

# **Agilent 1100 Series LC/MSD**

**System Installation Manual**



**Agilent Technologies**

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## Edition/Print Date

All editions and updates of this manual and their creation dates are listed below.

First Edition ..... May 2000

## Safety symbols

Warnings in the manual or on the instrument must be observed during all phases of operation, service, and repair of this instrument. Failure to comply with these precautions violates safety standards of design and the intended use the instrument. Agilent Technologies assumes no liability for the customer's failure to comply with these requirements.



Refer to operating instructions



Indicates hazardous voltage



Indicates hot surface



Indicates earth (ground) terminal

## Manual Conventions

### WARNING

A warning calls attention to a condition or possible situation that could cause **personal injury**.

### CAUTION

A caution calls attention to a condition or possible situation that could **damage or destroy the instrument or the user's work or data**.

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## General Information

## Before You Begin

This manual describes the installation of an Agilent 1100 Series LC/MSD system. This process is outlined as a sequence of steps.

Several options and accessories are included in this manual. They are presented in the recommended order of installation. Disregard the sections that do not apply to a specific instrument configuration.

The following installation instructions are intended for on-site installation by a trained Agilent Customer Engineer.

Additional information is available in the *Agilent 1100 Series LC/MSD Site Preparation Manual* (Agilent part number G1946-90098).

Installation of an LC/MSD system includes the following steps:

- 1 Inspection of shipped materials**
- 2 Data system installation**
- 3 LC/MSD installation**
- 4 LC installation and preparation**
- 5 Performance evaluation**
- 6 Customer familiarization**

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### **NOTE**

Checkout and tuning samples are shipped separately, to comply with safety regulations and to ensure prompt delivery. Make sure these samples have been stored correctly, per the instructions in the box.

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## Customer Responsibilities

The following are **not** included in the standard installation. They are the responsibility of the customer unless previous arrangements have been made between the customer and the Agilent Technologies Customer Service Organization.

- Preparation of all site facilities including the provision of adequate space, supporting bench, ventilation and ac power as stated in the *1100 Series LC/MSD Site Preparation Manual* (part number G1946-90098).
- Operating supplies: syringes, vials, and solvents.
- Nitrogen gas: the LC/MSD requires a large quantity of contaminant-free nitrogen gas. Agilent recommends that the nitrogen source be either a nitrogen generator or a large (160 liter or greater) dewar of liquid nitrogen. For additional information on nitrogen gas requirements, see the *1100 Series LC/MSD Site Preparation Manual* (part number G1946-90098).

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### WARNING

**Nitrogen is the *only* acceptable drying and nebulizing gas. Use of air, oxygen, or other gases, when combined with solvents and high voltages in the spray chamber, could result in explosion.**

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### NOTE

Solvents that are acceptable for most LC applications may contain unacceptably high levels of background contaminants detectable by the more-sensitive LC/MSD. Ideally, LC solvents used with the LC/MSD should be rated for both HPLC and pesticide, environmental, or GC/MS analyses. Use the highest purity solvents you can obtain. Acceptability of solvents for a specific application must be *empirically* determined.

- Separate vents for pump and spray chamber exhaust
- Secondary containment containers for the drain bottle
- Testing, modification, and/or repair of instruments not purchased as part of the Agilent 1100 LC/MSD system
- Operational training for programs not specifically listed in this document
- Tests using customer-supplied samples or equipment
- Any tasks not described in this manual

In addition, the customer is required to:

- Provide someone to help lift the LC/MSD (63.1 kg) onto the bench
- Have the primary user present during installation and familiarization

## Other Documentation

Additional information is contained in the following documentation:

- 1100 Series LC/MSD Maintenance and Reference CD-ROMs
- LC/MSD hardware reference online help
- LC/MSD ChemStation online help
- 1100 Series LC manuals, maintenance CD-ROM, and online help
- Computer installation manuals
- Computer peripheral manuals (printer, backup drives, and so on)
- Windows NT® 4.0 documentation

This installation manual is intended to be used in combination with these other resources. Many steps in this manual are explained in detail elsewhere, and the appropriate resource should be consulted if you are not sure of how to perform a particular step.

### Web-Based Product Update News

To access the latest information on the Agilent ChemStation software:

- 1 Point your web browser to the Agilent web site at <http://www.Agilent.com/>.**
- 2 Click on Services and Support.**
- 3 Click on Chemical Analysis Technical Support.**
- 4 Click on Software Status Bulletins and Patches.**

You are prompted to enter your product registration number to access the software status bulletin web page.



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## Warranty

Agilent Technologies warrants its Analytical products against defects in materials and workmanship for the warranty period. During the warranty period, Agilent, at its option, repairs or replaces products that prove to be defective. Products that are installed by Agilent are warranted from the installation date; all others are warranted from the date of delivery.

If Buyer schedules or delays installation more than 30 days after delivery, then warranty period starts on 31st day from the date of shipment. For international orders, the grace period is 60 days, and the warranty period starts on the 61st day from the date of shipment.

Agilent software and firmware products that are designated by Agilent for use with a hardware product, when properly installed on that hardware product, are warranted not to fail to execute their programming instructions due to defects in materials and workmanship. If Agilent receives notice of such defects during the warranty period, Agilent shall repair or replace software media and firmware that do not execute their programming instructions due to such defects. Agilent does not warrant that the operation of the software, firmware, or hardware shall be uninterrupted or error free.

Within Agilent service travel areas, warranty and installation services for products installed by Agilent and certain other products designated by Agilent are performed at Buyer's facility at no charge. For installation and warranty services outside of Agilent's service travel area, Agilent provides a quotation for the applicable additional services.

The foregoing warranty shall not apply to defects resulting from:

- Improper or inadequate maintenance, adjustment, calibration, or operation by Buyer
- Buyer-supplied software, hardware, interfacing, or consumables
- Unauthorized modifications or misuse
- Operation outside of the environmental and electrical specifications for the product
- Improper site preparation and maintenance
- Customer-induced contamination or leaks

## 1 General Information

### **Warranty**

This warranty may be modified in accordance with the laws of your country. Please consult your local Agilent office for the period of the warranty, for shipping instructions, and for the applicable wording of the local warranty.

### **Warranty Claims**

If physical damage is found, or if operation is not as specified when the instrument is first received, notify the carrier and the nearest Agilent Technologies office immediately. The Agilent office arranges for repair or replacement of the instrument without waiting for settlement of a claim with the carrier. For other than initial inspection warranty claims, contact your local Agilent office.

### **Service Agreements**

Several service agreements are available, each designed to meet a specific need. In addition to a preventive maintenance agreement, others cover specific repair/maintenance services for the Agilent 1100 Series LC/MSD and can provide for the extension of warranty beyond the initial warranty period.

Details of these agreements, together with prices applicable to the particular installation, can be obtained from your local Agilent Technologies office.

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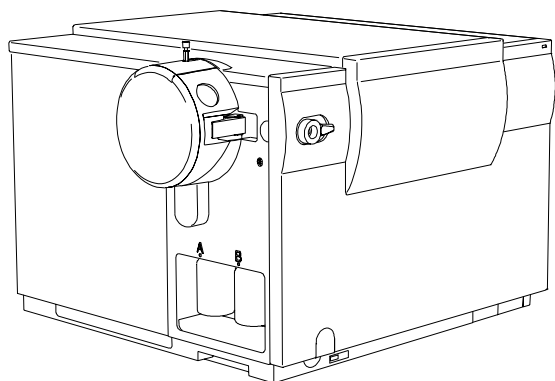
## Installation

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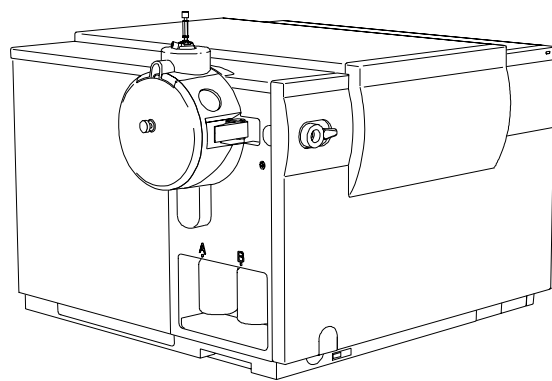
# Installing the LC/MSD

Installing the LC/MSD requires the following steps:

- Unpacking and setup
- Preparing for installation
- Connecting the LC/MSD
- Installing the spray chamber
- Installing the LC
- Baking out the LC/MSD (after ChemStation Installation)



LC/MSD with electrospray interface



LC/MSD with APCI interface

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## Unpacking and setup

Use the following procedure to unpack and set up the Agilent 1100 Series LC/MSD system.

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### NOTE

Shipping containers should not be opened until an Agilent Technologies representative is present to verify the contents of each carton. Warranty claims for missing items are honored only if an Agilent representative is on site to verify the contents of each shipping container as it is unpacked.

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### NOTE

Checkout and tuning samples are shipped separately to comply with safety regulations and to ensure prompt delivery. Make sure these samples have been stored correctly, per the instructions in the box.

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**1 Before unpacking, carefully examine all containers for external signs of damage.**

If damage is discovered, immediately contact the carrier, the Agilent Service District Manager (DM), and the California Avenue Site Technical Support group.

**2 Check off each item on the packing list, and verify the serial numbers.**

**3 Record the serial numbers in the installation documentation.**

**4 Retain shipping containers and material until contents are checked for completeness and instrument performance is verified.**

**5 Report any discrepancies to the supplying division.**

**6 Check the line voltage.**

Verify the proper line voltage and outlet ratings according to the instructions given in the *1100 Series LC/MSD Site Preparation Manual* (part number G1946-90098).

## Preparing for installation

*Materials Needed:*

- Edwards mist filter instructions
- Edwards oil drain kit instructions
- Oil return connector kit, Agilent part number 3162-1057
- Pump oil pan, G1946-00034
- Utility knife
- Needlenose pliers

**1 Using *two* people, lift the LC/MSD onto a stable bench or table.**

Handholds are on the side and rear of the chassis. To avoid twisting while reaching, place the MSD on the bench facing backward, then turn it around.

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**W A R N I N G**

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**Do *not* attempt to lift the LC/MSD (62 kg) without assistance.**

**2 Unpack the mist filter, exhaust hose, and stainless steel pump oil drip pan from the shipping kit.**

**3 Remove the foreline pump from its shipping container:**

- Cut the outer cardboard sleeve.
- Tilt the box on its side and slide the pump out of the box.
- Remove the plastic foam spacers.

**4 Set the pump into the pump oil drip pan.**

The purpose of the pan is to catch any small amounts of oil that may seep out of the pump. Additionally, the pan can contain all of the oil in the pump in case of a catastrophic seal failure.

**5 Remove the plugged outlet connector and install the new KF-25 fitting that came with the pump.**

Do *not use* the outlet nozzle as described in the Edwards manual and on the warning tag.

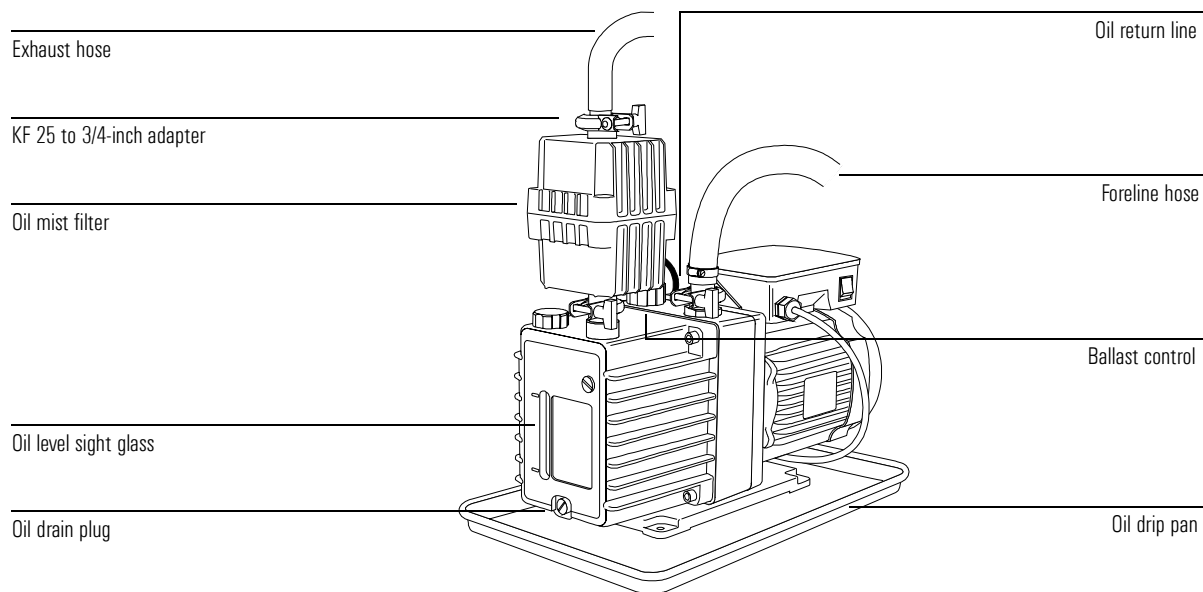
**6 Unpack the oil return kit from the pump box.**

The felt plugs and screen are not needed.

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### 7 Install the mist filter on the outlet port.

Be sure the small port on the side of the filter is on the side facing the ballast control and port (toward the motor end of the pump).



### 8 Install the oil return line:

- Install the restrictor into the black nitrile rubber tubing.
- Connect the tubing between the ballast port fitting and the oil mist filter.  
Use a pair of needlenose pliers to compress the clamps.

### 9 Set the ballast control at least 2 turns *open* (counterclockwise).

This allows oil trapped by the filter to return to the pump. If the Stage 1 pressure is greater than 2.5 Torr for G1946C LC/MSD VL and 3.5 Torr for G1946D LC/MSD SL after pumpdown, turn the ballast control clockwise to partially close the ballast.

### 10 Use the KF 25 to 1/2-inch hose fitting adapter to connect the 3/4-inch OD Tygon exhaust hose to the mist filter.

#### *Pump oil (fluid)*

The foreline pump comes filled with Inland 45 pump oil. You do **not** need to add additional oil at installation.

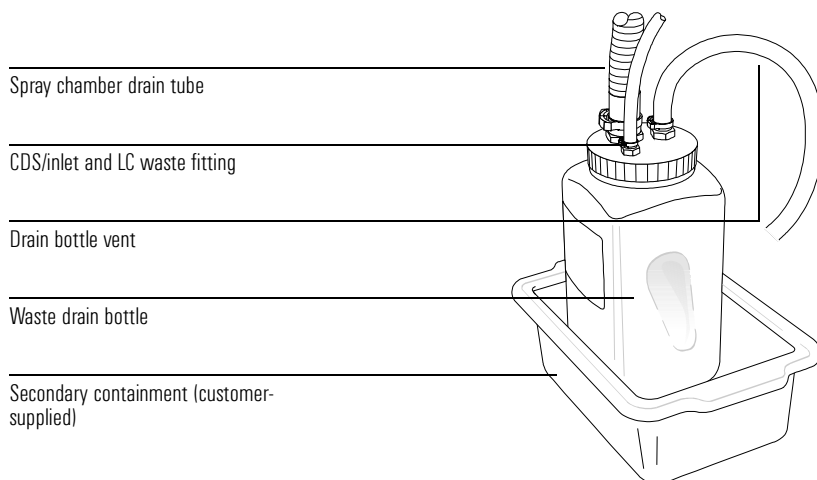
## Connecting the LC/MSD

### 1 Connect the foreline hose to the foreline pump.

If the foreline pump is to be located to the front of the LC/MSD, then disconnect the foreline hose from the Stage 1 weldment on LC/MSD and route the foreline hose through the front hose exit port.

### 2 Using the supplied hook / loop fastener tape, secure the drain bottle into a secondary containment tub.

Check with the local fire department to determine whether secondary containment is necessary and what materials are acceptable for the container.



### 3 Connect the spray chamber drain tube to the 1-inch fitting on the drain bottle.

The drain tube can also be routed out the front of the LC/MSD if necessary.

### 4 Attach the 1/4-inch calibrant delivery system (CDS) / inlet module waste tubing from the LC/MSD to the 1/4-inch fitting on the drain bottle.



- 5 **Connect the drain bottle vent tubing to the 3/4-inch fitting on the drain bottle, then connect other end of the tubing to a vent connection that is *separate* from the vent used for the foreline pump.**

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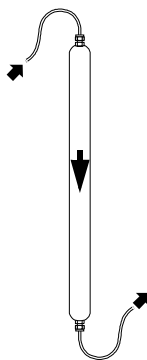
**CAUTION**

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The drain bottle vent *must* be separate from the foreline pump vent to prevent the foreline pump exhaust from contaminating the the LC/MSD's spray chamber.

- 6 **Connect the nitrogen gas conditioner between the nitrogen tank regulator or the nitrogen generator and the nitrogen gas fitting on the LC/MSD.**

Use two lengths of 1/4-inch teflon supply tubing (0890-1793). Be sure to check the flow direction arrow on the nitrogen gas conditioner and connect the tubing accordingly. Secure the gas filter in a vertical position with tie wraps.



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**WARNING**

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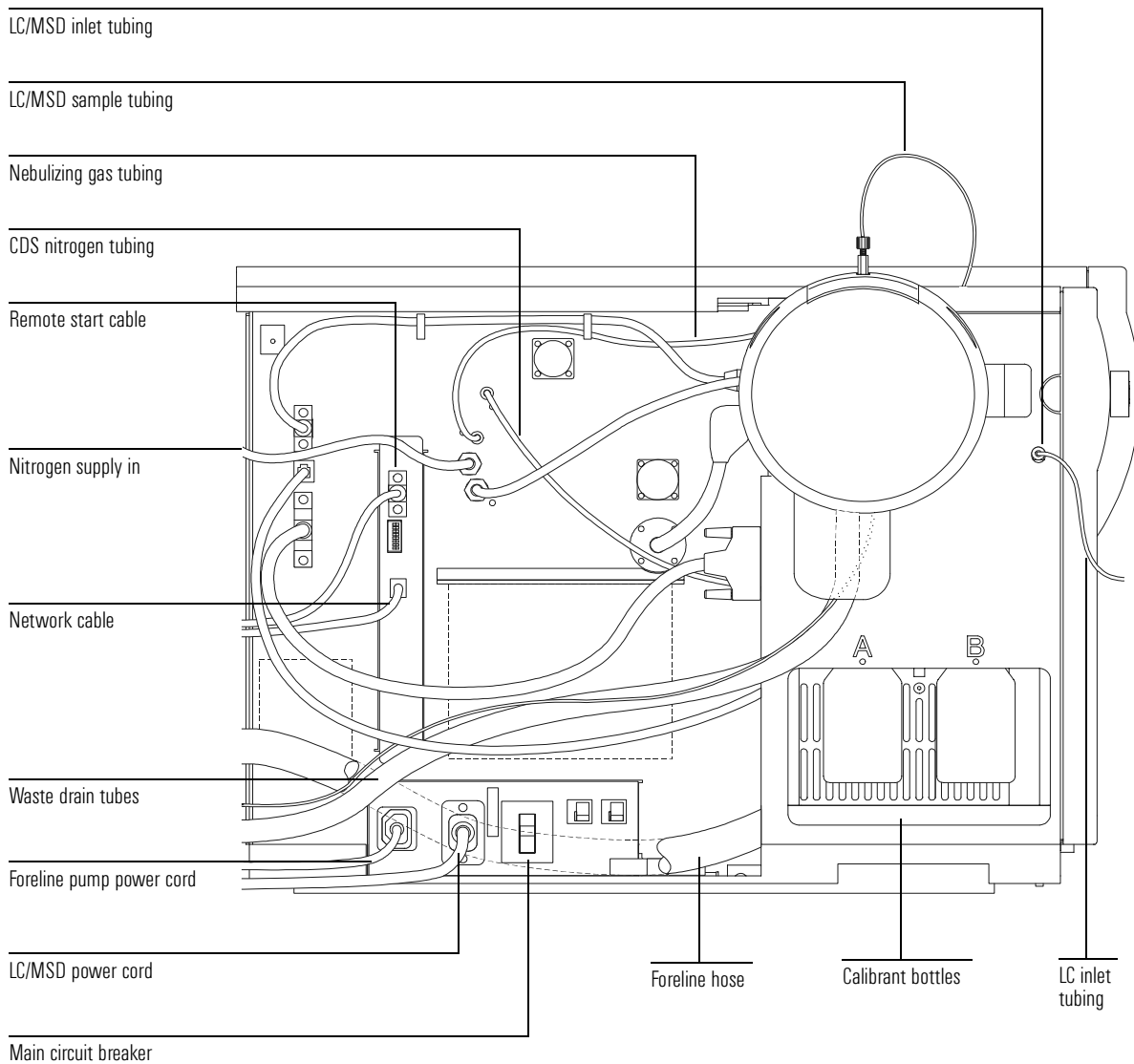
**Nitrogen is the *only* acceptable drying and nebulizing gas. Air, oxygen, or other gases, when combined with solvents and high voltages in the spray chamber, could cause an explosion.**

- 7 **Set the pressure on the nitrogen supply regulator to 80 to 100 psi.**  
Turn on the nitrogen gas for a few minutes to purge the tubing and gas conditioner before connecting the nitrogen gas supply to the LC/MSD. Regulator pressures above 100 psi cause nitrogen waste due to release from the bleed valve on the flow-control module.
- 8 **Connect the remote start cable to its connector on the LC/MSD.**  
You attach the other end of this cable to the LC later.
- 9 **Verify that the main circuit breaker on the side panel and the front power switch are both in the Off position.**

## 2 Installation

### Connecting the LC/MSD

- 10 Plug the foreline pump power cord into the foreline pump power connector on the LC/MSD.**
- 11 Plug the LC/MSD power cord into the LC/MSD power connector on the LC/MSD and the other end of the LC/MSD power cord into the wall outlet.**



**12 Turn on the main circuit breaker but leave the front power switch off.**

## Installing the spray chamber

### *Materials Needed*

- Agilent G1947A APCI interface
  - APCI calibrant, G2422A
- or*
- Agilent G1948A Electrospray interface
  - Electrospray calibrant, G2421A

- 1 Remove the foil covering the spray chamber mount, and remove the shipping cover from the spray chamber.**
- 2 For G1946D LC/MSD SL model Electrospray interface only - Install the nebulizer spacer from the shipping kit as follows:**
  - Using a flat-blade screwdriver, remove the two nebulizer shoulder screws from the top of the spray chamber.
  - Install the nebulizer spacer onto the top of the spray chamber using two m3x8 Torx T10 screws.
  - Install the two nebulizer shoulder screws into the top of the nebulizer spacer.
- 3 Install the nebulizer in the spray chamber.**
- 4 Install the appropriate spray chamber.**
- 5 Connect the 1/8-inch nebulizing gas tubing from the LC/MSD mainframe to the nebulizer gas fitting.**
- 6 Connect the LC/MSD sample tubing to the nebulizer zero dead volume fitting.**
- 7 Rinse the calibrant bottles with acetonitrile.**
- 8 Add the appropriate calibrant to the correct bottle of the calibrant delivery system (CDS).**
  - Electrospray calibrant (blue label) in bottle B

*or*

  - APCI calibrant (red label) in bottle A

If you only have one spray chamber, you can use the other calibrant bottle for a 90:10 acetonitrile / water flushing solution. Cover the label on the bottle with one indicating the actual contents. Be aware that the restriction in the CDS is designed for use with Agilent standard LC/MSD calibrants. Because of viscosity differences, flow rates of different solvents vary dramatically.

---

**CAUTION**

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The O-ring seals in the CDS have *poor* compatibility with aliphatic, aromatic, and halogenated hydrocarbons. *Never* use these types of solvents in the CDS.

- 9 ***For APCI only.* Connect the APCI corona cable to the APCI HIGH VOLTAGE connector. Connect the vaporizer heater / cable to the APCI HEATER connector.**
- 10 **Turn on the LC/MSD power switch in front to initiate pumpdown of the LC/MSD.**

The foreline pump will become quieter within a few seconds.

## Installing the LC

### Materials Needed

- HPLC (or better) grade methanol *or* isopropanol *or* acetonitrile
- HPLC (or better) grade water

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### W A R N I N G

While it is *possible* to stack the Agilent 1100 Series LC modules on top of the LC/MSD without damaging the LC/MSD, this arrangement is potentially unstable and dangerous and is *not* recommended.

---

**1 Install the Agilent 1100 LC system according to its installation documents.**

Other LCs are supported for remote start only, with no ChemStation control.

**2 For G1946D LC/MSD SL model only - Install the 2.1 x 30mm x 3.5 micron SB-C18 Rapid Resolution<sup>®</sup> column.**

**3 Connect the remote start cable from the LC/MSD to a remote start connector on the LC.**

**4 Install a JetDirect card into the LC detector module.**

If a detector module is not present, install the JetDirect card in the pump module.

**5 Prepare the LC solvents for your instrument's checkout procedure.**

The organic solvent can be *methanol*, *isopropanol*, *or* *acetonitrile*.

- 50: 50 organic solvent / water
- Up to 1% acetic acid or 0.2% formic acid can be added for positive ion verification. While this is usually not necessary, it may be beneficial to overcome ion suppression resulting from background contaminants in the mobile phase.

*G1946C LC/MSD VL*

*G1946D LC/MSD SL*

75: 25 methanol / water with 5 mM ammonium formate. To make the 5mM ammonium formate solution, add 0.315g of ammonium formate to 1 liter of 75:25 methanol/water mobile phase. Use ammonium formate with 97% purity or better.

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### NOTE

*At least* HPLC grade solvents should be used. Solvents that are acceptable for most LC applications may contain high levels of background that are detectable by the more sensitive LC/MSD. LC solvents used with the LC/MSD should be rated for both HPLC and pesticide, environmental, or GC/MS analyses. Use the highest purity solvents you can obtain. Acceptability of solvents must be *empirically* determined.

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# Installing the ChemStation

Installing the ChemStation consists of:

- Installing the computer
- Installing the SICL Drivers and configuring the LAN client
- Configuring the TCP/IP network
- Installing and configuring the CAG BootP server
- Editing the HOSTS file
- Installing the ChemStation software
- Configuring the Instruments

## Installing the computer

- 1 Verify that the line voltage is correct.**
- 2 Unpack the PC, monitor, printer, and network hub.**
- 3 Position the PC on the bench top.**
- 4 Install the PC and monitor.**

See the installation documentation supplied with the PC.

- 5 Verify that a network card is installed in the PC.**

- 6 Install the network hub.**

Place it on the table next to the PC, plug the power supply into the hub, and connect the power supply to line power.

- 7 Connect a Category 5, Shielded Twisted Pair (STP) cable from the 10BT LAN connection on the PC network card to any one of connectors 1-7 on the hub.**

Do not connect to port 8 on the hub.

---

### NOTE

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If the Cascade port is to be used later to connect the hub to the site LAN, then port 8 must be left open.

- 8 Connect a second Category 5 STP LAN cable from one of the open connectors 1-7 on the hub to the JetDirect card in one of the 1100 LC modules.**

Do not connect to port 8 on the hub.

- 9 Connect a third Category 5 STP LAN cable from one of the open connectors 1-7 on the hub to the LAN connection on the LAN/MS control card in the LC/MSD.**

Do not connect to port 8 on the hub.

- 10 At this point, do *not* connect the hub to the site LAN.**

Isolating the LC/MSD system from the site LAN enables the BootP server to recognize the address of the 1100 LC and the LC/MSD more easily.



**11 Install the printer.**

See the installation documentation supplied with the printer.

**12 Turn on the printer, hub, monitor, and PC, in that order.**

## Installing the SICL Drivers and configuring the LAN client

The LC/MSD requires that the SICL drivers be installed and configured for LAN Client.

- 1 Close any Windows applications that are running.**
- 2 Insert the ChemStation CD-ROM into the drive.**
- 3 In Windows NT Explorer, double-click the self-extracting installation program `d:\gpib\hpiolib.exe`. Click Next or Back to navigate through the installation panels. The version of the driver you install must be G.02.02.01 or later.**

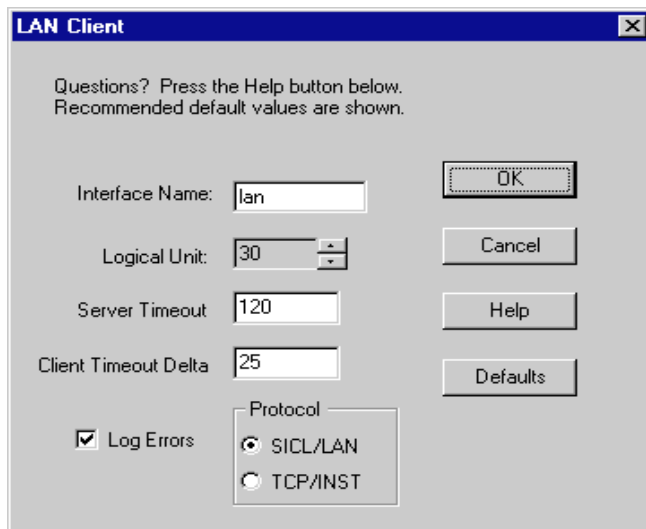
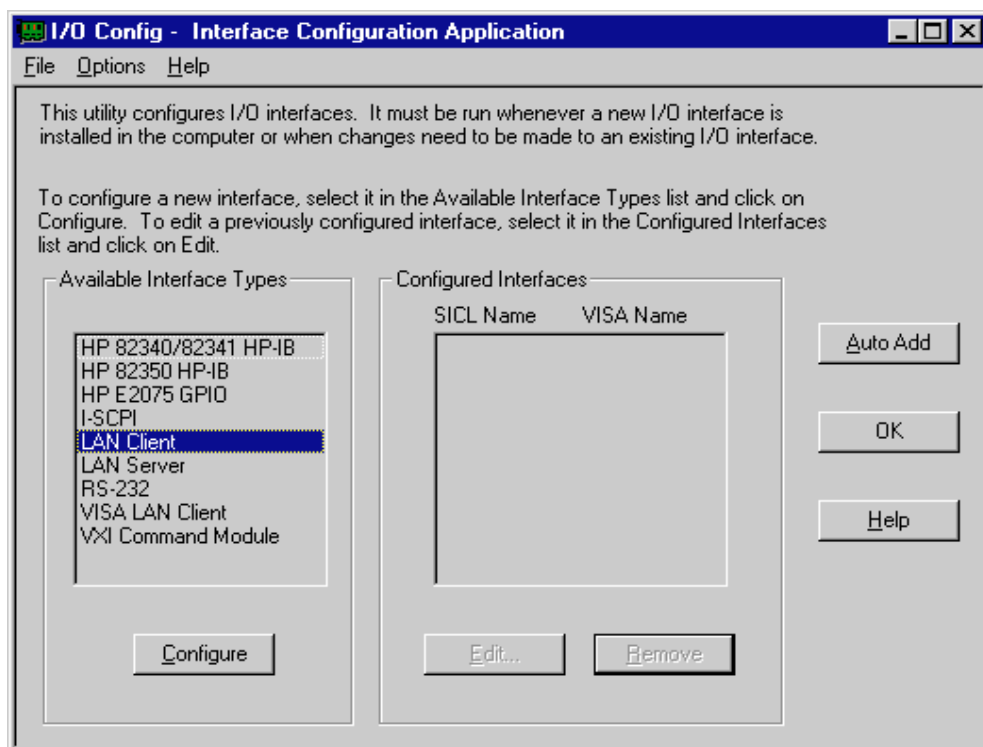
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### NOTE

When the prompt "Install the HP E8491 VXI Components?" appears, leave the checkbox blank and click **Next**. *Do not install* the HP E8491 VXI Components.

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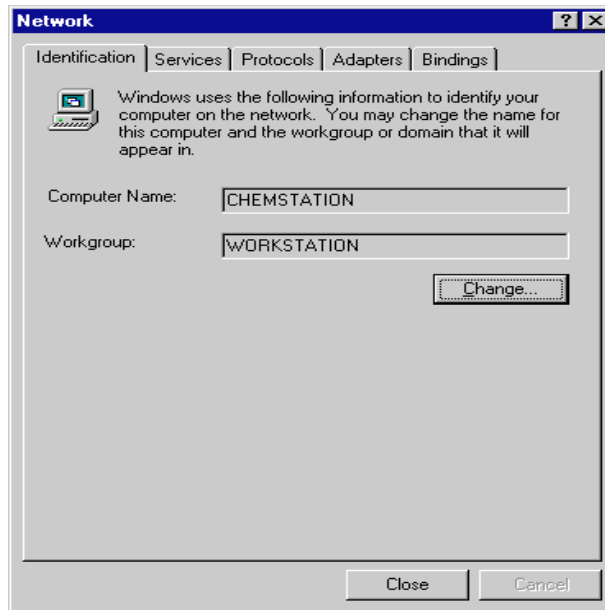
- 4 Accept the default directories for both SICL and VISA software.**
- 5 When the setup program is done copying files and creating program groups, select the Configure the Interfaces Manually option.**
- 6 Select LAN Client in the configuration panel, then click Configure. The parameters shown on the next page can be used for configuring the LAN Client.**
- 7 Click OK when you are asked to restart your system to activate the driver.**



## Configuring the TCP/IP network

### 1 Check to see if a network card is configured on your system.

From the Windows Control Panel, select **Network** to open the Network properties dialog box as shown in the following example.



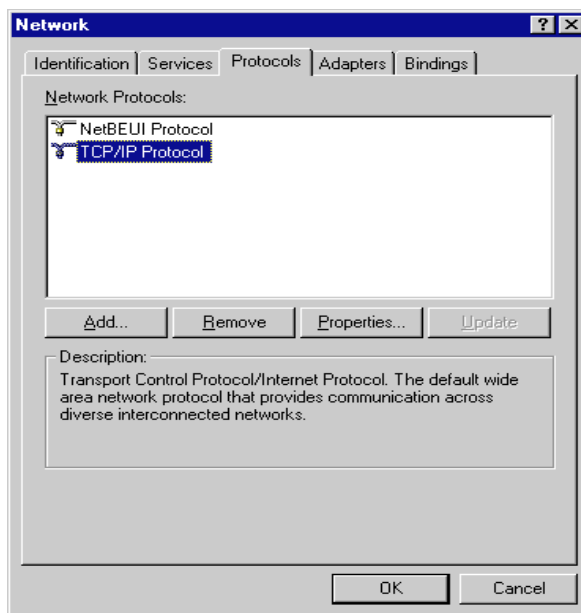
### 2 Check to see if a network card is already installed.

Select the **Adapters** tab on the Network properties dialog box. If no network card is configured, refer to the hardware manual of your network card and the PC for how to install and configure a network adapter card.

### 3 Check to see if a TCP/IP protocol is already installed.

Once the network adapter card is installed and configured, select the **Protocols** tab and check if a TCP/IP protocol is already installed (see example on following page).

---



#### 4 Install TCP/IP protocol if required.

If no TCP/IP protocol is installed, select **Add** to add a network protocol stack, then select **TCP/IP protocol**. Select **No** to the usage of DHCP, and then specify the location of your Windows NT 4.0 CD-ROM or the Windows NT installation files on your hard disk. When the installation is done, select the **Bindings** tab to allow NT to associate the TCP/IP protocol with your installed network adapter.

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#### NOTE

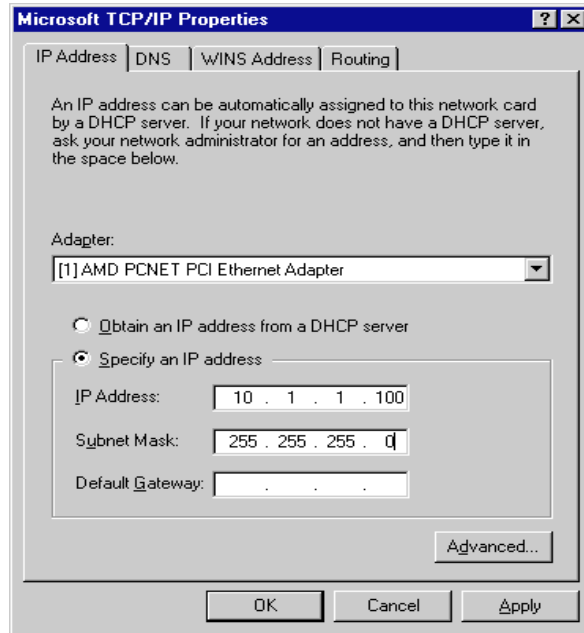
The analytical instruments are not supported on a network with a DHCP server. These servers also respond to BootP requests and do not set the buffer handling of the JetDirect card correctly. They may send a different IP address to the instrument each time it is started.

#### 5 Set the IP Address and Subnet Mask.

After the TCP/IP Protocol has been added, highlight the **TCP/IP Protocol** in the Protocols tab, then click **Properties**. Enter the IP Address and Subnet Mask being used for the ChemStation Network (see example on the next page).

## 2 Installation

### Configuring the TCP/IP network



If the ChemStation is used only for local instrument control and will *not* be connected to the site LAN, then you can use the default computer name CHEMSTATION, the default IP address of 10.1.1.100, the default Subnet Mask of 255.255.255.0, and leave Default Gateway blank.

If the system *is* being setup on the site LAN, enter the IP Address, Subnet Mask, and Default Gateway provided by the system administrator. Add DNS and WINS addresses also if desired. DNS and WINS are not needed for ChemStation operation but are used to access the World Wide Web or browse a network that uses DHCP.

## Installing and configuring the CAG BootP server

Use the following procedure to install and configure the BootP Server program, which allows you to configure instruments connected to the ChemStation via the network.

### **1 Install the BootP server from the ChemStation software CD.**

Insert the ChemStation software CD into the CD-ROM drive. Exit out of the ChemStation software setup program if it starts up automatically. To install the BootP Server, double-click on the **setup.exe** file in the **\BootP** directory on the CD.

### **2 Start the CAG BootP server from the ChemStations program group or by re-booting the PC.**

BootP runs automatically at Startup. Click once on BootP from the Taskbar to open the BootP Server window. The BootP server program should be left running (minimized is okay) at all times during instrument operation.

### **3 Discover the MAC address of the 1100 Jet Direct card and the LAN/MS Control card.**

If the system is configured as a local ChemStation network, BootP can be used to discover the MAC address of the 1100 Jet Direct card and the LAN/MS Control card. To discover the MAC address of each card, open the BootP window, then power up each instrument individually while all other instruments on the network are powered off.

---

**NOTE**

When determining the MAC address for the Jet Direct card in the 1100 LC module, don't power off the LC/MSD--just disconnect the LAN cable from the LAN/MS Control card. Also, to power up the LC/MSD, just press the reset (RST) button on the LAN/MS Control card.

---

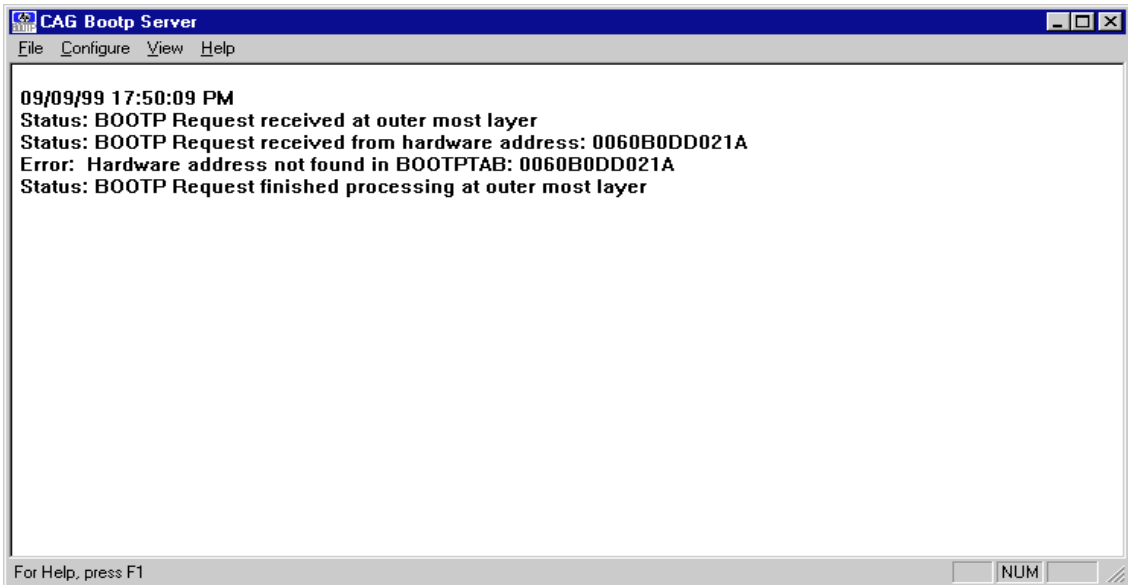
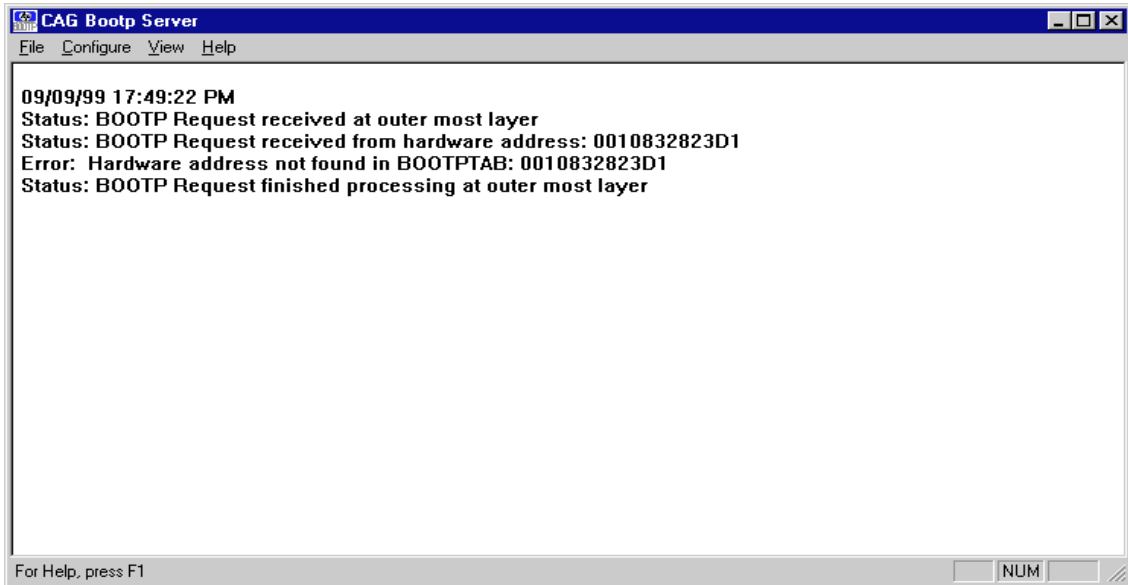
### **4 Make note of the MAC addresses of the JetDirect card and LAN/MS Control card.**

Once the instrument has completed its self-test, the 1100 Jet Direct card or LAN/MS Control card will make a BootP request in the server window as shown on the following page.

---

## 2 Installation

### Installing and configuring the CAG BootP server





**5 Configure the JetDirect card and the LAN/MS Control card as follows.**

Select **Add Entry** from the **Configure** menu of the BootP Server window. If the MAC address was detected by powering on an instrument, the address will appear in the Add/Entry screen. If the address was not detected, then check the cabling and TCP/IP protocol settings, and try powering up the instruments again.

**6 Select the MAC address for the JetDirect card in the 1100 LC module, and enter the Host Name and IP address for that instrument as shown below.**

If the ChemStation is used only for local instrument control and will *not* be connected to the site LAN, then you can use the Host Name of LC1100 and IP address of 10.1.1.101.

If the system *is* being setup on the site LAN, enter the Host Name and IP Address provided by the system administrator.

The comment field is optional. The Subnet Mask must match the TCP/IP configuration of the network card in the PC. The Gateway address is only required if the ChemStation is connected to the site LAN and should be supplied by the system administrator.

---

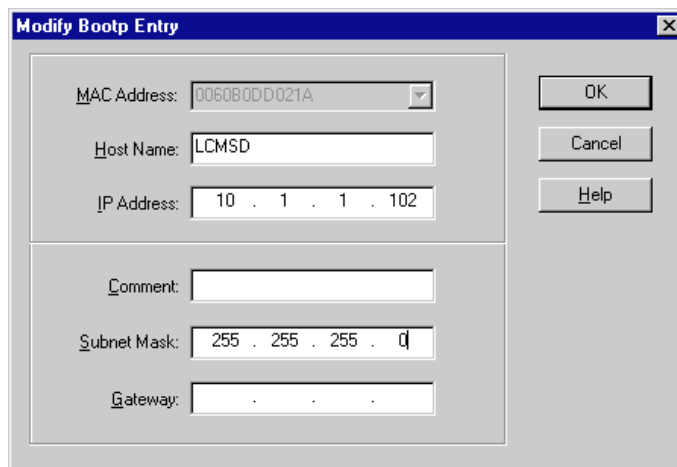
**NOTE**

---

If the default IP address is not used, make sure that the IP address supplied by the system administrator is unique. The first three fields of the IP address should be the same as the IP address specified for the PC.

---

- 7 Select the MAC address for the LAN/MS Control card in the LC/MSD, and enter the Host Name and IP address for that instrument as shown below.



If the ChemStation is used only for local instrument control and will *not* be connected to the site LAN, then you can use the Host Name of LCMSD and IP address of 10.1.1.102,

If the system *is* being setup on the site LAN, enter the Host Name and IP Address provided by the system administrator.

The comment field is optional. The Subnet Mask must match the TCP/IP configuration of the network card in the PC. The Gateway address is only required if the ChemStation is connected to the site LAN and should be supplied by the system administrator.

---

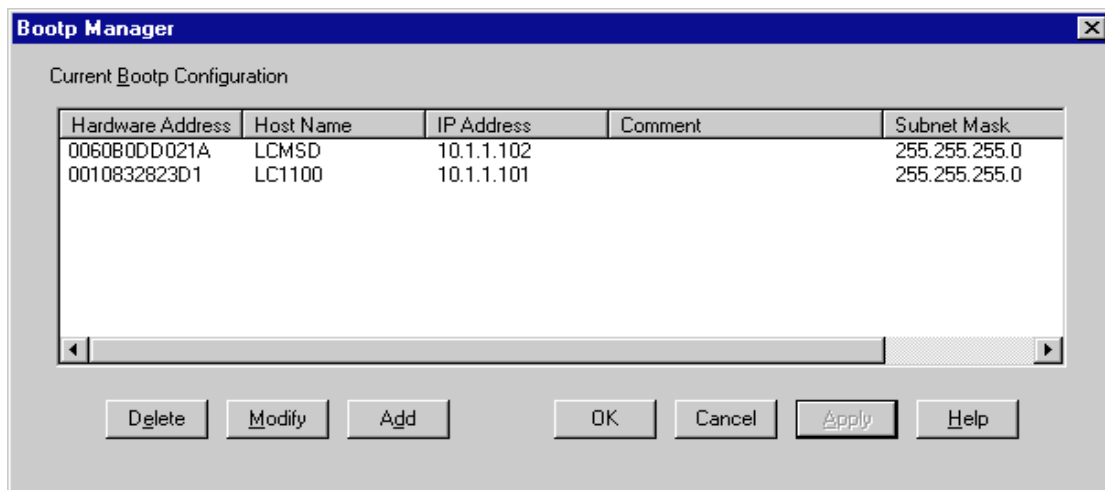
**NOTE**

If the default IP address is not used, make sure that the IP address supplied by the system administrator is unique. The first three fields of the IP address should be the same as the IP address specified for the PC and the 1100 LC.

- 8 Click OK when finished to close the Modify Bootp Entry dialog box.

### 9 Confirm the BootP table entries you just made for the 1100 LC and the LC/MSD.

Select BootP manager from the Configure menu to view the current BootP configuration as shown in the following example.

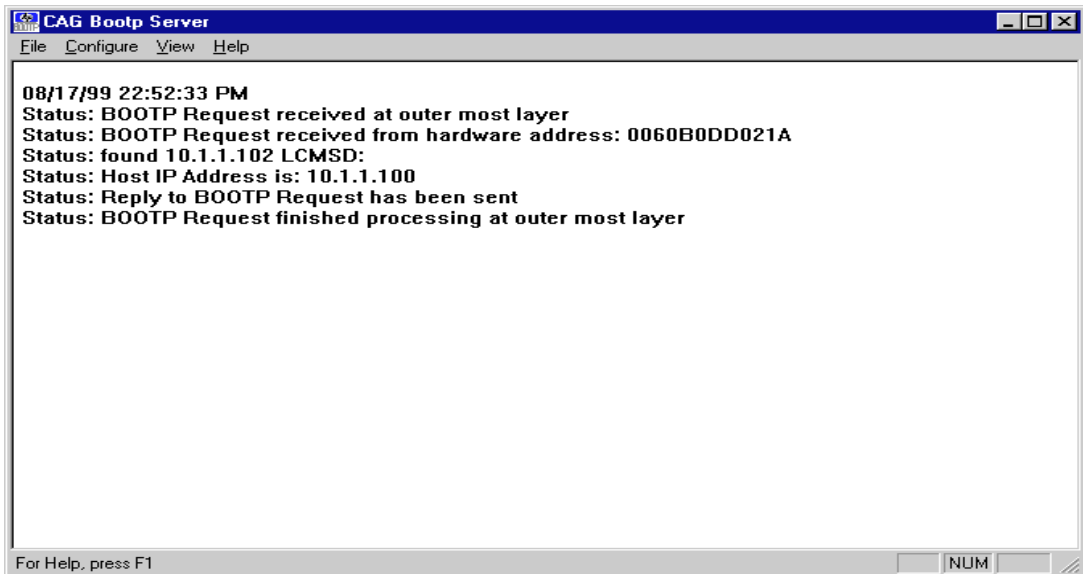
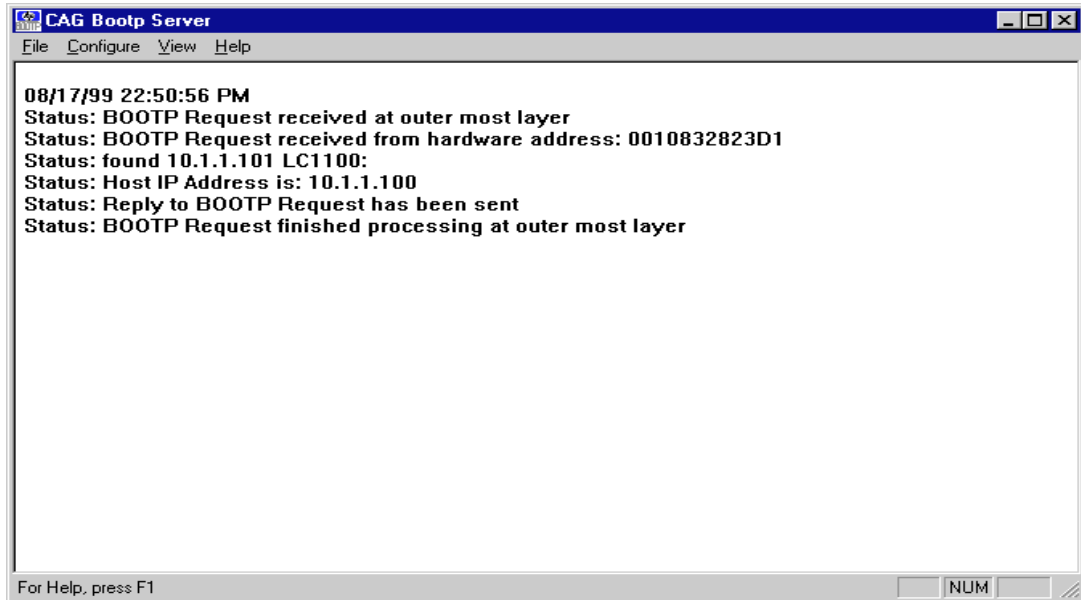


### 10 Power cycle the instruments again to confirm that the instruments have been properly configured in the BootP Server.

Power cycle the instruments again by pressing the Reset button on the LC/MSD and the front power switch on the 1100 LC module where the JetDirect card is located (usually the UV detector). After the self-tests are complete, the BootP program assigns the correct IP addresses for the Host PC, the JetDirect card in the 1100 LC, and the LAN/MS control card in the MSD. See the examples on the next page.

## 2 Installation

### Installing and configuring the CAG BootP server



---

## Editing the HOSTS file

In order for the PC to properly address the LC/MSD, you must also edit the HOSTS file as described below.

- 1 Using Notepad, open the file **HOSTS** in the `winnt\system32\drivers\etc` directory.
- 2 Type in the IP address and the Host Name for the PC, the 1100 LC, and the LC/MSD as shown in the example below.

```
Hosts - Notepad
File Edit Search Help
# Copyright (c) 1993-1995 Microsoft Corp.
#
# This is a sample HOSTS file used by Microsoft TCP/IP for Windows NT.
#
# This file contains the mappings of IP addresses to host names. Each
# entry should be kept on an individual line. The IP address should
# be placed in the first column followed by the corresponding host name.
# The IP address and the host name should be separated by at least one
# space.
#
# Additionally, comments (such as these) may be inserted on individual
# lines or following the machine name denoted by a '#' symbol.
#
# For example:
#
#       102.54.94.97       rhino.acme.com           # source server
#       38.25.63.10      x.acme.com             # x client host

10.1.1.100      CHEMSTATION
10.1.1.101      LC1100
10.1.1.102      LCMSD
```

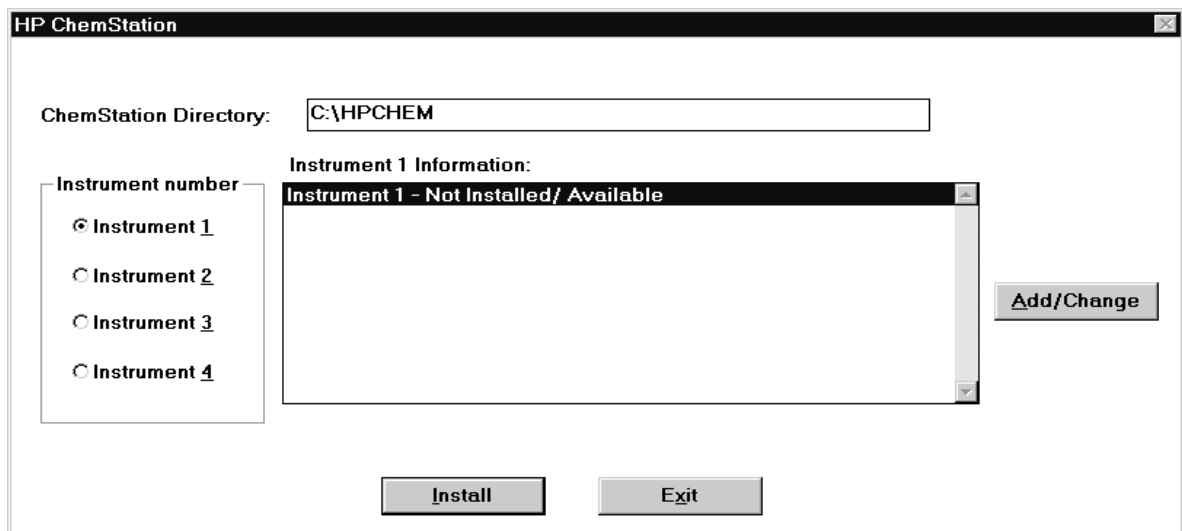
- 3 Save the changes to the **HOSTS** file.  
Make sure to use the file name **HOSTS** (with *no* .txt extension).
- 4 Reboot the PC.

---

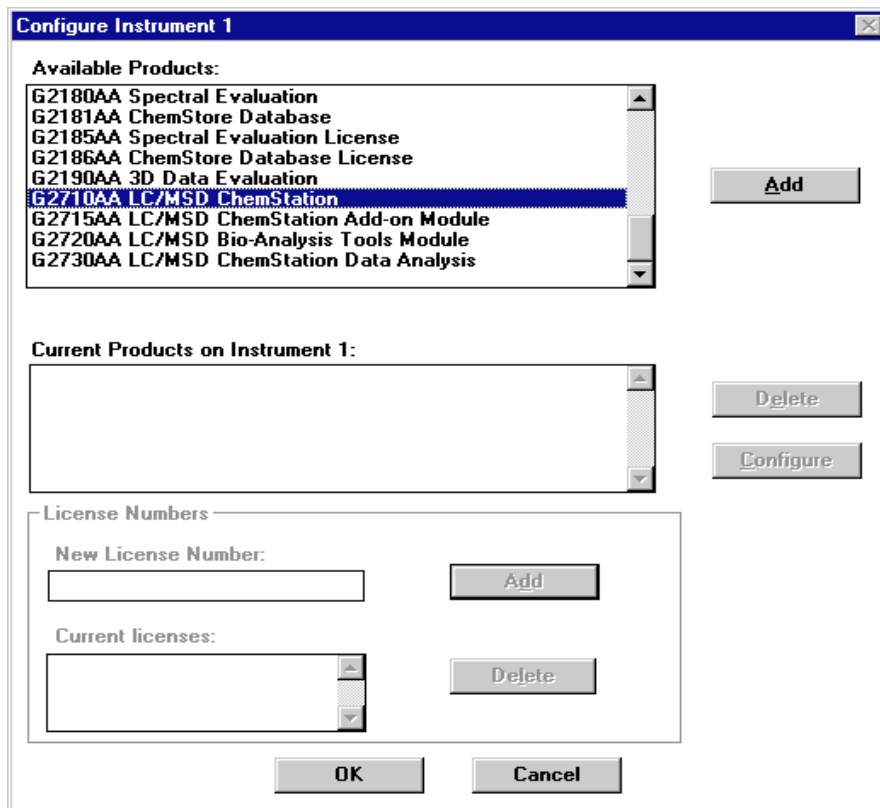
## Installing the ChemStation software

- 1 **Before installing the ChemStation software, make sure the PC has Windows NT 4.0 installed and configured as described on page 66.**
- 2 **Insert ChemStation CD-ROM into the CD-ROM drive.**
- 3 **In Windows NT Explorer, double-click on SETUP.EXE in the root directory on the CD-ROM.**

After a few seconds the Instrument Setup dialog box appears, as shown below:



- 4 **Select Instrument 1, and click Add/Change. The following dialog box appears:**



- 5 **Select G2710AA LC/MSD ChemStation from the list of available products in the Configure Instrument 1 dialog box, and click Add.**
- 6 **Enter the license number for the selected module in the New License Number field, and click Add.**

The license numbers are printed on the Software Certificate and Registration Packet.
- 7 **Repeat steps 5 and 6 for each module you want to install.**
- 8 **Click OK to return to the Instrument Setup dialog box.**

The selected modules with their license numbers are now displayed under the instrument number.
- 9 **Click Install to install the ChemStation software.**

- 10 When the installation program is finished, the Configuration Editor window appears.**

**To configure the 1100 LC**

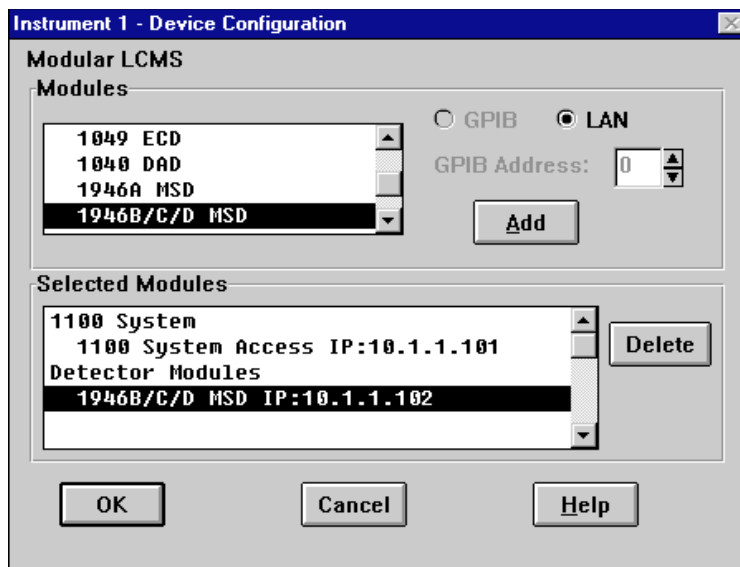
- 1 Select Instruments from the Configure menu.**
- 2 When the Select Instrument dialog box appears, select Modular LCMS System for Instrument Type, then click OK.**
- 3 When the Device Configuration dialog box appears, select 1100 System Access for Modules (for the Agilent 1100 LC).**
- 4 Select the LAN option (*not* GPIB).**
- 5 Click the Add button.**
- 6 Select the Identify by IP address option.**

Enter the IP address for the JetDirect card in the 1100 LC Module. The IP address was configured in the BootP server as described on page 31.
- 7 Continue with G1946 LC/MSD configuration on the next page.**



## To configure the G1946 LC/MSD

- 1 Select Instruments from the Configure menu.
- 2 When the Select Instrument dialog box appears, select Modular LCMS System for Instrument Type, then click OK.
- 3 When the Device Configuration dialog box appears, select G1946B/C/D LC/MSD as shown below.



- 4 Select the LAN option (*not* GPIB).
- 5 Click the Add button.
- 6 Select the Identify by IP address option.  
Enter the IP address for the JetDirect card in the 1100 LC Module. The IP address was configured in the BootP server as described on page 31.
- 7 Save the instrument configuration by selecting Save from the File menu, then close the Configuration Editor window.
- 8 Remove the ChemStation CD-ROM and store it in a safe place.

**9 Reboot the PC.**

**Additional installation activities**

**1 Save the license numbers in a safe place.**

These are required if you need to reinstall the software and for future upgrades.

**2 Install the 1100 Series Maintenance and Repair CD-ROMs.**

- Insert the 1100 Series LC Maintenance CD-ROM in the CD-ROM drive.
- In Windows NT Explorer, double-click on **setup.exe**.
- Be sure to check the box to include the LC/MSD files.
- Follow the instructions on the screen.

**3 Install the 1100 Series LC/MSD Reference Collection.**

- Insert the first 1100 Series LC/MSD Reference Collection CD-ROM in the CD-ROM drive.
- In Windows NT Explorer, double-click on **setup.exe**.
- Follow the instructions on the screen.

**4 Find the Custom Instrument Files diskette that is supplied with the instrument binder.**

Copy the **atunes.tun** and **atunem.tun** directories from the diskette to the following directory on the PC as appropriate for your instrument model:

*G1946C LC/MSD VL*

**\\hpchem\1\1946Ctun**

*G1946D LC/MSD SL*

**\\hpchem\1\1946Dtun**

---

# Completing and Verifying Installation

Completing installation and verifying LC/MSD performance requires:

- Updating the LAN/MS control card firmware (if required)
- Priming the LC degasser and verifying 1100 LC firmware
- Baking out the LC/MSD
- Verifying ChemStation software installation (optional)
- Preparing performance evaluation samples
- Verifying LC/MSD sensitivity
- Topics of special importance

## Updating the LAN/MS control card firmware (if required)

### 1 Start up the LC/MSD ChemStation online session and confirm that you can communicate with the 1100 LC and the LC/MSD.

If the message: “MS interface has an older firmware version x.xx.xx. Please update firmware to y.yy.yy or later.” appears at the end of the ChemStation start-up, proceed to step 2 to update the MS Interface firmware. Otherwise, no action is required.

### 2 Manually update the LAN/MS Control card firmware if required.

If you get the message shown above, manually update the LAN/MS Control card firmware as described below.

- Exit the ChemStation software.
- In Windows NT Explorer, double-click on **msupdate.exe** in the **hpchem\ms\firmware** directory.
- When prompted, enter the IP address of the LC/MSD, then press Enter to proceed.
- You will be warned not to disrupt power to the MSD during the update. Type **Y** to proceed. It may take several minutes to download the firmware.
- When prompted to power cycle the instrument, just depress the reset (RST) button located below the Serial A connection on the LAN/MS Control card in the LC/MSD.

When the firmware update is complete, the update window will automatically close.

## Priming the LC degasser and verifying 1100 LC firmware

- 1 Start up the LC/MSD ChemStation.**
- 2 Prime each channel of the 1100 LC vacuum degasser by pumping 5 ml/min of 100% isopropanol for at least 10 minutes on each channel.**
- 3 Next, flush out each channel of the 1100 LC vacuum degasser by pumping 5 ml/min of 100% water for at least 10 minutes on each channel.**
- 4 Verify that the firmware for each 1100 LC module is the latest available. Update the firmware as appropriate.**
- 5 Continue with *Baking out the LC/MSD* on the next page.**

## Baking out the LC/MSD

- 1 **Connect the LC/MSD inlet tubing (part number 0890-1915).**
- 2 **Set the drying gas flow to: 10 l/min for the Electrospray interface or 5 l/min for APCI interface.**
- 3 **Set the nebulizer pressure to 40 psi.**
- 4 **Set the drying gas temperature to 350° C.**
- 5 **Set the vaporizer temperature to 500° C (APCI interface only).**
- 6 **Set the LC flow to 0.5 ml/min using the solvent mixture appropriate for your instrument model.**

*G1946C LC/MSD VL*

- 50: 50 organic/water solvent. The organic solvent can be *methanol*, *isopropanol*, or *acetonitrile*.

*G1946D LC/MSD SL*

- 75: 25 methanol / water with 5 mM ammonium formate. To make the 5mM ammonium formate solution, add 0.315g of ammonium formate to 1 liter of 75:25 methanol/water mobile phase. Use ammonium formate with 97% purity or better.

- 7 **Make sure the position of the MS selection valve is set so that the LC flow is diverted to the spray chamber (select Switch Stream/ MSD).**
- 8 **Allow the system to bake out at least 2 hours, preferably overnight.**

---

### CAUTION

If the system has been exposed to humid conditions during shipping or storage, a minimum of 4 hours bakeout is required to prevent arcing of the quadrupole.

---

- 9 **Begin software familiarization while the system is baking out.**

---

## Verifying ChemStation software installation (optional)

After installing and configuring the ChemStation software, your internal validation procedure *may* require you to verify the correctness of the installation and to verify that the software is fully operational. This process is called Installation Qualification (IQ).

### 1 In the ChemStations program group, double-click on the Installation Qualification icon.

The following message box displays the name of each file as it is analyzed. This takes several minutes.



### 2 The IQ utility reports the following categories of files:

File Category	Explanation	Action Required
Identical files	Required files have passed the check.	None
Missing files	Necessary files are missing.	Reinstall the ChemStation software.
Modified files	Files have been modified or corrupted.	Reinstall unless you have customized the files.*
Invalid reference file	The original reference file is corrupt or has been modified since creation.	Reinstall the original reference file (requires reinstalling the ChemStation software).

---

\* See the following page to learn how to create a reference file for a customized installation.

## Verifying ChemStation software installation (optional)

File	Version	FileDescription
<b>Identical files</b>		
apg_top.exe	4.0.0.0	CAG Server execut
apgdde.dll	3.27.0.0	Analytical Product (
ccccc15.exe		(NO VERSION INFO
cfg35900.exe		(NO VERSION INFO
d8452a.dll	0.0.1.76	HP 8452A Runbuffe
editor.hlp		(Help)
hp-lc.ini		(Initialization)
hp-ms.ini		(Initialization)
hpced02.exe	1.3.0.9	HP APG Configurati
hpfabs00.dll	1.0.3.7	support functions
hpgthk00.dll	0.0.0.0	Generic Thunk Mod
hplib_gt.dll		(NO VERSION INFO
hplib_srv.dll	4.0.0.0	CAG DataComm Se
hpitgr01.dll	1.21.0.0	HP LEGO Componen
hplc1050.hlp		(Help)
hplc1090.hlp		(Help)
hpnls01.dll	0.4.0.0	NLS Module
hppcad.ini		(Initialization)

**Installation Verification completed successfully.**

**3 If you have customized or added any system files (\*.dlc, \*.dll, \*.drv, \*.enu, \*.exe, \*.hlp, \*.ini, \*.mac, or \*.mcx), generate a customized reference file:**

— Click the **Start** button and **Run** the IQ utility, typing the following:

**C:\hpchemsys\hpveri00.exe -f custom.ref**

— Create an icon with the following command line in its properties:

**hpveri00.exe -r custom.ref**

For a complete description of the command line syntax of the IQ utility, click **Help** in the ChemStation Installation Verification window. You can also **Run** the help file, C:\HPCHEMSYS\HPVERI.HLP.



---

## Preparing performance evaluation samples

### *Materials Needed:*

- 1 ml graduated pipette, p/n 9301-1423
- 50 ml volumetric flask, p/n 9301-1424
- 100 ml volumetric flask, p/n 9301-1344
- Positive-mode performance evaluation sample, Agilent G2423A (for both interfaces)
- Plastic bottles for storing first dilution, p/n 9301-1433

The supplied performance evaluation samples must be diluted to concentrations required for the LC/MSD system checkout. Use the following solvent mixes you prepared for the LC installation (See *Installing the LC* on page 22.).

### *G1946C LC/MSD VL only*

- 50:50 organic solvent / water

### *G1946D LC/MSD SL only*

- 75:25 methanol / water with 5mM ammonium formate. To make the 5mM ammonium formate solution, add 0.315g of ammonium formate to 1 liter of 75:25 methanol/water mobile phase. Use ammonium formate with 97% purity or better.

---

### **NOTE**

At least HPLC grade solvents should be used. Solvents that are acceptable for most LC applications may contain unacceptably high levels of background contaminants detectable by the more sensitive LC/MSD. LC solvents used with the LC/MSD should be rated for both HPLC and pesticide, environmental, or GC/MS analyses. Use the highest purity solvents you can obtain.

***For G1946C LC/MSD Model VL only*** - Acceptability of individual lots of solvents must be empirically determined. Methanol, isopropanol, and acetonitrile are all acceptable organic solvents for the performance evaluation samples; if one solvent shows too much background, try another one.

---

### **NOTE**

Use the diluted samples within a day of dilution. Refrigerate the intermediate (first) dilution in the supplied bottles.

### *Tips:*

- Always rinse the graduated pipettes and volumetric flasks *thoroughly* with deionized water before, in between, and after use.
  - Use polypropylene labware for preparing performance evaluation samples, since glass vessels introduce unacceptable levels of sodium.
-

## 2 Installation

### **Preparing performance evaluation samples**

- Always rinse the autosampler vials and caps with the solvent mix used for sample dilution prior to filling them with the performance verification samples. This minimizes any background contributed by the vials and caps. The vials may be run uncapped if the septa are found to be a source of background contamination.

**G1946C LC/MSD VL Performance Verification Summary Table**

	<b>ES Positive SIM Mode</b>	<b>APCI Positive SIM Mode</b>
Sample	Reserpine, 5 ng/ $\mu$ l	Reserpine, 5 ng/ $\mu$ l
Concentration after dilution	2 pg/ $\mu$ l	2 pg/ $\mu$ l
Injection volume	5 $\mu$ l	5 $\mu$ l
Total sample amount injected	10 pg	10 pg
Sample order number	G2423A	G2423A
Solvent	50:50 organic / water	50:50 organic / water
Method name	MSSUPRES.M	MSSUPCI.M
Performance Specification	10: 1 pk-pk 50: 1 rms	10: 1 pk-pk 50: 1 rms

**G1946D LC/MSD SL Performance Verification Summary Table**

	<b>ES Positive SIM Mode</b>	<b>APCI Positive SIM Mode</b>	<b>ES Positive Scan Mode</b>	<b>APCI Positive Scan Mode</b>
Sample	Reserpine, 5 ng/ $\mu$ l	Reserpine, 5 ng/ $\mu$ l	Reserpine, 5 ng/ $\mu$ l	Reserpine, 5 ng/ $\mu$ l
Concentration after dilution	1 pg/ $\mu$ l	1 pg/ $\mu$ l	10 pg/ $\mu$ l	10 pg/ $\mu$ l
Injection volume	1 $\mu$ l	1 $\mu$ l	5 $\mu$ l	5 $\mu$ l
Total sample amount injected	1 pg	1 pg	50 pg	50 pg
Sample order number	G2423A	G2423A	G2423A	G2423A
Solvent	75:25 methanol / water with 5mM ammonium formate	75:25 methanol / water with 5mM ammonium formate	75:25 methanol / water with 5mM ammonium formate	75:25 methanol / water with 5mM ammonium formate
Method name	SLSIMES.M	SLSIMCI.M	SLSCNES.M	SLSCNCI.M
Performance Specification	10: 1 pk-pk 50: 1 rms	10: 1 pk-pk 50: 1 rms	10: 1 pk-pk 50: 1 rms	10: 1 pk-pk 50: 1 rms

**G1946C LC/MSD Model VL  
Electrospray and APCI, Positive SIM Modes**

- 1 Transfer 1 ml of 5 ng/ $\mu$ l reserpine (Agilent G2423A) to a 50 ml volumetric flask.**

Use a clean graduated pipette.

- 2 Dilute to the 50 ml mark with 50:50 organic solvent / water.**

- 3 Transfer 1 ml of the first dilution to a second 50 ml volumetric flask.**

Use a clean graduated pipette.

- 4 Dilute to the 50 ml mark with 50:50 organic solvent / water.**

This provides the final 2 pg/ $\mu$ l reserpine concentration required for performance verification.

- 5 Transfer approximately 1 ml of the second dilution to a vial for use in the LC autosampler.**

### **G1946D LC/MSD Model SL Electrospray and APCI, Positive SIM Mode**

- 1 Transfer 1 ml of 5 ng/μl reserpine (Agilent G2423A) to a 50 ml volumetric flask.**  
Use a clean graduated pipette.
- 2 Dilute to the 50 ml mark with 75:25 methanol / water with 5 mM ammonium formate.**
- 3 Transfer 1 ml of the first dilution to a 100 ml volumetric flask.**  
Use a clean graduated pipette.
- 4 Dilute to the 100 ml mark with 75:25 methanol / water with 5 mM ammonium formate.**  
This provides the final 1 pg/μl reserpine concentration required for performance verification.
- 5 Transfer approximately 1 ml of the second dilution to an autosampler vial.**

### **G1946D LC/MSD Model SL Electrospray and APCI, Positive Scan Mode**

- 1 Transfer 1 ml of 5 ng/μl reserpine (Agilent G2423A) to a 50 ml volumetric flask.**  
Use a clean graduated pipette.
- 2 Dilute to the 50 ml mark with 75:25 methanol / water with 5 mM ammonium formate.**
- 3 Transfer 5 ml of the first dilution to a 50 ml volumetric flask.**  
Use a clean graduated pipette.
- 4 Dilute to the 50 ml mark with 75:25 methanol / water with 5 mM ammonium formate.**  
This provides the final 10 pg/μl reserpine concentration required for performance verification.
- 5 Transfer approximately 1 ml of the second dilution to an autosampler vial.**

## Verifying LC/MSD sensitivity

Use the methods specified below to verify the performance of the LC/MSD system for the interface types that were purchased with the system.

The performance verification methods require an Agilent 1100 LC with an autosampler.

---

### **C A U T I O N**

Be sure that you have entered the custom parameters. Otherwise it may not be possible to tune the LC/MSD.

---

## G1946C LC/MSD VL model Electrospray Interface, Positive SIM Mode

- 1 Start up the LC/MSD ChemStation software and load the method MSSUPRES.M.**
- 2 Edit the method to ensure that 50:50 organic solvent / water is selected as the LC solvent.**

All other LC and MS parameters should correspond to the parameters given in *Electrospray positive ion SIM sensitivity (G1946C)* on page 69.

- 3 Perform an autotune.**

After the autotune has completed, you may need to wait up to 30 minutes before continuing to allow for the calibrant solution to be pumped out of the MSD. This minimizes any background signal resulting from the calibrant.

---

**NOTE**

---

You may need to further optimize the nebulizer pressure by running FIA experiments to achieve maximum instrument sensitivity.

- 4 Place the vials into the LC autosampler.**
  - Position #1: empty, uncapped vial
  - Position #2: vial of the solvent used for dilution (solvent blank)
  - Position #3: vial with the electrospray reserpine sample (2 pg/ $\mu$ l)
- 5 Run the method.**
- 6 Review the results.**

When the method is finished, a report prints showing the signal-to-noise ratio for the five blank and five sample peaks, and a blank-subtracted average of the sample peaks. The blank-subtracted average signal-to-noise value must be greater than or equal to 10:1 peak-to-peak (50:1 RMS).

## **G1946C LC/MSD VL model APCI Interface, Positive SIM Mode**

### **1 Load the method MSSUPCL.M.**

### **2 Edit the method to ensure that 50:50 organic solvent / water is selected as the LC solvent.**

All other LC and MS parameters should correspond to the parameters given in *APCI positive SIM ion sensitivity (G1946C)* on page 72.

### **3 Perform an autotune.**

After the autotune has completed, you may need to wait up to 30 minutes before continuing to allow for the calibrant solution to be pumped out of the MSD. This minimizes any background signal from the calibrant.

---

#### **NOTE**

---

You may need to further optimize the nebulizer pressure to achieve maximum instrument sensitivity.

### **4 Place the vials into the LC autosampler.**

- Position #1: empty, uncapped vial
- Position #2: vial of the solvent used for dilution (solvent blank)
- Position #3: vial with the reserpine sample (2 pg/μl)

### **5 Run the method.**

The method performs an FIA run with one injection of the empty vial, five injections of the solvent blank, and five injections of the reserpine sample.

### **6 Review the results.**

When the method is finished, a report prints showing the signal-to-noise ratio for the five blank and five sample peaks, and a blank-subtracted average of the sample peaks. The blank-subtracted average signal-to-noise value must be greater than or equal to 10:1 peak-to-peak (50:1 RMS).



## **G1946D LC/MSD SL model Electrospray Interface, Positive Scan Mode**

### **1 Load the method SLSCNES.M.**

### **2 Edit the method to ensure that 75:25 methanol / water with 5mM ammonium formate is selected as the LC solvent.**

All other LC and MS parameters should correspond to the parameters given in *Electrospray positive ion Scan sensitivity (G1946D)* on page 81.

### **3 Perform an autotune.**

After the autotune has completed, you may need to wait up to 30 minutes before continuing to allow for the calibrant solution to be pumped out of the MSD. This minimizes any background signal from the calibrant.

---

**NOTE**

---

You may need to further optimize the nebulizer pressure to achieve maximum instrument sensitivity.

### **4 Place the vials into the LC autosampler.**

- Position #1: empty, uncapped vial
- Position #2: vial of the solvent used for dilution (solvent blank)
- Position #3: vial with the reserpine sample (10 pg/μl)

### **5 Run the method.**

The method performs an FIA run with one injection of the empty vial, five injections of the solvent blank, and five injections of the reserpine sample.

### **6 Review the results.**

When the method is finished, a report prints showing the signal-to-noise ratio for the five blank and five sample peaks, and a blank-subtracted average of the sample peaks. The blank-subtracted average signal-to-noise value must be greater than or equal to 10:1 peak-to-peak (50:1 RMS).

## **G1946D LC/MSD SL model Electrospray Interface, Positive SIM Mode**

### **1 Load the method SLSIMES.M.**

### **2 Edit the method to ensure that 75:25 methanol / water with 5mM ammonium formate is selected as the LC solvent.**

All other LC and MS parameters should correspond to the parameters given in *Electrospray positive ion SIM sensitivity (G1946D)* on page 75.

### **3 Perform an autotune.**

After the autotune has completed, you may need to wait up to 30 minutes before continuing to allow for the calibrant solution to be pumped out of the MSD. This minimizes any background signal from the calibrant.

---

**NOTE**

---

You may need to further optimize the nebulizer pressure to achieve maximum instrument sensitivity.

### **4 Place the vials into the LC autosampler.**

- Position #1: empty, uncapped vial
- Position #2: vial of the solvent used for dilution (solvent blank)
- Position #3: vial with the reserpine sample (1 pg/μl)

### **5 Run the method.**

The method performs an FIA run with one injection of the empty vial, five injections of the solvent blank, and five injections of the reserpine sample.

### **6 Review the results.**

When the method is finished, a report prints showing the signal-to-noise ratio for the five blank and five sample peaks, and a blank-subtracted average of the sample peaks. The blank-subtracted average signal-to-noise value must be greater than or equal to 10:1 peak-to-peak (50:1 RMS).

## **G1946D LC/MSD SL model APCI Interface, Positive Scan Mode**

### **1 Load the method SLSCNCL.M.**

### **2 Edit the method to ensure that 75:25 methanol / water with 5mM ammonium formate is selected as the LC solvent.**

All other LC and MS parameters should correspond to the parameters given in *APCI positive ion Scan sensitivity (G1946D)* on page 84.

### **3 Perform an autotune.**

After the autotune has completed, you may need to wait up to 30 minutes before continuing to allow for the calibrant solution to be pumped out of the MSD. This minimizes any background signal from the calibrant.

---

**NOTE**

---

You may need to further optimize the nebulizer pressure to achieve maximum instrument sensitivity.

### **4 Place the vials into the LC autosampler.**

- Position #1: empty, uncapped vial
- Position #2: vial of the solvent used for dilution (solvent blank)
- Position #3: vial with the reserpine sample (10 pg/μl)

### **5 Run the method.**

The method performs an FIA run with one injection of the empty vial, five injections of the solvent blank, and five injections of the reserpine sample.

### **6 Review the results.**

When the method is finished, a report prints showing the signal-to-noise ratio for the five blank and five sample peaks, and a blank-subtracted average of the sample peaks. The blank-subtracted average signal-to-noise value must be greater than or equal to 10:1 peak-to-peak (50:1 RMS).

## **G1946D LC/MSD SL model APCI Interface, Positive SIM Mode**

### **1 Load the method SLSIMCLM.**

### **2 Edit the method to ensure that 75:25 methanol / water with 5mM ammonium formate is selected as the LC solvent.**

All other LC and MS parameters should correspond to the parameters given in *APCI positive ion SIM sensitivity (G1946D)* on page 78.

### **3 Perform an autotune.**

After the autotune has completed, you may need to wait up to 30 minutes before continuing to allow for the calibrant solution to be pumped out of the MSD. This minimizes any background signal from the calibrant.

---

**NOTE**

---

You may need to further optimize the nebulizer pressure to achieve maximum instrument sensitivity.

### **4 Place the vials into the LC autosampler.**

- Position #1: empty, uncapped vial
- Position #2: vial of the solvent used for dilution (solvent blank)
- Position #3: vial with the reserpine sample (1 pg/μl)

### **5 Run the method.**

The method performs an FIA run with one injection of the empty vial, five injections of the solvent blank, and five injections of the reserpine sample.

### **6 Review the results.**

When the method is finished, a report prints showing the signal-to-noise ratio for the five blank and five sample peaks, and a blank-subtracted average of the sample peaks. The blank-subtracted average signal-to-noise value must be greater than or equal to 10:1 peak-to-peak (50:1 RMS).

---

## Multiply-charged compound data analysis test

Perform this test only if the optional G2720AA Deconvolution & Bioanalysis software was purchased with the LC/MSD system.

- 1 **In the Data Analysis view, load the data file PROT\_FIA.D from the HPCHEM1\DATA\MSDEMO directory.**

This an FIA data file consisting of five injections of a 3 pmole myoglobin sample in positive electrospray mode.

- 2 **On the ChemStation command line, type `auto_sn` and press the Enter key to display the MS Auto SN Parameters dialog box shown below.**

**MS Auto SN Parameters**

**MS Signals**

Use Loaded Signals

Load Signals: MSD1

Number of FIA injections : 6

**Processing options**

Use predefined test: Myoglobin

Extract ion(s):

Smooth Chromatograms

Auto Integrate

Integration Off time [min] : 0.6

**Signal-to-Noise Parameters**

Noise method : Individual

Noise range (min): -0.70 to -0.25

**Deconvolution**

Deconvolute Expected MW: 16951.97

Number of Mass Peaks: 20

Print Report

OK Cancel Help

**Multiply-charged compound data analysis test**

- 3 In the MS Signals portion of the dialog box, use the default selection (Load Signals: MSD1).**
- 4 In the Processing Options portion of the dialog box, use the default selections (Use Predefined Test: Myoglobin and Auto Integrate with an Integration Off time of 0.6 min).**
- 5 In the Signal to Noise Parameters portion of the dialog box, use the default selections (Noise method: Individual and Noise Range -0.7 to -0.25 min).**
- 6 In the Deconvolution Portion of the dialog box, use the default selections (Deconvolute checked, Expected MW 16951.97, and Expected Peaks 20).**
- 7 Make sure the Print Report option is selected.**
- 8 Select OK to run the Deconvolution Mass Assignment Test.**
- 9 Inspect the report that is generated.**

The mass assignment error should be -0.0086% of the expected molecular weight of 16951.97.

## Topics of special importance

- Small drips of oil from the foreline pump are *not* unusual.
- For cleaning the capillary, pre-wet the inside of the capillary with isopropanol before inserting the cleaning wire. The alcohol acts as a lubricant, making it easier to insert the wire.
- Be sure to clean the spray chamber ***every day***, as shown in the 1100 Series LC/MSD Maintenance and Repair CD-ROM.
- The ***electrospray*** spray chamber needs ***extra cleaning at least weekly***:
  - Remove the spray chamber and place it cover-side down.
  - Fill the spray chamber with 50:50 organic: water solution to cover the standoffs for the mesh electrode.
  - Gently scrub the insulators with a cotton swab (part number 8520-0023).

## 2 Installation

### Topics of special importance



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## Supplemental Information

## Configuring Windows NT 4.0

### Software configuration requirements

- Windows NT Workstation revision 4.0 plus Service Pack 6a
- NTFS disk partitions, but no compression for active data files
- User accounts and passwords set up
- Minimal desktop configuration (wallpaper, desktop icons)
- TCP/IP networking
- Microsoft Internet Explorer for Internet access
- The system registry should be modified to prevent network session time-out (TCP/IP only), and subsequent loss of network connections:
  - Run **Windows | system32 | regedit32.exe**.
  - Navigate through the menus following this path:  
HKEY\_LOCAL\_MACHINE on **Local Machine | System | CurrentControlSet | Services | NetBT | Parameters | SessionKeepAlive**.
  - With Radix set to Hex, set **Data** to **fffffff** (eight "F"s).
  - Click **OK**.
- Not all Windows NT-supported devices are supported for ChemStation products (Magneto-optical devices and CD-ROM writing units are not supported for data collection.)
- SICL driver components from the **GPIB** directory of the ChemStation CD-ROM
- Windows NT 4.0 system recovery disks created at completion of installation

## Removing (uninstalling) the ChemStation software

Use the following procedure only if you are comfortable with editing system files. Otherwise, ask your system administrator for assistance.

- 1 If there are any data, methods, libraries, or other files or directories that you want to save, move or copy them to a directory outside of those to be deleted.**
- 2 Close ALL applications except Explorer.**
  - In Windows NT Explorer, navigate to C:\Temp.  
Select *all* the files and press <Delete>. (Do not delete the Temp directory itself.)
  - Click **Yes** to send them all to the **Recycle Bin**.
  - Delete the file `c:\winnt\system\vhpid.386`.
  - Delete the `\hpchem` directory.
  - Drag all ChemStation icons to the **Recycle Bin**.
- 3 Click the Start button on the taskbar, and select Run.**
  - Type `sysedit` and click **OK**.
  - In `autoexec.bat`, delete the `C:\HPCHEM` and `C:\HPCHEM\SYS` references from the `SET PATH=` statement.
  - In `win.ini`, delete the following sections:  
`[PCS]` and `[PCS, #]`, where # may be 1– 4
  - In `system.ini`, delete the following line:  
`EMMExclude=dc00-dfff`
  - Save and exit Sysedit.
- 4 On the taskbar, click Start with the right mouse button, and select Open All Users.**
  - Double-click the Programs icon.
  - Right-click the icon for the HP ChemStation group, and click **Delete** (or drag to the **Recycle Bin**).
  - Click **Yes** to send the group to the recycle bin.
  - Close the `C:\WINNT\Profiles` window(s).
  - Empty the **Recycle Bin** (click the Recycle Bin icon with right mouse button, and select **Empty**).
  - Reboot the computer. You are now ready to load new software.

---

## Shutting down the LC/MSD in case of computer failure

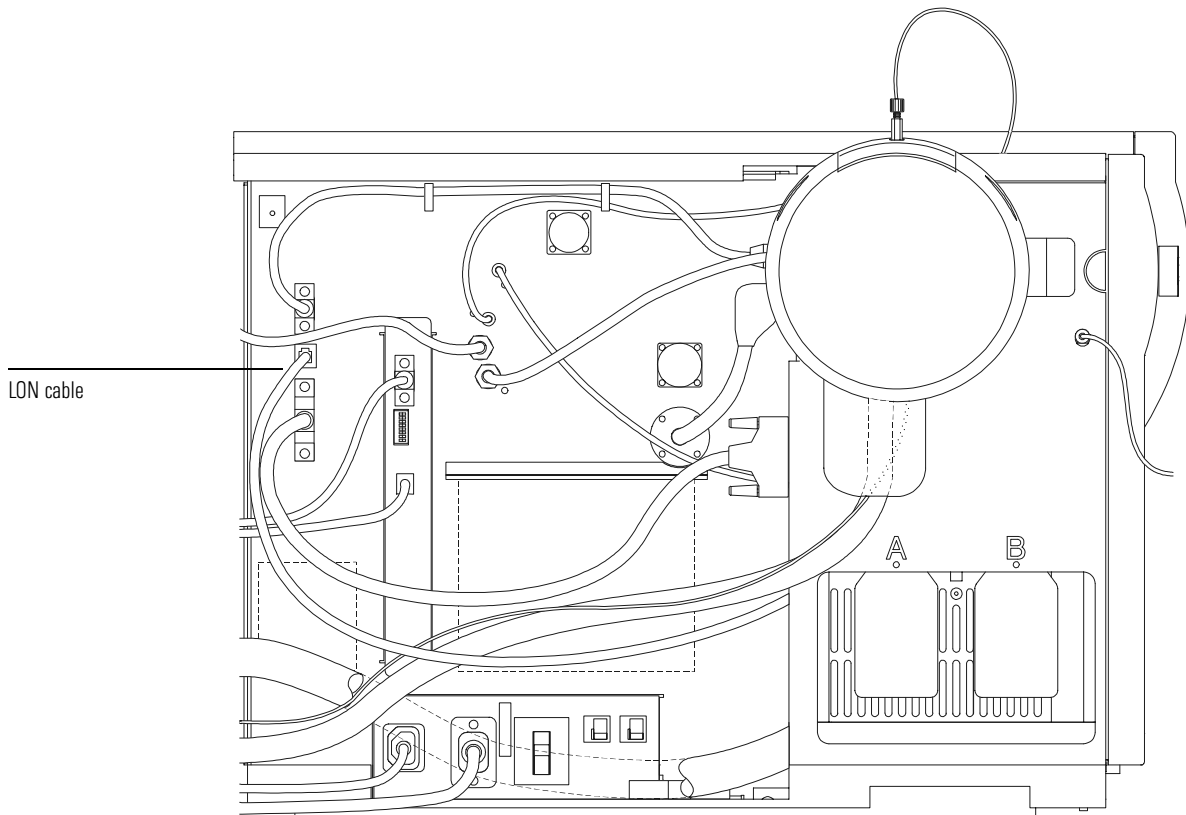
- 1 **Disconnect the LON cable on the side panel.**
- 2 **Wait 10 minutes for the turbo pumps to stop.**
- 3 **Turn off the front LC/MSD power switch.**
- 4 **Reconnect the LON cable.**

---

### CAUTION

Do not reconnect this cable with the LC/MSD power on.

---



## Parameters for installation verification for G1946C

### Electrospray positive ion SIM sensitivity (G1946C)

#### Method Information

Name	MSSUPRES.M
Reserpine SIM method	
ESI Positive Ion Sensitivity Test	

#### Run Time Checklist

Pre-Run Cmd/Macro	Off
Data Acquisition	On
Standard Data Analysis	On
Customized Data Analysis	On
Macro Name	auto_sn -1,, "Reserpine"
Save GLP Data	Off
Post-Run Cmd/Macro	Off
Save Method with Data	On

#### 1100 High Pressure Gradient Pump 1

##### Control

Flow	0.400 ml/min
Stop Time	No Limit
Post Time	Off

##### Solvents

Solvent A	100.0%
Solvent B	Off

##### Pressure Limits

Minimum Pressure	0 bar
Maximum Pressure	400 bar

**Parameters for installation verification for G1946C****Electrospray positive ion SIM sensitivity (G1946C) (cont)****Mass Spectrometer Detector**

## General Information

Use MSD:	Enabled
Ionization Mode	API-ES
Tune File	atunes.tun
Polarity	Positive
Stop Time	No Limit
Peak Width	0.08 min
Scan Speed Override	Not Applicable
Time Filter	Enabled
Data Storage:	Not Applicable
Fragmentor Ramp:	Disabled

**SIM Parameters**

Time (min)	Group Name	SIM ion	Gain EMV	Fragmentor	SIM Resol.	Actual Dwell
0.00	Group 1	609.30	3.0	150	High	460

**[MSZones]**

Gas Temp	350° C	Maximum 350° C
Drying Gas	10.0 l/min	Maximum 13.0 l/min
Neb Pres	25 psig	Maximum 60 psig
VCap (Positive)	4000 V	

**[Time Table]**

Time Table is disabled

## Electrospray positive ion SIM sensitivity (G1946C) (cont)

### FIA Series

FIA Series in this Method	Enabled
Time Setting	
Time between Injections	1.00 min

### FIA Series Table

Line	Vial	FIA Sample Name	Inj/Vial
1	1	Air blank	1
2	2	Solvent blank	5
3	3	10 pg Reserpine	5

### 1100 Autosampler 1

Injection	
Injection Mode	Standard
Injector Volume	5.0 µl
Auxiliary	
Draw Speed	200 µl/min
Eject Speed	200 µl/min
Draw Position	0.0 mm
Time	
Stop Time	As Pump
Post Time	Off

**Parameters for installation verification for G1946C****APCI positive SIM ion sensitivity (G1946C)****Method Information**

Name	MSSUPCI.M
Reserpine SIM Method	
APCI Positive Ion Sensitivity Test	
Run Time Checklist	
Pre-Run Cmd/Macro	Off
Data Acquisition	On
Standard Data Analysis	On
Customized Data Analysis	On
Macro Name	auto_sn -1,, "Reserpine"
Save GLP Data	Off
Post-Run Cmd/Macro	Off
Save Method with Data	On

**1100 High Pressure Gradient Pump 1**

## Control

Flow	1.000 ml/min
Stop Time	No Limit
Post Time	Off

## Solvents

Solvent A	100.0%
Solvent B	Off

## Pressure Limits

Minimum Pressure	0 bar
Maximum Pressure	400 bar



## APCI positive ion SIM sensitivity (G1946C) (cont)

### Mass Spectrometer Detector

#### General Information

Use MSD	Enabled
Ionization Mode	APCI
Tune File	atunes.tun
Polarity	Positive
StopTime	No limit
Peak Width	0.06 min
Scan Speed Override	Not Applicable
Time Filter	Enabled
Data Storage	Not Applicable
Fragmentor Ramp	Disabled

### SIM Parameters

Time (min)	Group Name	SIM ion	Gain EMV	Fragmentor	SIM Resol.	Actual Dwell
0.00	Group 1	609.30	3.0	150	High	340

### [MSZones]

Gas Temp	350° C	Maximum 350° C
Vaporizer	425° C	Maximum 500° C
Drying Gas	6.0 l/min	Maximum 13.0 l/min
Neb Pres	60 psig	Maximum 60 psig
VCap (Positive)	2500 V	
Corona (Positive)	4.0 $\mu$ A	

### [Time Table]

Time Table is disabled

**Parameters for installation verification for G1946C****APCI positive ion SIM sensitivity (G1946C) (cont)****FIA Series**

FIA Series in this Method	Enabled
Time Setting	
Time between Injections	1.00 min

**FIA Series Table**

Line	Vial	FIA Sample Name	Inj/Vial
1	1	Air blank	1
2	2	Solvent blank	5
3	3	10 pg Reserpine	5

**1100 Autosampler 1**

## Injection

Injection Mode	Standard
Injector volume	5.0 $\mu$ l

## Auxiliary

Draw Speed	200 $\mu$ l/min
Eject Speed	200 $\mu$ l/min
Draw Position	0.0 mm

## Time

Stop Time	As Pump
Post Time	Off

## Parameters for installation verification for G1946D

### Electrospray positive ion SIM sensitivity (G1946D)

#### Method Information

Name	SLSIMES.M
Reserpine SIM method	
ESI Positive Ion Sensitivity Test for SL Model	

#### Run Time Checklist

Pre-Run Cmd/Macro	Off
Data Acquisition	On
Standard Data Analysis	Off
Customized Data Analysis	On
Macro Name	auto_sn -1,, "Reserpine-SL"
Save GLP Data	Off
Post-Run Cmd/Macro	Off
Save Method with Data	Off

#### 1100 High Pressure Gradient Pump 1

##### Control

Flow	0.400 ml/min
Stop Time	No Limit
Post Time	Off

##### Solvents

Solvent A	100.0%
Solvent B	Off

##### Pressure Limits

Minimum Pressure	0 bar
Maximum Pressure	400 bar

**Parameters for installation verification for G1946D****Electrospray positive ion SIM sensitivity (G1946D) (cont)****Mass Spectrometer Detector**

## General Information

Use MSD:	Enabled
Ionization Mode	API-ES
Tune File	atunes.tun
Polarity	Positive
Stop Time	No Limit
Peak Width	0.08 min
Scan Speed Override	Not Applicable
Time Filter	Enabled
Data Storage:	Not Applicable
Fragmentor Ramp:	Disabled

**SIM Parameters**

Time (min)	Group Name	SIM ion	Gain EMV	Fragmentor	SIM Resol.	Actual Dwell
0.00	Group 1	609.30	3.0	150	High	460

**[MSZones]**

Gas Temp	350° C	Maximum 350° C
Drying Gas	13.0 l/min	Maximum 13.0 l/min
Neb Pres	35 psig	Maximum 60 psig
VCap (Positive)	4000 V	

**[Time Table]**

Time Table is disabled

## Electrospray positive ion SIM sensitivity (G1946D) (cont)

### FIA Series

FIA Series in this Method	Enabled
Time Setting	
Time between Injections	2.5 min

### FIA Series Table

Line	Vial	FIA Sample Name	Inj/Vial
1	1	Air blank	1
2	2	Solvent blank	5
3	3	1 pg Reserpine	5

### 1100 Autosampler 1

Injection	
Injection Mode	Standard
Injector Volume	1.0 $\mu$ l
Auxiliary	
Draw Speed	200 $\mu$ l/min
Eject Speed	200 $\mu$ l/min
Draw Position	0.0 mm
Time	
Stop Time	As Pump
Post Time	Off

**Parameters for installation verification for G1946D****APCI positive ion SIM sensitivity (G1946D)****Method Information**

Name	SLSIMCI.M
Reserpine SIM Method	
APCI Positive Ion Sensitivity Test for SL Model	
Run Time Checklist	
Pre-Run Cmd/Macro	Off
Data Acquisition	On
Standard Data Analysis	Off
Customized Data Analysis	On
Macro Name	auto_sn -1,, "Reserpine-SL"
Save GLP Data	Off
Post-Run Cmd/Macro	Off
Save Method with Data	Off

**1100 High Pressure Gradient Pump 1**

## Control

Flow	1.000 ml/min
Stop Time	No Limit
Post Time	Off

## Solvents

Solvent A	100.0%
Solvent B	Off

## Pressure Limits

Minimum Pressure	0 bar
Maximum Pressure	400 bar

## APCI positive ion SIM sensitivity (G1946D) (cont)

### Mass Spectrometer Detector

#### General Information

Use MSD	Enabled
Ionization Mode	APCI
Tune File	atunes.tun
Polarity	Positive
StopTime	No limit
Peak Width	0.04 min
Scan Speed Override	Not Applicable
Time Filter	Enabled
Data Storage	Not Applicable
Fragmentor Ramp	Disabled

### SIM Parameters

Time (min)	Group Name	SIM ion	Gain EMV	Fragmentor	SIM Resol.	Actual Dwell
0.00	Group 1	609.30	3.0	150	High	220

### [MSZones]

Gas Temp	350° C	Maximum 350° C
Vaporizer	400° C	Maximum 500° C
Drying Gas	5.0 l/min	Maximum 13.0 l/min
Neb Pres	60 psig	Maximum 60 psig
VCap (Positive)	4000 V	
Corona (Positive)	4.0 $\mu$ A	

### [Time Table]

Time Table is disabled

**Parameters for installation verification for G1946D****APCI positive ion SIM sensitivity (G1946D) (cont)****FIA Series**

FIA Series in this Method      Enabled  
Time Setting  
    Time between Injections      2.00 min

**FIA Series Table**

Line	Vial	FIA Sample Name	Inj/Vial
1	1	Air blank	1
2	2	Solvent blank	5
3	3	1 pg Reserpine	5

**1100 Autosampler 1**

## Injection

Injection Mode      Standard  
Injector volume      1.0 µl

## Auxiliary

Draw Speed      200 µl/min  
Eject Speed      200 µl/min  
Draw Position      0.0 mm

## Time

Stop Time      As Pump  
Post Time      Off



## Electrospray positive ion Scan sensitivity (G1946D)

### Method Information

Name	SLSCNES.M
Reserpine Scan Method	
ESI Positive Ion Sensitivity Test for SL Model	
Run Time Checklist	
Pre-Run Cmd/Macro	Off
Data Acquisition	On
Standard Data Analysis	Off
Customized Data Analysis	On
Macro Name	auto_sn -1,, "Reserpine-SL"
Save GLP Data	Off
Post-Run Cmd/Macro	Off
Save Method with Data	Off

### 1100 High Pressure Gradient Pump 1

Control	
Flow	0.400 ml/min
Stop Time	No Limit
Post Time	Off
Solvents	
Solvent A	100.0%
Solvent B	Off
Pressure Limits	
Minimum Pressure	0 bar
Maximum Pressure	400 bar

**Parameters for installation verification for G1946D****Electrospray positive ion Scan sensitivity (G1946D) (cont)****Mass Spectrometer Detector**

## General Information

Use MSD	Enabled
Ionization Mode	API-ES
Tune File	atunes.tun
Polarity	Positive
StopTime	No limit
Peak Width	0.08 min
Scan Speed Override	Not Applicable
Time Filter	Enabled
Data Storage	Not Applicable
Fragmentor Ramp	Disabled

**Scan Parameters**

Time (min)	Mass Range Low	Mass Range High	Gain EMV	Fragmentor	Threshold	Stepsize
0.00	100	650	3.0	150	0	0.10

**[MSZones]**

Gas Temp	350° C	Maximum 350° C
Drying Gas	13.0 l/min	Maximum 13.0 l/min
Neb Pres	35 psig	Maximum 60 psig
VCap (Positive)	4000 V	

**[Time Table]**

Time Table is disabled

## Electrospray positive ion Scan sensitivity (G1946D) (cont)

### FIA Series

FIA Series in this Method	Enabled
Time Setting	
Time between Injections	2.5 min

### FIA Series Table

Line	Vial	FIA Sample Name	Inj/Vial
1	1	Air blank	1
2	2	Solvent blank	5
3	3	50 pg Reserpine	5

### 1100 Autosampler 1

Injection	
Injection Mode	Standard
Injector Volume	5.0 $\mu$ l
Auxiliary	
Draw Speed	200 $\mu$ l/min
Eject Speed	200 $\mu$ l/min
Draw Position	0.0 mm
Time	
Stop Time	As Pump
Post Time	Off

## APCI positive ion Scan sensitivity (G1946D)

### Method Information

Name	SLSNCI.M
Reserpine Scan Method	
APCI Positive Ion SensitivityTest for SL Model	
Run Time Checklist	
Pre-Run Cmd/Macro	Off
Data Acquisition	On
Standard Data Analysis	Off
Customized Data Analysis	On
Macro Name	auto_sn -1,, "Reserpine-SL"
Save GLP Data	Off
Post-Run Cmd/Macro	Off
Save Method with Data	Off

### 1100 High Pressure Gradient Pump 1

#### Control

Flow	1.000 ml/min
Stop Time	No Limit
Post Time	Off

#### Solvents

Solvent A	100.0%
Solvent B	Off

#### Pressure Limits

Minimum Pressure	0 bar
Maximum Pressure	400 bar

**APCI positive ion Scan sensitivity (G1946D) (cont)**

**Mass Spectrometer Detector**

General Information

Use MSD	Enabled
Ionization Mode	APCI
Tune File	atunes.tun
Polarity	Positive
Stop Time	No limit
Peak Width	0.04 min
Scan Speed Override	Not Applicable
Time Filter	Enabled
Data Storage	Not Applicable
Fragmentor Ramp	Disabled

**Scan Parameters**

Time (min)	Mass Range Low	Mass Range High	Gain EMV	Fragmentor	Threshold	Stepsize
0.00	100	650	3.0	150	0	0.15

**[MSZones]**

Gas Temp	350° C	Maximum 350° C
Vaporizer	400° C	Maximum 500° C
Drying Gas	5.0 l/min	Maximum 13.0 l/min
Neb Pres	60 psig	Maximum 60 psig
VCap (Positive)	4000 V	
Corona (Positive)	4.0 µA	

**[Time Table]**

Time Table is disabled

**Parameters for installation verification for G1946D****APCI positive ion Scan sensitivity (G1946D) (cont)****FIA Series**

FIA Series in this Method	Enabled
Time Setting	
Time between Injections	2.00 min

**FIA Series Table**

Line	Vial	FIA Sample Name	Inj/Vial
1	1	Air blank	1
2	2	Solvent blank	5
3	3	50 pg Reserpine	5

**1100 Autosampler 1**

Injection	
Injection Mode	Standard
Injector Volume	5.0 $\mu$ l
Auxiliary	
Draw Speed	200 $\mu$ l/min
Eject Speed	200 $\mu$ l/min
Draw Position	0.0 mm
Time	
Stop Time	As Pump
Post Time	Off

---

## Safety Information

### Safety Class

The Agilent 1100 Series LC/MSD is a Safety Class I instrument and has been designed and tested in accordance with IEC Publication 1010, Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use.

### WARNING

Connecting an LC/MSD to a power source that is not equipped with a protective earth contact creates a shock hazard for the operator and can damage the instrument. Likewise, interrupting the protective conductor inside or outside the LC/MSD or disconnecting the protective earth terminal creates a shock hazard for the operator and can damage the instrument.

Always use power cords with properly grounded plugs. Ensure that the cables meet your country's standards for safety. This instrument is disconnected from the power by removing the power cords from the power outlets. This means that the power outlets must be easily accessible.

### WARNING

For your safety, ensure the supply voltage does not fluctuate more than 10% over the rated voltage. This equipment must be installed in an environment of Category II installation as defined in IEC664.

### WARNING

For your safety, never remove covers or perform operations, unless you are instructed to do so by Agilent learning products. There may be a risk of electric shock or other hazards.

### WARNING

Several parts are hot for functional purposes, please allow them to cool down before opening covers.

### WARNING

Nitrogen is the only acceptable drying and nebulizer gas. Use of air, oxygen, or other gases, when combined with solvents and high voltages in the spray chamber, could result in explosion.

Always operate the LC/MSD in a properly vented room.

### WARNING

Safety glasses, gloves and other protection equipment should be when performing maintenance, as directed in the Agilent learning products.

## Acoustic Noise Declaration

### Deutsch

Die folgende Information wird in Übereinstimmung mit den Anforderungen der Maschinenlärminformationsverordnung vom 18. Januar 1991 erteilt. Schalldruckpegel am Arbeitsplatz bei normalem Betrieb,  $L_p < 70$  dB(A), nach EN 27779 (Typprüfung).

### English

This statement is provided to comply with the requirements of the German Sound Emission Directive, from 18 January 1991. Sound Pressure  $L_p < 70$  dB(A), at operator's position, normal operation, according to EN 27779 (Type Test).



**Agilent Technologies**

**Document History**

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