   - *Section A.1*
   - *Section A.2*
   - *Section A.3*
   - *Section A.4*
   - *Section A.5*
   - *Section A.6*
6. To see the result of the calculation, click **Calculate**.

   The results display in the **Output** window.
7. To validate the calculation for errors, click **Evaluate**.

   The results of the validation check display in the **Output** window.
8. To save the calculation and close the *Edit User-defined Calculation* window, click **OK**.

   You will be returned to the *User Defined Calculations* window.
9. To save the changes on the *User Defined Calculations* window and close it, click **OK**.

Note
To save the changes on the *User Defined Calculations* window without closing it, click **Save**.

A.1 Insert a comment

To add a comment to the calculation, do the following:

1. Click on the *Insert* drop-down list and select **Insert Comment**.

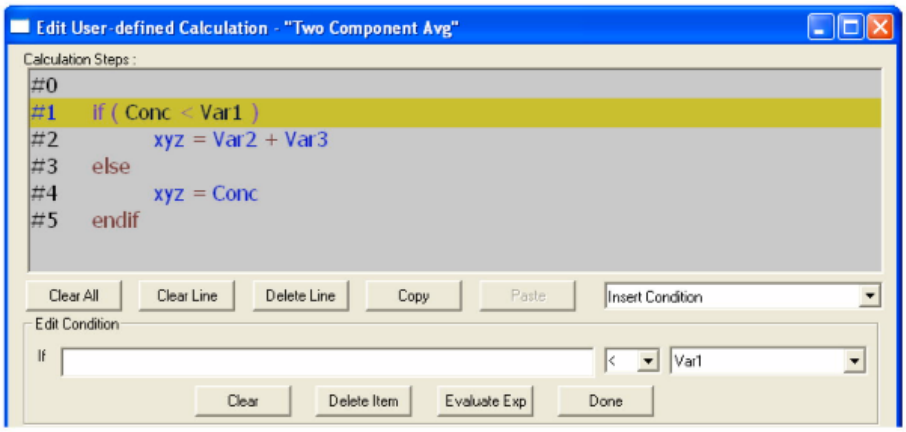
   A new line will be added to the **Calculation Steps Viewer** and the **Expression Editor** will switch to *Edit Comment* mode.

2. Enter the comment into the *Edit Comment* text box and then click **Done**.

   The comment will be added to the **Calculation Steps Viewer**.

A.2 Insert a conditional statement

Figure A-3: An example of a conditional statement



The **Expression Editor** in *Edit Condition* mode allows you to build a conditional statement:

Figure A-4: The Expression Editor in Edit Condition mode

Expressions are built using the **Expression Editor** in *Edit Expression* mode.

To add a conditional statement, do the following:

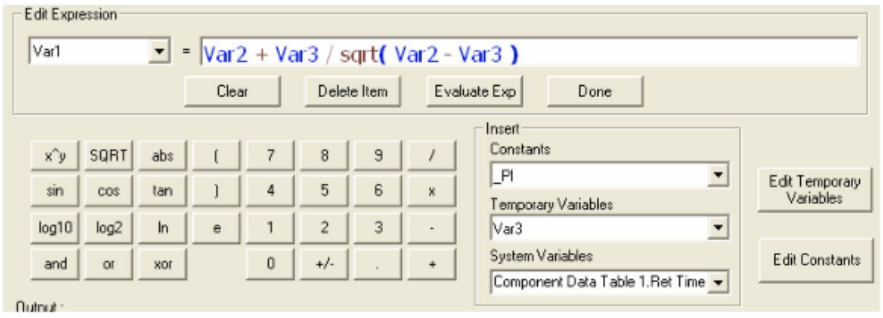
1. Click on the *Insert* drop-down list and select **Insert Condition**.

   A new line is added to the **Calculation Steps Viewer** and the **Expression Editor** switches to *Edit Condition* mode.

2. Add an expression.

   You can use constants, temporary variables, system variables, and the calculator functions to build the expression. For information on inserting system variables, see *Section A.6*. For information on creating variables, see *Section A.5*. For information on creating constants, see *Section A.4*.

Figure A-5: Edit Expression area



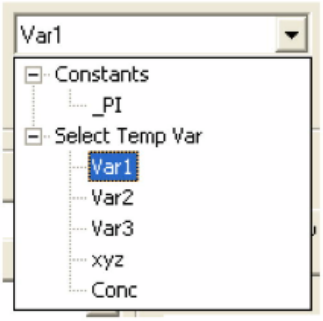
3. Select a relational operator from the drop-down list.

   You have the following options:

<	Less than
<=	Less than or equal
>	Greater than
>=	Greater than or equal
==	Equal
!=	Not equal

4. To add a variable or constant to the expression, click the *Variable/Constant* drop-down list and select the appropriate item.

Figure A-6: The Variable/Constant drop-down list



For information on creating variables, see *Section A.5*. For information on creating constants, see *Section A.4*.

5. Click **Done**.

   MON2020 validates the statement and if there are no errors, it adds it to the Calculation Steps Viewer.

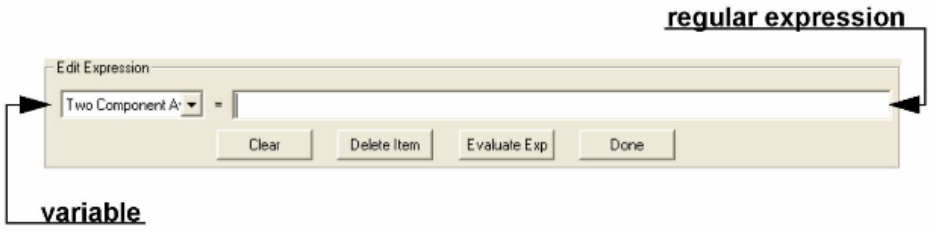
To complete the conditional statement, use the **Expression Editor** in *Edit Expression* mode to add the necessary mathematical expressions.

A.3 Insert an expression

A mathematical expression has the following structure:

Variable = Regular expression

Figure A-7: Edit Expression area



To add an expression to a conditional statement or calculation, do the following:

1. Click on the *Insert* drop-down list and select **Insert Expression**.

   A new line is added to the **Calculation Steps Viewer** and the **Expression Editor** switches to *Edit Expression* mode.

2. Select a variable from the *Variable* drop-down tree view.

You can select either a temporary variable or you can set the expression you are building as the final result of your new user-defined calculation. For instance, if the user-defined calculation you are building is called 'User Calc 1,' then you can select **User Calc 1** from the **Final Result** tree view. For information on creating variables, see *Section A.5*.

3. Add a regular expression.

   You can use constants, temporary variables, system variables, and the calculator functions to build the expression. For information on inserting system variables, see *Section A.6*. For information on creating variables, see *Section A.5*. For information on creating constants, see *Section A.4*.

4. Click **Done**.

   MON2020 validates the statement and if there are no errors, it adds it to the **Calculation Steps Viewer**.

A.4 Create a constant

To create a constant that you can use in building a calculation, do the following:

1. From the *Edit User-defined Calculation* window, click **Edit Constants**.

   The *Edit Constants* window displays, showing all the constants that have been created so far for the GC.

2. Click **Insert before**.

   A new row will be added to the *USER_CALC_CONSTANTS* table.

Note
To delete a constant, select it in the *USER_CALC_CONSTANTS* table and click **Delete**.

3. Double-click the *Label* cell and enter a name for the constant.

Note
To edit any cell, double-click it.

4. Double-click the *Value* cell and enter a value for the constant.
5. Use the *Comment* cell to store information that is relevant for the constant.
6. Click **OK** to save the changes and close the window.

Note
To save the changes without closing the window, click **Save**.

A.5 Create a temporary variable

To create a temporary variable that you can use in building a calculation, do the following:

1. From the *Edit User-defined Calculation* window, click **Edit Temporary Variables**.

   The *Edit Temporary Variables* window displays, showing all the temporary variables that have been created so far for the user-defined calculation.

2. Click **Insert**.

   A new row will be added to the table.

   Note
   To delete a variable from this window, select it in the table and click **Delete**.

3. Double-click the *Name* cell and enter a name for the variable.
4. Use the *Comment* cell to store information that is relevant for the variable.
5. Click **OK** to save the changes and close the window.

   To save the changes without closing the window, click **Save**.

A.6 Insert a system variable

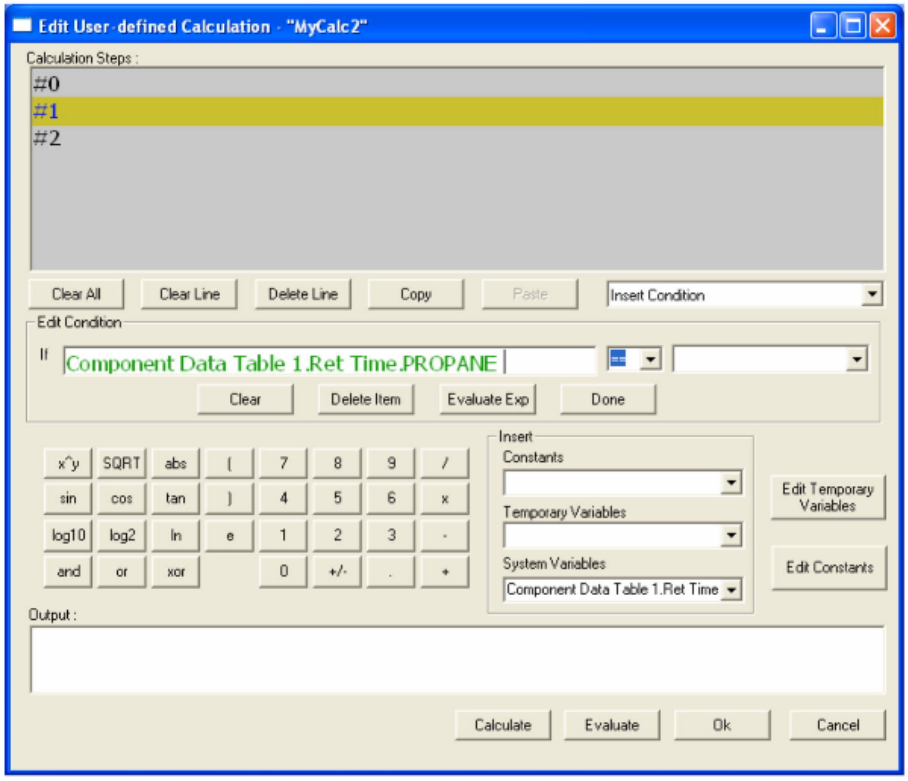
To insert a system variable into the Expression Editor, do the following:

From the *Edit User-defined Calculation* window, click on the *System Variables* drop-down arrow.

For a demonstration of how to use the context-sensitive variable selector, see *Section 1.11*.

The selected system variable displays in the *System Variables* drop-down box and in the Expression Editor.

Figure A-8: The Expression Editor



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