SIEMENS

Advance Maxum™

The First “Plug and Play” Gas Chromatograph System

Siemens Applied Automation, Inc.

Power Made Simple

The “plug and play” concept that has become the standard in modern technology is now available in the Advance Maxum™ Process Gas Chromatograph System from Siemens Applied Automation.

From oven and electronic components to software and communication networks, Advance Maxum is completely modular. For example, modules use on-board microprocessors for “smart” operation and connect with just one simple cable. There are even pre-configured application modules for many common measurements. Advance Maxum’s modular design results in less engineering, assembly and repair time, and fewer spare parts – all of which means lower costs for the user.

But modular design is only half of the story. Advance Maxum also has automatic software that recognizes your application, hardware components, and network configuration. Set-up is simple and automatic, including complete chromatogram capture and peak detection. In fact, with “point and click” applications, Advance Maxum provides the simplest operation and lowest training requirements.

And we didn’t stop there. Advance Maxum also enhances your current investment. All existing Advance Optichrom analyzers can either be connected or upgraded to Advance Maxum. Applied Automation is and has always been committed to true “backward compatibility” which assures greatest value for our customers.

Best of all, Advance Maxum is a true “one-world” instrument. Its universal power supply and metric hardware meet all international codes and standards. The user interface and documentation are multi-lingual. And, as is true for all Applied Automation analytical equipment, Advance Maxum users can have the confidence of knowing they are supported by service organizations around the world.

Introducing the New Advance Maxum

Advance Maxum is all new, from top to bottom. But, Advance Maxum is not just new, it's a revolutionary approach to gas chromatography: modular and automatic – "plug and play." With novel hardware and features, Advance Maxum is the new chromatograph standard.

New Application Tools

- Modular detector and heater assemblies
- Multiple temperature zone oven
- Low-volume valves and heated multiple cell detectors
- Electronic pressure control of carrier and fuel gases

New Modular Electronic Controls

- International power supply
- Modular system controller and sensor-near electronics
- Modular 24 vdc solenoid valve drivers
- "Click together" electronic communication bus

New Maintenance Panel

- Graphic display with menu-based functions
- On-line real-time and historical chromatograms
- Total maintenance function display and control

New Workstation

- EZChrom™ application builder*
- Real-time chromatogram and data displays
- Comprehensive application engineering tools

New Applications

- Parallel chromatography
- Complete application modules

New Communication System

- Transparent peer-to-peer communication
- High-speed, open and redundant networks

What all of this means to you is:

- Power
- Simplicity
- Cost savings

**EZChrom™ is a trademark of Scientific Software, Inc.*

Versatile Oven for Maximum Flexibility

Advance Maxum has an all new oven. With 40% larger capacity, the oven can house up to three detectors and more than twelve valves. But that's not all. The oven can also be divided into two separate temperature-controlled zones providing unsurpassed application flexibility.

New High-Efficiency Insulation

- Provides more room enabling greater application power
- Allows higher operating temperature for flexible chromatography
- Allows heating with lower power and air consumption to reduce startup and recovery heating time

New Separately-Heated Oven Compartments

- Allows two separate measurement methods for the same sample to provide on-line referencing for continuous quality monitoring
- Allows several complete process applications in the same analyzer to reduce cost of housing space

New Modular Design for Detectors, Air-Bath Heater and Methanator

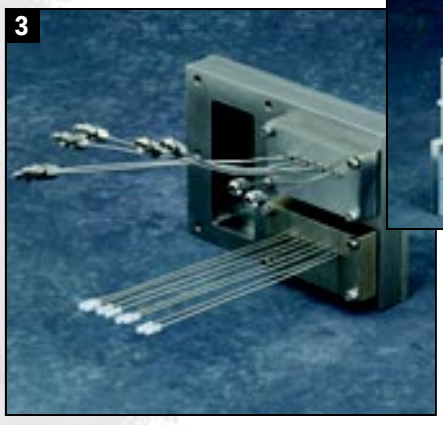
- Provides quick heater and detector installation or replacement to minimize maintenance down time
- Allows up to three different detector modules in a single oven to maximize chromatograph power and flexibility
- Allows a methanator to be installed as simply as a heater or detector to reduce costs

New Oven Mounting Features

- Provides space for various types of chromatograph valves to enable greatest flexibility and to optimize chromatography
- Provides separate mounting plates and suspended mounting brackets on lower oven shelf for best thermal stability and greatest chromatogram repeatability

Flexible Tools for Maximum Capability

Advance Maxum has all new chromatography tools. A new 10-port valve does the work of two Model 11 valves. In addition, the new 8-cell thermal conductivity detector provides an analytical capability that has never been available – it performs not just one but up to six simultaneous measurements.



❶ New 10-Port Valve

- Does the work of two Model 11 valves
- Is half the size of the Model 11 valve
- Uses pressure-on-diaphragm activation with no moving parts
- Operates over 10 million cycles on clean samples
- Switches gas samples up to 75 psig (5-bar)
- Can operate on carrier gas with negligible consumption

❷ New Electronic Feed-Through Assemblies

- Eliminates all oven wiring
- Reduces detector electronic noise with full metal shielding
- Meets all international codes without cumbersome seals
- Allows any detector to be attached to the same assembly

❸ New Thermal Conductivity Detector

- Includes 6 independent measurement cells and 2 reference cells
- Features thermistor bead connections that do not require soldering
- Mates directly to the modular feed-through assembly

❹ New Flame Ionization Detector

- Includes the flame chamber plus two filament-type thermal conductivity cells
- Contains a heater (optional) to prevent condensation at lower oven temperatures
- Includes flame arrestors in the cell block to prevent condensation blockage
- Allows direct capillary column feed to the flame for zero-dead-volume
- Mates directly to the modular feed-through assembly

Smart Electronics for Maximum Simplicity

Advance Maxum uses all new modular electronics. Every module includes a built-in microprocessor to make it a self-contained "smart" device. Even better, these devices are interconnected with a snap-together serial bus. Advance Maxum electronics are simply "plug and play."

New Universal Power Supply and New Power Entry and Control Module

- Provides shielding of high-power circuits to meet EMI/RFI reduction standards
- Uses plug-in field wiring to simplify installation
- Accepts international electrical power to reduce costs of installation

New System Controller (SYSCON)

- Features a high-speed 32-bit microprocessor to give system power
- Includes battery-backed RAM and PROM for long term security
- Includes on-board printer and chart recorder connections at no extra cost

New Sensor Near Electronics (SNE)

- Includes high-speed, 32-bit microprocessor for each detector to provide powerful, direct signal processing
- Provides 1000 points/second digitalization to enable modern fast chromatography
- Provides all application hardware control to simplify maintenance and installation

New Input / Output (I/O) Hardware

- Features plug-in boards for all field-wired I/O to reduce option costs
- Provides a plug-in communication board for optional network connection
- Allows user-programming of all I/O functions for maximum flexibility

New Solenoid Valve Control Module

- Features all air solenoid operators in a modular assembly to minimize down time during repair
- Provides 3-way and 4-way valve manifolds for maximum valving options
- Uses separate tubing manifolds with plug-in seals to accommodate variable air supplies

New Electronic Pressure Control Module (EPC)

- Allows precise pressure control without restrictors or needle valves which eliminates oven set-up time
- Allows programmed pressure control to enable faster chromatography and modern applications
- Can be used for carrier and fuel gas supply eliminating costs of unreliable mechanical regulation

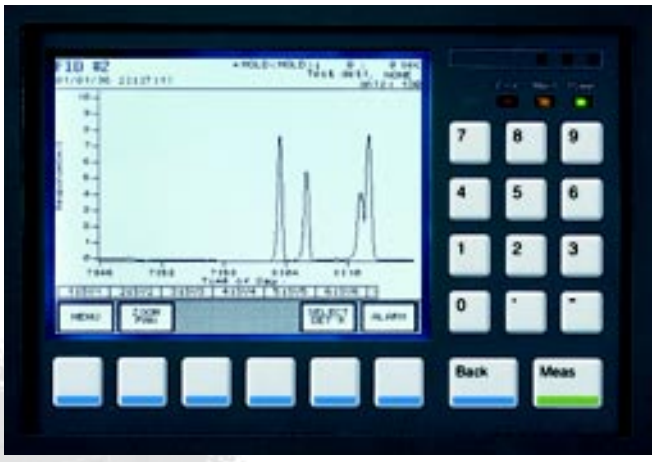
Graphical Panel for Maximum Accessibility

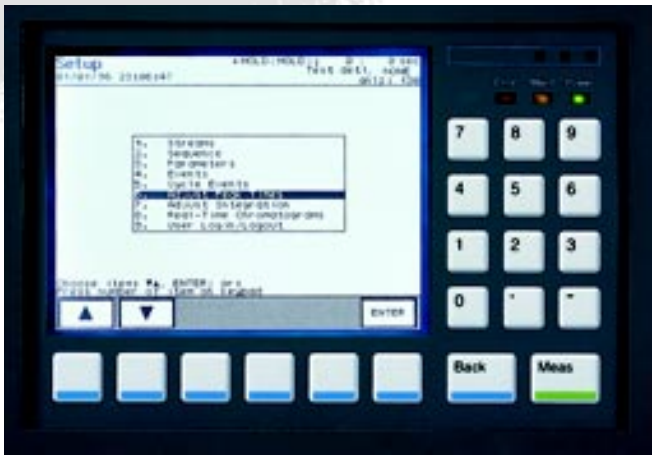
Advance Maxum includes an all new operator maintenance panel. With its graphical display, all maintenance functions and data are presented in a simple, easy-to-understand format. With a stored or real-time chromatogram displayed, strip-chart recorders are now a thing of the past.

New Maintenance Panel

- Provides simple and direct access to all maintenance functions to reduce training costs
- Uses a graphical display for complete presentation of information to make operation intuitive and easy
- Provides "hot-keys" and shortcuts for fewer key strokes saving time for experienced users
- Displays real-time chromatograms with zoom and pan features eliminating the need for strip-chart recorders
- Stores hours of chromatograms complete with voltages and cycle times for future comparison to simplify on-going maintenance

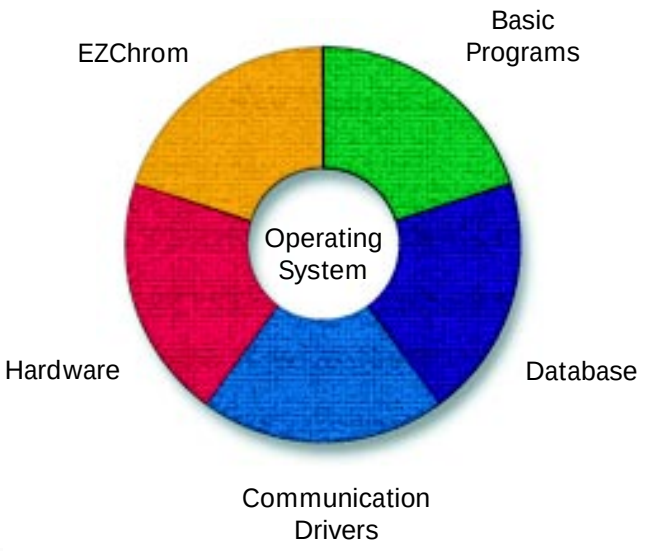
What all of this means to you is that the power of Advance Maxum is simple to use!





Powerful Software for Maximum Control

Advance Maxum uses industry standard software. This platform provides true "plug and play" functionality. In addition, standard software means robust operation and future expandability. Best of all, the EZChrom software makes Advance Maxum the first process chromatograph with laboratory-grade power.



Operating System

- Supports tested, modular software packages for reliability
- Supports Ethernet TCP/IP for open communications
- Provides database and calculation support for system power
- Recognizes all hardware for easy "plug and play" set-up

Real-Time Relational Database

- Operates on-line for direct convenient data access
- Provides an open architecture for custom configurations
- Uses standard query tools for easy data access

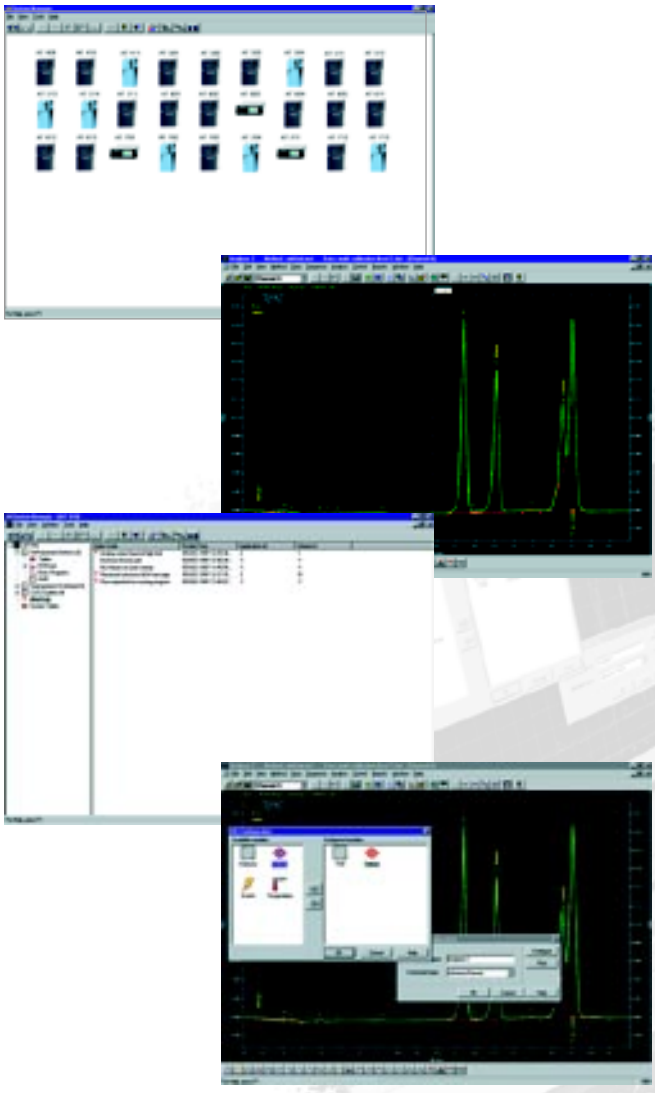
Advance EZChrom

- Provides automatic method set-up and component peak identification with a simple "mouse click" for easiest operation
- Chooses best peak gating and basing methods automatically for greatest application reliability
- Re-processes captured chromatograms with different methods to reduce application cost
- Identifies and measures unknown component peaks automatically for best process information
- Supports simultaneous, multiple detector measurements for greatest analytical power

BASIC Programming

- Permits unlimited customization for best compliance with user needs
- Uses industry-standard BASIC programming syntax for ease of training
- Accesses real-time data in any analyzer on the network for greatest flexibility

Comprehensive Workstation for Maximum Convenience



Advance Maxum uses a PC-based, network workstation for convenient programming and data processing. Any analyzer
can be programmed and monitored from a single location. The workstation includes graphical displays for simple operation, maintenance, and diagnostics capabilities.

New Advance Application Personal Computer Workstation

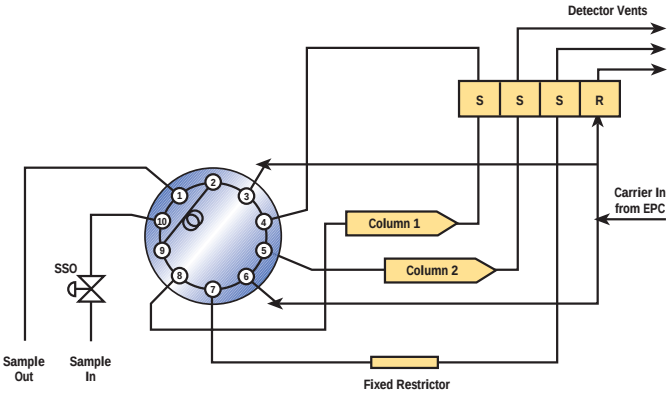
- Operates on Windows 95 or NT* for greatest compatibility
- Automatically recognizes and displays all network hard ware for easiest system operation and maintenance
- Monitors alarm status of all analyzers on the network to make central system maintenance simple and practical
- Graphically displays all analyzer operating data to reduce cost of maintaining large systems
- Provides multiple levels of password protection for all analyzer operating functions to ensure system security
- Can be connected through existing business LANs to allow wide access for monitoring or maintenance
- Supports PC printers for hard copy of chromatograms, programs, and alarm logs to help meet the record keeping requirements of quality processes

*Windows is a trademark of Microsoft Corporation

Parallel Chromatography for Maximum Speed

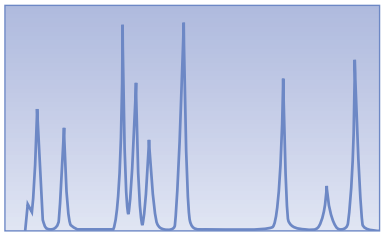
Advance Maxum provides a completely new approach to gas chromatography. All of the new modular hardware and automatic software gives Advance Maxum the ability to do what no other chromatograph can do – Parallel Chromatography.

The concept of parallel chromatography is not new. But Advance Maxum is the first gas chromatograph, process or laboratory, to implement this concept in a single analyzer without compromises in cost and complexity. The result is a quantum step in chromatograph application capability – significantly higher performance at lower cost.

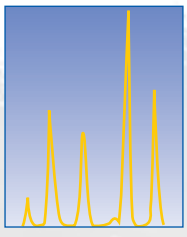


Modular Applications with Parallel Chromatography

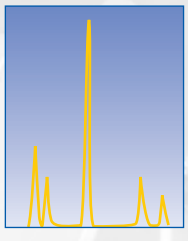
With Advance Maxum's new hardware and software, you can take a complex single-train chromatograph analysis and break it into multiple simple trains. Each of the simple trains is then run simultaneously, in parallel. This not only simplifies the overall analysis, but also allows it to be performed faster and more reliably.



Serial Chromatography



Maxum Parallel Chromatography



With the ability to break chromatography into parallel operating modules, it is possible to use standard configurations for common applications. For example, 95% of the vapor thermal conductivity detector applications in a typical olefins plant can be done with various combinations of less than 12 total standard mini-applications. What's more, each of these measurements can be performed in less than two minutes.

These standard applications can be configured alone or in any combination of parallel groups, depending on the measurement requirements. With modular applications and parallel chromatography, application development can be virtually eliminated. Standard application modules and methods can be taken off-the-shelf and installed in the analyzer. Because each module is simple and developed for optimum performance, the result is not only faster delivery, but also a more reliable measurement.

What does all this mean to you:

- Shorter cycle times
- Standardized training for maintenance personnel
- Faster delivery

Modular Applications for Maximum Versatility

Although modular applications with parallel chromatography significantly enhance the ability to perform standard measurements, they have other advantages as well.

❶ More Frequent Measurement Updates

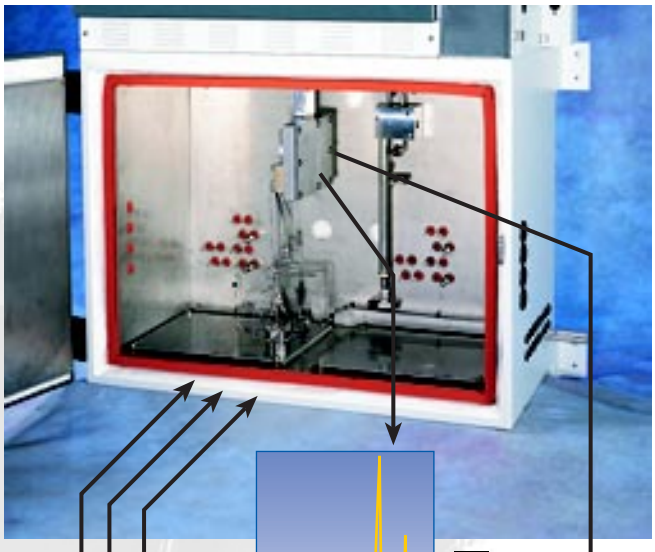
While parallel chromatography with modular applications reduces the cycle time for complex applications, it can also increase chromatograph analysis frequency. Duplicate modules can be run in parallel at staggered times to provide more frequent measurement updates.

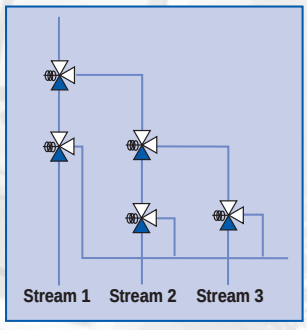
❷ Alternatives to Stream Switching

If the same or similar measurements are performed on different streams, parallel modules can be used for each stream rather than switching the stream to a single module. This has the added benefit of reducing overall cycle time on multiple-stream applications.

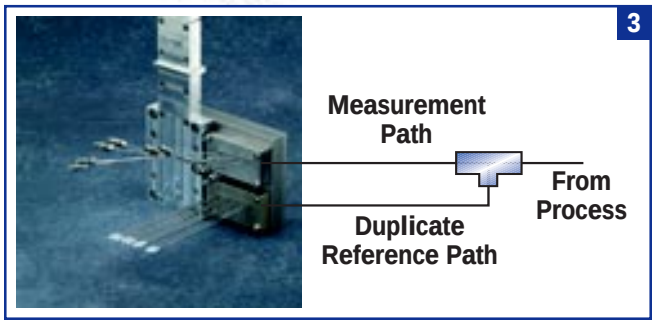
❸ Less Frequent Calibration

Parallel chromatography with modular applications can also significantly reduce calibration requirements. By running two identical modules in parallel on the same stream, redundant measurements are provided. As long as the results remain the same within a predefined error limit, the analysis is known to be accurate. Any deviation outside the error limit can then notify the user or activate analyzer calibration. However, with the simpler parallel measurement configurations and standard modular applications, calibration requirements for the new Advance Maxum will already be reduced significantly.

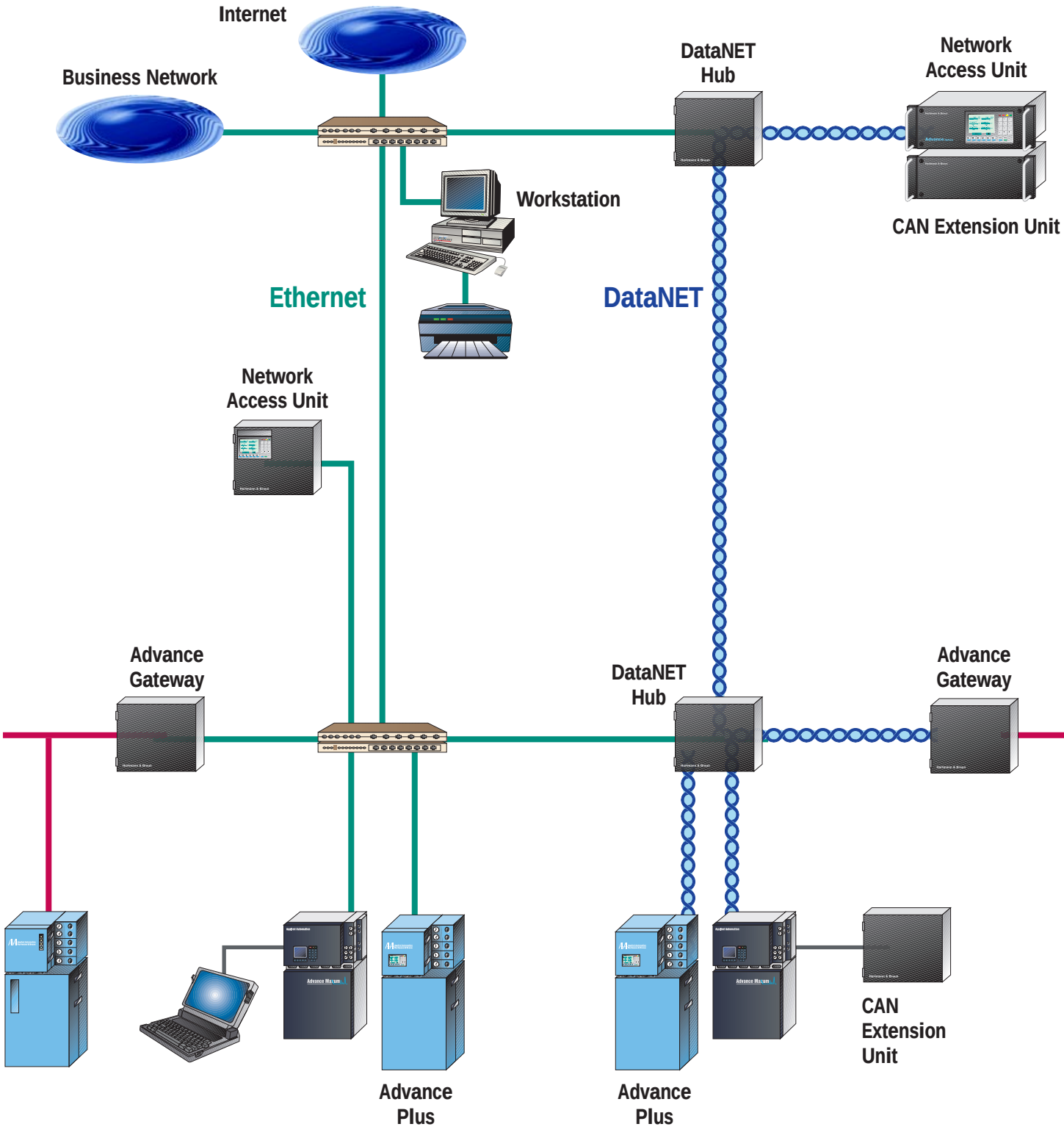




Traditional Sample Selection



Open Network for Maximum Connectivity



Advance Maxum is a completely distributed analyzer system. Network communication uses industry standard protocols providing high-speed communication between all devices. The Advance Communication System can function alone or may be connected to a DCS or plant-wide LAN. And, in keeping with Applied Automation's philosophy for backward compatibility, the Advance Communication System is completely backward compatible with all existing Advance Data Hiway systems.

Network Access Unit

- Available with maintenance panel
- Slots for I/O hardware
- May have multiple units anywhere in one network

CAN Extension Unit

- Slots for additional I/O boards

DataNET

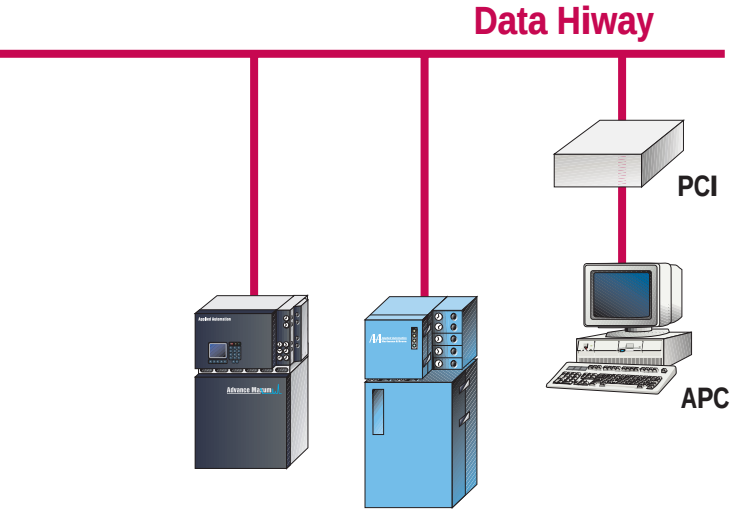
- Ordinary twisted pair wire or fiber optics
- True message confirmation
- Hazardous area hardware ratings
- Fully redundant

The Advance Communication System

- Provides high speed peer-to-peer communication for greatest user flexibility
- Allows open TCP/IP connectivity to industry standard networks to enable large, open systems
- Can be implemented as single or redundant or in any combination for lowest cost
- Supports interconnection to the Advance Data Hiway and Advance Optichrom Chromatographs to ensure backwards compatibility
- Implemented as any combination of:
  - Ethernet for lowest cost
  - DataNET for highest reliability
  - Data Hiway for backwards compatibility

Advance Products Supported

- Maxum and Optichrom GCs
- Network Access Unit (NAU) for remote maintenance and I/O
- CAN Extension Unit (CEU) for additional I/O boards
- Gateway for interface to Data Hiway
- Workstation for user interface
- Hubs for network expandability



Optimized Configurations for Maximum Value

Advance Maxum provides completely new configuration flexibility. Now, the user can optimize the analyzer system configuration for maximum value.

❶ More Measurements per Oven

With multiple cell detectors and parallel chromatography, Advance Maxum can perform more measurements in the same oven. Compact modular components and modular applications make this possible but still easy to maintain.

❷ More Ovens per Analyzer

With dual oven compartments that are independently temperature-controlled, Advance Maxum can perform the function of two chromatographs in a single analyzer unit. Again, compact modular components and modular applications make this practical.

❸ More Analyzers per Controller

With sensor-near electronics and simple bus communication, Advance Maxum allows up to 21 analysis modules per system controller. Where multiple analyzers are installed together in a shelter, only one of the analyzers needs to be equipped with a system controller and maintenance panel. Because the sensor-near electronics controls the entire application, the system hardware cost can be minimized without sacrificing reliability.

❹ More Analyzers per Shelter

With the shorter wall print of Advance Maxum, analyzers may be stacked without sacrificing maintenance accessibility. All wiring and tubing connections can be made on the sidesto allow zero clearance on the top and bottom. This can allow a dramatic reduction in the total cost of shelters for a complete analyzer system.

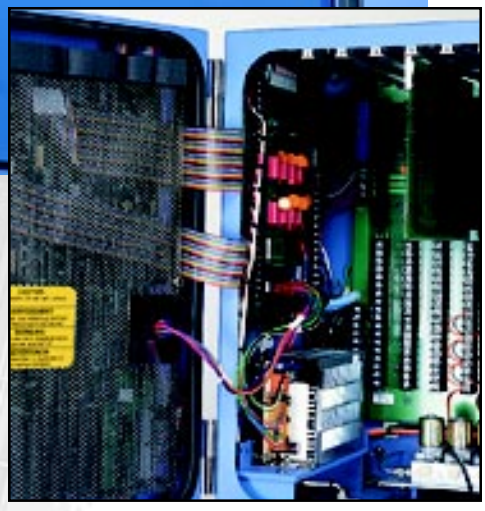
Easy Upgrades for Maximum Compatibility

Advance Maxum is backward compatible with all existing Advance Data Hiway systems. What's more, Advance Plus fully upgrades Optichrom analyzers currently in the field to Maxum capability.

Upgrading any present Advance Optichrom analyzer is as simple as replacing the door. No special adaptations, wiring, or conversions are required. And Advance Plus works with all Optichrom analyzers regardless of detectors or I/O requirements. Even the present Data Hiway connections can be used, simply by adding an Advance Gateway communication option.

With Advance Plus, all of the software and programming capabilities of Advance Maxum are available to the Optichrom analyzer. Chromatograph setup and operation are now made simple with EZChrom. In addition, this brings to Optichrom all the data transfer benefits of Advance Maxum's open architecture.

With Advance Plus, the power and convenience of Advance Maxum are readily available to extend the useful life of Optichrom analyzers. The conversion is simple and cost effective giving you maximum value from your current investment.



Advance Maxum Brings You:

- **Versatile Oven**
- **Flexible Tools**
- **Smart Electronics**
- **Graphical Panel**
- **Powerful Software**
- **Comprehensive Workstation**
- **Parallel Chromatography**
- **Modular Applications**
- **Open Network**
- **Optimized Configurations**
- **Easy Upgrades**

Advance Maxum from Applied Automation
Power Made Simple

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