Velocity XPT™

Accelerated Purge and Trap Sample Concentrator

TELEDYNE
INSTRUMENTS
Tekmar
A Teledyne Technologies Company

14-8900-074_vB

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Chapter 1

Introduction

1.0 Introduction

The Velocity XPT is a purge and trap concentrator that allows automatic processing of liquid and solid samples for analysis by gas chromatography. The Velocity XPT purges volatile organic compounds from water or solids into a sorbent trap. The trap is then rapidly heated and the analytes are swept with GC carrier gas onto the column for separation and detection. The concentrator uses accelerated purge and trap technology and interfaces with the gas chromatograph.

1.1 Velocity XPT Specifications

1.2 Technical Specifications	
Voltages	100/115 VAC 50/60 Hz. 8 amps, 920 watts 220/240 VAC 50/60 Hz. 4 amps, 920 watts
Operating Temperature	The system is capable of operating in lab temperatures between 10° and 30° C (50° and 86° F)
Humidity	10% to 90%
Corrosion	The front cover is corrosion resistant to waters within a pH range of 1-10
Weight	27 lbs.
Dimensions	Height: 19” Width: 8” Depth: 18.8”
Cycle Time	The cycle time for the unit is ≤ 15 minutes when using an 11 minute purge time. This time includes purge, desorb, bake and cool down to ‘purge ready’ for the concentrator only. (this specification assumes an ambient room temperature between 20-22° C (68°-71.6 F).

1.3 Certification	
The unit has successfully completed all appropriate EMC, EMI, and safety requirements per UL, FCC, CSA, and IEC.	
EN61326 Class B	EN-161010-1
FCC Part 15A Class B	UL61010A-1
CSA C22.2 #1010.1-92	
Designed and manufactured under a quality system registered to ISO 9001:2000. Declaration of Conformity available.	

1.4 Software	
Operating System	The Velocity XPT PC interface is fully functional in operating environments of Windows 98 and higher. Windows 2000 or above is recommended.
TekLink	Communicates through RS-232.

1.5 Temperatures	
Trap Heater Cooling	Trap Heater cools from 225°C to 35°C in 90 seconds or less (assuming an ambient temperature between 20°-22°C)
Required Maximum Temperature Ranges	
Valve	300°C
External Transfer Line	300°C
Trap Heater	350°C
Mount	100°C
Moisture Trap	350°
Sample Heaters (optional)	Maximum temperature of 100°C
FFC™ (Forward Focusing Chamber)	Assumes the same temperature as the Valve Oven. Cannot be adjusted independent of the Valve oven.
Temperature Zone Accuracy and Precision	• Accuracy: ± 2% or 3°C, whichever is greater • Transfer Lines: ± 10% or 30°C, whichever is greater • Precision: ± 2% or 3°C, whichever is greater
Temperature Zone Equilibrium	For all zones other than the sample heater, temperature changes equilibrate within 10 minutes or at 10°/min., whichever is longer.
Uniformity	Temperatures should be within 10% of measured temperatures after 30 minutes of equilibration

1.6 Flowpath Requirements	
Flowpath	Silcosteel®, PEEK®, or glass for all surfaces coming in contact with Sample.
Valves	All Solenoid valves are 24 VDC
Gas Requirements	• Helium or Nitrogen, 99.999% pure or greater • 100 psig maximum • 50 psig minimum
Flow Rates	The system is capable of supplying flow rates from 5mL/min. to 500 mL/min. The system requires no manual intervention to change or adjust the flow rates.
Leak Checking	The system automatically leak checks itself.

1.7 Spare Parts List

1.7.1 Glassware

Item No.	Description
14-2337-024	Sparger, 5ml fritted, 1/2” (glassware only)
14-2334-024	Sparger, 25ml fritted 1/2” (glassware only)
14-2336-024	Sparger, 5ml fritlless, 1/2” (glassware only)
14-2333-024	Sparger, 25ml fritless, 1/2” (glassware only)
14-2052-024	Sparger, 5ml fritless, 1/2” (glassware only)
14-2053-024	Sparger, 25ml needle, 1/2” (glassware only
14-8921-000	Sparger, 5ml fritted, kit (included with Velocity XPT)
14-8922-000	Sparger, 25ml fritted, kit
14-8923-000	Sparger, 5 ml fritless, kit
14-8924-000	Sparger, 25ml fritless, kit
14-8925-000	Sparger, 5ml needle, kit
14-8926-000	Sparger, 25ml needle, kit

1.7.2 Heaters

Item No.	Description
14-7806-000	Mount RTD Assembly
14-8785-000	Oven RTD Assembly
14-8788-000	Oven Cartridge Heater
14-8789-000	Mount/FCC Cartridge Heater 110V
14-8789-100	Mount/FCC Cartridge Heater 230V
14-8790-120	Transferline Heater Assembly 72”, 115V
14-8790-220	Transferline Heater Assembly 72”, 230V
14-8791-100	Trap Heater Assembly 72”, 110V
14-8791-200	Trap Heater Assembly 72”, 230V
14-8920-000	Sample Heater Assembly for Velocity XPT for all glassware types, 110V
14-8920-100	Sample Heater Assembly for Velocity XPT for all glassware types, 110V

1.7.3 Fittings

Item No.	Description
12-0041-016	Ferrule, Teflon, 1/4”, glassware
12-0044-016	Ferrule set, 1/8”, brass
12-0069-016	Nut, 1/8”, Swagelok, brass
12-0338-016	Union, bulkhead, 1/8”, filter assembly, SS
14-0053-016	Elbow, male, 1/8” NPT, brass
14-8470-016	1/8” 1/4-28 Upchurch Nylon Plug Nut
14-1758-016	Tee, 1/8”, SS
14-8905-116	1/8” to 1/16” Union Silcosteel Coated w/ferrules (no 1/8” ferrule)
14-6412-016	Nut, male, stainless steel, 1/16”, 1.5” long
14-4049-002	1/8” x 12”, Glass-lined trap
12-0070-016	Union, tee, 1/8”, brass
14-0051-016	Union, 1/16”, SS, with ferrules
14-0158-016	Ferrule, 1/16”, Swagelok
14-0216-016	Female luer connector for sample valve
14-0241-016	Ferrule, 1/16” SS, Valve
14-0243-016	Nut, 1/16”, short, SS, Valco
14-0264-016	Union, bulkhead, 1/16”. SS, Upchurch
14-1301-016	Ferrule set, 1/2”, PTFE
14-1590-016	Nut, plug, Valco
14-2261-016	Union, reducing, 1/4” - 1/16”, SS
14-2549-016	Elbow, 90°, tube, 1/8 NPT to 1/16”
14-2792-016	Nut, 1/16”, plug, brass
14-3123-016	Ferrule, blue, 1/16”, Teflon
14-3295-016	Nut, 1/16”, male, SS, Swagelok
14-3296-016	Nut, 1/16”, SS, Swagelok, plug
14-3354-016	Nut, knurled, 1/2”
14-4050-016	Ferrule, 1/8”, graphite vespel
14-8905-016	1/8” - 1/16” Union SIlcosteel coated w/ferrules (1/8” Teflon 71/16” SS)
14-8914-016	1/8” Manifold Nut, Delrin
14-8915-016	1/8” Manifold Bushing, Delrin

14-8916-016	1/16” Manifold Nut, Delrin
14-8919-016	1/8” - 1/16” Graphite Vespel Reducing Ferrule
14-8918-016	1/8” - 1/8” Bulkhead union Silcosteel coated
14-8674-000	Mount assembly, Silcosteel w/fittings (no heaters)
14-8671-079	4-way Union, Silcosteel, includes fittings and cap nut.

1.7.4 Electronics

Item No.	Description
14-0298-039	Cord, power, universal, 10A, 115V
14-5484-034	Fuse, 8 amp, 5 x 20mm, 250V, Type T
14-7835-090	Temperature Control Board
14-7837-090	Microprocessor Board (CPU)
14-8780-090	AC Output Board
14-8781-090	DC Output Board
14-8782-090	Power Supply
14-8783-090	Infrared receiver/transmitter (IRDA) assembly
14-8793-086	AC Power Cable
14-8795-086	Infrared receiver/transmitter (IRDA) power adapter
14-8797-086	CPU/DC board cable
14-8798-086	25-pin DC board to Back Panel
14-8800-086	Temperature Board DC Cable Assembly
14-8876-086	Mass Flow Controller Cable
14-5082-039	220V Power Cable
14-5107-086	RS232 Cable Assembly
14-6453-034	Fuse 4.0A, 5x20 MM T-40
14-8794-086	DC Power Cable
14-8796-086	Cable Assembly, IRDA to CPU
14-8796-186	Short LNET Cable
14-8838-057	AC Troubleshooting LED
080-613	Battery
14-8888-086	Trap Heater, 110V Voltage Selector
14-8891-086	Trap HEater, 220V Voltage Selector

14-8890-086	Oven/FFC Heater, 110V Voltage Selector
14-8893-086	Oven/FFC Heater, 220V Voltage Selector
14-8734-000	Cooling Fan Assembly
14-8899-000	PDA Assembly
14-8899-086	RS-232 PDA Cradle Assembly
14-8599-100	PDA Stylus (3 pack)

1.7.5 Valves

Item No.	Description
14-0036-050	Sample Valve, 3-Port
14-8901-000	Valve Manifold Ass'y w / 3-port Solenoid Valves, Fittings, and Cables
14-8906-050	Mass Flow Controller assembly with fittings
14-8901-150	3-Port Solenoid valve for manifold (Purge, Bake, or Vent Valve), 24VDC
14-8902-000	Discrete 3-port Solenoid Valve Ass'y. w/fittings (Drain or Eliminator Valves)
14-8913-050	6-port Valve Ass'y, 24VDC (Valve, fittings, actuator, controller and cable)
14-8913-250	Rotor, 6-port Valve
14-8913-150	6-port Valve body w/slider
14-6750-150	6-port Valve Actuator
14-8901-450	LED Cable for 3-port solenoid manifold cable
14-8901-550	LED Cable, Drain Valve
14-8908-000	Trap Injection Port w/Septa

1.7.6 Miscellaneous

Item No.	Description
14-8900-074	User Manual, Velocity XPT
14-2440-006	Ceramic Standoff for valve oven plate
14-8834-000	Guardian™ Foam Sensor option for Velocity XPT
14-8834-100	Guardian Foam Sensor and Eliminator™ Kit for Velocity XPT
14-8900-017	Shipping Carton, Velocity XPT
14-8909-043	Thermal Green Septa for Trap Injection Port

1.7.7 Traps

Item No.	Description
14-5864-003	VOCARB® 3000 TRAP
14-5865-003	VOCARB® 4000 TRAP
12-0083-003	Trap, Tenax (#1)
12-0084-003	Trap, Tenax/Silica gel (#2)
14-0124-003	Trap, Tenax/Silica gel/Charcoal (#3)
14-1457-003	Trap, Tenax/Charcoal (#4)
14-2366-003	Trap, OV-1 Tenax/Silica gel/Charcoal (#5)
14-1755-003	Trap, OV-1/Tenax/Silica gel (#6)
14-3347-003	Trap, OV-1/Tenax (#7)
14-3928-003	Trap, Carbopack B/Carbosieve S 111(#8)
14-8911-003	DryFlow Moisture Trap
14-5866-003	Trap, BTEX
14-1168-003	Trap, Blank (#0)
14-4045-003	Trap, glass-lined Trap, Tenax (G1)
14-4046-003	Trap, glass-lined Trap, Tenax/Silica gel(G2)
14-4047-003	Trap, glass-lined Trap, Tenax/Silica gel/Charcoal (G3)
14-4839-003	Trap, glass-lined Trap, Tenax/Charcoal (G4)
14-4164-003	Trap, glass-lined Trap, blank

Tubing

Item No.	Description
14-5229-002	Tubing, 1/16”, nickel, large bore, (price/ft.) 10 ft. increments
14-6104-002	Tubing, transfer line, Silcosteel (per ft.), 0.40 x 1/16”
14-7630-002	1/8” Teflon Tubing Red
14-7634-002	1/8” Teflon Tubing Blue
14-8675-002	Mount Sample Tubing Assembly w/Fittings
14-8997-000	Forward Focusing Chamber Assembly w/Fittings
14-8927-002	Peek Tubing, 1/16”, Green
14-6934-002	Peek Tubing, 1/16”, Natural

1.7.8 G C Interface Cables.

Item No.	Description
14-6689-086	Interface: HP 6890 GC
14-2991-000	Interface: HP 5890 GC
14-4652-086	Interface: • HP 5890 w/5970 MSD and Unix-B • MS-DOS software, HP 5890/5971/5972 MSD and Unix-B • MS DOS software and HP 5890/5989 MS Engine
14-4830-086	Interface 2 Tekmar 3000 series/ 2000 / 6000 / 7000's / to one HP 5890 (GC only) (3000 series / 2000 / 6000/ 7000's must hook to separate columns)
14-4188-086	Interface HP 5890 w/5970 MSD and Unix or Pascal based software. **Note:** • If you are using Pascal software, this cable requires the HP A111 (HP P/N: 05990-60111) or A211 (HP P/N 05990-60211) accessory card and internal accessory cable (HP P/N 05987-60158). • If you are using Unix software, only the internal accessory cable (HP P/N 05987-60158) is required.
14-2993-000	Interface: HP 5995/96/85/87/88/92 GC/MS with HP-1000/RTE GC/MS Software
14-2974-000	Interface: HP 5700 Series (exc. 5710/30/90)
14-2990-000	Interface: HP 5880A/5840A. Also requires timer/GC ready simulator P/N 14-5825-086)
14-3318-000	Interface: HP 5995/96/87/85/92 w/Chemstation Quicksilver
14-3010-000	Interface kit: HP 5995/85/93/92 GC/MS (includes I/O box). Requires HP's BATCH or AQUARIUS software and external events relay board to operate SIDS Data System.
14-2968-000	Interface: Varian 3300/3400/3500/3600
14-5044-086	Interface 2 Tekmar 3000 series/ 2000 / 6000 / 7000's to one Varian 3400 GC. (3000 series / 2000 / 6000/ 7000's must hook to separate columns)
14-2969-000	Interface: Varian 3700
14-2966-000	Interface kit: Varian Vista and Varian 6000 (includes I/O box for switching 2000A to 2000B)
14-7396-086	Interface: Varian 3800/3900
14-3433-000	Interface: Varian 3300/3400/3500/3600
14-3052-000	Interface: A&B to Varian Vista I/O box
14-2972-000	Interface: Tracor 560/565/570
14-2992-000	Interface: Tracor 540 and Water Dimension l
14-4655-086	Interface: 2 Tekmar 3000 series / 2000 / 6000 / 7000's to one Tracor (GC only) (3000 series / 2000 / 6000/ 7000's must hook to separate columns)

14-3430-000	Interface: • Tracor 585 • Tremetrics 9000 Water Dimensions ll • Finnigan 9001
14-2970-000	Interface: Perkin-Elmer Sigma Series
14-3233-000	Interface: Perkin-Elmer 8000 Series/Autosystem/Clarus
14-5397-086	Interface: 2 Tekmar 3000 series / 2000/ 6000/ 7000's to one Perkin Elmer 8000 Series/ Autosystem/Clarus
14-2973-000	Interface: Shimadzu GC9A w/reducing union for transfer line connection
14-4610-086	Interface: • Shimadzu CGC 14A / 15A / 17A GC 14A w/QP 1000 EX MSD • GC 14A w/QP 2000 MSD, also includes 1/16" to 2 mm unions. (Needs Shimadzu P/N 221-34280-91).
14-4610-186	Interface: • Shimadzu CGC 14A / 15A / 17A GC 14A w/QP 1000 EX MSD and • GC 14A w/QP 2000 MSD. (Needs Shimadzu P/N 221-34280-91)
14-4009-000	Cable: Interface splicer, Finnigan 5100/4000/4500 and OWA
14-4938-086	Interface: Carlo Erba Mega and Vega Series/Fisons 8000
14-3147-000	Interface: General purpose / HNU 301/321/421 (HNU Valve driver option required)
14-7397-086	Trace 2000 Interface cable w 1/16" to 2mm unions
14-7397-186	Trace 2000 Interface Cable
14-8417-000	Duet™ High Throughput Interface. Interfaces two Tekmar VOC systems to one GC or GC/MS system.

Chapter 2

Installation & Setup

2.0 Installation

This section describes

- Prerequisites and site preparation for Concentrator installation.
- Unpacking and checking the Concentrator shipment.
- Major components of the Concentrator.

Equipment installation and operation is easier if you use the illustrations to identify and locate the described components on the Concentrator.

2.0.1 Operating Environment

The Concentrator operates at temperatures between 10°C and 30°C (50°F and 86°F) with humidity levels between 10% and 90%. These temperatures and humidity levels are consistent with a standard lab environment and should pose no difficulty.

	**CAUTION**
To avoid material and/or component damage keep the concentrator away from corrosive substances (gas, liquid, or solid)	

The Concentrator requires a clear surface area with no shelves or overhanging obstruction. The Concentrator is 19” high, 18.8” deep, 8” wide, and weighs 27 lbs. Make sure the surface where you place the Concentrator is capable of supporting the unit’s weight, and that the unit sits firmly and evenly on the surface.

	**WARNING**
A minimum 6” clearance is required for optimal trap performance. To avoid interference with the Concentrator performance maintain a minimum 6” perimeter around the unit, unobstructed by other equipment.	

2.0.2 Power Requirements

After selecting and clearing a location for the concentrator, check the availability of the required grounded outlets. The Concentrator uses:

- 115V/230V power at 50/60 Hz.
- One grounded, three-pronged receptacle for the main power cord.
- Additional accessories may also require one or more grounded outlets.

2.0.3 Gas Supply Requirements

Concentrator operation requires the availability of ultra-high purity nitrogen or helium (as purge gas). Verify that the following items are in compliance:

1. Nitrogen or helium purity must be 99.999%, and < 0.5 ppm% hydrocarbon tested.

2. Gas pressure at the source must be high enough to:

   - Allow at least a 50 psi pressure drop at every flow or pressure regulator
   - Travel the distance from the source to the concentrator
   - Provide the required gas pressure at the concentrator. Operation of the Concentrator requires helium or nitrogen at an incoming (supply) pressure of 50 to 100 psig.

3. The diameter of the tubing that supplies the gas depends on the maximum pressure drop allowable for your setup.

   - If the helium supply is close to the concentrator, use the pre installed 1/8” blue tubing.
   - If any of the following circumstances are present you may want to reduce pressure by replacing the pre installed 1/8” blue tubing with 1/4” tubing:

     a. The gas supply is a long way from the concentrator

     b. A single source supplies several instruments

     c. A single source is subject to high demand for gas

4. Gas supply tubing lengths must be adequate. Be generous when cutting lengths of tubing for local supply lines. A relatively long coil of tubing between supply and the Concentrator allows you to move the instrument without disconnecting the plumbing. The system is supplied with 3’ of tubing. Additional tubing can be added to increase the length as needed.

5. It is essential that gas line fittings and regulators are the correct size and type. Consult your local gas supplier for type and size of cylinder valves, then select compatible pressure regulators based on the required valves. Keep these considerations in mind:

   - Use good quality pressure regulators with stainless steel diaphragms. This reduces high source pressures to the pressure required by the concentrator. Teledyne Tekmar recommends using a single, two-stage regulator rather than two single-stage pressure regulators to meet the concentrator’s pressure specifications.
   - On/Off valves, while not essential, are very useful when mounted on the outlet fitting of a two-stage regulator.
   - If pipe thread connections are required in your gas supply lines, seal them with instrument-grade Teflon® tape.

	**CAUTION**
Always use instrument-grade Teflon tape to seal thread connections. Do not use pipe dope or lower grades of Teflon® tape. Volatile materials in the dope and/or low grade tape will contaminate the tubing!	

2.0.4 Connecting to an Autosampler

If you are connecting to an AQUATek 70 or a SOLATek 72 autosampler, refer to the laminated Installation diagrams that came with your Velocity XPT. These diagrams are also found in Chapter 5 - Diagrams.

For additional installation information refer to the manual that shipped with your autosampler.

	**CAUTION**
When connecting to an autosampler always use organic-free, deionized water (DI). Failure to use organic-free deionized water may damage your system.	

2.1 Unpacking the Concentrator

1. Remove the Concentrator Kit Box and the concentrator from the shipping carton. Each concentrator shipps with a Kit Box.

2. Compare the contents of the Kit Box against the Packing List. Kit Box parts are identified and their location specified by the grid on the inside of the Kit Box lid (Figure 2-1). Check for each listed item.

#3 Trap (14-0124-003) Dry Flow Trap(14-8911-003) Vocarb 3000 Analytical Trap (14-5864-003)					
14-1301-016 **1/2" Teflon Ferrule Set**	**12-0041-016** **1/4" Teflon Ferrule**	**14-0051-016** **1/16" -1/16" SS Union**	**14-8914-016** **1/16" Upchurch Nuts** **14-3123-016** **1/16" Upchurch Ferrule**	**14-8908-000** **TOT Injection Port**	
14-8919-016 **1/8" to 1/16" GVP Reducing Ferrule**	**14-4050-016** **1/8" GVP Ferrule**	**14-5484-034** **115 Volt** **14-6453-034** **230 Volt**	**14-8914-016** **1/8" Upchurch Nut** **14-8915-016** **1/8" Upchurch Bushing**	**14-8470-016** **Upchurch Plug Nut**	**14-2792-016** **Brass Cap Nut**
14-3295-016 **Male Nut** **14-0158-016** **Male Ferrule**	**12-0070-016** **1/8" Brass Tee**	**14-0243-016** **Valco Nut** **14-0241-016** **Valco Ferrule**	**14-8909-043** **7mm Septa**	**14-1590-016** **Valco Plug Nut**	**14-3296-016** **1/16" Plug Nut**

Figure 2-1: Concentrator Kit Box Layout

If an item is missing, call the Teledyne Tekmar Customer Service Department:

U.S and Canada (800) 874-2004

Outside the U.S. and Canada Country Code + 1 (513) 229-7000

2.2 Major Components

The Concentrator consists of a front panel sample glassware assembly and an optional hand-held PDA controller.

2.2.1 PDA

An optional color PDA with Pocket PC capabilities can be used for local control. The PDA is fully equipped with I.R. communication.

2.2.2 Front Panel LED Assembly

The blue LEDs on the front of the Concentrator illuminate to display the current mode of operation. The Standby LED flashes upon Power up. (Figure 2-2).

Figure 2-2: Velocity XPT: LEDs, Glassware, and Optional PDA

The Concentrator can accommodate a 5mL or a 25mL sample sparger. The sample mount is attached to the chassis; the sample valve assembly and the glassware are installed on the unit. To access the glassware the plastic guard must be removed. This is done by lifting the guard up and sliding it forward.

2.2.3 Concentrator Trap

The Concentrator ships with stainless steel glass-lined tubes installed in the unit. Trap selection is at the discretion of the user. The Kit Box contains three Traps:

- **Vocarb 3000 Analytical Trap (14-5864-003)**
- **#3 Trap (14-0124-003)**
- **Dry Flow Trap(14-8911-003)**

Install either the Vocarb 3000 Analytical Trap or the # 3 Trap as described below (Figure 2-3). The Dry Flow Trap is described in section 2.2.4

⚠	**IMPORTANT:** **You must install the default parameters for the Trap you select. Your Trap will not operate properly without these parameters installed and damage to the Trap may occur!** **You can set the default parameters by selecting your Trap in the Method Wizard (reference 4.3.1), or you can manually input the information. Refer to the information packaged with your Trap for default parameters.**

⚠	**The Analytical Trap is secured with a fixed brass nut at the top of the assembly. When you need to remove the trap first loosen the nut at the bottom of the assembly, then loosen the fixed brass nut. Slide the trap out by pulling straight up. Install the replacement trap with the fixed brass nut at the top of the assembly.**

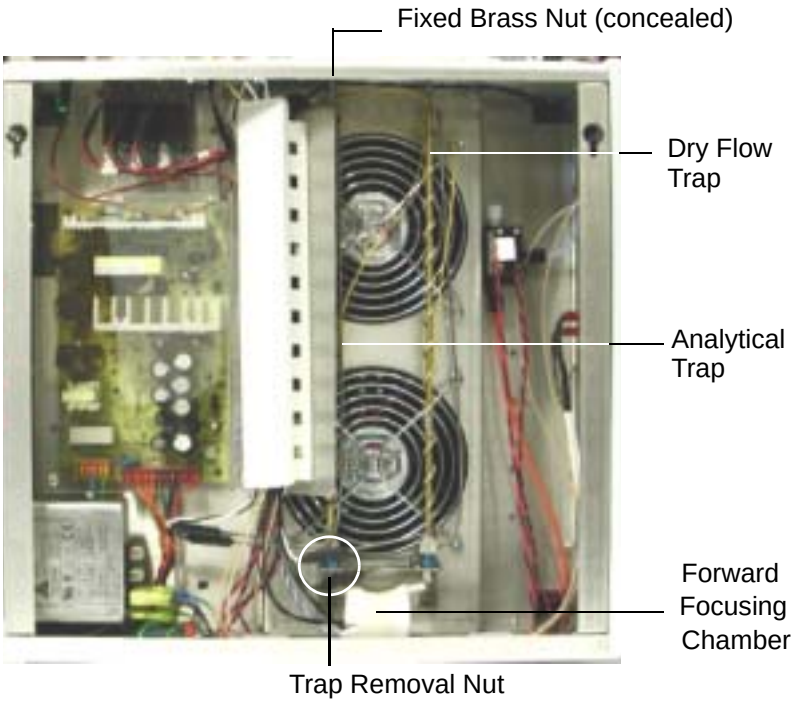


Figure 2-3: Velocity XPT Trap

2.2.4 Dry Flow Trap

The Velocity XPT ships with a stainless steel glass-lined tube installed in the unit. The kit box contains a Dry Flow Trap that can be installed into the unit for additional moisture removal.

If you install the Dry Flow Trap, you must also install the default parameters for the Dry Flow Trap . Your Trap will not operate properly without these parameters installed.

The following Hydrophobic Traps generally do not need a Dry Flow Trap:

- # 1 (Tenax)
- # 5 (OV-1 / Tenax)
- # 8 Carbopak B, Carbopak C
- BTEX
- Vocarb 3000
- Vocarb 4000

Since these Traps do not retain water, they can be dry purged prior to the desorption step to remove residual water prior to transfer to the GC column.

The following Hydrophillic Traps may require a Dry Flow Trap:

- # 2 (Tenax/Silica Gel)
- # 3 (Tenax/Silica Gel/Charcoal)
- # 4 (Tenax/Charcoal)
- # 6 (OV-1/Tenax/Silica Gel)
- # 7 (OV-1/Tenax Silica Gel/Charcoal)

These Traps do not remove residual water via the dry purge step. Therefore, there may be the need to incorporate the Dry Flow Trap into the system to remove residual water from the system prior to transfer to the GC Column.

2.3 Printed Circuit Boards

Concentrator operations are controlled by four printed circuit boards and a Power Supply.

2.3.1 A.C. Output Board

The A.C. Output Board is mounted directly below the transfer line. All A.C. outputs and temperature sensors are connected to this board.

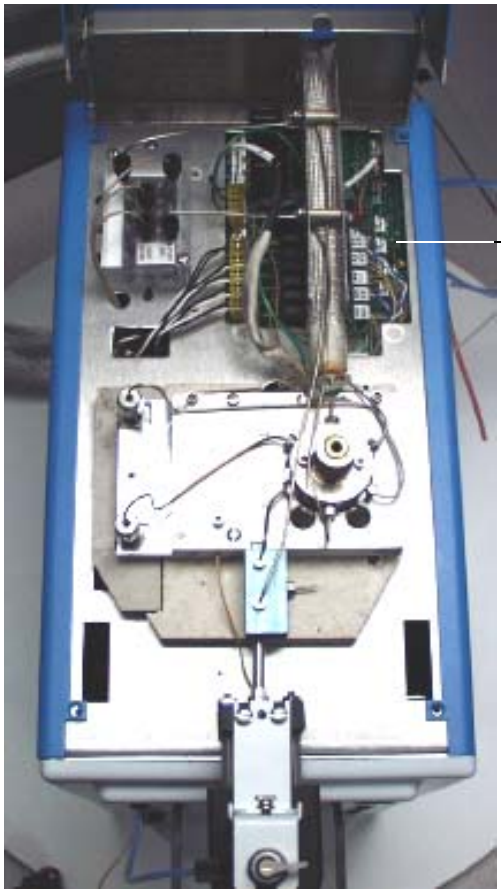


Figure 2-4: A. C. Output Board

2.3.2 Temperature Board

This board is connected to the bottom side of the A.C. Output board. The Temperature board is responsible for all AC control and RTD feedback for the standard temperature zones**.**

Figure 2-5: Temperature Board

2.3.3 CPU Board

The CPU board is located in the back right section of the unit. This board has a 25-pin, sub D connector for communications to the GC, and two RS-232 Ports for external communications (Figure 2-6).

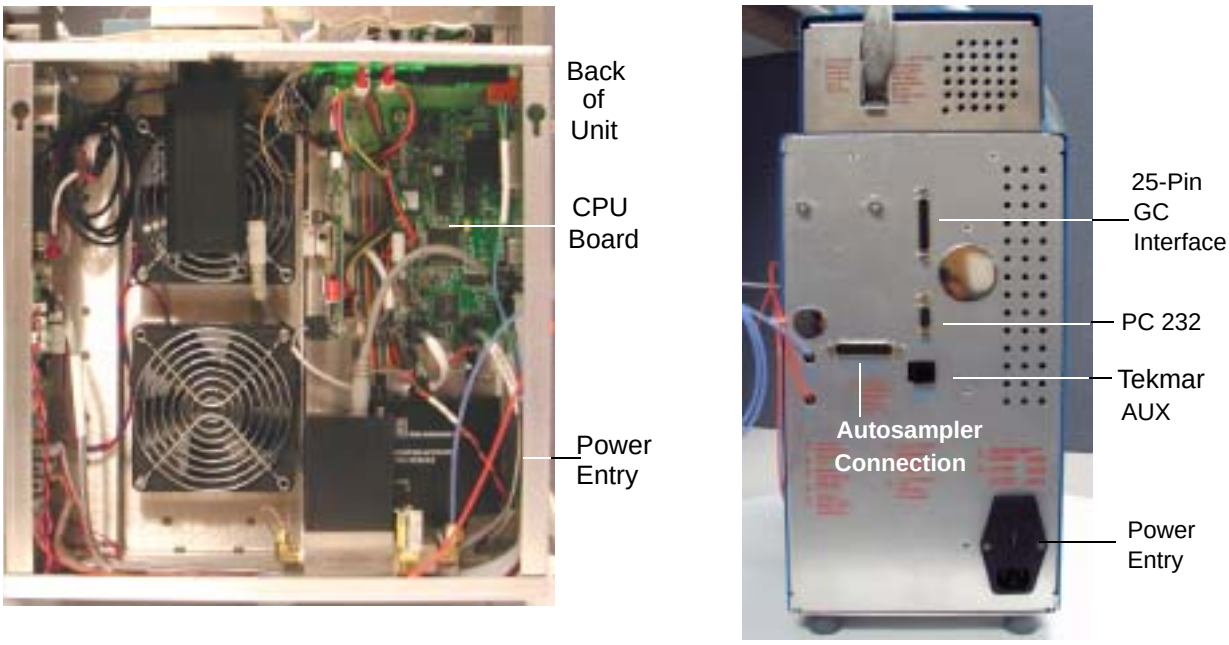


Figure 2-6: CPU Board Connectors

2.3.4 D.C. Output Board

The D.C Output board is located behind the front panel on the right side of the unit. This board controls all DC outputs as well as the Infra Red communications and the Aquatek 70 Interface.

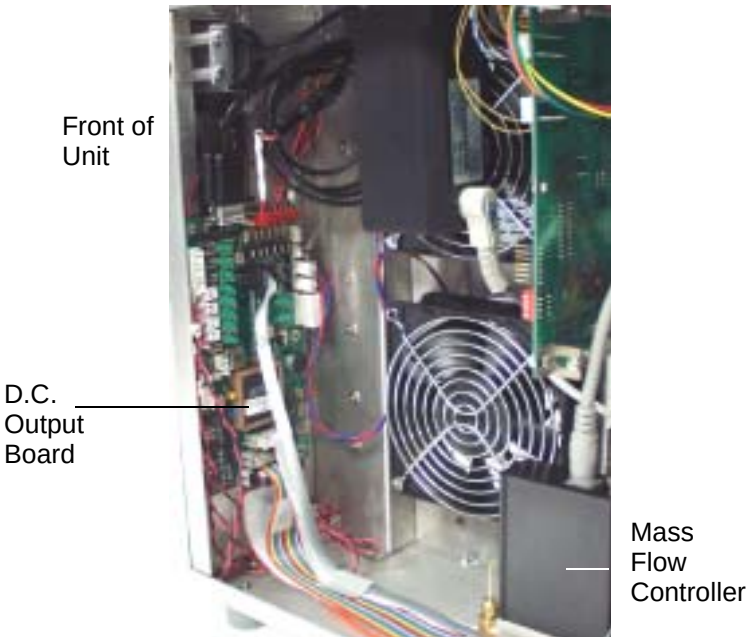


Figure 2-7: D.C. Output Board

2.4 Gas Inlets and Outlets

Figure 2-8 shows the concentrator's rear panel with the Gas Inlets for Sample Purge and Carrier Gas.

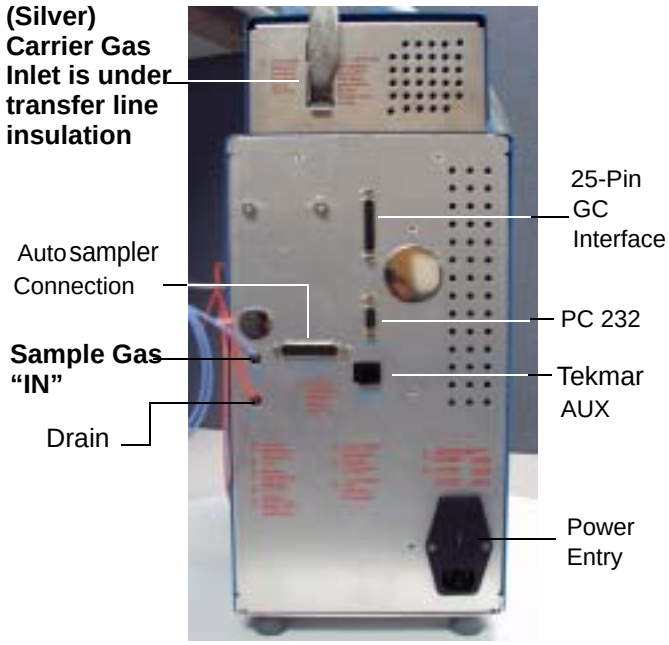


Figure 2-8: Concentrator: Rear Panel

2.4.1 Sample/Purge Gas Inlet (supplies gas for purging and cleanup)

Sample gas (ultra-high purity helium or nitrogen) flows through the sparger to carry volatile organic analytes onto the trap. (Nitrogen can be used as sample gas, but it may contain more impurities). The helium or nitrogen enters the back panel through the blue 1/8" tubing labeled "Sample Gas" (Figure 2-8)

Teledyne Tekmar recommends a sample gas flow of 40 mL/min ±5 mL for 11 minutes to achieve a 440 mL purge volume.

2.4.2 Carrier Gas Inlet

Carrier Gas is high purity helium (or nitrogen) used to desorb volatile organic analytes off the internal trap and carry them through the transfer line back to the GC. Carrier gas enters the back panel with the heated transfer line (Figure 2-8). Depending on the concentrator's current operating mode:

- Carrier gas backflushes through the trap and carries volatile organic analytes over to the GC.

2.4.3 Transfer Line Return

- The Transfer Line Return is the interface between the GC and the Concentrator. Carrier gas makes a passive current through the concentrator and returns, unchanged, to the GC through the transfer line. GC carrier gas in independently controlled through the GC

2.5 Concentrator Valves and Lines

The Purge Valve, Bake Valve, and Vent Valve are mounted on a manifold which supplies gas to various locations within the system

.

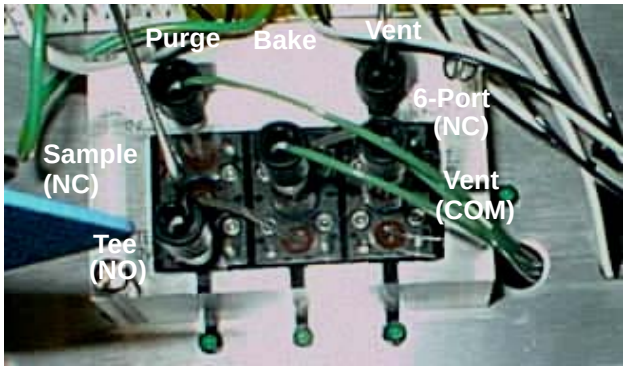


Figure 2-9: Concentrator Valves

1. **Bake Valve**. The Bake Valve receives inlet flow from the Mass Flow Controller:

    - When the Bake Valve is “OFF” the flow moves to the Purge Valve.
    - When the Bake Valve is “ON” it allows the trap to be backflushed baked.

2. **Purge Valve**. Sample gas flows from the **Bake Valve**.

    - When the Purge Valve is OFF, the sample gas flow is routed around the glassware.
    - When the Purge Valve is ON, it routes gas through the Sparge vessel.

3. **Vent Valve**. When the Vent Valve is “ON” it allows flow out the vent. When the Vent Valve is ”OFF”, it closes the system.

4. **Drain Valve**. When the Drain line is “ON”, liquid or gas flows from the glassware, out the needle, and through the drain line. When the Drain Valve is “Off”, the line is closed.

5. **The 6-port Valve** (Figure 2-9) inside the valve oven has two settings that control the direction of sample and carrier gas flow through the concentrator.

6. **Mass Flow Controller** - Regulates the flow by controlling the gas pressure.

2.6 Autosamplers

- The Concentrator can process up to 70 liquid samples with the AQUATek 70.
- The Concentrator can process up to 72 liquid or solid samples with the SOLATek 72.

For further instructions, refer to the manuals that shipped with your autosampler.

2.7 TekLink Software

TekLink software makes it possible for you to use a personal computer (PC) running Microsoft® Windows™ to monitor, schedule, and control the operation of the concentrator. TekLink requires an operating system running Windows 98 or higher. **Windows 2000 or higher is recommended**. Using TekLink you can:

- Define custom Methods or operating sequences that meet your analytical requirements
- Set up schedules for running certain Methods at specified positions on an Autosampler
- Start, interrupt, and/or reset a run in progress
- Advanced Diagnostics

2.7.1 Pneumatic Connections

The Concentrator requires two independent gas flows:

- Carrier gas flows from the GC to the carrier gas line in the Concentrator, through the Concentrator, and back to the GC by way of a heated valve and transfer line.
- During Purge Mode Sample gas flows from the sample gas source to the Concentrator sample inlet, through the sparger, over the trap, and out the Concentrator vent.

2.7.2 Connecting the Sample Gas Line

Sample gas is usually supplied through a tee union from the GC carrier gas supply tank.

- Install the 1/6” brass tee union (from the kitbox) to the carrier gas supply line to the GC as shown in Figure 2-11.
- Run the Blue Sample Gas Line from the Concentrator to the tee.

2.7.3 Connecting to the GC and Carrier Gas Supply

When you connect the Concentrator to the Gas Chromatograph you have the following options:

1. Connect to the GC Carrier Gas Inlet and leave the injection port free for direct injections.

2. Make a direct column connection. If you plan to use a Cryofocusing Module, you must make a direct column connection to the GC.

2.7.4 Using GC Regulated Carrier Gas

When you make the connections illustrated in Figure 2-11 the GC supplies and controls carrier gas flow to the Concentrator. Using this configuration keeps the GC injection port free for direct sample injections. Generally speaking, you cannot use a Cryofocusing Module with the configuration shown in Figure 2-11

To make the connections:

1. Select an injection port. You may have to remove the covers around the port to expose the line that supplies carrier gas to the port.

⚠	**CAUTION**
Some Injection Ports have multiple pieces of tubing connecting to the Injection Port. Do not cut any lines until you are certain that you know which line is the carrier line.	

2. Open the line at a point one or two inches from the injector housing. If a union connects tubing from the carrier gas supply to the injector port inlet, disconnect the union. If there is no union, cut the line and install the 1/16” -1/16” union from the kit box. (Reference Figure 2-11)

3. Connect to the line coming from the GC control pneumatics to a 1/16” union.

4. Connect the piece of 1/16” nickel tubing to the union located on the outer edge of the transfer line (This is the **silver** tubing that runs along the transfer line).

5. Connect the tubing going to the injection port inlet to the **brown** tubing in the transfer line using a 1/16” Swagelok Union.

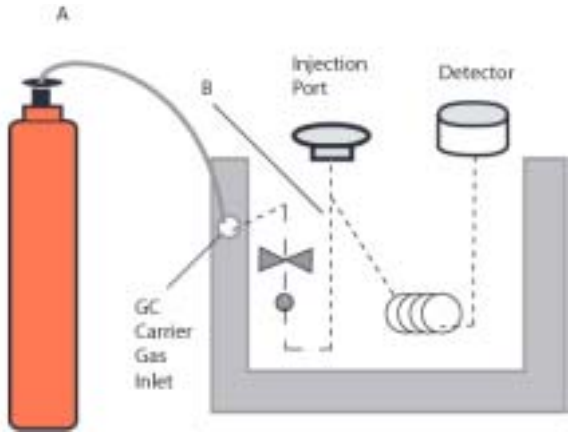


Figure 2-10: Connecting to a Sample Gas Supply

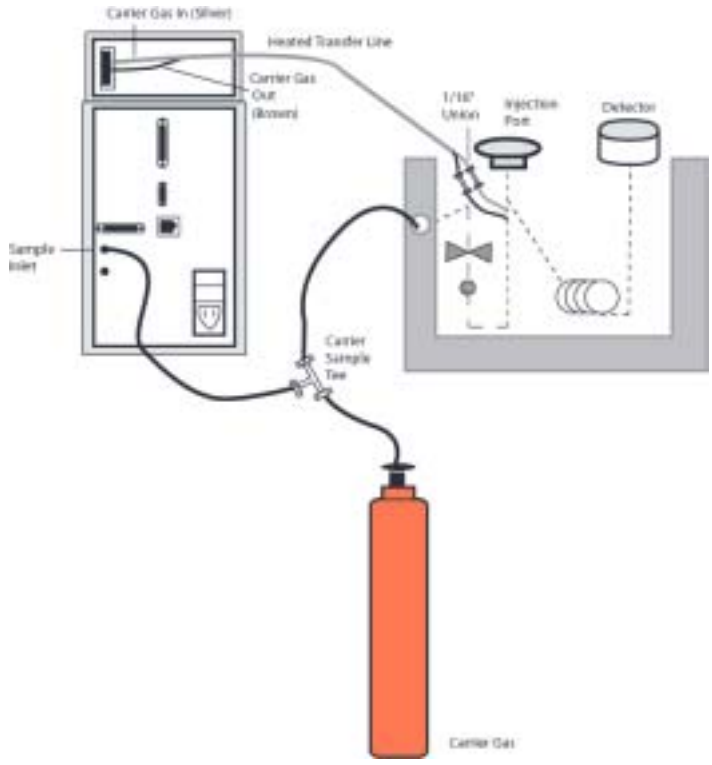


Figure 2-11: Connecting to a Sample Gas Supply

2.7.5 Making a Direct Column Connection Using an External Regulator Assembly

You must use an external pressure regulator (EPR) when the back pressure in the GC injection port is regulated on the downstream side.

Note: Any Cryofocusing Module installations or direct column connections require an EPR.

Figure 2-12 shows the connections required to make a direct column connection to the GC.

To make a direct column connection:

1. Allow the GC to cool to room temperature.

2. Since this configuration removes carrier gas flow from the GC pneumatic control, you must install an external pressure regulator (TD Part # 14-3938-000, or the equivalent) between the gas supply source and the carrier gas line on the outside of the Concentrator Transfer line.

    - Connect the outlet of the regulator to the carrier gas inlet line on the outside of the Concentrator Transfer Line. A 1/16” or 1/8” union may need to be installed to route 1/8” tubing to the EPR.

3. Find an opening in the GC to route the transfer line into the GC oven to make the connection to the column (i.e. unused injection port or detector).

4. Using a zero dead volume union, connect the column to the transfer line from the Concentrator return line

Notes:

- If you use the Concentrator with a Cryofocusing Module, connect the transfer line at the Cryofocusing Module, not directly to the GC. Please refer to the Cryofocusing Module Instruction manual for installation instructions
- Be sure that the heater assembly on the transfer line is as close to the injection port as possible to minimize cold spots. As an alternative, the transfer line can pass through the injection port with the union in the GC oven.

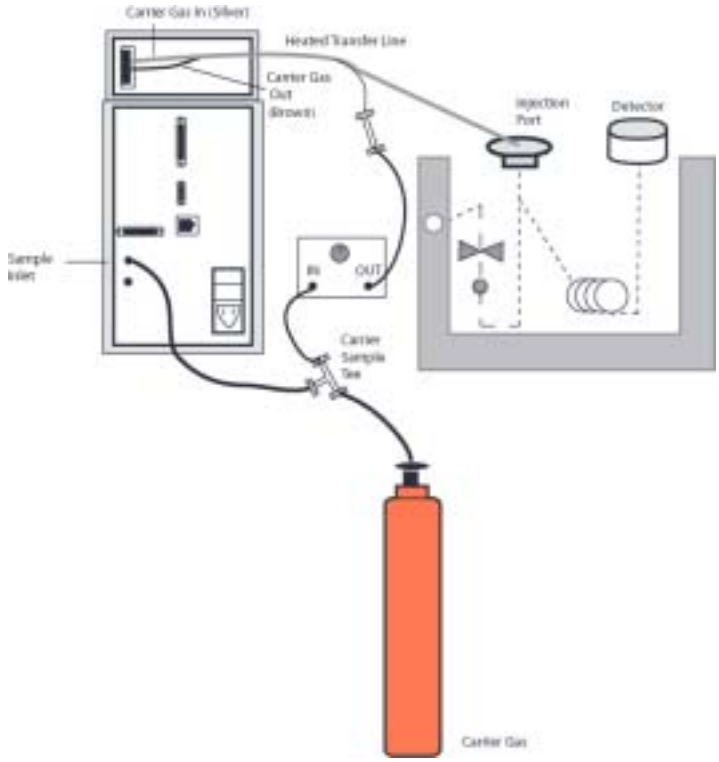


Figure 2-12: Direct Column Connections to the GC

2.7.6 Routing the Drain Tubing

The Drain tubing is red (Figure 2-13). Run the drain tubing to a sink or waste bottle. Make sure the drain tubing is not crimped or blocked in any way.

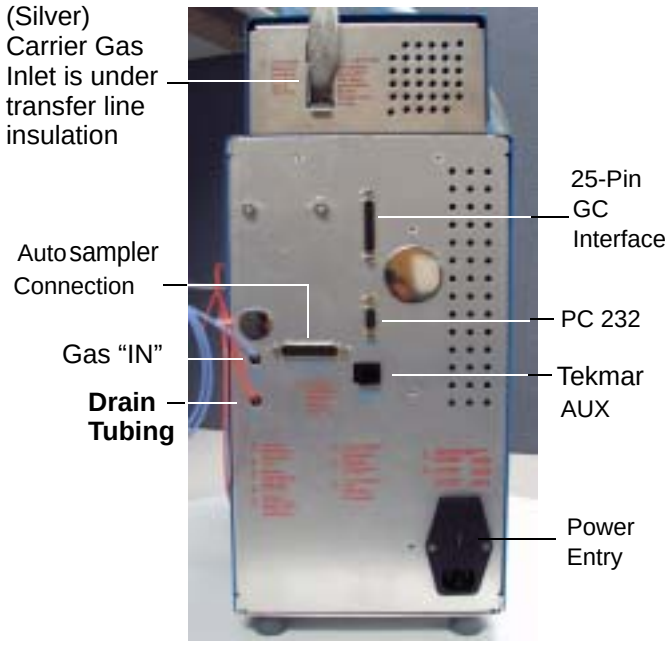


Figure 2-13: Drain Tubing & Electrical Connections

2.7.7 Making Electronic Connections

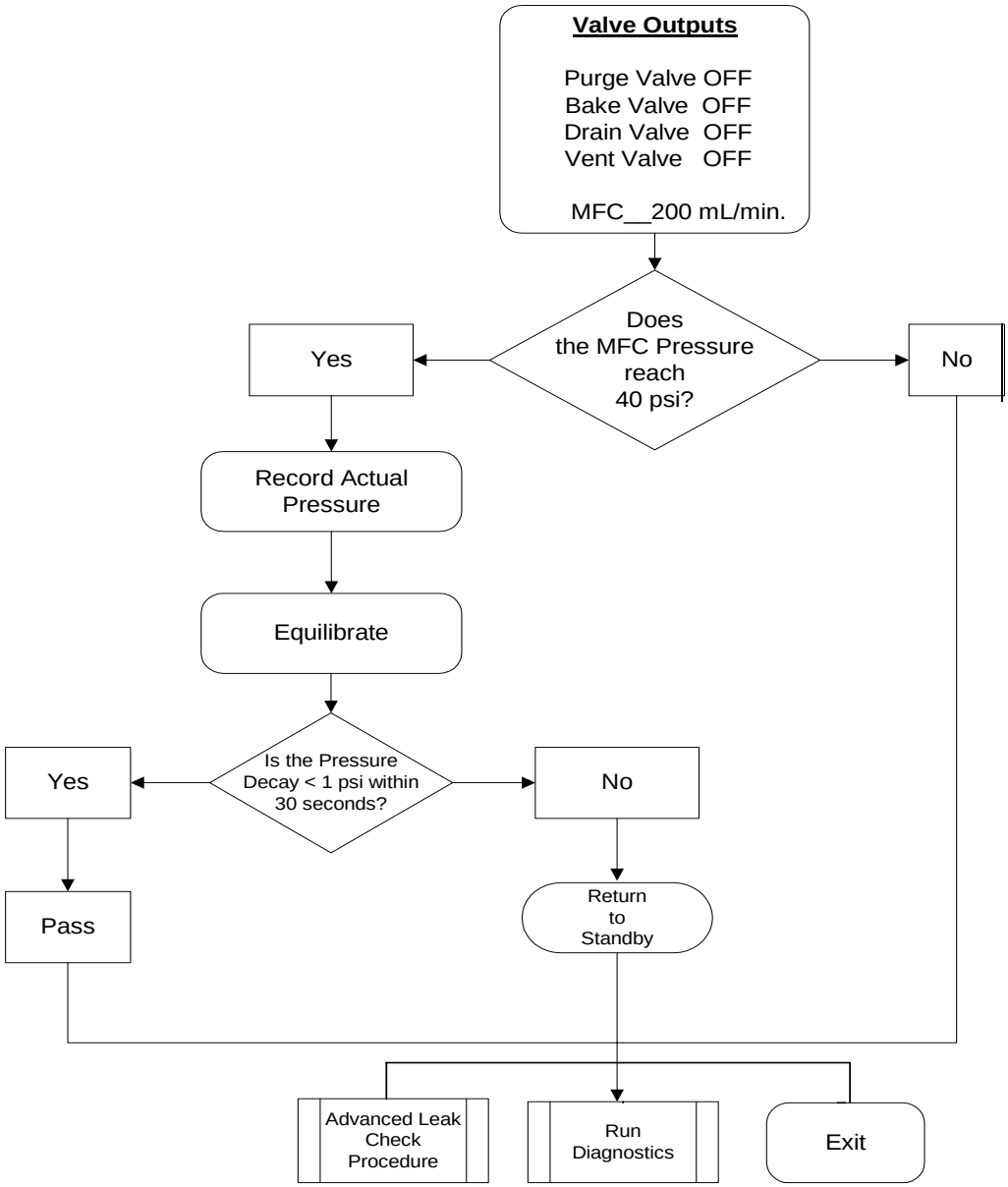
If you are using an accessory like an autosampler or a Cryofocusing Module, it must be connected electronically to the Concentrator by way of a cable. The Concentrator must also be connected electronically to the GC.

The Concentrator has a GC interface port. Instructions for connecting a Concentrator to a specific model of gas chromatograph accompany the interface cable required for your specific Concentrator setup.

Refer to the Bench Setup diagrams in Chapter 5 for an illustrated setup diagram.

2.8 Leak Checking Sequence

A leak check can be activated by clicking the toolbar icon, or selecting Leak Check form the Command menu (**Command>Go to Leak Check**). When a leak check is initiated the following sequence of events occur:



2.8.1 Advance Leak Checking Guidelines

If your unit fails the System Leak Check as outlined in 2.8, the following Advanced Leak Check should be performed to isolate the problem area.

1. In the Kit Box that came with your unit locate Upchurch Plug (#14-8470-016). Insert this plug in the normally open tee (NO) on the Purge Valve and select Retest.

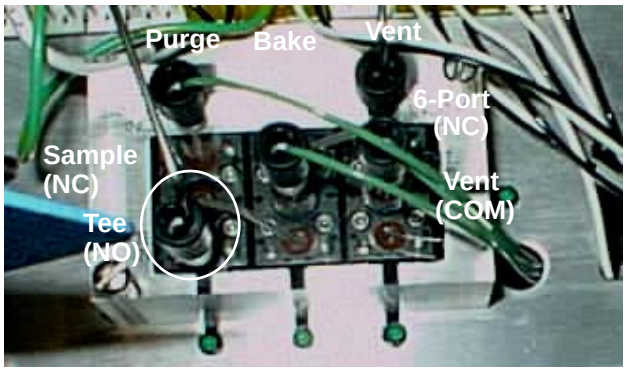


Figure 2-14: Purge Valve NO Tee

If the system passes the leak check, move to Step # 2. If the system fails the leak check, examine the following areas and their associated lines:

- Mass Flow Controller (MFC)
- Purge Valve
- Bake Valve
- Plug Nut

When the problem is corrected, retest the unit from the leak Check screen and, if it is OK, reconnect the Purge Valve.

2. Isolate the Drain Valve and lines by turning the Sample Valve to the “OFF” position.

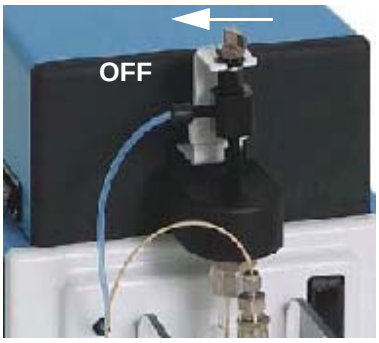


Figure 2-15: Sample Valve Switch

- If the unit fails the Leak Check, move to Step #3.
- If the unit passes, check the Drain Line or Valve for the leak.

3. Start the Leak Check mode. Go to the Diagnostic mode and toggle the 6-Port valve to position “B”. Continue the test. If the unit passes, check the following:

- Position # 3 on the 6-Port valve
- Position # 6 on the 6-Port valve
- Dry Flow Trap
- Analytical Trap
- Forward Focusing Chamber (FFC)

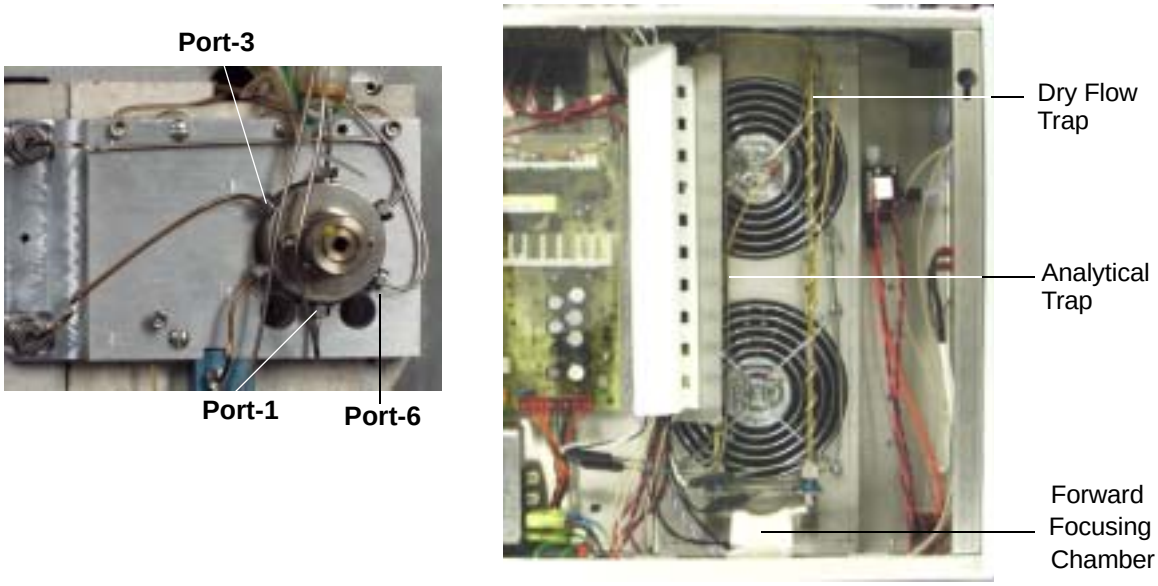


Figure 2-16: Leak Checking

If the system fails the Leak Check, examine the following:

- Glassware (Figure 2-2)
- Mount (Figure 2-17)
- 4-way tee (Figure 2-17)
- Vent valve (Figure 2-14)

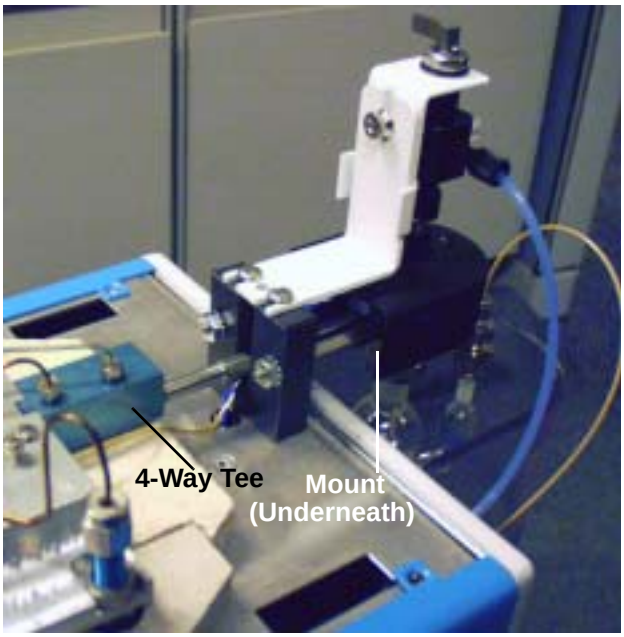


Figure 2-17: 4-Way Tee and Mount Location

2.9 Foam Sensor and Foam Eliminator (option)

If you ordered the optional Foam Sensor or Foam Eliminator (or both) the following section explains the configuration and operation of these options. The Guardian Foam Sensor mounts on the glassware on the front of the unit.

If you ordered the Guardian after the installation of your unit, refer to the installation instructions that came with your order.

If you have the Eliminator, the de-foaming agent is supplied by Teledyne Tekmar as part of your order.

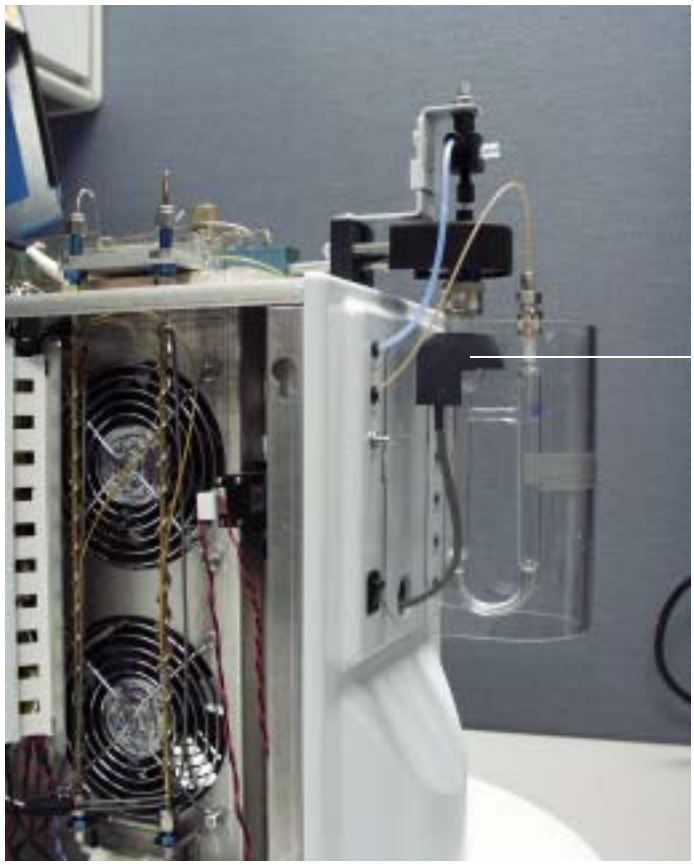


Figure 2-18: Guardian Foam Sensor

There are several configurations for the Guardian and the Eliminator:

- Guardian used with the Velocity XPT
- Guardian and Eliminator used with the Velocity XPT
- Guardian used with the Velocity XPT and an autosampler
- Guardian and Eliminator used with the Velocity XPT and an autosampler

Note: Select Tools>Configurations>Foam Sensor and toggle to select to abort the schedule after an error message is issued.

2.9.1 Guardian (Velocity XPT)

The Guardian uses a photo sensor mounted on the outside of the sparger. When foaming occurs the foam blocks the sensor prompting the Velocity XPT to shut off the purge flow and drain the sample.

2.9.2 Guardian and Eliminator (Velocity XPT)

When foam is sensed, the unit shuts off the purge gas. The purge clock is stopped and the foam transfer valve is activated to add a de-foamer for a specified period of time.

Upon completion of the time, the purge gas and purge clock are reactivated. If the sensor does not trip again, everything proceeds in sequence.

- If the sensor is tripped a second time the above procedure repeats.
- If the sensor is tripped a third time, an error message appears on the screen and all schedules are halted (optional).

When the sample is run the system prompts the user to manually rinse the glassware

2.9.3 Guardian (Velocity XPT and Autosampler)

The Guardian uses a photo sensor mounted on the outside of the sparger. When foaming occurs the foam blocks the sensor prompting the Velocity XPT to shut off the purge flow and drain the sample.

- The unit may give an error message and halt all schedules (optional).
- Upon completion of drainage the unit steps to the next program mode. This prevents communication errors between the GC and the Velocity XPT and keeps them asychronous.

2.9.4 Guardian and Eliminator (Velocity XPT and Autosampler)

When foam is sensed, the unit shuts off the purge gas. The purge clock is stopped and the foam transfer valve is activated to add a de-foamer for a specified period of time.

Upon completion of the time, the purge gas and purge clock are reactivated. If the sensor does not trip again, everything proceeds in sequence.

The foam line is rinsed during Desorb

- If the sensor is tripped a second time the above procedure repeats.
- If the sensor is tripped a third time, the system gives an error that is written to the Sample Log and the schedule proceeds as normal.

2.10 Cryofocusing Module (option)

If your GC (gas chromatograph) has a capillary column with an ID of 0.32 or less, and you are not splitting the sample at the injection port, Teledyne Tekmar recommends installing a Cryofocusing Module to improve chromatographic resolution. Cryofocusing or cold trapping ensures efficient trapping and injection.The Cryofocusing Module is an optional accessory to the Velocity XPT.

2.10.1 Components

Before starting your installation please check to make sure you have the items listed below:

Quantity	Part Number	Description
1	14-8993-_00	Cryofocusing Module Assembly (Shipping Carton)
1	14-2531-800	Cryo Valve Assembly (Shipping Carton)
1	14-1668-000	LN_2 Transfer Line Assembly (Shipping Carton)
1	14-6566-982	Mounting Plate to 5890 (Kit Box)
2	14-3336-006	Standoff, 6-32 x 1/2”
2	14-6567-001	Screw, M4 x 0.7 x 8mm, Phillips
2	14-0722-009	Washer, Flat # 6
1	14-1812-000	Cryo Vent Line
1	14-3105-000	Cryo Valve Power Cord, 12 VDC
1	14-9036-086	Communications Cable, Velocity XPT to Cryo
1	14-3474-039	Female Power Cord
1	14-2086-016	Mini Ferrule, 0.4mm I.D. Graphite Vespel
1	14-2069-016	Mini Ferrule, 0.5mm I.D. Graphite Vespel
1	14-8205-100	12 VDC Power Supply
2	14-6453-034	Fuse, 4.0A, 5 x 20 MM T-4.0
1	14-2098-039	Power Cord (115V)
1	14-5028-039	Power Cord (220V)
1	14-3404-016	1/16” to 1/16” Union SS w/o Ferrules
7’	14-7410-002	1/32” SilcoSteel Tubing
7’	14-5229-002	Large Bore Nickel Tubing
1	14-0159-016	1/16” Swagelok Nut
1	14-0158-016	1/16” Swagelok Ferrule
1	14-0241-016	1/16” Valco Ferrule
1	14-0243-016	1/16” Short Valco Nut
1	14-4814-000	LN_2 Tank Adapter
1	14-7341-280	6890 Mounting Bracket
1	14-0521-016	Ferrule, 0.4mm I.D. Graphite Vespel
1	14-0540-016	Ferrule, 0.5mm I.D. Graphite Vespel
1	14-2074-016	Ferrule, 0.8mm I.D. Graphite Vespel
1	14-1520-016	Zero Dead Volume Union
1	14-7686-016	1/16” to 1/32” Valco Adapter Fitting

2.10.2 Principles of Operation

This is what happens when you analyze a sample using the Velocity XPT and a Cryofocusing Module:

1. The sample components (analytes) are desorbed from a trap.
2. Inside the Cryofocusing Module there is a cryofocus trap. Using liquid nitrogen (LN_2) the cryofocus trap is cooled to between -50°C and -180°C.
3. During the desorb, the sample components are condensed and refocused as carrier gas passes through the cooled area. The sample components form into a narrow band on the first section of the GC column. The carrier gas continues to flow through the GC column and on the detector.
4. The cryofocus trap has a heater that is rapidly heated under a stream of carrier gas. This causes the sample components to be injected or transferred to the GC.

Figure 2-19: Cryofocusing Module (Rear View) and Cutaway View of the Trap

2.11 Cryofocusing Specifications

Column Interface	Cryofocus on column (fused silica, 0.18 - 0.53) via: • 1/32” Zero Dead Volume Glass Union or • 1/16” Stainless Steel Union
Mounting	• Universal Position adjustable bracket (compatible with any GC) over an unused injection port • Agilent 6890 mounting bracket
Cryofocus Trap	90mm long
Trap Temperature Range	-180°C to 300°C/min. gradient heated, with a rise rate of 300°C/min.
Valving	12V, electrically actuated LN_2 Valve
Control	Velocity XPT electronics interface
Unit Dimensions	Cryofocus Module 12cm W x 10.5cm. D x 30cm H
Average Weight	3.4 lbs. / 1.54 kgs.
Utility Requirements	• 115/230 VAC ± 5%. 50/60Hz., 4 amps, 460 watts • LN_2 coolant at 22-75 psig (75 psig recommended for optimum performance)
Safety and Regulatory Certifications	This unit conforms to: • EN50082-1 1992 • EN55011 Group 1 Class A • EN61010-1 1992 • Designed and manufactured under a quality system registered to ISO 9001: 2000 (Declaration of Conformity available)
Part Numbers	• 110V: 14-8993-000 • 220V: 14-8993-100

2.12 Installation

	**WARNING**	
To avoid electrical shock, turn off and unplug the power cord before removing panels.		

	**WARNING**	
The 3-wire power cord is a safety feature. Plug the cord into a properly grounded outlet. Do not use an extension cord!		

	**WARNING**	
Some Cryo and Velocity XPT components heat to high temperatures. To avoid being burned, allow the instruments to thoroughly cool before removing the panels		

2.12.1 Pneumatic Connections

1. Remove the outer cover of the Cryofocusing Module by loosening the fastener on the front cover and carefully sliding the front cover forward.

2. Mount the Cryofocusing Module onto the GC.

   - Align the mounting bracket over the GC's injection port, arranging the slotted holes on the mounting bracket over the tapped holes on the GC.
   - Secure the bracket to the GC with (2) M4 x 0.7 x 8mm long pan head screws.

3. Locate the (2) 6-32 x 1/2 standoffs. Fasten the Cryofocusing Module over the unused GC port with the standoffs.

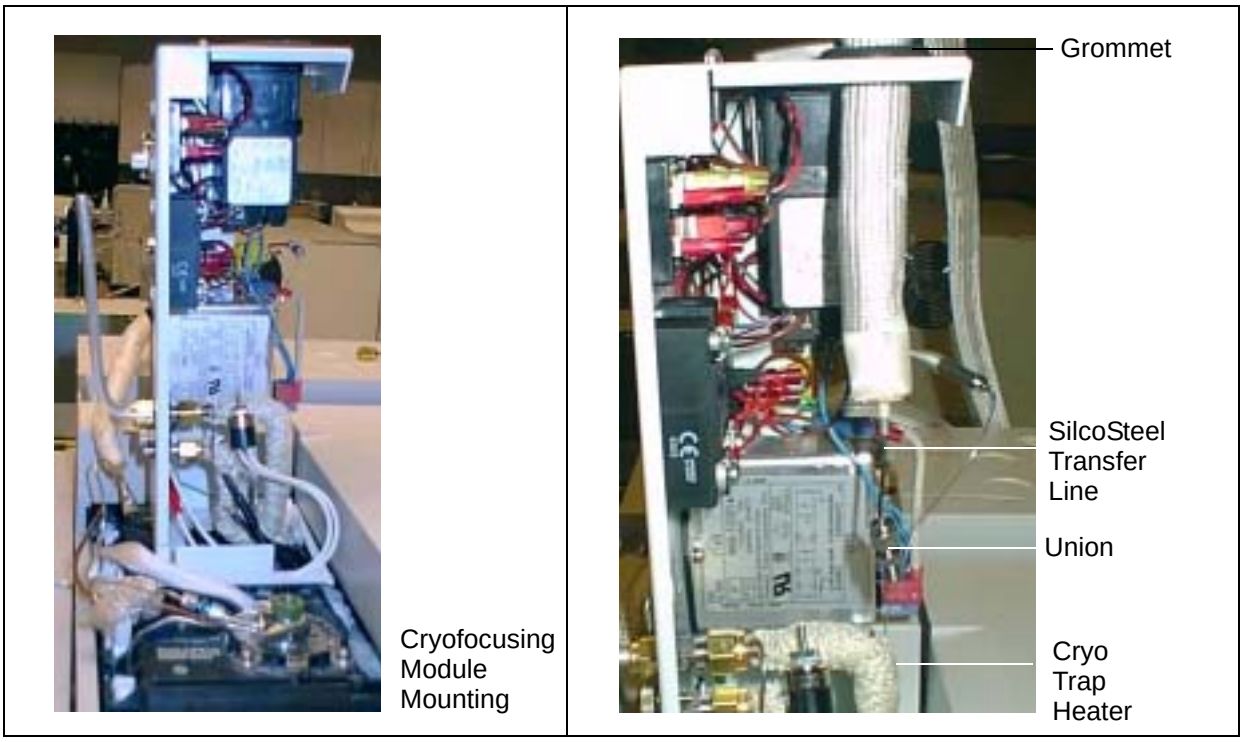


Figure 2-20: Cryofocusing Module Mounted to GC.

4. Insert the Transfer Line through the grommet on the top of the Cryofocusing Module.

5. Connect the 1/16" SilcoSteel Transfer line (brown tubing running down the center of the transfer line heater) to the 1/16" to 1/16" stainless steel union supplied in the Kit Box.

6. Feed the Analytical column or Precolumn through the Cryofocusing Trap Heater.

7. Connect the Column or Precolumn to the bottom side of the 1/16" to 1/16" union using the appropriate Graphite Vespel Ferrule supplied with your unit.

Note: If you are using a Precolumn, use the Zero Dead Volume Union, and the appropriate ferrules supplied with the Cryofocusing Module to connect the Precolumn to the Analytical column.

2.12.2 Installation of Small O.D. Transfer Line Tubing (Optional)

The 1/16” SilcoSteel Tubing can be replaced with smaller O.D.tubing to allow the Transfer line to be used as the Cold Trap. The smaller O.D. tubing can be passed through the Cryofocusing Trap Heater where it will act as a Precolumn for the Cryofocusing Module. Tubing replacement can be done with

- 1/32” SilcoSteel Tubing (supplied)
- Uncoated Fused Silica Tubing

	WARNING	
Some Cryo and Velocity XPT components heat to high temperatures. To avoid being burned, allow the instruments to thoroughly cool before servicing.		

1/32” SilcoSteel Installation

1. Remove the 1/16” SilcoSteel by loosening the Valco nut in Port-#4 of the 6-Port Valve on the Velocity XPT.

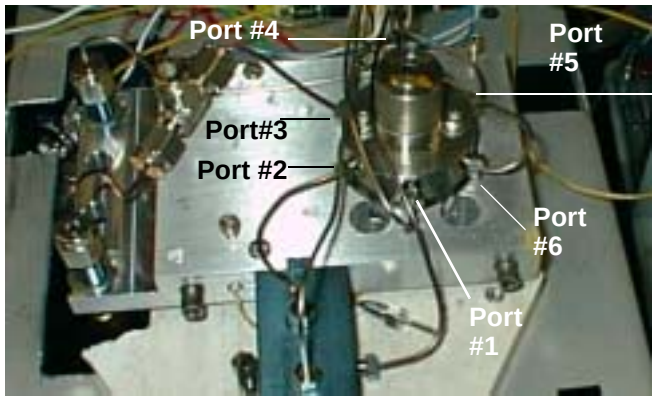


Figure 2-21: 6-Port Valve: Velocity XPT

2. Cut the ferrule and nut off the tubing.
3. Starting at the opposite end, pull the tubing out of the Transfer Line.
4. Slide the tubing into the Transfer Line Heater.
5. Using the 1/16” to 1/32” adapter fitting (supplied in the Kit Box) connect the 1/32” line to the #4 Port of the 6-Port Valve on the Velocity XPT.
6. Feed the 1/32” line through the Cryo Trap Heater (Refer to Figure 2-20) and connect to the 1/16” to 1/16” union with the 0.8mm ferrule (supplied in the Kit Box).
7. Attach the GC column to the union with ferrules supplied in your Kit Box.

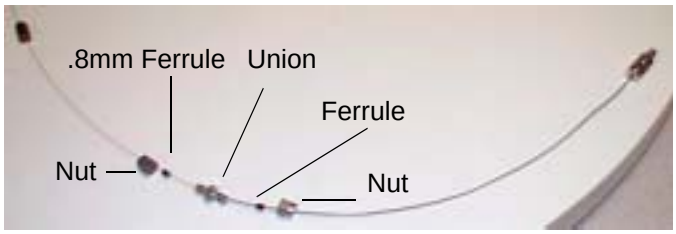


Figure 2-22: Attaching the 1/32” Transfer Line to the GC Column

Fused Silica Installation

1. Remove the 1/16” SilcoSteel by loosening the Valco nut in Port-#4 of the 6-Port Valve on the Velocity XPT. (Figure 2-21)

2. Cut the ferrule and nut off the tubing.

3. Starting at the opposite end, pull the tubing out of the Transfer Line.

4. Slide the tubing into the Transfer Line Heater.

5. Connect the Fused Silica tubing to the 6-Port Valve of the Velocity XPT using the Graphite Vespel Ferrule (supplied in the Kit Box) and the Valco Nut removed in Step 2.

6. Feed the Fused Silica line through the Cryo Trap Heater (Refer to Figure 2-20) and connect to the Zero Dead Volume Union with the Graphite Vespel ferrules (supplied in the Kit Box).

7. Attach the GC column to the union with ferrules supplied in your Kit Box.

2.12.3 Coolant Connections

1. Locate the bottom bulkhead union on the rear of the Cryofocusing Module. Connect the 1/4” foam insulated copper transfer line to this union.

2. The top bulkhead union on the Cryofocusing Module is a coolant vent. Connect the Cryo vent line to the top of the bulkhead union.

CAUTION:

Vented coolant can harm nearby people and equipment! Route the line described in Step 2 into a hood or into an area where the vented coolant cannot cause harm.

Figure 2-23: Cryo Vent line and Transfer Line Connections

3. Connect the other end of the copper line to the outlet fitting on the cryogenic valve.

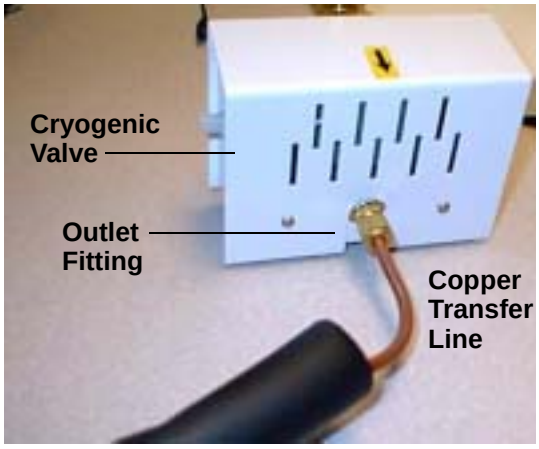


Figure 2-24: Cryogenic Valve: Outlet Fitting

4. Place the cryogenic valve as close to the coolant supply tank as possible. The closer the cryogenic valve is to the coolant supply, the more coolant you save. **Do not place the valve more than 5 feet away from the coolant supply tank**.

5. Connect a line from the valve inlet fitting on the cryogenic valve to the coolant supply tank. Use the LN_2 tank adapter that came with your Kit Box. **To reduce LN_2 consumption, minimize the distance between the LN_2 tank and the Cryofocusing module.**

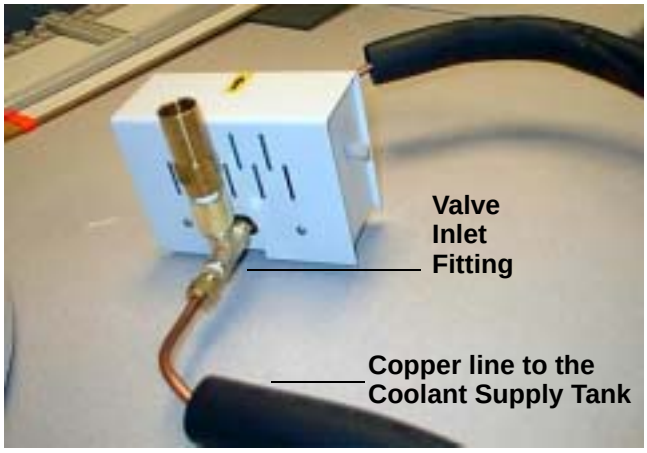


Figure 2-25: Connection from Cryogenic Valve to Coolant Tank

6. The Cryofocusing Module has a relief valve that vents excess pressure. **Do not connect the cryogenic valve at this time**. Proceed to the next section (*Electronic Connections*).

2.12.4 Electronic Connections

1. Connect the DC Power Supply to the rear of the Cryofocusing Module (Figure 2-23).
2. Connect the A.C. Cable from the Power Entry Module to an outlet (Figure 2-23)
3. Connect the A.C. “Out” Cable from the rear of the Cryofocusing Module to the D.C Power Supply (Figures 2-23 and 2-24)

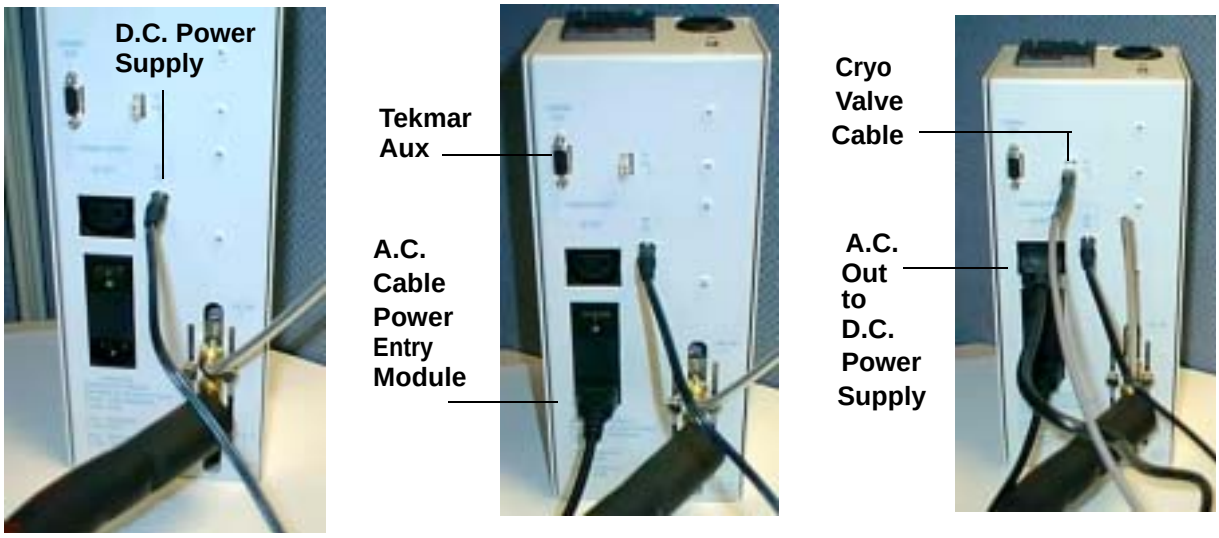


Figure 2-26: Electronic Connections

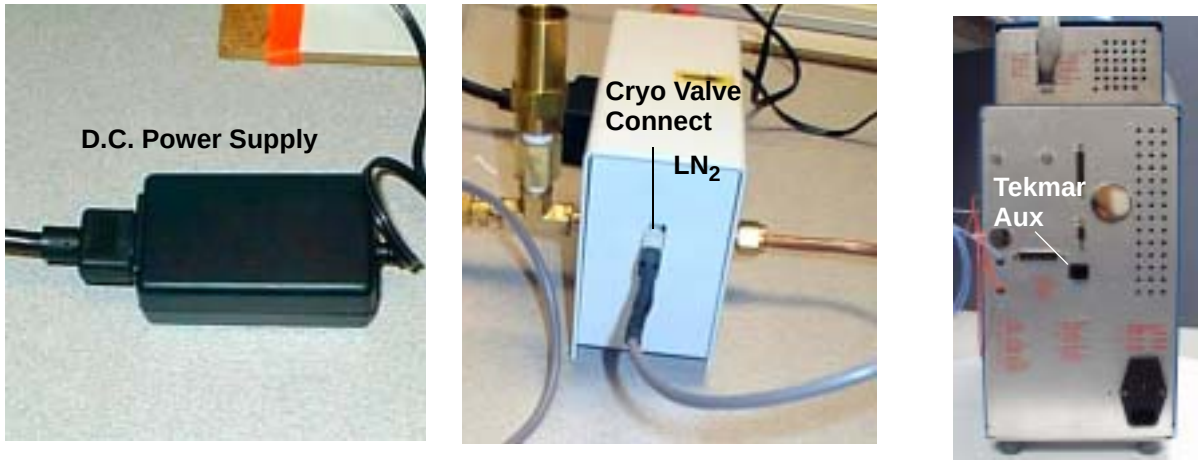


Figure 2-27: Electronic Connections

4. Connect the Cryo Valve Cable to LN2 on the Cryogenic Valve (Figures 2-23 and 2-24).
5. Connect the 9-Pin Tekmar Aux cable to the rear of the Velocity XPT Tekmar Aux Port (Figures 2-23 and 2-24).

2.12.5 Carrier Gas Connections

Figure 2-28: Gas Regulator

1. Attach the gas line from the gas supply to the INLET of the gas regulator.

2. Connect one end of the large bore Nickel Tubing to the OUTLET of the gas regulator and the other end to Port #5 of the 6 Port heated valve

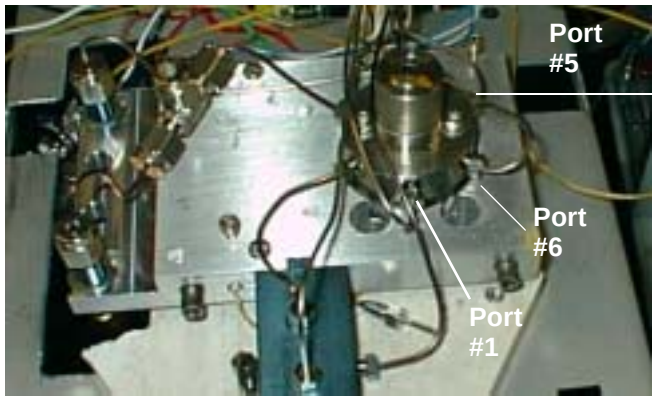


Figure 2-29: Port #5 of the Heated 6-Port Valve

2.13 Operating Parameters

To activate the software screens for the Cryofocusing Module check the <Enable Cryo Option> in the Configuration setup (**Tools>Configure Unit**).

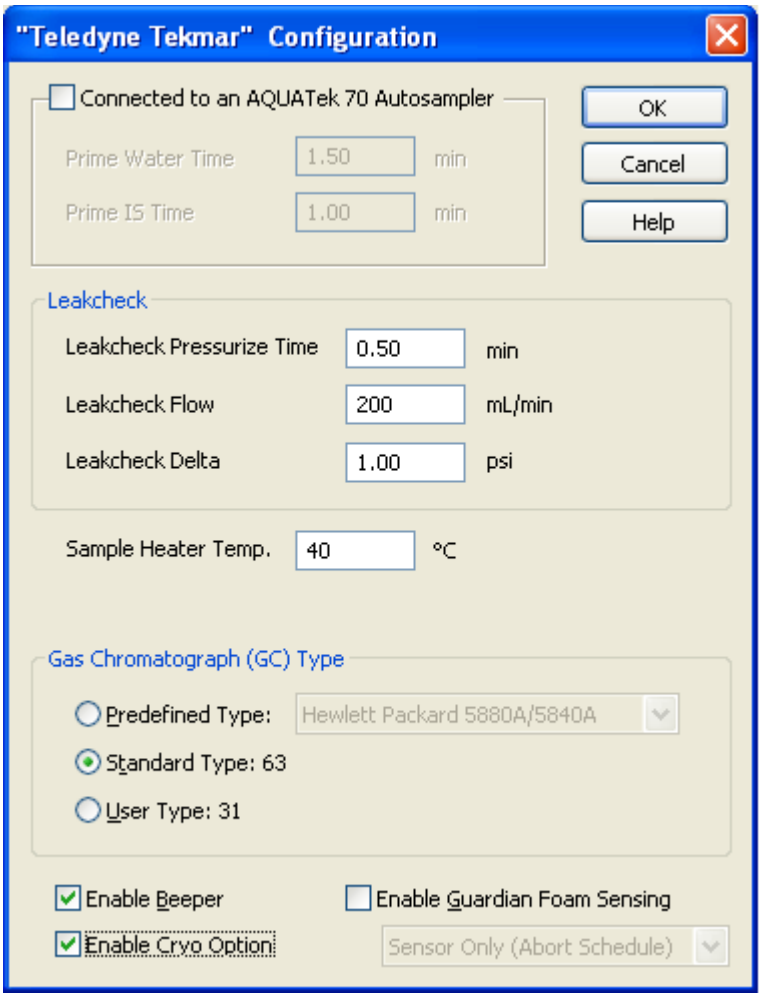


Figure 2-30: Enable Cryo Option

There are four parameters (time and temperature settings) that must be set for the Cryofocusing Module:

- Focus Temperature
- Injection Time
- Injection Temperature
- Standby Temperature

The values you select for these parameters are mainly determined by the type of column you are using.

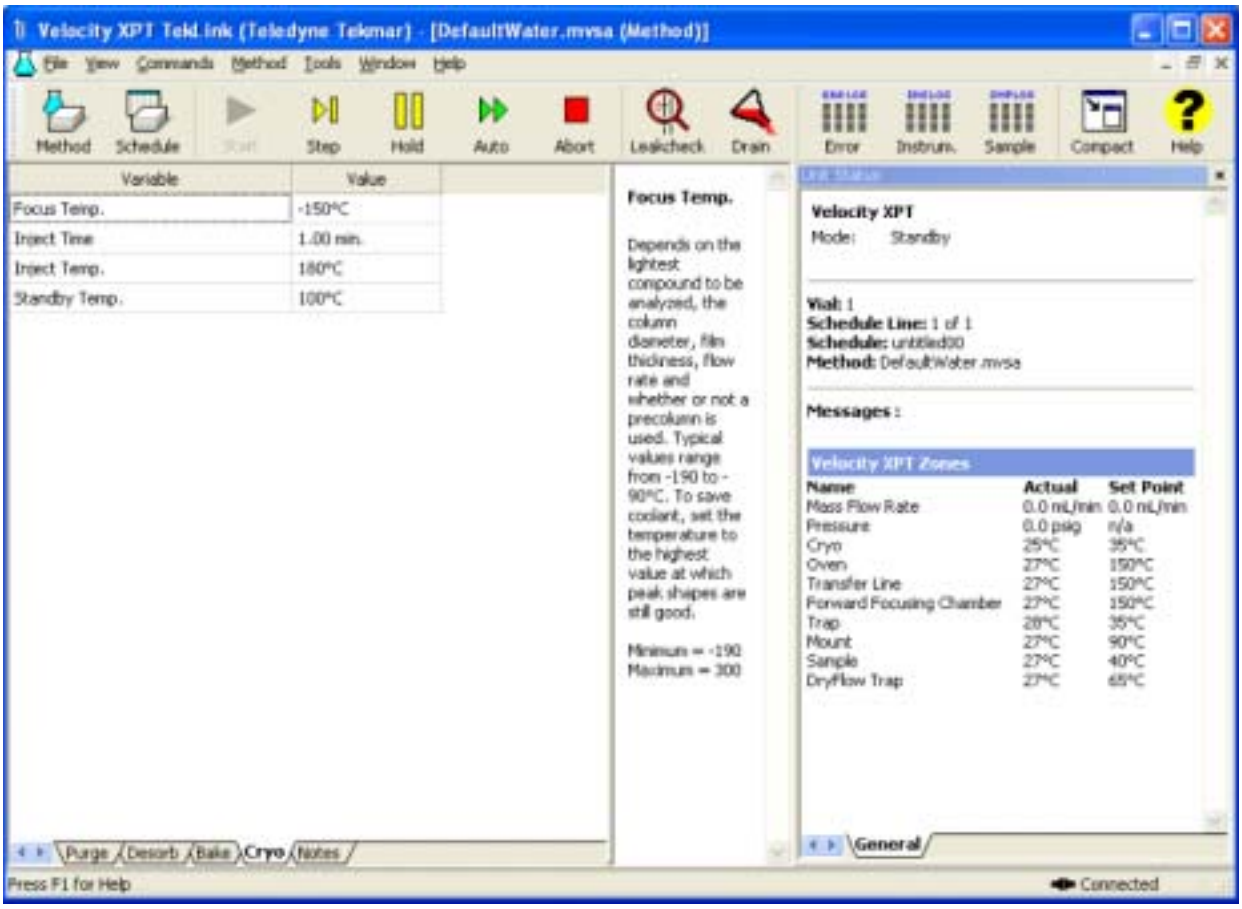


Figure 2-31: Cryo Operating Parameters

2.13.1 Focus Temperature

The Focus Temperature is the low temperature maintained by the Cryofocus Trap during Desorb. The temperature you choose may vary from one analysis to another, depending on the following:

- The lightest compound in the sample
- Column flow rate
- If you are using an uncoated precolumn
- The column you are using (considering diameter, stationary phase, and film thickness). The higher the capacity of the column, the higher you can set the temperature. Lower capacity columns require lower temperatures for quantitative trapping. The table below lists recommended starting values.

Column Internal Diameter	Film Thickness	Cooldown Temperature
0.20mm	0.25µm	-130°C
0.32mm	1.00µm	-110°C
0.53mm	3.00µm	-95°C

When setting the Focus Temperature, keep the following in mind:

- The temperature you choose greatly depends on column type, as well as the compound's concentration and volatility.
- The lighter the compounds and the higher the concentration, the cooler you should set the temperature.
- Use the highest temperature possible to conserve coolant while maintaining good peak shape.

CAUTION

Coolant delivery pressure must be 20 to 75 psi. The higher the pressure, the more coolant you save. However, to avoid damage to the Cryofocusing Module, DO NOT set the coolant delivery pressure above 75 psi. If you use low coolant pressure (20 psi), the transfer line from the LN_2 tank to the valve should not be more than 20 feet long.

2.13.2 Inject Temperature

The Inject Temperature is the temperature to which the Cryofocuser is heated to release sample components (analytes) onto the GC column. The temperature you choose may vary from one analysis to another based on the following:

- The heaviest compound in the sample
- Column flow rate
- The column you are using (considering the diameter, stationary phase, and film thickness)

Set the Inject Temperature high enough to rapidly drive the least volatile component out of the cryofocus trap. the higher the capacity of the column, the higher the temperature can be set.

Note: As a general rule, the maximum temperature of the GC temperature program is adequate for the Inject Temperature.

CAUTION

Do not set the Inject Temperature too high. Excessive heat will break down the stationary phase or the polymide coating of the column.

2.13.3 Inject Time

The Inject Time is the duration (in minutes) of the Inject Step. During the Inject Step the Cryofocuser is maintained at its high temperature to release analytes onto the GC column.

Set the Inject time so that it is long enough for the cryofocus trap to reach the desired temperature. Add at least 0.25 minutes longer than necessary to reach the desired temperatures. Typical values are 0.50 to 1.00 minutes.

2.13.4 Standby Temperature

The Standby Temperature is the default temperature while the unit is in Standby mode.

Chapter 3

Basic Operations

3.0 Basic Operations

The Concentrator system performs a programmed series of operating steps. These steps are referred to as Modes and vary depending on installed equipment and your system configuration. Basic Mode descriptions are provided below and more specific descriptions, based on your autosampler selection, are given in chart form.

3.1 Concentrator Mode Descriptions

Mode	Description
Standby	In Standby the system is waiting for all temperature zones and flow rates to reach their desired set points.
Purge Ready	At Purge Ready all method set points are at equilibrium and the concentrator is ready to analyze samples.
Pressurize	When the Velocity XPT is connected to an AQUATek 70 this Mode allows sample to be removed from a VOA vial and directed to a sample loop.
Fill Internal Standard	This Mode is used when connected to an AQUATek 70 and allows the internal standard to be directed to a valve addition mechanism.
Sample Transfer	This Mode is used only when a liquid autosampler is connected. The concentrator allows a liquid sample to be introduced into the sparging vessel. The time required for this step is autosampler dependant. Please refer to your autosampler's operating manual for further assistance.
Prepurge	Prepurge Mode is only used when the Concentrator is working in conjunction with an external sample heater. Purge gas is directed to the vessel to remove excess oxygen prior to heating and subsequent purging.
Preheat	Preheat Mode applies only to units equipped with an external sample heater. This Mode allows the sample to reach a uniform programmed temperature prior to sample purging.
Purge	Purge Mode is the analyte extraction mode in which the inert gas (such as helium) is dispersed through the sample matrix in the sparger for a preset time and flow. The gas containing the analytes is directed to a sorbent trap for concentration. **NOTE**: The gas passes through the trap, deposits the analytes, and is vented to the atmosphere.
Dry Purge	Dry Purge Mode is used to drive excess water from the sorbent trap. The inert gas is directed to the sorbent trap without passing through the sample glassware. This process ensures that no additional moisture is added to the trap.
Desorb Ready	This mode is active when the concentrator is waiting for a G.C ready signal to allow it to step to Desorb.

Mode	Description
Desorb Preheat	In Desorb Preheat the sorbent trap is heated to a preset temperature in a static state. This allows the analytes to release from the sorbent and move to the FFC.
Desorb	In Desorb the sorbent trap is heated to its final point and rotates the six-port valve so that the carrier gas is backflushed through the trap and over to the G.C. for separation and subsequent detection. This mode will also start the G.C. column program and, depending on your selection, drain the sample from the glassware.
Rinse Loop	Rinse Loop Mode is used only when an AQUATek 70 is connected. It allows time for the sample loop to be rinsed with hot water.
Purge Loop	Purge Loop Mode is used only when an AQUATek 70 is connected. It allows time for the sample loop to be purged with dry gas.
Bake Fill	Bake Fill Mode is used only when an AQUATek 70 is connected. It allows hot water to be introduced to the sample loop for subsequent delivery to the concentrator glassware.
Bake Transfer	Bake Transfer is used when you are connected to an AQUATek 70. This mode alows the autosampler to introduce cleaning water into the sparge vessel for glassware and line rinsing. For more information on this cleaning process, please consult your autosampler's operating manual.
Bake Drain	Bake Drain is used when connecting to an AQUATek 70. The cleaning water introduced to the sample glassware during Bake Transfer is now drained from the system.

Table 3-1: Concentrator Mode Descriptions

Velocity XPT Concentrator Modes

							Valve Output Chart						
Mode	**Description**	**Variables**	**Default**	**Min**	**Max**	**Unit**	**MFC**	**Purge**	**Vent**	**Drain**	**Bake**	**6-Port**	**Fan**
Standby With Flow	The system waits for all temperature zones to meet their setpoints prior to starting a sample run. While the system is waiting, there is a low flow forced through the unit to allow the system to remain in a positive pressure situation. (**Note: Glassware is bypassed**)	MFC	10	0	500	mL/min.	On	Off	On	Off	Off	Purge	On
		Trap Temp	35	0	350	°C							
		Transfer line	150	0	300	°C							
		Valve Oven	150	0	300	°C							
		Dry Flow Trap	175	0	350	°C							
		FFC	150	0	300	°C							
		Mount	90	0	100	°C							
Standby With No Flow	The system waits for all temperature zones to meet their setpoints prior to starting a sample run. While the system is waiting, the vent valve and MFC are closed sealing the system.	MFC	0	0	500	mL/min	Off	Off	Off	Off	Off	Purge	On
		Trap Temp	35	0	350	°C							
		Transfer line	150	0	300	°C							
		Valve Oven	150	0	300	°C							
		Dry Flow Trap	175	0	350	°C							
		BOT	150	0	300	°C							
		Mount	90	0	100	°C							
Purge Ready	This mode indicates to the user that all setpoints have been reached and the system is ready to begin running samples.						On/ Off	Off	On	Off	Off	Purge	Off
Prepurge	This mode is only available when the unit has a pocket heater installed. the headspace of the sample will be swept to remove any oxygen prior to heating the sample. this mode is typically used only when running soil samples	Prepurge Time	1	0	299	minutes	On	On	On	Off	Off	Purge	Off
		Prepurge Flow	40	0	500	minutes							

Velocity XPT Concentrator Modes

							Valve Output Chart						
Mode	**Description**	**Variables**	**Default**	**Min**	**Max**	**Unit**	**MFC**	**Purge**	**Vent**	**Drain**	**Bake**	**6-Port**	**Fan**
Preheat	This mode is only available when the Concentrator has a Pocket Heater installed. Preheat is the time allowed by the user for the sample to heat prior to purging the sample	Preheat Time	1	0	299	minutes	Off	Off	On	Off	Off	Purge	Off
		Preheat Temp.	40	0	100	°C							
Purge	Purge mode is used to extract the volatiles from the sample and deposit them on the analytical trap	Purge Time	11	0	299	minutes	On	On	On	Off	Off	Purge	Off
		Purge Flow	40	0	500	mL/min.							
		Purge Temp (Trap)	0	0	350	°C							
Dry Purge	Dry Purge is used to remove any excess water deposited in the analytical trap	Dry Purge Time	0.5	0	299	minutes	On	Off	On	Off	Off	Purge	Off
		Dry Purge Flow	200	0	500	mL/min.							
		Dry Purge Temp	40	0	350	°C							
Desorb Ready	Desorb Ready indicates to the user that the analytical trap is loaded and ready to be transferred to the GC.						Off	Off	Off	Off	Off	Purge	Off
Desorb Preheat	Desorb Preheat indicates that the desorbent trap is heated to a preset temperature in a static state. This allows the analytes to release from the sorbent and move to the FFC.	Des Preheat Temp	245	0	350	°C	Off	Off	Off	Off	Off	Purge	Off
Desorb	The sample is flushed from the analytical trap onto the GC Column	Desorb Time	1	0	299	minutes	On	Off	Off	Off	Off	Desorb	Off
		Desorb Temp	250	0	100	°C							
Drain	Drain removes the sample from the glassware and sends it to a waste container. This mode occurs during the desorb mode and is only used with water samples.	Drain Flow	250	0	500	mL/min.	On	On	Off	On	Off	Desorb	Off

Velocity XPT Concentrator Modes

							Valve Output Chart						
Mode	**Description**	**Variables**	**Default**	**Min**	**Max**	**Unit**	**MFC**	**Purge**	**Vent**	**Drain**	**Bake**	**6-Port**	**Fan**
Bake	The analytical trap and the moisture removal trap are heated and back flushed with gas to prevent cross contamination of samples	Bake Time	2	0	299	minutes	On	Off	Off	On	On	Purge	Off
		Bake Flow	400	0	500	mL./min.							
		Trap Temp	270	0	350	°C							
		Dry Flow	300	20	350	°C							

Velocity XPT with an AQUATek 70

							Valve Output Chart						
Mode	**Description**	**Variables**	**Default**	**Min**	**Max**	**Unit**	**MFC**	**Purge**	**Vent**	**Drain**	**Bake**	**6-Port**	**Fan**
Standby With Flow	The system waits for all temperature zones to meet their setpoints prior to starting a sample run. While the system is waiting, there is a low flow forced through the unit to allow the system to remain in a positive pressure situation.	MFC	10	0	500	mL/min.	On	Off	On	Off	Off	Purge	On
		Trap Temp	35	0	350	°C							
		Transfer line	150	0	300	°C							
		Valve Oven	150	0	300	°C							
		Dry Flow Trap	175	0	350	°C							
		BOT	150	0	300	°C							
		Mount	40	0	100	°C							
Standby With No Flow	The system waits for all temperature zones to meet their setpoints prior to starting a sample run. While the system is waiting, the vent valve and MFC are closed sealing the system.	MFC	0	0	500	mL/min	Off	Off	Off	Off	Off	Purge	On
		Trap Temp	35	0	350	°C							
		Transfer line	150	0	300	°C							
		Valve Oven	150	0	300	°C							
		Dry Flow Trap	175	0	350	°C							
		BOT	150	0	300	°C							
		Mount	40	0	100	°C							
Purge Ready	This mode indicates to the user that all setpoints have been reached and the system is ready to begin running samples.						On/ Off	Off	On	Off	Off	Purge	Off
Pressurize	This mode is used when connected to a liquid autosampler. Pressurize mode allows sample to be removed from a VOA vial and directed to a sample loop	Pressurize Time	0.25	0	299	minute	On/ Off	Off	On	Off	Off	Purge	Off
Fill I.S.	Fill I.S. mode is used when connected to a liquid autosampler. This mode allows internal standards to be directed to a valve addition mechanism.	I.S. Fill Time	0.04	0	299	minute	On/ Off	Off	On	Off	Off	Purge	Off

Velocity XPT with an AQUATek 70

							Valve Output Chart						
Mode	**Description**	**Variables**	**Default**	**Min**	**Max**	**Unit**	**MFC**	**Purge**	**Vent**	**Drain**	**Bake**	**6-Port**	**Fan**
Sample Transfer	Sample Transfer is only used when a liquid autosampler is connected. The concentrator allows a liquid sample to be introduced into the sparging vessel. The time required for this step is autosampler dependant. Please refer to your autosampler's operating manual for further assistance.	Sample Transfer Time	0.25	0	299	minutes	Off	Off	On	On	Off	Purge	Off
Preheat	Preheat mode is only available when the Concentrator has a Pocket Heater installed. This is the time that the user is allowing for the sample to be heated prior to purging the sample.	Preheat Time	1	0	299	minute	Off	Off	On	Off	Off	Purge	Off
		Preheat Temp.	40	0	100	°C							
Purge	Purge Mode is used t o extract volatiles from the sample and deposit them on the analytical trap	Purge Time	11	0	299	minute	On	On	On	Off	Off	Purge	Off
		Purge Flow	40	0	500	mL/min.							
		Purge Temp (Trap)	0	0	350	°C							
Rinse Loop (During Desorb)	Rinse Loop Mode is used only when a liquid autosampler is connected. It allows time for the sample loop to be rinsed with hot water.	Loop Rinse Time	0.25	0	299	minute	On	On	Off	On	Off	Desorb	Off
Purge Loop (During Desorb)	Purge Loop Mode is used only when a liquid autosampler is connected. It allows time for the sample loop to be purged with dry gas.	Loop Purge Time	0.25	0	299	minute	On	On	Off	On	Off	Desorb	Off

Velocity XPT with an AQUATek 70

							Valve Output Chart						
Mode	**Description**	**Variables**	**Default**	**Min**	**Max**	**Unit**	**MFC**	**Purge**	**Vent**	**Drain**	**Bake**	**6-Port**	**Fan**
Dry Purge	Dry Purge Mode is used to remove any excess water deposited on the analytical trap	Dry Purge Time	0.5	0	299	minute	On	Off	On	Off	Off	Purge	Off
		Dry Purge Flow	200	0	500	mL/min.							
		Dry Purge Temp	40	0	350	°C							
Desorb Preheat	The temperature range for Desorb Preheat		255	0	350	C°	Off	Off	Off	Off	Off	Purge	Off
Desorb Ready	Desorb Mode indicates to the user that the analytical trap is loaded and is ready to be transferred to the GC.						Off	Off	Off	Off	Off	Purge	Off
Desorb with Drain	During Desorb Mode the sample is flushed from the analytical trap onto the GC column	Desorb Time	1	0	299	minute	On	On	Off	On	Off	Desorb	Off
		Desorb Temp	260	0	350	°C							
Bake Fill	This mode is only used when a liquid autosampler is connected. Bake Fill allows hot water to be introduced to the sample loop for subsequently delivery to the concentrator glassware.	Bake Fill Time	0.25	0	299	minute	Off	Off	On	Off	Off	Purge	Off
Bake Transfer	Bake Transfer is used when connected to an aqueous autosampler. This mode allows the autosampler to introduce cleaning water into the sparge vessel for glassware and line rinsing. For more information on this cleaning process please consult your autosampler's operating manual.	Bake Transfer Time	0.25	0	299	minute	Off	Off	On	Off	Off	Purge	Off

Velocity XPT with an AQUATek 70

							Valve Output Chart						
Mode	**Description**	**Variables**	**Default**	**Min**	**Max**	**Unit**	**MFC**	**Purge**	**Vent**	**Drain**	**Bake**	**6-Port**	**Fan**
Bake Drain	Bake Drain is used when connected to an aqueous autosampler. The cleaning water that was introduced to the sample glassware is now drained from the system.	Bake Drain Time	0.5	0	299	minute	On	On	Off	On	Off	Purge	Off
		Bake Drain Flow	400	0	500	mL/min.							
Bake	During Bake Mode the analytical trap and the moisture removal trap are heated and flushed with gas to prevent cross contamination of samples	Bake Time	2	0	299	minute	On	Off	Off	On	On	Purge	Off
		Bake Flow	400	0	500	mL/min							
		Trap Temp	265	0	350	°C							
		Dry Flow Trap	300	0	350	°C							

Velocity XPT with SOLATek 72

							Valve Output Chart					
Mode	**Description**	**Variables**	**Default**	**Min**	**Max**	**Unit**	**MFC**	**Purge**	**Vent**	**Drain**	**Bake**	**6-Port**
Standby With Flow	The system waits for all temperature zones to meet their setpoints prior to starting a sample run. While the system is waiting, there is a low flow forced through the unit to allow the system to remain in a positive pressure situation.	MFC	10	0	500	mL/min.	On	Off	On	Off	Off	Purge
		Trap Temp	35	0	350	°C						
		Transfer line	150	0	300	°C						
		Valve Oven	150	0	300	°C						
		Dry Flow Trap	175	0	350	°C						
		FFC	150	0	300	°C						
		Mount	40	0	100	°C						
Standby With No Flow	The system waits for all temperature zones to meet their setpoints prior to starting a sample run. While the system is waiting, the vent valve and MFC are closed sealing the system.	MFC	0	0	500	mL/min	Off	Off	Off	Off	Off	Purge
		Trap Temp	35	0	350	°C						
		Transfer line	150	0	300	°C						
		Valve Oven	150	0	300	°C						
		Dry Flow Trap	175	0	350	°C						
		FFC	150	0	300	°C						
		Mount	40	0	100	°C						
Purge Ready	This mode indicates to the user that all setpoints have been reached and the system is ready to begin running samples.						On/ Off	Off	On	Off	Off	Purge
Sample Fill	This mode is used when connected to a liquid autosampler. The Sample Fill pulls sample out of the vial.	Sample Fill					On	Off	On	Off	Off	Purge
Fill I.S.	This mode is used when connected to a liquid autosampler. This mode allows internal standards to be directed to a valve addition mechanism.						On	Off	On	Off	Off	Purge

Velocity XPT with SOLATek 72

							Valve Output Chart					
Mode	**Description**	**Variables**	**Default**	**Min**	**Max**	**Unit**	**MFC**	**Purge**	**Vent**	**Drain**	**Bake**	**6-Port**
Sample Transfer/ Sample Sweep Time	Sample Transfer mode is used only when a liquid autosampler is connected. The concentrator allows a liquid sample to be introduced into the sparging vessel. The time required for this step is autosampler dependant. Please refer to your autosampler's operating manual for further assistance.		.5 Sample Sweep Time	0	299	Min.	Off	Off	On	Off	Off	Purge
Preheat	Preheat mode is only available when the Concentrator has a Pocket Heater installed. This is the time that the user is allowing for the sample to be heated prior to purging the sample.	Preheat Time	1	0	299	minute	Off	Off	On	Off	Off	Purge
		Preheat Temp.	40	0	100	°C						
Purge	Purge Mode is used t o extract volatiles from the sample and deposit them on the analytical trap	Purge Time	11	0	299	minute	On	On	On	Off	Off	Purge
		Purge Flow	40	0	500	mL/min.						
		Purge Temp (Trap)	0	0	350	°C						

Velocity XPT with SOLATek 72

							Valve Output Chart					
Mode	**Description**	**Variables**	**Default**	**Min**	**Max**	**Unit**	**MFC**	**Purge**	**Vent**	**Drain**	**Bake**	**6-Port**
Dry Purge	Dry Purge Mode is used to remove any excess water deposited on the analytical trap	Dry Purge Time	0.5	0	299	minute	On	Off	On	Off	Off	Purge
		Dry Purge Flow	200	0	500	mL/min.						
		Dry Purge Temp	40	0	350	°C						
Desorb Preheat	The temperature range for Desorb Preheat		255	0	350	C°	Off	Off	Off	Off	Off	Purge
Desorb Ready	Desorb Mode indicates to the user that the analytical trap is loaded and is ready to be transferred to the GC.						Off	Off	Off	Off	Off	Purge
Desorb	During Desorb Mode the sample is flushed from the analytical trap onto the GC column	Desorb Time	1	0	299	minute	Off	Off	Off	Off	Off	Desorb
		Desorb Temp	260	0	350	°C						
Drain	During Drain Mode the sample is removed from the glassware and sent to a waste container. This mode occurs during the Desorb mode and is only used with water samples.	Drain Flow	400	0	500	mL/min.	On	On	Off	On	Off	Desorb
Bake Fill	This mode is only used when a liquid autosampler is connected. Bake Fill allows hot water to be introduced to the sample loop for subsequently delivery to the concentrator glassware.						On	On	Off	On	Off	Purge

Velocity XPT with SOLATek 72

							Valve Output Chart					
Mode	**Description**	**Variables**	**Default**	**Min**	**Max**	**Unit**	**MFC**	**Purge**	**Vent**	**Drain**	**Bake**	**6-Port**
Bake Transfer	Bake Transfer is used when connected to an aqueous autosampler. This mode allows the autosampler to introduce cleaning water into the sparge vessel for glassware and line rinsing. For more information on this cleaning process please consult your autosampler's operating manual.	Bake Sweep Time	0.5 min.		299	minute	Off	Off	On	Off	Off	Purge
Bake Drain	Bake Drain is used when connected to an aqueous autosampler. The cleaning water that was introduced to the sample glassware is now drained from the system.	Bake Drain Time	0.5 min		299	minute	On	On	Off	On	Off	Purge
Bake	During Bake Mode the analytical trap and the moisture removal trap are heated and flushed with gas to prevent cross contamination of samples	Bake Time	2	0	299	minute	On	Off	Off	On	On	Purge
		Bake Flow	400	0	500	mL/min.						
		Trap Temp	265	0	350	°C						
		Dry Flow Trap	300	0	350	°C						

Chapter 4

TekLink

4.0 TekLink

4.1 Installing TekLink

Teklink installation and operation requires a Pentium II or higher processor running Microsoft Windows 98 or above (Windows 2000 is recommended). Your system should have at least 6.4 megabytes of free space and a CD Rom Drive.

1. Start Windows and insert your TekLink CD into the drive. All other programs should be shut down during installation.

2. Double-click the TekLink icon and follow the screen prompts. The first screen that appears is the VOC TekLink Setup Wizard:

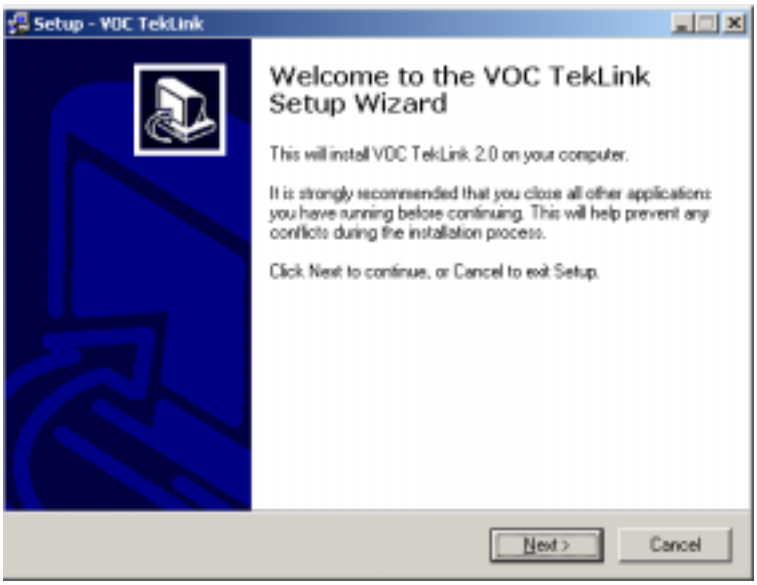


Figure 4-1: TekLink Setup Wizard

3. Select <Next>. A screen appears that contains the Software License Agreement. Read the agreement and, if you agree to the terms of the license select <Yes> and proceed with installation.

4. Choose the destination directory for TekLink. The default directory is

C:\Program Files\Teledyne Tekmar\VOC TekLink\2.0

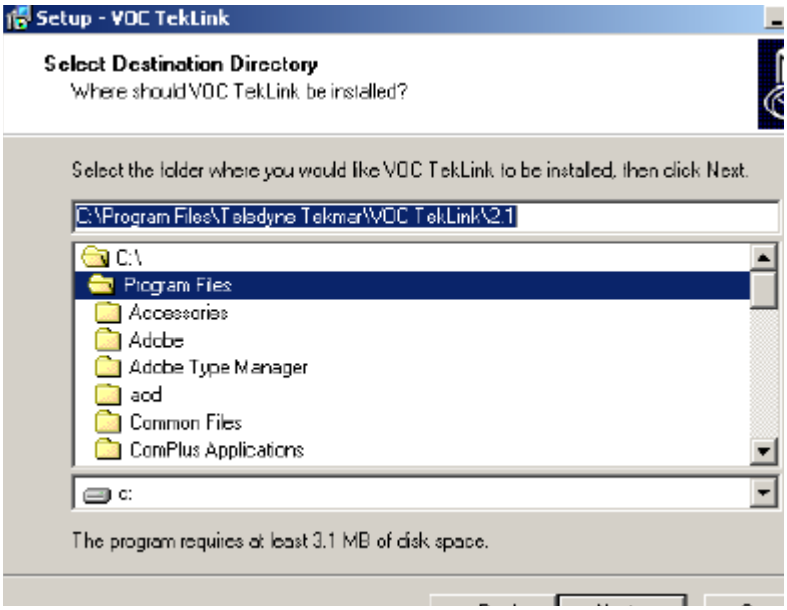


Figure 4-2: TekLink Destination Directory

5. Select the components you wish to install. Deselect the ones you do not wish to install. Full installation requires 6.4 megabytes of free space. If you choose not to perform a full installation, check the bottom of the window to view how much free space is needed for the components you selected. When you have made your choices, Select <Next>.

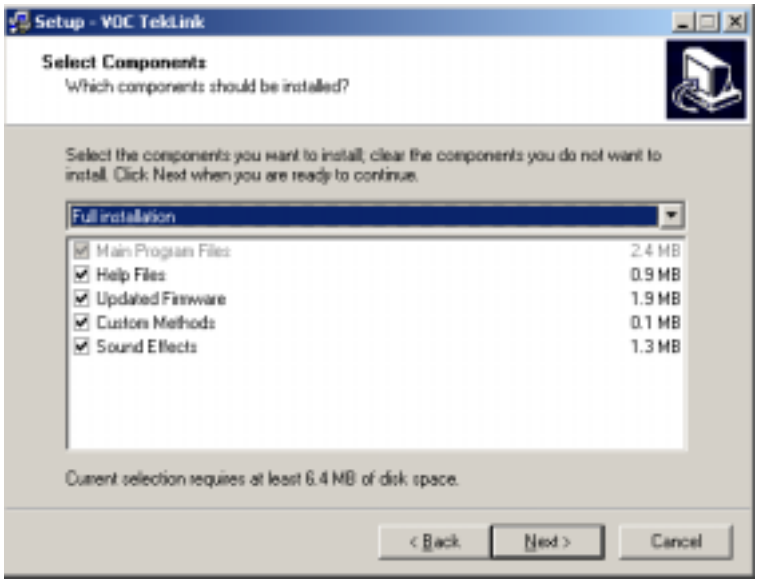


Figure 4-3: Component Installation

6. Select the Start Menu folder in which you would like Setup to create the program's shortcuts, then select <Next>.

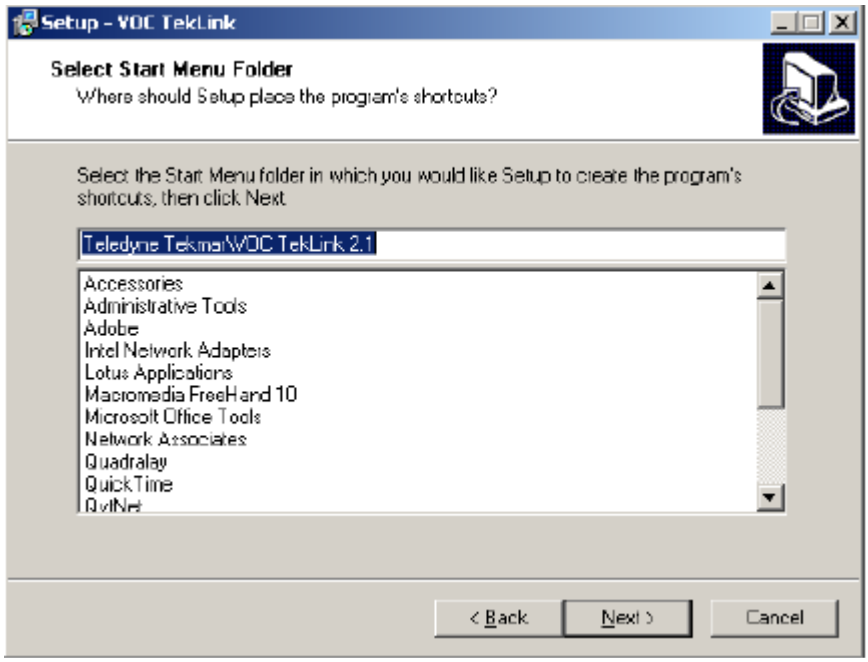


Figure 4-4: Select Start Menu Folder

7. Select <Install> to continue with the installation or <Back> if you want to review or change any settings.

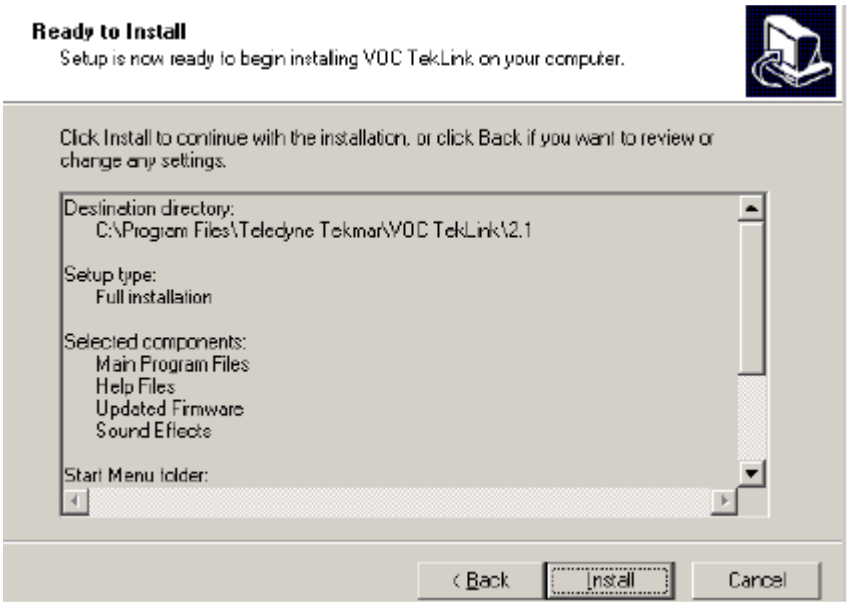


Figure 4-5: Installation Screen

8. The next screen that appears allows you to select additional tasks to be performed during the install. these are outlined on the screen below:

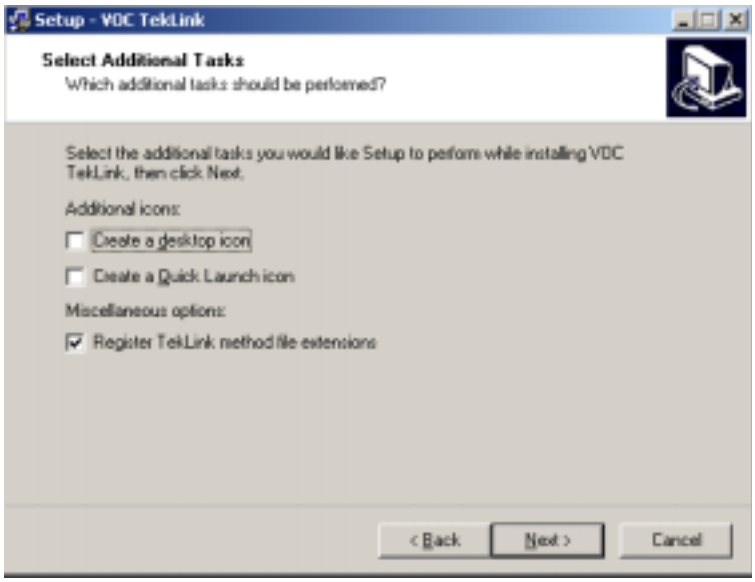


Figure 4-6: Additional Tasks

9. When your installation completes the screen below appears. From this screen you can select to view the “Readme .txt” and to launch TekLink automatically after the installation is complete. Make your selections and select <Finish>.

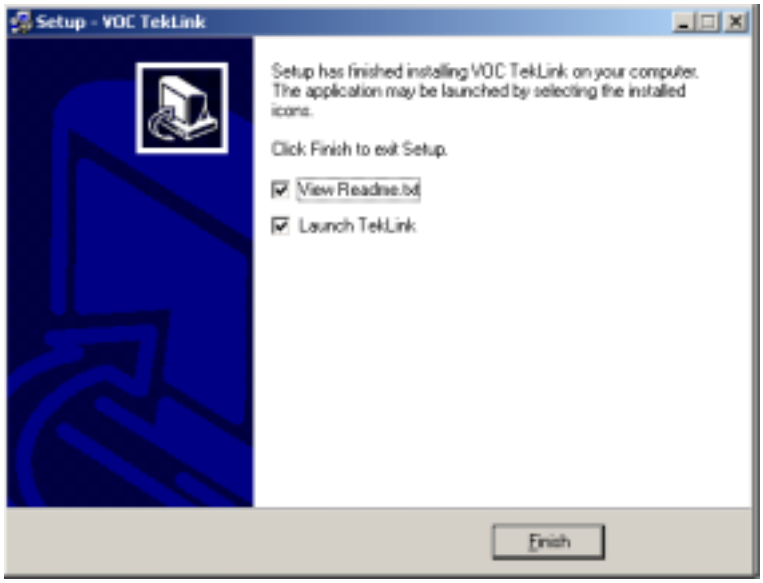


Figure 4-7: Installation Setup Complete Screen

TekLink is installed on the specified drive and directory. If you checked the box to launch TekLink, the program will start. The TekLink folder is in **Start>Programs>VOC TekLink 2.1>VOC TekLink** program folder and, if you selected the option to place an icon on the desktop, you can double-click the icon to start the program.

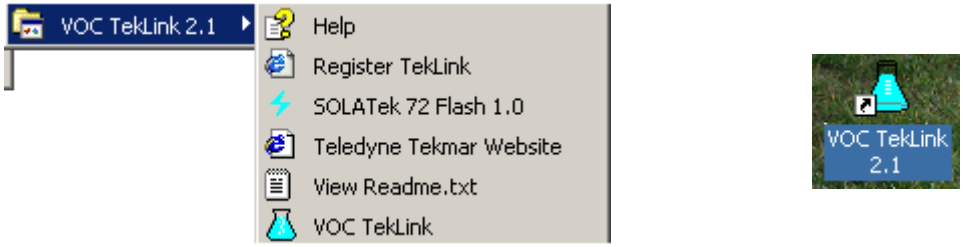


Figure 4-8: VOC TekLink Startup Folder and Icon

4.1.1 Selecting an Instrument to Work with TekLink

When you start TekLink the first screen that appears asks you to select an instrument to work with TekLink. Use the <Add> button to view selections.

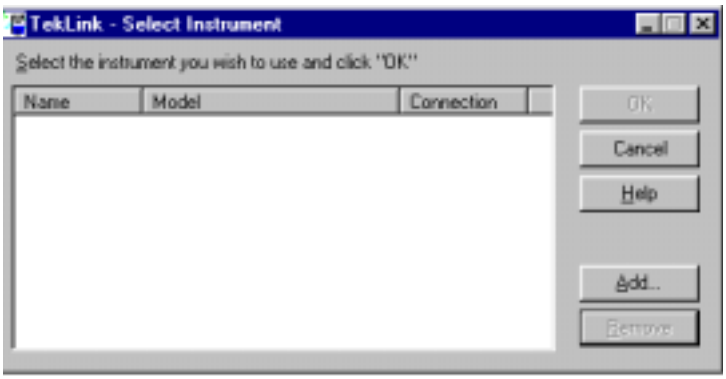


Figure 4-9: Select Instrument Screen

When you select <Add> the “Add Instrument” screen appears. From this screen you can select from the pop-up-list the model of the Tekmar instrument you are using and select one of the four ports that the instrument will use. You can also specify a unique name for the instrument. You can repeat this process for each additional concentrator or autosampler connected to your PC (up to four).

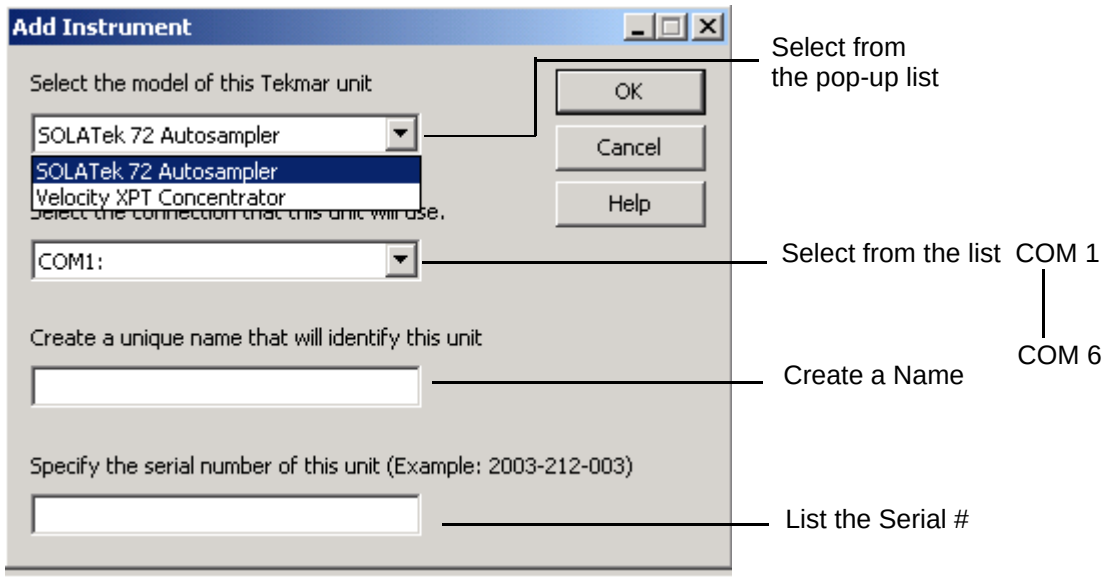


Figure 4-10: Add Instrument Screen

To verify the name and status of the active unit, view the Instrument Status window of the control screen:

4.1.2 Specifying the Configuration

Configuring the Concentrator with TekLink

The Concentrator uses gas chromatography to process samples. Operating under microprocessor control it produces a discrete sample, or multiple samples loaded from an autosampler. When programmed with custom methods, this system is capable of operating at different time and temperature parameters and running different analytical sequences on specified samples.

Using a personal computer running Microsoft Windows (Windows 2000 or greater Is recommended), TekLink enables you to program, monitor, schedule, and control custom operating sequences for up to four concentrators.

Before setting up Methods and running Samples, familiarize yourself with the TekLink software. To run properly, TekLink must recognize and be configured correctly with the concentrator/autosampler

To specify the configuration of an active unit select **Tools>Configure Unit**.

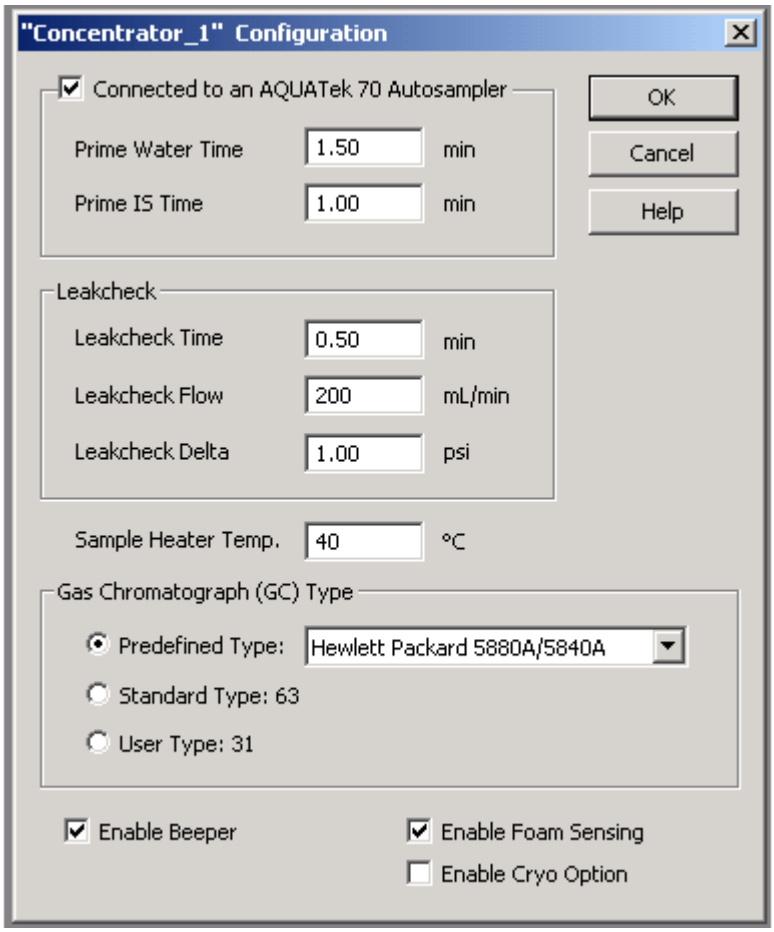


Figure 4-11: Configuration Specifications

Connected to an AQUATek 70 Autosampler

When you are connected to an AQUATek 70 Autosampler selecting this option activates the screens and fields needed to provide information relevant to the autosampler.

Prime Water Time and **Prime IS Time** set the time allotted to prime the water and prime the Internal Standard.

Leak Checking

These are the default specifications for the automatic Leakcheck. Leakcheck is accessible from the Toolbar menu (**Command>Leakcheck**) or by selecting the toolbar Leakcheck icon.

Enable Beeper, Enable Foam Sensing, Enable Cryo Option

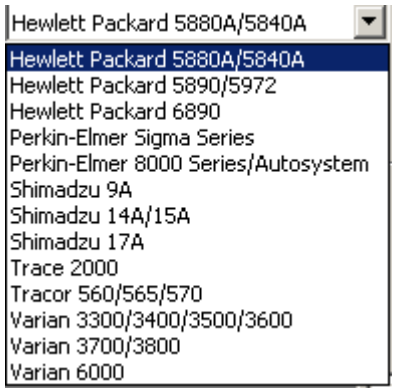
Selecting these features toggles the associated feature on and off. Foam Sensing and Cryo are optional equipment.

Gas Chromatograph (GC) Type

You can specify the type of Gas Chromatograph system you have:

- Select from the pop-up list.
- Configure the system for a Standard GC Port.
- Configure the system for a User GC Port.

The input/output characteristics of the GC, as it interacts with the concentrator, determine the GC type classification. Refer to your GC User Manual or I/O cable diagram for information on GC configuration.



Sample Heater Temperature sets the temperature for the Sample Heater in C°.

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4.2 TekLink Icons

Situated below the TekLink Menu is a bar containing icons. These icons allow you easier access to some of the more commonly used menu items and commands.

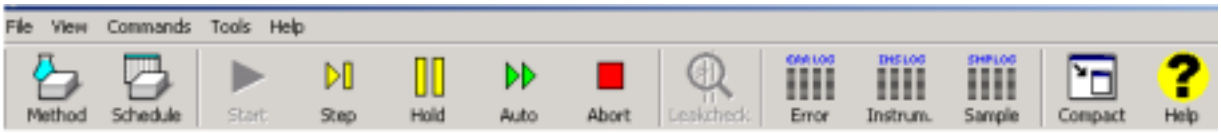


Figure 4-12: Velocity XPT Toolbar Icons

4.2.1 File Menu

From the File menu you can access the options for opening, saving, printing, and accessing Method Files and Schedules. From the File menu you can load a Method File from disk.

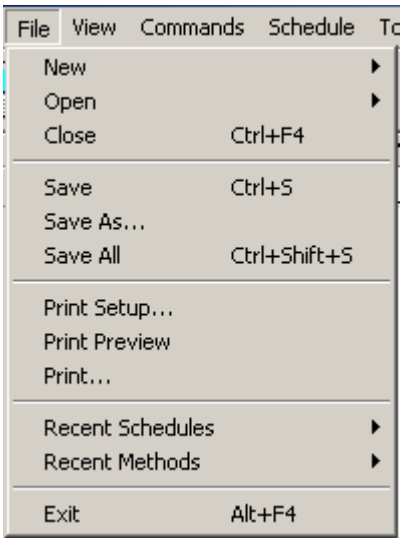


Figure 4-13: File Menu Options

4.3 Creating and Using Methods

After you have installed and configured the concentrator, you can create customized Methods (operating sequences) that meets your analytical requirements for samples processing. These methods can be created using the Method Wizard, or by inputting your specifications in the Method fields.

After connecting the required concentrator(s) and configuring your PC's COM ports to recognize the connected units, you can use the **Method>Updates** to review and edit Methods.

4.3.1 Using the Method Wizard

You can create a new Method by selecting the Method icon in the toolbar, or by accessing **File>New Method**. When you choose a New Method the Method Wizard appears.

- If you wish to create your Methods without using the Wizard deselect the option in the Method Wizard window.
- If you want to use the Wizard select <Next> and the Wizard will create a Method best suited for your current setup.

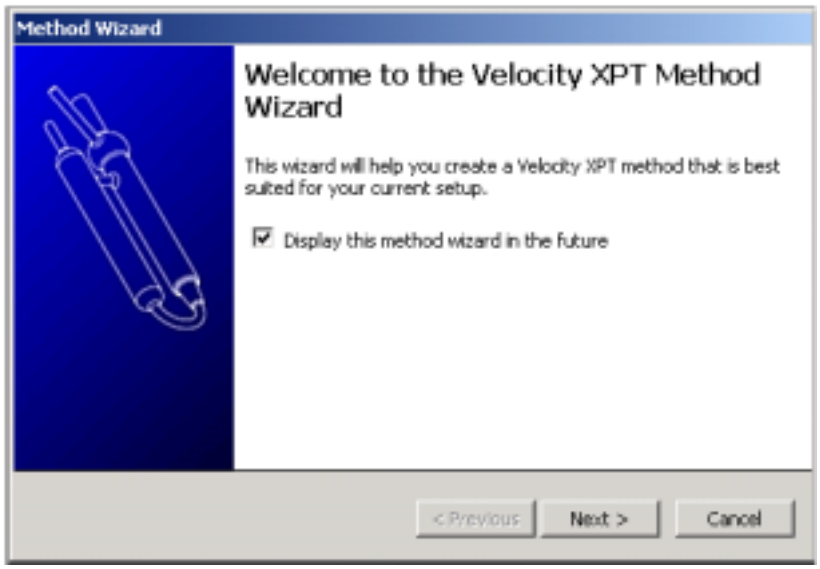


Figure 4-14: Method Wizard

When you select <Next> a series of screens will appear. Select the information that matches your system:

Are you using a Teledyne Tekmar Autosampler?	Yes	No	
What Sample Type are you running?	Liquid	Soil	
Are you using a Pocket Heater?	Yes	No	
Are you using a Cryofocusing Module?	Yes	No	
Are you using a GC column ID?	Yes	No	
What is your Trap Type?	1 or 7	2,3,4,5 or 6	8, Vocarb 3000, or Vocarb 4000
Are you using a Dry Flow Trap?	Yes	No	

When you finish inputting the information the “Wizard Complete” screen will appear. If you want to edit the Method after it comes up, select the “Open the New Method for Editing” checkbox.

Click <Finish>.

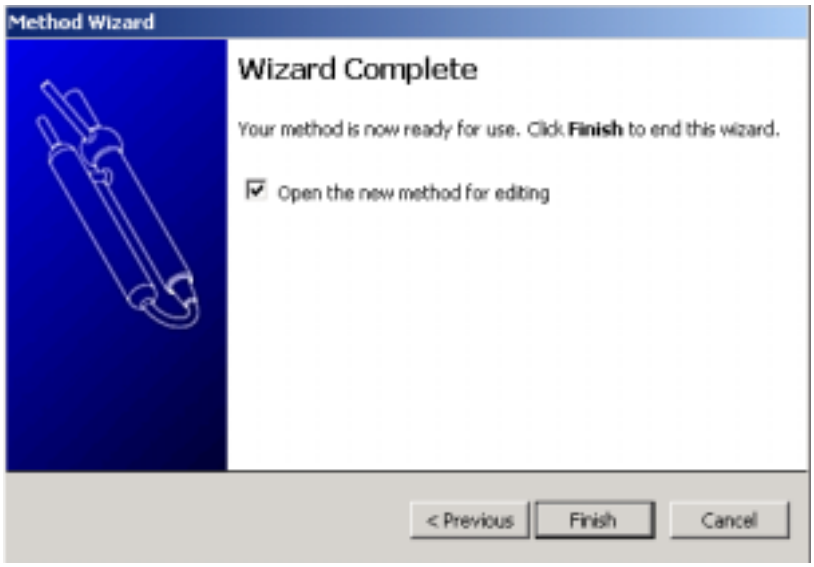


Figure 4-15: Wizard Complete screen

When you click <Finish> the Wizard prompts you to name and save the Method.

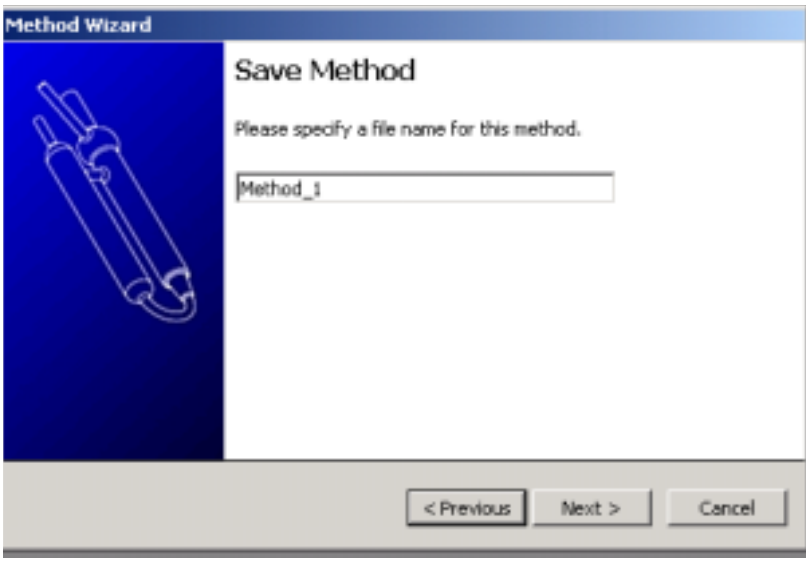


Figure 4-16: Wizard “Save Method”

Press <Next> to save the Method with a file name.

When you press <Next> the screen below appears with the specifications for the Method you have created. At the bottom of the screen there are Five tabs (Purge, Desorb, Bake, Cryo, and Notes). Click on these tabs to bring up the corresponding screen.

When you click on a line in the Method screen, information relevant to that topic appears in the column to the right, including parameters for minimum and maximum settings.

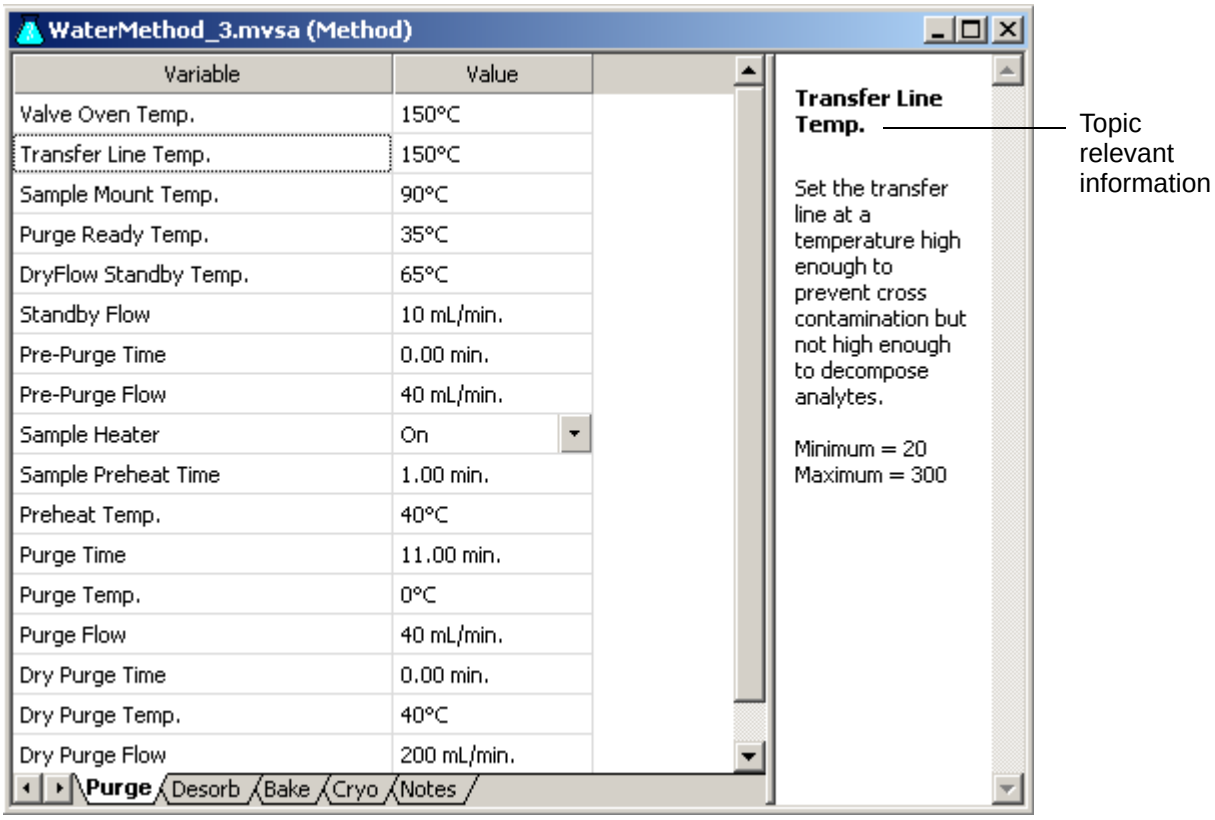


Figure 4-17: New Water Method: Default Parameters

4.3.2 New Method / AQUATek 70

When your concentrator is configured to work with an autosampler, creating a New Method adds an additional screen for that autosampler's Method Parameters.

If you are connected to an AQUATek 70, specify this when you enter your configuration information in the **Tools>Configure** menu.

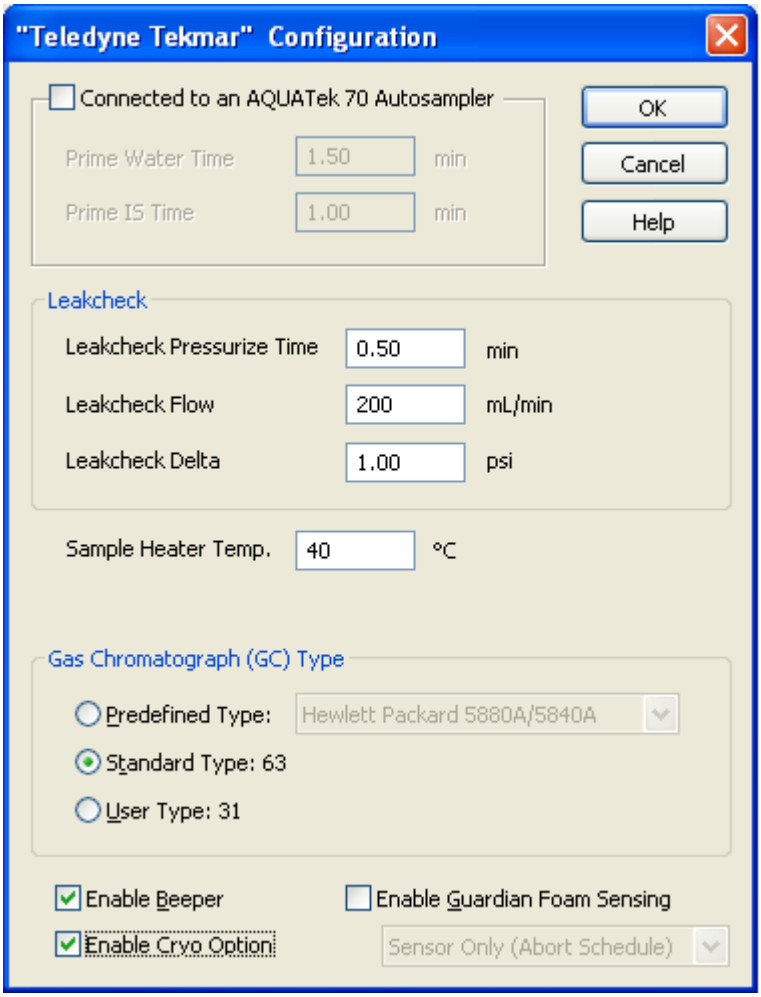


Figure 4-18: Specifying AQUATek 70 Autosampler

4.3.3 Editing a Method in Progress

You can change a Method while it is running, but the change you make does not occur until the next run of the Method. To change a Method:

- Open the Active Method
- Make the desired changes to the Purge, Desorb, and Bake screens
- When you exit the Method the system will prompt you to save the changes.

4.3.4 Building and Editing Schedules / Velocity XPT

After creating customized Methods, you can define Method Schedules that specify samples, operating sequences, and the order in which they run. You can build a new schedule using **File>New>Schedule** or by selecting the icon on the toolbar.

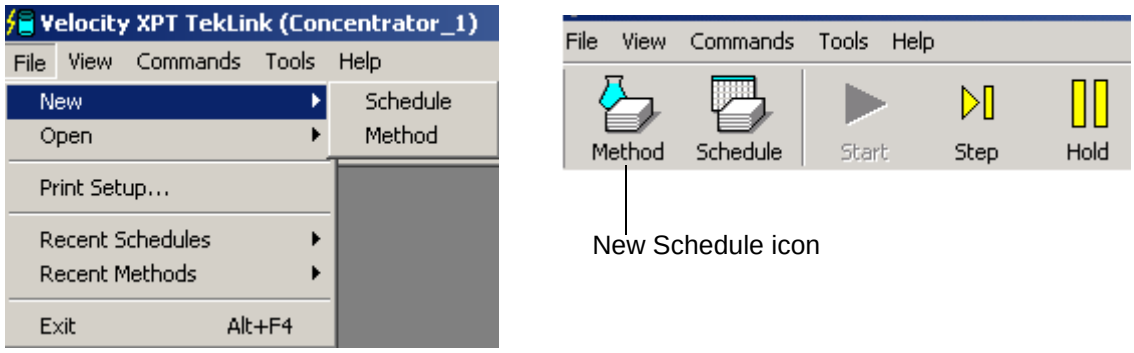


Figure 4-19: Creating a New Schedule

When you select a New Schedule, a screen similar to the one below appears:

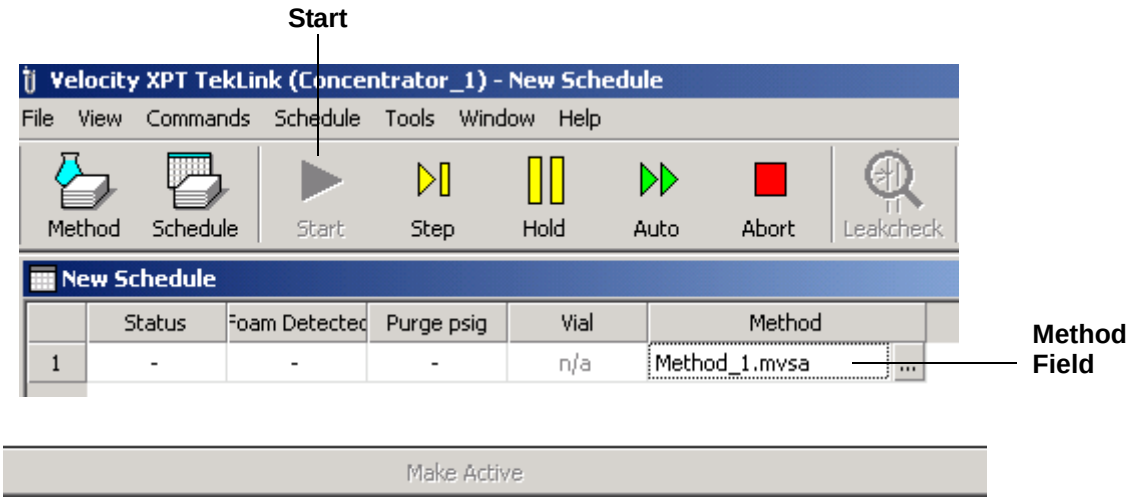


Figure 4-20: Schedule Builder

Method Selection

Click in the Method field to open the directory where your methods are stored. The file name of the Methods you select appears in that field.

Make Active

Select <Make Active> to load the schedule to the Concentrator.

Start

Select the Start icon to start the schedule.

4.3.5 Building and Editing Schedules / AQUATek 70

If your concentrator is configured to work with an autosampler, you can cut, delete, copy, and insert new lines into your schedule by right-clicking with your mouse anywhere in the schedule and selecting where you want the action to occur:

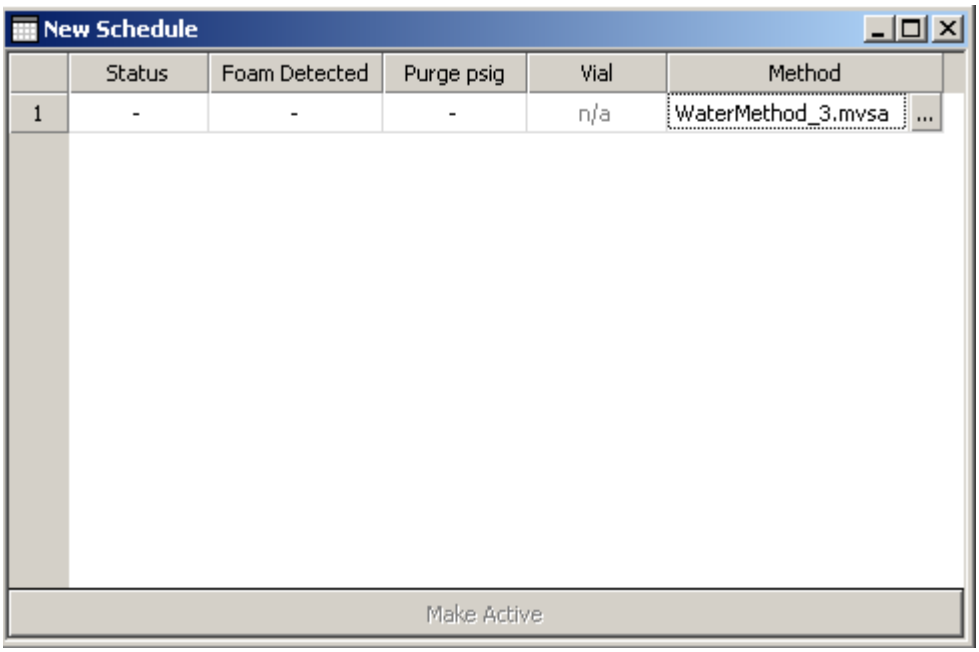


Figure 4-21: Building and Editing Schedules / Aquatek 70

Status

Status is either Active or Pending. **The Schedule Builder cannot be used for an "Active" Schedule.**

Foam Detected

Records foam detected during a schedule

Purge psig

Records the purge pressure one minute into the Purge Mode

Method Selection

Click in the Method field to open the directory where your methods are stored. The file name of the Methods you select appears in that field.

Vial #

Select a Vial # and scroll down to highlight the vial positions, in sequence, you wish to run.

Make Active

Select Make Active to load the schedule to the Concentrator

Starting the Schedule

To Start the Schedule, select the **Start** Icon from the menu bar (Figure 4-21)

Saving and Naming the Schedule

Use **File>Save** or **File >Save As** to name the Schedule and save it to the directory where your Schedules are stored. When you exit the Schedule Builder or TekLink, the program takes you to the file where your Schedules are stored and prompts you to name the Schedule

Printing the Schedule

To print a copy of the Schedule, select **File >Print.**

4.3.6 Schedule Editor

To edit an existing Schedule select **File>Open**, browse to the folder where you store your Schedules, and open the desired Schedule. If the Schedule you want to open has been used recently you may open it from the list of Recent Schedules under the File menu (**File>Recent Schedules)**.

Note: You can make Schedule changes while Velocity XPT is running, but you cannot change a line of the Schedule that is currently executing, or has executed. Changes can only be made to the lines of the Schedule that have not yet executed.

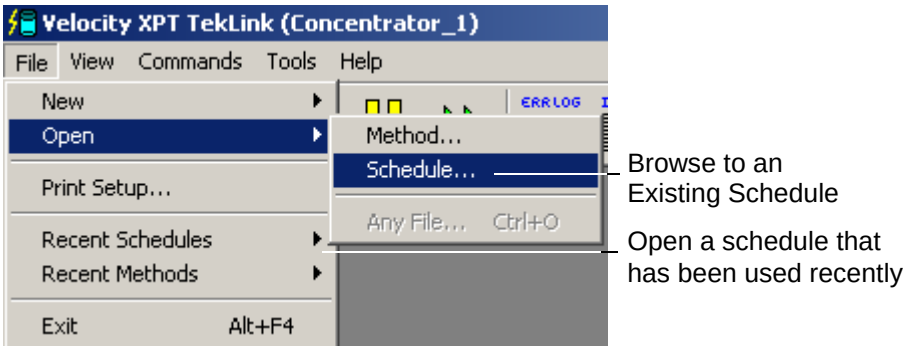
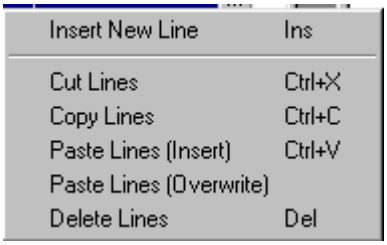


Figure 4-22: Opening an Existing Schedule

Editing a Schedule



To edit a Schedule, click on the line number you wish to change.

Schedule Lines

To add, delete, cut, copy, or paste a line of schedule, right click with the mouse and select from the menu. Select the line where you want the action to occur.

Saving the Schedule

When you exit the Schedule Builder or TekLink, the program takes you to the file where your Schedules are stored and prompts you to name the Schedule

4.3.7 View Menu

From the View menu you can select whether to display the Toolbar, Status Bar, and Compact Status screen. A checkmark next to the selection indicates it is being displayed. You can also select to show the Active Schedule (also available as a toolbar icon), Active Methods, the Instrument Log, Error Log, and Sample Log (these three logs can also be displayed by selecting their icons in the toolbar).

When you select Compact Status a window with a floating adjustable palette is created mirroring the right side of the control screen. The palette remains on the screen, allowing the user to access TekLink functions without having the full TekLink window active.

Click the ‘X’ in the upper right corner of the window to close the window and return to the TekLink screen

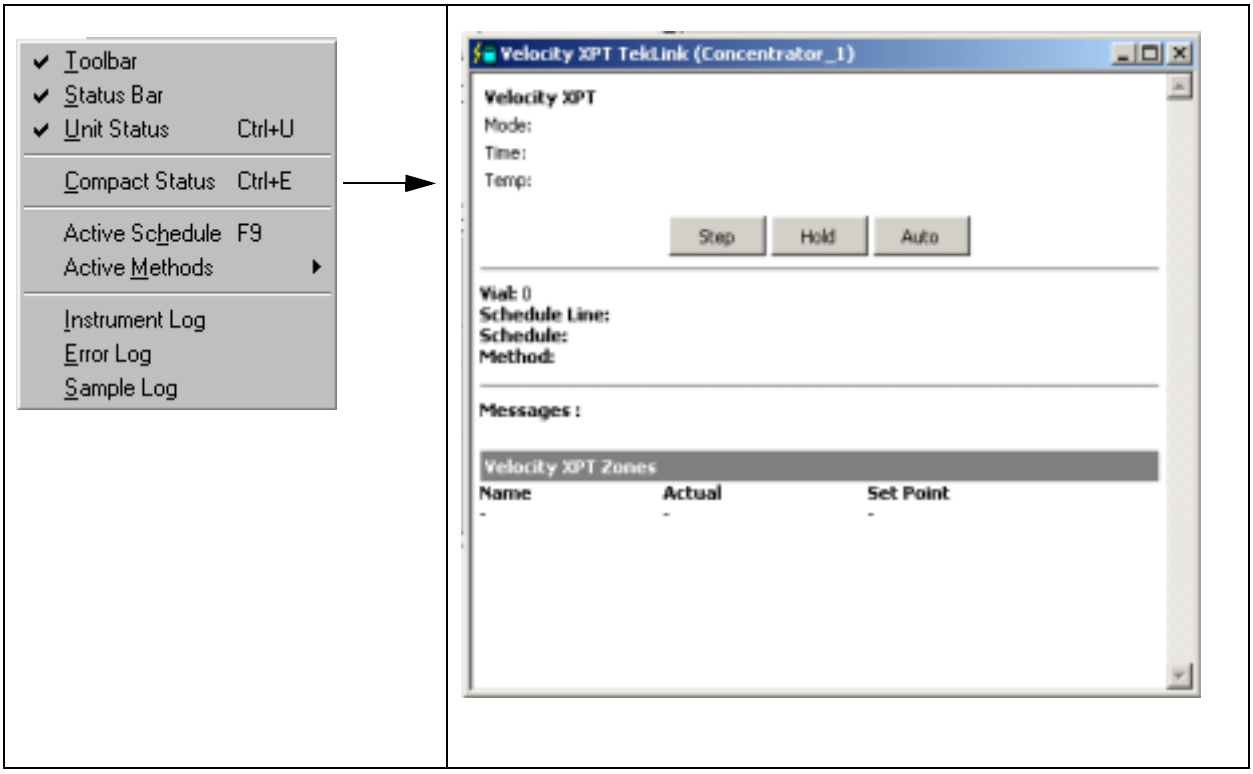


Figure 4-23: View Menu and Compact Status Screen

4.3.8 Commands Menu

From the Command menu you can access the functions featured below. These commands put the unit in the selected mode, and also give the user the option to perform other functions. Functions are available depending on your system configuration. Items that are inaccessible are not applicable to your current configuration.

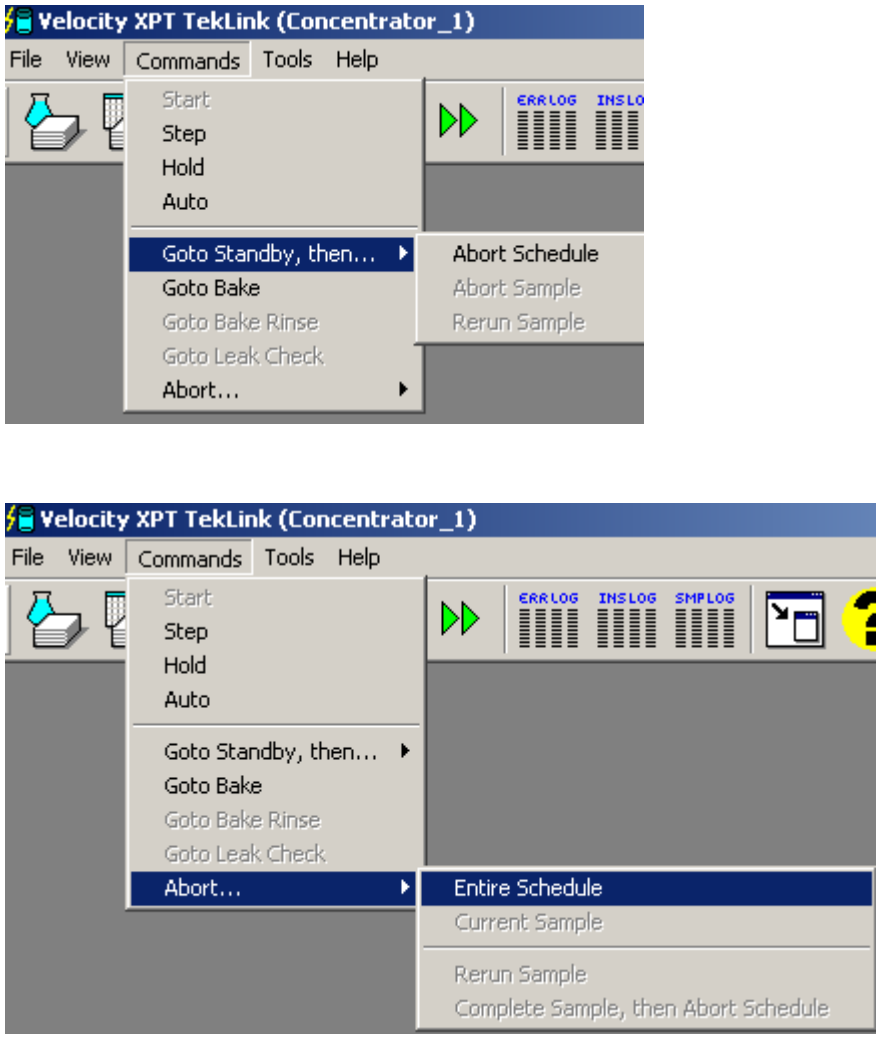


Figure 4-24: Command Menu Options

Start	Start moves the unit to its first step in the operating run
Step	Moves the unit to the next operating step
Hold	Keeps the unit in its current mode
Auto	Resumes the normal operation after the unit has been in “HOLD”
Go to Standby	**Choose one of the options below:**

Abort the Schedule	When you abort the schedule the active concentrator returns to “Standby” for the first scheduled Method. Aborting the schedule causes the concentrator to “Step to Bake” and drains the contents of the concentrator glassware.
Current Sample	Select “Abort Current Sample” to abort the sample in progress. The active concentrator proceeds to the next scheduled sample. This functions steps the concentrator to “Bake” and drains the contents of the glassware.
Rerun Sample	Select Rerun Sample to abort and rerun the current sample.
Complete Sample and Abort	Select Complete Sample and Abort to finish running the current sample and abort the rest of the schedule. The active concentrator finishes the sample it is running, returns to the beginning of the schedule, and then goes to Standby.

4.3.9 Tools Menu

The functions available through the Tools menu vary according to your configuration. Menu functions that are inaccessible are not relevant to your current operation.

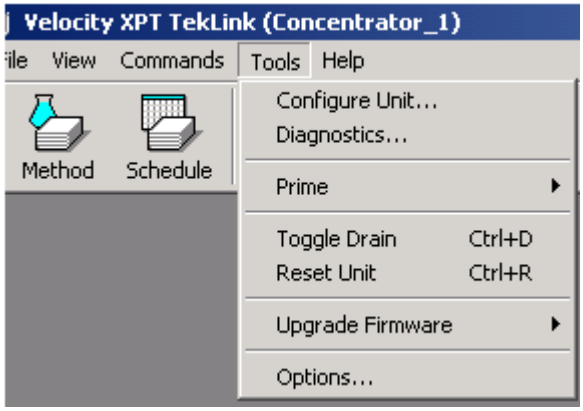


Figure 4-25: Tools Menu

4.3.10 Diagnostics

From the Tools menu you can run individual diagnostics for specific components. When you are using Velocity XPT to process samples, selecting **Tools>Diagnostics** brings up the following diagnostic screen:

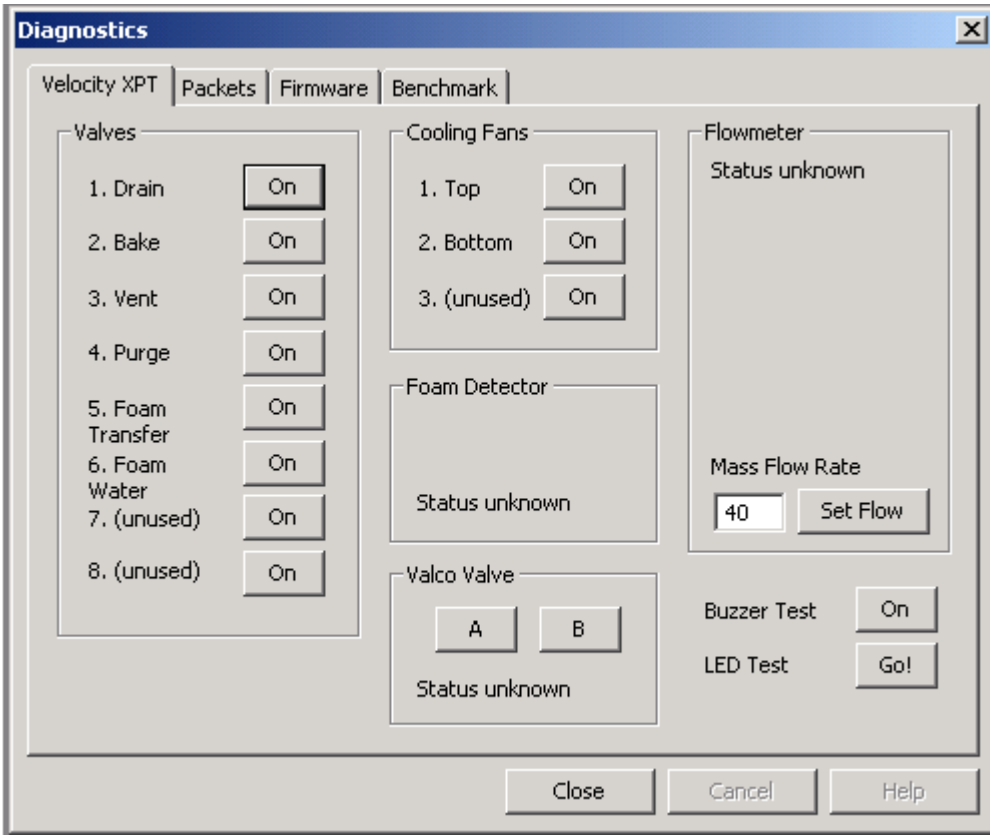


Figure 4-26: Velocity XPT Diagnostics Menu

The Diagnostic screen for the Velocity XPT allows the user to toggle functions on/off to test the unit.

Packets

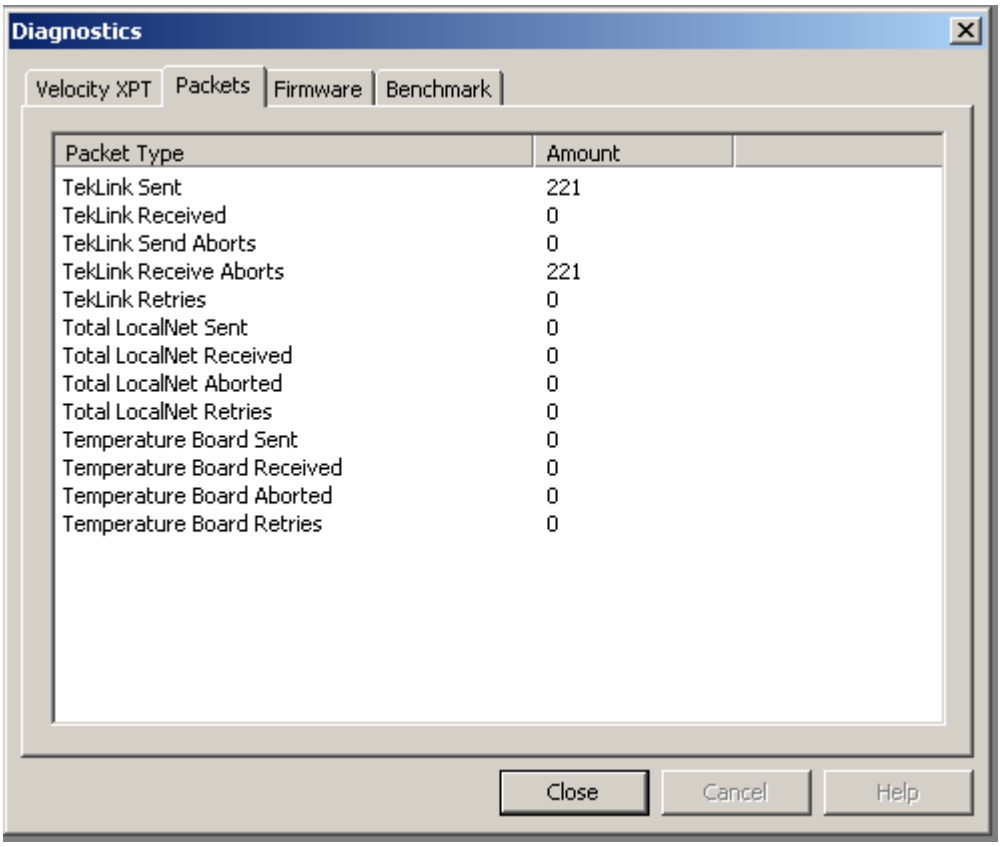


Figure 4-27: Packets Status Screen

The Packet Status screen provides data on system communications between the boards in the Velocity XPT and between TekLink and the Velocity XPT itself. It records signals sent, received, aborted, and retried.

Firmware

The Firmware Diagnostics allow you to Flash upgrade, if necessary, the firmware in certain boards. Select the board you wish to Flash upgrade from the Device menu and select <Flash>. TekLink automatically detects the correct COM Port.

Note: The Main Board can also be flashed from the Tools menu: **Tools>Upgrade Firmware>Main Board**

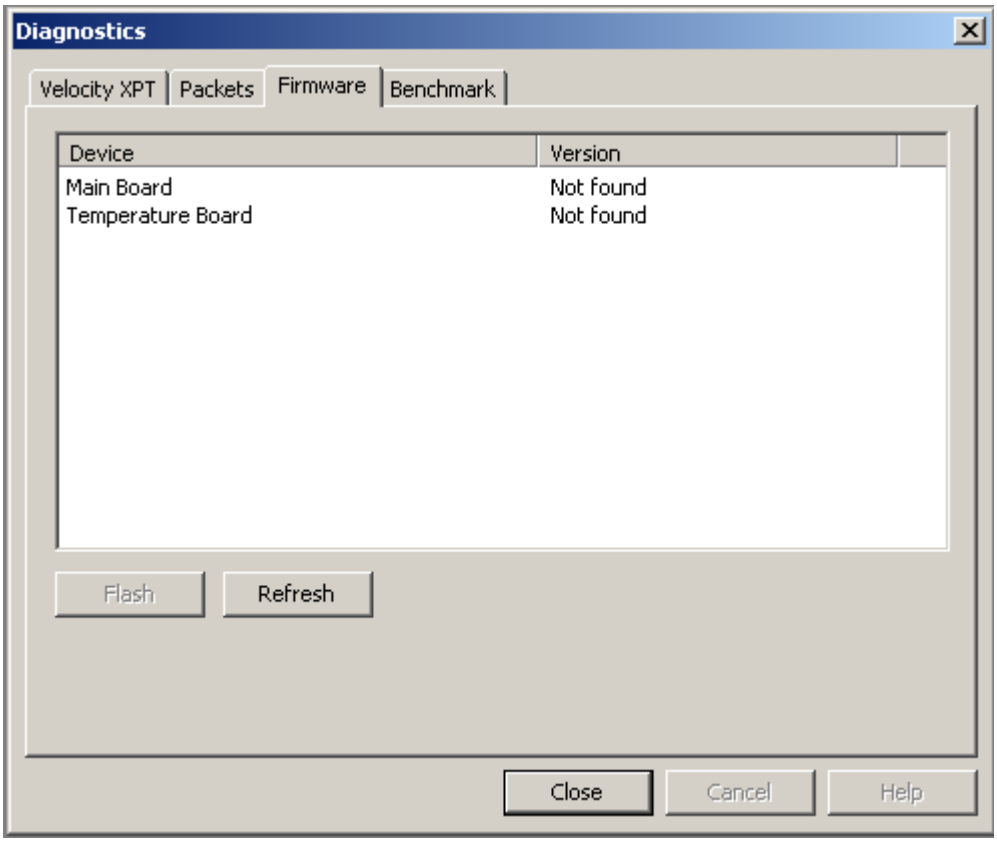


Figure 4-28: Firmware Diagnostics Screen

Benchmark

The Benchmark Test is an interactive program that tests heaters, LEDs, and the continuity of inputs and outputs on the CPU board. Select <Benchmark> and the system presents a series of questions to the user.

If you enter your name in the area provided, then the results of the Benchmark test are saved in the Instrument Log. To access a saved Benchmark test select **View>Instrument Log,** or select the icon in the Velocity XPT toolbar and select the Benchmark test results.

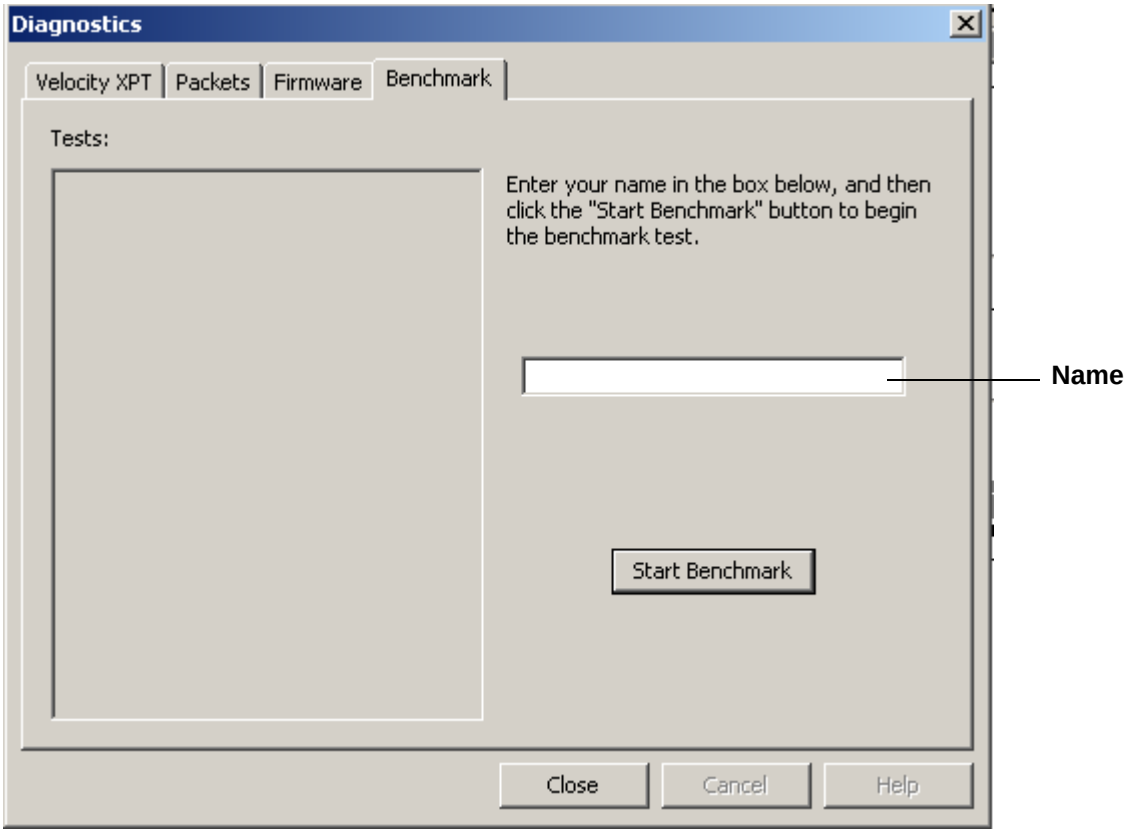


Figure 4-29: Options: Benchmark Screen_1

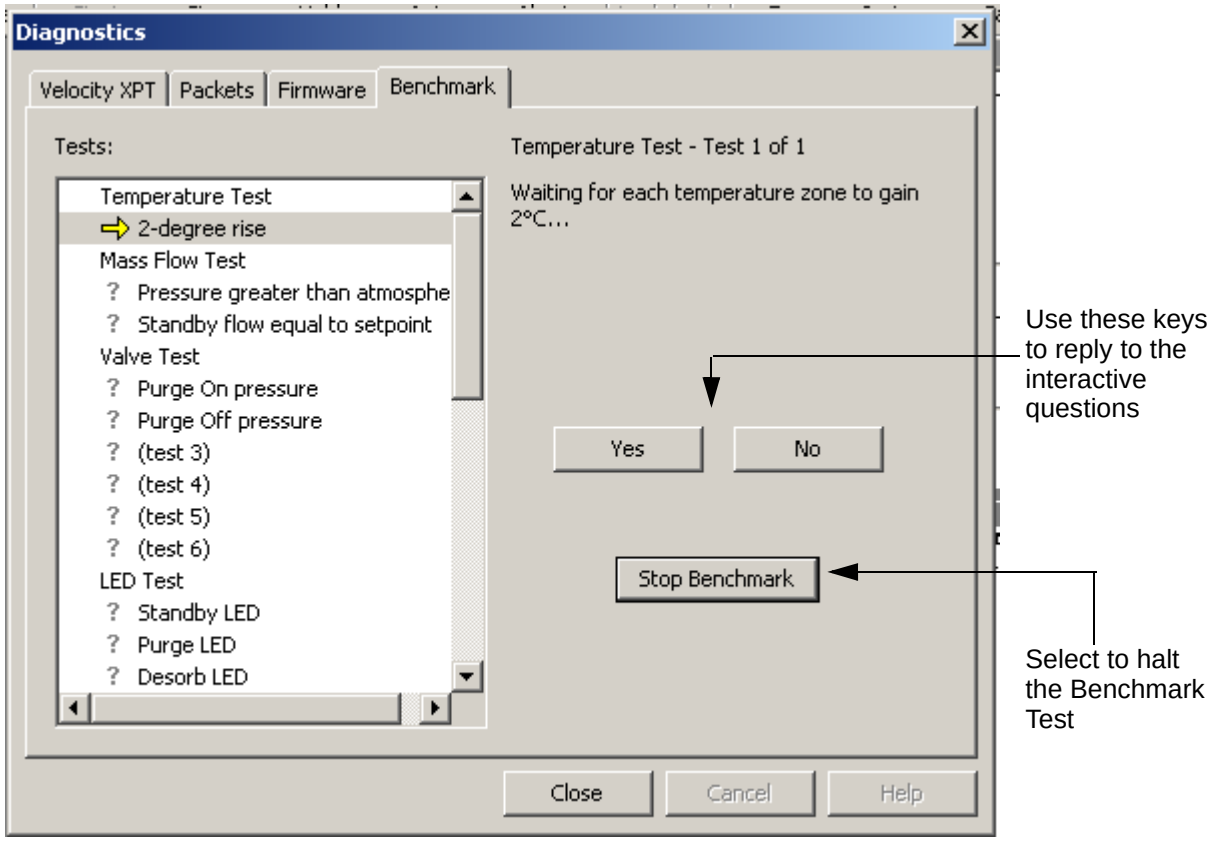


Figure 4-30: Benchmark Screen_2

4.3.11 Options

From the TekLink Options screen you can:

- Set certain screen preferences
- Define options for your Schedules
- Create default directories for saving and storing Methods
- Set up automatic E-mail alerts
- Assign unique sounds to alert you when certain events occur

General

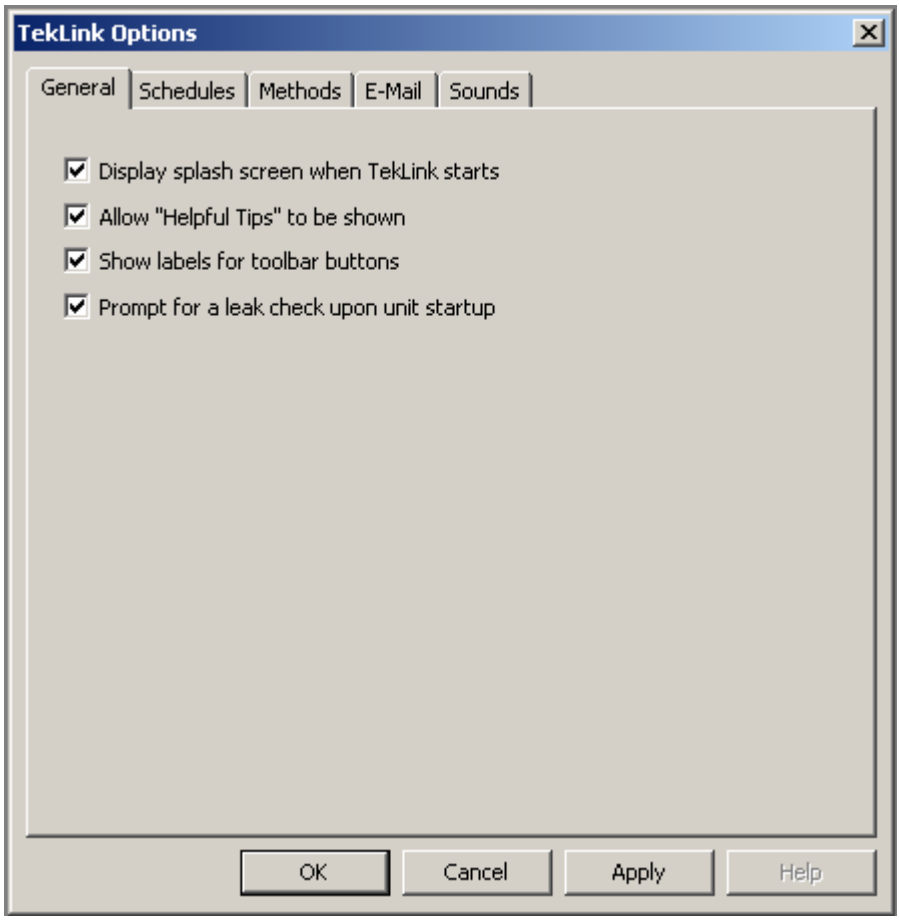


Figure 4-31: TekLink Options Screen

Splash Screen

The Splash Screen appears when you start TekLink. To disable this screen deselect the option on the TekLink Options screen.

Figure 4-32: TekLink Splash Screen

Context-Sensitive Tips

Select this option to activate tips that are specific to the operation you are performing.

Show Labels for Toolbar Buttons

Selecting this option labels the toolbar icons. Deselect this option and the icons appear without labeling.

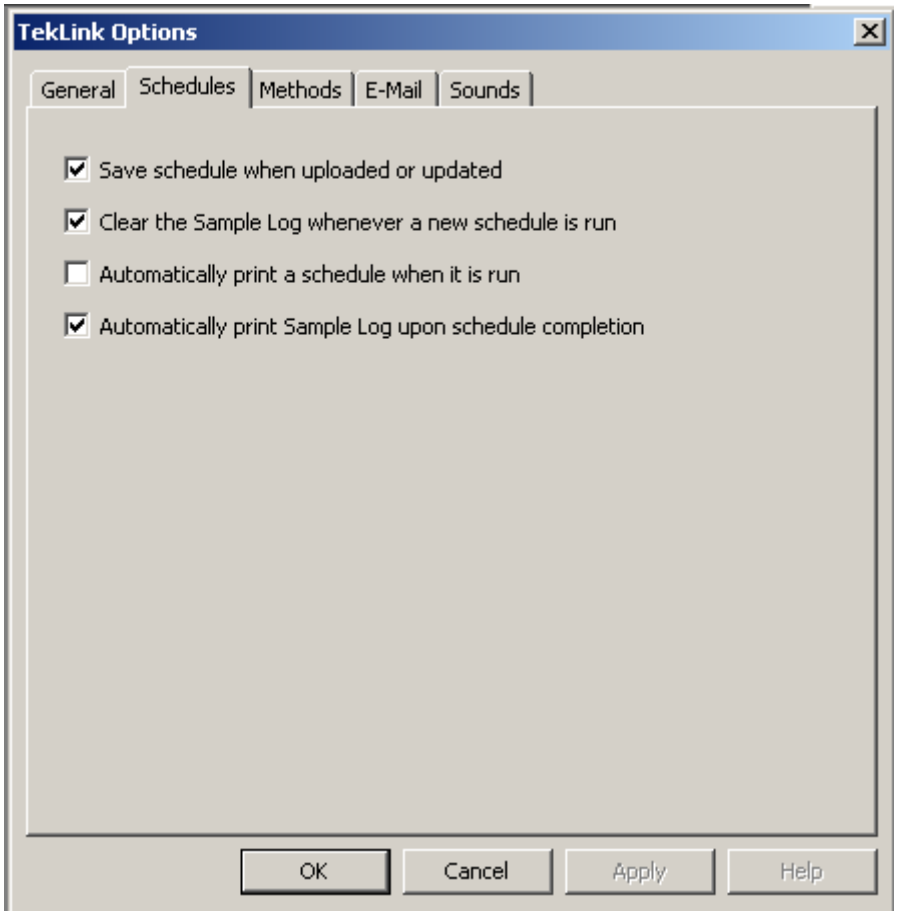
Leak Check

Select this option if you wish the system to prompt you to perform a leak check at startup.

Schedules

From the Options menu you can select Saving, Printing, and Storing options for your Schedules

Select **Tools>Options>Schedules** to access the menu that allows you to define options for your Schedules.



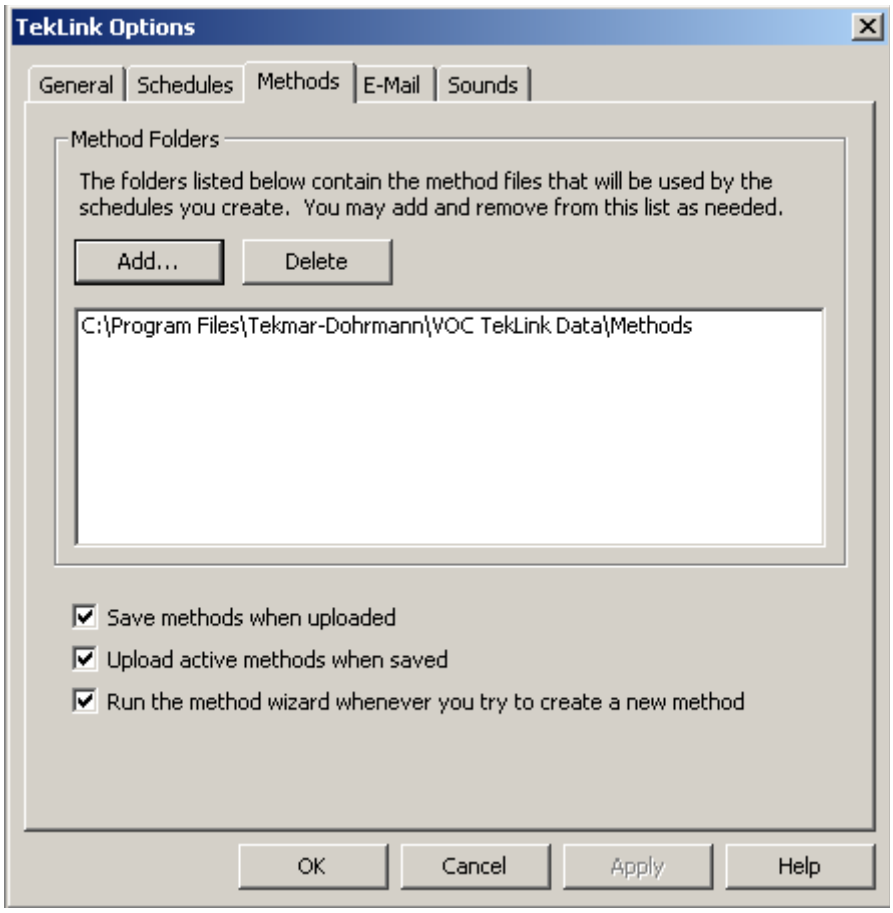
The saving, storing, and printing Schedule options are tools that allow automatic recording and storing of data used to build and run your Schedules. Maintaining a file with Schedule information builds a data library that can be helpful in diagnosing system problems.

Figure 4-33: Options: Schedules Screen

Methods

Create default directories for saving and storing your Methods:

Select **Tools>Options>Methods** to access the screen that allows you to create default directories for your Methods.



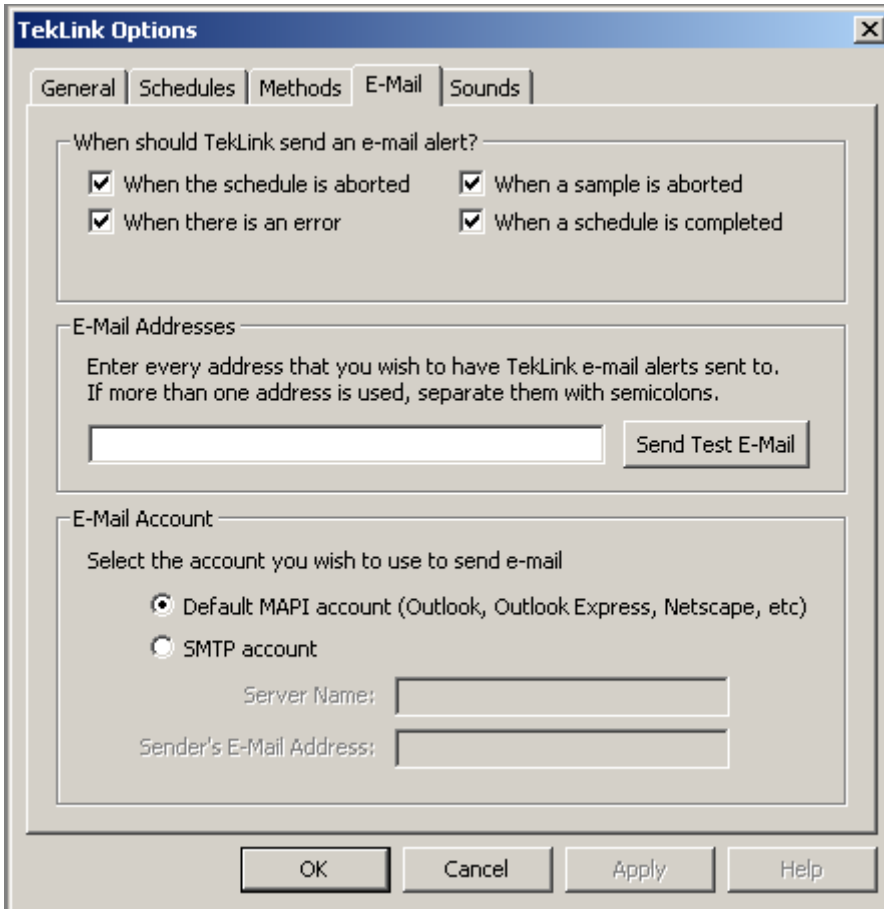
Use this screen to add or delete directories for your Methods files. When you designate a default directory the Methods Display field automatically accesses that directory when you click in the field to select a Method.
You can store Methods in more than one directory.

Figure 4-34: Options: Methods Screen

E-mail

Select E-mail notification options for your system.

TekLink allows you to designate certain conditions that will automatically alert you with E-mail when they occur. Select **Tools>Options>E-Mail**:



Use the checkboxes to designate when TekLink should notify you with E-mail.

You must designate one or more E-mail addresses for TekLink to send to.

TekLink allows you to send a test E-mail to verify that the E-mail addresses and accounts are set up correctly.

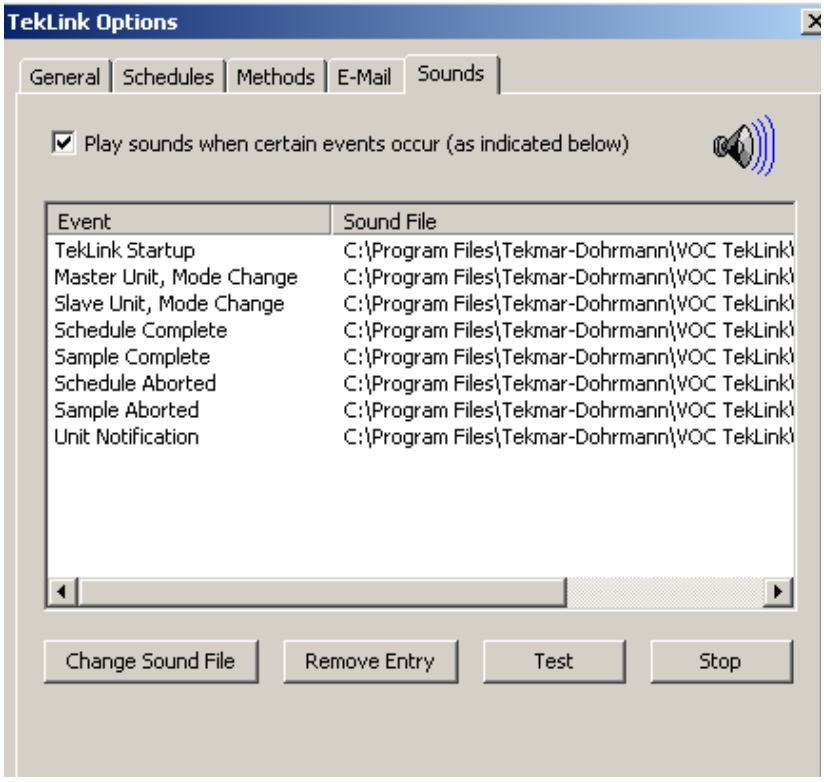
Notify your System Administrator if you need help with your E-mail account.

Figure 4-35: Options: E-mail Notifications

Sounds

Assign or remove the sounds that are played when your system performs certain functions

TekLink allows you to assign sounds to certain events as a way of letting you know when a specific event has occurred. To assign or remove a sound select **Tools>Options>Sounds.**



You can change the sound that plays by selecting <Change Sound File> and browsing through the available options.

- <Test> allows you to hear the sound and decide if you want to keep it.
- <Stop> stops a test sound that is playing.
- <Remove Entry> disables the sound file for the selected event. <Help> takes you to the online Help menu
- <Cancel> removes changes made since the last time <OK> was pressed and closes the window.
- <OK> accepts the changes made to the Sounds selection.

Figure 4-36: Options: Sounds Screen

4.4 The PDA and TekLink

An optional color PDA with Pocket PC capabilities can be used for local control of the Velocity XPT. The PDA is fully equipped with I.R. communication.

The PDA shown here may not match the PDA you receive with your unit.

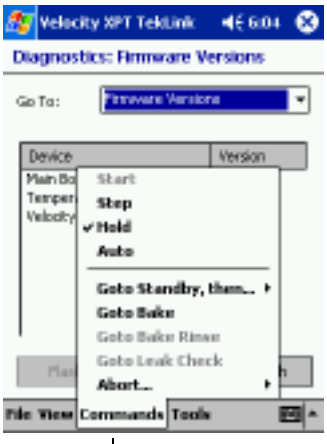
These differences are cosmetic only and do not affect the performance or consistency of the TekLink software.

Figure 4-37: PDA

4.4.1 Operating your PDA

Basic operating instructions for your PDA are provided by the manufacturer. Familiarize yourself with these instructions before using the PDA to control your unit. A basic understanding of PDA navigational skills will assist you in accessing TekLink functions.

The screens that display on your PDA allow you the same access to TEkLink operations as the screens that appear on your PC. They are configured differently because of the screen size. The toolbar menu appears across the bottom of the screen and the listings for each item are accessed by touching the menu item with the PDA stylus.



Toolbar Menu Items

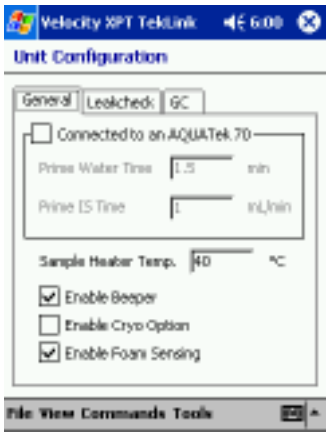
4.4.2 PDA TekLink Screens

The screen reproductions below provide capsule shots of TekLink screens as they appear on the PDA.

	**View/Unit Status** Allows the user to view: • the instrument mode • temperatures • the Active Schedule • the Active Method
	**View/Unit Status/Active Method** From this screen the user can change the Method parameters. By touching the stylus to the **Purge**, **Desorb**, and **AQUATek 70** tabs the user can access and change the Method parameters for the Active Method.
	**View/Unit Status/Active Schedule** From this screen the user can make changes to the Active Schedule.

View/Unit Status/Temperatures

From this screen the user can view all the temperatures and flow parameters that can be viewed while the instrument is running.



Tools/Configure

This is the configuration screen for the Velocity XPT. From this screen the user can access and change the information in the **General, Leakcheck**, and **GC** tabs.

Tools/Diagnostics/Velocity XPT

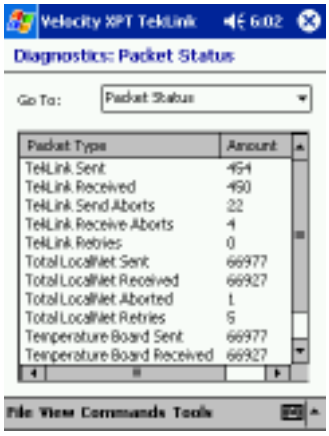
From this screen the user can turn the Velocity XPT outputs on and off.

Tools/Diagnostics/Velocity XPT Valves

From this screen the user can turn the Velocity XPT valves on and off.

Tools/Diagnostics/VelocityXPT Flowmeter

From this screen the user can change the mass flow rate.



Tools/Diagnostics/Packet Status

From this screen the user can view the sent and received signals between the board and TekLink.

Tools/Diagnostics/Firmware Versions

From this screen the user can view versions of Firmware as well as update the Firmware.

Commands

From the Commands menu the user has access to the functions below. Certain functions may be inaccessible depending on the status of the unit.

- Start
- Step
- Hold
- Auto
- Go to Standby, then...
- Go to Bake
- Go to Bake Rinse
- Go to Leak Check
- Abort...

File Menu

From the File menu the user can save or update a Method or Schedule.

	**View Menu** From the View menu the user can view the Schedules, Methods, and the Unit Status
	**Tools Menu** From the Tools menu you can access: Configure Unit Diagnostics Functions Priming Standards or Water Upgrade Firmware Toggle the Drain Reset the Unit Resync the Unit

Chapter 5

Diagrams

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