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## Multi-instrument Control with G1701CA MSD Productivity ChemStation

### Overview

In the GC/MS laboratories of today there is a continual effort to increase productivity and reduce operating costs by optimizing instrumentation and the resulting flow of information. Historically, GC/MS systems have been controlled by a single dedicated software application that provides control, acquisition, and data reduction locally at the instrument. Remote data processing has significantly improved productivity, but it requires additional PC hardware and software and does not eliminate the need for a local system controller at each instrument.

With the introduction of the new LAN 5973 Network MSD and G1701CA MSD Productivity ChemStation software, it is now possible to provide simultaneous multi-instrument control of two LAN GC/MS systems, or of up to four LAN GC systems or of a combination of both (not to exceed four detectors) from any location within the laboratory. Operation of two GC/MS systems and mixed GC systems eliminates the need for additional ChemStations dedicated to each instrument and reduces the bench space required for operation. Multi-instrument system control can be very cost effective in dedicated, routine high-volume applications or in smaller laboratories that are cost-sensitive and that routinely share instrument resources.

When combined with our G1710BA/CA remote Data Analysis and review software, multi-instrument support allows laboratories to optimize data acquisition and to off-load data processing to a more convenient location (Figure 1). Multi-instrument support not only results in greater productivity, but also reduces the cost of ownership and increases the flexibility of instrument locations within the laboratory.

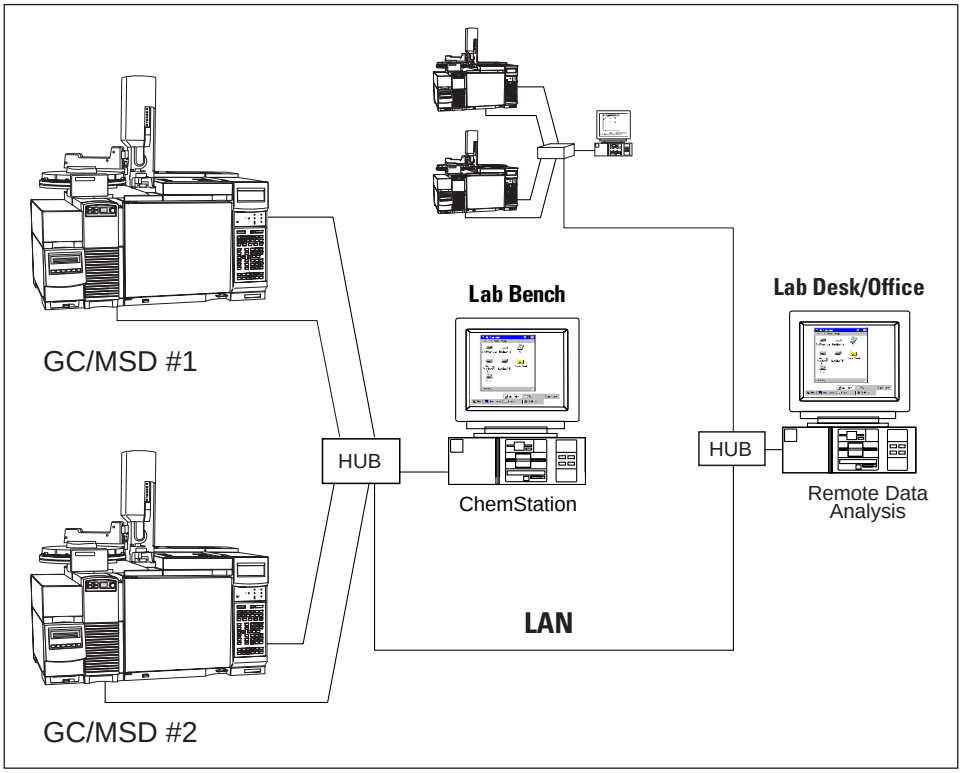


**Figure 1. Single MSD ChemStation controlling two GC/MSD systems with optional remote data processing to optimize performance and provide best value.**

## System Configuration

The MSD Productivity ChemStation allows the operator to configure up to four systems, two of which may include MSDs. Each configured instrument/system may include an MSD or a GC or both. Two MSDs may be configured or, if no MSD is present, up to four GCs. Each configured instrument includes its specific IP address for easier LAN management (Figure 2).

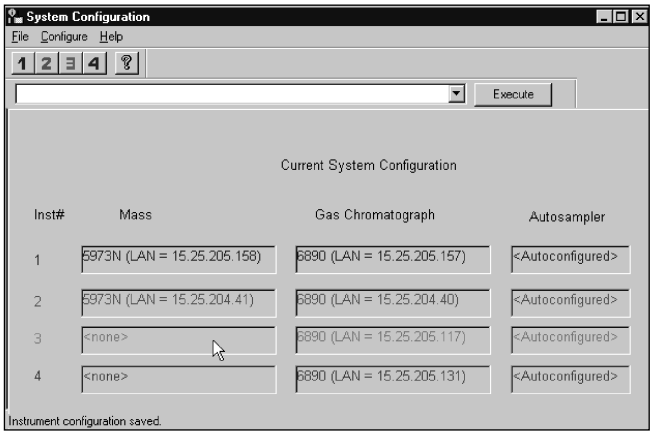


**Figure 2. In this example two GC/MS (no GC detectors) and 2 GC (1 detector each) systems are configured. Each configured instrument is clearly displayed along with its IP address for easier LAN management.**

## How it works

The MSD Productivity ChemStation is based on Hyphenated Instrument Architecture (HIA). HIA allows each 32-bit-software module to operate independently within a seamless application. There are three basic modules: Instrument Control, Data Analysis, and Custom Reports. Because each of these modules operates independently, multiple sessions of a particular module may be executed.

With Instrument Control, each configured system is treated independently of the other and is controlled by a second application of the Instrument Control software module. Each system may have its own acquisition, sequence, and data analysis methods, and each system may be monitored and managed independently of the other. For example, the sequence on system 1 may be paused for a priority sample while system 2 continues uninterrupted. Instrument control panels for each system may be individually customized to include system status information that you feel is important and the panels may be resized or minimized to fit your needs (Figure 3).

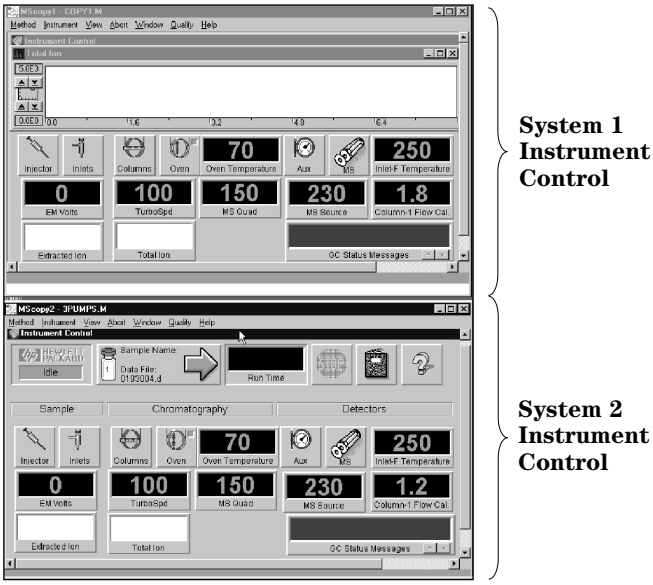


**Figure 3. Each system has its own separate acquisition method and sequence, and each system runs independently of the other. Instrument control windows can be customized to present easy-to-read monitors for all important system functions.**

## Operation

Managing two GC/MSD systems is the same as managing one system. Instrument Control is started, method and samples are loaded, and the analysis is started. Because each Instrument Control window is clearly identified by the system and method name you provide, you always know which instrument is associated with which instrument control window and which method is being run (Figure 4). Each system is started independently of the other, and real-time displays provide information regarding the analysis status of each system. The total ion chromatogram (TIC) or extracted ion chromatogram (EIC) may also be displayed if the operator prefers (Figure 5).

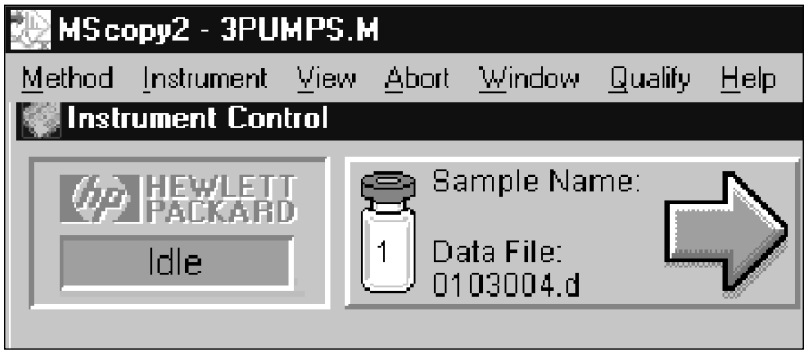


**Figure 4. In this example, the user-defined system name (Mscopy2) and method name (3PUMPS.M) are clearly displayed on the top line of the instrument control panel.**

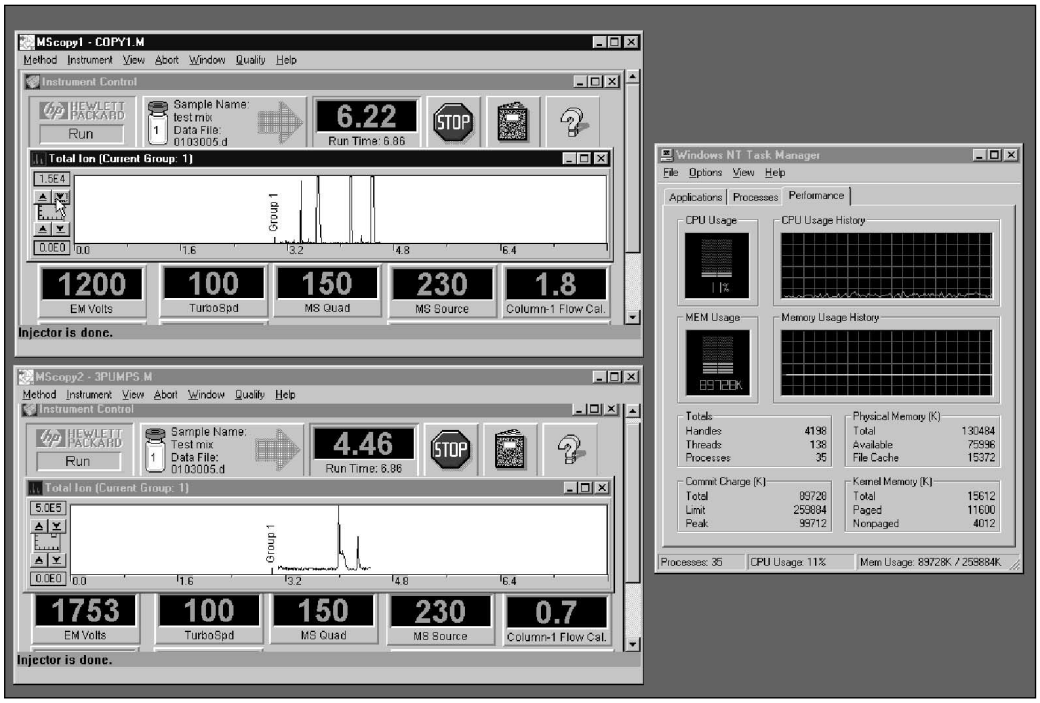


**Figure 5. In this example, two LAN GC/MSD systems are acquiring data simultaneously from one MSD Productivity ChemStation. System 1 (top) is 6.22 min into the analysis and system 2 is 4.46 min into the analysis. Notice the CPU and Memory use display to the right (accessible via Task Manager). Although two systems are acquiring data, the PC resource utilization is minimal. PC performance in this example may not be consistent with what you experience. Actual performance on your system is based on PC speed, memory and other applications, which may be running.**

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## Remote Data Processing

When combined with G1710BA/CA Data Analysis software, multi-instrument control ChemStations can control and acquire data from system groups for transfer and processing on remote Data Analysis ChemStations. The use of remote Data Analysis ChemStations allows data processing and review to be executed at a more convenient location.

For more information on remote data processing with G1710BA/CA software, see publication number 5968-2696E.

## Configuration Considerations

When configuring a multi-instrument system, the maximum four-detector rule must be followed. No more than four detectors may be configured at one time and a maximum of only two MSD detectors (see Table 1). Table 1 does not show all possible combinations, and more memory may be required, based on the execution of additional software applications.

**Table 1. Memory requirements for supported combinations of LAN GC and MSD detectors. This table is for LAN based systems only.**

| Total Detectors | PC Memory | MSD1 | MSD2 | GC 1 | GC 2 | GC 3 | GC 4 |
|---|---|---|---|---|---|---|---|
| One | 64MB | X | | | | | |
| Two | 128MB | X | X | | | | |
| Three | 256MB | X | X | X | | | |
| Four | 256MB | X | X | X | X | | |
| Three | 128MB | X | | X | X | | |
| Four | 256MB | X | | X | X | X | |
| Four | 256MB | | | X | X | X | X |

As with any network-based system, additional expertise is required to set up and maintain a complex network. In the examples described here, the systems were set up using local area networks (via Hubs) and TCP/IP protocols, which is the manufacturer supported installation configuration for new systems. Although more complex connections to building/site LANs is possible, your local IT department is required in the planning and execution stages.

## Performance

MSD Productivity ChemStation performance requirements are defined by the number of instruments and software applications that are to be executed at any given time. For example, after each analysis is completed, the data analysis will be started to process the results. If a method includes extensive data processing following each analysis, then more PC resources may be required. If you plan to do extensive interactive data analysis during data acquisition, this too may result in slower performance and require additional resources. If you plan to do extensive interactive data processing using the same MSD ChemStation, you may elect to do so upon completion of the data acquisition using the DoList feature (see publication number 5968-4366E) or you may choose to use the G1710CA remote data analysis software.

The High Performance MSD Productivity ChemStation bundle, G1729CA, includes the PC resources required to operate two GC/MSDs with minimal interactive data analysis. Minimum PC requirements include (1) the HP Kayak 400 Pentium PC, (2) 128 Mbytes Ram, (3) LAN Interface, and (4) CD ROM.

## Summary

Multi-instrument control can optimize instrumentation costs, reduce the bench space required, and increase productivity. When combined with off-line/remote data processing, multi-instrument control allows you to manage the sample analysis process more efficiently and to isolate functionality based on job responsibilities.

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**Printed in the U.S.A. September 1999
(23) 5968-7800E**