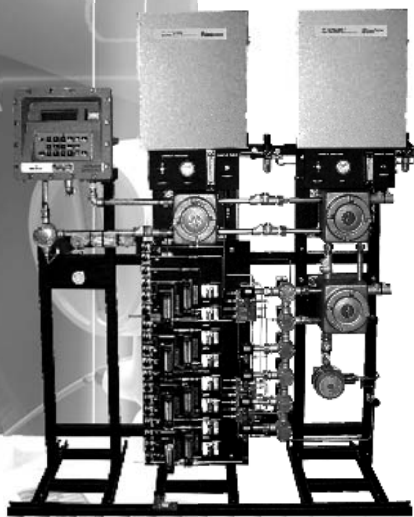
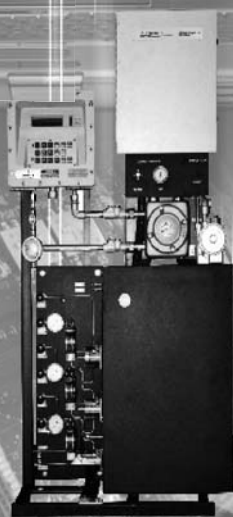


# MON2000™ Software and Networking for Daniel® Danalyzer™ Gas Chromatographs



# MON2000™ Software and Networking for Daniel® Danalyzer™ Gas Chromatographs

MON2000™ Gas Chromatograph software is used with Daniel® Danalyzer™ Gas Chromatographs. As a leading worldwide supplier of on-line gas chromatographs, Daniel has designed the software used in Danalyzer Gas Chromatographs to have the flexibility, calculation power and data security to handle the precise component identification as well as strict adherence to industry standard calculations that fiscal and gas quality measurements demand. The Danalyzer Gas Chromatograph also has the communication and networking power to send this information on to other devices such as SCADA systems, flow computers, and plant control systems.

## Features and Benefits

### Increased Operating Efficiencies

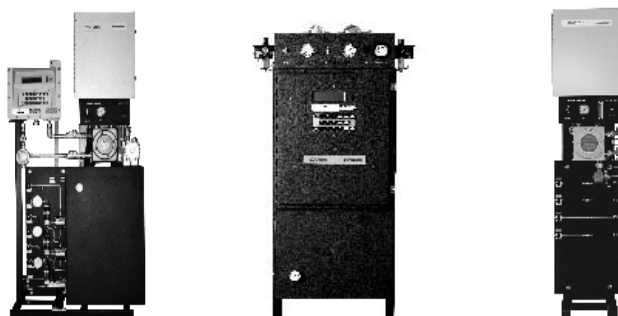
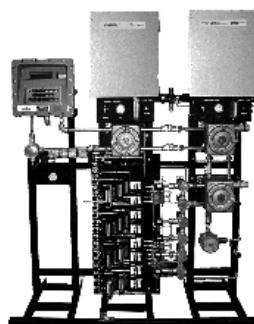
- Full choice of ISO 6976-1995 or GPA 2272-2000 calculation methods and parameters
- Provides hourly, daily, weekly, monthly, or variable time interval (0-167 hours) averages
- Archives up to 254 item averages, holds over 3 months of standard four minute runs - with expandable archiving capabilities
- Can trend archived variables graphically on a PC or printer
- User-friendly laptop/PC software cuts technician time and training costs
- Internet ready - download software enhancements directly from our website and e-mail chromatograms for peer review
- Remote troubleshooting capability

### Flexibility to accommodate nearly any communication need

- Support for RS-485, RS-422 and Ethernet communication
- Optional internal modem board; fully functional remote off-site access from MON2000 software
- Ability to connect all Danalyzer Models of gas chromatographs onto one network
- Link to multiple PC workstations running MON2000 if desired
- Polling of reports, alarms and chromatograms to the MON2000 workstation from anywhere in your gas chromatograph network
- RS-232C local port

### Security at all levels of data collection and communication

- API 21.1 compliant
- Three levels of security; configurable to read only or read/write for third party access to gas chromatograph data
- Data archiving built into each gas chromatograph
- Redundant Modbus and OPC links possible
- No central Modbus server needed for Modbus links



### Flexible Analytical Software

Each Danalyzer Gas Chromatograph has an application program with all the analyzer settings and values for that specific application. This application program has the flexibility to handle the analytical needs of the natural gas industry including the various types of analytical detectors, selection of peak integration methods as well as access to all the analysis timed events. In the rare event a change needs to be made in the application program, these settings are easily accessed through the MON2000 software using a laptop or connection over a network to a PC workstation.

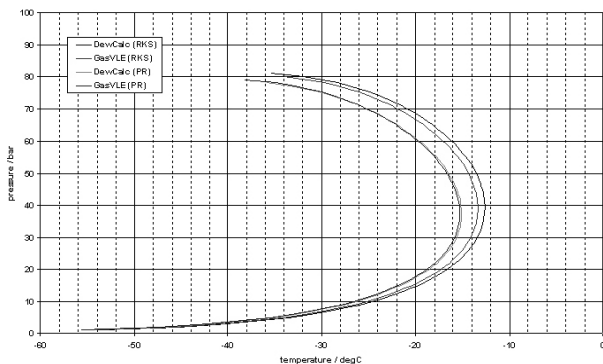
### Extensive Calculation Capability

The software is supplied with an assortment of built-in calculations to accommodate the measurement needs found in the natural gas industry (both U.S. and metric units). The software for the Danalyzer Gas Chromatograph can also be configured for custom calculations. Standard calculations include:

- Heating value calculation in BTU or SI units
- Calculations on dry, saturated, gross, net and actual basis
- Wobbe Index and relative density
- Concentrations in mole%, weight% or liquid volume%
- Gallons per thousand cubic feet (GPM)
- Averages of values over hourly, daily, weekly, monthly or user defined periods
- Reid Vapor Pressure

### Hydrocarbon Dew Point Calculation

One optional calculation that is becoming increasingly popular on Danalyzer Gas Chromatographs is the calculation of natural gas Hydrocarbon Dew Point. Hydrocarbon Dew Point analysis is proving to be an important tool for identifying unaccounted for or lost BTU in the pipeline due to condensation.



Calculations of the Hydrocarbon Dew Point are made using PR or RKS equations-of-state and latest physical property data.

### Audit Trails And Data Security

Data security and validation can be found at every level in the Danalyzer Gas Chromatograph design. Each Danalyzer maintains API 21.1 compliant historical archives for measured and calculated values, as well as analyzer events and alarms. This includes logging of all user changes to the analysis events as well as the physical properties of the compounds.

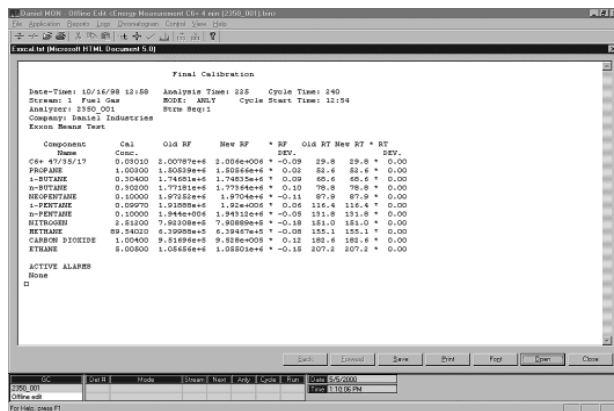
### Wide Range Of Reports Built In

Presentation of data in a clear and concise format is an important part of any on-line analyzer. The Danalyzer Gas Chromatograph supports a wide range of reports to simplify the data reporting process. Standard reports include:

- Analysis results
- Alarm and maintenance logs
- Calibration reports
- Time-based averages reports
- Audit trail reports
- Archived data reports
- Chromatograph files include reports

### Easy To Update Physical Properties Data Files

To ensure that the calculations performed by the Danalyzer are to the latest measurement standard, each analyzer is loaded with complete GPA 2145 or ISO 6976 physical properties. Manual entries of alternate physical constants are allowed but are tagged as "USR" for audit purposes. Updating of the physical properties as standards evolve is as simple as logging into the Daniel web site and downloading the physical property values into the Danalyzer Gas Chromatograph.



This Calibration Report is an example of one of the many standard reports built into every Danalyzer™ Gas Chromatograph.

**MON2000 Software - Powerful Yet Simple To Use**

Danalyzer Gas Chromatographs are designed to operate unattended. If adjustments are needed, our exclusive MON2000 software allows complete control of your gas chromatographs - either locally or remotely. From within MON2000, a user can:

- Review and modify analytical settings on one screen
- Upload and display multiple chromatograms on the screen for comparison
- Upload and trend any of the measured results
- Export data for use in other 3rd party applications
- Overlay multiple chromatograms for troubleshooting and calibration
- Compare previous calibration to current calibration

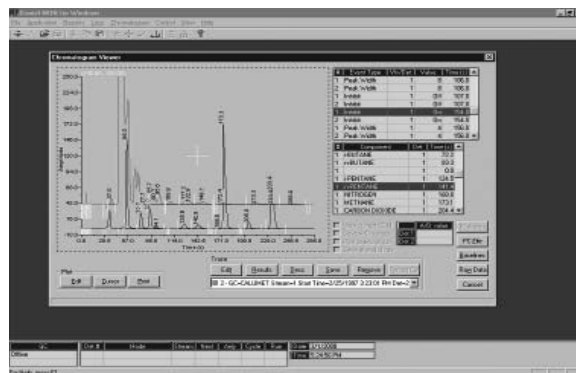
**MON2000 also has a number of tools built in to help users manage their analyzers such as:**

- Automatic recording of alarms in a log file
- Event logs that provide a continuous record of all operator changes with time and user name stored
- Maintenance log scratch pad for keeping track of maintenance or testing
- Download and install the latest GPA 2145 or ISO 6976 physical property values

Data collected from the gas chromatographs can be stored and displayed in a wide range of options such as trend lines on the screen and logs automatically documenting all changes made to the gas chromatograph. Data can also be exported in formats compatible with most third-party Windows® applications.

**MON2000 Software Package**

- Last chromatogram for each sample and calibration stream stored in the gas chromatograph
- Fixed time or auto slope detection for peak integration
- Hot-key shortcuts for raw data, analysis results, and other data directly from chromatogram screen
- Ticks downward for timed events, ticks upward for peak integration
- Colored tick marks for easier TEV and CDT tracking



**Advanced Functions**

- Zoom functions to optimize peak integration
- Current chromatogram on screen, last analysis and calibration data stored in the gas chromatograph controller
- Unlimited storage of chromatograms to PC hard drive

**Powerful Yet Simple – MON2000 Software**

Simple drop-down menus

Connect to any GC with a mouse click

Full featured chromatogram display

Summary of application event status and time

Automatic listing of measured components

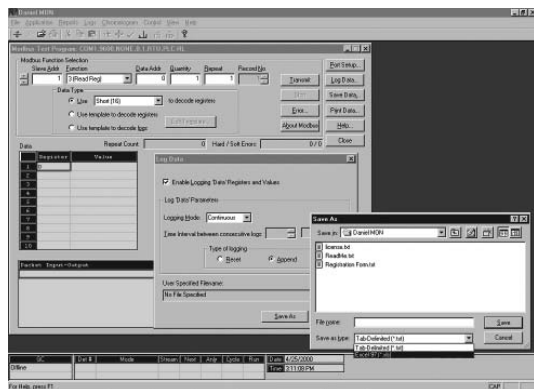
Quickly add chromatograms to overlay

Save CGM's to hard drive

Event Type	Vhr/Det	Value	Time
Detector	1	6	101.0
Inhibit	1	Off	143.0
Inhibit	1	On	145.0
Detector	1	5	150.0
Peak Width	1	8	160.0
Inhibit	1	Off	175.0
Inhibit	1	On	245.0
Detector	1	0	247.0

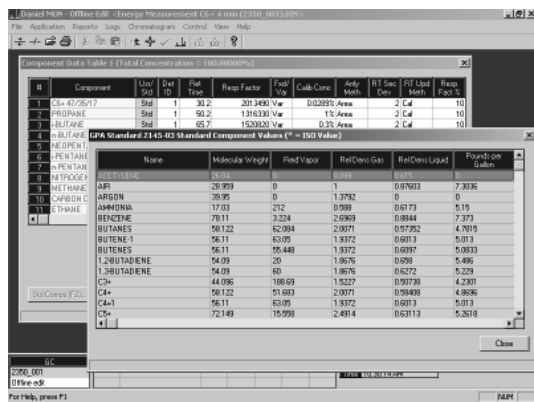
Component	Det	Time
n-BUTANE	1	470.4
n-BUTANE	1	522.2
BUTENE-1	1	559.6
TRANS-2-BUTENE	1	601.8
CIS-2-BUTENE	1	638.4
1,3-BUTADIENE	1	666.4
CARBON DIOXIDE	1	743.2
ETHYLENE	1	771.0

- Timed events, peak integration parameters and chromatograms on one screen
- Trending of any component or calculated value from archived data in the gas chromatograph controller
- Export data effortlessly with Windows® functionality



**Simplified Troubleshooting Through Chromatogram Comparison**

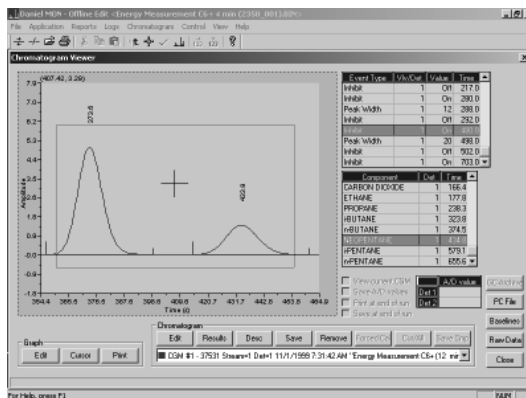
- Virtually unlimited possibilities for advanced troubleshooting and analysis
- Compare chromatograms (up to 8) to simplify troubleshooting or overlay multiple chromatograms to spot a trend
- Compare the previous calibration to the current calibration



**Modbus Polling Functions**

- Data acquisition and reporting functions for multiple gas chromatographs
- Hard-wired or remote access via modem

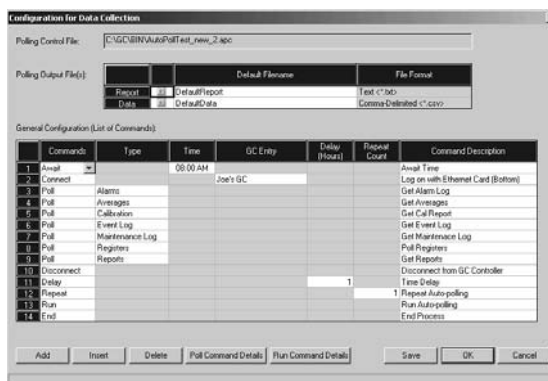
- Flexible Windows®-based configuration
- Set up polling for continuous operation or determine the polling intervals from 1 second to 24 hours



**MON2000 Plus Software Package**

An optional add-on for the MON2000 is the MON2000 Plus software package. The MON2000 Plus software can be configured to automatically collect and store averages, calibration data as well as chromatograms, averages, reports and maintenance log information. Features include:

- Collect data over RS-232, RS-422, RS-485, Ethernet or modem links
- Collect data from Modbus registers within any Danalyzer Gas Chromatograph
- User defined polling time / frequency individually to each gas chromatograph
- Data stored in industry standard \*.txt or \*.csv file formats



MON2000 Plus can be configured to automatically collect a wide assortment of analysis data and maintenance files from any gas chromatograph that it is connected to.

Windows® is a registered trademark of Microsoft Corporation

## Product Datasheet

DAN-GC-MON2000-DS-1005

October 2005

### Flexibility To Meet Nearly Any Networking and Communication Need

Danalyzer Gas Chromatographs can be configured in a number of networking and data communication schemes to meet the communication requirements of the natural gas industry. Options include modem, Ethernet, as well as multi-drop RS-485 networks. It is even possible to set up automatic polling for data collection if desired.

Whether you want to network gas chromatographs throughout the plant or simply link a single gas chromatograph to a flow computer, the Danalyzer Gas Chromatograph can be configured to handle most any scenario:

- Choice of Ethernet, RS-422 or RS-485 network
- Same network connects Danalyzer Model 700, Model 500 and Model 1000 Gas Chromatographs
- Able to connect multiple PC workstations using MON2000
- Connectivity to flow computer or SCADA systems using industry standard protocols such as Modbus and OPC
- Data communication options include simple analog and discrete signals as well as Modbus serial links

To preserve the integrity of the analysis data, all Danalyzer Gas Chromatographs are capable of storing analysis data internally in the event of loss of communication.

### RS-485

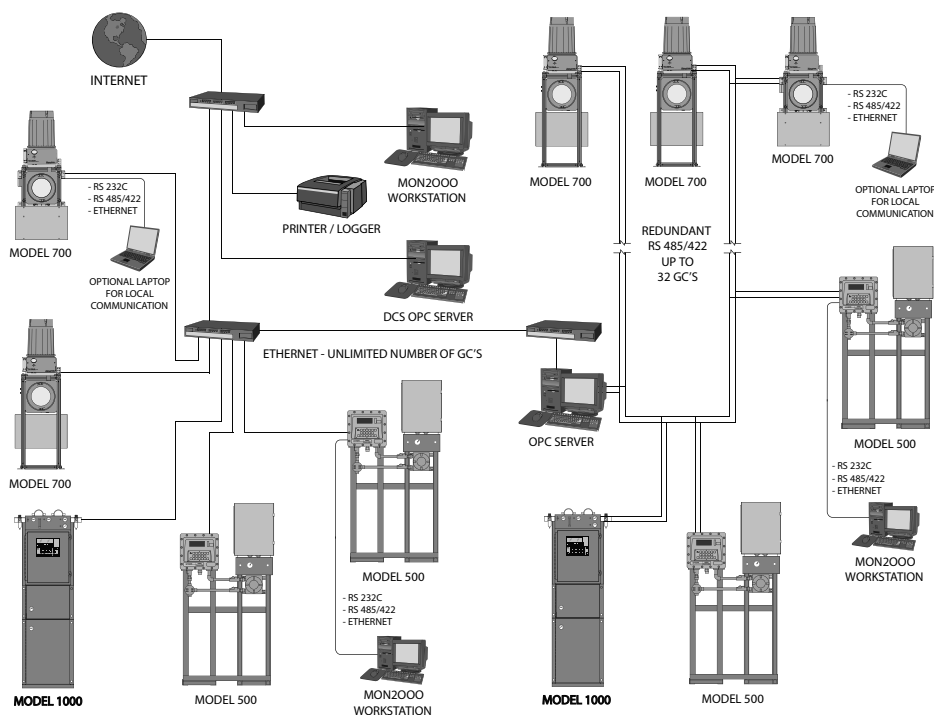
In the natural gas industry, serial communication based on an RS-485 network is a very popular choice between gas chromatographs and other devices such as flow computers. Simple yet robust, the serial link makes it easy to transfer compositional data to other field devices needing the information. Furthermore, Danalyzer Gas Chromatographs have multiple serial ports built in to provide the ultimate in communication flexibility.

When configured in a "multi-drop" network, up to 32 Danalyzer Gas Chromatographs can be connected together to simplify networking as well as giving the user the option to access all the analyzers from one workstation if desired.

### Ethernet

Ethernet is the most widely-installed local area network technology in the world. The most commonly installed Ethernet systems are called 10Base-T and provide transmission speeds up to 10 Mbps. But Ethernet systems using fiber optics and transmission speeds of up to 100 Mbps are being increasingly used.

When the Ethernet option for networking Danalyzer Gas Chromatographs is selected, restrictions on network size and number of analyzers and MON2000 workstations are removed. With the use of media converters and appropriate hubs, the user can freely select between using wire-based networks (10BaseT) or fiber-based networks (10BaseF).



**Whether the Danalyzer™ Gas Chromatograph is being connected to a single flow computer or being tied into a plant-wide analyzer system, the analyzer has the flexibility to handle nearly any user's needs.**

## Product Datasheet

DAN-GC-MON2000-DS-1005

October 2005

### Secure Modbus Connectivity

For on-line gas chromatographs, Modbus continues to be the preferred choice to transfer gas chromatograph data to flow computers and SCADA systems. The Danalyzer Modbus design avoids the use of central interface cards or computers that can act as a single-point of failure in the Modbus link. Instead, the flow computer or SCADA system can “talk” directly to each gas chromatograph to gather the data needed. Danalyzer Gas Chromatographs provide 4-8 optional communication ports.

Furthermore, the register and coil addresses can be easily customized to meet the specific data structure of the flow computer or SCADA system. There is even a program built into the MON2000 software to test the Modbus link if troubleshooting is needed.

### OPC Communication

A new standard replacing Modbus is OPC (OLE for Process Control). OPC is a data transmission standard developed in the mid-1990s to share data in a fast, robust fashion, and eliminates proprietary schemes used by some vendors. OPC works on a server / client format that provides bi-directional communication between a host of analyzers from various manufacturers and the plant control system.

The OPC option follows the tag naming protocol proposed by the Center for Process Analytical Chemistry (CPAC). The option also supports OPC Historical Data Archiving (HDA) functions which can be important to help ensure that data is not lost even if communication links are down for extended periods of time.

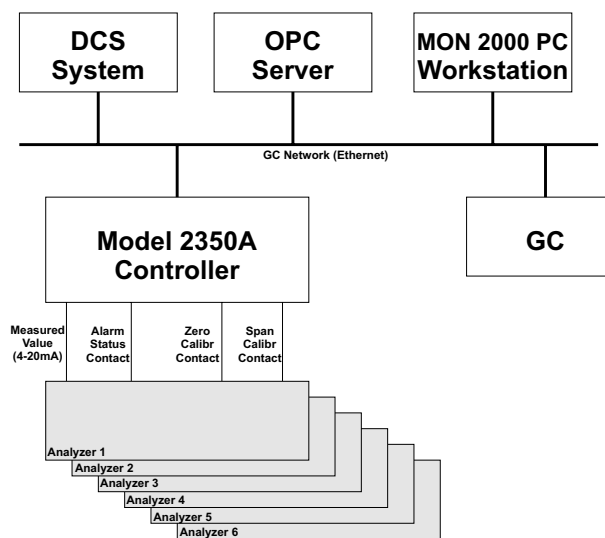
### Communication To Other Devices

With the power of the Danalyzer networking capability, it is natural for users to want to bring in other types of field data onto the network such as temperature and pressure of the pipeline, measurement data from a moisture analyzer or a status signal from a safety monitor.

The Model 2350A Continuous Analyzer Controller (CAC) is the ideal solution for integrating a wide range of on-line analyzers on to the robust gas chromatograph network. Analyzers integrated onto the network include any analyzer capable of sending its data via an analog signal such as oxygen, moisture, and infrared analyzers as well as signals from pressure and temperature transmitters.

Once on the network, the data from the on-line analyzers is accessible to all the gas chromatograph communication links and workstations; eg, Modbus, OPC and data archiving on PC workstations. The data can also be used in common reports and calculations.

The Model 2350A CAC is also able to interact with the on-line analyzers to monitor alarm status, initiate calibration / validation as well as monitor for concentration limit alarms.



The Model 2350A CAC provides a portal for non-gas chromatograph data to enter onto the powerful Danalyzer™ network system.

## Product Datasheet

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