OPERATING MANUAL

PARTISOL®-PLUS MODEL 2025
SEQUENTIAL AIR SAMPLER

May 1999

Revision B

R&P Part Number 42-004773

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the new microweighing technology

U.S. EPA Reference Method Designations RFPS-0498-118 and RFPS-1298-127

Notice is hereby given that the U.S. Environmental Protection Agency (EPA) in accordance with 40 CFR 40 Part 53 has designated a reference method for measuring mass concentrations of particulate matter as PM-2.5 in ambient air. The reference method is a gravimetric method which uses a specially designed PM-2.5 sampler for particle collection. The designated method is as follows:

> RFPS-0498-118 "Rupprecht & Patashnick Company, Incorporated Partisol-Plus Model 2025 PM-2.5 Sequential Air Sampler" operated with software version 1.003 or 1.100, for continuous sample periods, in accordance with the Model 2025 Instruction Manual and with the requirements and sample collection filters specified in 40 CFR Part 50 Appendix L.

Notice is hereby given that the U.S. Environmental Protection Agency (EPA) in accordance with 40 CFR Part 50 has designated a new reference method for measuring mass concentrations of particulate matter as PM-10 in ambient air. The new reference method is a gravimetric method which uses a specially designed PM-10 inlet, configured as a PM-10 reference method, for particle collection. The designated method is as follows:

> RFPS-1298-127 "Rupprecht & Patashnick Company Partisol-Plus Model 2025 PM-10 Sequential Air Sampler" with PM-10 inlet, configured as a PM-10 reference method, and operated for 24-hour continuous sample periods in accordance with the Model 2025 Instruction Manual and with the requirements specified in 40 CFR Part 50, Appendix J or Appendix M.

These methods are available from Rupprecht & Patashnick Company, Inc. (R&P), 25 Corporate Circle, Albany, New York 12203.

Patents, Copyrights and Trademarks

Safety Notice

Repair of instrumentation manufactured by Rupprecht & Patashnick Co., Inc. (R&P) should only be attempted by properly trained service personnel, and should only be conducted in accordance with R&P system documentation. Do not tamper with this hardware. High voltages may be present in all instrument enclosures. Use established safety precautions when working with this instrument. Instrument is supplied with a grounded three-prong plug designed for outdoor use. When operating the instrument outdoors, be sure that it is plugged into a properly rated exterior (outdoor) outlet.

The Partisol-Plus stand must be anchored when installed outdoors to prevent tipping of the sampler and/or stand in high winds.

Some assembly of the inlet and WINS impactor is required for installation and regular maintenance. Be careful to avoid pinching your fingers between the assembly parts when assembling the WINS impactor or inlet.

Never place your hands or fingers in the filter exchange mechanism. Refer to the Partisol-Plus Model 2025 Sequential Air Sampler Service Manual (September 1998, Revision B) for instructions on clearing a filter jam.

The seller cannot foresee all possible modes of operation in which the user may attempt to utilize this instrumentation. The user assumes all liability associated with the use of this instrumentation. The seller further disclaims any responsibility for consequential damages. Use of this product in any manner not intended by the manufacturer will void the safety protection provided by the equipment, and may damage the equipment and subject the user to injury.

Warranty (U.S.)

Unless otherwise agreed upon in writing by authorized personnel of Rupprecht & Patashnick Co., Inc. (R&P) and the purchaser, the following warranty shall be in force for equipment sold and operated in the United States of America.

R&P warrants that the R&P-supplied equipment shall be free from defects in material or workmanship for a period of three-hundred and sixty-five (365) days after the date of shipment. Subject to the conditions of this provision, R&P agrees to repair or replace, free of charge, any components of the equipment found to be defective in material or workmanship during the warranty period. Purchaser shall notify R&P of any detected defects and shall return any equipment believed to be defective to R&P, suitably insured and at the purchaser's expense. In the event R&P determines the equipment returned for warranty correction is not defective within the terms of the warranty, purchaser shall be responsible for all costs of handling and return transportation. R&P's sole responsibility under the warranty shall be, at R&P's option, to either repair or replace any component that fails during the warranty period due to a defect in workmanship and/or material, provided purchaser has promptly reported same to R&P and R&P has, upon inspection, found such components to be defective.

The above warranty is contingent upon the proper use of the equipment (i.e., operation and maintenance in accordance with the procedures set forth in the provided operation manual(s)) and does not cover equipment that has been modified without R&P's approval, or which has been subjected to abuse or unusual physical or electrical stress.

This warranty does not cover any optional personal computer equipment or operating system software supplied with the equipment beyond the warranty period provided by the manufacturer of the computer or software. The customer is responsible for obtaining a local, third-party service agreement for computer service requirements beyond the warranty term of the computer.

THE ABOVE IS A LIMITED WARRANTY AND IS THE ONLY WARRANTY MADE BY R&P. R&P DISCLAIMS ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING ALL WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THE STATED EXPRESS WARRANTY IS IN LIEU OF ALL LIABILITIES OR OBLIGATIONS OF R&P FOR DAMAGES ARISING OUT OF OR IN CONNECTION WITH THE DELIVERY, USE OR PERFORMANCE OF THE EQUIPMENT. IN NO EVENT SHALL R&P BE LIABLE FOR ANY SPECIAL, CONSEQUENTIAL, EXEMPLARY OR INDIRECT DAMAGES EVEN IF IT HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

Equipment Rating

The following information can be used to determine the power service requirements of this product:

Line Voltage	
115 V ~ 60 Hz	3.0 Amp
230 V ~ 50 Hz	1.5 Amp

Electrical & Safety Conformity

This product as been tested by ETL Testing Laboratories, and has been documented to be in compliance with the following U.S. and Canadian standards:

UL Standard 3101-1
CAN/CSA C22.2 NO. 1010.1

Rupprecht & Patashnick Co., Inc. certifies that this product operates in compliance with the EC Directive 89/336/EEC with reference to electrical emissions and immunity. Specifically, the equipment meets the requirements of EN55011 Group 1, Class B (Emissions) and EN55082-1 (Immunity).

The hardware has been tested for personal or fire safety hazards, and meets the requirements of EN61010-1 (Safety) in fulfillment of EC Directive 73/23/EEC.

U. S. EPA Quality Assurance Specifications

This operating manual includes references to the U.S. Environmental Protection Agency (EPA) 2.12 Quality Assurance Handbook, Volume II, Part II. Partisol-Plus Model 2.25 Air Samplers that are installed as part of a U.S. EPA monitoring network, or which must meet U.S. EPA monitoring requirements, should refer to the procedures found in the 2.12 Quality Assurance Handbook. The 2.12 Quality Handbook provides general EPA-recommended guidance and, in some cases, may provide additional, more detailed or more recent guidance.

A copy of the U.S. EPA 2.12 Quality Assurance Handbook can be obtained from the AMTIC web site: http://www.epa.gov/ttn/amtic/pmqa.html, the QC coordinator at any EPA Regional Office, or from the Monitoring and Quality Assurance Group (MD-14), U.S. EPA, Research Triangle Park, NC 27711.

Section Revision List

As R&P instrumentation changes, so do our Operating and Service manuals. However, these changes may effect only one aspect of an instrument, while leaving the instrument as a whole unchanged. To explain these individual changes to our customers, R&P will update only those sections of its Operating and Service manuals that are effected by the instrument updates or improvements. As each manual section changes, so does its revision number, which is located at the top right corner of each page of each section.

To help our customers keep track of the changes to the Partisol-Plus Model 2025 Sequential Air Sampler and its operating manual, following is a list of the manual sections with their respective revision numbers:

Section Number and Description	*Revision Number*
Section 1: Introduction	B.004
Section 2: Hardware Installation	B.004
Section 3: Filter Handling and Exchange	B.003
Section 4: Software Overview	B.003
Section 5: Software Setup and Operation	B.005
Section 6: Sampler Operation	B.003
Section 7: Operating Information	B.003
Section 8: Viewing Stored Data	B.004
Section 9: Data Input and Output	B.003
Section 10: Direct Communications Using RPComm	B.001
Section 11: Password Protection	B.003
Section 12: Routine Verification and Maintenance Procedures	B.004
Section 13: Resetting the Sampler	B.003
Section 14: Service Menu	B.003

Section Number and Description	*Revision Number*
Appendix A: Overview of Partisol-Plus Software Screens	B.004
Appendix B: Program Register Codes	B.003
Appendix C: Two-Way Serial Communication	B.003
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Section 1: Introduction

The Partisol-Plus Model 2025 Sequential Air Sampler (Figure 1-1) is designed to meet the regulatory monitoring requirements for PM-2.5 (40 CFR Part 50 Appendix L) and PM-10 (40 CFR Part 50 Appendix J or Appendix M) and other particulate sampling methods in the U.S., Europe and other countries.

✔ The Partisol-Plus Sampler builds upon features first introduced with the original Partisol PM-10 Air Sampler.

This sampling platform holds the U.S. Environmental Protection Agency (EPA) reference designation for the sampling of PM-10. Many of the design features adopted by the U.S. EPA in the PM-2.5 Federal Reference Method were first introduced in a reference-designated air sampling method designed by Rupprecht & Patashnick Co., Inc. in its original Partisol Sampler. These include the following:

- A flow rate of 1 m^3/h through a single filter
- The use of standard 47 mm sample filters with a filter exchange mechanism
- Full microprocessor control and data handling
- Active volumetric flow control.

The Partisol-Plus Sampler can be configured to operate with a variety of inlet systems, including the U.S. EPA WINS inlet-based reference PM-2.5 method, and PM-10, PM-

Figure 1-1. Partisol-Plus Model 2025 Sequential Air Sampler.

2.5 (using a cyclone inlet), PM-1 and TSP (total suspended particulate matter) inlets. A filter storage and exchange system allows the unit to operate for up to 16 days of daily sampling between site visits. The Partisol-Plus system samples particulate matter onto 47 mm diameter filters that are available in a wide variety of materials, many of which are suitable for post-collection analysis.

Internal data storage and data input and output features allow meteorological data and information from other external sources to be averaged and stored. Built-in sensors measure ambient conditions, including temperature, atmospheric pressure and relative humidity.

The Partisol-Plus Sampler allows users to define various sampling programs, in addition to the standard 24-hour, midnight-to-midnight implementation. Conditional sampling can be based upon information received from external sources in the form of analog input levels.

The sampler records information by exposed filter (filter data), 5-minute period (interval data) and by meteorological values and information received from other sources (input data) at user-defined intervals.

The unit computes sampled volumes in both volumetric and standard terms to comply with different regulations around the world.

1.1. Advanced Features

The following is a list of some of the advanced features contained in the Partisol-Plus Sampler:

- Automatic filter changing system with a capacity of up to 16 filters between site visits.

- Operational simplicity, performance audits and stored data retrieval are made possible through an embedded microprocessor and menu-driven software.

✔ Filter cassette magazines simplify filter exchange and transportation, and minimize the chances of contamination.

- An active, volumetric flow-control system maintains a constant volumetric flow rate at the level specified by the user (default of 16.7 l/min) by incorporating a mass flow controller and ambient temperature and pressure sensors. Sampled volumes are reported in volumetric and standard terms. The sampler uses a reliable sample pump.

- The sampler uses standard 47 mm filters housed in reusable cassettes. These cassettes are loaded in magazines to ease handling and minimize the possibility of contamination.

- The temperature of the collection filter is maintained within 5° C of the outdoor ambient temperature by a continuous filter compartment ventilation system.

- Interval data are stored every 5 minutes, and include the 5-minute averages of the filter temperature, ambient temperature, ambient pressure and average flow rate. Data storage continues during and after the exposure of the collection filter. The sampler has a sampling capacity of 16 days of 5-minute interval data.

- A record of filter data is stored for each filter used in the sampler and includes all U.S. EPA-specified values such as error condition flagging, and average temperatures and pressures. Filter data records also include sampled volume in volumetric and standard terms, and meteorological and analog input data averaged over the collection period. The sampler can store 50 filter data records.

- The sampler stores records of input data every 30 minutes by default. These include the averages over the data storage interval of meteorological inputs and information received in analog form from other sources. The sampler can store 32 days of input data records, which are recorded every 30 minutes.

- Inputs received from external sources in analog voltage form are converted to engineering units through user-defined formulas.

- Automatic calibration of analog input and output channels.

- The sampler is easily transported due to its compact form and lightweight design. Its low noise level makes it appropriate for indoor monitoring.

- A bidirectional RS232 interface for data transfer to or from a personal computer (PC) or other digital device allows interval, filter and input data to be retrieved conveniently. The sampler's standard configuration includes basic PC-based communication software for bidirectional information exchange with the system.

- Automatic leak check.

- Low maintenance requirements due to durable components and a long-life vacuum pump.

1.2. Organization of Manual

This manual is divided into fourteen sections, eleven appendixes and an index which discuss different topics. The first sections explain how to setup the system's hardware and software, while the later sections describe the advanced features of the Partisol-Plus Sampler. The user should read and implement the procedures discussed in the earlier sections before using the advanced functions explained later in the manual. The following list provides an overview of the topics handled in each section of the manual:

Section 1: Introduction
This section introduces the user to the advanced features of the Partisol-Plus Sampler and describes the flow and sampling configurations of the system. It also discusses the flow control scheme used in the unit.

Section 2: Hardware Installation
This section contains the instructions for setting up the sampling hardware and its stand.

Section 3: Filter Handling and Exchange
This section explains how to handle the 47 mm collection filters used in the Partisol system, from the initial conditioning of the filter, to the installation of magazines in the sampling system, to the post-collection conditioning and weighing of the filter. This part also describes how to compute the average particulate concentration based upon the initial and ending filter weights, and the total volume drawn through the filter.

Section 4: Software Overview
This section provides an overview of the hierarchy of system's software screens, and explains how to navigate around the software and change the values of parameters.

Section 5: Software Setup and Operation
This section describes the operation of the Partisol-Plus Sampler, including the definition of its sampling program.

Section 6: Sampler Operation
This section describes the steps involved in verifying the sampler's performance characteristics prior to starting a sampling run, programming a sampling run and retrieving data after a sampling run.

Section 7: Operating Information
The Partisol-Plus Sampler displays a variety of information regarding the state of the

system, ranging from status codes to screens that display the current values of operating parameters. This section describes the type of diagnostic information available to the user.

Section 8: Viewing Stored Data
Interval and filter data stored internally may be viewed on the sampler's screen. This section describes the type of operational information stored internally and how to view the data.

Section 9: Data Input and Output
Data may be downloaded through the Partisol-Plus Sampler's RS232 bidirectional port. This section describes how to transmit internally stored operational information to external devices. The unit also can receive and transmit analog voltage information, and output user-defined digital information as logic level outputs. This section describes these input/output capabilities.

Section 10: Direct Communications Using RPComm
RPComm is a communications software package developed for Windows 9x/NT to provide interactive remote communications with R&P instrumentation. This section describes how to set up a Partisol-Plus Sampler for direct communication with a PC and how to use RPComm.

Section 11: Password Protection
This section describes the instrument's password protection functions.

Section 12: Routine Verification and Maintenance Procedures
This section explains how to verify the sampler's performance and describes hardware maintenance procedures.

Section 13: Resetting the Sampler
This section describes how to reset the instrument's parameter set points and internal data storage.

Section 14: Service Menu
This Partisol-Plus Sampler contains software support for low-level diagnostics and troubleshooting. This section describes the screens that the user may access for these types of activities. Many of the routines exercised from the service menu are described in Sections 11 and 12, and in the Partisol-Plus Model 2025 Service Manual.

Appendix A: Overview of Partisol-Plus Software Screens
This appendix contains the software menu tree of the Partisol-Plus Sampler, and all display screens of the software.

Appendix B: Program Register Codes
All important system variables, parameters and current results are stored in "Program Register Codes." These codes, which are listed in this appendix, are important when communicating with the sampler through its RS232 interface.

Appendix C: Two-Way Serial Communication
This appendix describes the two-way serial communication capabilities of the hardware.

Appendix D: Installing New System Software
This appendix explains how to download the unit's operating software and RPComm software into the Partisol-Plus Sampler.

Appendix E: Consumables and Parts
This appendix contains a list of consumables and spare parts for the Partisol-Plus Sampler.

Appendix F: Filter Log
This appendix contains a filter log that can be used as a quality assurance tool to track the history of each filter used in the sampler.

Appendix G: Maintenance of Inlets
This appendix describes the maintenance procedures for the R&P 1st stage inlet, WINS PM-2.5 impactor and other size-selective inlets available from Rupprecht & Patashnick.

Appendix H: Inlet Conversion
This appendix describes the components of the PM-2.5 Wins inlet sampler configuration and the PM-10 sampler configuration and the procedures for converting the Partisol-Plus from a PM-2.5 to a PM-10 particulate air sampler.

Appendix I: Using the Palmtop
This appendix explains how to use the palmtop to communicate with the Partisol-Plus Sampler.

Appendix J: Modem Communications
This appendix explains how to install the sampler's internal modem kit or an external commercial modem. It also describes how to set up the RPComm software program to communicate with the modem, and how to set up a serial switching device for communicating with several instruments through one modem.

Appendix K: Overview of RPComm Software Screens
This appendix contains the display screens of the RPComm software program.

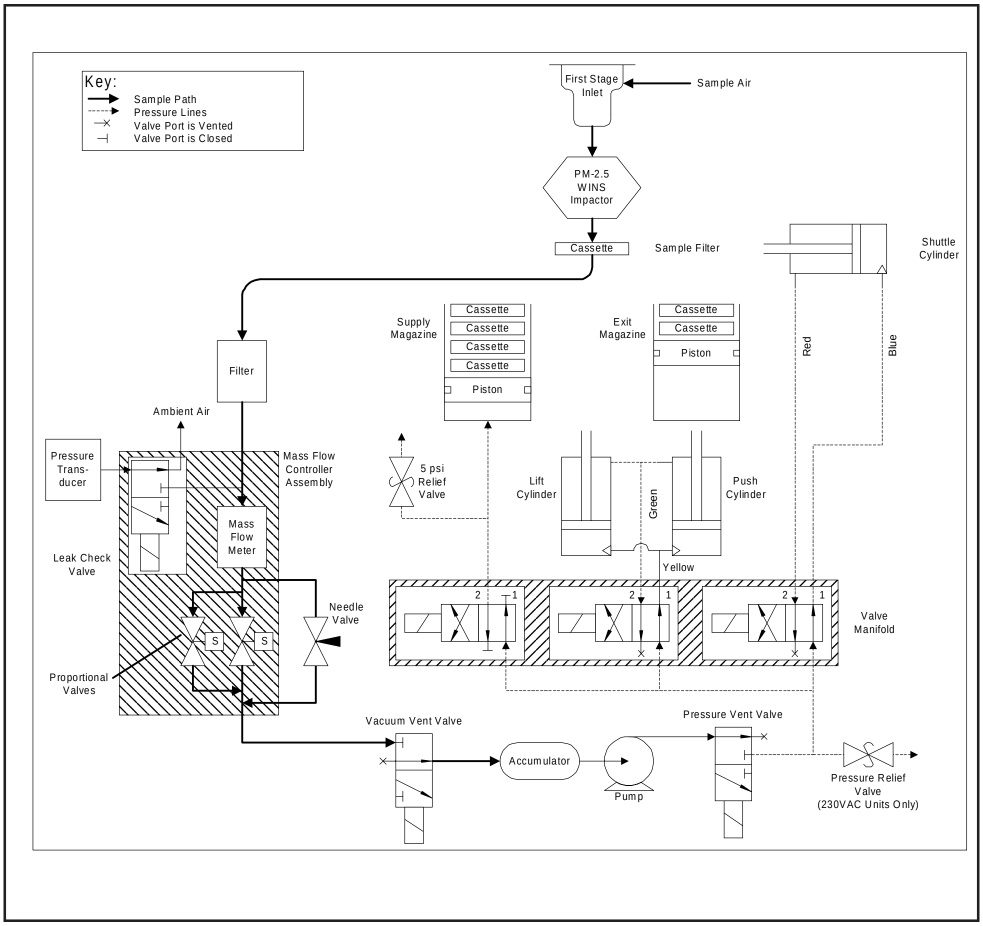


Figure 1-2. System flow schematic.

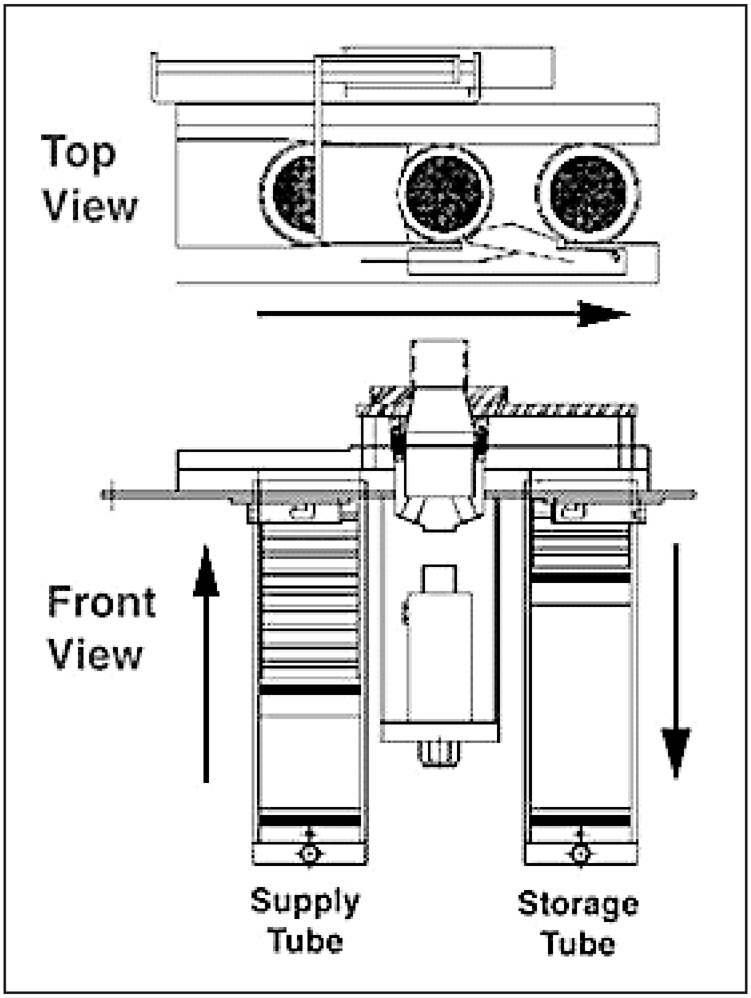
1.3. Flow Schematic

The system flow schematic provides an overview of the unit's basic flow and electronic connections (Figure 1-2). The schematic shows an inlet system consisting of a first-stage inlet that is followed by a down tube and WINS PM-2.5 impactor. For reference U.S. EPA PM-2.5 sampling, the WINS impactor is located inside the sampler enclosure. For sampling other particle size cut points, the first stage inlet is replaced with a PM-10, PM-2.5 (cyclonic), PM-1 or TSP inlet, and the WINS impactor is substituted with a pass through adapter tube.

✔ The Partisol-Plus Sampler actively maintains a constant volumetric flow rate at the user-defined set point (16.7 l/min by default).

A 47 mm filter is housed in a filter cassette that the user installs with other cassettes in a supply cassette magazine, that has a capacity of up to 16 filters. A storage magazine holds the exposed filters. The U.S. EPA prescribes the use of Teflon® filter material for reference PM-2.5 sampling, while PM-10 measurements are generally accom-

Figure 1-3. The Partisol-Plus Sampler's filter exchange mechanism.



plished using TX40 (Teflon-coated glass fiber), quartz fiber or Teflon materials. A range of other materials can be used in the 47 mm format for special applications.

The use of filter cassette magazines simplifies filter exchange and transport, and minimizes the risk of contamination during these procedures. Filter cassette magazines may be exchanged while the unit is sampling. The supply magazine contains pre-weighed, preconditioned filters used for collection, and the storage magazine receives exposed filters (Figure 1-3). During filter exchange, the sampler pushes unexposed filter cassettes contained in the supply magazine upward and to the right, while the already-exposed filter is moved to the storage magazine. For sensitive speciation applications, every second-loaded filter can be a separator, forming a complete seal between filter cassettes contained in the storage magazine.

An inline particle trap filter downstream of the sample filter protects the mass flow controller from any particles that may remain in the air flow. The mass flow controller operates under the control of the sampler's microprocessor, and maintains the sample stream at a constant *volumetric* flow rate (16.7 l/min default) through the use of ambient temperature and pressure sensors. The accumulator minimizes pulsations caused by the vacuum pump.

The Partisol-Plus Sampler maintains a constant volumetric flow rate at the set point entered by the user (usually 16.7 l/min), and reports sampled volumes (m^3) in volumetric or standard terms. The sampling system determines the ambient temperature and pressure for flow rate calculations through the use of sensors that provide continually updated information to the microprocessor system.

The mass flow controller in the Partisol-Plus Sampler is calibrated at a temperature of 0° C and pressure of 1 Atmosphere (1013.2 millibars or 760 mm Hg). The instrument uses the measured ambient temperature and pressure to sample at the correct volumetric flow rate. Using this information, the microprocessor calculates the correct mass flow set point (Flow $Rate_{STP}$) required to achieve the desired volumetric flow setting:

$$\text{Flow Rate}_{STP} = \text{Flow Rate}_{Vol} \times \frac{273.15}{\text{Ave Temp} + 273.15} \times \frac{\text{Ave Pres}}{760}$$

where:

Flow $Rate_{STP}$	=	Control set point of the mass flow meter (equivalent flow at 0° C and 1 Atmosphere).
Flow $Rate_{Vol}$	=	Volumetric flow rate set point (l/min) as entered by the user in the Setup screen (Section 5). This value is 16.7 l/min (1 m^3/h) for most applications.
Ave Temp	=	The current temperature (°C) as measured by the temperature sensor mounted on the down tube of the sampler.
Ave Pres	=	The current pressure (mm Hg) as measured by the pressure transducer in the sampler's enclosure.

Mass concentration data reported to the U.S. EPA must be in volumetric m^3, which simply involves the integration of the above volumetric flow rate over the sampling period, without any further adjustment.

The Partisol-Plus Sampler automatically determines the sampled volume in volumetric or standard m^3 for each filter exposed, and stores this information internally for later viewing or downloading (Sections 8-10).

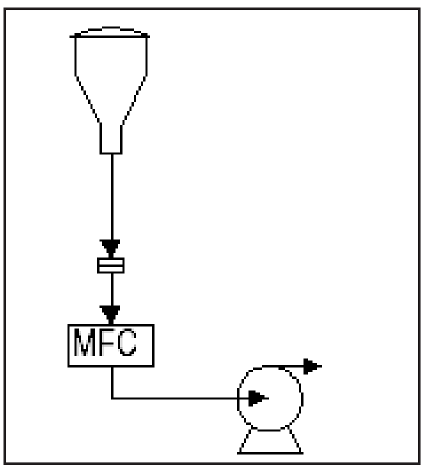
To report volumes in standard terms, the user must ensure that the standard temperature and standard pressure parameters in the Setup screen (Section 5) are set to their proper values. In many countries, standard volumes are defined in terms of 760 mm Hg pressure and 25° C temperature. Flow volumes referenced internally by the sampler to 0° C are converted to standard conditions using the following computation:

$$\text{Volume}_{\text{EPA}} = \text{Volume}_{\text{STP}} \times \frac{\text{Std Temp} + 273.15}{273.15} \times \frac{760 \text{ mm Hg}}{760 \text{ mm Hg}}$$

1.4. System Configuration

The Partisol-Plus Sampler consists of a single flow directed through a 47 mm filter. The air stream that passes through the inlet system passes through a single 47 mm filter that is housed in the filter platform (Figure 1-4).

Figure 1-4. Flow configuration.



Section 2: Hardware Installation and Maintenance

This section describes the installation of the Partisol-Plus Sampler, along with the setup of its support stand. This section also covers a number of operational considerations.

2.1. Standard Hardware Configuration

The following is a list of the standard components (compilation package) provided with a Partisol-Plus Sampler:

Partisol-Plus enclosure with WINS PM-2.5 impactor or pass through adapter tube
Inlet system for size-selective sampling
3 Rainhoods and associated hardware
Sample tube
Partisol-Plus stand
Ambient temperature sensor and cable
10 Partisol-Plus filter cassettes
Solid filter leak check/separator disk
3 Filter cassette magazines
Magazine transport container
Flow audit adapter
Box of 25 glass filters, 37 mm diameter (with WINS PM-2.5 systems)
Bottle of WINS impactor oil, 30 ml (with WINS PM-2.5 systems)
Operating software diskette
9-to-9 pin computer cable
2 Operating manuals
2 Service manuals
1 Quick Start guide

2.2. Setting Up the Sampler

Follow these steps to set up the unit for use as a Federal Reference Method sampler:

1) Cut any tie wraps and remove any transport restraints from inside the sampler enclosure.

2) Install the large rainhood on the right side of the enclosure (Figure 2-1). The rainhood should cover both air filters.

a) Peel back the paper facing of the larger gasket and apply it to the larger rainhood.

b) Place the large rainhood, with its gasket attached, on the enclosure.

Figure 2-1 (Left). Partisol-Plus Sampler with a large rainhood installed on the right side panel of the unit.

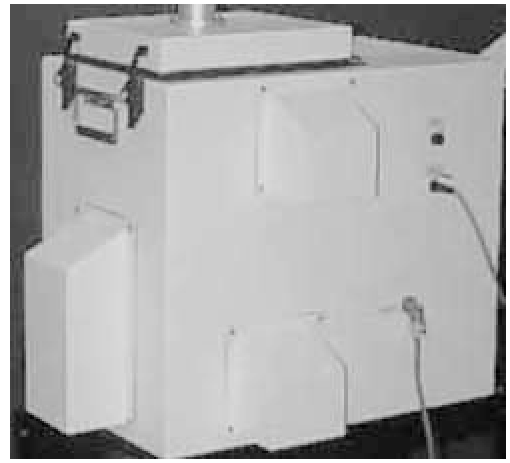


Figure 2-2 (Right). Partisol-Plus Sampler with two small rainhoods installed on the back panel of the unit.

c) Secure the rainhood to the unit using four (4) #10-32 x 1/2" slot bind head screws.

3) Install the two small rainhoods (Figure 2-2). Both rainhoods are installed on the back panel of the enclosure.

a) Peel back the paper facing of one of the smaller gaskets and apply it to one of the smaller rainhoods.
b) Place the small rainhood, with its gasket attached, on the enclosure.
c) Secure the rainhood to the unit using four (4) #10-32 x 1/2" slot bind head screws.
d) Repeat this procedure for the other small rainhood.

4) Install the sample tube and first stage inlet (Figure 2-3).

a) Insert the end of the sample tube, with the 5 cm (2 inches) machined section, into the bulkhead of the sampler. Ensure that the tube is pushed into the enclosure through the final O-ring until it stops.

b) Turn the dome connector on the bulkhead to ensure a tight grip.

c) Place the first stage inlet on the end that has 3 cm (1.25 inches) of machining. Ensure that the tube is pushed past the inlet's two O-rings (which provide some resistance) until it stops.

In its final sampling configuration, the entrance to the inlet must be approximately 2 m (±.0.2m) above the ground (6 to 7 feet). The stand (57-004644) that comes with the sampler provides a convenient means of installing the sampler to the correct height requirements.

5) Connect the unit to the electric supply. Be sure to fulfill all safety and regulatory requirements for the hardware.

The wires inside the power cord are defined by the following colors, which are different for 115 and 230 VAC configurations:

	115 VAC	*230 VAC*
Line	Black or Brown	Brown
Neutral	White or Blue	Blue
Common Ground	Green or Green/Yellow	Green/Yellow

For *115 VAC configurations* of the Partisol-Plus system, the standard three-pronged U.S. plug is provided at the end of the power cord. The unit is properly grounded and use of a ground fault interrupter is not necessary.

In the case of *230 VAC configurations* of the Partisol-Plus system, no electrical plug is provided at the end of the power cord. This line must be wired in accordance with safety codes.

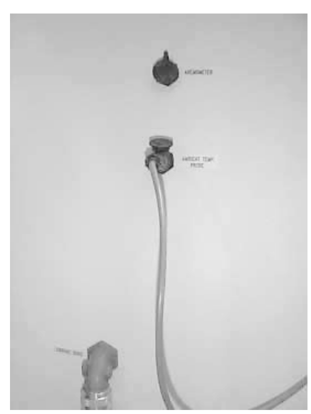
6) Install the ambient temperature sensor.

a) Locate the two screws on the left side of the enclosure.
b) Remove the two screws. Be sure to retain the washers. This will expose two holes.
c) Locate the ambient temperature probe assembly in the compilation package (Section 2.1).
d) Secure the assembly to the enclosure using the screws and washers previously removed (Figure 2-3).

IMPORTANT: Place the washers between the ambient temperature bracket and the enclosure – *not under the head of the screw* – to keep water from leaking into the electronics compartment.

Figure 2-3 (Left). Ambient temperature probe assembly mounted on the enclosure.

Figure 2-4 (Right). Ambient temperature probe plugged into the “ambient temperature” connector.



e) Plug the ambient temperature probe into the connector on the back panel of the sampler labeled “Ambient Temperature” (Figure 2-4).

7) Prepare the WINS PM-2.5 impactor for use, as described in Appendix G.3.

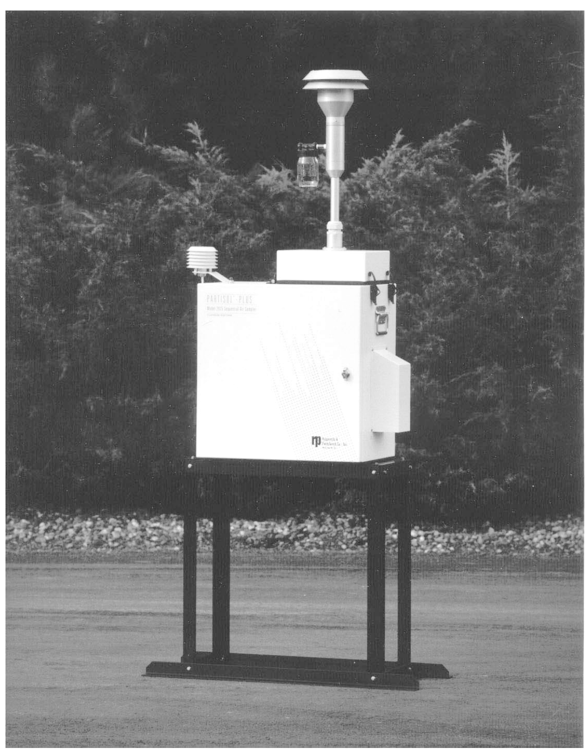
8) Install a 47 mm filter in the manner described in Section 3, but without turning on the sampler.

2.3. Partisol Stand

The Partisol stand (57-004644) keeps the Partisol-Plus Sampler’s inlet at the appropriate height. Figure 2-5 shows the unit mounted on the stand.

> **WARNING:** If the Partisol-Plus is mounted on a stand, it could fall or tip over in high wind conditions if the stand is not properly anchored.

Figure 2-5. Partisol-Plus Sampler mounted on optional stand.



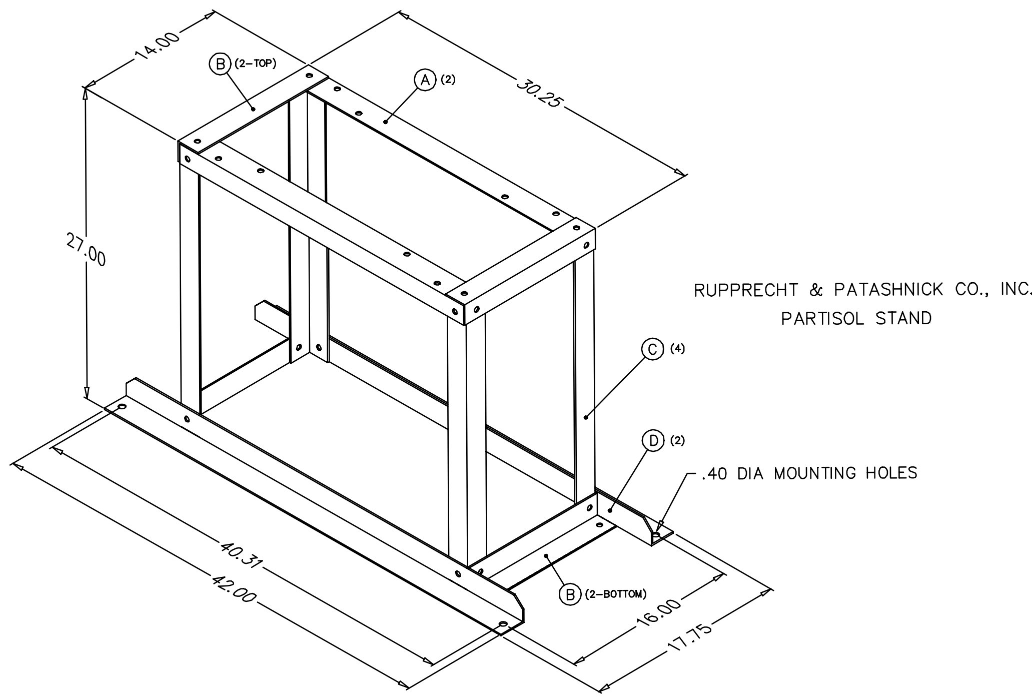


Figure 2-6. Assembly information for the Partisol-Plus stand.

A	(2)	Top front and top back	36-005479
B	(4)	Top right and top left	36-005476
C	(4)	Legs	36-005478
D	(2)	Bottom front and bottom back	36-005477
E	(4)	Hex head bolt 1/4-20 x 3/8"	21-001291-0006
F	(20)	Hex head bolt 1/4-20 x 3/4"	21-001291-0012
G	(24)	Flat washer, 1/4"	21-001275
H	(24)	Split ring washer, 1/4"	21-000848

Follow these steps to assemble the Partisol-Plus Sampler's stand:

NOTE: Figure 2-6 contains a list of parts and assembly information for the stand. Put this hardware together in accordance with the diagram shown in this figure. IMPORTANT: Always remember to place the split ring washer between the head of the bolt and the washer.

1) **Assemble the bottom of the stand by laying out the front, back and sides.**
2) **Place one leg on each inside corner, fasten with F, G and H hardware.**
3) **Attach the top front and back to the outside of the legs with F, G and H hardware. Do not tighten.**
4) **Fasten the right and left rails to the legs and top front and back rails with F, G and H hardware.**
5) **Tighten all hardware.**
6) **Place the Partisol-Plus Sampler onto the stand and secure using E, G, and H hardware.**

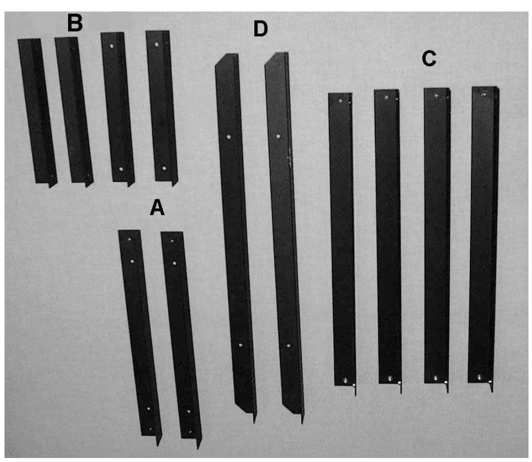


Figure 2-7. Partisol-Plus stand components

2.4. Hardware Considerations

A number of internal systems of the Partisol-Plus Sampler are designed to maintain acceptable operating conditions within the hardware.

✔ A fan and heater provide cooling and heating for the sampler.

The sample pump is always running when sampling takes place. If the filter compartment temperature exceeds 15° C, and the sample pump is running, the pump fan in the pump compartment initiates. The pump fan stops running once the temperature falls below 15° C. However, the pump fan will not initiate if the sample pump is not running, regardless of the temperature measured in the filter compartment.

When the device is not sampling, the sample pump initiates only if the ambient temperature falls below 7.5° C for 30 seconds. If the sample pump does initiate due to low temperatures, it stops running when the ambient temperature exceeds 7.5° C. In this case, the flow through the pump enters the system through the vacuum vent valve. This does not effect the filter that is in sampling position.

If the temperature measured on the interface board drops below 10° C for 30 seconds, the heater in the electronics compartment initiates and runs until the temperature exceeds 10° C.

2.5. Adjusting the Liquid Crystal Display (LCD)

A knob on the right side of the display/keypad adjusts the contrast of the sampler's liquid crystal display (LCD) (Figure 2-9). This knob may be turned clockwise and counter-clockwise.

Figure 2-8. LCD contrast adjustment knob on right side of display/keypad.

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Section 3: Filter Handling and Exchange

This section explains how to perform the initial inspection and the equilibrium and weighing (before and after sampling) of the 47 mm filters used in the Partisol-Plus Sampler. This section also describes how to insert and remove the filter cassette magazines in the sampler, and calculate the 24-hour mass concentration average of PM-2.5, as found in the U.S. EPA 2.12 Quality Assurance Handbook, Volume II Part II Section 7: Filter Preparation and Analysis, Section 8 Field Operation and Section 11: Calculations, Validation and Reporting of PM-2.5 Monitoring Data. Use the filter log in Appendix F for record keeping.

3.1. Filter Handling and Initial Inspection

The only filter media currently approved by the U. S. EPA for reference method sampling of PM-2.5 is a 47 mm diameter, 2 µm pore-size Teflon® filter. These filters can be purchased from R&P in the following form:

PTFE (Teflon) filters, 2.0 µm pore size, box of 50 (10-002322-0050)

You may use other filters or materials for other types of sampling, depending upon local regulations. For example, the U.S. EPA allows the use of Pallflex TX40 (Teflon-coated glass fiber) filters, quartz fiber filters and Teflon material for PM-10 sampling.

✘ Do not touch filters with your fingers. Use non-serrated forceps to handle the filters.

Ensure that your filters are clean and do not touch them with your fingers. Filters should be stored at the laboratory in petri dishes or some other protective housing, and should be transported to and from the sampling site in a capped filter cassette magazine enclosed in a metal transport container. Use non-serrated forceps to handle the 47 mm filters.

Inspect each filter visually for integrity before use. Check for the following:

- Pinholes
- Chaff or flashing
- Loose material
- Discoloration
- Non-uniformity.

3.2. PRE-SAMPLING FILTER EQUILIBRATION

Follow these steps to equilibrate the 47 mm filters before use. Refer to the U.S. EPA 2.12 Quality Assurance Handbook, Section 7. Use petri dishes to store filters in the laboratory.

1) **Place a label on the cover of each petri dish and number each dish.**
2) **Place the petri dish cover *under* the bottom half of the dish.**
3) **Place each inspected filter into a separate petri dish.**
4) **Record the filter number, relative humidity, temperature, date and time at the beginning of equilibration.**
5) **Equilibrate each filter for *at least* 24 hours under the following conditions:**

   The equilibration room must be held at a constant relative humidity between 30% and 40% relative humidity, with a variability of not more than ±5% relative humidity. The equilibration room must be held at a constant temperature between 20° C and 23° C with a variability of not more than ±2° C.

3.3. PRE-SAMPLING FILTER WEIGHING

Follow these steps to weigh the 47 mm collection filters (tare weight) before sampling, refer to 2.12 Quality Assurance Handbook, Section 7:

✔ Record the initial filter weight as W_i.

✔ The pre-sampling weighing must take place within 30 days of the sampling period.

1) **Ensure that each filter has been equilibrated for at least 24 hours before weighing.**
2) **Filters must be weighed on a microbalance with a resolution of at least 1 µg (0.001 mg). Be sure to warm up the balance before weighing filters.**
3) **Weigh each filter at least once (three times recommended), recording the mass in grams (Figure 3-1). The average mass reading is the initial filter weight, W_i (g). Use appropriate techniques to neutralize static charges on the filter. This pre-sampling weighing must take place within 30 days of the sampling period.**
4) **Immediately place each weighed filter into an open filter cassette (59-004648-0001) (Figure 3-2) that has a serial number etched on the screen. These filter cassettes also are referred to as having**

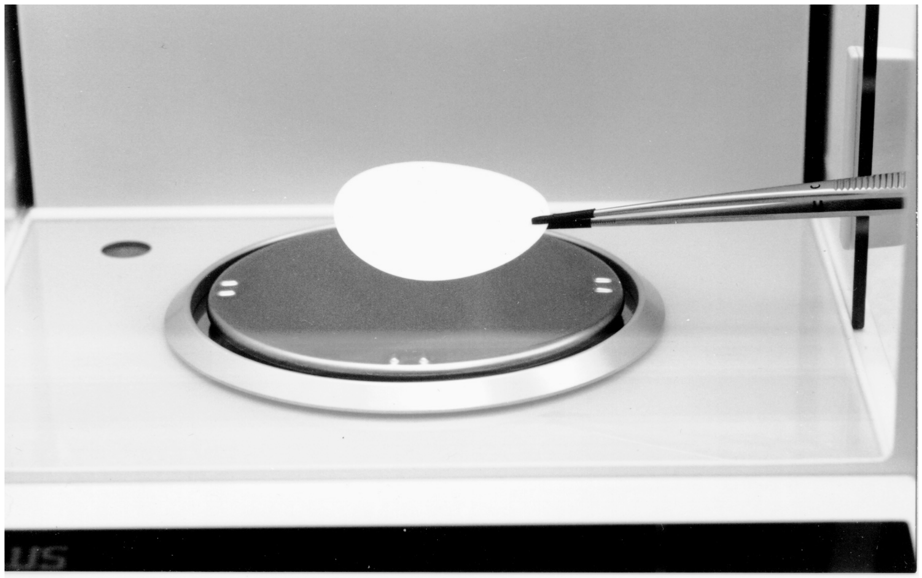


Figure 3-1. Positioning a 47 mm filter on a balance.

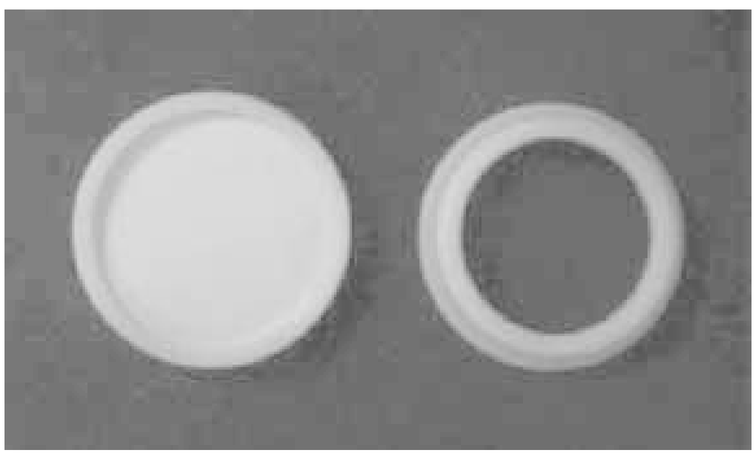


Figure 3-2. 47 mm filter placed in bottom section of cassette. Top part of cassette shown on right.

"serialized" screens. Close the filter cassette by snapping its top part onto its bottom section. Ensure that the top and bottom pieces of the cassette are pushed completely together.

5) **Record the serial number of the filter cassette.**

6) **Remove the orange cap from the top of the filter cassette magazine.**

7) **Insert the filter cassettes into a filter cassette magazine (59-005569) that will be installed in the field (Figure 3-3). Place the first filter cassette on top of the magazine's piston and push downward.**

IMPORTANT: If the piston is not located at the top of the magazine when you begin inserting the filter cassettes into the magazine, follow the instructions in Section 3.4 to move the piston into place.

8) **Stack each successive filter cassette on top of the first filter cassette (one on top of the other). As you place each cassette in the magazine, press down to move the piston downward, making room for the next cassette. *Note the order of the filter cassette serial numbers as they are inserted in the magazine.***

NOTE: If using separator disks for speciation work, the filter cassette order from top to bottom must be as follows: separator disk cassette, filter cassette, separator disk cassette, filter cassette, etc.

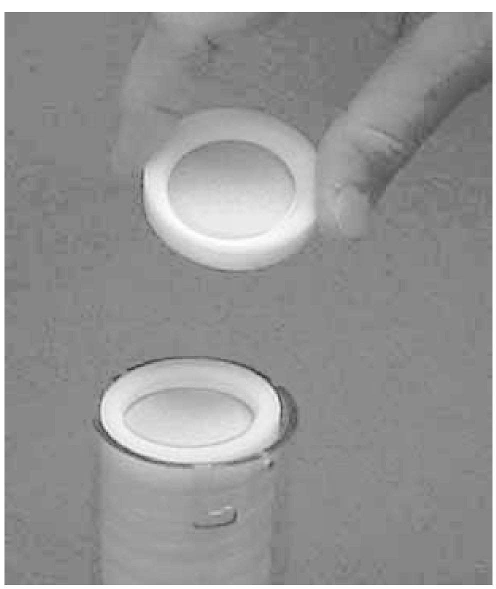
9) **After you have inserted all of the filter cassettes into the magazine, replace the orange cap (Figure 3-4) back on the end of the magazine to hold the filter cassettes in place and to prevent filter contamination.**

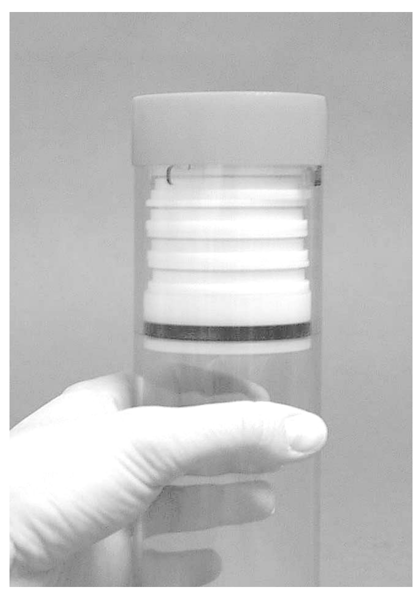
10) **Document the relative humidity, temperature, date and time of the initial weighing.**

11) **The "zero" reading of the microbalance should be verified between each filter weighing.**

Figure 3-3 (Left). Inserting filter cassettes into a filter cassette magazine.

Figure 3-4 (Right). Capped magazine.





3.4. PREPARING THE FILTER CASSETTE MAGAZINE

Follow these steps to move the filter cassette magazine's piston to the top of the magazine:

1) **Attach the bulb pump hose (59-004733) to the magazine's air connector fitting with the quick connect fitting on the end of the hose (Figure 3-5).**
2) **Squeeze the bulb gently until the piston reaches the top of the magazine.**

Figure 3-5. Attach bulb pump hose to magazine air connector.

3.5. FILTER TRANSPORTATION

The capped filter cassette magazines should be inserted into the metal transport container (20-004997) (Figure 3-6). The filter cassette magazine's caps must be secure during transport to avoid contaminating the filters. Collection filters must be transported carefully in the metal transport containers to and from the sampling site as specified in the U.S. EPA 2.12 Quality Assurance Handbook, Section 8.

Figure 3-6 (Right). Magazine in metal transport container.

3.5.1. Installing a Filter Cassette Magazine

Filter cassette magazines may be exchanged in any of the sampler's operating modes.

> **IMPORTANT:** Filter cassette magazines containing new filters must be installed on the left (supply) side, while empty magazines for receiving exposed filters must reside on the right (storage) side.

Perform these steps to install a filter cassette magazine:

NOTE: The piston should always be at the top of the (empty) storage magazine prior to installing the magazine into the sampler. Otherwise, exposed filters will not seat properly in the empty magazine when the filters are transferred, and particulate on the filter may become dislodged. Use the bulb pump hose described in Section 3.4 to position the piston at the top of the magazine.

1) **Open the enclosure of the Partisol-Plus Sampler.**

2) **Identify the appropriate mounting position for the filter cassette magazine to be installed (left side for supply and right side for storage).**

3) **Remove the orange cap from the top of the filter cassette magazine.**

4) **With the air connection of the filter cassette magazine facing toward the user, line up the grooves at the top of the filter cas-**

Figure 3-7 (Left). Positioning the filter cassette magazine into its mounting location.

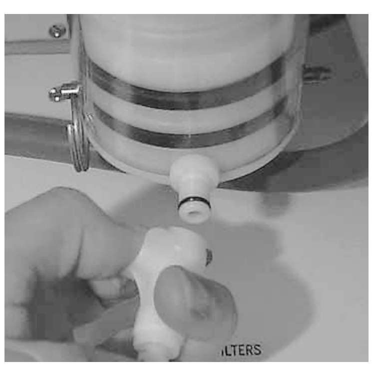
Figure 3-8 (Right). Rotating the filter cassette magazine into its locked position.

sette magazine with the mounting studs on the metal ring that holds the magazine in place (Figure 3-7).

5) **Push the filter cassette magazine upward and rotate it to the right to lock it into place (Figure 3-8).**

6) **Attach the air pressure supply tube to the air connection at the base of the supply filter cassette magazine (Figures 3-9 and 3-10). The storage filter cassette magazine does not have an air pressure supply tube.**

NOTE: R&P recommends that the serial number of the topmost filter cassette, or a user-defined batch number, be entered in the Filter List screen (Section 5.3.7) *each time the user exchanges the filter cassette supply magazine*. If the filter cassette magazine is installed when the sampler is not running, you should enter the topmost filter cassette serial number in the proper screen once you have turned the sampler on.



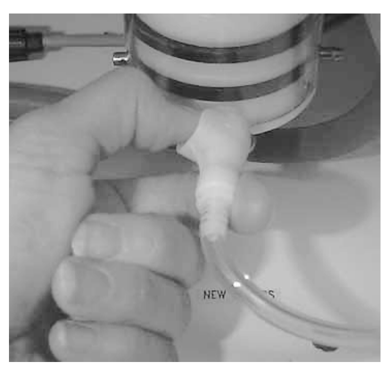


Figure 3-9 (Left). Positioning the pressurized air tube toward the air connector on the filter cassette magazine.

Figure 3-10 (Right). Attaching the tube to the connector.

3.5.2. Removing a Filter Cassette Magazine

Perform these steps to remove a filter cassette magazine:

NOTE: The supply magazine (containing unused filters) is on the left-hand side, and the storage magazine (containing exposed filters) is on the right-hand side.

1) **Open the enclosure of the Partisol-Plus Sampler.**
2) **Rotate the magazine to the left and pull it down.**
3) **Place the orange cap over the open end of the filter cassette magazine to protect its contents during transport. Place the capped magazine into a metal transport container (Figure 3-6).**

3.6. Removing Filter Cassettes from a Magazine

The most convenient means of removing filter cassettes from a filter cassette magazine is to use the R&P cassette removal sleeve (36-004733) (Figure 3-12).

Follow these steps to remove filter cassettes from a filter cassette magazine:

1) **Remove the magazine's cap.**
2) **Line up the four pins on the inner surface of the metal cap of the cassette removal sleeve with the four slots at the top of the filter cassette magazine. Slide the cassette removal sleeve onto the top of the filter cassette magazine.**
3) **Attach the bulb pump hose to the magazine's air connector fitting with the quick connect fitting on the end of the hose (Figure 3-5).**
4) **Squeeze the bulb gently until the topmost filter cassette is positioned in the slot of the metal cap (Figure 3-11).**
5) **Slide the filter cassette out of the slot (Figure 3-12). Continue to push the filter cassettes into the slot by squeezing gently on the bulb. When all filter cassettes have been removed from the magazine, remove the cassette removal sleeve from the top of the magazine and disconnect the hose from the magazine air connector. The filter cassette magazine is now ready to be loaded with unused filters.**
6) **Insert new filter cassettes (loaded with unused filters) into the**

magazine one at a time, recording the serial numbers of each filter and cassette screen. Push down on each filter cassette so that the topmost filter is just below the top of the magazine. Either install the loaded magazine in the sampler, or cap the magazine to protect the filter cassettes from contamination.

Figure 3-11. Squeeze gently on the bulb to push filter cassettes to the top of the cassette removal sleeve.

Figure 3-12. Sliding cassette through slot.

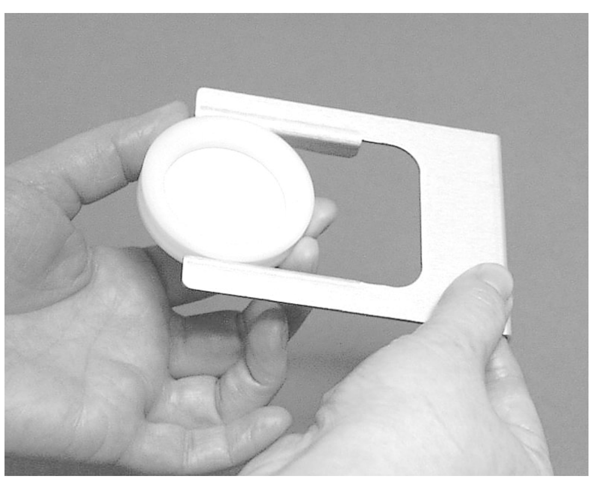
3.7. Post-Collection Equilibration

Follow these steps to equilibrate the 47 mm filters after sampling:

1) **Separate the filter from the cassette with the filter cassette separator tool (38-004892) as shown in Figure 3-13.**
2) **Remove the 47 mm filter from the filter cassette and set the filter in its petri dish. The cassette can then be used to hold other filters once it has been cleaned. Refer to Section 12.2 for the filter cassette cleaning procedure.**
3) **Examine the filter for defects that may have occurred during sampling, and for evidence of leaks in the filter cassette. To check for leaks in the filter cassette, check the filter for pronounced radial streaks that extend beyond the exposed area of the filter.**
4) **Place the petri dish cover *under* the bottom half of the dish.**
5) **Place a paper towel over the open petri dish during equilibration.**
6) **Record the filter number, relative humidity, temperature, date and time at the beginning of this post-collection equilibration.**
7) **Equilibrate each filter for *at least* 24 hours under the following conditions:**

   The equilibration room must be held at a constant relative humidity between 30% and 40%, with a variability of not more than ±5% relative humidity.

Figure 3-13. Filter cassette separator tool.



The equilibration room must be held at a constant temperature between 20° C and 23° C, with a variability of not more than ±2° C.

3.8. Post-Collection Weighing

Follow these steps to weigh the 47 mm collection filters after sampling:

✔ Record the final filter weight as W_f.

1) **Ensure that the filters have been equilibrated for at least 24 hours before weighing.**
2) **Filters must be weighed on a microbalance with a resolution of at least 1 µg (0.001 mg). Ensure that the balance has been allowed to warm up before weighing filters.**
3) **Remove the filter from its petri dish.**
4) **Weigh each filter at least once (three times recommended), recording the mass in grams (Figure 3-14). The average mass reading is the final filter weight, W_f (g).**
5) **Return the filter to its petri dish, place the petri dish cover over it and store it for archival purposes.**
6) **Document the relative humidity, temperature, date and time of the post-collection weighing as specified in the U.S. EPA 2.12 Quality Assurance Handbook, Section 7.**
7) **The "zero" reading of the microbalance should be verified between each filter weighing.**
8) **Determine the net mass filter loading (DW) by subtracting the average initial filter weight (W_i computed in Step 3 of Section 3.3)**

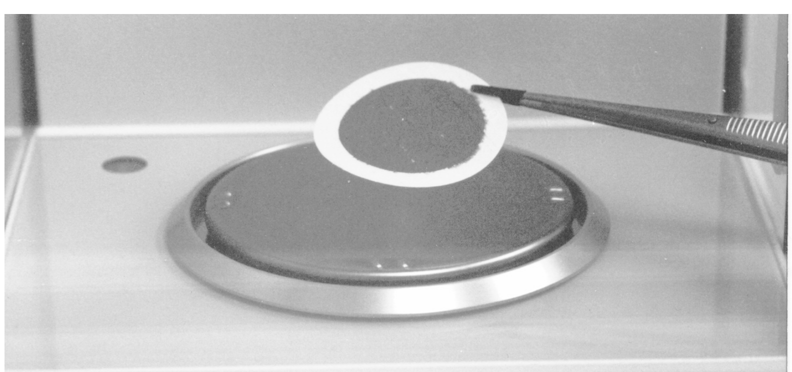


Figure 3-14. Placing a used 47 mm filter on a balance.

from the final filter weight (W_f computed in Step 4 above). Ensure that the figures used in this computation were obtained from the *same filter and balance*.

3.9. Computation of Mass Concentration

NOTE: Refer to the U.S. EPA 2.12 Quality Assurance Handbook, Section 11.

Compute the average mass concentration (MC) of particulate matter during the sampling period using the following formula with the information previously assembled:

$$MC = \frac{DW \times 10^6}{V}$$

where:

DW = the net change in the mass (g) of the 47 mm filter between the initial weighing and the post-collection weighing, as computed in Step 8 of Section 3.8.

10^6 = Conversion factor from grams (g) to micrograms (µg).

V = the volume drawn through the filter, as obtained from the sampler. For U.S. EPA PM-2.5, this must be volumetric m^3. Other sampling standards require that the standard volume be used. The Partisol-Plus Sampler can furnish either the actual or standard volume.

For 24-hour PM-2.5 concentration averages to be valid without adjustment for U.S. EPA reporting purposes, the total sampling time must be between 23 and 25 hours, and other requirements must also be met, as referenced in the U.S. EPA 2.12 Quality Assurance Handbook, Section 8. The sampler also indicates to the user which, if any, status conditions were encountered during sampling.

Section 4: Software Overview

This section describes the steps involved in turning on the Partisol-Plus Sampler, navigating through its basic screens and interacting with the unit. The sampler's software menu structure and a complete list of screens may be found in Appendix A.

4.1. Turning On the Partisol-Plus Sampler

Follow the procedures outlined in Sections 2 and 3 before attempting to operate the Partisol-Plus Sampler. Once the sampling system has been wired to a main electrical source of the proper voltage in accordance with local standards, power can be applied to the unit.

✔ Ensure that all applicable safety standards are met before applying power to the hardware.

Follow these steps to turn on the sampler:

1) **Install a loaded supply and empty storage filter cassette magazine into the filter exchange mechanism of the sampler (Section 3).**
2) **Press the power switch on the main panel (lower left) to its "on" (1) position to activate the sampler (Figure 4-1).**
3) **If necessary, turn the adjustment knob, located to the right of the keypad/display, to adjust the contrast of the liquid crystal display (LCD).**

Once the power switch is pressed, the pump in the sampler may turn on momentarily. This is the default setting of the unit for operating in extremely cold environmental conditions where heat is necessary to warm the electronics.

Figure 4-1. Press "1" on the "on/off" switch (left) to turn on the sampler.

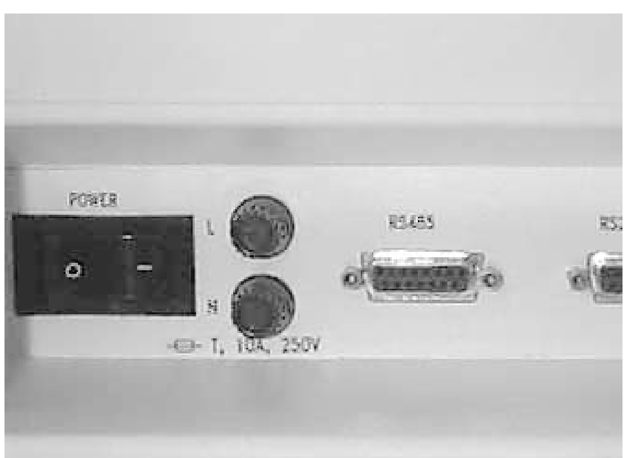


Figure 4-2. Title screen.

```
       Partisol-Plus
  Model 2025 Sequential Air Sampler

  Version: 1.202   Date: 8-Dec-98

 Copyright 1998
 Rupprecht & Patashnick Co., Inc.
```

RDfault	RData			Reset	

4.2. Title Screen

The Title screen momentarily appears on the sampler’s display to identify the model number of the unit and the revision number of the installed software (Figure 4-2). During the time that the sampler displays this screen, the user has a chance to reset the unit by pressing the appropriate keys on the keypad (Section 13).

4.3. Main Screen

After a few seconds, the Title screen is automatically replaced by the Main screen (Figure 4-3). This screem shows summary information regarding the sampling program currently defined by the user, the current operating mode, the existence of any status conditions and certain operational information. The sampler displays the following fields on the Main screen:

Status Code — The value of the status code in the upper left-hand corner of the Main screen (next to Stat) indicates whether the unit is operating properly (Section 7). A value of “OK” indicates that all functions are proceeding normally.

Operating Mode — The sampler displays the current operating mode in the upper right-hand corner of the Main screen (next to Mode). Press <RUN/STOP> to switch between the Stop and Wait Operating Modes (Section 5.1).

Figure 4-3. Main screen.

```
Stat:OK   Partisol 2025   Mode:Stop
  Current Time: 09:27 98/07/23
  Start Sample: 00:00 98/07/24
   Stop Sample: 00:00 98/07/25
     Filter ID:  123456
          Flow:   0.0 l/min
        Volume:   000.00 m^3
  Help | Stats | FiltSet | Data | Setup |
```

Current Time/Date

The local time and date are displayed next to Current Time on the second line of the Main screen. Press <F5: Setup> from the Main screen to enter the Sample Definition Setup screen (Section 5.2). From the Sample Definition screen, press <F5: System> to reach the System Setup screen. While in the System Setup screen, input the local time and date before initiating a sampling program. The Partisol-Plus Sampler expresses time as “hh:mm” and dates as “yy/mm/dd” by default. Users may change these formats in the System Setup screen (Section 5.2).

Start Sample

The start time displayed next to Start Sample indicates the time and date at which the sampler is currently programmed to begin sample collection (hh:mm yy/mm/dd by default). Press <F5: Setup> from the Main screen to enter the Sample Definition Setup screen (Section 5.2). With the unit in the Stop Operating Mode (Section 5.1), the user can change the start sample time and date from this screen.

Stop Sample

The stop time displayed next to Stop Sample indicates the time and date at which the sampler is currently programmed to stop sample collection (hh:mm yy/mm/dd by default). Press <F5: Setup> from the Main screen to enter the Sample Definition Setup screen (Section 5.2). With the unit in the Stop Operating Mode (Section 5.1), the user can change

the stop sample time and date from this screen by changing or editing the Default Sample Duration field.

Filter ID — This field displays the filter identification number for the filter that is in the sampling position. The filter number displayed at the top of the screen will automatically track the Filter IDs in the sequence entered in the Filter List screen.

Flow — This field displays the current sample flow rate. Press <F5: Setup> from the Main screen to enter the Sample Definition Setup screen (Section 5.2). With the unit in the Stop Operating Mode (Section 5.1), the user can change the flow rate from this screen.

Volume — This field displays an automatic calculation of the volume of air drawn through the sampler. The volume calculation depends upon how long the sampler has run.

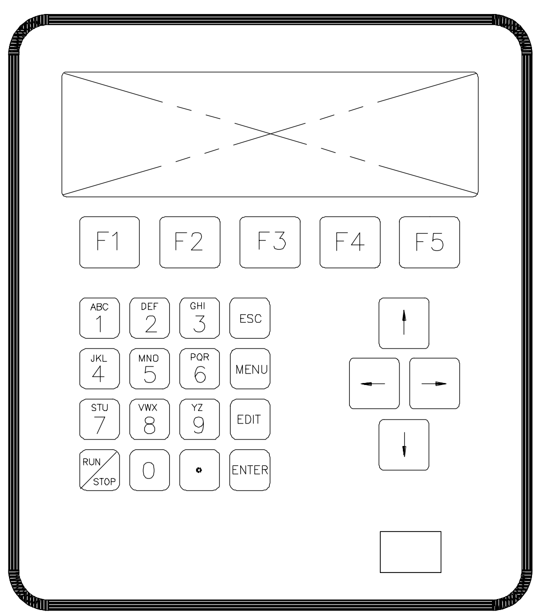


Figure 4-4. The Partisol-Plus Sampler's display/keypad.

The function keys (soft keys) labeled “F1” to “F5” activate the commands shown on the bottom line of almost every screen in the system. The following parts of this section describe how to navigate among the system’s software screens, and how to switch between the “Browse Mode” and “Edit Mode” to change the system’s parameters.

4.4. Navigating Among Screens

✔ Use the function keys to drop down by one layer in the structure of screens. Pressing <ESC> returns the user to the next highest level.

The system software allows the user to navigate easily through the use of soft function keys (<F1> to <F5>) and the <ESC> key (Figure 4-4). From the Main screen, press <F1: Help>, <F2: Stats>, <F3: FiltSet>, <F4: Data> or <F5: Setup> to drop down one level in the screen structure (Figure 4-6). Pressing the <ESC> key causes the current display to be replaced by the next higher screen in the hierarchy. For example, pressing <ESC> when in the Filter Setup screen returns the user to the Main screen. The definition of the soft function keys changes as different screens appear on the display and different functions are required. Appendix A contains an overview of all screens included in the Partisol-Plus software.

Many screens allow the user to change the value of system parameters. The <EDIT> key causes the sampler to leave the Browse Mode and enter the Edit Mode. This interaction with the sampler is described in the following parts of this section. Press <ESC> to exit the Edit Mode while in any screen.

Figure 4-5. Time Base Filter Setup screen with two menu lines in the browse mode.

```
Stat:OK      Filter: 01        Mode:STOP
        Current Time: 15:34 98/07/23
        Start Sample: 00:00 98/07/24
         Stop Sample: 12:00 98/07/24
           Filter ID: P 123456
         Cassette ID: RP100123
              Blank:  No
```

Help	Prev	Next	FiltLst	*More*

Function Keys in Browse Mode

Help	Prev	Next	FiltLst	*More*
	Reset	+ Hour	+ Day	*Back*

Function Keys in Edit Mode

-List	+List	Bksp		

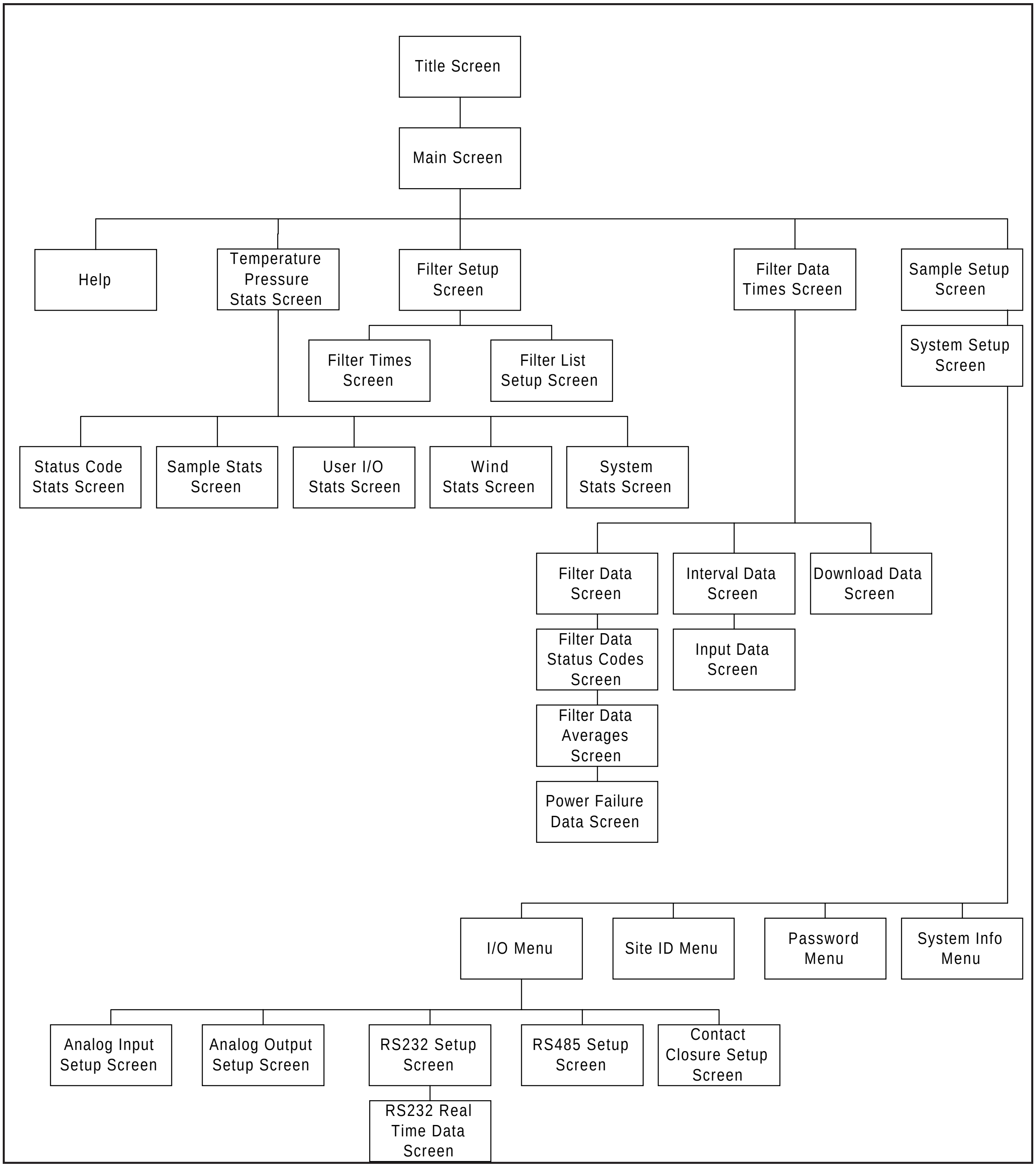


Figure 4-6. Hierarchy of screens.

Certain displays such as the Time Base Filter Setup screen (Figure 4-5) contain the contain the <F5: *More*> key, which indicates that additional options exist for this screen. Pressing <F5: *More*> causes the additional (extended) menu options to appear on the bottom line of the display shown as a second line of options in Figure 4-5. To distinguish between the selections available from the main and second lines of the menu, the function keys in the first line are designated by <F1> to <F5> in this manual's instructions, while the second line contains the titles <F6> to <F10>. Press <F10: *Back*> when in the second menu line to return to the main menu line.

4.5. Master Menu

The Master Menu provides another means of gaining access to other screens in the unit's software. It can sometimes provide a more direct route to other program screens than negotiating the hierarchy of screens using regular soft function keys.

Press <MENU> to display the Master Menu screen (Figure 4-7). This screen does not contain any fields that can be changed or edited. Press the arrow keys (<↓> and <↑>) to view the soft function key options available for the categories listed. Press the desired soft function key to make a selection, or <ENTER> in the absence of any soft function key definitions. Refer to Appendix A for the soft function key choices and the screens that you can access from the Master Menu.

Do *not* select "Service Mode" from the Master Menu unless you need to access this operating mode (Section 14).

Press <ESC> to return to the Main screen from the Master Menu screen without making any selection.

Figure 4-7. Master menu.

```
        Master Menu
> Status Codes
  System Status
  Sampling Setup
  Data Storage
  System Setup
  Service Mode
StCode |      |      |      |      |
```

4.6. Edit Mode

The unit is normally in the Browse Mode, which allows the user to move from screen to screen with ease. In a number of screens, however, the user may want to change the unit's operating parameters. In such a case, the user must enter the Edit Mode.

Press <EDIT> to enter the Edit Mode from the Browse Mode. If the current screen does not contain any fields that can be changed or edited in the current operating mode, the unit displays a message to inform the user. In such a case, the user must return the sampler to the Stop Operating Mode by pressing <RUN/STOP> before attempting to enter the Edit Mode in the desired screen.

Appendix B contains a complete list of program register codes (PRCs). These codes describe the unit's parameters and variables that are available for viewing and retrieval. The column labeled "Edit Modes" indicates the operating modes in which the user may edit the value of a specific parameter. Many operating parameters such as Current Time and Date can only be changed when the monitor is not sampling, i.e., when it is in the Stop Operating Mode. The "Range" column indicates the allowable range of the program register code.

The System Setup screen contains a number of fields that can be changed (Figure 4-8). Press <F5: Setup> twice when in the Main screen to enter the System Setup screen. Because the System Setup screen contains fields that can be changed or "edited,"

Figure 4-8. System Setup screen.

```
      System Setup
Average Temp: 99      Standard Temp: 99
Average Pres: 999     Standard Pres: 999
Date Form: YY/MM/DD   Average Time: 30
Time Form:       :    Filter Fan: ON
Curr Time: 05:00:00   Auto Run: ON
Curr Date: 98/04/10
```

Help	I/O	Site ID	Passwd	SysInfo	
Function Keys in Browse Mode					
Help	I/O	Site ID	Passwd	SysInfo	
Function Keys in Edit Mode					
-List	+List	Bksp	ChSign		

Figure 4-8 displays a second set of soft function key definitions that are active only when the unit is in the Edit Mode.

✔ The cursor changes shape when the sampler enters the Edit Mode.

After pressing <EDIT> to enter the Edit Mode, the cursor changes shape; it changes from an *underline* when it is in the Browse Mode to a *large square* shape when the monitor is in the Edit Mode.

Press the arrow keys (<↑>, <↓>, <←> and <→>) to select the field to be edited.

✔ Use the arrow keys to move from one field to another while remaining in the Edit Mode.

In the Edit Mode, many screens, such as the System Setup screen (Figure 4-8), contain soft function keys that will decrease (<-List>) and increase (<+List>) the value of the parameter currently being edited. These keys *repeat* when held down, and also *accelerate* to a faster decrementing or incrementing speed when depressed for a longer period of time.

Users may also enter numeric values directly from the keypad. The <Bksp> (back-space) soft function key erases the previously typed character when in the Edit Mode.

To change the sign of numeric values (to make a positive number, negative or a negative number, positive), use the “ChSign” key that is available on many screens in the Edit Mode. To use this feature, first input the required number and then press the <ChSign> soft function key.

Times are expressed as “hours:minutes:seconds” by default, and can be edited using the <-List> and <+List> keys, or through direct keypad entry. For the purposes of editing, the time variable is split into three separate fields: hours, minutes, and seconds. Use the arrow keys on the keypad (<←> and <→>) to move from one part of the time variable to another.

Dates are expressed as “year/month/day” by default, and are edited as three separate parts using the <-List> and <+List> soft function keys or through direct keypad entry. Use the arrow keys on the keypad (<←> and <→>) to move from one part of the date variable to another.

✔ Leave the Edit Mode by pressing <ENTER> to save changes, or <ESC> to disregard changes.

To edit multiple parameters while remaining in the Edit Mode, press the arrow keys on the keypad after making each change. This moves the cursor to a new field and keeps the Partisol-Plus Sampler in its Edit Mode.

The following two keystrokes cause the software to leave the Edit Mode and return to the Browse Mode:

<ENTER>	Changes made while in the Edit Mode are retained, and the monitor returns to the Browse Mode.
<ESC>	Changes made while in the Edit Mode are *not* retained, and the monitor returns to the Browse Mode.

The cursor reverts to its *underline* shape when the unit returns to the Browse Mode.

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Section 5: Software Setup and Operation

This section describes the parameter settings in the software screens that affect the sampler's basic operation and sample programming. It also describes the unit's operational modes. Do not attempt the procedures described in this section until carrying out the steps in Sections 2, 3 and 4. Appendix A contains all of the sampler's screens, and Appendix B provides a listing of the unit's program register codes (PRCs).

5.1. Modes of Operation

The Partisol-Plus Sampler displays its current operating mode in the upper right-hand corner of the Main screen (Figure 4-3), and certain other screens. Press <RUN/STOP> to switch between the non-sampling Stop Operating Mode and the sampling program execution modes (Wait, Sampling, Audit, Done, Error). In certain cases, the user must select <STOP> after pressing <RUN/STOP> to re-enter the Stop Operating Mode. The unit's operating modes are defined as follows (Figure 5-1):

Stop Mode — In the Stop Operating Mode (STOP), the user defines the sampling program using the Sampling Setup screen and the Filter Setup screens (Sections 5.3.1-5.3.5). Because this is the only non-operational mode, all user-definable system parameters may be edited with the sampler in this state.

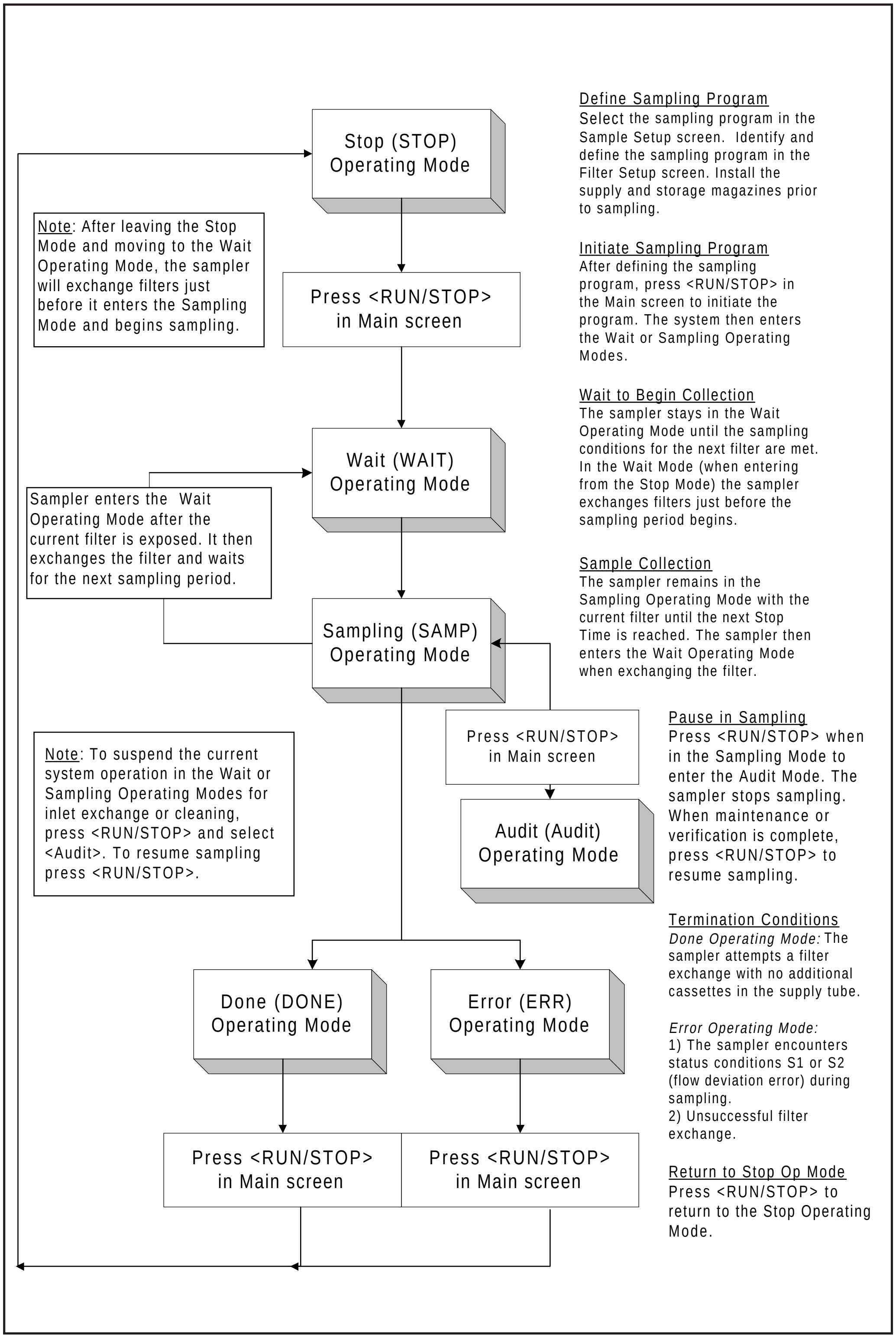
NOTE: It is *not* necessary to return to this mode to exchange filter cassette magazines. They can be swapped while the device is sampling.

Pressing <RUN/STOP> with the unit in this mode causes the sampler to advance to the Wait or Sampling Operating Modes.

Wait Mode — The Partisol-Plus Sampler resides in the Wait Operating Mode (WAIT) until the user-defined sampling conditions are met for the next filter to be exposed. At that point, the unit automatically enters the Sampling Operating Mode and begins sample collection.

When the sampler moves from the Stop Mode to the Wait Mode, it does not automatically exchange filters. The sampler will wait until the Start Sampling Time occurs and then just before it begins sampling, it will exchange filter cassettes and begin sampling. However, when the unit completes a sample and transfers to the Wait or Done Mode, it will exchange filters just as it moves from the Sampling Mode to the Wait or Done Mode.

Figure 5-1. Overview of operating modes.



Pressing <RUN/STOP> when in the Wait Operating Mode offers the user the choice of entering the Audit Operating Mode (for exchanging or cleaning the WINS impactor) or the Stop Operating Mode.

Sampling Mode

While in the Sampling Operating Mode (SAMP), the sampler is currently in a user-defined sampling interval. Except in the case of Advanced or Episodic sampling with conditions, the unit will draw a continuous air flow through the sample path when the proper sampling conditions are met. The unit controls the sample stream at the volumetric flow rate specified by the user (16.7 l/min by default). Unless the sample flow rate deviates from its set point by 10% for more than 5 minutes, the sampler remains in this mode until the stop sampling conditions are met. If the sample flow rate deviates from this set point, the unit will enter the Error Mode (ERR) and it will stop sampling. The software will register an "S1" Status Code and the light on top of the unit will turn on and remain on until the user resets the unit.

Pressing <RUN/STOP> when in the Sampling Operating Mode offers the user the choice of entering the Audit Operating Mode (for exchanging or cleaning the WINS impactor) or the Stop Operating Mode.

Once the stop sampling conditions are met, the sampler attempts to exchange filter cassettes. If no additional filter cassettes are present in the filter cassette supply magazine, it switches to the Done Operating Mode; otherwise, the hardware returns to the Wait Operating Mode prior to initiating the next sample.

Done Mode

The sampler enters the Done Operating Mode (DONE) if the filter cassette supply magazine runs out of filter cassettes. Pressing <RUN/STOP> with the unit in this mode causes the sampler to return to the Stop Operating Mode.

The unit will continue to sample until all filter cassettes are used, except when a critical error condition is encountered (Section 7).

Error Mode — The sampler proceeds to the Error Mode (ERR) under two status conditions:

- The measured flow deviates from its set point by 10% for 5 minutes, causing the unit to break off sampling and display status code “S1” (Section 7.1).

- The sampler detects a hardware error in attempting a filter exchange, signified by status code “X” (Section 7.2).

Pressing <RUN/STOP> with the unit in the Error Operating Mode causes the sampler to return to the Stop Operating Mode.

Audit Mode — The Audit Operating Mode takes the unit off line and allows the user to exchange or clean components in the sampling train, such as the WINS impactor. Leak checks and flow verifications (Section 12) can also be done with the sampler in the Audit Mode.

When in the Wait or Sampling Modes, press <RUN/STOP> and select <F1: Audit>. At this point, the sampler will suspend all regular operations until you complete your audit. After the audit is complete, press <RUN/STOP> to resume regular operations.

To prepare for an audit, remove the supply magazine containing sampled filters and replace it with a clean audit magazine. After you have pressed <RUN/STOP> and then selected <F1: Audit>, the unit will display its Main screen. While in the Main screen, press the <MENU> key. This will bring you to the Master Menu screen. From the Master Menu screen, press <F3:Audit> and then <F2: FiltAdv> to advance the sampling filter out of the sampling position. The magazine containing the single current sampling filter should be moved to the supply magazine position and an empty storage magazine installed in the storage position. Once you have completed your exchanging or cleaning procedures, press <F2: FiltAdv> to move the sampling filter back into the sampling position. Remember to install new sampling filters in the supply magazine and remove the audit filter cassette from the storage magazine. Press <RUN/STOP> to resume sampling. Press <ESC> to display the Main screen. Section 12 describes the maintenance and verification procedures in detail.

NOTE: Fundamentally, filter cassette magazines may be exchanged when the sampler in any operating mode because the exchange procedure does not affect the sampling train. But if the unit is about to perform a filter cassette exchange

or if it is performing episodic sampling, it is advisable to enter the Audit Operating Mode when exchanging magazines.

5.2. Setup Screens

The unit's Setup screens set the global default sampling parameters for the numerous programming options available. The Sample Setup screen allows the user to set default sampling parameters. The System Setup screen defines whether the sampler uses the default Ambient Temperature and Pressure settings, or Standard Temperature and Pressure settings for maintaining and reporting flow rates in volumetric or standard terms. The System Setup screen also can be used to set the sampler to the current local time and date.

5.2.1. Sample Setup Screen

The Sample Setup screen allows the user to define global sampling parameters for the operation of the Partisol-Plus Sampler, such as the sample definition method (default programming method), the default sample start time and duration, the default repeat time and filter type and the default sample flow rate and flow error mode.

The parameters in this screen can be edited while the unit is sampling. However, the changes that are inputted while the unit is sampling will not take effect until the user presses the <ENTER> button. At this point, the system is no longer in Edit Mode, the changes are saved and the unit begins to sample using the changed parameters.

Press <F5: Setup> when in the Main screen (Figure 4-3) to enter the Sample Setup screen (Figure 5-2). All of the fields in the Sample Setup screen can be edited when the sampler is in the Stop Operating Mode. Pressing <F2: Set EPA> will display a screen prompt, "Do you want to set up default sample conditions to USEPA standard?" Pressing <F1: Yes> in this screen will automatically set up the sampler's defaults in the Basic sampling program to EPA network requirements for continuous sampling. At this point, if you press <ESC> to return to the Sample Setup screen, you will see that the unit's default parameters will all be set to EPA sampling requirements.

The following fields make up the Sample Setup screen:

Sample Definition Method	This parameter allows the user to select the type of sampling program. Basic, Time Base, Time2 Base, Advanced, Episodic and RS232. Basic 24-hour continuous sampling is the unit's default setting. Press <+List> or <-List> in the Edit Mode to access the sampling program selections. Sampling programs are described in Section 5.3.

Default Sample Start	The Default Sample Start time is used to set the default starting time for the selected sampling program in hh:mm. 00:00 is the system default for this parameter. When editing this parameter, treat each part of the time as a separate field.
Default Sample Duration	This parameter allows the user to select the sampling duration for the selected sampling program in hhh:mm. The default for this parameter is 024:00. When editing this parameter, treat each part of the time as a separate field.
Default Sample Repeat Time	The Default Sample Repeat Time parameter will allow you to pause the unit while it is running in the continuous operation mode, offsetting the sample start time. For example, if you wanted the unit to sample for 24 hours every three days, you would set this field to 72 hours. The unit will then sample 24 hours, wait 48 hours and then sample again for 24 hours. This cycle will repeat each time a filter is advanced into sampling position. If you don't want to offset the sample start time, you would set this parameter equal to the Default Sample Duration. For example, if you wanted the unit to sample for 24

Figure 5-2. Sample Setup screen.

```
 Sample Definition Method:    Basic
 Default Sample Start Time:    00:00
  Default Sample Duration:    024:00
Default Sample Repeat Time:    024:00
       Default Filter Type:      P
          Sample Flow Rate:     16.7
Flow Error Mode: Err   Separators: No
```

Help	Set EPA			System	
Function Keys in Browse Mode					
Help	Set EPA			System	
Function Keys in Edit Mode					
-List	+List	Bksp	ChSign		

	hours, advance to the next filter and then sample for another 24 hours, you would set the Default Sample Repeat Time and the Default Sample Duration to 024:00.
Default Filter Type	This parameter allows the user to identify the filter type. The default for this parameter is “P” (EPA Filter). The user can select another alphabetic character by pressing <+List> or <-List> while in the Edit Mode to identify another filter type as the default filter.
Sample Flow Rate	The default flow rate parameter determines the sample flow rate (volumetric l/min). Typically 16.7 l/min is entered in this field.
Flow Error Mode	The Flow Error Mode parameter has two modes: WAIT and ERR. If the Flow Error Mode parameter is set in the WAIT Mode and the sampler shuts down automatically because of a critical flow error S1 (Section 7.1), the sampler will exchange a filter and resume sampling at the next programmed sample start time. If the Flow Error Mode parameter is set to the ERR Mode and the sampler shuts down because of a critical flow error, the sampler will not exchange a filter or resume sampling. ERR is the default condition for this parameter.
Separators	If you want to do speciation sampling, you would use the Separators field. The “No” value in this field will select all filters as either sampling filters or blanks (Section 5.3.7). A “Yes” value will exchange a filter cassette before each sampling filter in a sampling run. If you choose the “Yes” value, you should install a solid filter leak check/separator disk (36-004768) in each filter cassette that is intended to be used as a separator. Cassettes should be stacked in the supply magazine so that the topmost filter cassette, and then every other filter cassette, has a separator disk. Do not use sampling filters as separators.

NOTE: When in the Edit Mode, use the arrow keys (<↑>, <↓>, <←> and <→>) to select the field that you want to edit. After you have finished editing the fields, press <ENTER> to save your changes.

.

5.2.2. System Setup Screen

The System Setup screen allows the user to define global parameters for the operation of the Partisol-Plus Sampler, such as the current time and date, and default time and date formats, and to set up the sampler for remote RS232 operation. Most of the parameters in this screen can be edited only in the sampler's Stop Operating Mode (Section 5.1).

Press <F5: Setup> when in the Sample Setup screen (Figure 5-2) to enter the System Setup screen (Figure 5-3). All of the fields in the System Setup screen can be edited when the sampler is in the Stop Operating Mode.

The following fields make up the System Setup screen:

Average Temp — The Average Temperature (°C) is used by the sampler to maintain the proper volumetric sample flow rate. The default value of Average Temperature is 99, indicating that the

Figure 5-3. System Setup screen.

```
      System Setup
Average Temp: 99    Standard Temp:  99
Average Pres: 999   Standard Pres: 999
Date Form: YY/MM/DD   Average Time:  30
Time Form:         :    Filter Fan: ON
Curr Time: 05:00:00      Auto Run: ON
Curr Date: 98/04/10
```

Help	I/O	Site ID	Passwd	SysInfo	

Function Keys in Browse Mode

Help	I/O	Site ID	Passwd	SysInfo	

Function Keys in Edit Mode

-List	+List	Bksp	ChSign		

	unit should use the reading from the external temperature sensor to maintain a constant volumetric flow rate.
Standard Temp	The Standard Temperature (°C) is used by the sampler to report flow rate results in standard terms. The default setting for Standard Temperature is 99, which may need to be changed to match conventions in different parts of the world. The default setting for Standard Temperature does not have any effect on the volumetric flow rate and actual volume calculations by the unit.
Average Pres	The Average Pressure (mm Hg) is used by the sampler to maintain the proper volumetric sample flow rate. The default value of Average Pressure is 999, indicating that the unit should use the reading from the sampler's ambient pressure sensor to maintain a constant volumetric flow rate.
Standard Pres	The Standard Pressure (mm Hg) is used by the sampler to report the flow rate results in standard terms. The default setting of Standard Pressure is 999. The default setting for Standard Pressure does not have any effect on the volumetric flow rate and actual volume calculations by the unit.
Date Form	The Date Form determines the form in which the sampler displays dates. The default value is yy/mm/dd. The Partisol Plus Sampler makes the following choices available: yy/mm/dd (default) mm/dd/yy dd/mm/yy
Average Time	The Average Time parameter defines the sample averaging and storage interval (min) for the input data records (Section 8.3). The default value of this parameter is 30 minutes, meaning that input data values are averaged over 30 minute periods and stored every 30 minutes.
Time Form	The Time Form determines the form in which the sampler displays time. The default is hh:mm:ss. The unit also allows time to be displayed as hh.mm.ss.
Filter Fan	This parameter controls the filter fan. If this field is set to "ON," the filter fan will run continously. If this field is set to "AUTO," the filter fan will only initiate if the temperature of

the filter and ambient air differs by 2° C. If the Filter Fan field is set to “OFF,” the filter fan will not initiate at all. When you set this field to “OFF,” the filter temperature range error code (that initiates the filter fan in the “AUTO” setting) will be disabled.

Curr Time — The Curr Time parameter is the current local time (or other standard time selected by the user) expressed by default as hh:mm:ss. When editing this parameter, treat each part of the time as a separate field.

Auto Run — If no keys are pressed for 3 hours and the Auto Run feature is “ON,” the unit will automatically enter the Wait or Sampling Mode.

Curr Date — The Curr Date parameter is the current local date expressed by default as yy/mm/dd. When editing this parameter, treat each part of the date as a separate field.

The System Setup screen also provides access to the sampler’s input and output capabilities, password protection settings (Section 11), site identification information and system information.

5.2.3. Site Identification Screen

The Site Identification screen (Figure 5-4) has two 32-character fields. The user can enter site identification numbers using one or both fields. If no entry is made in these fields then no site identification numbers will appear in the sampler’s data output from this screen.

Remote operation of the sampler and data download is programmed from the System Setup screen (Figure 5-3). While in the System Setup screen press <F2: I/O> which takes you to the A/I Setup screen. In this screen, press <F3: RS232> to display the RS232 Setup screen. Pressing <F3:SetPRC> (program register code) from the RS232 Setup screen displays the RS232 Real Time Data screen. Setting up the sampler with the correct parameters for RS232 communication is discussed in Section 9.

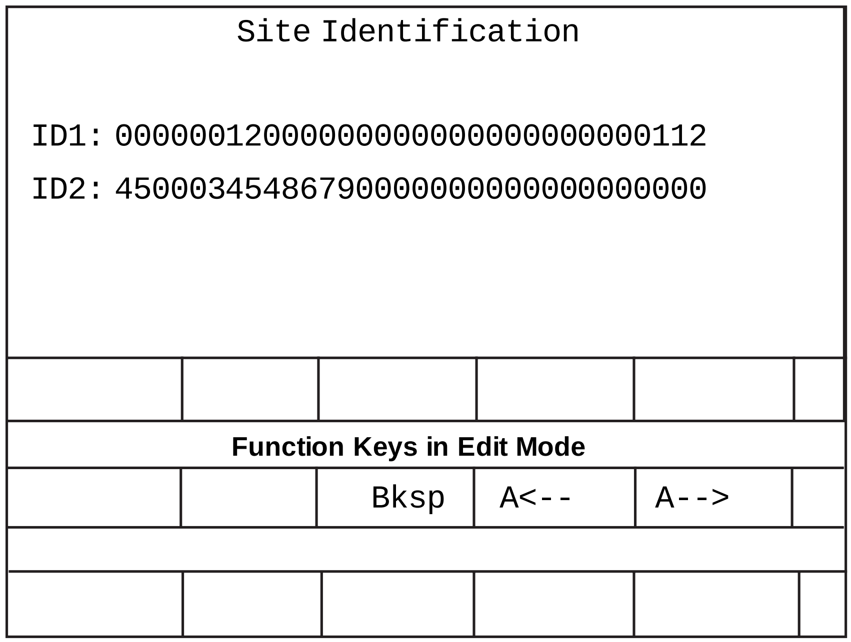


Figure 5-4. Site Identification screen.

5.2.4. System Information Screen

The only field that can be edited in the System Information screen (Figure 5-5) is the sampler serial number. This screen displays the following configuration information:

Software Version	The revision of the operating software currently loaded in the sampler.
Software Date	The revision date (dd-mm-yy) of the operating software currently loaded in the sampler.
Serial Number	The serial number of the Partisol-Plus Sampler. The user may edit this field.
Filter Exchange	The type of filter exchange mechanism built into the Partisol-Plus Sampler. The unit's system software automatically determines the type of installed sampling system. The possible values of this parameter are as follows:

MANUAL
SINGLE
DICHOT

Figure 5-5. System Information screen.

```
      System Information
Software Version:   1.202
  Software Date:  8-Dec-98
  Serial Number:   10019
Filter Exchange:  SINGLE
  Int Board Rev:     1
    Flow Type 1:    20
```

Function Keys in Browse Mode					
Function Keys in Edit Mode					
-List	+List	Bksp			

Int Board Rev — This field contains the revision level of the interface board installed in the Partisol-Plus Sampler. The system's software automatically detects the value of this parameter.

Flow Type 1 — This field contains the type of flow controller installed in flow channel 1. The value of this parameter is 20 for a 0-20 l/min flow controller.

5.3. Filter Setup Screens

The Sample Definition Method selected in the Sampling Setup screen (Figure 5-2) provides a straightforward means of defining the sampling program. Available programs are Basic, Time, Time2, Advanced, Episodic and RS232 Sampling. All of these sampling programs except the RS232 displays a filter setup screen accessed from the Main screen, which includes the default parameters set in the Sample Setup screen. The RS232 sampling program does not have a filter setup screen. If RS232 is selected as the sampling method, the filter list will display when <F3: FiltSet> is pressed from the Main screen. Section 9.2 describes setting up the sampler for remote RS232 operation.

Press <F3: FiltSet> when in the Main screen (Figure 4-3) to enter the Filter Setup screen. Only one of the Filter Setup screens described in Sections 5.3.1-5.3.5 will display depending on the Sample Definition Method selected by the user in the Sample Setup screen (Section 5.2.1). For example, if Basic was selected in the Sample Definition field, then the Basic Filter Setup screen will display when you press <F3: FiltSet> from the Main screen. The Filter List screen (Section 5.3.7) is accessible from all of the Filter Setup screens. The parameters in this screen can be edited while the unit is sampling. However, the changes that are inputted while the unit is sampling will not take effect until the user presses the <ENTER> button. At this point, the system is no longer in Edit Mode, the changes are saved and the unit will begin to sample using the changed parameters *with the next filter*. The changed parameters will not effect the filter that is currently in sampling position.

5.3.1. Basic Filter Setup Screen

The Basic Filter Setup program is the most commonly used sampling program. In this program, the sampler changes filter cassettes and samples continuously for the same duration with each filter until there are no more filter cassettes available in the supply magazine.

Figure 5-6. Basic Filter Setup screen.

```
Stat:OK    Filter Setup   Mode:STOP
                Start Date: 98/07/24

 The Current Time is: 15:34 98/07/23
Sample will start at: 00:00 98/07/24
Each sample will collect for 024:00 hours
```

Times	+ Day	NextDay	FiltLst	Next Hr	
Function Keys in Browse Mode					
Times	+ Day	NextDay	FiltLst	Next Hr	
Function Keys in Edit Mode					
-List	+List	Bksp			

The Basic Filter Setup screen (Figure 5-6) uses the following fields to define the Basic sampling program of the Partisol-Plus Sampler:

Start Date	The Start Date parameter determines the date (yy/mm/dd by default) on which sampling on the first filter sample will begin. The first filter sample is the topmost filter in the supply magazine. When editing this parameter, treat each part of the date as a separate field.
The Current Time	The current time and date is displayed in this field.
Sample will start at	This parameter defines the time of day that the Partisol-Plus will begin sampling on each individual filter cassette. This start time by default is the time selected in the Sample Setup screen.
Each sample will collect	This parameter displays the sampling duration in hours. The sampler will use the default duration from the Sample Setup screen.

Sampling is always continuous in Basic Filter Setup unless a Repeat Time offset was selected in the Sample Setup screen. The Partisol-Plus will automatically begin and end sampling according to the start time and sample collection time displayed in the Basic Filter Setup screen. During sampling, the screen will show the conditions for the next filter that is waiting to be moved into sampling position. The screen will not show the conditions for the filter that is currently in the sampling position.

In this screen, the <F5: Next Hr> soft key allows the user to quickly start a 24-hour sample at the top of the next hour.

5.3.2. Time Base Filter Setup Screen

The Time Base Filter Setup screen (Figure 5-7) will display if the Sample Definition Method in the Sample Setup screen was entered as “Time.” The Time Base Sequential Sampling program allows the user to set a time interval for sequential sampling. For example, if the user selected 00:00 for Start Sample and 12:00 as End Sample times as shown in Figure 5-8 for filter #1, the sampler would start sampling at midnight and stop at noon. You must program the Start Sample and End Sample times for each filter in the filter cassette magazine or the unit will sample according to the default settings that are entered in the Sample Setup screen (Figure 5-2).

Figure 5-7. Time Base Filter Setup screen.

```
Stat:OK      Filter: 01        Mode:STOP
         Current Time: 15:34 98/07/23
         Start Sample: 00:00 98/07/24
          Stop Sample: 12:00 98/07/24
            Filter ID: P 123456
         Cassette ID: RP100123
               Blank: No
```

Help	Prev	Next	FiltLst	*More*

Function Keys in Browse Mode

Help	Prev	Next	FiltLst	*More*
	Reset	+ Hour	+ Day	*Back*

Function Keys in Edit Mode

-List	+List	Bksp		

The Time Base Filter Setup screen contains the following fields to define the Time Base sampling program of the Partisol-Plus Sampler:

Filter — The Filter field identifies the filter that is in sampling position by default. Pressing <F3:Next> will allow the user to program each filter in the magazine with a unique Time Base start and end time.

Current Time — The current time and date are displayed in this field.

Start Sample — The Start Sample parameter defines the time and date that the Partisol-Plus will begin sampling for the filter number displayed in the Filter field at the top of the screen. When editing, treat each part of the time and date as a separate field.

Stop Sample — The Stop Sample parameter defines the time and date that the unit will stop sampling for the filter number displayed in the Filter field. When editing, treat each part of the time and date as a separate field.

Filter ID — This field displays the Filter ID (filter identification) number for the filter that is in sampling position. The Filter number displayed at the top of the screen will automatically track the

Filter ID numbers in the sequence entered in the Filter List screen. The Filter ID number also can be entered for each sampling and blank filter in this screen.

Cassette ID

This field displays the Cassette ID (cassette identification) number for the filter that is in sampling position. The Filter number displayed at the top of the screen will automatically coincide with the Cassette ID numbers in the sequence entered in the Filter List screen. The Cassette ID number also can be entered for each sampling and blank filter in this screen.

Blank

This parameter is either “Yes” or “No,” and it defines whether the Filter number at the top of the screen is intended to be used as a sampling filter or a blank filter. The sequence for sampling filter and blank filter cassettes can be most conveniently set in the Filter List screen. The sequence also can be selected in this screen by pressing <+List> while in the Edit Mode to change this parameter from “No” to “Yes.” If you set this parameter to “Yes” in the Time Base Sequential Sampling screen, the first filter will be a blank filter and the next filter advanced by the sampler will be the sampling filter.

In the Browse Mode, the soft function keys <F2: Prev> and <F3: Next> are used to move to the previous or next filter number. The <F4: FiltLst> key displays the Filter List screen (Section 5.3.7). Pressing <F5: *More*> will access the <F6> to <F10> function keys. The <F7: Reset> key will reset current settings for all filters to their default settings as defined in the Sample Setup screen. The <F8: +Hour> and <F9: +Day> keys are used to increment the Start Sample or Stop Sample times by one hour or one day respectively. Pressing <F10: *Back*> will restore the original <F1> to <F5> functions. In the Edit Mode, the soft function keys are <F1: +List>, <F2: -List> and <F3: Bksp>.

NOTE: If the Partisol-Plus has been programmed for fewer sampling cycles than available filter cassettes in the supply magazine, the unit will continue to sample using the entered program(s) *and then revert to the default sampling program.* Sampling will continue with any additional filter cassettes using the default program settings as entered in the Sample Setup screen.

5.3.3. Time 2 Base Sampling Screen

The Time 2 Base Sampling screen (Figure 5-8) will display if “Time 2” was selected as the Sample Definition Method in the Sample Setup screen (Figure 5-2). Selecting this program allows the user to sample for two different scheduled intervals on the same sampling filter. This feature will turn the sampling flow on at the beginning of the sample run, stop sampling for the programmed period of time, and resume sampling on the same filter for another programmed interval.

The Time 2 Base Sampling screen contains the following fields to define the sampling program of the Partisol-Plus Sampler:

Filter — The Filter field identifies the filter that is in sampling position. Pressing <F3: Next> will allow the user to program each filter in the magazine with a unique Time 2 Base program.

Current Time — The current time and date are displayed in this field.

Start Time 1 — The Start Time 1 parameter defines the time and date that the Partisol-Plus will begin sampling for the filter number displayed in the Filter field at the top of the screen. When editing, treat each part of the time and date as a separate field.

Figure 5-8. Time 2 Base Setup screen.

```
Stat:OK    Filter: 01   Mode:STOP
       Current Time: 15:34  98/07/23
     Start Time       Stop Time
1: 00:00 98/07/15   06:00 98/07/15
2: 12:00 98/07/15   18:00 98/07/15
Filter ID: P 123456   Blank:  No
  Cass ID: RP100123
```

Help	Prev	Next	FiltLst	*More*

Function Keys in Browse Mode

Help	Prev	Next	FiltLst	*More*
	Reset	+ Hour	+ Day	*Back*

Function Keys in Edit Mode

-List	+List	Bksp		

Stop Time 1	The Stop Time 1 parameter defines the time and date that the unit will stop sampling for the filter number displayed in the filter field. The sampler will not exchange a filter at Stop Time 1, but will stop sampling until Start Time 2. When editing, treat each part of the time and date as a separate field.
Start Time 2	The Start Time 2 parameter defines the time and date that the Partisol-Plus will resume sampling on the filter number displayed in the filter field at the top of the screen. When editing, treat each part of the time and date as a separate field.
Stop Time 2	The Stop Time 2 parameter defines the time and date that the unit will stop sampling for the filter number displayed in the filter field. The Stop Time 2 instructs the sampler to end the sampling run, exchange a filter and advance to the program for the next filter number. When editing, treat each part of the time and date as a separate field.
Filter ID	The Filter ID in this screen has the same definition as in the Time Base Filter Setup screen (Section 5.3.2).
Cass ID	The Cass ID in this screen has the same definition as in the Time Base Filter Setup screen (Section 5.3.2).
Blank	The Blank in this screen has the same definition as in the Time Base Filter Setup screen (Section 5.3.2)

In the Time 2 Base Sampling program, Start Time 1 and Stop Time 1 must always be less than Start Time 2 and Stop Time 2. The Time 2 Base Sampling screen has the same <F1> to <F10> function keys as the Time Base Filter Setup screen. The sampler will continue to sample on all filter cassettes in the supply magazine using the programmed parameters.

5.3.4. Advanced Filter Setup Screen

The Advanced Filter Setup screen will display if "ADV" was selected as the Sample Definition Method in the Sample Setup screen. The Advanced Filter Setup screen (Figure 5-9) provides access to additional sample programming parameters beyond the standard time-based sampling capabilities of the Partisol-Plus Sampler. The user can select up to three conditions that must be met for sampling to take place. The unit will flow ambient air through the filter if the conditions are met, and discontinue the flow if the conditions are not met without advancing a filter during the programmed sampling duration.

The Advanced Filter Setup screen contains the following parameters:

Filter — The Filter field identifies the filter in the sampling position. Pressing <F3:Next> will allow the user to program each filter in the magazine with a unique Advanced sampling program.

Current Time — The current time and date are displayed in this field.

Start Sample — The Start Sample parameter defines the time and date that the Partisol-Plus will begin sampling for the filter number displayed in the Filter field at the top of the screen. When editing, treat each part of the time and date as a separate field.

Stop Sample — The Stop Sample parameter defines the time and date that the unit will stop sampling for the filter number displayed in the Filter field. When editing, treat each part of the time and date as a separate field.

Cond, Min, Max — The Partisol-Plus Sampler allows you to use the values of up to three input variables to control conditional sampling. These three terms (Condition, Minimum and Maximum) are joined together as “and” functions to form

Figure 5-9. Advanced Filter Setup screen.

```
Stat:OK     Filter: 01         Mode:STOP
    Current Time: 15:34 98/07/23
    Start Sample: 00:00 98/07/24
     Stop Sample: 00:00 98/07/25
Cond:  TEMP   %RH   -----  | ID: P 1234556
Min:   25.00  40.00  0.00  | Cass: RPxxxxxx
Max:   55.00  85.00  0.00  | Blank:   No
```

Help	Prev	Next	FiltLst	*More*
Function Keys in Browse Mode				
Help	Prev	Next	FiltLst	*More*
	Reset	+Hour	+ Day	*Back*
Function Keys in Edit Mode				
-List	+List	Bksp		

the circumstances under which sampling takes place. A value of “------” for the Condition parameter indicates that a particular term is not used.

The permissible values of the Condition parameter are as follows:

------	Condition not used
TEMP	Current ambient temperature (°C)
PRES	Current ambient pressure (mm Hg)
%RH	Current relative humidity (%)
WNDSPD	Current wind speed (km/h)
WNDDIR	Current wind direction (deg)
AI1 Current	A/I 1 (engineering units)
AI2 Current	A/I 2 (engineering units)
AI3 Current	A/I 3 (engineering units)
AI1AVE	Average A/I 1 (engineering units)
AI2AVE	Average A/I 2 (engineering units)
AI3AVE	Average A/I 3 (engineering units)
%FLOW	Sample flow rate (l/min)

The Minimum and Maximum parameters define the range for each condition during which sampling should take place.

No conditional sampling takes place if the value of all three Condition parameters is “------.”

(Filter) ID — This field displays the Filter ID numbers for the available filters as entered in the Filter List screen (Section 5.3.7). The Filter number displayed at the top of the screen will automatically track the Filter ID numbers in the sequence entered in the Filter List screen. The Filter ID number also can be entered for each sampling and blank filter in this screen.

Cassette ID — The Cassette ID in this screen has the same definition as in the Time Base Filter Setup screen (Section 5.3.2).

Blank — The Blank in this screen has the same definition as in the Time Base Filter Setup screen (5.3.2).

With the values entered in the Advanced Filter Setup screen as shown in Figure 5-9, sampling on Filter 01 will begin any time after midnight on July 24, 1998, when the ambient temperature is between 25° and 55° C and the relative humidity is between

40% and 85%. The sampler will continue to flow ambient air through the sampling filter as long as both conditions are met. The sampler will stop the flow through the filter at any time that either condition is not met. The sampler will cycle the ambient air flow through the filter on and off for the duration of the sampling run depending upon the ambient conditions. The filter will be exchanged at the programmed Stop Sample time regardless of the sampling conditions at that moment. The filter also will be exchanged regardless of the sampling conditions that occurred during the last programmed sampling duration.

It is possible that a filter will not have ambient air flowing through it at all during its programmed sampling duration. If the sampling conditions are not met during a programmed sampling duration, and the filter does not have any ambient air flowing through it, the filter will still be exchanged at the programmed Stop Sample time.

Press <F7: Reset> in the Advanced Filter screen to reset the conditional sampling parameters to their “off” values (“------” for Condition, and “0” for minimum and maximum values). All other function keys in the Advanced Filter Setup screen have the same function as those keys in the Time Base Sampling screen.

5.3.5. Episodic Sampling Setup Screen

The Episodic Sampling Setup screen will display if “EPISOD” is selected as the Sample Definition Method in the Sample Setup screen (Figure 5-2). The Episodic Filter Setup screen (Figure 5-10) provides access to additional conditional sample programming parameters. The user can select up to three conditions that must be met for sampling to take place. The unit will sample if the conditions are met, and then stop sampling and exchange a filter when those conditions are no longer met. Sampling will begin on the new sampling filter only when conditions are again met. With Episodic sampling, there is no set sampling cycle for a given filter, rather the sampler itself is given a duration during which the sampling on an undetermined number of filters will take place.

The Episodic Sampling Setup screen contains the following parameters:

Current Time	The current time and date are displayed in this field.
Start Event Capture	The Start Event Capture parameter is the start time for the sampler to determine if conditions met. The air flow through the sampling filter will start as soon as the conditions are met.
Stop Event Capture	The unit will stop sampling and enter the Done Mode when the current time equals the Stop Event Capture time.

Cond, Min, Max	The unit allows you to use the values of up to three input variables to control conditional sampling. These three terms (Condition, Minimum and Maximum) are joined together as “and” functions to form the circumstances under which sampling takes place. A value of “------” for the Condition parameter indicates that a particular term is not used.

The permissible values of the Condition parameter are identical to the conditions found in the Advanced Filter Setup screen (Section 5.3.4). With the values entered in the Episodic Sampling screen shown in Figure 5-10, the sampler will begin sampling at midnight if the ambient temperature is between 25° and 55° C and the RH is between 40% and 75%. The unit will continue to sample on this filter as long as these conditions are met, until the Stop Event Capture time. If either of these conditions are not met during the interval between the Start Event Capture and Stop Event Capture times, the sampler will enter the Wait Mode and advance a new filter into the sampling chamber. Sampling will begin again only if the temperature and relative humidity conditions are within the Min and Max values. This sampling and filter exchange cycle will continue until the supply magazine is empty or until the Stop Event Capture time. The unit will then enter the Done Mode until reprogrammed.

Figure 5-10. Episodic Sampling Setup screen.

```
Stat:OK     Episodic Setup       Mode:STOP
Current Time: 15:34 98/07/23
Start Event Capture: 00:00 98/07/24
 Stop Event Capture: 00:00 98/07/25
Cond:  TEMP   %RH   -----
 Min: 25.00  40.00  0.00
 Max: 55.00  75.00  0.00
```

Help	+Hour	+Day	List A	Reset	
Function Keys in Browse Mode					
Help	+Hour	+Day	List A	Reset	
Function Keys in Edit Mode					
-List	+List	Bksp			

5.3.6. RS232 Program Mode

If you select “RS232” as the Sample Definition Method in the Sample Setup Screen (Figure 5-2), the unit will not display a Filter Setup screen. When RS232 is selected in the Sample Setup screen, the <F3: FiltSet> soft function key in the Main screen will display the Filter List Setup screen (Figure 5-11). In the RS232 program, the sampler operates according to the present value of Program Register Code 319 (Appendix B). Program Register Code 319 will transmit the following values to the sampler:

0	Stop Sampling (Sampling Not Active)
1	Exchange Cassette and Start Sampling
2	Activate Sampling (Sampling Active)

5.3.7. Filter List Setup Screen

The Filter List Setup screen is accessible from any of the Filter Setup screens (Figures 5-6 to 5-10) by pressing <F4: FiltLst>. The Filter List Setup screen (Figure 5-11) allows the user to enter the serial numbers of the filters and the cassettes used for sampling and to identify which filters in the series are to be used as blank filters. Although Filter ID numbers and Cassette ID numbers can be entered in the Filter Setup screens, the Filter List Setup screen is the most convenient means of entering a series of Filter and Cassette ID numbers. This screen also allows the user to select filters as blank filters. EPA monitoring network filters have serial numbers imprinted on the filter. R&P

Figure 5-11. Filter List Setup screen.

Type		Filt ID	Cassette ID	Blank	
1:	P	001123	RP 100001	No	/ \
2:	P	001124	RP 100002	No	
3:	P	001125	RP 100003	Yes	
X:	P	001126	RP 100004	No	
X:	P	001127	RP 100005	No	
16:	P	001138	RP 100016	No	\ /

	FiltSet	Copy	Insert	Delete	

Function Keys in Browse Mode

	FiltSet	Copy	Insert	Delete	

Function Keys in Edit Mode

-List	+List	Bksp			

cassette screens are serialized (have serial numbers imprinted on them) for cassette identification.

The Filter List Setup screen includes the following parameters:

Filter Number	The filter numbers 1-16 in this field identify the filter cassette according to all of the parameters listed below.
Type	This parameter identifies the filter type such as P for an EPA supplied filter. The user can select another alphabetic character to identify different filter types. The default parameter for this field is “P.”
Filt ID	This parameter is used to enter the filter’s serial number. Press <EDIT> to edit the Filter ID field. Scroll down to the first number in the series to be edited and enter the serial number of the filter in the Filter ID column, press <ENTER>. Press <F3: Copy> and follow the instructions in the display. This will automatically increment the entered number for the remaining 15 filters in the series. Press <F4: Insert> to insert a number in the series, or <F5: Delete> to delete a filter serial number. If the ID number is “0,” the sampler will automatically assign a filter identifier.

NOTE: If you select <F5: Delete> to delete a filter, the unit will display a Warning/Confirmation screen that will ask you to confirm the filter deletion.

Cassette ID	This parameter is used to enter the filter cassette screen serial number. Scroll down to the first number in the series to be edited and enter the serial number of the filter cassette screen in the filter cassette. Cassette ID numbers are entered, incremented and edited in the manner described above for Filter ID numbers.
Blank	The Blank field indicates whether the filter is to be used as a blank filter. If this parameter is set to “Yes,” at the end of the previous sampling cycle the filter will advance from the supply magazine to the storage magazine. The next filter in the series after the blank filter will advance to the sampling position for sampling. Blank filters can be used as the EPA required storage filter.

Filter cassettes should be loaded into the magazine from top to bottom to match the sequence of Filter and Cassette ID numbers entered in the Filter List Setup screen. When the separator field in the Sample Setup screen is selected, the sampler *only counts sampling filters* in the Filter field at the top of many of the Filter Setup screens. There is no filter ID or cassette ID associated with separator cassettes. Blanks on the other hand will have either the user or sampler assigned filter and cassette ID numbers. The Filter field tracks blank filters and sampling filters.

5.3.8. Filter Times Screen

The Filter Times screen is accessible from the Basic Filter Setup screen (Figure 5-6) only if “BASIC” is selected as the Sample Definition Method in the Sample Setup screen (Figure 5-2). Press <F1: Times> while in the Filter Setup screen to enter the Filter Times screen (Figure 5-12). This screen is used mainly as a troubleshooting screen to help users know when their unit actually will begin and end sampling on each of the filters in the supply magazine. However, you may use the screen as a basic reference tool (while your unit is functioning properly) to be sure that your unit is correctly programmed to sample at the times that were set in the Sample Setup screen (Section 5.2.1).

To view all of the starting and ending times for each filter in the filter list, press the <↓> arrow.

The Filter Times screen contains the following parameters:

Start — This column displays the beginning sampling times for each filter in the filter list.

Figure 5-12. Filter Times screen.

```
     Start          Stop
Cur  17:15 99/06/08 17:16 99/06/08
1.   17:15 99/06/08 17:16 99/06/08
2.   17:18 99/06/08 17:19 99/06/08
3.   17:21 99/06/08 17:22 99/06/08
4.   17:24 99/06/08 17:25 99/06/08
5.   17:27 99/06/08 17:28 99/06/08   \/
```

Stop	This column displays the ending sampling times for each filter in the filter list.
Curr	This row contains the beginning and ending times that the unit is scheduled to sample on the filter that is in the sampling position.
1-16	These rows contain the beginning and ending times that the unit is scheduled to sample on the filters in the filter cassette magazine.

5.4. Turning Off the Partisol-Plus Sampler

Follow the steps below to turn off the hardware:

- If the device is *not* in the Stop Operating Mode, press <RUN/STOP> to enter the Stop Operating Mode.
- Press the power switch on the front panel of the Partisol-Plus Sampler into its “off” (0) position (Figure 4-1).

5.5. Automatic Switching of Edit Modes and Screens

The Partisol-Plus Sampler takes a number of actions automatically during periods of inactivity:

- Any time more than 15 minutes pass since the last keystroke was entered on the keypad, the backlighting of the LCD (liquid crystal display) dims. When this occurs, press any key to reactivate the screen’s backlighting.
- If the sampler is left in the Edit Mode for more than 5 minutes without any user keystrokes, it automatically reverts to the Browse Mode.
- Whenever the sampler remains in a screen other than the Main screen for longer than 15 minutes without any user keystrokes, the unit automatically reverts to the Main screen.
- If no keys are pressed for 3 hours and the Auto Run feature (in the System Setup screen) is “ON,” the unit will automatically enter the Wait or Sampling Mode.

5.6. Operation After Power Failure

The Partisol-Plus Sampler performs the following actions upon resumption of power if a power failure occurs while the sampler is in its Sampling Operating Mode:

- If the power outage is longer than 60 seconds, the hardware registers a “Z” status condition (Section 7.1) and stores the starting time and date of the power failure in the current record of filter data (Section 8.1).

- If ending sampling conditions are not yet reached for the filter that is in sampling position upon resumption of the power supply, the sampler continues its sampling program in the Sampling Operating Mode. The “Z” status condition will be retained in the filter data record. Otherwise, depending upon how much time has passed, the unit will perform a filter exchange until it reaches the next filter scheduled to sample. It then either begins sampling or enters the Wait Operating Mode to await the start of the next sequential sample. If the unit begins sampling, the “Z” status condition will be retained in the current record of filter data. However, if the unit enters the Wait Operating Mode, the unit will automatically clear the “Z” status condition.

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Section 6: Sampler Operation

This section explains how to verify your sampler's performance characteristics prior to starting a sampling run, programming a sampling run for midnight-to-midnight, 24-hour continuous sampling, and retrieving data after a sampling run in the field. Users who will not be sampling on a continuous 24-hour cycle should refer to Section 5.3 for programming instructions. Read Sections 7 through 12 prior to field operation.

6.1. Sampling Verification

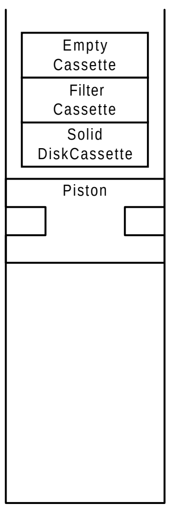

Figure 6-1. Loaded audit magazine.

R&P recommends that the tests described below be performed *after every four weeks of routine operation.* However, individual monitoring organizations may abide by different standards. Refer to the U.S. EPA 2.12 Quality Assurance Handbook, Section 8 for EPA verification schedule requirements. Refer to Section 12 of this manual for more detailed information on sampler performance verification.

Follow these steps to verify sampler performance characteristics prior to starting, or during, a sampling run:

1) **Create an audit magazine (Figure 6-1). Install a supply magazine with an empty cassette (no screen), an external leak check cassette (with a 47mm filter) and an internal leak check cassette (with a solid filter leak check/separator disk) into an empty supply magazine. The empty cassette should be in the topmost position as shown in Figure 6-1. Install the audit magazine in the left side of the enclosure and a clean empty storage magazine on the right side of the enclosure to collect the partially exposed sampling filter (Section 3).**

Figure 6-2. Audit Confirmation screen.

```
Stat: OK     Partisol-Plus    Mode: WAIT

      Do you want to AUDIT or STOP?

          Please choose:

Audit | Stop |  |  | Resume |
```

Figure 6-3. Partisol-Plus Audit screen.

```
                    Audit
Filt Temp: 22.5  |      Set Flow: 16.7
 Amb Temp: 22.6  |      Cur Flow: 16.68
 Amb Pres:  752  |      FTS Pres:  0.00
  Amb %RH:   75  |      FTS Flow:  0.00
                 |      FTS Const m: 0.000
Timer: 00:00:00         FTS Const b: 0.000
 Pump  |  Valve  |      | FiltAdv | LeakChk |
```

2) WINS impactor maintenance and performance verification can be performed while in the Stop, Wait or Sampling Modes. If the unit is in the Stop Mode, press <RUN/STOP> twice to enter the Audit Mode. If the unit is in the Wait or Sampling Modes, press <RUN/STOP> once to enter the Audit Mode. The unit then will display the Audit Confirmation screen (Figure 6-2). Press <F1: Audit>, and then press any key to continue.

✘ Be sure to select <F1: Audit> in the Audit Confirmation screen if you are performing an audit from the Sampling Mode.

NOTE: The Audit Confirmation screen also will give you the option to select <F2: Stop> or <F5: Resume>, in addition to <F1: Audit>.

IMPORTANT: If you are performing an audit from the Sampling Mode and you choose <F2: Stop> in the Audit Confirmation screen, the unit will not resume sampling (after your audit procedures are finished) at the set points that you previously entered. The unit will advance its sampling cycle to the next day and then enter the Wait Mode.

Press <MENU>, make sure that “>Audit” is selected and then press <ENTER>. This will display the Audit screen (Figure 6-3). Press <F4: FiltAdv> and wait for the filter exchange to occur. If the Partisol-Plus was previously in the sampling mode, a partially exposed sampling filter will advance into the empty storage magazine, and the empty cassette will move into the sampling chamber.

2) Remove the 1st stage inlet and the sample tube by pulling straight up on the sample tube. Unlatch and open the sampler’s top cover. Pull straight up to remove the WINS impactor (Figure 6-4).

3) Verify the sampler’s filter temperature by inserting an external

Figure 6-4 (Left). Removing the WINS Impactor.

Figure 6-5 (Right). Inserting the temperature probe into the sampling chamber.

thermometer into the sampling chamber as shown in Figure 6-5. Compare the measured temperature (°C) with the Filt Temp displayed in the Audit screen. If the measured temperature and Filt Temp readings are not within ± 2° C of each other, perform the filter temperature calibration procedure described in the Service Manual.

4) **Verify the sampler's ambient temperature by measuring the current temperature (°C) at the ambient temperature sensor using an external thermometer. Compare the measured temperature (°C) with the Amb Temp displayed in the Audit screen. If the measured temperature and Amb Temp readings are not within ± 2°C of each other, perform the ambient temperature calibration procedure described in the Service Manual.**

5) **Verify the sampler's ambient pressure by measuring the current ambient station pressure in mm Hg with an external measurement device. Verify that the value for ambient pressure displayed in the Audit screen is within ±10 mm Hg of the measured barometric pressure. If this is not the case, the sampler requires recalibration. Refer to the Service Manual.**

6) **Unscrew the middle section of the WINS impactor to expose the impactor assembly. Remove the impactor assembly, and replace it with a clean, oiled impactor assembly (Figure 6-6). Place the impactor assembly into the bottom section of the WINS impactor, and screw the top onto the bottom of the WINS impactor. Ensure that the WINS impactor remains in an upright orientation, and reinstall the impactor in the sampler by pressing downward.**

Figure 6-6. Upper and lower sections of the impactor assembly.

Lower the top cover and re-latch it. Install the downtube, pressing down until it hits a stop.

7) **Perform an external leak check. Install the flow audit adapter on the sample downtube, and close the valve on the flow audit adapter. Press <F5: LeakChk>, <F2: Start>, and follow the instructions displayed on the screen. A “Pass” or “Fail” message will display at the end of the leak check cycle. If a “Fail” message is displayed, refer to Section 10.1.6.**

8) **Verify the sampler’s flow. If you are using a Streamline FTS Flow Transfer Standard, remove the flow audit adapter and install the FTS on the sample tube. Confirm that the FTS “m” and “b” calibration constants are entered in the Audit screen. Other flow meters may require the use of the flow audit adapter (valve open) to measure flow.**

   Press <F5: Audit> to enter the Audit screen. Confirm that 16.7 l/min is the set flow in the Set Flow field. Press <F1: Pump> and then <F2: Valve>. Wait for the flow rate displayed in the Cur Flow column to stabilize. If you are using the FTS, press <EDIT>, enter the pressure drop (inches H_2O) from the FTS display, and then press <ENTER>. The sampler will calculate and display the FTS volumetric flow. Press <F2: Valve> and then <F1: Pump> to turn off the pump. The measured flow should be within ± 5% of the displayed Cur Flow. If this is not the case, the sampler requires calibration (see Service Manual).

9) **Perform an internal leak check. Press <F4:FiltAdv> to move the cassette with the solid filter leak check/separator disk into the sampling position. Press <F2: Start>, and follow the instructions**

on the screen. A "Pass" or "Fail" message will display at the end of the leak check cycle. If a "Fail" message is displayed, refer to section 12.1.8.

10) **Remove the audit magazine from the supply position. Place the partially exposed sampling cassette (from the audit magazine) in the topmost position of a loaded supply magazine. Connect the air hose to the supply magazine. Press <F4: FiltAdv> to move the partially exposed sampling filter into the sampling position. The internal leak check cassette will advance to the storage magazine. Remove this cassette from the storage magazine and install an empty storage magazine as described in Section 3.4.1.**

11) **Replace the 1st stage inlet on the sample tube by pressing down until it hits a stop. Press <ESC> twice to return to the Main screen. Press <RUN/STOP> to resume sampling.**

6.2. Programming the Sampler

This section describes the procedures for programming the sampler for a sampling run. A supply magazine with the desired number of conditioned 47 mm filters in cassettes (including blank filter cassettes or separator disk cassettes) should be installed in the left side of the enclosure and a clean empty storage magazine should be installed on the right side of the enclosure. Refer to Section 5 for more detailed information on programming the sampler.

Follow these steps to program the sampler for a sampling run:

1) **Press <F3: FiltSet> to display the Basic Filter Setup screen then press <F4: FiltLst>. Press <EDIT>, then enter the filter ID numbers and the cassette (screen) ID numbers in the appropriate fields (Section 5.3.7). A blank (storage filter) can also be selected in the Filter List Setup screen. When you are finished inputting all filter and cassette ID numbers, press <ENTER> to save your changes.**

2) **If the sampler was programmed for 24-hour, midnight-to-midnight, continuous sampling as the default program, it is not necessary to reprogram the sampler. If this is the case, go to step 4. If it was not programmed for 24-hour, midnight-to-midnight, continuous sampling as the default program, go to step 3.**

3) **The sampler must be in the Stop Mode to enter a new sampling program. In the Main screen, press <F5> twice to display the**

System Setup screen. Confirm that the sampler is set to the correct time and date. If not, press <EDIT>, enter the correct data and press <ENTER>. Confirm that the Site ID is correct by pressing <F3: SiteID>. Edit and enter the site ID if necessary. Press <ESC> twice to display the Sample Setup screen. EPA default conditions (midnight-to-midnight, continuous, 24-hour sampling) can be set by pressing <F2: Set EPA>, and following the instructions in the display.

4) **If the sampler is in Stop Mode, press <RUN/STOP>. The sampler will enter the Wait Mode. A filter cassette will advance automatically into the sampling chamber and begin the sampling run at the programmed start time. If the sampler was in the Wait or Sampling Mode, it will continue in that mode according to the programmed sampling cycle. At the end of the 24-hour sampling run, the Partisol-Plus Sampler will move the sampled filter into the storage magazine, and advance a new filter into the sampling chamber. The sampler will continue to move filters and sample until there are no more filter cassettes in the supply magazine. When the supply magazine is empty, the sampler will enter the Done Operating Mode.**

NOTE: There are two critical sampling conditions that will cause the sampler to change from the Sampling Mode into the Error Mode: 1) If the measured flow rate deviates from its set point by ≥10% for more than 5 minutes (status condition "S1"), the sampler will shut down and enter the Error Mode, and 2) Should a filter exchange error occur due to an error in the exchange process (status condition "X"), the sampler will display ERR in the upper right-hand corner of the Main screen. The Error Mode causes the sampler to shut down until the user presses <RUN/STOP> and enters a new sampling program. Any time either of these conditions occurs during a sampling run, the status light on the outside of the enclosure will flash continuously to alert the user to a critical status condition. Refer to Section 7 for a more complete description of error codes.

6.3. Post-Sampling Verification and Data Retrieval

This section explains how to verify the sampling run status and retrieve the sampling run data. Refer to Sections 8, 9 and 10 for more complete information on verification and data retrieval.

Follow these steps to verify the sampling run status and retrieve the sampling run data:

1) **Data can be displayed on the screen or downloaded to a personal computer (PC) while in the Stop, Sampling, Done, Error or Audit Modes. Cassette magazines can be changed in any mode (except at the time selected for a filter change).**

2) **If the sampler has not been previously set up for data transfer to a PC, check the RS232 setup in the System Setup screen. Press <F5:Setup> twice from the Main screen to display the System Setup screen.**

3) **In the System Setup screen, press <F2: I/O>, and then <F3: RS232>. Make sure that the parameter in the Protocol field is set correctly for the file transfer software installed in the PC (refer to Section 9 for setting RS232 parameters). Press <ESC> three times to return to the Main screen.**

4) **Connect the PC to the sampler with the 9-to-9 pin RS232 cable. Use RPComm or any other data transfer program to transfer data from the sampler to the PC. Refer to Appendix D for instructions on how to load the RPComm software into your PC, and refer to Section 10 for instructions on how to use RPComm to transfer data from the unit to your PC.**

5) **Check the sampling run status on the Main screen, and note any status code other than "OK." Press <F4: Data> to view the filter data from the sampling run. Record data from the Filter Data screen onto a sampling run log sheet if desired. If there were any status codes other than "OK," verify the validity of the sampling run by pressing <F3: MoreDat>, until the Filter Data Status Codes screen appears. Press <ESC> until you return to the Main screen.**

6) **Press <F5: Setup> twice from the Main screen to display the System Setup screen. Press <F2: I/O>, then <F3: RS232> to enter the RS232 Setup screen. Set the Protocol field to "Storage." To save this change, press <ENTER>. Press <ESC> until you return to the Main screen. Press <F4: Data> to display the FIlter Data screen. The record from the last sampling run is displayed in the upper right-hand corner of the Filter Data screen. Press <F5: DwnLoad> to display the Download Data screen. Scroll to the Last Rec Field, and use the <F4: Last> key to select the *last data record.* Press <F1: First> to acccess the first Rec Field and use the <F2: -Ptr> or <F3: +Ptr> to select *the first data record* you want to download. Once the PC communications software is**

ready to receive the records, press <F5: Start>. The sampler will download all data from the currently displayed record to the last record in the data file. If you need to download output for Interval data, Status Codes or any of the other screens accessed from the Filter Data screen, display the screen and repeat the download process.

7) If any Status Code conditions occurred, press <ESC> to return to the Main screen. From the Main screen, press <F2: Stats>, then <F1: StCode> to reach the Status Codes screen. While in this screen, press <F3: MoreDat> to display the Status Codes screen. Press <F1: Reset> to reset the Status condition for the next run to "OK."

8) Remove and cap the storage magazine containing the sampled filters. Place the capped magazine in a metal transport container. Make sure that a loaded supply magazine and empty storage magazine are installed in the sampler before the scheduled start of the next sampling run.

Section 7: Operating Information

This section describes the status codes generated by the Partisol-Plus Sampler, and the operating information contained in the Operating Statistics screens. Refer to Appendix A for a detailed hierarchy of screens.

7.1. Status Codes

✔ The sampler displays the current status code in the upper left-hand corner of the Main screen and several other screens.

✔ The current status code is made up of one or more single- or double-letter abbreviations, or “OK.”

The sampler displays operational status codes in the upper left-hand corner of the Main screen (Figure 4-3), and on several other screens. The unit shows a status of “OK” if no current status conditions exist. The sampler resets the status code to “OK” when it exchanges filter cassettes.

With the occurrence of any status conditions, the unit will display the single- or double-letter abbreviation for the situation that applies. The sampler also provides secondary indicators of the unit’s current status conditions through the use of two status lights. One light is located next to the I/O connectors inside the unit’s enclosure. The other light is mounted on the outside enclosure, and located on the top left side of the unit. If the unit’s current status code is “OK,” the indicator lights do not light up. If the unit reports a noncritical status code, it will turn on the lights. If the unit reports a critical status code, the lights will blink on and off continuously.

The Status Codes screen (Figure 7-1) displays a list and description of the currently active status conditions. When in the Main screen, press <F2: Stat> and then <F1: StCode> to enter the Status Codes screen.

Figure 7-1. Status Codes screen.

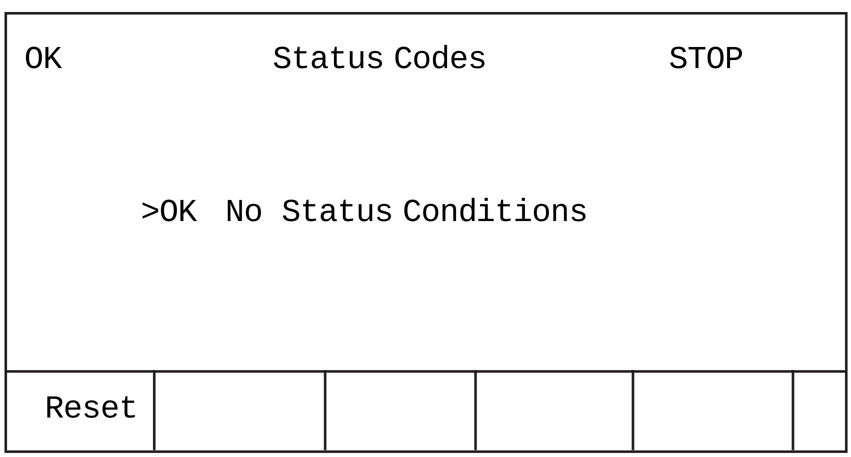

Figure 7-2. Filter Exchange screen.

```
        Filter Exchange     Step: ------
Valves        Stat:   Ok         1    2
Pressure: OFF Pump:OFF   NewFilt: OFF  OFF
Shuttle: OFF             LiftUp:  ON   OFF
MagPres: OFF    Shuttle  LiftDn:  OFF  OFF
LiftPush: OFF   Rdy:ON   PushDn:  ON   OFF
                Ext:OFF  PushUp:  OFF  OFF
```

ON/OFF	AmbFilt	FlowVal	Start	Misc	
Function Keys in Browse Mode					
ON/OFF	AmbFilt	FlowVal	Start	Misc	
Function Keys in Edit Mode					
-List	+List	Bksp			

The following list details the system's status codes and definitions:

OK *No current status conditions.*

M *Flash Memory*. The sampler detected an error in its flash memory.

C *Calibration*. A failure occurred in the sampler's automatic analog input calibration routine.

Y *System Reset*. The system performed an unanticipated reset.

Z *Power Failure*. A power outage occurred during sampling on the current filter. Power outage events of less than 60 seconds are not logged by the sampler.

F *Flow Out of Range*. The measured sample flow rate through the flow channel deviated by ±5% from its set point for more than 5 minutes.

S1 *Flow Stop*. The measured sample flow rate through the flow channel deviated by ±10% from its set point for more than 5 minutes. This is a *critical status condition*, causing the sampler to enter the Error or Wait Operating Mode (Section 5.2.2) and the status lights to blink continuously.

✔ A heater in the sampler's electronics compartment ensures that the control zone stays within limits under cold temperature conditions.

A *Ambient Sensors*. The ambient temperature sensor was not installed correctly or indicated an invalid value. For ambient temperature, this corresponds to a reading of less than -60° C or greater than 70° C.

T *Filter Temperature*. One of the filter compartment temperature sensors was not installed correctly or was out of range, i.e., less than -60° C or greater than 70° C.

E *Electronics Temperature*. The temperature of the unit's electronics compartment was outside of its usual operating range, i.e., less than 0° C or greater than 70° C.

R1 *Filter Temperature Range*. The measured temperature of the filter exceeded the measured ambient temperature by more than 5° C for more than 30 consecutive minutes.

X *Filter Exchange Failed*. The sampler encountered a mechanical problem in attempting to exchange a filter cassette. This is a *critical status condition*, causing the sampler to enter the Error Operating Mode (Section 5.1) and the status lights to blink continuously.

O1 *Coefficient of Variation 1*. The coefficient of variation of the sample flow rate, expressed as a percentage, was greater than 2 (2%) during the exposure of a filter.

P *Elapsed Sample Period*. For sampling programs of ≥12 hour duration without conditional sampling, the sampler issues this status code if the elapsed time of a sample differed by ±1 hour from the selected duration. Sampling programs of less than 12 hours will not indicate an elapsed time error.

L *Leak Check Failed.* This error code will appear if the leak check failed. A leak check fails if the vacuum created in the sampling system leaks at a rate of 25 mm Hg or greater, which is equal to the maximum leak rate of 80 ml/min that is indicated as acceptable by the U.S. EPA.

D *Audit Performed.* This status condition indicates to the user that an audit was performed during sampling. It does *not* indicate an error. It is for information purposes only. This status code appears only in the filter data screen.

N *No filters.* This status condition indicates that there are no filters left in the supply magazine.

In the case of multiple status conditions, the sampler displays the single- or double-letter codes for each status condition in the status field of the Main screen, and other screens that have a status condition field. For example, the sampler would display “ZR1” in the status condition field if a power outage occurred and if its filter temperature was outside of the acceptable range.

The unit stores all status conditions that apply to each exposed filter in the filter data storage buffer (Section 8.1).

7.2. Operating Statistics Screens

The Partisol-Plus Sampler contains five screens that display operating statistics: the Temperature and Pressure Statistics screen, User I/O Statistics screen, Sample Statistics screen, Wind Statistics screen and the System Statistics screen. These can be accessed from the Main screen (Figure 4-3) by pressing <F2: Stats> to enter the Temperature and Pressure Statistics screen. From this screen, you can access the Sample Statistics screen by pressing <F2: Sample>, the User I/O Statistics screen by pressing <F3: User IO>, the Wind Statistics screen by pressing <F4: Wind>, and the System Statistics screen by pressing <F5: System>.

7.2.1. Temperature and Pressure Statistics Screen

The Temperature and Pressure Statistics screen (Figure 7-3) displays information on various current and average temperatures, and the current and average pressure and relative humidity. Press <F2: Stats> when in the Main screen, or <F1: TmpPres > when in any of the other statistics screens, to enter the Temperature and Pressure Statistics screen.

Figure 7-3. Temperature and Pressure Statistics screen.

```
Stat:OK  Temp/Pressure  Mode:SAMPLE
                   Current  Average
  Filter Temp:       25.8     21.2 C
Filter Comp Temp:    25.4     21.1 C
 Ambient Temp:       25.8     21.1 C
 Ambient Pres:       751      748 mmHg
  Ambient %RH:       72       68%

 StCode | Sample | User IO | Wind | System |
```

The Temperature and Pressure Statistics screen contains the following information:

Filter Temp	This field contains the current and latest averaged values of the filter temperature (°C).
Filter Comp Temp	This field contains the current and latest averaged temperature (°C) in the sampler's filter compartment.
Ambient Temp	This field contains the current and latest averaged values of the ambient temperature (°C), as measured by the external temperature sensor.
Ambient Pres	This field contains the current and latest averaged values of the ambient pressure (mm Hg), as measured by a sensor located inside the sampler enclosure.
Ambient %RH	This field contains the current and latest averaged values of the ambient relative humidity (%), as measured by a sensor located in the ventilated filter compartment.

Press <ESC> to return to the Main screen from the Temperature and Pressure Statistics screen.

7.2.2. Sample Statistics Screen

The Sample Statistics screen (Figure 7-4) provides information about the flow, volume and sampling time through the currently installed sampling filter in the Partisol-Plus Sampler. The Filter and Cassette ID numbers for this filter are also displayed. Press <F2> twice from the Main screen, or <F2: Sample> from the Temperature and Pressure Statistics screen, to enter the Sample Statistics screen.

The Sample Statistics screen contains the following information:

Flow Setpoint	This field contains the flow rate set point (volumetric l/min).
Current Flow	This field contains the current flow rate (volumetric l/min).

Volume	This field contains the sample volume (volumetric m^3) drawn through the currently installed filter.
Elapsed Sample Time	This field contains the elapsed sample time in hh:mm of the currently installed filter.
Current Filter ID	This field contains the serial number of the currently installed filter as entered into the Filter List Setup screen or as assigned by the Partisol-Plus.
Current Cassette ID	This field contains the serial number of the currently installed filter cassette screen as entered in the Filter List Setup screen or assigned by the Partisol-Plus.

Press <ESC> to return to the Main screen from the Sample Statistics screen.

Figure 7-4. Sample Statistics screen.

```
Stat:OK   Sample Stats      Mode:SAMP
               Flow Setpoint:  16.7 l/min
                Current Flow:  16.7 l/min
                      Volume:   004.30 m^3
         Elapsed Sample Time:   4:18
           Current Filter ID:   P 123456
         Current Cassette ID:   RP100123

TmpPres |         | User IO | Wind    | System |
```

7.2.3. USER I/O STATISTICS SCREEN

The User I/O Statistics screen (Figure 7-5) displays the analog inputs and the digital outputs of the Partisol-Plus. The averages correspond to the values computed over the latest completed averaging/storage interval, as defined by the Average Time parameter in the System Setup screen (Section 5.2).

Press <F3> from any of the statistics screens to enter the User I/O Statistics screen.

The User I/O Statistics screen contains the following information:

Analog Inputs 1, 2, 3	This field contains the current and latest averaged values of user defined analog inputs 1, 2 and 3

(engineering units). Refer to Section 9 for additional information.

Logic Outputs 1, 2 — This field contains the current values of user-defined logic outputs 1 and 2 (VDC). Refer to Section 9.4 for additional information on logical output settings.

Press <ESC> to return to the Main screen from the User I/O Statistics screen.

Figure 7-5. User I/O Statistics screen.

```
Stat:OK          User I/O       Mode:SAMP
                Current    Average
Analog Input 1:  +0000.00   +0000.00
Analog Input 2:   +000.00   +0000.00
Analog Input 3:  +0000.00   +0000.00
Logic Output 1:    000
Logic Output 2:    000

TmpPres | Sample |        | Wind   | System |
```

7.2.4. Wind Statistics Screen

The Wind Statistics screen (Figure 7-6) displays the wind speed, wind velocity and wind direction values. The averages correspond to the values computed over the latest completed averaging/storage interval as defined by the Average Time parameter in the System Setup screen (Section 5.2). These values only have meaning if an optional wind vane/anemometer (59-004953) is attached to the sampler.

The Wind Statistics screen contains the following information:

Wind Speed — This field contains the current and latest averaged values of the wind speed (km/h. This value only has meaning if an optional wind vane/anemometer is attached to the sampler.

Wind Velocity — This field contains the latest vector-based average of the wind velocity (km/h). This value only has meaning if an optional wind vane/anemometer is attached to the sampler.

Wind Direction — This field contains the current and latest vector-based averaged values of the wind direction (degrees), as derived from an optional, externally mounted, wind vane/anemometer. This value only has a meaning if an optional wind vane anemometer is attached to the sampler.

Press <ESC> to return to the Main screen from the Wind Statistics screen.

Figure 7-6. Wind Statistics screen.

```
Stat:OK  Wind Stats          Mode:SAMP
                    Current  Average
   Wind Speed:  000.0    000.0 km/h
 Wind Velocity:   N/A      000.0 km/h
Wind Direction:   000      000 deg

TmpPres | Sample | User IO |  | System |
```

7.2.5. System Statistics Screen

The System Statistics screen (Figure 7-7) provides a general overview of the sampler's operation. Press <F5: System> from any of the other statistics screens to display the System Statistics screen.

The System Statistics screen contains the following information:

Elec Temp — This field contains the current temperature (°C) of the sampler's electronics compartment.

Elec Heat — This field indicates whether the heater in the electronics compartment is currently switched "on" or "off."

Filter Num — This field contains the sequential filter number since the user last changed the value of the Filter ID parameter in the Filter List Setup screen (Section 5.2.7).

Filt Comp Fan	This field contains the current operational status of the filter compartment fan.
Filt Total	This field contains the total number of filters used in the Partisol-Plus Sampler.
Pump Fan	This field contains the current operational status of the pump compartment fan.
FXCHG Step	If the sampler is in the midst of performing a filter exchange, this value represents the current step of the filter exchange process. A value of "-----" indicates that a filter is not currently being exchanged. The steps that make up the filter exchange process are PRESS, MAGPR, LPON, SHUTH, LPOFF, SHUTB and DONE.
Pump	This field contains the current operational status of the sample pump.
FXCHG Stat	This parameter indicates the filter exchange step that has failed when a filter exchange was unsuccessful. If the filter exchange was successful, the status will be "OK." If a filter exchange failure occurs, one of the filter exchange status code descriptions (NEWFILT, LIFTDN, PUSHUP, SHUTRDY, LIFTUP, PUSHDN or SHUTEXT) will be displayed. Refer to the Partisol-Plus Service Manual for details on filter exchange status codes.

Figure 7-7. System Statistics screen.

```
Stat:OK   System Stats        Mode:SAMP

 Elec Temp: +25.8 C  Elec Heater: ON
 Filter Num: 02    Filt Comp Fan: ON
 Filt Total: 328       Pump Fan: OFF
 FXCHG Step: MAGPR         Pump: OFF
FXCHG Stat: ----

TmpPres | Sample | User IO | Wind |  |
```

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Section 8: Viewing Stored Data

✔ The Partisol-Plus Sampler has a capacity of 50 filter data records, 16 days of interval data records and 32 days of input data records. Data are stored in a circular buffer on a “first in, first out” basis.

The Partisol-Plus Sampler stores three types of data in its internal data logger: filter data, interval data and input data. This information is stored in three separate circular buffers whose contents can be viewed on the screen of the sampler and/or downloaded through the RS232 port. Once these buffers are filled, the oldest data points are replaced with the most recent information (“first in, first out”). The following describes the three types of data stored internally in the hardware:

Filter Data — Each record in this buffer contains information for a different collection filter exposed to the sample stream. The sampler displays records from this buffer in the Filter Data Time screen and its subscreens (Figures 8-1 to 8-5). These screens contain information about the operation and status of the sampler while each filter was exposed, calculated averages of filter data recorded by the sampler and a list of the unit’s recorded power failures during sampling. The Partisol-Plus Sampler has a capacity of 50 records of filter data.

✔ The unit stores one record of filter data for each collection filter exposed.

Interval Data — The sampler writes a new record of interval data every 5 minutes. Each record contains the latest 5-minute average of the filter temperature, ambient temperature, ambient pressure and average flow rate. The unit displays records from this buffer in the Interval Data screen (Figure 8-6). The Partisol-Plus Sampler has a capacity of 16 days of interval data.

Input Data — The sampler stores calculated averages of meteorological data and other information received through its analog input channels at the rate specified by the user in the Average Time field of the System Setup screen (Section 5.1). The unit displays these stored values in the Input Data screen (Figure 8-7). The sampler has a data storage interval of 30 minutes and a 32-day capacity of input data.

✔ The Partisol-Plus Sampler stores one record of interval data every 5 minutes whenever the unit is turned on.

8.1. Filter Data

✔ Press <F1: -Rec> and <F2: +Rec> to move among stored records of information. Hold down these keys to repeat and *accelerate* the movement.

Data for each filter exposed in the Partisol-Plus Sampler are stored as a separate record of filter data. For readability, the sampler splits the display of filter data records among five screens: the Filter Data Times screen (Figure 8-1), Filter Data screen (Figure 8-2), Filter Data Status Codes screen (Figure 8-3), Filter Data Averages screen (Figure 8-4) and the Power Failures screen (Figure 8-5).

Press <F4: Data> when in the Main screen (Figure 4-3) to access the Filter Data Times screen (Figure 8-1). From this screen, press <F3: MoreDat> repeatedly to view its subsidiary screens in the following order:

Filter Data screen (Figure 8-2)
Filter Data Status Codes screen (Figure 8-3)
Filter Data Averages screen (Figure 8-4)
Power Failures screen (Figure 8-5).

To switch among filter data, interval data and input data, press <F4> repeatedly. With the exception of the subsidiary filter data screens, the sampler displays the last database record when the user enters the screens. The fields in these screens can not be edited.

To navigate among records of stored information, press <F1: -Rec> to move backward and <F2: +Rec> to move forward when in any of the filter data screens, the Interval Data screen and the Input Data screen. Holding down these keys repeats and *accelerates* these actions. The current record number is in the upper right-hand corner.

8.1.1. Filter Data Times Screen

Press <F4: Data> when in the Main screen (Figure 4-3) to enter the Filter Data Times screen (Figure 8-1). The sampler displays the following filter data fields in this screen:

Stat	The Stat field in the upper left-hand corner of the screen shows the status conditions encountered during sampling. A value of “OK” indicates that the sampler did not encounter any status conditions. Press <F3: MoreDat> twice to view the Filter Data Status Codes screen (Figure 8-2) for an explanation of the status codes recorded. Section 7.1 contains a complete listing of the single- and double-letter status codes that may be displayed in this field.

Rec	This field contains the number of the current record, which is displayed in the upper right-hand corner of the screen.
Set Sample Start	The Set Sample Start field is the time and date (hh:mm yyyy/mm/dd by default) set by the user as the start time in the Filter Setup screen (Section 5.2).
Set Sample Stop	The Set Sample Stop field is the time and date (hh:mm yyyy/mm/dd by default) set by the user as the sample ending time in the Filter Setup screen.
Actual Sample Start	This field shows the *actual* starting time/date (hh:mm yyyy/mm/dd by default) at which the unit began sampling.
Actual Sample Stop	This field indicates the *actual* ending time/date (hh:mm yyyy/mm/dd by default) at which the system stopped sampling.
Valid Elapsed Time	The Valid Elapsed Time field shows the elapsed sampling time (hh:mm by default) during which the sampler operated normally, i.e., without any status conditions.
Total Elapsed Time	The Total Elapsed Time field shows the total sampling time (hh:mm by default) during which the sampler drew a sample stream through its filter. Power outages will cause this figure to be smaller than the programmed sample duration time.

Figure 8-1. Filter Data Time screen.

```
Stat:OK    Filter Data Times    Rec: 7
   Set Sample Start:  00:00 1998/06/01
    Set Sample Stop:  00:00 1998/06/02
Actual Sample Start:  00:00  1998/06/01
 Actual Sample Stop:  00:00  1998/06/02
 Valid Elapsed Time:  24:00
 Total Elapsed Time:  24:00
 -Rec | +Rec | MoreDat | IntvDat | DwnLoad |
```

Press <F3: MoreDat> to display the Filter Data screen. Press <ESC> to return to the Main screen.

8.1.2. Filter Data Screen

The Filter Data screen (Figure 8-2) provides information on the Filter ID, Cassette ID and Site ID numbers to identify the filter and the cassette used for the displayed record number and to identify the site where the sampler is located. Other data included on this screen are the flow volume, the percent coefficient of variation and the maximum temperature difference between the sampler's ambient and filter temperature sensor measurements.

The sampler displays the following filter data fields in this screen:

Stat	The Stat field in the upper left-hand corner of the screen shows the status conditions encountered during exposure of the sample filter.
Rec	The Rec field in the upper right-hand corner of the screen contains the number of the current record.
Filt ID	This field displays the Filter ID number for the record number that is displayed in the upper right-hand corner of the screen.
Volume	The Volume field indicates the total sample volume (volumetric m^3) that has passed through the filter.

Figure 8-2. Filter Data screen.

```
Stat:OK    Filter Data      Rec: 7
Filt ID: P 123456           Volume: 006.00
Cass ID: RP100123           % CV:  0.1
Max Temp Diff: 0.8 at 15:38 1998/06/01

Id1: "0123000001003281997072116OOOO"
Id2: "                              "
-Rec | +Rec | MoreDat | IntvDat | Dwnload |
```

Cass ID	This field displays the Cassette ID number for the record number that is displayed in the upper right-hand corner of the screen.
%CV	The coefficient of variation is equal to the standard deviation of the 5-minute flow rate averages divided by the average flow rate (16.7 l/min by default). This value is then multiplied by 100 to yield the percent (%) CV value. If the figure is greater than 2 (2%), the sampler displays the “O1” status code (Section 7.1).
Max Temp Diff	The Max Temp Diff field shows the maximum difference (°C) between the filter and ambient temperatures during sample collection, and the time/ date (hh:mm yyyy/mm/dd by default) at which the sampler recorded the deviation.
Id1, Id2	The Id1 and Id2 fields are the site identification numbers as entered in the Site Identification screen (Section 5.1).

Press <F3: MoreDat> to display the Filter Data Status Codes screen. Press <ESC> to return to the Main screen.

8.1.3. Filter Data Status Codes Screen

Press <F3: MoreDat> when in the Filter Data screen to enter the Filter Data Status Codes screen (Figure 8-3). The sampler remains in the same record of filter data when

Figure 8-3. Filter Data Status Codes screen.

```
            Status Codes          Rec: 7

 >OK No Status Conditions

-Rec | +Rec | MoreDat | IntvDat |  |
```

switching among filter data-related screens.

The Filter Data Status Codes screen displays descriptions of all status codes recorded in the present record of filter data.

8.1.4. Filter Data Averages Screen

Press <F3: MoreDat> when in the Filter Data Status Codes screen to enter the Filter Data Averages screen (Figure 8-4). The sampler remains in the same record of filter data when switching among filter data-related screens.

The Filter Data Averages screen displays the following information:

Stat	The Stat field in the upper left-hand corner of the screen shows the status conditions encountered during exposure of the sample filter.
Rec	The Rec field in the upper right-hand corner of the screen contains the number of the current record.
Flow	This field contains the minimum, average and maximum flow rate (l/min).
WSpd	This field contains the average wind speed (km/h) recorded during the filter exposure period. This value has meaning only if an optional wind vane/anemometer is attached to the Partisol-Plus Sampler.

Figure 8-4. Filter Data Averages screen.

```
Stat:OK       Averages       Rec: 7
       Min   Ave    Max     Averag
Flow: 16.6   16.7   16.7   WDSpd: 00.0
FltT: +22.2  +22.5  +22.7  WVel: 00.0
AmbT: +22.3  +22.5  +22.7  WDir:   0
Pres:  751    752    752    AI1: 000.0
 %RH:  65     69     72     AI2: 000.0

-Rec   +Rec   MoreDat  IntvDat
```

FltT	This field contains the minimum, average and maximum temperature (°C) of the filter recorded during the filter exposure period.
WVel	This field contains the vector-based average of the wind velocity (km/h) recorded during the filter exposure period. This value has meaning only if an optional wind vane/anemometer is attached to the Partisol-Plus Sampler.
AmbT	This field contains the minimum, average and maximum ambient temperature (°C) recorded during the filter exposure period.
WDir	This field contains the vector-based average of the wind direction (degrees) recorded during the filter exposure period. This value has meaning only if an optional wind vane/anemometer is attached to the Partisol-Plus Sampler.
Pres	This field contains the minimum, average and maximum ambient pressure (mm Hg) recorded during the filter exposure period.
AI1	This field contains the average of analog input 1 (engineering units) recorded during the filter exposure period.
%RH	This field contains the minimum, average and maximum relative humidity (%) recorded during the filter exposure period.
AI2	This field contains the average of analog input 2 (engineering units) recorded during the filter exposure period.

8.1.5. Power Failures Screen

Press <F3: MoreDat> when in the Filter Data Averages screen to enter the Power Failures screen (Figure 8-5). The sampler remains in the same record of filter data when switching among filter data-related screens.

The Power Failures screen (Figure 8-5) displays the starting time/date (hh:mm yyyy/mm/dd by default) of up to 10 power outages, of durations longer than 60 seconds, that occurred during the filter exposure period of the current filter data record.

Figure 8-5. Power Failures screen.

```
      Power Failures          Rec: 7
2:24 1998/05/26
6:43 1998/05/26

 -Rec | +Rec | MoreDat | IntvDat |  |
```

8.2. Interval Data Screen

The Partisol-Plus Sampler stores 5-minute, averaged ambient temperature, filter temperature, ambient pressure and flow rate measurements as interval data. It writes a new record of interval data every 5 minutes on a continuous basis, and has a capacity of 16 days before it overwrites the oldest records. The unit displays interval data records in the Interval Data screen (Figure 8-6).

Press <F4: IntvDat> from one of the filter data screens or <F4> twice from the Main screen (Figure 4-3) to enter the Interval Data screen (Figure 8-6). The Interval Data screen contains the following information:

Rec	This field contains the number of the current interval record, which is displayed in the upper right-hand corner of the screen.

Time	This field contains the ending time/date (hh:mm yyyy/mm/dd by default) of the 5-minute interval being displayed.
Filt Temp	The Filt Temp field displays the 5-minute average of the ambient temperature (°C).
Ambient Temp	The Ambient Temp field displays the 5-minute average of the ambient temperature (°C).
Ambient Pres	The Ambient Pres field displays the 5-minute average of the ambient pressure (mmHg).
Flow	The Flow field displays the 5-minute average of the flow rate (l/min).

Figure 8-6. Interval Data screen.

```
        Interval Data          Rec: 1108
      Time: 15:15 1998/05/26
        Filt Temp: 20.7 C
     Ambient Temp: 21.9 C
     Ambient Pres:  751 mm Hg
             Flow: 16.7 l/min

 -Rec | +Rec |      | InptDat | DwnLoad |
```

8.3. Input Data Screen

The Partisol-Plus Sampler stores averaged meteorological and input data at the interval specified by the user in the Average Time field of the Setup screen (Section 5.1). The default averaging/storage interval is 30 minutes. The sampler has the capacity to retain 32 days of input data before it overwrites the oldest records. The unit displays input data records in the Input Data screen (Figure 8-7).

Press <F4: InptDat> from the Interval Data screen (Figure 8-6) to enter the Input Data screen (Figure 8-7).

The Input Data screen contains the following information:

Figure 8-7. Input Data screen.

```
Stat:OK   Input Data    Rec: 185
  Record Time: 15:30 1998/05/26
Valid:  023:55          FiltT:  +22.5
Total:  024:00         FCompT:  +24.0
 WSpd:  0 Km/h           AmbT:  +22.7
 WVel:  0 Km/h           Pres:  762 mmHg
 WDir:  0 deg            %RH:    65%
-Rec | +Rec | StCode | FiltDat | DwnLoad |
```

Stat	The Stat field in the upper left-hand corner of the screen shows the status conditions encountered during exposure of the sample filter.
Rec	This field contains the number of the current record, which is displayed in the upper right-hand corner of the screen.
Record Time	This field contains the time/date (hh:mm yyyy/mm/dd by default) at which the sampler stored the current record of input data.
Valid	This field contains the elapsed sampling time within the averaging/storage interval (hh:mm by default) during which the sampler operated normally, i.e., without any status conditions.
FiltT	This field contains the average filter temperature (°C) recorded during the averaging/storage interval.
Total	This field contains the total sampling time within the averaging/storage interval (hh:mm by default) during which the sampler drew a sample stream through its filter(s). Power outages result in this figure being smaller than anticipated.
FCompT	This field contains the average filter compartment

	temperature (°C) recorded during the averaging/storage interval.
WSpd	This field contains the average wind speed (km/h) recorded during the averaging/storage interval. This value has meaning only if an optional wind vane/anemometer is attached to the Partisol-Plus Sampler.
AmbT	This field contains the average ambient temperature (°C) recorded during the averaging/storage interval.
WVel	This field contains the vector-based average wind velocity (km/h) recorded during the averaging/storage interval. This value has meaning only if an optional wind vane/anemometer is attached to the Partisol-Plus Sampler.
Pres	This field contains the average ambient pressure (mm Hg) recorded during the averaging/storage interval.
WDir	This field contains the vector-based average wind direction (degrees) recorded during the averaging/storage interval. This value has meaning only if an optional wind vane/anemometer is attached to the Partisol-Plus Sampler.
%RH	This field contains the average relative humidity (%) recorded during the averaging/storage interval.

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Section 9: Data Input and Output

The Partisol-Plus Sampler provides various capabilities for transmitting data to other devices in digital and analog form. It can also receive information in the form of analog voltages from other hardware, allowing the user to convert these inputs to engineering units. This section describes how to access these features.

Data input and output is accessed from the System Setup screen (Figure 5-3). The contents of the System Setup screen are reviewed in Section 5.2. This section describes how to use the <F2: I/O> function.

9.1. System I/O Screen

Pressing <F2: I/O> while in the System Setup screen displays the System I/O screen (Figure 9-1). The function keys available at the bottom of the System I/O screen provide access to specialized screens for analog input (<F1: A/I>) and analog output (<F2: A/O>), and RS232 (<F3: RS232>), RS485 (<F4: RS485>) and Contact Closure (<F5: Contact>) output capabilities. By selecting these function keys, the user can move from one type of I/O screen to another without having to backtrack to the System Setup screen.

Figure 9-1. System I/O screen with the I/O menu available on the bottom of the screen.

```
      System Setup
Average Temp: 99      Standard Temp: 99
Average Pres: 999     Standard Pres: 999
Date Form: yy/mm/dd    Average Time: 30
Time Form:       :      Filter Fan: ON
Curr Time: 05:00:00       Auto Run: ON
Curr Date: 98/12/10
```

A/I	A/O	RS232	RS485	Contact	
Function Keys in Browse Mode					
A/I	A/O	RS232	RS485	Contact	
Function Keys in Edit Mode					
-List	-List	Bksp	ChSign		

9.2. Downloading Stored Data

R&P supplies the Partisol-Plus Sampler with RPComm software and a 9-to-9 pin computer cable (07-000587) to enable the creation of data files containing stored information on a personal computer (PC). Alternately, other commercially available software may be used to receive and store transferred information on a PC.

9.2.1. RS232 Setup Screen

Set up the sampler for downloading data in the System Setup screen. Press <F5: Setup> twice from the Main screen to display the System Setup screen. Press <F2: I/O>, then <F3: RS232> to enter the RS232 Setup screen (Figure 9-2). Ensure that the parameters displayed in the RS232 Setup screen match the settings of your PC's RS232 port settings. Edit these if necessary.

The RS232 Setup screen defines the configuration of the RS232 port on the front panel of the Partisol-Plus Sampler (Figure 9-4). Depending upon the definition of the parameters in this screen, the RS232 port can be used either for advanced two-way

Figure 9-2. RS232 Setup screen.

```
        RS232 Setup
Baud Rate:   9600  Protocol:    AK
Data Bits:     8   RS-Para1:    52
Parity:     None   RS-Para2:  75048
Stop Bits:     1   RS-Para3:  13010
Flow Ctrl:  None   RS-Para4:     0
```

A/O	A/I	SetPRC	RS485	Contact	
Function Keys in Browse Mode					
A/O	A/I	SetPRC	RS485	Contact	
Function Keys in Edit Mode					
-List	+List	Bksp			

serial communication (AK Protocol or German Ambient Network Protocol) or one-way transmission from the instrument to another device. The following parameters define the operation of the RS232 port:

NOTE: For the fields described below, press <F1: -List> or <F2: +List> when in the Edit Mode to scroll through the list of choices.

Baud Rate — This field contains the data transmission rate (baud), which may be set to 1200, 2400, 4800, 9600, 19200 or 38400 baud (9600 is the default).

Data Bits — This field contains the word length (bits), which may be either 5, 6, 7, or 8 bits (8 is the default).

Parity — This field contains the parity of data transmission, which can be defined as “None,” “Even” or “Odd” (None is the default).

Stop Bits — This field contains the number of stop bits for each character transmitted, ranging from 1 to 2 (1 is the default).

Flow Ctrl — This field contains the type of communication flow control, which may be either “None” or “Xon/Xoff” (None is the default).

Protocol — This field contains the manner in which the RS232 port is used, according to the following categories:

None. The serial port is not currently defined for any communication. The unit must reside in this mode to download a new version of the system operating software into its Flash memory (Appendix D).

AK. With the unit in this protocol, the RS232 serial port is configured for two-way serial communication using the AK communication protocol (Appendix C). This selection makes use of RS232 parameters 1 to 3 listed in the RS232 Setup screen (Figure 9-2).

Storage. With the unit in this protocol, the user can download information from the sampler’s data storage buffers. This protocol allows only one-way transmission from the unit to another device. To retrieve data from the unit in this protocol, you must have a software program, such as Hyper Terminal

or Pro Comm Plus, already installed on your PC that will capture the data.

RealTime. When in this protocol, the unit downloads user-defined, comma-delimited records of information defined by time intervals. The user defines the program register codes (PRCs) (Appendix B) of the variables to be downloaded in the RS232 RealTime Data screen (Figure 9-3) in the “Data 1” to “Data 8” fields. To reach this screen, press <F2: SetPRC> when in the RS232 Setup screen. To input your required data time interval, you would change the value of the “Intv” field in the RS232 RealTime Data screen. This field will accept values ranging from “0” (no data transmission) to “3,600” seconds. Each transmitted record is date and time stamped. For example, if you entered “10” in the Intv field, during sampling the unit will output one line of data (the actual data values are defined by the user in the Data 1 to Data 8 fields) every 10 seconds. This protocol allows only one-way transmission from the unit to another device, such as a PC. To retrieve data from the unit in this protocol, you must have a software program, such as Hyper Terminal or Pro Comm Plus, already installed on your PC that will capture the data.

Figure 9-3. RS232 Real Time Data screen.

```
     RS232 RealTime Data
           Intv:  0
Data 1: StatCode  Data 5: AmbP Cur
Data 2: CurFlow1  Data 6: AmbRHCur
Data 3: CurFlow2  Data 7: WDir Cur
Data 4: AmbT Cur  Data 8: WSpd Cur
```


Function Keys in Browse Mode

Function Keys in Edit Mode

-List	+List	Bksp			

Cycle. When in this protocol, the instrument downloads user-defined, comma-delimited records of information *at the end of a sampling period*. The user defines the PRCs of variables to be downloaded in the RS232 Real Time Data screen (Figure 9-3) in the “Data 1” to “Data 8” fields. To reach this screen, press <F2: SetPRC> when in the RS232 Setup screen. This protocol allows only one-way transmission from the unit to another device, such as a PC. To retrieve data from the unit in this protocol, you must have a software program, such as Hyper Terminal or Pro Comm Plus, already installed on your PC that will capture the data.

German. The serial port is set up for basic communication functions using the German Ambient Network Protocol (Appendix C).

The correct setting for the Protocol field is dependent upon the user’s transfer software.

9.2.2. Downloading Data from the Sampler

Follow these steps to download data from the unit using commercially available data capture software:

NOTE: See Section 10 for instructions on how to download data using the RPComm software program.

1) **Go to the RS232 Setup screen (Figure 9-2) and set the Protocol field to “Storage,” “RealTime” or “Cycle,” depending on how you want your data formatted. To change the value of this field, press <EDIT> and then press <F2: +List> until the correct protocol appears in the field. To save this change, press <ENTER>.**
2) **Attach the ends of the 9-to-9 pin computer cable to the RS232 port of the Partisol-Plus Sampler and the RS232 connector of your PC to link the two devices (Figure 9-4).**
3) **Initiate your commercially available data capture software program such as Hyper Terminal or Pro Comm Plus.**
4) **Ensure that your data capture software program is set for the same communications parameters as the Partisol-Plus Sampler. The default settings of the unit is 9600 baud, 8 bit word length, 1 stop bit and no parity. Refer to Appendix C, if you suspect that the unit’s parameters have been changed.**

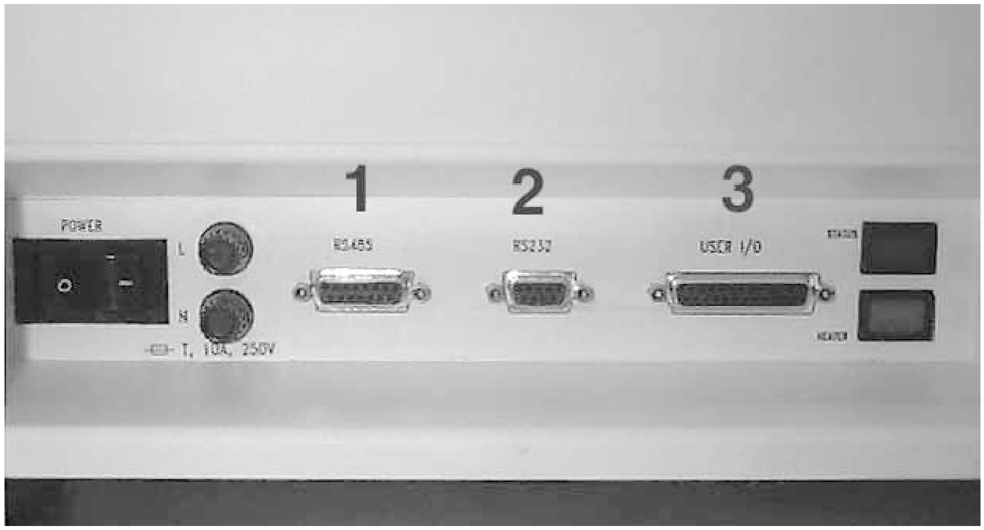


Figure 9-4. Connector panel on front panel of Partisol-Plus Sampler.

1: RS485 connector.
2: RS232 connector.
3: User I/O connector.

5) Set the communications software into the appropriate mode, such as the “Data Capture” mode or another similar downloading command.

6) On the sampler, define your data output parameters, depending on which protocol that you are using, as follows:

✔ Pressing <F5: DwnLoad> while in the Filter Data, Interval Data or Input Data screen is a convenient way to download stored information.

a) *Storage protocol.* Go to the screen that identifies the storage buffer that you want to download. You can select the Filter Data screen (Figure 8-2), Interval Data screen (Figure 8-6) or the Input Data screen (Figure 8-7). Each screen has the <F5: DwnLoad> button. If you want to download data from all three storage buffers, you must perform the data download from each screen. For example, if you want to download from the Filter Data screen, press <F5: DwnLoad> while in that screen. In the Download Data screen (Figure 9-5), the Storage field will indicate that the storage buffer being downloaded is the “Filter” storage buffer. Choose the record at which you would like the unit to begin downloading. To select the beginning record, press <F2: -Ptr> or <F3: +Ptr>. This will change the Current Pointer field. Once the correct beginning record is indicated in the Current Pointer field, press <F5: Start>. The unit will download all the data in filter storage buffer beginning at the record number indicated in the Current Pointer field.

b) *RealTime protocol.* From the RS232 Setup screen, press <F3: SetPRC> to go to the RS232 RealTime Data screen (Figure 9-3). In this screen, select the time interval at which you want the data to download during sampling. For example, if you want the unit to download data every 10 seconds, you would input “10” in the Intv field. This field will accept values ranging from “0” (no data transmission) to “3,600” seconds. Then select the program register codes (PRCs) (Appendix

B) of the variables that you want to download and input them in the Data 1 through Data 8 fields. To change the PRCs, press <EDIT> and then <F1: -List> and <F2: +List>. When you are finished entering the correct PRCs, press <ENTER> to save your changes. At this point, the unit should automatically begin downloading to your PC.

c) *Cycle protocol.* This protocol is similar to the RealTime protocol except the time interval (when the data is recorded) is limited to the filter sampling duration. For example, if your sampler is set to sample on each filter for 24 hours, then data will be recorded once every sampling cycle, or once every 24 hours. You must set your PRCs in the RS232 RealTime Data screen, but the unit will disregard any time interval you set in the Intv field. As soon as you set your PRCs and press <ENTER> to save your changes, the unit will then automatically download to your PC.

To download data from your Partisol-Plus Sampler using RPComm software, go to Section 10 for further instructions.

For two-way communication via modems, an optional 9-to-25 pin modem cable (51-002814) is required to attach the sampler's 9-pin RS232 port to a modem's 25-pin connector. Refer to the Service Manual for a listing of the pin assignments on the RS232 connector. For further instructions on connecting the unit to a modem, go to Appendix J.

9.2.3. Download Data Screen

The Filter Data Time screen (Figure 8-1), Filter Data screen, (Figure 8-2), Interval Data screen (Figure 8-6) and the Input Data screen (Figure 8-7), contain the <F5: DwnLoad> key to download stored data through the sampler's RS232 port to another serial device. Press <F5:DwnLoad> from the Filter Data Time screen to display the Download Data screen (Figure 9-5).

The <F5: Start> keystroke allows the user to download records from the *current* position, or current record being displayed, to the last record recorded by the unit. Pressing <F5> again prior to completing the download cancels the data transfer.

The Download Data screen provides information on the current position, or current record being displayed, and other available records.

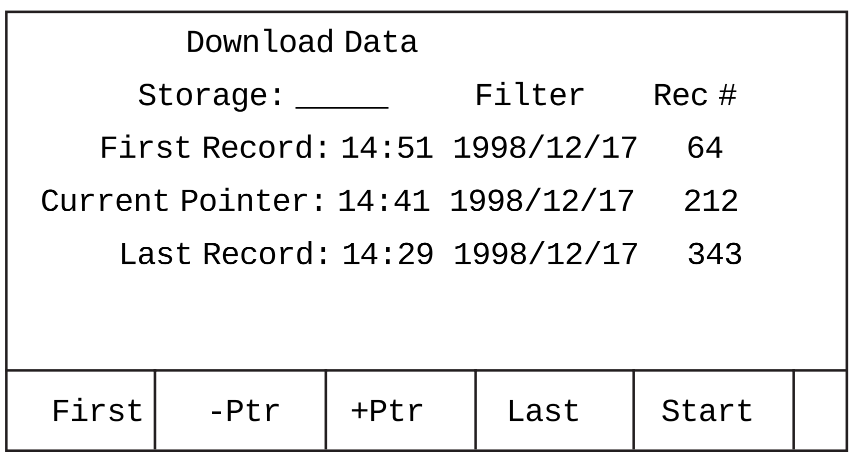
The Data Download screen contains the following information:

Storage	This field contains the data type being downloaded: Filter Data, Interval Data or Input Data.

First Record	This field contains the time and date of the first record of stored data.
Current Pointer	This field shows the time and date of the record at the position of the current pointer. Data will be downloaded *starting at this record number*. Pressing <F2: +Ptr> or <F3: -Ptr> will increment or decrement the current pointer record number. Pressing <F1: First> will move the pointer to the first record number.
Last Record	This field indicates the time and date of the last record of stored data. An uninterrupted data download will transfer all data records from the position of the current pointer to the last stored record.

Pressing <F5: Start> from this screen will download the selected data type (Filter, Interval or Input data) from the position of the current pointer to the last record of stored data.

Figure 9-5. Download Data screen.



9.3. Format of Filter Data Records

Each record of filter data contains the comma-delimited data fields shown below. Records are separated from each other by the “carriage return” (ASCII 013) and “line feed” (ASCII 010) characters.

Each filter data record contains:

Filter ID (32-character string)
Cassette ID (32 character string)
Set Start Date (“yyyy/mm/dd”)
Set Start Time (hh:mm)
Actual Start Date (“yyyy/mm/dd”)
Actual Start Time (hh:mm)
Actual Stop Date (“yyyy/mm/dd”)
Set Stop Time (hh:mm)
Total Sampling Time (hh:mm)
Average Flow (volumetric l/min)
Flow Coef of Variation (%)
Sampled Volume (m^3)
Minimum Ambient Temperature (°C)
Average Ambient Temperature (°C)
Maximum Ambient Temperature (°C)
Minimum Filter Temperature (°C)
Average Filter Temperature (°C)
Maximum Filter Temperature (°C)
Minimum Ambient Pressure (mm Hg)
Average Ambient Pressure (mm Hg)
Maximum Ambient Pressure (mm Hg)
Maximum Temperature Difference (°C)
Date of Max Temp Diff (“yyyy/mm/dd”)
Time of Max Temp Diff (hh:mm)
Site ID1 (32-character string)
Site ID2 (32-character string)
Status Codes (hexadecimal summation)
Valid Sampling Time (hh:mm)
Minimum Flow (volumetric l/min)
Maximum Flow (volumetric l/min)
Average Wind Speed (km/h)
Average Wind Velocity (km/h)
Average Wind Direction (degrees)
Minimum Ambient RH (%)
Average Ambient RH (%)

Maximum Ambient RH (%)
Average Analog Input 1 (engineering units)
Average Analog Input 2 (engineering units)
Average Analog Input 3 (engineering units)
Total Sampling Time (mmmm)
Valid Sampling Time (mmmm)
Power Failure Date ("yyyy/mm/dd")
Power Failure Time (hh:mm)

✔ The sampler includes these power interruption fields only for the number of events that occurred (up to 10).

The number of fields in each record of filter data varies, depending upon the number of power interruptions recorded. If the sampler did not experience any power interruptions during sampling, the unit omits all of the power interruptions fields shown above. Otherwise, filter data records contain fields for only the number of power interruptions encountered.

9.4. Format of Interval Data Records

Each record of interval data contains the comma-delimited data fields shown below. Records are separated from each other by the "carriage return" (ASCII 013) and "line feed" (ASCII 010) characters.

Each interval data record contains:

Date at End of 5-Minute Period ("yyyy/mm/dd")
Time at End of 5-Minute Period (hh:mm)
5-Minute Average Ambient Temperature (°C)
5-Minute Average Filter Temperature (°C)
5-Minute Average Ambient Pressure (mm Hg)
5-Minute Average Flow (volumetric l/min)

9.5. Format of Input Data Records

Each record of input data contains the comma-delimited data fields shown below. Records are separated from each other by the "carriage return" (ASCII 013) and "line feed" (ASCII 010) characters.

Each input data record contains:

Storage Date of Input Data Record ("yyyy/mm/dd")
Storage Time of Input Data Record (hh:mm)
Valid Sampling Time (hh:mm)

Total Sampling Time (hh.mm or hh:mm)
Average Filter Temperature (°C)
Average Filter Compartment Temperature (°C)
Average Ambient Temperature (°C)
Average Ambient Pressure (°C)
Average Ambient RH (%)
Average Wind Speed (km/h)
Average Wind Velocity (km/h)
Average Wind Direction (degrees)
Average Analog Input 1 (engineering units)
Average Analog Input 2 (engineering units)
Average Analog Input 3 (engineering units)
Status Codes (hexadecimal summation)

9.6. Analog Input Conversions

The User I/O connector on the front panel of the Partisol-Plus Sampler (Figure 9-4) allows the unit to receive three 0-5 VDC analog inputs from external sources. The pin assignments of these inputs are as follows:

Input Channel 1	Positive Pin 14	Ground Pin 1
Input Channel 2	Positive Pin 3	Ground Pin 15
Input Channel 3	Positive Pin 17	Ground Pin 4

Refer to the Service Manual for a complete listing of pin assignments in the external connectors of the Partisol-Plus Sampler.

The Analog Input Setup screen (Figure 9-6) allows the user to convert the input voltage levels into engineering units for display, averaging and storage. From the Main screen, press <F5: Setup>, <F5: System>, <F2: I/O>, <EDIT> and <F1: A/I> to display the Analog Input Setup screen.

The sampler uses the following formulas to convert voltage level inputs (0-5 VDC) to engineering units, where “x” is the voltage being received:

$$\text{Calculated Value} = A + Bx + Cx^2$$

The Analog Input Setup screen allows the user to enter unique values for constants A, B and C for each channel of analog input. The calculated values shown at the bottom of the screen are the current results computed by the sampler using the A, B and C constants entered by the user.

For example, the user would assign a value of 0 to constant A, 200 to constant B, and 0 to constant C to convert a 0-5 VDC analog input voltage corresponding to an ozone concentration of 0-1,000 ppb (analog input 1 in Figure 9-6). The sampler shows results from implementing these constants on the bottom line of the Analog Input Setup screen, 19.63 ppb in this example.

The logic level outputs of 0 or 5 VDC are transmitted through the user I/O connector on the front panel of the Partisol-Plus Sampler (Figure 9-4). The two channels have the following pin assignments (consult the Service Manual for a complete listing of connector definitions):

Channel 1	Logic Output Pin 11	Ground Pin 13
Channel 2	Logic Output Pin 25	Ground Pin 24

Figure 9-6. Analog Input Setup screen.

```
        A/I Setup
    Const A  Const B  Const C
 1:   0.0000  200.0000   0.0000
 2:   0.0000  200.0000   0.0000
 3:   0.0000  100.0000   0.0000
Calculated Values:    A/I Mode: SING
 1: 19.6294 2:  8.7125 3:  1.1384
```

	A/O	RS232	RS485	Contact	

Function Keys in Browse Mode

	A/O	RS232	RS485	Contact	

Function Keys in Edit Mode

-List	+List	Bksp	ChSign		

9.7. Analog Voltage Output

The User I/O connector on the front panel of the Partisol-Plus Sampler (Figure 9-4) provides the hardware connections to analog voltage output (described below), analog voltage input and to user-defined logic level outputs described in Sections 9.3 and 9.6.

The Analog Output screen (Figure 9-7) allows the user to define the output of three voltage signals through the User I/O port. For each channel of output, the user specifies the following parameters in the Edit Mode:

Variable — This field contains the program register code (PRC) (Appendix B) of the variable whose current value is to be transmitted. To enter the desired variable, the user may press either the <F1: -List> and <F2: +List> soft function keys while in the Edit Mode, or may enter the numeric PRC itself. Pressing <F3: Bksp> allows the user to “backspace” over previously typed characters.

MinVal — This field contains the value of the PRC variable that corresponds to the minimum analog voltage output (0% of full scale output).

MaxVal — This field contains the value of the variable that corresponds to the maximum analog voltage output (100% of full scale output).

Format — This field contains the type of analog or current output selected. The range of choices includes 0-1, 0-2, or 0-5 VDC. Press <F1: -List> and <F2: +List> when in the Edit Mode to

Figure 9-7. Analog Output Setup screen.

A/O Setup

	Variable	MinVal	MaxVal	Format
1	OpMode	0.00	5.00	0-5 VDC
2	CurFlow1	0.00	20.00	0-5 VDC
3	None	0.00	0.00	0-5 VDC

A/I		RS232	RS485	Contact	
Function Keys in Browse Mode					
A/I		RS232	RS485	Contact	
Function Keys in Edit Mode					
-List	+List	Bksp	ChSign		

choose the desired output format. The default setting for output format is 0-5 VDC.

For voltage output, the minimum input impedance is 10 KΩ.

The pin assignments on the User I/O connector for analog output are as follows (see the Service Manual for complete listing of pin-out definitions):

Output Channel 1	Positive Pin 9	Ground Pin 21
Output Channel 2	Positive Pin 20	Ground Pin 7
Output Channel 3	Positive Pin 6	Ground Pin 18

Pressing <F2: RS232>, <F3: RS485>, or <F5: Contact> allows the user direct access to the other output-related screens without having to return to the Setup screen.

9.8. RS485 Input/Output

An RS485 port on the front panel of the Partisol-Plus Sampler (Figure 9-4) provides future connection options with other R&P instrumentation. The RS485 Setup screen (Figure 9-8) contains one user-definable field, defined as follows:

Station — This field contains the address of the ChemSpec sampler for the purpose of RS485 communication.

Figure 9-8. RS485 Setup screen.

```
RS485 Setup
Station: 11
```

A/I	A/O	RS232		Contact	
Function Keys in Browse Mode					
A/I	A/O	RS232		Contact	
Function Keys in Edit Mode					
-List	+List	Bksp			

9.9. Logic Level Output

The Partisol-Plus Sampler provides two user-definable, logic level outputs on the User I/O connector on the front panel of the sampler (Figure 9-4) with a voltage level of either 0 or 5 VDC. The user defines the conditions in the Contact Closure Setup screen (Figure 9-9) under which each of these channels reads 0 or 5 VDC. This programmability provides the user with the ability to tailor the outputs to a variety of alarm conditions that may vary from site to site.

For each output channel defined in the Contact Closure Setup screen, the unit performs an evaluation of a program register code's (PRC) current value. This test can include a bit-wise operator ("AND" or "OR") for integer variables such as the current status condition, a comparison operator (<, <=, =, >=, > and <>), and a constant with which the unit compares the resulting value of the left-hand operations. *If the result of the comparison for an output channel is "true" the unit transmits 5 VDC; otherwise, the voltage transmitted by an output channel is 0 VDC.*

The screen contains the following user-definable fields for each channel of logic level output:

> NOTE: When in the Edit Mode, press <F1: -List> and <F2: +List> to select from a list of predefined settings for Variable, BitOp and Comp.

Variable — This is the PRC (Appendix B) of the variable whose current value is to be tested by the unit. In Figure 9-9, the PRC is 5, which is "StatCode" (Appendix B).

BitOp — If the variable selected is an integer, the user can apply a bit-wise "AND" or "OR" mask to its value. For example, if the user would like to test for a filter temperature range 1 or 2 error (H800 and H1000, PRC 5), the values of the contact closure parameters would be:

Variable	5	Program register code for "StatCode" (Appendix B).
BitOp	AND	Use the bit-wise "AND" operator to mask the variable.
BitVal	6144	The sum of status codes 2048 and 4096 (R1 and R2).

Comp	=	Equal to
CompVal	0	The value of the left-hand side is equal to “0” if neither status code 2048 (H800) nor 4096 (H1000) is currently active.

In this case, the TTL output level is 5 VDC if neither status condition is currently active, and 0 VDC if either status code occurs. Refer to the Service Manual for a definition of the pins in the User I/O connector.

✔ Select “OR” as the BitOp and “0” as the BitVal if no masking is desired. Masking is only performed with integer program register codes (PRCs).

BitVal The value that is masked against the variable using the “AND” or “OR” operator. Select “OR” as the BitOp and “0” as the BitVal if no masking is desired.

Figure 9-9. Contact Closure Setup screen.

```
     Contact Closure Setup


  Variable BitOp BitVal Comp CompVal
 1 StatCode  OR     0    =    0.00
 2 OpMode    OR     0    =    2.00
```

A/I	A/O	RS232	RS485		

Function Keys in Browse Mode

A/I	A/O	RS232	RS485		

Function Keys in Edit Mode

-List	+List	Bksp	ChSign		

Comp The type of comparison performed between the result of the left-hand operations and the constant entered at the right. The comparison operator is defined as one of the following:

< Less than
<= Less than or equal to

=	Equal to
>=	Greater than or equal to
>	Greater than
<>	Not equal to.

CompVal The constant against which the result of the left-hand operations are compared to determine a value of true (0 VDC) or false (5 VDC). In Figure 9-9, the value of the left-hand side is equal to 0 if neither status code 2048 (H800) nor 4096 (H1000) is currently active. In this case, the TTL output is 5 VDC; otherwise, it is 0 VDC.

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Section 10: Direct Communications Using RPComm

RPComm is a communications software package developed for Windows 9x/NT to provide interactive remote communications with R&P instrumentation. RPComm also comes in a version for palmtop computers/Windows CE (Appendix I). Refer to Appendix K for a complete list of RPComm software screens.

RPComm enables the user to:

- Download the data stored within the unit's data logger
- Schedule automatic data downloads
- View and graph downloaded data
- View a real-time graph of selected variables
- Remotely operate the unit using a virtual keypad
- Make multiple connections.

RPComm has two communication modes — direct and modem. Direct communication is accomplished when the unit has a direct cable connection with a personal computer (PC). Modem communication is accomplished when the unit has a connection with a PC through the use of a modem and phone line (Appendix J). Before modem communication is attempted, direct communication must be successfully completed. This will ensure that the PC and unit have been set up properly for communications.

10.1. Instrument Setup for Direct Communication

To set up the sampler for direct communication with a PC, you must use the 9-to-9 pin cable (07-000587) that is included in the compilation package.

Follow these steps to set up the unit for direct communication:

1) Connect the female end of the 9-to-9 pin cable to one of your PC's serial (COM) ports. Be sure to note which serial port the cable is connected to.

2) Connect the male end of the 9-to-9 pin cable to the unit's RS232 connector that is located on the front of the unit (Figure 10-1).

3) From the unit's Main screen (Figure 10-2), press <F5:Setup> to enter the Sample Setup screen, then press <F5: System> to display the System Setup screen. From the System Setup screen, press <F2: I/O> to display the System I/O screen (Figure 10-3). From the System I/O screen, press <F1: A/I> to display the Analog Input Setup screen (Figure 10-4). Press <F3: RS232> to enter the RS232 Setup screen (Figure 10-5).

Figure 10-1. Connector panel on front panel of Partisol-Plus Sampler.

1: RS485 connector.
2: RS232 connector.
3: User I/O connector.

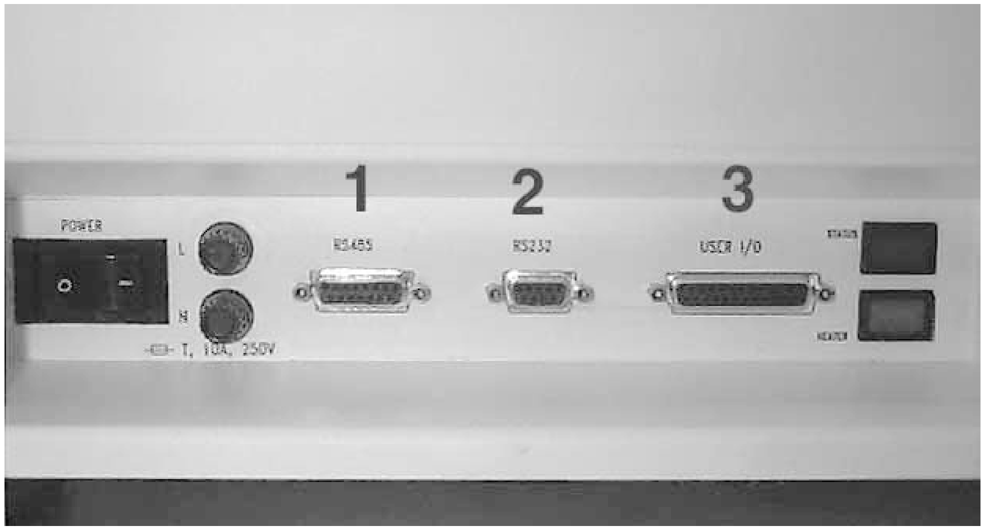


Figure 10-2. Partisol-Plus Main screen.

```
Stat:OK   Partisol 2025    Mode:Stop
  Current Time: 09:27 98/07/23
  Start Sample: 00:00 98/07/24
   Stop Sample: 00:00 98/07/25
     Filter ID:   123456
          Flow:   0.0 l/min
        Volume:   000.00 m^3
```

Help	Stats	FiltSet	Data	Setup	

Figure 10-3. System I/O screen.

```
        System Setup
Average Temp: 99    Standard Temp:  99
Average Pres: 999   Standard Pres: 999
Date Form: yy/mm/dd  Average Time:  30
Time Form:        :    Filter Fan: ON
Curr Time: 05:00:00     Auto Run: ON
Curr Date: 98/12/10
```

A/I	A/O	RS232	RS485	Contact	
Function Keys in Browse Mode					
A/I	A/O	RS232	RS485	Contact	
Function Keys in Edit Mode					
-List	+List	Bksp	ChSign		

Figure 10-4. Analog Input Setup screen.

```
         A/I Setup
   Const A  Const B  Const C
1:   0.0000  200.0000   0.0000
2:   0.0000  200.0000   0.0000
3:   0.0000  100.0000   0.0000
Calculated Values:    A/I Mode: SING
1: 19.6294 2:  8.7125 3:  1.1384
```

	A/O	RS232	RS485	Contact	
Function Keys in Browse Mode					
	A/O	RS232	RS485	Contact	
Function Keys in Edit Mode					
-List	+List	Bksp	ChSign		

Figure 10-5. RS232 Setup screen.

```
        RS232 Setup
Baud Rate:   9600  Protocol:    AK
Data Bits:     8   RS-Para1:    52
Parity:     None   RS-Para2:  75048
Stop Bits:     1   RS-Para3:  13010
Flow Ctrl:   None  RS-Para4:     0
```

A/O	A/I	SetPRC	RS485	Contact	
Function Keys in Browse Mode					
A/O	A/I	SetPRC	RS485	Contact	
Function Keys in Edit Mode					
-List	+List	Bksp			

4) On the RS232 Setup screen, ensure that the Protocol is set to "AK." This is necessary for RPComm to operate properly. The default values for the remaining settings on this screen are shown in Figure 10-5. R&P does not recommend changing the settings from their default values.

5) The unit is now set up for direct communication with a PC.

10.2. Using RPComm

NOTE: This section assumes that RPComm was installed in the default locations when the installation program was executed (Appendix D).

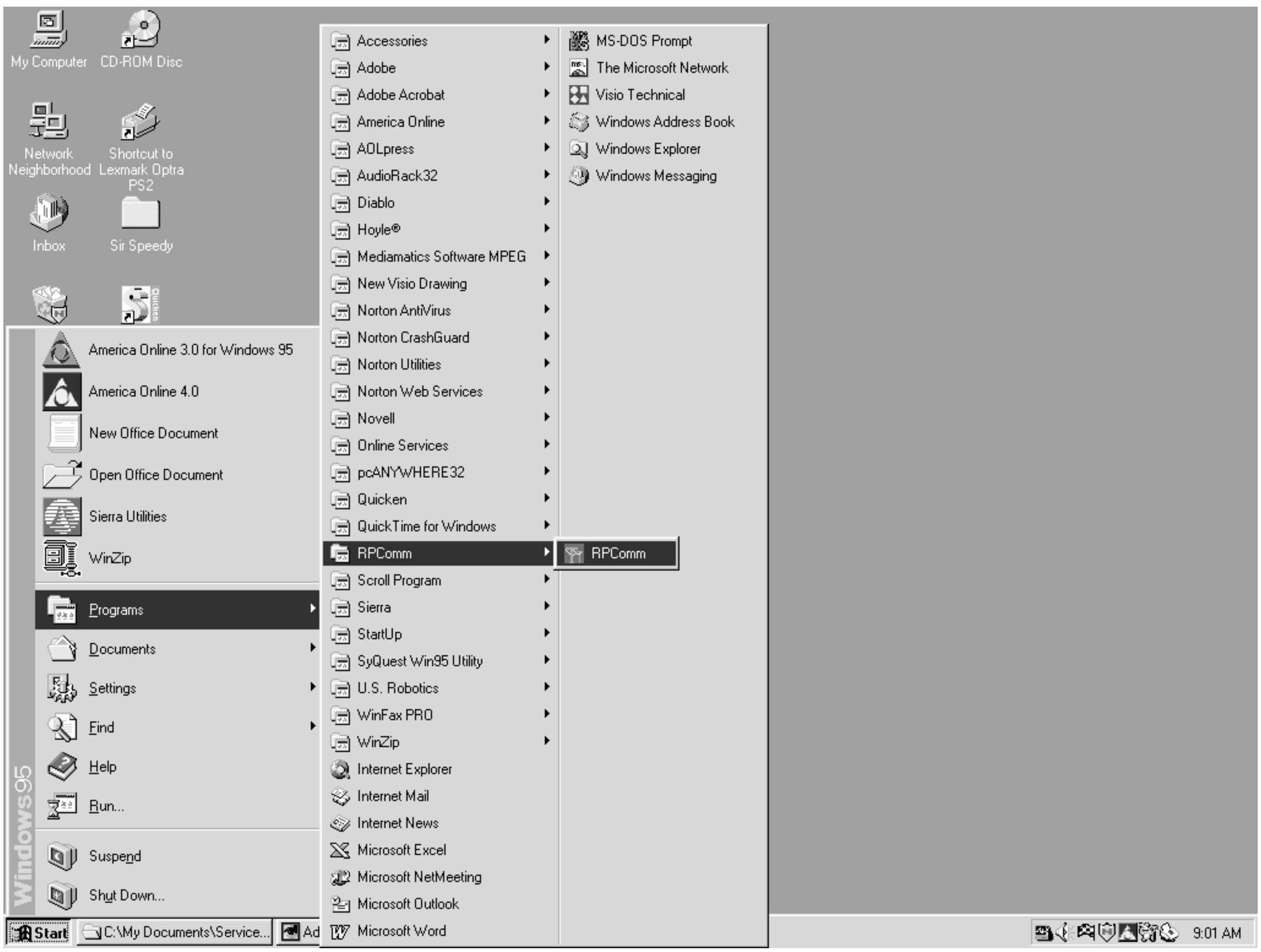
10.2.1. Executing RPComm

NOTE: The Windows operating system screens shown in this section are from the Windows 95 operating system. These screens may vary slightly from your computer's screens if you are operating RPComm under the Windows 98 or Windows NT operating systems.

Follow these steps to execute RPComm:

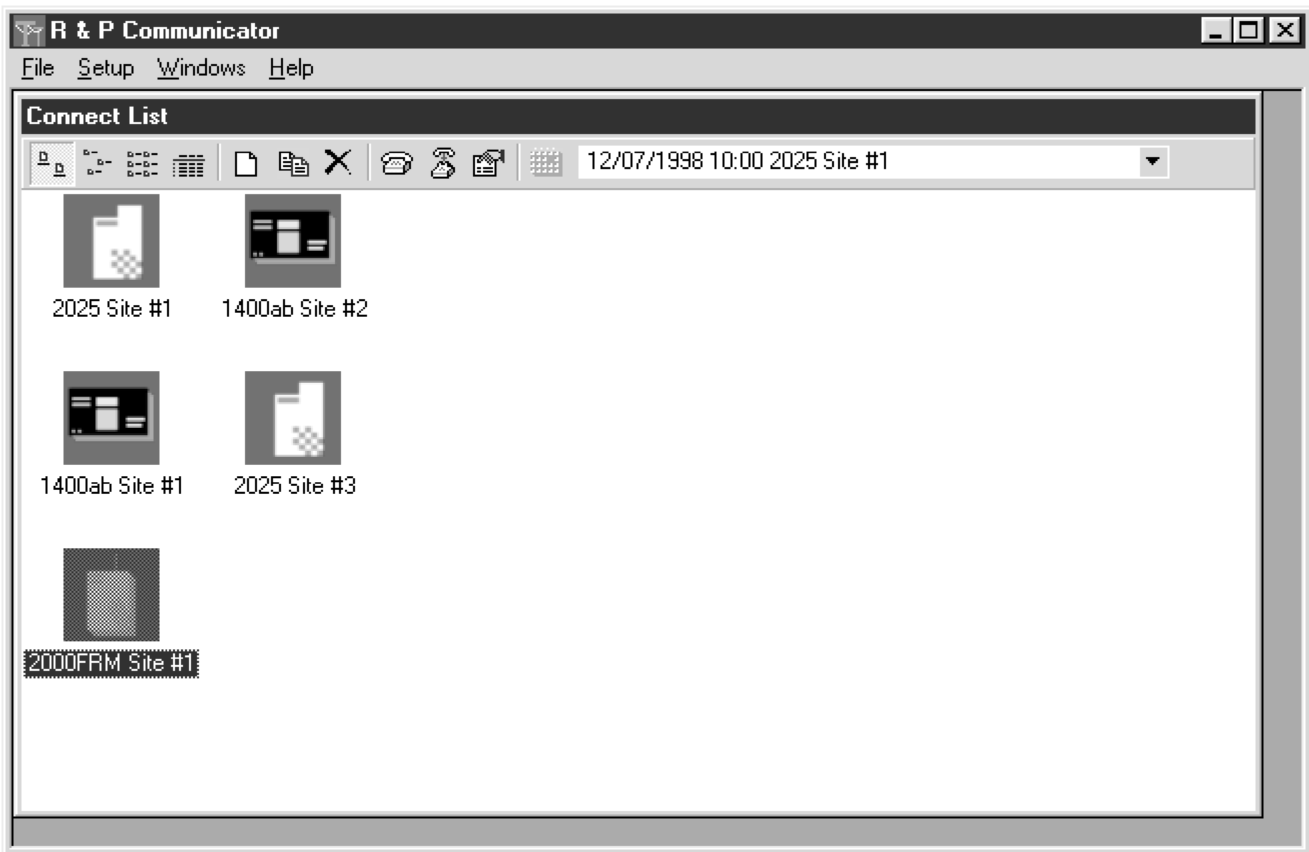
1) **Initiate the RPComm software by selecting the “Start” button on your PC’s screen, highlighting “Programs,” and then highlighting “RPComm.” Choose the RPComm icon to begin executing the RPComm program (Figure 10-6).**

Figure 10-6. Executing RPComm.



2) When RPComm begins executing, two screens are always displayed: the R&P Communicator Main screen and the Connect List screen (Figure 10-7).

Figure 10-7. Connect List screen.



10.2.2. Creating a New Connection

A connection is the hardware, software and proper settings that enables information to travel between your PC and unit. The hardware part of the connection is accomplished with the use of a 9-to-9 pin cable (Section 10.2.1). The software part of the connection is accomplished when RPComm is executed. The proper settings must be set within RPComm to complete the connection.

> NOTE: The Windows operating system screens shown in this section are from the Windows 95 operating system. These screens may vary slightly from your computer's screens if you are operating RPComm under the Windows 98 or Windows NT operating systems.

Follow these steps to create a new connection:

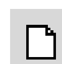
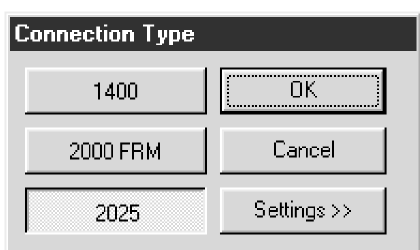
1) **With the Connect List screen displayed (Figure 10-7), select the New Connection icon on the toolbar.**  **The Connection Type screen will then be displayed (Figure 10-8).**

Figure 10-8. Connection Type screen.



2) **From the Connection Type screen, select the "2025" button and choose "Settings" to display the AK Protocol Setup screen (Figure 10-9).**

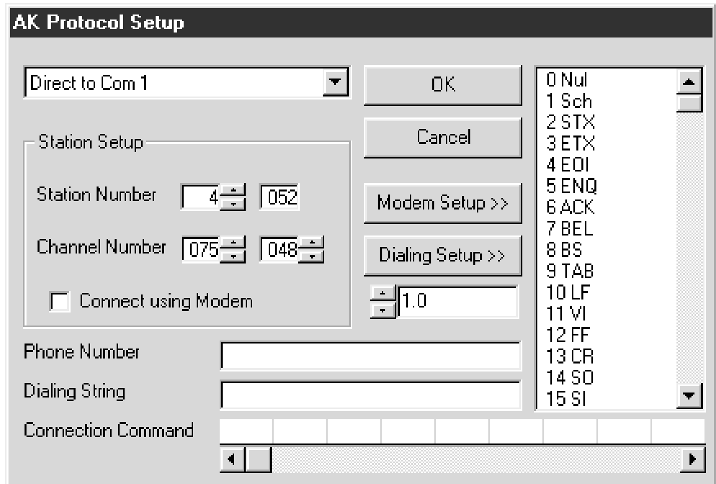


Figure 10-9. AK Protocol Setup screen.

3) **For a direct connection, the connection description box should read “Direct to Com x,” where “x” is the serial (COM) port on your PC that the unit is connected to (Section 10.2.1).**

4) **The Station Setup portion of the screen lists a Station Number (default = 4, 052) and Channel Number (Default = 075, 048). These values must match those entered into the unit on its RS232 Setup screen. R&P recommends that these be left at their default values.**

5) **The description boxes for Phone Number, Dialing String and Connection Command are not used for a direct connection. The Modem Setup and Dialing Setup buttons also are not needed for a direct connection.**

6) **Select “OK” when the proper settings have been confirmed.**

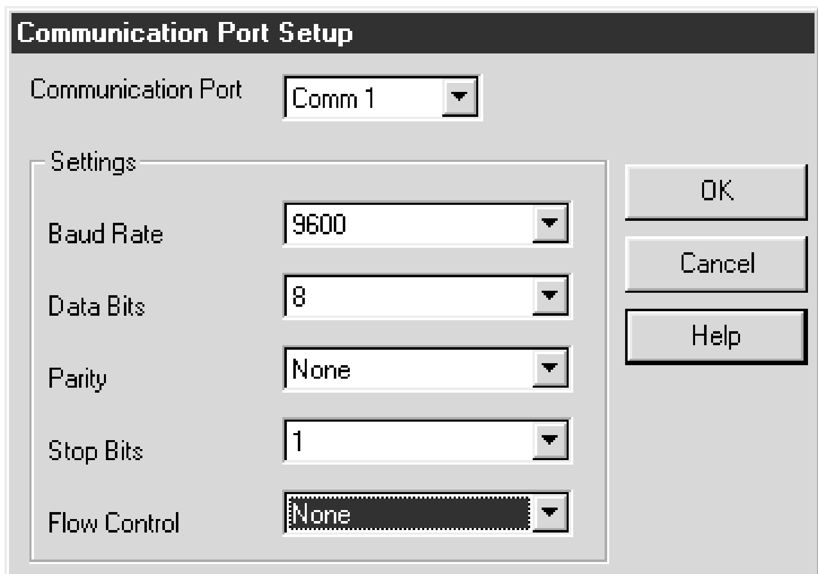
7) **Choose “OK” from the Connection Type screen to finish the connection setup. “New Connection” will now be displayed in the Connect List screen. This name can be edited by highlighting the words “New Connection” and then selecting the words again. When the blinking cursor appears, the user can type the desired name. To save this new file name, press the Enter key on your PC’s keyboard.**

8) **The connection should now be ready for use. However, because different instruments require different RS232 port settings, these values must sometimes be changed. To check these values, from the Connect List screen, select the “Setup” pull down menu and choose “RS232.” The Communication Port Setup screen will**

appear (Figure 10-10). For the 2025, the settings should be: baud rate = 9600, data bits = 8, parity = none, stop bits = 1, flow control = none.

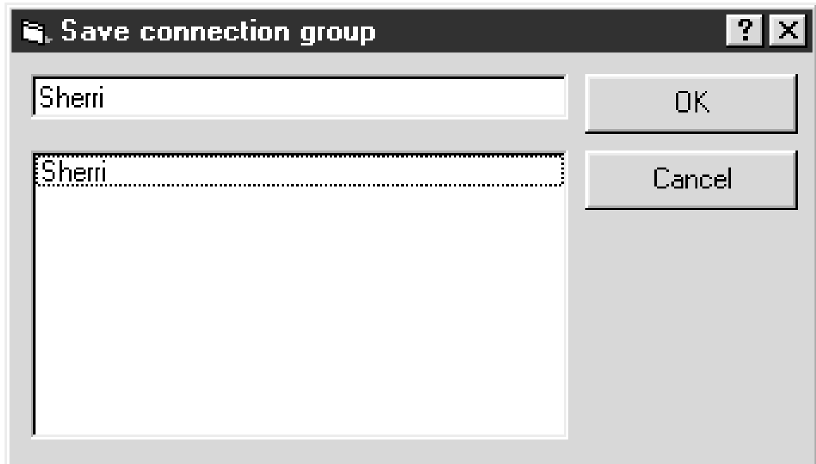
NOTE: If you are using multiple connections to different instrument types and one instrument being used is a TEOM Series 1400 Ambient Particulate Monitor, the flow control setting should be RTS.

Figure 10-10. Communication Port Setup screen.



9) If desired, additional connections can be defined using the above procedure. These new connections can connect various instrument types. When all new connections have been defined, they can be saved in a connection group. From the R&P Communicator Main screen (Figure 10-12), select the "File" pull down menu and choose "Save Group." The next time RPComm is executed, the connection group can be restored by choosing "Open Group" from the "File" pull down menu of the R&P Communicator Main screen. A list of saved connection groups will be displayed in the Save Connection Group screen (Figure 10-11). Choose the desired group and select "OK."

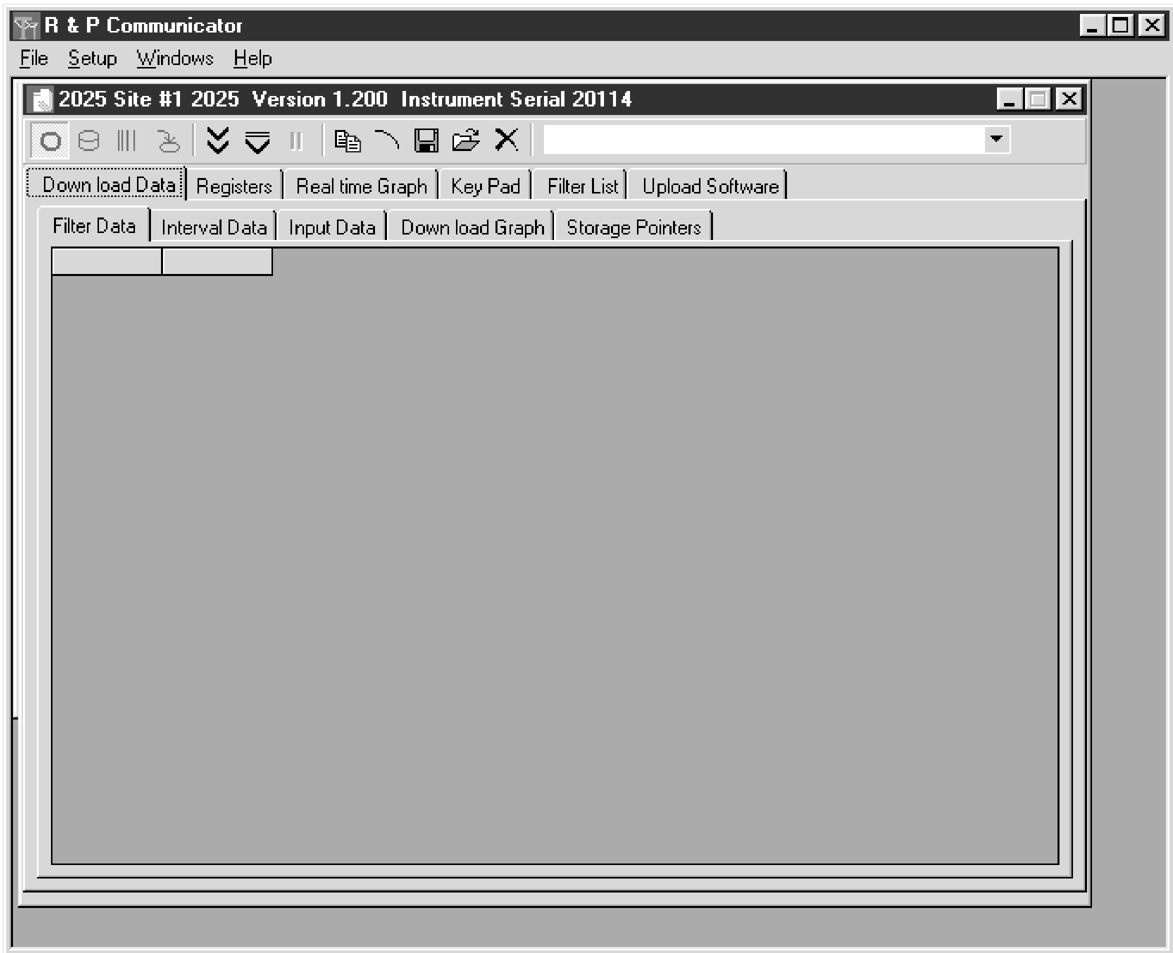
Figure 10-11. Save Connection Group screen.



10) To connect to an instrument, highlight the desired connection and select the Connection icon on the tool bar.  **This will display the 2025 Main screen (Figure 10-12).**

NOTE: If the connection is successful, the instrument's serial number will be displayed at the top of the screen. If the connection is not successful, or if there is no instrument attached, then the serial number area will be blank or will display "99999."

Figure 10-12. 2025 Main screen.



10.2.3. Downloading Stored Data

There are three types of data stored in the unit's internal data logger: filter data, interval data and input data.

> NOTE: The Windows operating system screens shown in this section are from the Windows 95 operating system. These screens may vary slightly from your computer's screens if you are operating RPComm under the Windows 98 or Windows NT operating systems.

10.2.3.1. Setting the Storage Pointer Positions

A storage pointer is a place marker in the internal data logger. When data is downloaded from a unit, the downloading begins at the storage pointer location and continues to the last written record. Once data has been downloaded, the storage pointer position is set to the end of the storage buffer so that the next time data is downloaded, only new data are output. However, if the user wishes to download data only from a particular date, for example, then the position of the storage pointer will need to be set. There are three storage pointers used in the Partisol-Plus Sampler, one for each type of data (filter, interval and input).

To set the storage pointer positions, go to the R&P Communicator Main screen (Figure 10-12) and select the Storage Pointer tab. On the Storage Pointer screen (Figure 10-13), the storage pointer location for each data type will be displayed. Refer to Figure 10-14 for a compete description of the control buttons displayed on the Storage Pointer screen.

Figure 10-13. Storage Pointer screen.

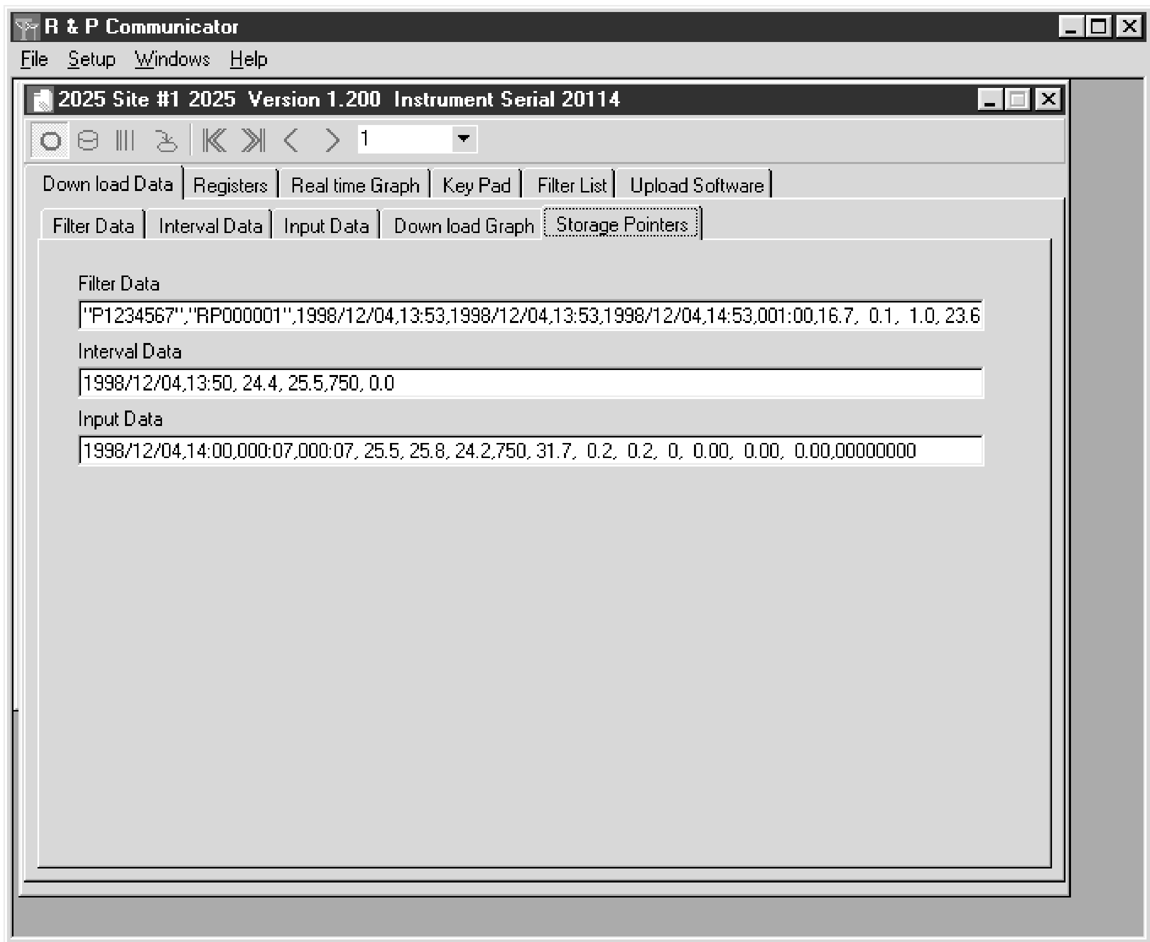
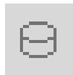
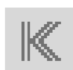
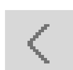
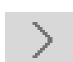
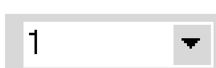


Figure 10-14. Control buttons on the Storage Pointer screen.

	Moves the storage pointer for all data types.
	Moves the storage pointer for only the filter data. The storage positions of the other two pointers will not change.
	Moves the storage pointer for only the input data. The storage positions of the other two pointers will not change.
	Moves the storage pointer for only the interval data. The storage positions of the other two pointers will not change.
	Moves the selected storage pointer(s) to the first record in the buffer. The displayed position of the selected storage pointer(s) will change, unless the pointer was already at the beginning of the buffer.
	Moves the selected storage pointer(s) to the last record in the buffer. The displayed position of the selected storage pointer(s) will change, unless the pointer was already at the end of the buffer. This is useful if the user wishes to download only the last 10 records, for example. Once the end of the buffer is reached, the pointer can be stepped back 10 records using the Move Back icon.
	Moves the selected storage pointer(s) back "x" number of records, where "x" is defined in the Change Record Step box. The displayed position of the selected storage pointer(s) will change, unless the pointer was already at the beginning of the buffer.
	Moves the selected storage pointer(s) forward "x" number of records, where "x" is defined in the Change Record Step box. The displayed position of the selected storage pointer(s) will change, unless the pointer was already at the end of the buffer.
	Change Record Step box. The step size can be 1, 5, 10, 100 or 1000.

10.2.3.2. Downloading Data

Follow these steps to download data from the internal data logger:

1) **Before data are downloaded, the user should ensure that the storage pointer position(s) are correct. Set the storage pointer positions according to Section 10.2.3.1, if necessary.**
2) **From the 2025 Main screen (Figure 10-12), select the Download Data tab. Refer to Figures 10-15 and 10-16 for a complete description of the Download Data screen.**

Figure 10-15. Download Data screen.

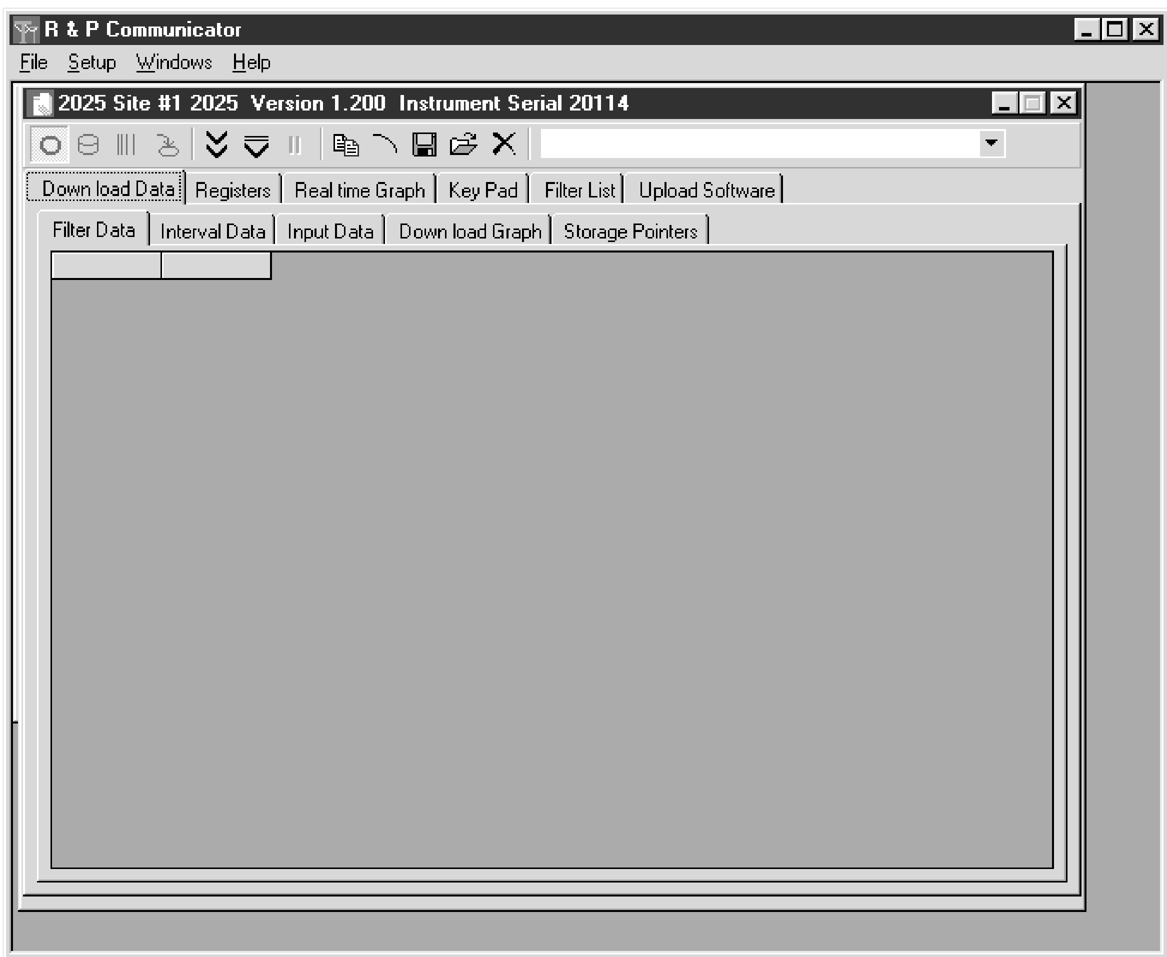
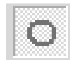


Figure 10-16. Control buttons on the Download Data screen.


Downloads all three type of data.


Downloads filter data only. Interval and input data will not be downloaded.


Downloads interval data only. Filter and input data will not be downloaded.


Downloads input data only. Filter and interval data will not be downloaded.


Downloads all stored data in the data buffer for the selected data types. After the data are downloaded, the storage pointer for the selected data type(s) will move to the end of the buffer. Once the data have been downloaded, each data type can be viewed by selecting the appropriate tab (Figures 10-17, 10-18 and 10-19).


Downloads data from the current storage pointer position(s) to the end of the data buffer for the selected data type(s). After the data are downloaded, the storage pointer for the selected data type(s) will move to the end of the buffer. Once the data have been downloaded, each data type can be viewed by selecting the appropriate tab (Figures 10-17, 10-18 and 10-19).

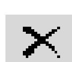

Aborts download. This action will set the storage pointer for the selected data type(s) to the record location where the download was aborted.


Copies selected data to the Windows clipboard. The data can then be imported and used in other programs (Section 10.2.4.1).


Sends selected data to the Download Graph tab. NOTE: Filter data cannot be graphed (Section 10.2.4.2).


Stores desired data to a file. The file is saved in a comma-delimited ASCII format (Section 10.2.4.3).


Opens a data file that has been previously saved to disk for display and graphing.


Clears data currently being displayed.

When the download has been successfully completed, a message will appear in the Dialog box indicating how many records were downloaded. If multiple types of data were downloaded, the user can select the down arrow on the right of the Dialog box to see the results of each download type.

10.2.4. Manipulating Downloaded Data

Once data has been downloaded, it can be manipulated for different uses. All data manipulation procedures listed in this section can be performed within RPComm without being connected to the unit.

NOTE: The Windows operating system screens shown in this section are from the Windows 95 operating system. These screens may vary slightly from your computer's screens if you are operating RPComm under the Windows 98 or Windows NT operating systems.

10.2.4.1. Copying Data to the Clipboard

Once data have been downloaded and displayed in RPComm, a selection of these data can be copied to the Windows clipboard for use in other applications.

Follow these steps to copy data to the Windows clipboard:

1) **From the 2025 Main screen (Figure 10-12), select the Filter Data, Interval Data or Input Data tab to display the desired data screen (Figures 10-17, 10-18 or 10-19).**
2) **To select data, point your mouse cursor at the data cell where you wish to begin the selection. Press and hold down the left mouse button and drag the cursor until all the desired data is selected.**
3) **An alternate way to select data is to point the mouse cursor at the column heading where you wish to begin the selection. Press and hold down the left mouse button and drag the cursor across the columns until all the desired data is selected. This will choose all the data in the selected columns.**
4) **When the proper selection has been made, press the Copy icon.**

 **This will copy the selected data to the Windows clipboard.**

The data can then be pasted into another application.

NOTE: When data are copied to the clipboard, it includes the heading information, even if the entire column was not selected.

Figure 10-17. Downloaded filter data.

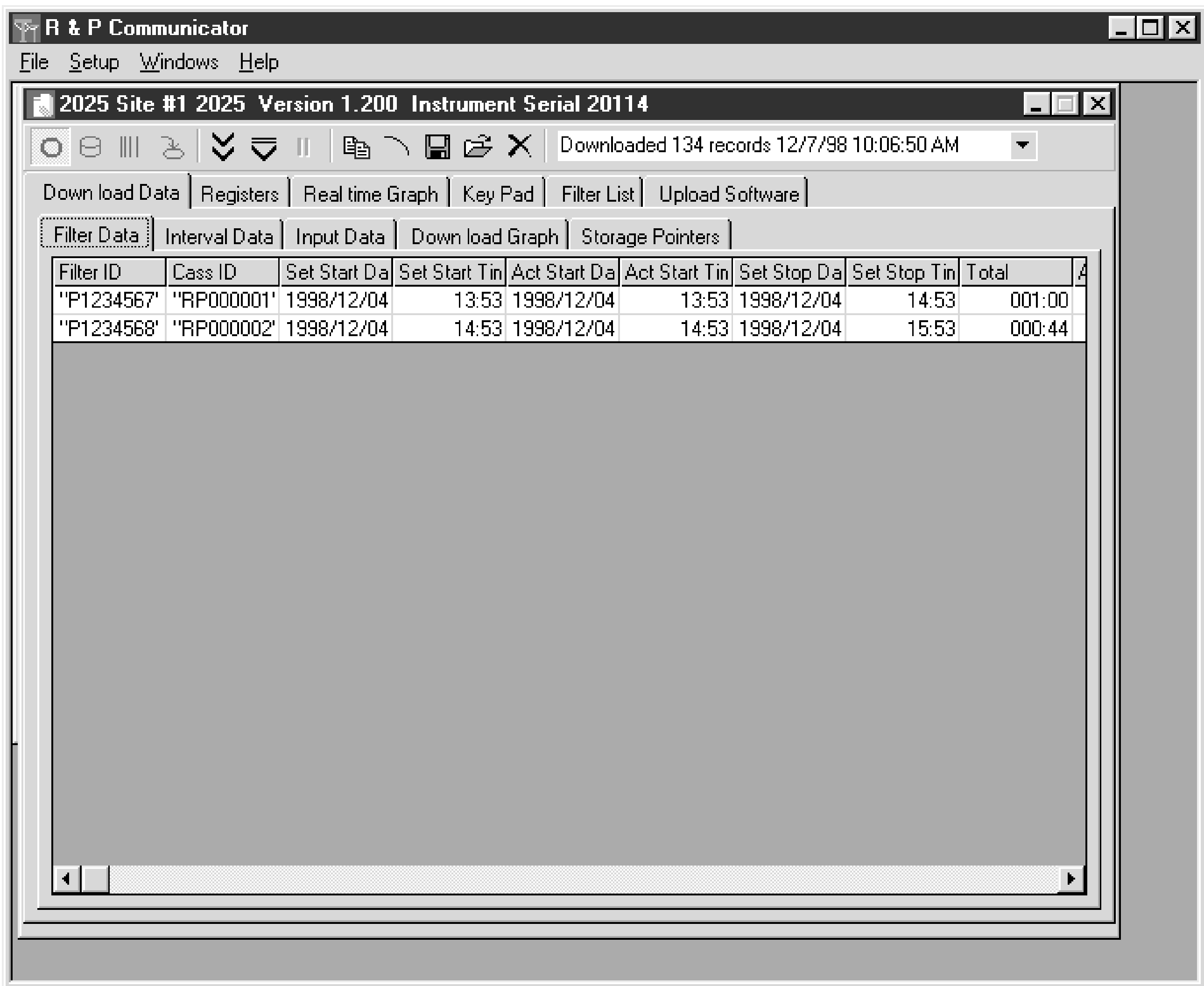
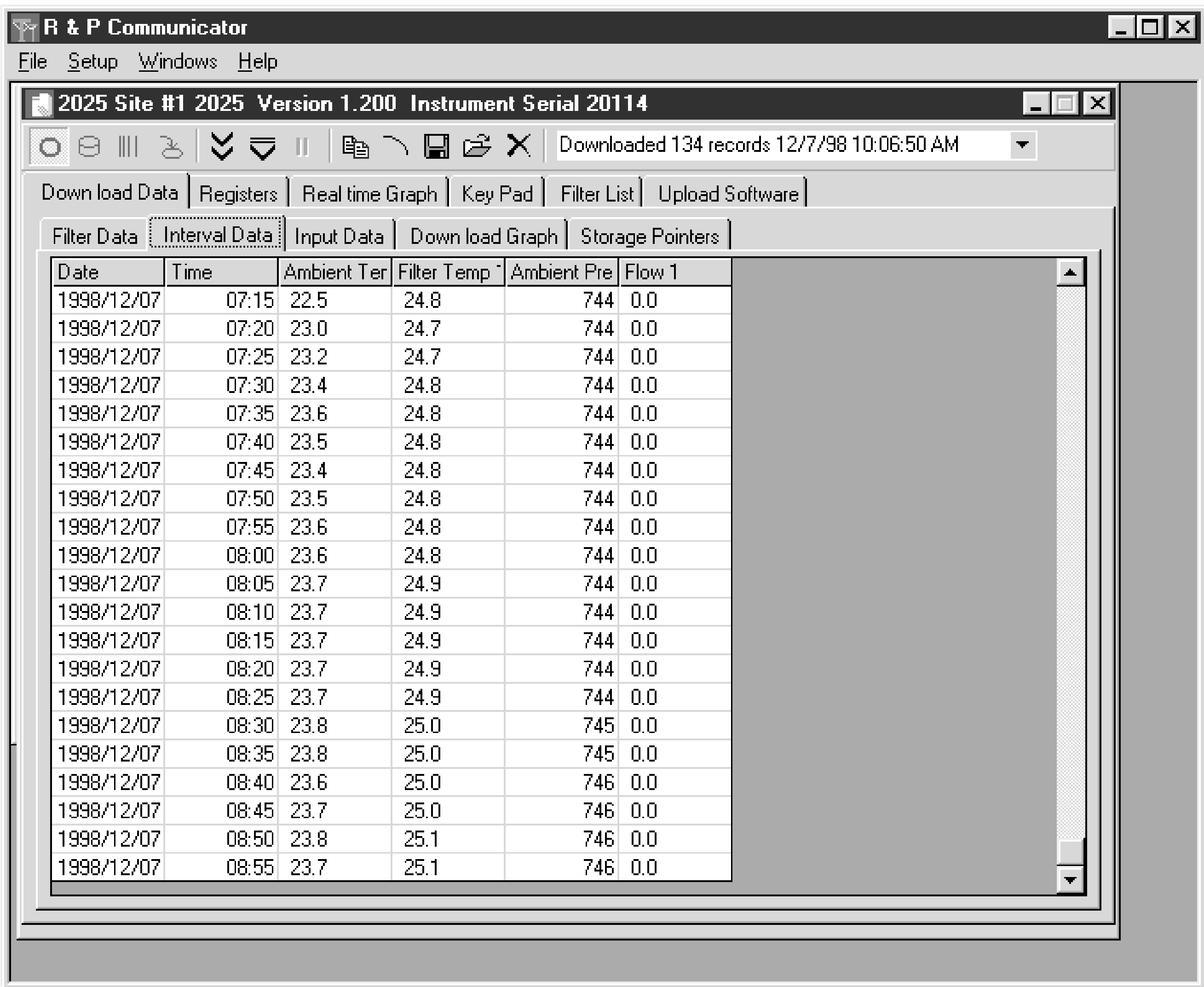
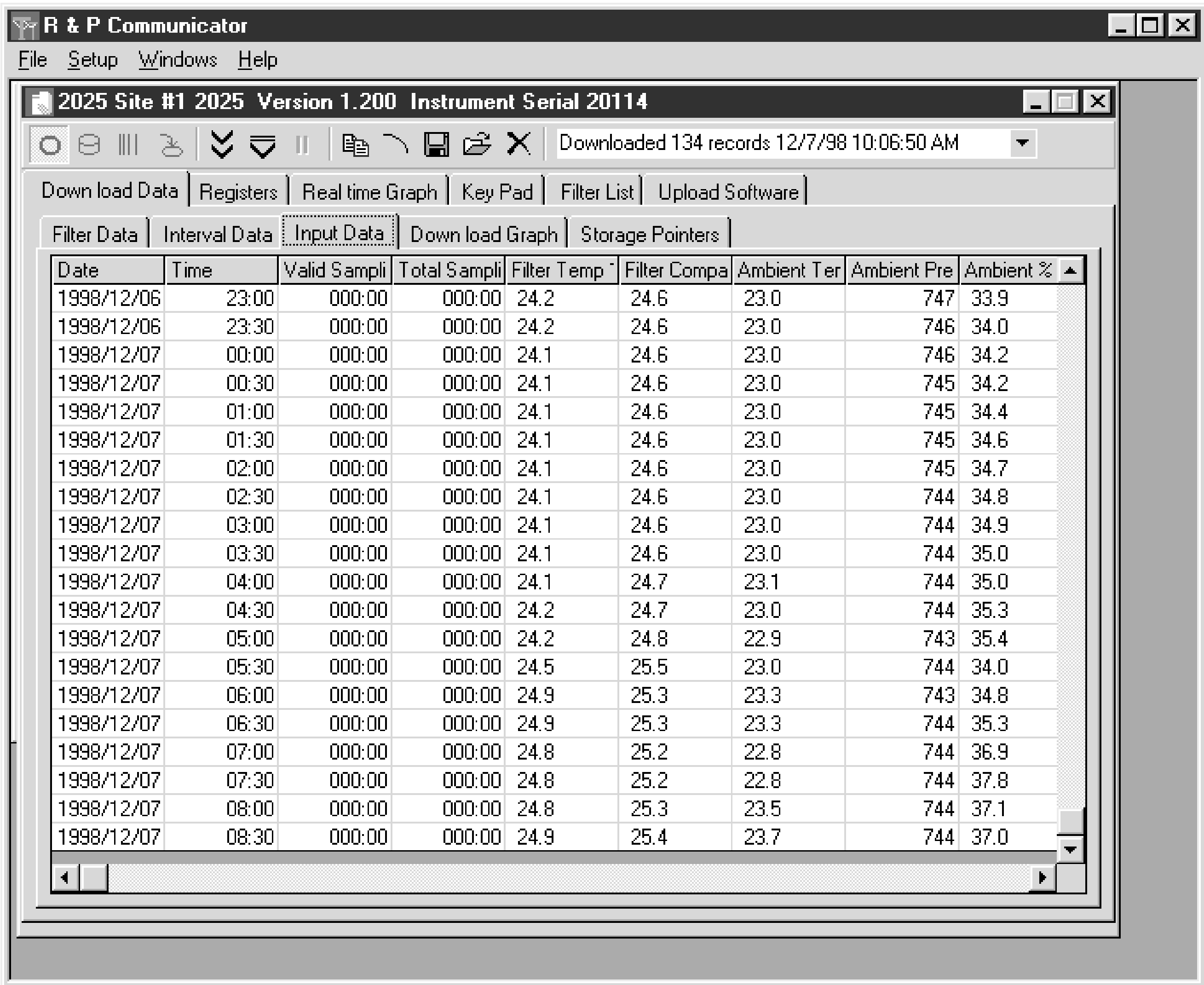


Figure 10-18. Downloaded interval data.



Date	Time	Ambient Ter	Filter Temp ˜	Ambient Pre	Flow 1
1998/12/07	07:15	22.5	24.8	744	0.0
1998/12/07	07:20	23.0	24.7	744	0.0
1998/12/07	07:25	23.2	24.7	744	0.0
1998/12/07	07:30	23.4	24.8	744	0.0
1998/12/07	07:35	23.6	24.8	744	0.0
1998/12/07	07:40	23.5	24.8	744	0.0
1998/12/07	07:45	23.4	24.8	744	0.0
1998/12/07	07:50	23.5	24.8	744	0.0
1998/12/07	07:55	23.6	24.8	744	0.0
1998/12/07	08:00	23.6	24.8	744	0.0
1998/12/07	08:05	23.7	24.9	744	0.0
1998/12/07	08:10	23.7	24.9	744	0.0
1998/12/07	08:15	23.7	24.9	744	0.0
1998/12/07	08:20	23.7	24.9	744	0.0
1998/12/07	08:25	23.7	24.9	744	0.0
1998/12/07	08:30	23.8	25.0	745	0.0
1998/12/07	08:35	23.8	25.0	745	0.0
1998/12/07	08:40	23.6	25.0	746	0.0
1998/12/07	08:45	23.7	25.0	746	0.0
1998/12/07	08:50	23.8	25.1	746	0.0
1998/12/07	08:55	23.7	25.1	746	0.0

Figure 10-19. Downloaded input data.



Date	Time	Valid Sampli	Total Sampli	Filter Temp	Filter Compa	Ambient Ter	Ambient Pre	Ambient %
1998/12/06	23:00	000:00	000:00	24.2	24.6	23.0	747	33.9
1998/12/06	23:30	000:00	000:00	24.2	24.6	23.0	746	34.0
1998/12/07	00:00	000:00	000:00	24.1	24.6	23.0	746	34.2
1998/12/07	00:30	000:00	000:00	24.1	24.6	23.0	745	34.2
1998/12/07	01:00	000:00	000:00	24.1	24.6	23.0	745	34.4
1998/12/07	01:30	000:00	000:00	24.1	24.6	23.0	745	34.6
1998/12/07	02:00	000:00	000:00	24.1	24.6	23.0	745	34.7
1998/12/07	02:30	000:00	000:00	24.1	24.6	23.0	744	34.8
1998/12/07	03:00	000:00	000:00	24.1	24.6	23.0	744	34.9
1998/12/07	03:30	000:00	000:00	24.1	24.6	23.0	744	35.0
1998/12/07	04:00	000:00	000:00	24.1	24.7	23.1	744	35.0
1998/12/07	04:30	000:00	000:00	24.2	24.7	23.0	744	35.3
1998/12/07	05:00	000:00	000:00	24.2	24.8	22.9	743	35.4
1998/12/07	05:30	000:00	000:00	24.5	25.5	23.0	744	34.0
1998/12/07	06:00	000:00	000:00	24.9	25.3	23.3	743	34.8
1998/12/07	06:30	000:00	000:00	24.9	25.3	23.3	744	35.3
1998/12/07	07:00	000:00	000:00	24.8	25.2	22.8	744	36.9
1998/12/07	07:30	000:00	000:00	24.8	25.2	22.8	744	37.8
1998/12/07	08:00	000:00	000:00	24.8	25.3	23.5	744	37.1
1998/12/07	08:30	000:00	000:00	24.9	25.4	23.7	744	37.0

10.2.4.2. Graphing Downloaded Data

Follow these steps to graph downloaded data:

1) **From the 2025 Main screen (Figure 10-12), select the Interval Data or Input Data tab to display the desired data (Figures 10-18 or 10-19).**

   NOTE: Filter data cannot be graphed.

2) **To select data, point the mouse cursor at the data cell where you wish to begin the selection. Press and hold down the left mouse button and drag the cursor until all the desired data is selected.**

3) **An alternate way to select data is to point the mouse cursor at the column heading where you wish to begin the selection. Press and hold down the left mouse button and drag the cursor across the columns until all the desired data is selected. This will choose all the data in the selected columns.**

4) **When the desired selection has been made, select the Graph icon.**

    **This will send the selected data to the Download Graph tab.**

5) **From the 2025 Main screen (Figure 10-12), select the Download Graph tab. The data that were selected should now be graphed and will appear in the Download Graph screen (Figure 10-20). The color key on the right portion of the Download Graph screen shows the variables being graphed and their corresponding colors.**

6) **To display only one of the selected sets of data, choose the desired data set from the color key. To display all selected sets of data again, choose each data set from the color key while holding down the Shift key on the computer.**

7) **Refer to Figure 10-21 for a complete description of the control buttons on the Download Graph screen.**

Figure 10-20. Download Graph screen.

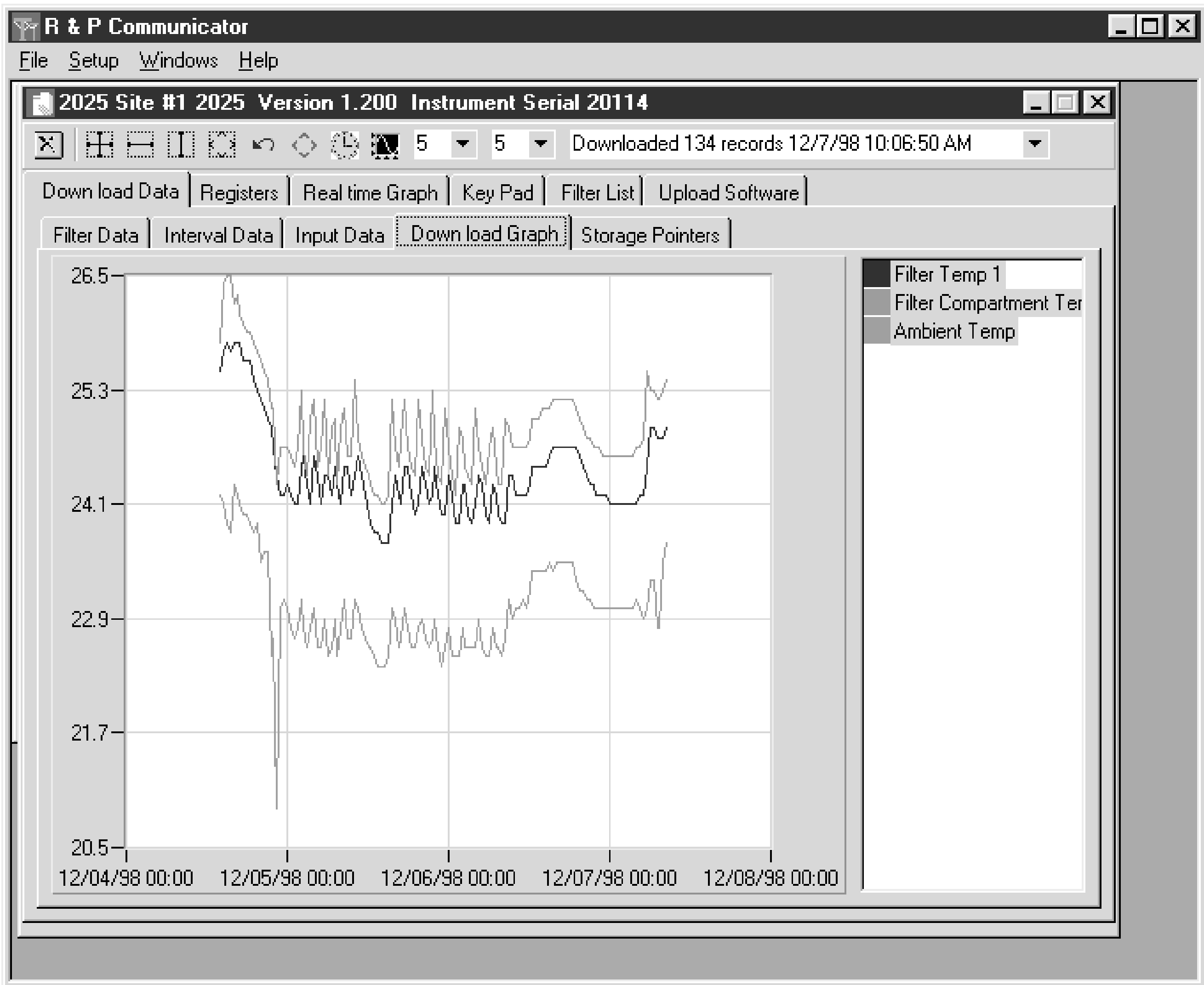
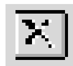
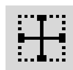


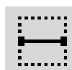
Figure 10-21. Control buttons on the Download Graph screen.



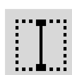
Clears all data listed on the right portion of the Download Graph screen. This includes data being displayed.



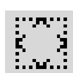
Decreases the scale of the x- and y-axis concurrently. With this icon selected, press and hold down the left mouse button and make a box around the area that you want to zoom into. Once the box is finished, let go of the mouse button. The graph will be resized according to the box dimensions.



Decreases the scale of the x-axis. With this icon selected, press and hold down the left mouse button at the beginning of the area that you want to zoom into. Drag the cursor to the end of the zoom area and let go of the mouse button. The graph will be resized according to the new x-axis dimensions.



Decreases the scale of the y-axis. With this icon selected, press and hold down the left mouse button at the beginning of the area that you want to zoom into. Drag the cursor to the end of the zoom area and let go of the mouse button. The graph will be resized according to the new y-axis dimensions.

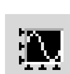


Enables panning. Panning allows the user to move the graph area so that a different section of the x- or y-axis will be displayed without effecting the scale of either axis. With this icon selected, place the mouse cursor somewhere within the graph area and hold down the left mouse button. Move the mouse so that the desired section of the graph is displayed.

Selecting this icon will undo the last zoom or panning step.

Rescales the x- and y-axis so that all the graphs for the selected data are displayed.

Toggles between the two possible x-axis scales: date and time, and time only. This does not effect the way the data are displayed on the graph.



Sends the graph currently being displayed to the Windows default printer.

These two boxes define the number of axis divisions on the graph. The box on the left refers to the x-axis and the right box refers to the y-axis. The number of divisions can be set to 5, 10, 15 or 20 divisions. Increasing the number of divisions results in a finer axis grid. Decreasing the number of divisions results in a courser axis grid. This does not effect the way the data are displayed on the graph.

10.2.4.3. Storing Data to a File

Follow these steps to save data to a file:

1) **From the 2025 Main screen (Figure 10-12), select the Filter Data, Interval Data or Input Data tab (Figures 10-17, 10-18 or 10-19).**

2) **Select the Save icon.**  **The Save Dialog box will appear and prompt the user for a file name. The default file name is:**

nnnnnxyy.txt

where: nnnnnn = the unit's serial number
x = data type (f = filter, i = interval, p = input)
yy = file number (01, 02, etc.)

3) **Once you have chosen a file name, select the "Save" button If more than one type of data has been downloaded, the Save Dialog box will appear again prompting the user for a file name for the next type of data. This will continue until all downloaded data have been saved.**

4) **These files will be saved in a comma-delimited ASCII format which can be imported into any spreadsheet program. The data include all column heading information.**

10.2.5. Scheduling Data Downloads

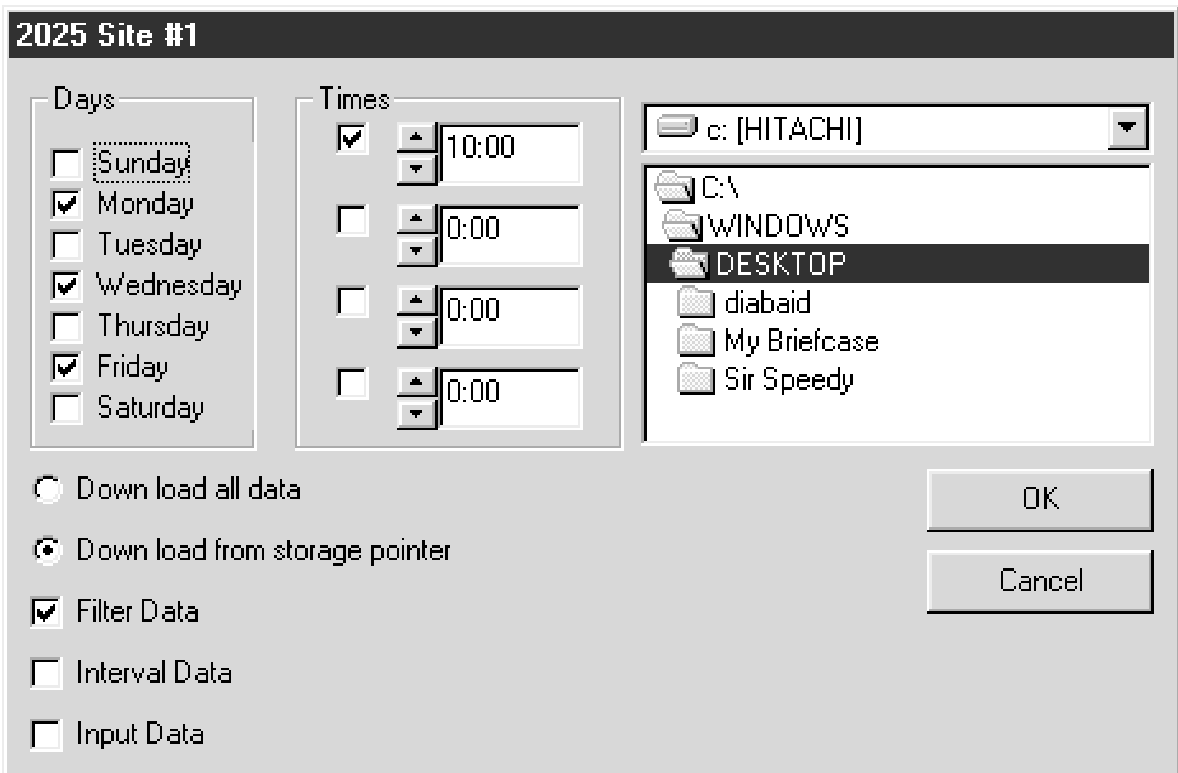
One useful feature of RPComm is its automatic download capability. This feature allows the user to schedule automatic data downloads from a unit up to four times a day.

NOTE: The Windows operating system screens shown in this section are from the Windows 95 operating system. These screens may vary slightly from your computer's screens if you are operating RPComm under the Windows 98 or Windows NT operating systems.

Follow these steps to schedule an automatic data download:

1) **With the Connect List screen displayed (Figure 10-7), select the Schedule Download icon.**  **This will display the Schedule Downloads screen (Figure 10-22).**

Figure 10-22. Schedule Downloads screen.



2) Check the box next to the day(s) of the week that you want the data to be downloaded. You may choose a single day each week or any other combination of days.

3) Select the time(s) on the chosen day(s) that the data are to be downloaded. The data can be downloaded up to 4 times a day.

4) Select the directory location where you want the downloaded data to be stored. R&P recommends that a separate directory be set up for data downloads and that the files be removed from this directory on a regular basis because the file serial number can track only 100 files. The data file will be saved under a file name according to the following convention:

nnnnnxyy.txt

where: nnnnnn = the unit's serial number

x = data type (f = filter, i = interval, p = input)
yy = file number (01, 02, etc.).

5) Select whether all of the data stored in the storage buffer will be downloaded at each scheduled time or if the download will begin at the storage pointer position.

6) Select which data files are to be downloaded. All three types of data can be chosen, if desired.

7) When the schedule has been completed, select "OK" to save your changes. The scheduled downloads for the next 24 hours are listed in the scheduled download list on the Connect List screen. For example, Figure 10-23 shows a scheduled download for 12/7/1998 at 10:00 for unit 2025, site #1.

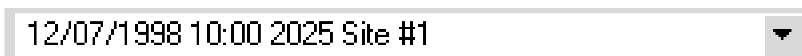


Figure 10-23. Example of a scheduled download from the Connect List screen.

8) Data downloads can be scheduled for each connection listed in the connection list. If more than one download is scheduled for the same time, the downloads will occur in the order that they are listed in the Scheduled Download box.

During a scheduled download, RPComm assigns file numbers or names to the downloaded data according to the file numbers that already exist in the download directory. RPComm increments the file numbers by a value of one more than the largest file number that already exists in the download directory.

For example, if the download directory has one file in it with the number 20114f01.txt, at the next scheduled filter data download RPComm will assign the file name 20114f02.txt to the new downloaded data. The number "02" was the next available file number.

The new file numbers will always be incremented (by a value of one) during scheduled downloads regardless of file type. For example, if the download directory has three files in it with the numbers 20114i01.txt, 20114f02.txt and 20114p03.txt, at the next scheduled filter data download, RPComm will assign the file name 20114f04.txt to the new downloaded data. The number "04" was the next available file number.

If all three types of data (filter, interval and input) are downloaded at the same time, RPComm will give all three files the same number. If the download directory is empty and you schedule a download of all three types of data, RPComm will assign the

following file names to the data: nnnnnf01.txt, nnnnni01.txt and nnnnnp01.txt ("nnnnn" is your unit's serial number).

If the download directory already has files in it and you schedule a download of all three types of data, RPComm will increment the file numbers using the next highest available number. For example, if the download directory has two files in it with the names 31005f02.txt and 31005p04.txt, and you schedule a download of all three types of data, then RPComm will assign the following file names to the downloaded data: 31005f05.txt, 31005p05.txt and 31005i05.txt. The number "05" was the next available file number.

10.2.6. Viewing Instrument Operation

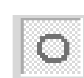
NOTE: The Windows operating system screens shown in this section are from the Windows 95 operating system. These screens may vary slightly from your computer's screens if you are operating RPComm under the Windows 98 or Windows NT operating systems.

10.2.6.1. Viewing System Registers

A system register is a value entered into, calculated by, or measured by the unit. Examples of system registers are the unit's serial number (entered into), the calibration constants (calculated by), and the ambient temperature (measured by). Every system register can be displayed by RPComm.

Follow these steps to view system registers:

1) **From the 2025 Main screen (Figure 10-12), select the Registers tab to display the Registers screen (Figure 10-24).**

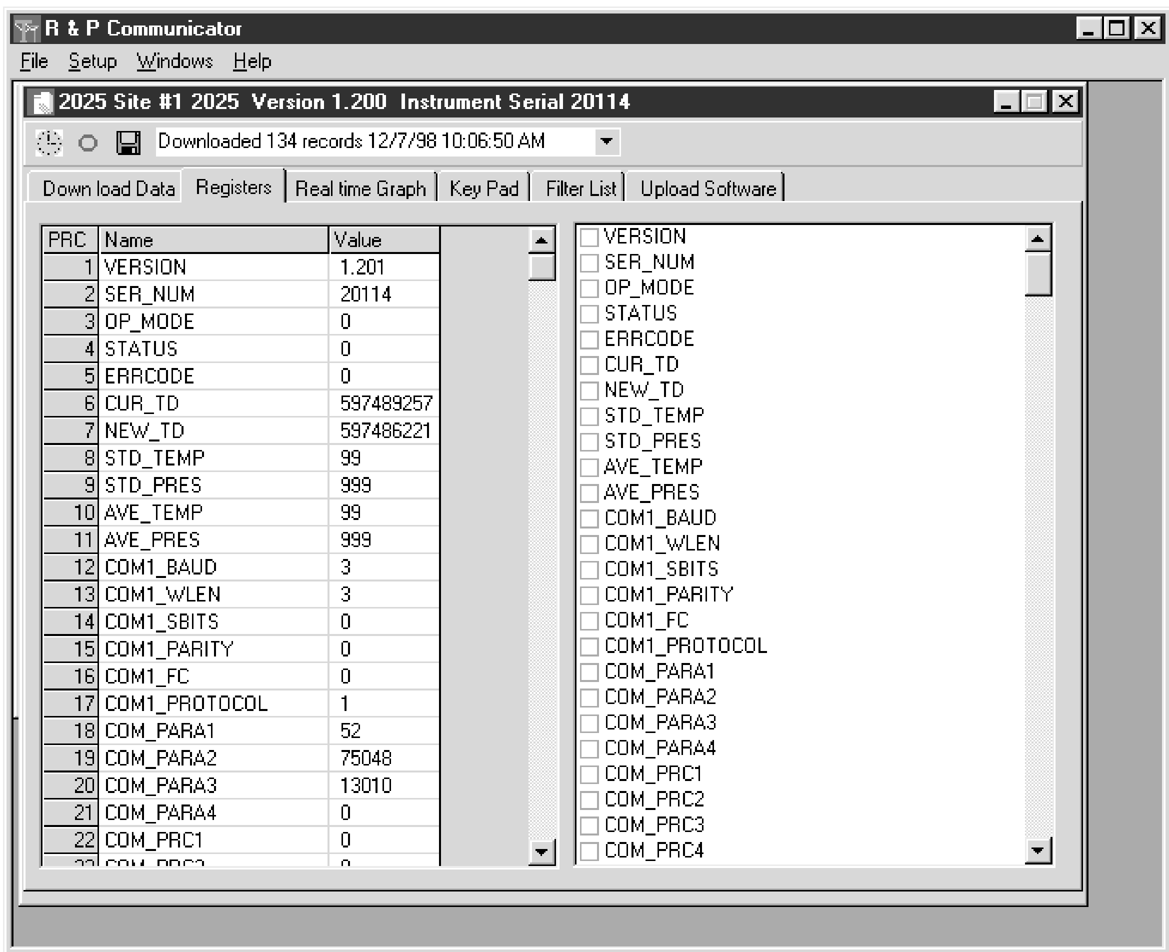
2) **On the right portion of the Registers screen is a list of all the system registers. Using the scroll bar, examine the list of registers and place a checkmark next the registers that you wish to view. Or, if desired, select the Select All Registers icon**  **to choose all the registers. As registers are selected, they will appear on the left side of the screen.**

3) **Select the Read Registers icon**  **to read the selected registers from the unit. All the current values will appear in the list on the**

left side of the screen next to their corresponding label.

4) To save the register list to a file, select the Save icon. The user will then be prompted to select a location and file name. This list can be useful for troubleshooting.

Figure 10-24. Registers screen.



10.2.6.2. Viewing Instrument Keypad

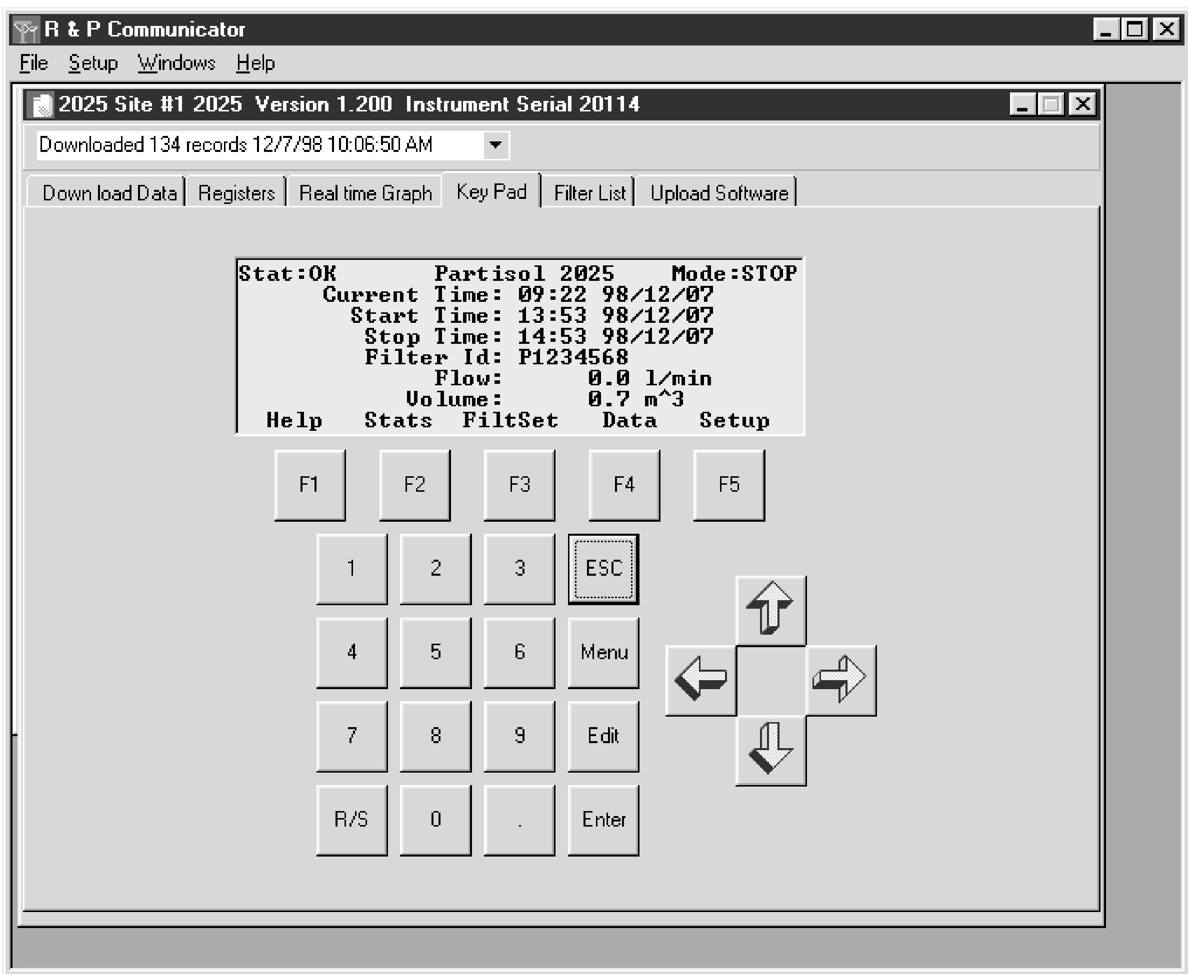
A virtual keypad is available for use through RPComm. This keypad looks exactly like the keypad on the unit and shows what is currently being displayed on the unit's display.

Follow these steps to view the virtual keypad:

1) From the 2025 Main screen (Figure 10-12), select the Keypad tab to display the virtual keypad (Figure 10-25).

NOTE: If the virtual display shows a number line as the top line and does not show the proper display, RPComm is not communicating with the unit properly.

Figure 10-25. Virtual keypad.



2) Operate the virtual keypad as you would the keypad on the unit.

NOTE: The Partisol-Plus Sampler has a built-in feature that allows the display backlight to turn off if a key has not been pressed within a set amount of time. Because of this, a key can be pressed on the virtual keypad and nothing may appear to change on the display. This could occur because the key stroke may have caused the display backlight to turn on. Therefore, the key may have to be pressed twice.

10.2.7. Creating a Real-Time Graph

RPComm can display any system register(s) in a real-time graph. Each register value is updated and graphed every second.

NOTE: The Windows operating system screens shown in this section are from the Windows 95 operating system. These screens may vary slightly from your computer's screens if you are operating RPComm under the Windows 98 or Windows NT operating systems.

Follow these steps to create a real-time graph:

1) From the 2025 Main screen (Figure 10-12), select the Real-Time Graph tab to display the Real-Time Graph screen (Figure 10-26).

2) In the lower-right corner of the screen is a list of system registers. Using the scroll bar, examine the list of registers and place a checkmark next to the registers that you wish to graph. As registers are chosen, the values will appear on the graph. The color key on the upper-right portion of the screen shows the variables being graphed and their corresponding colors.

3) Refer to Figure 10-27 for a complete description of the control buttons on the Real-Time Graph screen.

Figure 10-26. Real-Time Graph screen.

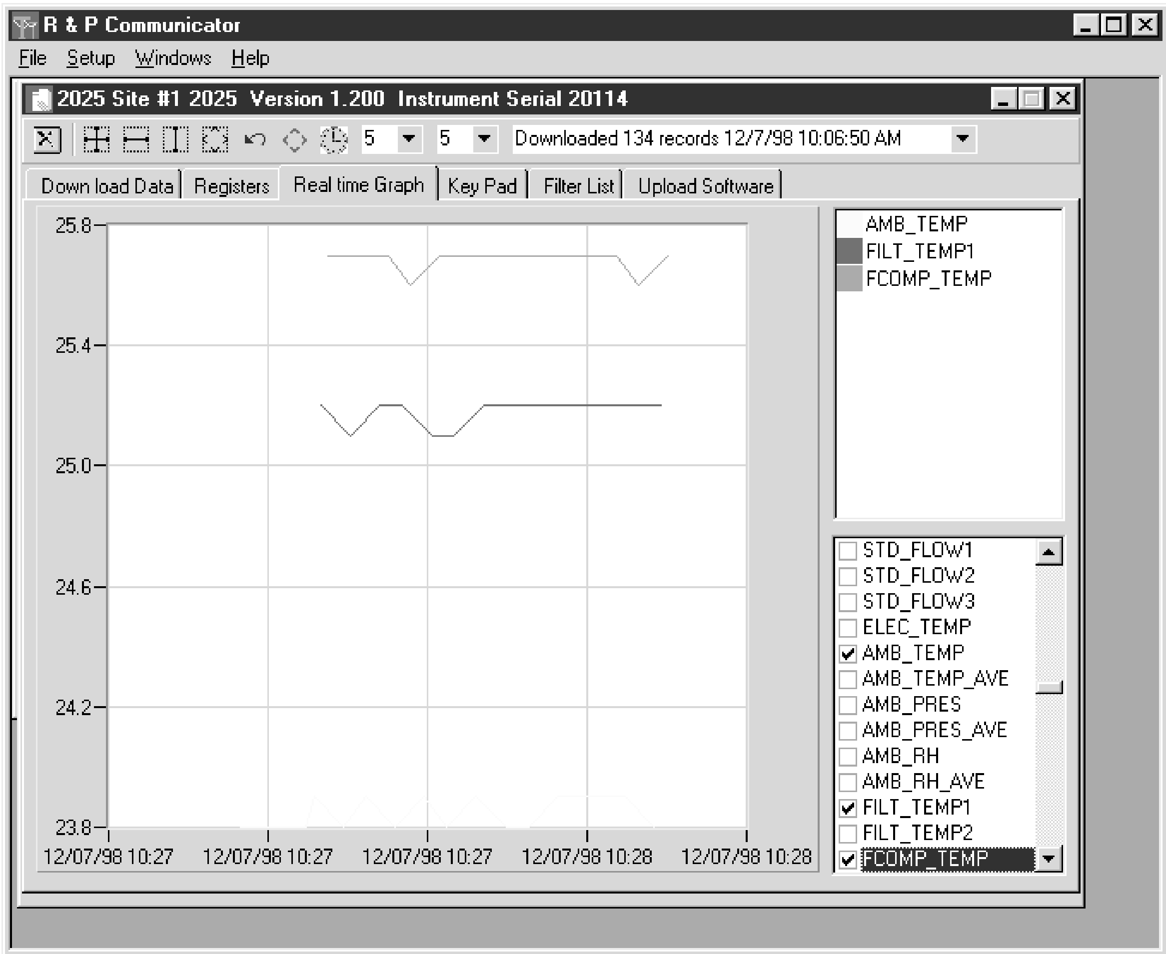
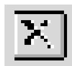
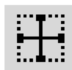


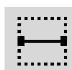
Figure 10-27. Control buttons on the Real-Time Graph screen.



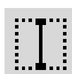
Clears all data listed on the right side of the Real-Time Graph screen. This includes data being displayed.



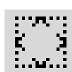
Decreases the scale of the x- and y-axis concurrently. With this icon selected, press and hold down the left mouse button and make a box around the area that you want to zoom into. Once the box is finished, let go of the mouse button. The graph will be resized according to the box dimensions.



Decreases the scale of the x-axis. With this icon selected, press and hold down the left mouse button at the beginning of the area that you want to zoom into. Drag the cursor to the end of the zoom area and let go of the mouse button. The graph will be resized according to the new x-axis dimensions.



Decreases the scale of the y-axis. With this icon selected, press and hold down the left mouse button at the beginning of the area that you want to zoom into. Drag the cursor to the end of the zoom area and let go of the mouse button. The graph will be resized according to the new y-axis dimensions.



Enables panning. Panning allows the user to move the graph area so that a different section of the x- or y-axis is being displayed without effecting the scale of either axis. With this icon selected, place the mouse cursor somewhere within the graph area and hold down the left mouse button. Move the mouse so that the desired section of the graph is displayed.

Selecting this icon will undo the last zoom or panning step.

Rescales the x- and y-axis so that all the graphs for the selected data are displayed.

Toggles between the two possible x-axis scales: date and time, and time only. This does not effect the way the data are displayed on the graph.

These two boxes define the number of axis divisions on the graph. The left box refers to the x-axis and the right box refers to the y-axis. The number of divisions can be set to 5, 10, 15 or 20 divisions. Increasing the number of divisions results in a finer axis grid. Decreasing the number of divisions results in a courser axis grid. This does not effect the way the data are displayed on the graph.

10.2.8. Managing A Filter List

Maintaining the filter list from the unit's keypad can be tedious and difficult. RPComm allows you to create, modify, save, retrieve and upload the unit's filter list from your PC.

NOTE: The Windows operating system screens shown in this section are from the Windows 95 operating system. These screens may vary slightly from your computer's screens if you are operating RPComm under the Windows 98 or Windows NT operating systems.

Follow these steps to manage a filter list:

1) **From the 2025 Main screen (Figure 10-12), select the Filter List tab to display the Filter List screen (Figure 10-28).**

2) **Select your unit's maximum filter capacity by using the Filter icon.**

   Standard Partisol-Plus Samplers have a 16-filter capacity (one filter exchanger), while the Dichotomous Partisol-Plus Model 2025 Samplers have a 32-filter capacity (two filter exchangers).

3) **To retrieve the filter list currently loaded in the unit, select the Retrieve icon.**

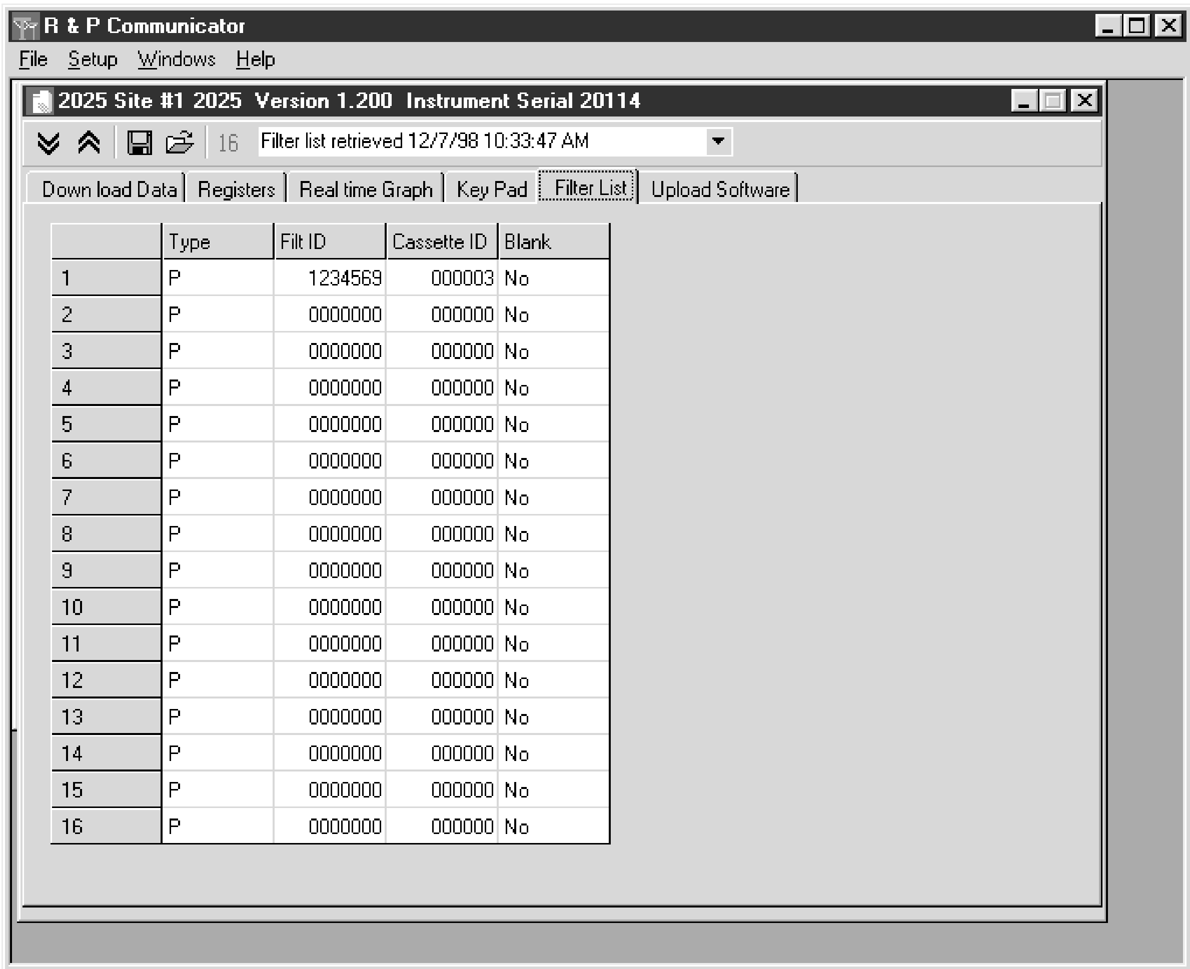
4) **To load a filter list previously saved, select the Load icon.**

5) **Modify the filter list as desired. For 32-filter capacity systems, filters 1 through 16 are installed in the front filter exchanger, and 17 through 32 are installed in the rear filter exchanger.**

   NOTE: For 32-filter capacity systems, a blank filter cassette must be in the same position for both filter exchangers. Therefore, if the position 1 filter is set as a blank, RPComm automatically sets the position 17 filter as a blank.

6) **Once the filter list has been modified as desired, upload the list to the unit by selecting the Send icon.**

Figure 10-28. Filter List screen.



Section 11: Password Protection

Access to program features of the Partisol-Plus Sampler can be restricted through the use of passwords. This section describes how to access this feature.

Password protection is accessed from the System Setup screen. The contents of this screen are reviewed in Section 5.1, while this section describes how to use the <F5: Passwd> function.

While in the System Setup screen (Figure 11-1), press the <F4: Passwd> key to display the Password Setup screenThe user may redefine the low and high level passwords while in this screen.

Figure 11-1. System Setup screen.

System Setup					
Average Temp: 99			Standard Temp: 99		
Average Pres: 999			Standard Pres: 999		
Date Form: YY/MM/DD			Average Time: 30		
Time Form: :			Filter Fan: ON		
Curr Time: 05:00:00			Auto Run: ON		
Curr Date: 98/04/10					
Help	I/O	Site ID	Passwd	SysInfo	
Function Keys in Browse Mode					
Help	I/O	Site ID	Passwd	SysInfo	
Function Keys in Edit Mode					
-List	+List	Bksp	ChSign		

11.1. Password Protection

The Password Setup screen (Figure 11-2) is displayed by pressing <F4: Passwd> while in the System Setup screen. The Partisol-Plus Sampler offers two levels of password protection to guard against unauthorized use of the unit. Under normal conditions, the unit operates with password protection turned off. The two levels of password protection are defined as follows:

Low When in the low protection state, the sampler prevents the user from entering the Edit Mode. Execute the following keystrokes while in the Browse Mode to initiate or disable the low protection state:

<ENTER>, <ENTER>, LoPassword, <ENTER>

If the password protection is successfully invoked or revoked, the unit will beep twice. An "L" in the field farthest to the right of the soft function key line (Figure 11-3) in the Main screen indicates that the unit is in the low protection state.

Figure 11-2. Password Setup screen.

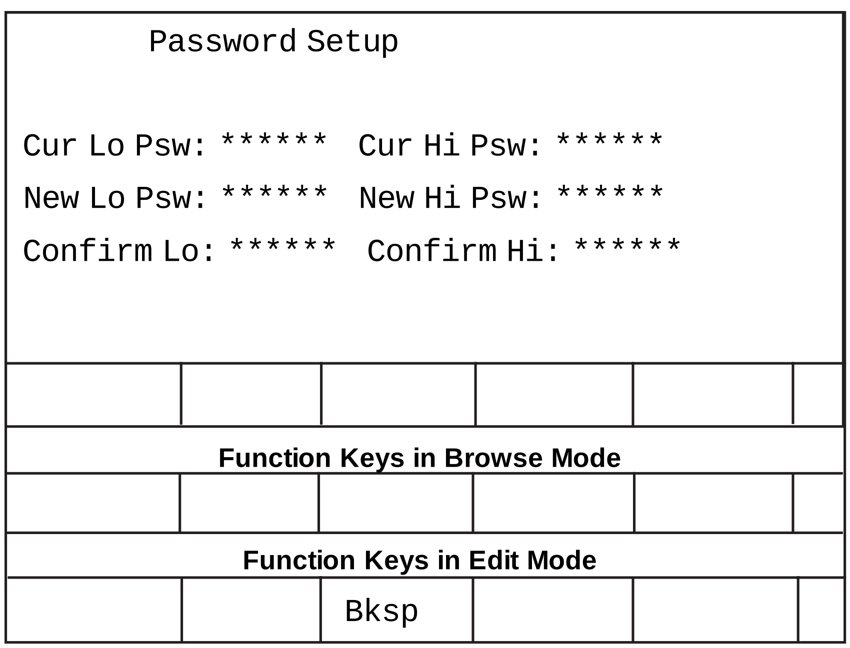


Figure 11-3. Main screen with low password protection turned on.

```
Stat:OK     Partisol 2025          Mode:Done
         Current Time: 09:27 98/07/23
         Start Sample: 00:00 98/07/24
          Stop Sample: 00:00 98/07/25
            Filter ID: 123456
          Cassette ID:  100123
                Blank:  No
StCode | Stats | FiltSet | Data | Setup | L
```

High

When in the high protection state, the sampler prevents the user from editing values and changing screens. Execute the following keystrokes while in the Browse Mode to initiate or disable the high protection state:

<ENTER>, <ENTER>, <ENTER>, HiPassword, <ENTER>

If the password protection is successfully invoked or revoked, the unit will beep three times. An “H” in the farthest field to the right of the soft function key line (Figure 11-4) indicates that the unit is in the high protection state.

Figure 11-4. Main screen with high password protection turned on.

```
Stat:OK     Partisol 2025          Mode:Done
         Current Time: 09:27 98/07/23
         Start Sample: 00:00 98/07/24
          Stop Sample: 00:00 98/07/25
            Filter ID: 123456
          Cassette ID:  100123
                Blank:  No
StCode | Stats | FiltSet | Data | Setup | H
```

The initial passwords for both low and high protection is “100000.” The user may move from low to high protection using the keystrokes above for the high protection state. When the user turns off high protection, the unit always reverts to its unprotected state.

The user may change the low and high passwords in the Password Setup screen (Figure 11-4). To reach this screen from the Main screen, press <F5: Setup>, <F5: System> and then <F4: Passwd>. After entering this screen, the user can move the cursor only to the fields labeled “Cur Lo Psw” and “Cur Hi Psw.”

To change the low password, enter the value of the current low password in the Cur Lo Psw field while in the Edit Mode. The unit then provides access to the New Lo Psw and Confirm Lo fields, in which the user must now enter the *new* low password twice. Press <ENTER> to leave the Edit Mode and to save your new low password. The sampler should beep twice to indicate that the password has been successfully changed.

If you do not enter a new low password correctly, the unit will not beep when you press <ENTER> and the cursor will move back to the line labeled “New Lo Psw.” Press <ESC> to leave the Password Setup screen in case of difficulties.

To change the high password, enter the value of the current high password in the Cur Hi Psw field while in the Edit Mode. The unit then provides access to the New Hi Psw and Confirm Hi fields, in which the user must now enter the *new* high password twice. Press <ENTER> to leave the Edit Mode and to save your new high password. The sampler should beep three times to indicate that the password has been successfully changed.

If you do not enter a new high password correctly, the unit will not beep when you press <ENTER> and the cursor will move back to the line labeled “New Hi Psw.” Press <ESC> to leave the Password Setup screen in case of difficulties.

> NOTE: Password protection can be turned on or off from any screen.

11.2. Resetting Low and High Passwords

If you misplace or forget the low and high passwords, you can reset both high and low passwords to “100000” by pressing <F4> when the unit displays the Title screen (Figure 11-5). Note that <F4> is not labeled with any text – this is a precaution taken to guard against unwanted use of this feature. Resetting the low and high passwords does not affect the current protection state of the unit , and does *not* change any of the sampler’s other parameters.

Figure 11-5. Title screen.

```
      Partisol-Plus
 Model 2025 Sequential Air Sampler

 Version: 1.202   Date: 8-Dec-98

Copyright 1998
Rupprecht & Patashnick Co., Inc.
```

RDfault	RData			Reset	

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Section 12: Routine Maintenance and Verification Procedures

This section describes the procedures involved in verifying the calibration of the Partisol-Plus Sampler and in maintaining the consistent operation of the hardware. U.S. EPA monitoring network requirements for maintenance and verification can be found in the U.S. EPA 2.12 Quality Assurance Handbook, Section 8.

12.1. Verification Procedures

The following verification procedures use the sampler's Audit screen (Figure 12-1), which is accessed through the Service Mode when the sampler is in the Stop Mode, or by pressing <RUN/STOP> when the sampler is in the Wait or Sampling Mode.

Figure 12-1. Audit screen.

```
                    Audit
Filt Temp: 22.5   |    Set Flow: 16.7
 Amb Temp: 22.6   |    Cur Flow: 16.68
 Amb Pres:  752   |    FTS Pres:  0.00
  Amb %RH:   75   |    FTS Flow:   0.00
                  |    FTS Const m: 0.000
Timer: 00:00:00        FTS Const b: 0.000
 Pump | Valve |      | FiltAdv | LeakChk |
```

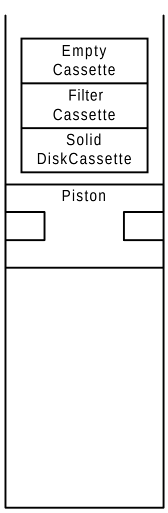

Figure 12-2. Loaded audit magazine.

Follow these steps to verify the sampler's performance characteristics *while in the Stop Mode*:

1) **Create an audit magazine (Figure 12-2). Install a supply magazine with an empty cassette (no screen), an external leak check cassette (with a 47mm filter) and an internal leak check cassette (with a solid filter leak check/separator disk) into an empty supply magazine. The empty cassette should be in the topmost position as shown in Figure 12-2. Install the audit magazine in the left side of the enclosure and a clean empty storage magazine on the right side of the enclosure to collect the partially exposed sampling filter (Section 3).**
2) **Press <MENU> to display the Master menu. Scroll to the ">Service Mode" and press <ENTER>.**
3) **Press <F1: Audit> to display the Audit screen.**

4) When the audit is complete, remove the audit magazine from the supply position. Place the partially exposed sampling cassette, that was previously in the sampling position befure you installed the audit magazine, in the topmost position of a loaded supply magazine. Connect the air hose to the supply magazine. Press <F4: FiltAdv> to move the partially exposed sampling filter into the sampling position. Any leak check cassette remaining in the sampling position that was used during the audit will advance to the storage magazine. Remove this cassette from the storage magazine and install an empty storage magazine as described in Section 3.4.1.

5) Replace the 1st stage inlet on the sample tube by pressing down until it hits a stop. Press <ESC> twice to return to the Main screen. Press <RUN/STOP> to begin sampling.

Follow these steps to verify the sampler's performance characteristics *while in the Sampling or Wait Modes*:

1) Create an audit magazine (Figure 12-2). Install a supply magazine with an empty cassette (no screen), an external leak check cassette (with a 47mm filter) and an internal leak check cassette (with a solid filter leak check/separator disk) into an empty supply magazine. The empty cassette should be in the topmost position as shown in Figure 12-2. Install the audit magazine in the left side of the enclosure and a clean empty storage magazine on the right side of the enclosure to collect the partially exposed sampling filter (Section 3).

✘ If you are performing an audit from the Sampling Mode and you choose <F2: Stop> in the Audit Confirmation screen, the unit WILL NOT resume sampling (after your audit procedures are finished) at the set points that you previously entered.

2) Press <RUN/STOP> once to enter the Audit Mode. The unit then will display the Audit Confirmation screen (Figure 12-3). Press <F1: Audit>, and then press any key to continue.

NOTE: The Audit Confirmation screen also will give you the option to select <F2: Stop> or <F5: Resume>, in addition to <F1: Audit>.

IMPORTANT: If you are performing an audit from the Sampling Mode and you choose <F2: Stop> in the Audit Confirmation screen, the unit will not resume sampling (after your audit procedures are finished) at the set points that you previously entered. The unit will advance its sampling cycle to the next day and then enter the Wait Mode.

3) Press <MENU>, make sure that ">Audit" is selected and then press <ENTER>. This will display the Audit screen (Figure 12-1).

Figure 12-3. Audit Confirmation screen.

```
Stat: OK     Partisol-Plus    Mode: WAIT

      Do you want to AUDIT or STOP?

          Please choose:

Audit  |  Stop  |  |  |  Resume  |
```

4) **When the audit is complete, remove the audit magazine from the supply position. Place the partially exposed sampling cassette, that was previously in the sampling position before you installed the audit magazine, in the topmost position of a loaded supply magazine. Connect the air hose to the supply magazine. Press <F4: FiltAdv> to move the partially exposed sampling filter into the sampling position. Any leak check cassette remaining in the sampling position that was used during the audit will advance to the storage magazine. Remove this cassette from the storage magazine and install an empty storage magazine as described in Section 3.4.1.**

5) **Replace the 1st stage inlet on the sample tube by pressing down until it hits a stop. Press <ESC> twice to return to the Main screen. Press <RUN/STOP> to resume sampling.**

12.1.1. Verifying the Ambient Air Temperature

Follow these steps to verify the ambient air temperature:

1) **Determine the current temperature (°C) at the ambient temperature sensor using an external thermometer, [°C = 5/9 x (°F - 32)].**

2) **Verify that the value of Amb Temp displayed in the Audit screen is within ± 2° C of the measured temperature. If this is not the case, perform the ambient temperature calibration procedure described in the Service Manual.**

12.1.2. Verifying the Filter Temperature

Follow these steps to verify the filter temperature:

1) Remove the 1st stage inlet and the sample tube by pulling straight upward on the sample tube. Unlatch and open the sampler's top cover. Pull straight upward to remove the WINS impactor (Figure 12-4). Perform the WINS impactor maintenance as described in Appendix G.

2) Verify the sampler filter temperature by inserting an external thermometer into the sampling chamber as shown in Figure 12-5. Compare the measured temperature (°C) with the Filt Temp displayed in the Audit screen. If the measured and Filt Temp readings are not within ± 2° C [°C = 5/9 x (°F - 32)] perform the filter temperature calibration procedure described in the Service Manual.

3) Install the WINS impactor by pressing down until it hits a stop. Insert the adapter on the WINS impactor and press down until it hits a stop.

Figure 12-4 (Left). Removing WINS impactor.

Figure 12-5 (Right). Inserting an external temperature probe into the sampling chamber.

12.1.3. Verifying the Ambient Pressure

Follow these steps to verify the ambient pressure:

1) **Determine the current ambient station pressure in mm Hg (absolute pressure, not corrected to sea level). Verify the sampler's ambient pressure by measuring the current ambient station pressure in mm Hg with an external measurement device.**
   - To convert from Atmospheres @ 0° C to mm Hg, multiply by 760.
   - To convert from millibars to mm Hg, multiply by 0.75012.
   - To convert from inches Hg @ 32° F to mm Hg, multiply by 25.4.
2) **Verify that the value for Amb Pres in the Audit screen is within ±10 mm Hg of the measured ambient pressure. If this is not the case, perform the ambient pressure calibration procedure described in the Service Manual.**

12.1.4. Verifying the Ambient Relative Humidity

Follow these steps to verify the ambient relative humidity:

1) **Determine the current ambient relative humidity (%).**
2) **Verify that the value for Amb %RH in the Audit screen is within ±1.5 percentage points of the measured ambient relative humidity. If this is not the case, perform the ambient relative humidity calibration procedure described in the Service Manual.**

12.1.5. External Leak Check

Follow these steps to perform an external leak check:

NOTE: To ensure leak tightness, a filter cassette containing a new 47 mm filter must be installed in the sampling position of the sampler.

1) **Attach the flow audit adapter to the sample tube (Figure 12-6) and close the valve on the flow audit adapter.**
2) **While in the Audit screen, press <F5: LeakChk> to display the Leak Check screen (Figure 12-7). Press <F2: Start>, and follow the instructions displayed on the screen.**

NOTE: If you press <F2: Start> but fail to follow the instructions on the screen, the unit will abort the leak check after waiting 5 minutes. To initiate another leak check, you must again press <F2: Start>.

3) A “Pass” or “Fail” message will display at the end of the leak check cycle. A pressure drop of 25 mm Hg or less is the sampler’s leak check pass criteria.

4) If a “Fail” message is displayed, insert a new 47 mm filter into a filter cassette and place it in the topmost position of the audit magazine. Press <F4: FiltAdv> to move the new filter into sampling position. Repeat the leak check procedure.

5) If a “Fail” message is again displayed, perform the troubleshooting procedures detailed in the Service Manual.

6) If a “Pass” message is displayed, slowly open the valve on the flow audit adapter.

Figure 12-6. Flow audit adapter with valve in closed position .

Figure 12-7. Leak Check screen.

```
                    Leak Check

   Leak valve: OFF |  Cur Flow: 0.00 l/min
 Vacuum Valve: OFF | Pressure: 769 mmHg
         Pump: OFF |    Timer: 00:00:00
                   |
                   |
 ON/OFF | Start |       | FiltAdv | Audit |
```

12.1.6. Flow Verification

Perform the temperature verification (Sections 12.1.1 and 12.1.2), pressure verification (Sections 12.1.3 and 12.1.4) and external leak check (Section 12.1.5) before executing the flow verification procedure.

Follow these steps to verify the flow rate:

NOTE: Ensure that the filter cassette previously installed in the sampler (which was used to perform the external leak check) remains in the unit for the flow verification.

1) **If you are using a Streamline FTS Flow Transfer Standard, remove the flow audit adapter and install the FTS on the sample tube (Figure 12-8). Confirm that the FTS "m" and "b" calibration constants are entered in the Audit screen. Other flow meters may require the use of the flow audit adapter (valve open) to measure**

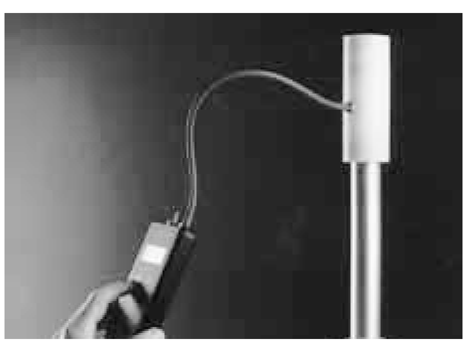

Figure 12-8. Streamline FTS Flow Transfer Standard installed on external sample tube.

flow.

2) **Press <F5: Audit> to enter the Audit screen. Confirm that 16.7 l/min is the set flow in the Set Flow field. Press <F1: Pump> and then <F2: Valve>. Wait for the flow rate displayed in the Cur Flow column to stabilize.**

3) **If using the FTS, press <EDIT>, enter the pressure drop (inches H_2O) from the Digital Manometer display, and then press <ENTER>. The sampler will calculate and display the FTS volumetric flow.**

4) **Press <F2: Valve> and then <F1: Pump> to turn off the pump. The measured flow should be within ± 5% of the displayed Cur Flow. If this is not the case, perform the flow rate calibration procedure described in the Service Manual.**

12.1.7. Internal Leak Check

Follow these steps to perform an internal leak test:

NOTE: To ensure leak tightness , a filter cassette containing a 47 mm solid filter leak check/separator disk (36-004768) must be installed in the unit. The leak check disk cassette should be assembled by placing a solid filter leak check/separator disk into a cassette, without a screen or filter.

1) **While in the Audit screen, press <F4: FiltAdv> to move the cassette with the leak check disk into the sampling position. Press <F5: LeakChk> to display the Leak Check screen (Figure 12-7). Press <F2: Start>, and follow the instructions displayed on the screen.**

NOTE: If you press <F2: Start> but fail to follow the instructions on the screen, the unit will abort the leak check after waiting 5 minutes. To initiate another leak check, you must again press <F2: Start>.

2) **The Partisol-Plus Sampler will run an automatic leak check, and report either a “Pass” or “Fail” message at the end of the leak check cycle. A pressure drop of 140 mm Hg or less is the sampler’s leak check pass criteria.**

3) **Press <F4: FiltAdv> to move the leak check cassette to the storage magazine.**

4) **If the unit displays a “Fail” message, clean the cassette and leak check disk carefully. Examine the cassette and disk for any**

external nicks or scratches. Discard any damaged cassette or disks, and re-run the test with a clean, undamaged cassette and leak check disk.

5) **If the leak check still fails after replacing the cassette and leak check disk, perform the troubleshooting procedures detailed in the Service Manual.**

6) **If the unit displays a "Pass" message, the internal leak check is complete. Remove the audit magazine from the supply position.**

7) **Place the partially exposed sampling cassette, that was previously in the sampling position before you installed the audit magazine, in the topmost position of a loaded supply magazine.**

8) **Connect the air hose to the supply magazine.**

9) **Press <F4: FiltAdv> to move the partially exposed sampling filter into the sampling position. Any leak check cassette remaining in the sampling position that was used during the audit will advance to the storage magazine. Remove this cassette from the storage magazine and install an empty storage magazine as described in Section 3.4.1.**

10) **Prior to installing a clean storage magazine, make sure that the magazine piston has been moved to the top of the magazine as described in Section 3.4.1**

11) **Replace the 1st stage inlet on the sample tube by pressing down until it hits a stop. Press <ESC> twice to return to the Main screen. Press <RUN/STOP> to resume sampling.**

12.2. Routine Maintenance Procedures

The routine maintenance of the Partisol-Plus Sampler consists of the following procedures performed at the indicated intervals:

NOTE: Refer to the U.S. EPA 2.12 Quality Assurance Handbook, Section 8 for EPA required maintenance intervals.

Filter cassettes — Inspect filter cassettes for contamination or damage after every use. Discard any damaged cassettes. Wipe with a clean dry cloth as required. Additional filter cassettes can be ordered from R&P (59-005923-0001).

Filter cassette magazines	R&P has designed the Partisol-Plus Sampler's filter cassette magazines to function for long periods of time without needing cleaning or maintenance. R&P does not recommend cleaning or disassembling the filter cassette magazines unless there is visible residue or contamination inside the magazine's tube or on its manifold or piston O-rings, or unless the manifold or piston O-rings are worn or damaged. When it becomes necessary to clean the filter cassette magazines see the Service Manual for instructions.
WINS PM-2.5 impactor	Clean the greased impactor section of the WINS PM-2.5 impactor after each complete sampling cycle according to the instructions in Appendix G. The impactor must be cleaned when the unit is not sampling.
External leak check	Perform an external leak check after every 4 weeks of use.
1st stage inlet	Clean the 1st stage inlet after every 14 days of use according to the instructions in Appendix G.
Particle trap filter	Exchange the particle trap filter (32-000393) in the sampler once a year, or as necessary. Turn off the sampler to replace this filter (see Service Manual).
"V" seals	Check the "V" seals (see Service Manual) every month. Replace, if necessary.
Rainhoods	Clean the air screens located under the sampler's rainhoods every 6 months, or as necessary.
Batteries	Check the voltage level of the batteries on the main computer board in the electronics compartment every 6 months.
Pump	The pump in the Partisol-Plus Sampler has a lifetime of approximately 12-18 months. If the pump's performance deteriorates, it should be rebuilt using the Partisol Pump Rebuild Kit (32-002642) (two kits are required for each rebuild), or replaced with a new pump (refer to Appendix E for a parts list).

Section 13: Resetting the Sampler

The Partisol-Plus Sampler's operating parameters can be easily reset to their default values. This section reviews the different types of reset capabilities available to the user.

The Title screen (Figure 13-1) provides the user access to the unit's reset functions (also see Section 4 for a discussion of the Title screen). With this screen displayed, the user can press one of the soft function keys to implement the desired type of reset. The user should use these capabilities with care, because information can be inadvertently lost if you select the incorrect reset key.

13.1. Resetting Operating Parameters

Pressing <F1: RDfault> while in the Title screen (Figure 13-1) causes the sampler to reset most of its operating parameters to their default settings. Refer to Appendix B for a list of the sampler's parameters and their corresponding program register codes (PRCs) and default values. If you choose this selection, it does *not* clear the sampler's data storage or channel definitions.

Figure 13-1. Title screen.

```
      Partisol-Plus
 Model 2025 Sequential Air Sampler

 Version: 1.202   Date: 8-Dec-98

Copyright 1998
Rupprecht & Patashnick Co., Inc.
RDfault | RData |  |  | Reset |
```

13.2. Sampler Default Settings

The following list is an example of some of the sampler's default settings. A complete description of all Partisol-Plus default settings is found in Appendix B.

Standard temperature	99
Standard pressure	999

Average temperature	99
Average pressure	999
Comm baud rate	9600
Comm word length	8
Comm stop bits	1
Comm parity	none
Comm flow control	none
Comm protocol	AK
Current low password	100000
Current high password	100000
Current password protection	none
Flow calibration reading	0 l/min
# points in flow calibration	3
Flow calibration minimum	15 l/min
Flow calibration maximum	18.4 l/min
FTS pressure	0" H_2O
FTS constant m	0
FTS constant b	0
Flow set point	16 l/min
Input data averaging period	30 min
Date format	yy/mm/dd
Time format	hh:mm
Default start time	00:00
Default duration	24:00
Default repeat time	24:00
Default filter type	P
Sampling type	Basic
Sampling start time	00:00
Sampling stop time	00:00
Sample blank	No
Site ID 1	0
Site ID 2	0
Separators	No
Flow mode	Err

13.3. Resetting Data Storage

Pressing <F2: RData> while in the Title screen (Figure 13-1) causes the sampler to clear the filter data, interval data and input data storage buffers. If you choose this selection, it does *not* clear the sampler's operating parameters or channel definitions.

13.4. Resetting Low and High Passwords

If you misplace the low and high passwords, you can reset both of these to “100000” by pressing <F4> when the unit displays the Title screen (Figure 13-1). Note that <F4> is not labeled with any text – this is a precaution taken to guard against unwanted use of this feature. Resetting the low and high passwords does not affect the current protection state of the unit and does *not* change any other instrument parameters.

13.5. Resetting All Instrument Parameters

NOTE: Extreme care must be used when exercising this command. Pressing <F5: Reset> will erase all of the sampler’s calibration constants. *Record all calibration constants (offset and span) from the samplers calibration screens* (Sensor Calibration, Filter Calibration and Flow Calibration screens) before pressing <F5: Reset>.

Pressing <F5: Reset> while in the Title screen (Figure 13-1) causes the unit to reset *all* of its operating parameters to their default conditions. This also clears the system’s data storage buffers, including the calibration constants.

After resetting the sampler, calibration constants can be re-entered in the appropriate calibration screen by pressing <EDIT>, entering the offset and span (where applicable) and pressing <ENTER>.

The sampler will require re-calibration only if the calibration constants have not been re-entered by the user.

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Section 14: Service Menu

The Service menu provides the user with access to a large number of screens used for operational, verification, calibration, diagnostic and informational purposes.This menu is only available when the unit is in the Service Mode.

14.1. Entering the Service Mode

To enter the Service Mode, press <MENU> on the display/keypad when the sampler is in the Stop Operating Mode (Section 5.1). This causes the Master Menu screen (Figure 14-1) to be displayed. Then use the arrow keys (↓ and ↑) to move the screen's selection indicator to the line labeled "Service Mode." With the pointer in this position, press <ENTER>. The unit then displays a Warning/Confirmation screen that asks the user to confirm entry into the Service Mode.

Figure 14-1. Master Menu screen.

```
       Master Menu
> Status Codes
  System Status
  Sampling Setup
  Data Storage
  System Setup
  Service Mode
StCode
```

The unit displays "SVC" as the current operating mode in the top right-hand corner of the Main screen (Section 4) when in the Service Mode. Refer to Section 5.1 for a description of the unit's operating modes. Press <MENU> to display the Service Menu screen (Figure 14-2), which provides complete access to the unit's audit/calibration, diagnostic and service capabilities. Refer to Appendix A for a complete list of screens available through the Service Menu.

Upon entering the Service Mode, the sampler turns off most of its routine control systems. The Model 2025 Service Manual contains maintenance and calibration routines that can be performed while in Service Mode.

14.2. Leaving the Service Mode

To leave the Service Mode and return to the normal operation of the sampler, press <MENU>. This causes the Service Menu screen to be displayed (Figure 14-2). Then use the arrow keys (↓ and ↑) to move the screen's selection indicator to the line labeled "Exit Service Mode." With the pointer in this position, press <ENTER>. The unit then returns to its usual operating configuration, re-establishing the usual control over its functions.

Figure 14-2. Service Menu screen.

```
        Service Menu
> System Maintenance Routines
  Manual Motion Tests
  Calibration/Audit
  Low Level System Info
  Exit Service Mode

  Audit | Leakchk |  |  |  |
```

Appendix A: Overview of Partisol-Plus Software Screens

This appendix contains all the software screens displayed by the Partisol-Plus Sampler, along with the hierarchy of screens. The later part of this appendix shows the menu structure and screens contained in the unit's Service Mode.

Figure A-1. Hierarchy of screens.

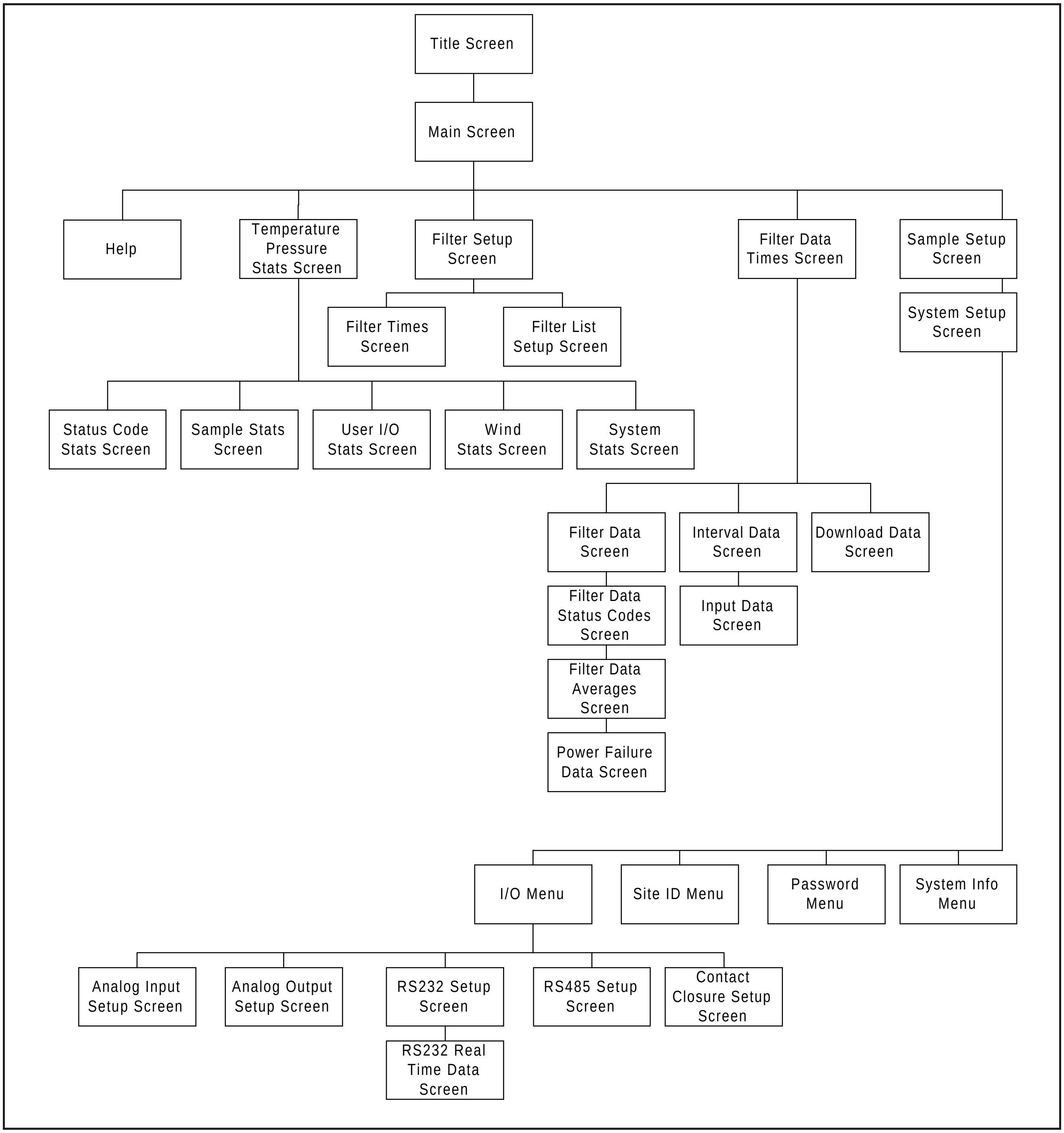

Figure A-2. Title screen.

```
        Partisol-Plus
  Model 2025 Sequential Air Sampler

  Version: 1.202    Date: 8-Dec-98

 Copyright 1998
 Rupprecht & Patashnick Co., Inc.
```

RDfault	RData			Reset

Figure A-3. Main screen.

```
Stat:OK   Partisol 2025   Mode:Stop
  Current Time: 09:27 98/07/23
  Start Sample: 00:00 98/07/24
   Stop Sample: 00:00 98/07/25
     Filter ID:  123456
          Flow:  0.0 l/min
        Volume:  000.00 m^3
```

Help	Stats	FiltSet	Data	Setup

Figure A-4. Help screen.

```
                  Help
> - Setting up your Sample
> - Operating Mode descriptions
> - Status codes
> - Downloading Data
> - Performing an Audit
> - Calibration
> - Filter Exchange
```

Figure A-5. Temperature and Pressure Statistics screen.

```
Stat:OK  Temp/Pressure  Mode:SAMPLE
                 Current  Average
  Filter Temp:     25.8    21.2 C
Filter Comp Temp:  25.4    21.1 C
 Ambient Temp:     25.8    21.1 C
 Ambient Pres:     751     748 mmHg
  Ambient %RH:     72      68%
```

StCode	Sample	User IO	Wind	System	

Figure A-6. Status Codes screen.

```
OK            Status Codes          STOP

       >OK  No Status Conditions
```

Reset					

Figure A-7. Sample Statistics screen.

```
Stat:OK   Sample Stats     Mode:SAMP
              Flow Setpoint:  16.7 l/min
               Current Flow:  16.7 l/min
                     Volume:   004.30 m^3
        Elapsed Sample Time:   4:18
          Current Filter ID:   P 123456
        Current Cassette ID:   RP100123
```

TmpPres		User IO	Wind	System	

Figure A-8. User I/O Statistics screen.

```
Stat:OK          User I/O       Mode:SAMP
                Current    Average
Analog Input 1:  +0000.00   +0000.00
Analog Input 2:   +000.00   +0000.00
Analog Input 3:  +0000.00   +0000.00
Logic Output 1:     000
Logic Output 2:     000

TmpPres | Sample |        | Wind | System |
```

Figure A-9. Wind Statistics screen.

```
Stat:OK  Wind Stats          Mode:SAMP
                 Current  Average
    Wind Speed:  000.0    000.0 km/h
 Wind Velocity:  N/A      000.0 km/h
Wind Direction:   000     000 deg

TmpPres | Sample | User IO |        | System |
```

Figure A-10. System Statistics screen.

```
Stat:OK   System Stats          Mode:SAMP

 Elec Temp: +25.8 C  Elec Heater: ON
 Filter Num: 02    Filt Comp Fan: ON
 Filt Total: 328        Pump Fan: OFF
 FXCHG Step: MAGPR          Pump: OFF
FXCHG Stat: ----

TmpPres | Sample | User IO | Wind |        |
```

Figure A-11. Basic Filter Setup screen.

Stat:OK Filter Setup Mode:STOP					
Start Date: 98/07/24					
The Current Time is: 15:34 98/07/23					
Sample will start at: 00:00 98/07/24					
Each sample will collect for 024:00 hours					
Times	+ Day	NextDay	FiltLst	Next Hr	
Function Keys in Browse Mode					
Times	+ Day	NextDay	FiltLst	Next Hr	
Function Keys in Edit Mode					
-List	+List	Bksp			

Figure A-12. Filter Times screen.

```
     Start          Stop
Cur  17:15 99/06/08 17:16 99/06/08
1.   17:15 99/06/08 17:16 99/06/08
2.   17:18 99/06/08 17:19 99/06/08
3.   17:21 99/06/08 17:22 99/06/08
4.   17:24 99/06/08 17:25 99/06/08
5.   17:27 99/06/08 17:28 99/06/08   \/
```

Figure A-13. Filter List Setup screen.

Type	Filt ID	Cassette ID	Blank	
1: P	001123	RP 100001	No	/\
2: P	001124	RP 100002	No	
3: P	001125	RP 100003	Yes	
X: P	001126	RP 100004	No	
X: P	001127	RP 100005	No	
16: P	001138	RP 100016	No	\/

	FiltSet	Copy	Insert	Delete	

Function Keys in Browse Mode

	FiltSet	Copy	Insert	Delete	

Function Keys in Edit Mode

-List	+List	Bksp			

Figure A-14. Filter Data Times screen.

```
Stat:OK     Filter Data Times    Rec: 7
   Set Sample Start:  00:00 1998/06/01
   Set Sample Stop:   00:00 1998/06/02
Actual Sample Start:  00:00 1998/06/01
 Actual Sample Stop:  00:00 1998/06/02
 Valid Elapsed Time:  24:00
 Total Elapsed Time:  24:00
```

-Rec	+Rec	MoreDat	IntvDat	DwnLoad	

Figure A-15. Filter Data screen.

```
Stat:OK    Filter Data      Rec: 7
Filt ID: P 123456           Volume: 006.00
Cass ID: RP100123           % CV:  0.1
Max Temp Diff: 0.8 at 15:38 1998/06/01

Id1: "0123000001003281997072116000O"
Id2: "                             "
-Rec | +Rec | MoreDat | IntvDat | Dwnload |
```

Figure A-16. Filter Data Status Codes screen.

```
                Status Codes          Rec: 7

 >OK No Status Conditions




-Rec | +Rec | MoreDat | IntvDat |   |
```

Figure A-17. Filter Data Averages screen.

```
Stat:OK       Averages       Rec: 7
        Min   Ave    Max     Averag
Flow:  16.6   16.7   16.7   WDSpd: 00.0
FltT: +22.2  +22.5  +22.7   WVel: 00.0
AmbT: +22.3  +22.5  +22.7   WDir:    0
Pres:  751    752    752     AI1: 000.0
 %RH:   65     69     72     AI2: 000.0
-Rec | +Rec | MoreDat | IntvDat |   |
```

Figure A-18. Power Failures screen.

```
        Power Failures            Rec: 7
2:24 1998/05/26
6:43 1998/05/26
```

-Rec	+Rec	MoreDat	IntvDat		

Figure A-19. Interval Data screen.

```
            Interval Data          Rec: 1108
          Time: 15:15 1998/05/26
           Filt Temp: 20.7 C
       Ambient Temp: 21.9 C
       Ambient Pres:  751 mm Hg
              Flow: 16.7 l/min
```

-Rec	+Rec		InptDat	DwnLoad	

Figure A-20. Download Data screen.

```
            Download Data
        Storage: _____       Filter     Rec #
     First Record: 14:51  1998/12/17    64
  Current Pointer: 14:41  1998/12/17    212
      Last Record: 14:29  1998/12/17    343
```

First	-Ptr	+Ptr	Last	Start	

Figure A-21. Input Data screen.

Stat:OK	Input Data		Rec: 185		
Record Time: 15:30 1998/05/26					
Valid:	023:55		FiltT:	+22.5	
Total:	024:00		FCompT:	+24.0	
WSpd:	0 Km/h		AmbT:	+22.7	
WVel:	0 Km/h		Pres:	762 mmHg	
WDir:	0 deg		%RH:	65%	
-Rec	+Rec	StCode	FiltDat	DwnLoad	

Figure A-22. Sample Setup screen.

Sample Definition Method:			Basic		
Default Sample Start Time:			00:00		
Default Sample Duration:			024:00		
Default Sample Repeat Time:			024:00		
Default Filter Type:			P		
Sample Flow Rate:			16.7		
Flow Error Mode: Err			Separators: No		
Help	Set EPA			System	
Function Keys in Browse Mode					
Help	Set EPA			System	
Function Keys in Edit Mode					
-List	+List	Bksp	ChSign		

Figure A-23. When the Sample Definition Method is set in the Time mode, the Filter Setup screen (Figure A-11) will change to the Time Base Filter Setup screen.

```
Stat:OK       Filter: 01        Mode:STOP
        Current Time: 15:34 98/07/23
        Start Sample: 00:00 98/07/24
         Stop Sample: 12:00 98/07/24
           Filter ID: P 123456
        Cassette ID: RP100123
              Blank:  No
```

Help	Prev	Next	FiltLst	*More*

Function Keys in Browse Mode

Help	Prev	Next	FiltLst	*More*
	Reset	+ Hour	+ Day	*Back*

Function Keys in Edit Mode

-List	+List	Bksp		

Figure A-24. When the Sample Definition Method is set in the Time2 mode, the Filter Setup screen (Figure A-11) will change to the Time 2 Base Sampling screen.

```
Stat:OK    Filter: 01   Mode:STOP
      Current Time: 15:34  98/07/23
     Start Time       Stop Time
1:  00:00 98/07/15   06:00 98/07/15
2:  12:00 98/07/15   18:00 98/07/15
Filter ID: P 123456   Blank:   No
  Cass ID: RP100123
```

Help	Prev	Next	FiltLst	*More*

Function Keys in Browse Mode

Help	Prev	Next	FiltLst	*More*
	Reset	+ Hour	+ Day	*Back*

Function Keys in Edit Mode

-List	+List	Bksp		

Figure A-25. When the Sample Definition Method is set in the Advanced mode, the Filter Setup screen (Figure A-11) will change to the Advanced Filter Setup screen.

```
Stat:OK     Filter: 01          Mode:STOP
   Current Time: 15:34 98/07/23
   Start Sample: 00:00 98/07/24
    Stop Sample: 00:00 98/07/25
Cond:  TEMP   %RH   -----   |ID: P 1234556
Min:   25.00 40.00  0.00    |Cass: RPxxxxxx
Max:   55.00 85.00  0.00    |Blank:   No
```

Help	Prev	Next	FiltLst	*More*

Function Keys in Browse Mode

Help	Prev	Next	FiltLst	*More*
	Reset	+Hour	+ Day	*Back*

Function Keys in Edit Mode

-List	+List	Bksp		

Figure A-26. When the Sample Definition Method is set in the Episodic mode, the Filter Setup screen (Figure A-11) will change to the Episodic Sampling Setup screen.

```
Stat:OK     Episodic Setup        Mode:STOP
Current Time: 15:34 98/07/23
Start Event Capture: 00:00 98/07/24
 Stop Event Capture: 00:00 98/07/25
Cond:  TEMP   %RH   -----
 Min: 25.00  40.00  0.00
 Max: 55.00  75.00  0.00
```

Help	+Hour	+Day	List A	Reset

Function Keys in Browse Mode

Help	+Hour	+Day	List A	Reset

Function Keys in Edit Mode

-List	+List	Bksp		

Figure A-27. System Setup screen.

System Setup					
Average Temp: 99			Standard Temp: 99		
Average Pres: 999			Standard Pres: 999		
Date Form: YY/MM/DD			Average Time: 30		
Time Form: :			Filter Fan: ON		
Curr Time: 05:00:00			Auto Run: ON		
Curr Date: 98/04/10					
Help	I/O	Site ID	Passwd	SysInfo	
Function Keys in Browse Mode					
Help	I/O	Site ID	Passwd	SysInfo	
Function Keys in Edit Mode					
-List	+List	Bksp	ChSign		

Figure A-28. System I/O screen.

System Setup					
Average Temp: 99			Standard Temp: 99		
Average Pres: 999			Standard Pres: 999		
Date Form: yy/mm/dd			Average Time: 30		
Time Form: :			Filter Fan: ON		
Curr Time: 05:00:00			Auto Run: ON		
Curr Date: 98/12/10					
A/I	A/O	RS232	RS485	Contact	
Function Keys in Browse Mode					
A/I	A/O	RS232	RS485	Contact	
Function Keys in Edit Mode					
-List	-List	Bksp	ChSign		

Figure A-29. Analog Input Setup screen.

A/I Setup					
Const A Const B Const C					
1: 0.0000 200.0000 0.0000					
2: 0.0000 200.0000 0.0000					
3: 0.0000 100.0000 0.0000					
Calculated Values: A/I Mode: SING					
1: 19.6294 2: 8.7125 3: 1.1384					
	A/O	RS232	RS485	Contact	
Function Keys in Browse Mode					
	A/O	RS232	RS485	Contact	
Function Keys in Edit Mode					
-List	+List	Bksp	ChSign		

Figure A-30. Analog Output screen.

A/O Setup					
Variable MinVal MaxVal Format					
1 OpMode 0.00 5.00 0-5 VDC					
2 CurFlow1 0.00 20.00 0-5 VDC					
3 None 0.00 0.00 0-5 VDC					
A/I		RS232	RS485	Contact	
Function Keys in Browse Mode					
A/I		RS232	RS485	Contact	
Function Keys in Edit Mode					
-List	+List	Bksp	ChSign		

Figure A-31. RS232 Setup screen.

RS232 Setup

Baud Rate:	9600	Protocol:	AK
Data Bits:	8	RS-Para1:	52
Parity:	None	RS-Para2:	75048
Stop Bits:	1	RS-Para3:	13010
Flow Ctrl:	None	RS-Para4:	0

A/O	A/I	SetPRC	RS485	Contact	
Function Keys in Browse Mode					
A/O	A/I	SetPRC	RS485	Contact	
Function Keys in Edit Mode					
-List	+List	Bksp			

Figure A-32. PRC Settings Warning/Confirmation screen.

RS232 Setup

RS232 protocol needs to be set to
"RealTime" or "Cycle" for the
PRC settings to work.
Press any key to continue

A/I	A/O	Set PRC	RS485	Contact	

Figure A-33. RS232 RealTime Data screen.

```
        RS232 RealTime Data
                 Intv:  0
  Data 1: StatCode  Data 5: AmbP Cur
  Data 2: CurFlow1  Data 6: AmbRHCur
  Data 3: CurFlow2  Data 7: WDir Cur
  Data 4: AmbT Cur  Data 8: WSpd Cur
```

Function Keys in Browse Mode					
Function Keys in Edit Mode					
-List	+List	Bksp			

Figure A-34. RS485 Setup screen.

```
        RS485 Setup
  Station: 11
```

A/I	A/O	RS232		Contact	
Function Keys in Browse Mode					
A/I	A/O	RS232		Contact	
Function Keys in Edit Mode					
-List	+List	Bksp			

Figure A-35. Contact Closure Setup screen.

```
Contact Closure Setup

 Variable  BitOp BitVal Comp CompVal
1 StatCode  OR     0    =    0.00
2 OpMode    OR     0    =    2.00
```

A/I	A/O	RS232	RS485		
Function Keys in Browse Mode					
A/I	A/O	RS232	RS485		
Function Keys in Edit Mode					
-List	+List	Bksp	ChSign		

Figure A-36. Site Identification screen.

```
Site Identification

ID1: 00000012000000000000000000000112
ID2: 45000345486790000000000000000000
```

Function Keys in Edit Mode					
		Bksp	A<--	A-->	

Figure A-37. Password Setup screen.

Password Setup					
Cur Lo Psw: ****** Cur Hi Psw: ******					
New Lo Psw: ****** New Hi Psw: ******					
Confirm Lo: ****** Confirm Hi: ******					
Function Keys in Browse Mode					
Function Keys in Edit Mode					
		Bksp			

Figure A-38. System Information screen.

System Information					
Software Version: 1.202					
Software Date: 8-Dec-98					
Serial Number: 10019					
Filter Exchange: SINGLE					
Int Board Rev: 1					
Flow Type 1: 20					
Function Keys in Browse Mode					
Function Keys in Edit Mode					
-List	+List	Bksp			

Figure A-39. Master Menu with status code options.

```
        Master Menu
> Status Codes
  System Status
  Sampling Setup
  Data Storage
  System Setup
  Service Mode
```

StCode					

Figure A-40. Master menu with system status options.

```
        Master Menu
  Status Codes
> System Status
  Sampling Setup
  Data Storage
  System Setup
  Service Mode
```

TmpPres	Sample	User IO	Wind	System	

Figure A-41. Master menu with sampling setup options.

```
        Master Menu
  Status Codes
  System Status
> Sampling Setup
  Data Storage
  System Setup
  Service Mode
```

FiltSet	FiltLst			IncFilt	

Figure A-42. Master menu with data storage options.

```
         Master Menu
  Status Codes
  System Status
  Sampling Setup
> Data Storage
  System Setup
  Service Mode
```

FiltDat	InptDat	IntvDat			

Figure A-43. Master menu with system setup options.

```
         Master Menu
  Status Codes
  System Status
  Sampling Setup
  Data Storage
> System Setup
  Service Mode
```

Setup	A/I	A/O	RS232	RS485	

Figure A-44. Master menu with service menu option.

```
         Master Menu
  Status Codes
  System Status
  Sampling Setup
  Data Storage
  System Setup
> Service Mode
```


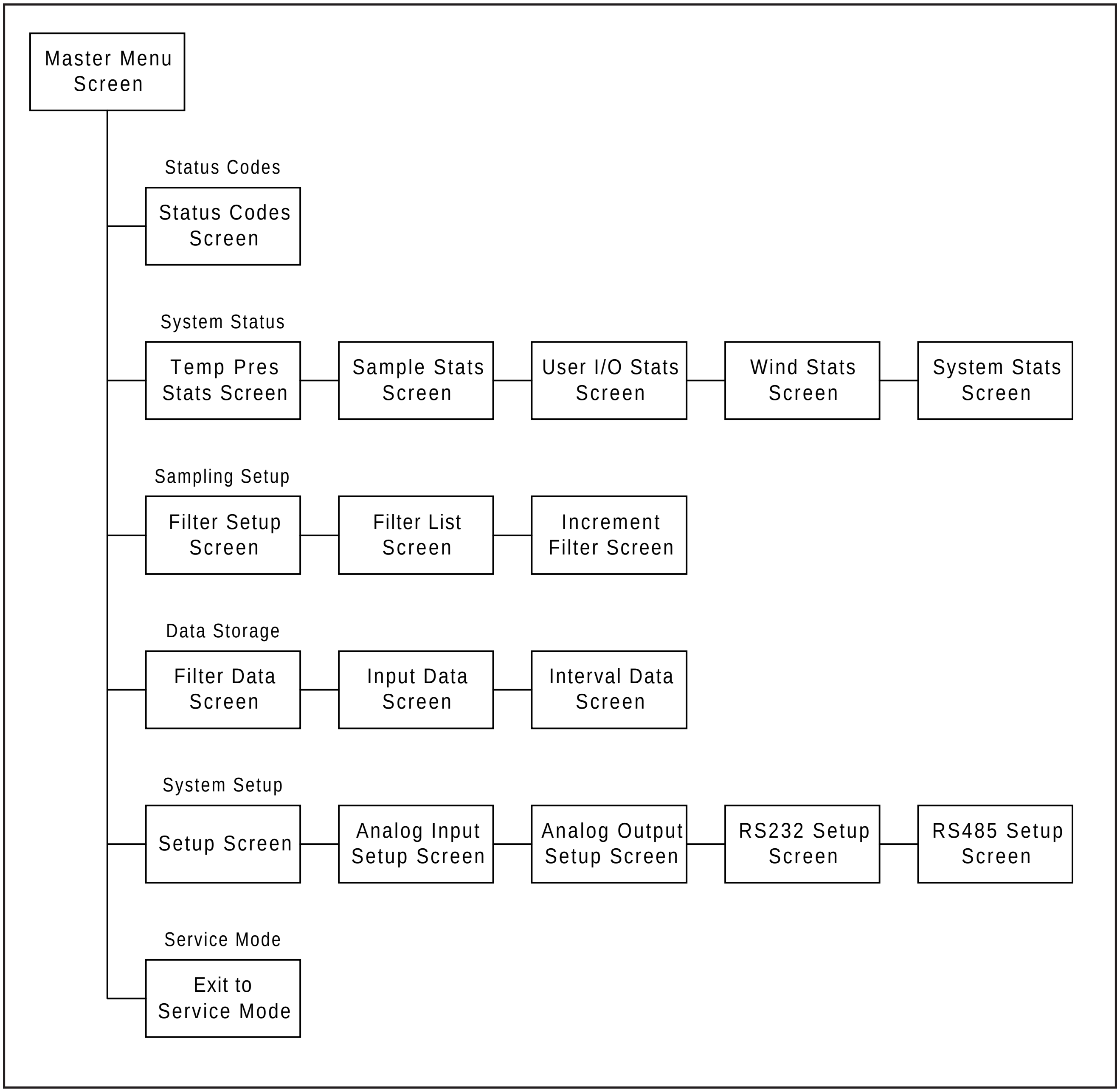

Figure A-45. Hierarchy of screens available through the Master menu. (Access the Master menu by pressing <MENU> when in a non-service operating mode.)

Figure A-46. Service menu with system maintenance routine options.

```
        Service Menu
> System Maintenance Routines
  Manual Motion Tests
  Calibration/Audit
  Low Level System Info
  Exit Service Mode

  Audit | Leakchk |  |  |  |
```

Figure A-47. Service menu with manual motion test options.

```
        Service Menu
  System Maintenance Routines
> Manual Motion Tests
  Calibration/Audit
  Low Level System Info
  Exit Service Mode

        | AmbFilt | FlowVal | FiltChg | Misc |
```

Figure A-48. Service menu with calibration/audit options.

```
        Service Menu
  System Maintenance Routines
  Manual Motion Tests
> Calibration/Audit
  Low Level System Info
  Exit Service Mode

  Audit | I/O Cal | SensCal | FiltCal | FlowCal |
```

Figure A-49. Service menu with low level system information options.

```
        Service Menu
  System Maintenance Routines
  Manual Motion Tests
  Calibration/Audit
> Low Level System Info
  Exit Service Mode
```

A/D	D/A	Discrte	TPIC	RTC	

Figure A-50. Service menu with exit service mode option.

```
        Service Menu
  System Maintenance Routines
  Manual Motion Tests
  Calibration/Audit
  Low Level System Info
> Exit Service Mode
```


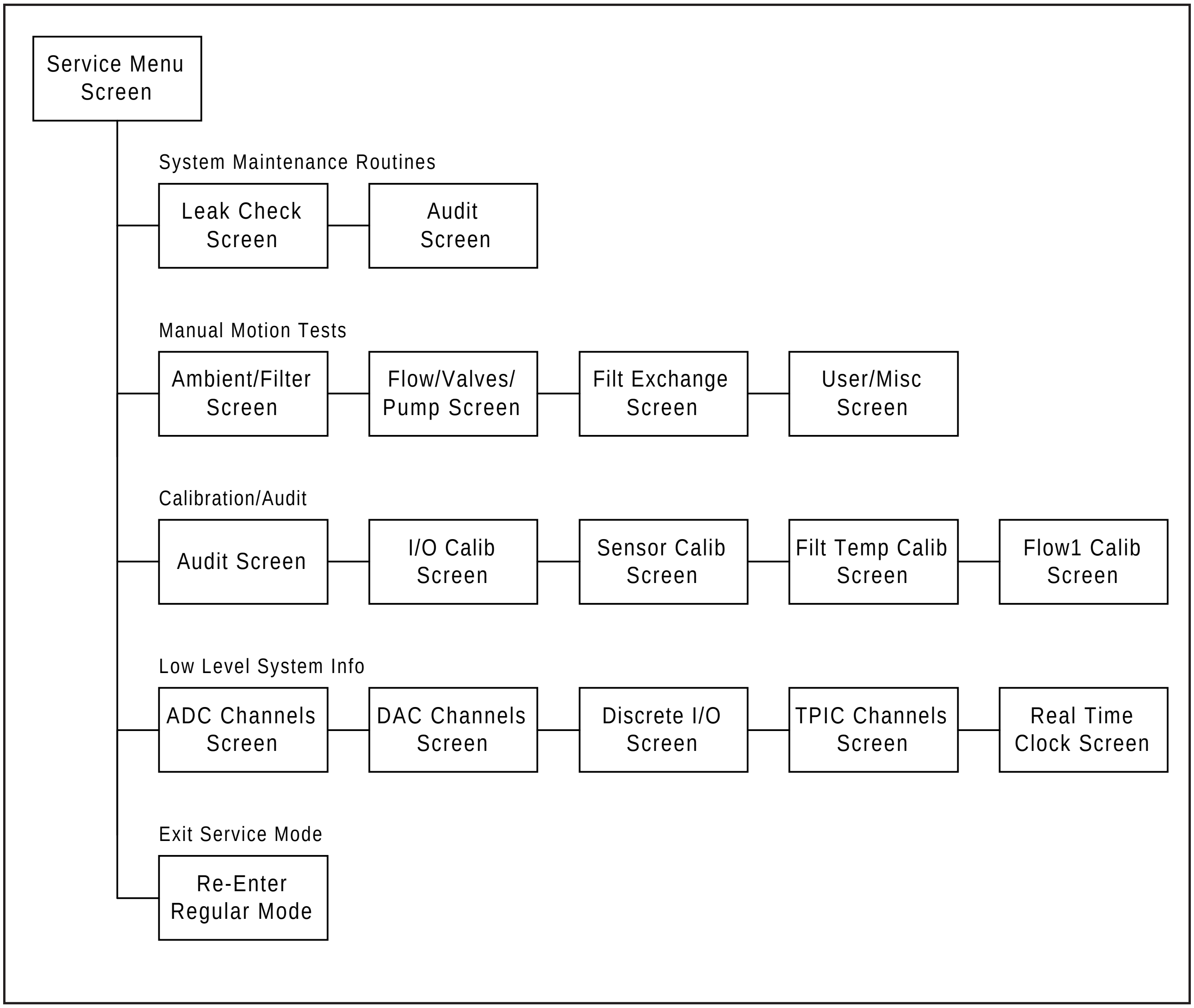

Figure A-51. Hierarchy of screens available through Service menu. (Access the Service menu by pressing <MENU> with the sampler in its service operating mode.)

Figure A-52. System Maintenance screen (Service Mode) with audit option.

```
      System Maintenance
>Audit
 Leak Check
```

Figure A-53. System Maintenance screen (Service Mode) with leak check option.

```
      System Maintenance
 Audit
>Leak Check
```

Figure A-54. Audit screen (Service Mode).

```
                    Audit
Filt Temp: 22.5   |      Set Flow: 16.7
 Amb Temp: 22.6   |      Cur Flow: 16.68
 Amb Pres:  752   |      FTS Pres:  0.00
  Amb %RH:   75   |      FTS Flow:   0.00
                  |      FTS Const m: 0.000
Timer: 00:00:00          FTS Const b: 0.000
 Pump  | Valve |  | FiltAdv | LeakChk |
```

Figure A-55. Leak Check screen (Service Mode).

```
              Leak Check

  Leak valve: OFF |  Cur Flow: 0.00 l/min
Vacuum Valve: OFF | Pressure: 769 mmHg
       Pump: OFF  |   Timer: 00:00:00
                  |
                  |
```

ON/OFF	Start		FiltAdv	Audit	

Figure A-56. Ambient Filter screen in manual motion tests (Service Mode).

```
        Ambient/Filter
 Filters      Ambient
 C: 24.4 C   Temp: 22.4 C   Elec T: 27.9
 1: 24.0 C   Pres:  767 mmHg  Heat: OFF
 2:  0.0C     %RH: 42.0 %  FltFan: OFF
             WSpd:  0.0   PumpFan: OFF
             WDir:   0
```

ON/OFF		FlowVal	FiltChg	Misc	
Function Keys in Browse Mode					
ON/OFF		FlowVal	FiltChg	Misc	
Function Keys in Edit Mode					
-List	+List	Bksp			

Figure A-57. Flows/Valves/Pumps screen in manual motion tests (Service Mode).

```
       Flows/Valves/Pump
  SetFlow CurFlow  5/20 ID  Vacuum   Leak
1:  0.0     0.0      ON      OFF     OFF




Pump: OFF
```

ON/OFF	AmbFilt		FiltChg	Misc	

Function Keys in Browse Mode

ON/OFF	AmbFilt		FiltChg	Misc	

Function Keys in Edit Mode

-List	+List	Bksp			

Figure A-58. Filter Exchange screen in manual motion tests (Service Mode).

```
       Filter Exchange      Step: ------
Valves        Stat:   Ok          1    2
Pressure: OFF Pump:OFF   NewFilt: OFF  OFF
Shuttle: OFF             LiftUp:   ON   OFF
MagPres: OFF    Shuttle  LiftDn:  OFF  OFF
LiftPush: OFF    Rdy:ON  PushDn:   ON  OFF
                Ext:OFF  PushUp:  OFF  OFF
```

ON/OFF	AmbFilt	FlowVal	Start	Misc	

Function Keys in Browse Mode

ON/OFF	AmbFilt	FlowVal	Start	Misc	

Function Keys in Edit Mode

-List	+List	Bksp			

Figure A-59. User/Misc screen in manual motion tests (Service Mode).

```
           User/Misc
     A/I  A/O |  Misc     |Analog Calib
1: 0.000 0.000| Stat: OFF  | InRly:  OFF
2: 0.000 0.000|  LCD: ON   | RefIN: 0.025
3: 0.000 0.000| Spkr: OFF  | OutRly:  OFF
   Discrete  |Hardware ID | PoleRly: OFF
1: ON 2: ON  |OFF OFF OFF |
```

ON/OFF	AmbFilt	FlowVal	FiltChg		

Function Keys in Browse Mode

ON/OFF	AmbFilt	FlowVal	FiltChg		

Function Keys in Edit Mode

-List	+List	Bksp			

Figure A-60. I/O Calibration screen in calibration/audit (Service Mode).

```
Calibrating... I/O Calib
          Input    User   Analog  Outputs
Offset: -0.0076  0.0000 -0.0059  0.0022
  Span:  1.0028  1.0023  0.9966  0.9978
   Set:  0.025   0.000   0.000   0.000
 Relay:   OFF   A/O Calib  Relay  OFF OFF
Actual:  0.025    0.007   0.007   0.007
```

ON/OFF	Start	SensCal	FiltCal	FlowCal	

Function Keys in Browse Mode

ON/OFF	Start	SensCal	FiltCal	FlowCal	

Function Keys in Edit Mode

-List	+List	Bksp	ChSign		

Figure A-61. Sensor Calibration screen in calibration/audit (Service Mode).

Sensor Calibration					
	Current	Actual	Offset		
Amb Temp (C) :	22.4	0.0	0.15		
Amb Pres(mmHg):	767	0	1.0		
Amb RH (%) :	40.9	0.0	0.23		
	I/O Cal		FiltCal	FlowCal	
Function Keys in Browse Mode					
	I/O Cal		FiltCal	FlowCal	
Function Keys in Edit Mode					
-List	+List	Bksp	ChSign		

Figure A-62. Filter Temperature Calibration screen in calibration/audit (Service Mode).

Filter Temp Calibration					
	Current	Actual	Offset		
Filter :	20.8	0.0	0.00		
Filt Comp:	21.9	0.0	0.00		
	I/O Cal	SensCal		FlowCal	
Function Keys in Browse Mode					
	I/O Cal	SensCal		FlowCal	
Function Keys in Edit Mode					
-List	+List	Bksp	ChSign		

Figure A-63. Flow Calibration screen in calibration/audit (Service Mode).

```
            Flow1 Calibration
Range: 15.0 - 18.3  | Cur Flow: 00.00 l/min
(Mass: 14.3 - 17.4 )| Set Flow: 00.0 l/min
Num Points: 2       | Act Flow: 00.00 l/min
For Streamline FTS:| Pressure: 0.00 inH2O
Const m: 0.0000     | Offset:  0.000
Const b: 0.0000     | Span:  1.000
```

	I/O Cal	SensCal	FiltCal	*More*

Function Keys in Browse Mode

	I/O Cal	SensCal	FiltCal	*More*
FlowMin	FlowMax	EPA Cal	Start	*Back*

Function Keys in Edit Mode

-List	+List	Bksp	ChSign	

Figure A-64. ADC Channels screen in low level system info (Service Mode).

```
            ADC Channels
   MFC 1 0: 1.007   FltComp T 8: 2.971/\
   MFC 2 1: 1.001    Humidity 9: 2.148
   MFC 3 2: 3.003   Amb Pres 10: 4.123
 FiltT 1 3: 2.943    Cal Ref 11: 0.025
 FiltT 2 4: 0.000     Elec T 12: 0.000
   Amb T 5: 2.955    User 1 13: 0.000\/
```

	D/A	Discrte	TPIC	RTC

Figure A-65. DAC Channels screen in low level system info (Service Mode).

DAC Channels

MFC 1 0: 1.000 4: 0.000

MFC 2 1: 0.000 User 1 5: 0.000

MFC 3 2: 0.000 User 2 6: 0.000

3: 0.000 User 3 7: 0.000

A/D		Discrte	TPIC	RTC	

Function Keys in Browse Mode

A/D		Discrte	TPIC	RTC	

Function Keys in Edit Mode

-List	+List	Bksp			

Figure A-66. Discrete I/O screen in low level system info (Service Mode).

Discrete I/O

G1:ON Mux1:ON Spkr:OFF MFC1:OFF

G2:OFF Mux2:ON AORly:OFF MFC2:OFF

SRIN:ON Mux3:ON AIRly:OFF MFC3:OFF

SCLR:ON Mux4:ON Pole:OFF ID3:OFF

RCK:OFF In1:OFF User1:OFF ID2:OFF

SRCK:OFF In2:ON User2:OFF ID1:OFF

A/D	D/A	MUX	TPIC	ON/OFF	

Figure A-67. Multiplexed Inputs screen in low level system info (Service Mode).

```
      Multiplexed Inputs
FXCHGid1: OFF PushUp1: ON   LiftDn2: ON
FXCHGid2: ON  ShutRdy: OFF  PushDn2: ON
NewFilt1: ON  ShutExt: ON  PushUp2: ON
 LiftUp1: OFF        : ON         : ON
 LiftDn1: ON  NewFilt2: ON
 PushDn1: OFF  LiftUp2: ON
A/D   D/A   Discrte   TPIC   ON/OFF
```

Figure A-68. TPIC Channels screen in low level system info (Service Mode).

```
        TPIC Channels
 LdcLight: ON    Vacuum: OFF   Leak 1: OFF
 ElecHeat: OFF         : OFF   Leak 2: OFF
     Pump : OFF  Shuttle: OFF   Leak 3: OFF
    Modem : ON  LiftPush: OFF    Vac 2: OFF
          : OFF  MagPres: OFF         : OFF
   Status : OFF Pressure: OFF    Vac 3: OFF
A/D   D/A   Discrte   ON/OFF   RTC
```

Figure A-69. Real Time Clock screen in low level system info (Service Mode).

```
         Real Time Clock
 Cur Time: 13:57:44   New Time: 13:57:00
 Cur Date: 98/12/30   New Date: 98/12/30
    RTC Adjustment:   4.0 seconds/day
 Set New Time and New Date to a time in
 the future, then press "SetTime" when
 the actual real time equals new time.
A/D   D/A   Discrte   TPIC   SetTime
```

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Appendix B: Program Register Codes

This appendix contains a listing of the program register codes (PRCs) used in the operating software of the Partisol-Plus Sampler. These codes come into play when the unit's two-way serial communication capability (Appendix C) is employed to request the current value of variables, to change the value of certain system parameters, and to download data from the system's internal data logger.

Because the sampler uses the hexadecimal number system for some of its status codes, this section also explains how to add and subtract hexadecimal numbers, and how to decipher the sampler's hexadecimal status codes.

B.1. Program Register Codes

MAIN PROGRAM REGISTER CODES					
Code	**Description**	**Units**	**Range**	**Default**	**Edit Modes**
002	Serial Number	N/A	N/A	N/A	NotRun
003	Operating Mode (Internal)	Code*	0 - 6	N/A	None
005	Status Code (Internal)	Code*	see code desc	0	None
031	Storage Download Type	Code*	0 - 2	0	Anytime
133	Current Flow 1 (Volumetric)	l/min	N/A	0	None
134	Current Flow 2 (Volumetric)	l/min	N/A	0	None
135	Current Flow 3 (Volumetric)	l/min	N/A	0	None
139	Current Electronics Compart Temperature	°C	N/A	0	None
140	Current Ambient Temperature	°C	N/A	0	None
141	Current Ambient Pressure	mmHg	N/A	0	None
144	Current Ambient Relative Humidity	%	N/A	0	None
146	Current Filter 1 Temperature	°C	N/A	0	None
147	Current Filter 2 Temperature	°C	N/A	0	None
148	Current Filter Compartment Temperature	°C	N/A	0	None
151	Current Wind Direction	deg	N/A	0	None
153	Current Wind Speed	km/h	0 - 180	0	None
319	Sampling Action Under Serial Control	N/A	0 - 2	0	Run
* Codes are described later in this Appendix.					

LISTING OF PROGRAM REGISTER CODES (000-024)

Code	Description	Units	Range	Default	Edit Modes
000	Null	N/A	N/A	N/A	N/A
001	Software Version	N/A	N/A	N/A	None
002	Serial Number	N/A	N/A	N/A	NotRun
003	Operating Mode (Internal)	Code*	0 - 6	0	None
004	Status Type (Internal)	Code*	0 - 2	0	None
005	Status Code (Internal)	Code*	see code desc	0	None
006	Current Time/Date (Internal)	sec	N/A	N/A	None
007	New Time/Date	sec	0 - 2.15E9	0	Anytime
008	Standard Temperature	°C	-50 - 50, 99	99	NotRun
009	Standard Pressure	mmHg	500 - 900, 999	999	NotRun
010	Average Temperature	°C	-50 - 50, 99	99	NotRun
011	Average Pressure	mmHg	500 - 900, 999	999	NotRun
012	Comm Baud Rate	Code*	0 - 5	3	Anytime
013	Comm Word Length	Code*	0 - 3	3	Anytime
014	Comm Stop Bits	Code*	0 - 1	0	Anytime
015	Comm Parity	Code*	0 - 2	0	Anytime
016	Comm Flow Control	Code*	0 - 1	0	Anytime
017	Comm Protocol	Code*	0 - 5	1	Anytime
018	Comm Parameter 1	N/A	0 - 1E10	52	Anytime
019	Comm Parameter 2	N/A	0 - 1E10	75048	Anytime
020	Comm Parameter 3	N/A	0 - 1E10	13010	Anytime
021	Comm Parameter 4	N/A	0 - 1E10	0	Anytime
022	Comm PRC 1	PRC	PRC	0	Anytime
023	Comm PRC 2	PRC	PRC	0	Anytime
024	Comm PRC 3	PRC	PRC	0	Anytime

* Codes are described later in this Appendix.

LISTING OF PROGRAM REGISTER CODES (025-049)

Code	Description	Units	Range	Default	Edit Modes
025	Comm PRC 4	PRC	PRC	0	Anytime
026	Comm PRC 5	PRC	PRC	0	Anytime
027	Comm PRC 6	PRC	PRC	0	Anytime
028	Comm PRC 7	PRC	PRC	0	Anytime
029	Comm PRC 8	PRC	PRC	0	Anytime
030	Comm Interval	sec	0, 1 - 3600	0	Anytime
031	Storage Download Type	*Code	0 - 2	0	Anytime
032	RS485 Instrument ID	N/A	10 - 99	11	Anytime
033	Printer Status [not used]	Code*	0	0	None
034	Printer Protocol [not used]	Code*	0 - 3	0	Anytime
035	Printer Interval [not used]	sec	0, 1 - 3600	0	Anytime
036	Printer PRC 1 [not used]	PRC	PRC	0	Anytime
037	Printer PRC 2 [not used]	PRC	PRC	0	Anytime
038	Printer PRC 3 [not used]	PRC	PRC	0	Anytime
039	Printer PRC 4 [not used]	PRC	PRC	0	Anytime
040	Printer PRC 5 [not used]	PRC	PRC	0	Anytime
041	Printer PRC 6 [not used]	PRC	PRC	0	Anytime
042	Printer PRC 7 [not used]	PRC	PRC	0	Anytime
043	Printer PRC 8 [not used]	PRC	PRC	0	Anytime
044	Printer Storage ID [not used]	Code*	0 - 2	0	Anytime
045	Analog Input 1, Constant A	N/A	-1E10 - 1E10	0	Anytime
046	Analog Input 2, Constant A	N/A	-1E10 - 1E10	0	Anytime
047	Analog Input 3, Constant A	N/A	-1E10 - 1E10	0	Anytime
048	Analog Input 1, Constant B	N/A	-1E10 - 1E10	0	Anytime
049	Analog Input 2, Constant B	N/A	-1E10 - 1E10	0	Anytime

* Codes are described later in this Appendix.

LISTING OF PROGRAM REGISTER CODES (050-074)

Cod	Description	Units	Range	Default	Edit Modes
050	Analog Input 3, Constant B	N/A	-1E10 - 1E10	0	Anytime
051	Analog Input 1, Constant C	N/A	-1E10 - 1E10	0	Anytime
052	Analog Input 2, Constant C	N/A	-1E10 - 1E10	0	Anytime
053	Analog Input 3, Constant C	N/A	-1E10 - 1E10	0	Anytime
054	Current Analog Input 1	N/A	N/A	0	None
055	Current Analog Input 2	N/A	N/A	0	None
056	Current Analog Input 3	N/A	N/A	0	None
057	Average Analog Input 1	N/A	N/A	0	None
058	Average Analog Input 2	N/A	N/A	0	None
059	Average Analog Input 3	N/A	N/A	0	None
060	Analog Output PRC 1	PRC	PRC	0	Anytime
061	Analog Output PRC 2	PRC	PRC	0	Anytime
062	Analog Output PRC 3	PRC	PRC	0	Anytime
063	Analog Output Minimum 1	N/A	-1E12 - 1E12	0	Anytime
064	Analog Output Minimum 2	N/A	-1E12 - 1E12	0	Anytime
065	Analog Output Minimum 3	N/A	-1E12 - 1E12	0	Anytime
066	Analog Output Maximum 1	N/A	-1E12 - 1E12	0	Anytime
067	Analog Output Maximum 2	N/A	-1E12 - 1E12	0	Anytime
068	Analog Output Maximum 3	N/A	-1E12 - 1E12	0	Anytime
069	Analog Output Type 1	Code*	0 - 2	2	Anytime
070	Analog Output Type 2	Code*	0 - 2	2	Anytime
071	Analog Output Type 3	Code*	0 - 2	2	Anytime
072	Contact Closure PRC 1	PRC	PRC	0	Anytime
073	Contact Closure PRC 2	PRC	PRC	0	Anytime
074	Contact Closure Logic Type 1	Code*	0 - 1	0	Anytime

* Codes are described later in this Appendix.

LISTING OF PROGRAM REGISTER CODES (075-099)

Code	Description	Units	Range	Default	Edit Modes
075	Contact Closure Logic Type 2	Code*	0-1	0	Anytime
076	Contact Closure Mask 1	N/A	0 - 1E10	0	Anytime
077	Contact Closure Mask 2	N/A	0 - 1E10	0	Anytime
078	Contact Closure Comparison 1	Code*	0-5	0	Anytime
079	Contact Closure Comparison 2	Code*	0 - 5	0	Anytime
080	Contact Closure Comparison Value 1	N/A	-1E10 - 1E10	0	Anytime
081	Contact Closure Comparison Value 2	N/A	-1E10 - 1E10	0	Anytime
082	Current Low Password	N/A	0 - 999999	100000	Anytime
083	New Low Password	N/A	0 - 999999	0	None
084	New Low Password Confirmation	N/A	0 - 999999	0	None
085	Current High Password	N/A	0 - 999999	100000	Anytime
086	New High Password	N/A	0 - 999999	0	None
087	New High Password Confirmation	N/A	0 - 999999	0	None
088	Current Password Protection	Code*	0	0	None
089	Analog Input Offset (Internal)	VDC	-0.2 - 0.2	0	Service
090	Analog Input Span (Internal)	N/A	0.95 - 1.05	1	Service
091	Analog Output Offset 1	VDC	-0.2 - 0.2	0	Service
092	Analog Output Offset 2	VDC	-0.2 - 0.2	0	Service
093	Analog Output Offset 3	VDC	-0.2 - 0.2	0	Service
094	Analog Output Span 1	N/A	0.95 - 1.05	1	Service
095	Analog Output Span 2	N/A	0.95 - 1.05	1	Service
096	Analog Output Span 3	N/A	0.95 - 1.05	1	Service
097	Flow Offset 1	l/min	-0.5 - 0.5	0	Service
098	Flow Offset 2	l/min	-0.5 - 0.5	0	Service
099	Flow Offset 3	l/min	-0.5 - 0.5	0	Service

* Codes are described later in this Appendix.

LISTING OF PROGRAM REGISTER CODES (100-124)

Code	Description	Units	Range	Default	Edit Modes
100	Flow Span 1	N/A	0.925 - 1.075	1	Service
101	Flow Span 2	N/A	0.925 - 1.075	1	Service
102	Flow Span 3	N/A	0.925 - 1.075	1	Service
103	Flow Calibration Reading	l/min	0 - 20	0	Service
104	Number of Points in Flow Calibration	N/A	2 - 5	3	Service
105	Flow Calibration Minimum 1	l/min	0 - 20	15	Service
106	Flow Calibration Minimum 2	l/min	0 - 20	15	Service
107	Flow Calibration Minimum 3	l/min	0 - 20	15	Service
108	Flow Calibration Maximum 1	l/min	5 - 20	18.4	Service
109	Flow Calibration Maximum 2	l/min	5 - 20	18.4	Service
110	Flow Calibration Maximum 3	l/min	5 - 20	18.4	Service
111	Volumetric Flow Minimum	l/min	0-25	15	Service
112	Volumetric Flow Maximum	l/min	0-25	18.4	Service
113	FTS Pressure	inchH2O	0 - 20	0	Service/Audit
114	Streamline FTP Constant m	N/A	-1 - 1	0	Service/Audit
115	Streamline FTP Constant b	N/A	-1 - 1	0	Service/Audit
116	Ambient Temperature Calibration Reading	°C	-50 - 80	0	Service
117	Ambient Temperature Offset	°C	-10 - 10	0	Service
118	Ambient Pressure Calibration Reading	mmHg	500 - 900	0	Service
119	Ambient Pressure Offset	mmHg	-15 - 15	0	Service
120	Ambient Rel Humidity Calibration Reading	%RH	0 - 100	0	Service
121	Ambient Rel Humidity Offset	%RH	-15 - 15	0	Service
122	Filter Temperature 1 Calibration Reading	°C	-50 - 80	0	Service
123	Filter Temperature 2 Calibration Reading	°C	-50 - 80	0	Service
124	Compartment Temperature Cal Reading	°C	-50 - 80	0	Service

* Codes are described later in this Appendix.

LISTING OF PROGRAM REGISTER CODES (125-149)

Code	Description	Units	Range	Default	Edit Modes
125	Filter Temperature 1 Offset	°C	-10 - 10	0	Service
126	Filter Temperature 2 Offset	°C	-10 - 10	0	Service
127	Compartment Temperature Offset	°C	-10 - 10	0	Service
128	Filter Exchange Type	Code*	0 - 3	0	None
129	Current Filter Exchange Step	Code*	0 - 8	0	None
130	Set Point: Flow 1	l/min	0 - 20	0	Service
131	Set Point: Flow 2	l/min	0 - 20	0	Service
132	Set Point: Flow 3	l/min	0 - 20	0	Service
133	Current Flow 1 (Volumetric)	l/min	N/A	0	None
134	Current Flow 2 (Volumetric)	l/min	N/A	0	None
135	Current Flow 3 (Volumetric)	l/min	N/A	0	None
136	Current Flow 1 (Standard)	l/min	N/A	0	None
137	Current Flow 2 (Standard)	l/min	N/A	0	None
138	Current Flow 3 (Standard)	l/min	N/A	0	None
139	Current Electronics Compartment Temp	°C	0 - 70	0	None
140	Current Ambient Temperature	°C	-60 - 70	0	None
141	Average Ambient Temperature	°C	N/A	0	None
142	Current Ambient Pressure	mmHg	10 - 950	0	None
143	Average Ambient Pressure	mmHg	N/A	0	None
144	Current Ambient Relative Humidity	%	0 - 100	0	None
145	Average Ambient Relative Humidity	%	N/A	0	None
146	Current Filter Temperature 1	°C	-60 - 70	0	None
147	Current Filter Temperature 2	°C	-60 - 70	0	None
148	Current Filter Compartment Temperature	°C	-60 - 70	0	None
149	Average Filter Temperature 1	°C	N/A	0	None

* Codes are described later in this Appendix.

LISTING OF PROGRAM REGISTER CODES (150-174)

Code	Description	Units	Range	Default	Edit Modes
150	Average Filter Temperature 2	°C	N/A	0	None
151	Current Wind Direction	deg	N/A	0	None
152	Average Wind Direction	deg	N/A	0	None
153	Current Wind Speed	km/h	0 - 180	0	None
154	Average Wind Speed	km/h	N/A	0	None
155	Wind Velocity	km/h	0 - 180	0	None
156	Input Data Averaging Period	min	5 - 1440	30	Anytime
157	Date Format	Code*	0 - 2	0	NotRun
158	Time Format	Code*	0 - 1	0	NotRun
159	Default Start Time	sec	0 - 86399	0	NotRun
160	Default Duration	sec	60 - 1209600	86400	NotRun
161	Defalt Repeat Time	sec	60 - 1209600	86400	NotRun
162	Default Filter Type	Code*	1 - 26	16	NotRun
163	Sample Flow Rate Set Point 1	l/min	1 -20	0	NotRun
164	Sample Flow Rate Set Point 2	l/min	1 - 20	0	NotRun
165	SampleType	Code*	0 -5	0	NotRun
166	Sample Filter Edit	N/A	0 - 16	1	None
167	Sampling Start	sec	0 - 2.14E9	0	NotRun
168	Sampling Mid Stop	sec	0 - 2.14E9	0	NotRun
169	Sampling Restart	sec	0 - 2.14E9	0	NotRun
170	Sampling Stop	sec	0 - 2.14E9	0	NotRun
171	Sample Filter Type A	N/A	0 - 26	0	Anytime
172	Sample Filter Type B	N/A	0 - 26	0	Anytime
173	Sample Filter ID A	N/A	0 - 9999999	0	Anytime
174	Sample Filter ID B	N/A	0 - 9999999	0	Anytime

* Codes are described later in this Appendix.

LISTING OF PROGRAM REGISTER CODES (175-199)

Code	Description	Units	Range	Default	Edit Modes
175	Sample Cassette ID A	N/A	0 - 9999999	0	Anytime
176	Sample Cassette ID B	N/A	0 - 9999999	0	Anytime
177	Sample Blank	Code*	0 - 1	0	Anytime
178	Sampling Condition 1	Code*	0 - 11	0	NotRun
179	Sampling Condition 2	Code*	0 - 11	0	NotRun
180	Sampling Condition 3	Code*	0 - 11	0	NotRun
181	Conditional Sampling Minimum 1	N/A	-1E10 - 1E10	0	NotRun
182	Conditional Sampling Minimum 2	N/A	-1E10 - 1E10	0	NotRun
183	Conditional Sampling Minimum 3	N/A	-1E10 - 1E10	0	NotRun
184	Conditional Sampling Maximum 1	N/A	-1E10 - 1E10	0	NotRun
185	Conditional Sampling Maximum 2	N/A	-1E10 - 1E10	0	NotRun
186	Conditional Sampling Maximum 3	N/A	-1E10 - 1E10	0	NotRun
187	Sample Filter Type 01A	N/A	0 - 26	16	Anytime
188	Sample Filter Type 02A	N/A	0 - 26	16	Anytime
189	Sample Filter Type 03A	N/A	0 - 26	16	Anytime
190	Sample Filter Type 04A	N/A	0 - 26	16	Anytime
191	Sample Filter Type 05A	N/A	0 - 26	16	Anytime
192	Sample Filter Type 06A	N/A	0 - 26	16	Anytime
193	Sample Filter Type 07A	N/A	0 - 26	16	Anytime
194	Sample Filter Type 08A	N/A	0 - 26	16	Anytime
195	Sample Filter Type 09A	N/A	0 - 26	16	Anytime
196	Sample Filter Type 010A	N/A	0 - 26	16	Anytime
197	Sample Filter Type 11A	N/A	0 - 26	16	Anytime
198	Sample Filter Type 12A	N/A	0 - 26	16	Anytime
199	Sample Filter Type 13A	N/A	0 - 26	16	Anytime

* Codes are described later in this Appendix.

LISTING OF PROGRAM REGISTER CODES (200-224)

Code	Description	Units	Range	Default	Edit Modes
200	Sample Filter Type 14A	N/A	0 - 26	16	Anytime
201	Sample Filter Type 15A	N/A	0 - 26	16	Anytime
202	Sample Filter Type 16A	N/A	0 - 26	16	Anytime
203	Sample Filter Type 01B	N/A	0 - 26	16	Anytime
204	Sample Filter Type 02B	N/A	0 - 26	16	Anytime
205	Sample Filter Type 03B	N/A	0 - 26	16	Anytime
206	Sample Filter Type 04B	N/A	0 - 26	16	Anytime
207	Sample Filter Type 05B	N/A	0 - 26	16	Anytime
208	Sample Filter Type 06B	N/A	0 - 26	16	Anytime
209	Sample Filter Type 07B	N/A	0 - 26	16	Anytime
210	Sample Filter Type 08B	N/A	0 - 26	16	Anytime
211	Sample Filter Type 09B	N/A	0 - 26	16	Anytime
212	Sample Filter Type 10B	N/A	0 - 26	16	Anytime
213	Sample Filter Type 11B	N/A	0 - 266	16	Anytime
214	Sample Filter Type 12B	N/A	0 - 26	16	Anytime
215	Sample Filter Type 13B	N/A	0 - 26	16	Anytime
216	Sample Filter Type 14B	N/A	0 - 26	16	Anytime
217	Sample Filter Type 15B	N/A	0 - 26	16	Anytime
218	Sample Filter Type 16B	N/A	0 - 26	16	Anytime
219	Sample Filter ID01A	N/A	0 - 9999999	0	Anytime
220	Sample Filter ID02A	N/A	0 - 9999999	0	Anytime
221	Sample Filter ID03A	N/A	0 - 9999999	0	Anytime
222	Sample Filter ID04A	N/A	0 - 9999999	0	Anytime
223	Sample Filter ID05A	N/A	0 - 9999999	0	Anytime
224	Sample Filter ID06A	N/A	0 - 9999999	0	Anytime

* Codes are described later in this Appendix.

LISTING OF PROGRAM REGISTER CODES (225-249)

Code	Description	Units	Range	Default	Edit Modes
225	Sample Filter ID07A	N/A	0 - 9999999	0	Anytime
226	Sample Filter ID08A	N/A	0 - 9999999	0	Anytime
227	Sample Filter ID09A	N/A	0 - 9999999	0	Anytime
228	Sample Filter ID10A	N/A	0 - 9999999	0	Anytime
229	Sample Filter ID11A	N/A	0 - 9999999	0	Anytime
230	Sample Filter ID12A	N/A	0 - 9999999	0	Anytime
231	Sample Filter ID13A	N/A	0 - 9999999	0	Anytime
232	Sample Filter ID14A	N/A	0 - 9999999	0	Anytime
233	Sample Filter ID15A	N/A	0 - 9999999	0	Anytime
234	Sample Filter ID16A	N/A	0 - 9999999	0	Anytime
235	Sample Filter ID01B	N/A	0 - 9999999	0	Anytime
236	Sample Filter ID02B	N/A	0 - 9999999	0	Anytime
237	Sample Filter ID03B	N/A	0 - 9999999	0	Anytime
238	Sample Filter ID04B	N/A	0 - 9999999	0	Anytime
239	Sample Filter ID05B	N/A	0 - 9999999	0	Anytime
240	Sample Filter ID06B	N/A	0 - 9999999	0	Anytime
241	Sample Filter ID07B	N/A	0 - 9999999	0	Anytime
242	Sample Filter ID08B	N/A	0 - 9999999	0	Anytime
243	Sample Filter ID09B	N/A	0 - 9999999	0	Anytime
244	Sample Filter ID10B	N/A	0 - 9999999	0	Anytime
245	Sample Filter ID11B	N/A	0 - 9999999	0	Anytime
246	Sample Filter ID12B	N/A	0 - 9999999	0	Anytime
247	Sample Filter ID13B	N/A	0 - 9999999	0	Anytime
248	Sample Filter ID14B	N/A	0 - 9999999	0	Anytime
249	Sample Filter ID15B	N/A	0 - 9999999	0	Anytime

* Codes are described later in this Appendix.

Listing of Program Register Codes (250-274)

Code	Description	Units	Range	Default	Edit Modes
250	Sample Filter ID16B	N/A	0 - 9999999	0	Anytime
251	Sample Cassette ID 01A	N/A	0 - 9999999	0	Anytime
252	Sample Cassette ID 02A	N/A	0 - 9999999	0	Anytime
253	Sample Cassette ID 03A	N/A	0 - 9999999	0	Anytime
254	Sample Cassette ID 04A	N/A	0 - 9999999	0	Anytime
255	Sample Cassette ID 05A	N/A	0 - 9999999	0	Anytime
256	Sample Cassette ID 06A	N/A	0 - 9999999	0	Anytime
257	Sample Cassette ID 07A	N/A	0 - 9999999	0	Anytime
258	Sample Cassette ID 08A	N/A	0 - 9999999	0	Anytime
259	Sample Cassette ID 09A	N/A	0 - 9999999	0	Anytime
260	Sample Cassette ID 10A	N/A	0 - 9999999	0	Anytime
261	Sample Cassette ID 11A	N/A	0 - 9999999	0	Anytime
262	Sample Cassette ID 12A	N/A	0 - 9999999	0	Anytime
263	Sample Cassette ID 13A	N/A	0 - 9999999	0	Anytime
264	Sample Cassette ID 14A	N/A	0 - 9999999	0	Anytime
265	Sample Cassette ID 15A	N/A	0 - 9999999	0	Anytime
266	Sample Cassette ID 16A	N/A	0 - 9999999	0	Anytime
267	Sample Cassette ID 01B	N/A	0 - 9999999	0	Anytime
268	Sample Cassette ID 01B	N/A	0 - 9999999	0	Anytime
269	Sample Cassette ID 01B	N/A	0 - 9999999	0	Anytime
270	Sample Cassette ID 01B	N/A	0 - 9999999	0	Anytime
271	Sample Cassette ID 01B	N/A	0 - 9999999	0	Anytime
272	Sample Cassette ID 01B	N/A	0 - 9999999	0	Anytime
273	Sample Cassette ID 01B	N/A	0 - 9999999	0	Anytime
274	Sample Cassette ID 01B	N/A	0 - 9999999	0	Anytime

* Codes are described later in this Appendix.

Listing of Program Register Codes (275-299)

Code	Description	Units	Range	Default	Edit Modes
275	Sample Cassette ID 09B	N/A	0 - 9999999	0	Anytime
276	Sample Cassette ID 10B	N/A	0 - 9999999	0	Anytime
277	Sample Cassette ID 11B	N/A	0 - 9999999	0	Anytime
278	Sample Cassette ID 12B	N/A	0 - 9999999	0	Anytime
279	Sample Cassette ID 13B	N/A	0 - 9999999	0	Anytime
280	Sample Cassette ID 14B	N/A	0 - 9999999	0	Anytime
281	Sample Cassette ID 15B	N/A	0 - 9999999	0	Anytime
282	Sample Cassette ID 16B	N/A	0 - 9999999	0	Anytime
283	Sample Blank 01	N/A	0 - 1	0	Anytime
284	Sample Blank 02	N/A	0 - 1	0	Anytime
285	Sample Blank 03	N/A	0 - 1	0	Anytime
286	Sample Blank 04	N/A	0 - 1	0	Anytime
287	Sample Blank 05	N/A	0 - 1	0	Anytime
288	Sample Blank 06	N/A	0 - 1	0	Anytime
289	Sample Blank 07	N/A	0 - 1	0	Anytime
290	Sample Blank 08	N/A	0 - 1	0	Anytime
291	Sample Blank 09	N/A	0 - 1	0	Anytime
292	Sample Blank 10	N/A	0 - 1	0	Anytime
293	Sample Blank 11	N/A	0 - 1	0	Anytime
294	Sample Blank 12	N/A	0 - 1	0	Anytime
295	Sample Blank 13	N/A	0 - 1	0	Anytime
296	Sample Blank 14	N/A	0 - 1	0	Anytime
297	Sample Blank 15	N/A	0 - 1	0	Anytime
298	Sample Blank 16	N/A	0 - 1	0	Anytime
299	Site ID1	N/A	0	0	Anytime

* Codes are described later in this Appendix.

Listing of Program Register Codes (300-324)

Code	Description	Units	Range	Default	Edit Modes
300	Site ID2	N/A	0	0	Anytime
301	Separators	N/A	0 - 1	0	NotRun
302	Current Sample Start	N/A	0	0	None
303	Current Sample MidStop	N/A	0	0	None
304	Current Sample Restart	N/A	0	0	None
305	Current Sample Stop	N/A	0	0	None
306	Current Filter Type1	N/A	0	0	None
307	Current Filter Type2	N/A	0	0	None
308	Current Filter ID1	N/A	0	0	None
309	Current Filter ID2	N/A	0	0	None
310	Current Cassette ID1	N/A	0	0	None
311	Current Cassette ID2	N/A	0	0	None
312	Current Sample Blank	N/A	0	0	None
313	Volume 1	N/A	0	0	None
314	Volume 2	N/A	0	0	None
315	Valid Time	N/A	0	0	None
316	Total Time	N/A	0	0	None
317	Filter Count	N/A	0	N/A	None
318	Total Filter Count	N/A	0	N/A	None
319	Sampling Serial Control	Code*	0 - 2	0	Anytime
320	AI Mode	N/A	0 - 1	Single	Anytime
321	Flow Mode	N/A	0 - 1	ERR	NotRun
322	Filter Exchange Status	N/A	0 - 20	0	None
323	Audit Elapsed Time	N/A	0	0	None
324	Real Time Clock Reference Time	N/A	0	N/A	None

* Codes are described later in this Appendix.

Listing of Program Register Codes (325-349)					
Code	**Description**	**Units**	**Range**	**Default**	**Edit Modes**
325	Real Time Clock Adjustment	sec/day	-60 - 60	4	Service
326	Filter Fan Control	N/A	0 - 2	2	NotRun
327	Flow Configuration	N/A	0 - 2	0	NotRun
328	Auto Run	N/A	0 - 1	0	Anytime
329					
330					
331					
332					
333					
334					
335					
336					
337					
338					
339					
340					
341					
342					
343					
344					
345					
346					
347					
348					
349					

* Codes are described later in this Appendix.

B.2. PRC Values Defined by Codes

Some of the Partisol-Plus Sampler's program register codes (PRC) have values that are defined by codes. These codes are defined in this section.

PRC 3: Operating Mode

0	STOP	Stop
1	WAIT	Wait
2	SAMP	Sample
3	DONE	Done
4	ERR	Error
5	SVC	Service
6	PAUS	Pause

PRC 4: Status Type

0	OK	OK
1	WARN	Status Warning
2	CRIT	Critical Warning (see PRC 5 below)

PRC 5: Status Code

0	OK	No Status Conditions
(H)1	M	Flash Memory
(H)2	C	Automatic System Calibration Failed
(H)4	Y	System Reset Occurred
(H)8	Z	Power Failure
(H)10	F1	Flow 1 Out of Range
(H)20	F2	Flow 2 Out of Range
(H)40	F3	Flow 3 Out of Range
(H)80	S1	Flow 1 Stopped Due to 10% Dev for 5 minutes*
(H)100	S2	Flow 2 Stopped Due to 10% Dev for 5 minutes*
(H)200	S3	Flow 3 Stopped Due to 10% Dev for 5 minutes*
(H)400	A	Ambient Sensor Out of Range
(H)800	T	Filter or Compartment Temp Sensor Out of Range
(H)1000	E	Electronics Temperature Out of Range
(H)2000	R1	Diff of Filter Temp 1 and Ambient Temp > ± 5 °C
(H)4000	R2	Diff of Filter Temp 2 and Ambient Temp > ± 5 °C
(H)8000	X	Filter Exchange Mechanism Failure*
(H)10000	N	Out of Filters
(H)20000	O1	Coeff of Variation for Flow 1 Too High
(H)40000	O2	Coeff of Variation for Flow 2 Too High
(H)80000	O3	Coeff of Variation for Flow 3 Too High

* Critical warning, see PRC 4 above.

NOTE: The current status code is the sum of all conditions that currently apply.

PRC 5: Status Code (continued)

(H)100000	P	Elapsed Sample Period Out of Range
(H)200000	L	Leak Check Failed
(H)400000	D	Audit Performed in Middle of Sample
(H)800000	B	Blank Filter
(H)1000000	S	Stop Key Pressed

NOTE: The current status code is the sum of all conditions that currently apply.

PRC 12: Comm Baud Rate

0	1200
1	2400
2	4800
3	9600
4	19200
5	38400

PRC 13: Comm Word Length

0	5
1	6
2	7
3	8

PRC 14: Stop Bits

0	1
1	2

PRC 15: Comm Parity

0	None
1	Even
2	Odd

PRC 16: Comm Flow Control

0	None
1	Xon/Xoff

PRC 17: Comm Protocol

0	None
1	AK
2	Storage
3	RealTime
4	Cycle
5	German

PRC 31: Storage Download Type

0	Filter Data
1	Interval Data
2	Input Data

PRC 33: Printer Status [not used]

0	ONLINE
1	BUSY
2	OFFLINE
3	NO PAPER
4	ERROR

PRC 34: Printer Protocol [not used]

0	None
1	Storage
2	RealTime
3	Cycle

PRC 44: Printer Storage ID [not used]

0	Set Point Information
2	Carbon Concentration Information
4	Calibration/Audit Data

PRC 69, 70, 71: Analog Output Type 1, 2, 3

0	0-1 VDC
1	0-2 VDC
2	0-5 VDC

PRC 74, 75: Contact Closure Logic Type 1, 2

0	AND
1	OR

PRC 78, 79: Contact Closure Comparison 1, 2

0	<	Less Than
1	<=	Less Than or Equal
2	=	Equal
3	>=	Greater Than or Equal
4	>	Greater Than
5	<>	Not Equal

PRC 88: Current Password Protection

0	No Protection Enabled – Regular Operation
1	Low Password Protection Enabled
2	High Password Protection Enabled

PRC 128: Filter Exchange Type

0	MANUAL	Manual Filter Exchange [not used]
1	SINGLE	Single Flow Path
2	DICHOT	Dual Flow Path
3	MODULE	Single Flow Path with Speciation Modules

PRC 129: Current Filter Exchange Step

0	-----	Filter Exchange Not Active
1	PRESS	End Sampling, Build Pressure
2	MAGPR	Magazine Pressure Lifts New Cassette
3	LPON	Lower Sample Platform, Raise Plunger
4	SHUTH	Shuttle Pushes Cassettes to New Positions
5	LPOFF	Lift Sampling Platform, Lower Plunger
6	SHUTB	Retract Shuttle for New Cassette
7	DONE	Turn Off Pressure; Exchange Complete

PRC 157: Date Format

0	yy/mm/dd
1	mm/dd/yy
2	dd/mm/yy

PRC 158: Time Format

0	.	Uses "." as Separator
1	:	Uses ":" as Separator

PRC 162: Default Filter Type

0	Space
1	A
2	B
3	C
4	D
5	E
6	F
7	G
8	H
9	I
10	J
11	K
12	L
13	M
14	N
15	O
16	P
17	Q
18	R
19	S
20	T
21	U
22	V
23	W
24	X
25	Y
26	Z

PRC 165: Sample Type

0	BASIC	24-hour Based Sampling
1	TIME	Time Base Continuous Sampling
2	TIME2	Time Base Cont. Samp/ two intervals
3	ADV	Conditional Sampling
4	EPISOD	Episodic Conditional Sampling
5	RS232	Sampler Operation to PRC

PRC 178, 179, 180: Sampling Conditions 1, 2, 3

0	------	None
1	TEMP	Ambient Temperature (°C)
2	PRES	Ambient Pressure (mmHg)
3	%RH	Ambient Relative Humidity (%)
4	WNDSPD	Wind Speed (km/h)
5	WNDDIR	Wind Dir (deg)
6	AI1	Analog Input 1 (Engineering Units)
7	AI2	Analog Input 2 (Engineering Units)
8	AI3	Analog Input 3 (Engineering Units)
9	AI1AVE	Ave Analog Input 1 (Engineering Units)
10	AI2AVE	Ave Analog Input 2 (Engineering Units)
11	AI3AVE	Ave Analog Input 3 (Engineering Units)

PRC 177: Filter Blank Operation

0	No
1	Yes

PRC 301: Separators

0	No
1	Yes

PRC 319: Sampling Action Under Serial Control

0	Stop Sampling (Sampling Not Active)
1	Exchange Cassette, Goes to State 2 (Sampling Active)
2	Activate Sampling (Sampling Active)

PRC 321: Flow Mode

0	Err	Error Mode
1	Wait	Wait Mode

B.3. Deciphering Hexadecimal Status Codes

When the Partisol-Plus Sampler's PRC 5: Status Codes are downloaded, they are displayed as hexadecimal numbers. This section describes hexadecimal numbers, shows you how to do simple addition and subtraction with these numbers and explains how they relate to the sampler's status codes.

Generally, in our everyday lives, we use the decimal number system, which is a base-10 number system. It uses 10 symbols (0, 1, 2, 3, 4, 5, 6, 7, 8 and 9) to represent number values. The hexadecimal number system is a base-16 number system that uses 16 symbols (0, 1, 2, 3, 4, 5, 6, 7, 8, 9, A, B, C, D, E and F) (Figure B-1) to represent number values. This can make simple addition and subtraction a bit confusing.

Figure B-1. The decimal number system and its hexadecimal equivalent.

Decimal	Hexadecimal
0	0
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
10	A
11	B
12	C
13	D
14	E
15	F
16	10
17	11

B.3.1. Place Holders

In the hexadecimal number system, when the value of a number exceeds 15 (which is represented by "F"), you must pay attention to the number's "place holder." A "place holder" is the number or symbol that is placed in front of a base number to represent larger numerical values (Example B-1).

Example B-1.

place holders		
↓	↓	↓
00	10	20
01	11	21
02	12	22
03	13	23

In the decimal number system, place holders increase by a value of 10. If we use the decimal number system in Example B-1, the numerical values of the place holders will increase by a value of 10. In the first row of Example B-1, the place holder is "0," which makes the decimal numerical value of the first number in that row: $0 \cdot 10+0 = 0$. In the second row, the place holder is "1," so the decimal numerical value of the first number in that row is $1 \cdot 10+0 = 10$. The place holder in the third row is "2," which makes the decimal numerical value of the first number in that row: $2 \cdot 10+0 = 20$.

However, place holders in the hexadecimal number system increase by a value of 16.This changes the values of the numbers in Example B-1. In the first row of Example B-1, the place holder is "0," which makes the hexadecimal numerical value of the first number in that row: $0 \cdot 16+0 = 0$. In the second row, the place holder is "1," so the hexadecimal numerical value of the first number in that row is $1 \cdot 16+0 = 16$. The place holder in the third row is "2," which makes the hexadecimal numerical value of the first number in that row: $2 \cdot 16+0 = 32$.

B.3.2. Converting Decimal Numbers to Hexadecimal

Converting the decimal numbers 0, 1, 2, 3, 4, 5, 6, 7, 8 and 9 to hexadecimal numbers is easy, because they hold the same value in the hexadecimal number system. The decimal numbers 10, 11, 12, 13, 14 and 15, convert to the letters A, B, C, D, E and F (Figure B-1), respectively, in the hexadecimal number system.

B.3.2.1. Converting Large Decimal Numbers to Hexadecimal

To convert large decimal numbers, such as 74 or 2045, to hexadecimal form, you must divide the decimal number by 16 repeatedly until you reach 0, while placing each remainder in a back-to-front sucession until you reach the beginning of the hexadecimal number (Examples B-2 and B-3).

NOTE: In the following examples, hexadecimal numbers will be designated by an (H) in front of the number.

Example B-2.

Convert 74 to hexadecimal form.

74 = (H)_ _ _

First, divide 16 into 74:

74 ÷ 16 = 4 with a remainder of 10

Convert the 10 to hexadecimal form (Figure B-1):

10 = (H)A

and place it at the end of the hexadecimal number:

74 = (H)_ _ A

Now, continue to divide by 16:

4 ÷ 16 = 0 with a remainder of 4

Place these numbers in the following place holders:

74 = (H)0 4 A

Therefore:

74 = (H)4A

Example B-3.

Convert 2045 to hexadecimal form.

2045 = (H)_ _ _ _

First, divide 16 into 2045:

2045 ÷ 16 = 127 with a remainder of 13

Convert the 13 to hexadecimal (Figure B-1):

13 = (H)D

and place it at the end of the hexadecimal number:

2045 = (H)_ _ _ D

Now, continue to divide by 16:

127 ÷ 16 = 7 with a remainder of 15

Convert the 15 to hexadecimal:

15 = (H)F

and place it in the next place holder:

2045 = (H)_ _ F D

Now, continue to divide by 16:

7 ÷ 16 = 0 with a remainder of 7

Place these numbers in the following place holders:

2045 = (H)0 7 F D

Therefore:

2045 = (H)7FD

B.3.3. Converting Small Hexadecimal Numbers to Decimal

To convert small hexadecimal numbers to decimal, multiply each place holder by 16 and then add the sum to the actual number in each place holder (Example B-4).

Example B-4.

Convert (H)5C to decimal form.

First, multiply 5 by 16:

$5 \cdot 16 = 80$

Then, convert (H)C to decimal form:

H(C) = 12

Now add 80 and 12:

$80 + 12 = 92$

Therefore:

(H)5C = 92

B.3.4. Converting Large Hexadecimal Numbers to Decimal

To convert hexadecimal numbers to decimal, you need to understand the concept of "16 to the power of..."which coincides with the number of place holders in the hexadecimal number. As you work your way from the beginning to the end of the hexadecimal number, you must multiply each number in each place holder by the correct power of 16, except in the "one's" place holder (Section B.3.3.1). Then you must add these sums together to find the decimal equivalent of the original hexadecimal number (Examples B-5 and B-6).

B.3.4.1. Understanding the Powers of 16

Each place holder in a hexadecimal number coincides with a "power of 16."

In the "one's" place (the place holder furthest to the right) of a hexadecimal number, the power of 16 is zero. This is represented as 16^0, and its numerical value is 16·0 = 0. For example, in the number (H)742, the number "2" is in the one's place. The numerical value of the number "2" is expressed as 16·0+2 = 2.

In the "ten's" place (the place holder directly to the left of the one's place) of a hexadecimal number, the power of 16 is "1." This is represented as 16^1, and its numerical value is 16·1 = 16. For example, in the number (H)742, the number "4" is in the ten's place. The numerical value of the number "4" is expressed as 16·1·4 = 64.

In the "100's" place (the place holder directly to the left of the ten's place) of a hexadecimal number, the power of 16 is "2." This is represented as 16^2, and its numerical value is 16·16 = 256. For example, in the number (H)742, the number "7" is in the 100's place. The numerical value of the number "7" is expressed as 16·16·7 = 1,792.

In the "1,000's" place (the place holder directly to the left of the 100's place) of a hexadecimal number, the power of 16 is "3." This is represented as 16^3, and its numerical value is 16·16·16 = 4,096. For example, in the number (H)32B7, the number "3" is in the 1,000's place. The numerical value of the number "3" is expressed as 16·16·16·3 = 12,288.

Example B-5.

Convert (H)2B4A to decimal form.

First, multiply 2 by 16^3:
(16^3 represents the place holder occupied by the number 2)

$2 \cdot 16^3 = 8{,}192$

Next, convert (H)B to decimal form:

(H)B = 11

Next, multiply 11 by 16^2:
(16^2 represents the place holder occupied by the letter B)

$11 \cdot 16^2 = 2{,}816$

Now add 8,192 and 2,816:

8,192 + 2,816 = 11,008

Next, multiply 4 by 16^1:
(16^1 represents the place holder occupied by the number 4)

$4 \cdot 16^1 = 64$

Now add 11,008 and 64:

11,008 + 64 = 11,072

Next, convert (H)A to decimal form:

(H)A = 10

Add 10 and 16^0:
(16^0 represents the place holder occupied by the letter A)

$10+16^0 = 10$

Now add 11,072 and 10:

11,072 + 10 = 11,082

Therefore:

(H)2B4A = 11,082

Example 5 can also be expressed in the following form (Example 6):

Example B-6.

(H)2B4A

$16^0 = 16\cdot0+10 = \underline{10}$ {(H)A = 10}

$16^1 = 16\cdot1\cdot4 = \underline{64}$

$16^2 = 16\cdot16\cdot11 = \underline{2{,}816}$ {(H)B = 11}

$16^3 = 16\cdot16\cdot16\cdot2 = \underline{8{,}192}$

$\underline{10} + \underline{64} + \underline{2{,}816} + \underline{8{,}192} = \underline{11{,}082}$

Therefore:

(H)2B4A = 11,082

B.3.5. Adding Small Hexadecimal Numbers

To add small hexadecimal numbers, simply convert them to decimal numbers and add them together. When you find the decimal sum, convert it into a hexadecimal number (Example B-7).

Example B-7.

(H)5	converts to	5
+(H)4		+4
?		9

When you convert the decimal sum, 9, into a hexadecimal number, you have (H)9 (Figure B-1).

(H)5	converts to	5
+(H)4		+4
(H)9		9

To add hexadecimal numbers with sums larger than 9, you will need to pay attention to their place holders. Similar to Example B-7, convert the hexadecimal numbers to decimal numbers and add them together (Example B-8).

Example B-8.

(H)A	converts to	10
+(H)D		+13
?		23

At this point, you should convert 23 into hexadecimal form by dividing it by 16. When you divide 16 into 23, you will find that 16 goes into 23 one time with remainder of 7 . Therefore, the hexadecimal equivalent of 23 is (H)17, where (H)17 = $1 \cdot 16+7$ = 23.

(H)A	converts to	10
+(H)D		+13
(H)17		23

B.3.6. Adding Large Hexadecimal Numbers

To add large hexadecimal numbers, such as numbers that are 3 or more digits in length, you can use simple linear addition (Example B-9).

Example B-9.

```
  (H)24B
+ (H)355
  (H) ?
```

First, convert (H)B to decimal form:

(H)B = 11

Next, add 11 and 5:

11 + 5 = 16

Now convert 16 to hexadecimal form:

16 = (H)10

In the original equation, place the zero under the right-hand column of numbers and carry the 1 over to the middle column:

```
       1
  (H)24B
+ (H)355
  (H)  0
```

Now, add 1, 4 and 5:

1 + 4 + 5 = 10

Now convert 10 to hexadecimal form:

10 = (H)A

In the original equation, place the A under the middle column:

```
  (H)24B
+ (H)355
  (H) A0
```

Now, add 2 and 3:

2 + 3 = 5

In the original equation, place the 5 under the left-hand column:

```
  (H)24B
+ (H)355
  (H)5A0
```

B.3.7. Deciphering Status Codes

When downloaded, the Partisol-Plus Sampler's PRC 5: Status Codes are displayed in hexadecimal form. The sampler may display more than one code at at time. When the unit does show more than one status code, it adds the codes together and displays them as a hexadecimal sum.

For example, if the unit displays the Flash Memory status code (hexadecimal number "(H)1") (Section B.2) and the System Reset Occurred status code (hexadecimal number "(H)4") at the same time, the two status codes (when downloaded) will be displayed as the hexadecimal number "5."

In Section B.2, the PRC 5: Status Code table has only two status codes that would add up to a value of 5. By looking at this table and breaking down the downloaded status codes, you will be able to decipher which status codes the unit has displayed.

To properly use the PRC 5: Status Code table, you must separate the status codes on the table into place holders: the "one's," "ten's," "100's," "1,000's," "10,000's," and "100,000's" and the "1,000,000's" place. To break down the downloaded status codes, you must match each section of the status code with these place holders. See Examples B-10 and B-11 for assistance with deciphering hexadecimal status codes.

Example B-10.

Decipher the following downloaded status code: 20C30

First, look at the PRC 5: Status Code table in Section B.2, and break down the status code into its different place holders:

1) There are no status codes displayed in the “one’s” place of the original status code.

2) In the “ten’s” place of the original status code, a status code of “30” is displayed. Because there are no status codes in the table that match this number, you will need to break down this number further.

In the “ten’s” place of the table, there are only two status codes that, when added together, will amount to 30: (H)10 “Flow 1 Out of Range” and (H)20 “Flow 2 Out of Range.” These are two of the status codes that the unit is displaying in its original status code.

At this point, you must subtract “30” from the original status code: 20C30 - 30 = 20C00. Now, continue to break down the resulting status code to decipher the rest of the status codes displayed in this number.

3) In the “100’s” place of the new status code (20C00), a status code of “C00 ” is displayed. Because there are no status codes in the table that match this number, you will need to break down this number further.

First, convert C00 to a decimal number. From the table in Figure B-1, you see that “C” is 12, which converts “C00” to “1200.”

Next, look at the PRC 5: Status Code table to decipher the “1200” status code. In the “100’s” place of the table, there are only two status codes that, when added together, will amount to 1200: (H)400 “Ambient Sensor Out of Range” and (H)800 “Filter or Compartment Temp Sensor Out of Range.” These are two more of the status codes that the unit is displaying in its original status code.

Now, subtract “C00” from “20C00”: 20C00 - C00 = 20,000. Continue to break down this status code to decipher the rest of the status codes displayed in this number.

4) In the “10,000’s” place of the PRC 5: Status Code table, the status code (H)20000 “Coeff of Variation for Flow 1 Too High” matches the “20,000” status code. This is the last status code that the unit is displaying in its original status code.

Therefore, the downloaded status code, “20C30,” breaks down into the following status codes, according to the PRC 5: Status Code table:

(H)10 “Flow 1 Out of Range”
(H)20 “Flow 2 Out of Range”
(H)400 “Ambient Sensor Out of Range”
(H)800 “Filter or Compartment Temp Sensor Out of Range”
(H)20000 “Coeff of Variation for Flow 1 Too High.”

Example B-11.

Decipher the following downloaded status code: 70B002

First, look at the PRC 5: Status Code table in Section B.2, and break down the status code into its different place holders:

1) In the "one's" place of the original status code, a status code of "2" is displayed. In the "one's" place of the PRC 5: Status Code table, the "2" status code matches the (H)2 "Automatic System Calibration Failed" status code. This is one of the status codes that the unit is displaying in its original status code.

Now, subtract "2" from "70B002": 70B002 - 2 = 70B000. Continue to break down this status code to decipher the rest of the status codes displayed in this number.

2) In the "ten's" place of the new status code, there are no status codes displayed.

3) In the "100's" place of the new status code, there are no status codes displayed.

4) In the "1,000's" place of the new status code (70B000), a status code of "B000 " is displayed. Because there are no status codes in the PRC 5: Status Code table that match this number, you will need to break down this number further.

First, convert "B000" to a decimal number. From the table in Figure B-1, you see that "B" is 11, which converts "B000" to "11,000."

Next, look at the PRC 5: Status Code table to decipher the "11,000" status code. In the "1,000's" place of the table, there are three status codes that, when added together, will amount to 11,000: (H)1000 "Electronics Temperature Out of Range," (H)2000 "Diff of Filter Temp 1 and Ambient Temp > ±5° C" and (H)8000 "Filter Exchange Mechanism Failure." These are three more of the status codes that the unit is displaying in its original status code.

Now, subtract "B000" from "70B000": 70B000 - B000 = 700000. Continue to break down this status code to decipher the rest of the status codes displayed in this number.

(Example 11 continued on page B-38)

(Example 11 continued from page B-37)

4) In the "10,000's" place of the new status code, there are no status codes displayed.

5) In the "100,000's" place of the new status code (700000), a status code of "700000" is displayed. Because there are no status codes in the PRC 5: Status Codes table that match this number, you will need to break down this number further.

In the "100,000's" place of the PRC 5: Status Code, there are three status codes that, when added together, will amount to "700,000": (H)100000 "Elapsed Sample Period Out of Range," (H)200000 "Leak Check Failed" and (H)400000 "Audit Performed in Middle of Sample." These are three more status codes that the unit is displaying in its original status code.

Therefore, the downloaded status code, "70B002," breaks down into the following status codes, according to the PRC 5: Status Code table:

(H)2 "Automatic System Calibration Failed"
(H)1000 "Electronics Temperature Out of Range"
(H)2000 "Diff of Filter Temp 1 and Ambient Temp > ±5° C"
(H)8000 "Filter Exchange Mechanism Failure"
(H)100000 "Elapsed Sample Period Out of Range"
(H)200000 "Leak Check Failed"
(H)400000 "Audit Performed in Middle of Sample."

Appendix C: Two-Way Serial Communication

The Partisol-Plus Sampler supports two serial communication protocols: the AK Protocol and the German Ambient Network Protocol. These permit a locally or remotely located computer to obtain information digitally from the unit, and are described in this appendix.

C.1. AK Protocol

The AK Protocol is the most powerful RS232 mode in the Partisol-Plus Sampler. It not only allows the user to query the present value of any system variable remotely, but also permits the user to change the values of system variables and download information from the internal data logger. The RPComm software supplied with the unit uses this protocol for two-way communication directly to a computer or through a modem. The following commands of the AK Protocol are presented in detail in the following pages:

AREG — Ask Register Command. This allows the user to query the Partisol-Plus Sampler for the current value of any system variable (Program Register Code, Appendix B).

EREG — Enter Register Command. This allows the user to assign a new value to any system variable. Great care must be exercised in using this command, as the value of variables should be changed only when the monitor is in the appropriate operating mode.

SFxx — Set Function xx Command. This allows the user to send commands such as <RUN/STOP> to the unit. Each command is designated with a two-digit code, xx.

ASTO — Ask Storage Command. This allows the user to download a specified number of records from the internal data logger from the current position of the AK storage pointer. The location of this storage pointer may be defined by the SSTO command. The values on each line of output are delimited by commas.

SSTO — Set Storage Command. This allows the user to change the location of the AK storage pointer in the internal data logger, and is used in conjunction with the ASTO command described above. The AK storage pointer is always located just following the last record transmitted through the RS232 port via the AK Protocol. If the circular buffer overwrites this location or if the ASTO or SSTO commands have not been used, the AK storage pointer resides at the oldest record in the internal data logger.

IMPORTANT NOTE: The Partisol-Plus Sampler contains three internal databases: filter data, interval data and input data (Section 7). When downloading stored information using the ASTO and SSTO commands of the AK Protocol, the user must specify which database is to be accessed by setting the value of Program Register Code 31 (Appendix B) to either 0 for filter data, 1 for interval data, or 2 for input data.

The following pages detail the format of the transmission and response messages of the commands listed above.

AK Protocol

Ask Register Command (AREG)

COM 2-WAY SETTINGS		
RS-Para 1	52	ASCII code for the 1-digit Station Number (for example "4": 052). The Station Number is always 1 digit in length.
RS-Para 2	75048	ASCII code representation of the 2-digit Channel Number (for example: "K0": 075, 048). The Channel Number is always 2 digits in length.
RS-Para 3	13010	Optional: Up to 3 ASCII codes can be added to response from instrument. In this case, <CR> and <LF> (ASCII codes 013 and 010) are appended to the response. Enter 0 if nothing is to be appended.
RS-Para 4	0	Not used.

Transmission to Instrument			Response from Instrument			
Byte	**Example**	**Description**	**B**	**No Err**	**Error**	**Description**
1	<STX>	ASCII code 002.	1	<STX>	<STX>	ASCII code 002.
2	4	1-digit Station Number, RS-Para 1.	2	4	4	1-digit Station Number, RS-Para 1.
3	A	Ask Register command. Enter the Program Register Code of the desired variable in bytes 21 to 23 below.	3	A	A	4-digit Ask Register command.
4	R		4	R	R	
5	E		5	E	E	
6	G		6	G	G	
7	<space>	Space.	7	<space>	<space>	Space.
8	K	2-digit Channel Number, as defined by RS-Para 2.	8	0	0	Number of current status conditions.
9	0		9	<space>	<space>	Space.
10	<space>	Space.	10	1	S	Program Register Code of the variable whose value is being requested. The PRC may be 1 to 3 characters long, and is not right-filled in the response.
11	1	Program Register Code of the variable whose value is being requested. The PRC may be up to 3 digits long. Do not right-fill if the PRC is less than 3 characters long.	11	2	E	
12	2		12	2	<ETX>	
13	2		13	<space>	<CR>	Space.
14	<ETX>	ASCII code 003.	14	1	<LF>	Current value of the variable referenced by the Ask Register command. NOTE: This value can be of varying length.
15			15	6		
16			16	.		
17			17	6		
18			18	9		
19			19	4		

AK Protocol

Ask Register Command (AREG) (continued)

Transmission to Instrument			Response from Instrument			
Byte	**Example**	**Description**	**B**	**No Err**	**Error**	**Description**
20			20	<ETX>		ASCII code 003.
21			21	<CR>		Up to 3 digits appended to the end of the response transmission, according to the entry for RS-Para 3.
22			22	<LF>		
23			23			
24			24			
25			25			
26			26			
27			27			
28			28			
29			29			
30			30			
31			31			
32			32			
33			33			
34			34			
35			35			
36			36			
37			37			
38			38			
39			39			
40			40			
41			41			
42			42			
43			43			
44			44			
45			45			
46			46			

AK Protocol

Enter Register Command (EREG)

COM 2-WAY SETTINGS		
RS-Para 1	52	ASCII code for the 1-digit Station Number (for example "4": 052). The Station Number is always 1 digit in length.
RS-Para 2	75048	ASCII code representation of the 2-digit Channel Number (for example: "K0": 075, 048). The Channel Number is always 2 digits in length.
RS-Para 3	13010	Optional: Up to 3 ASCII codes can be added to response from instrument. In this case, <CR> and <LF> (ASCII codes 013 and 010) are appended to the response. Enter 0 if nothing is to be appended.
RS-Para 4	0	Not used.

Transmission to Instrument			Response from Instrument			
Byte	**Example**	**Description**	**B**	**No Err**	**Error**	**Description**
1	<STX>	ASCII code 002.	1	<STX>	<STX>	ASCII code 002.
2	4	1-digit Station Number, RS-Para 1.	2	4	4	1-digit Station Number, RS-Para 1.
3	E	Enter Register command. Enter the Program Register Code in bytes 21 to 23 below, and the new value of the variable in bytes	3	E	E	4-digit Enter Register command.
4	R		4	R	R	
5	E		5	E	E	
6	G		6	G	G	
7	<space>	Space.	7	<space>	<space>	Space.
8	K	2-digit Channel Number, as defined by RS-Para 2.	8	0	0	Number of current status conditions.
9	0		9	<space>	<space>	Space.
10	<space>	Space.	10	3	S	Program Register Code of the variable whose value was entered. The PRC may be 1 to 3 characters long, and is not right-filled in the response.
11	3	Program Register Code of the variable whose value is being entered. The PRC may be up to 3 digits long. Do not right-fill if the PRC is less than 3 characters long.	11	1	E	
12	1		12		<ETX>	
13			13	<ETX>	<CR>	ASCII code 003
14	<space>	Space.	14	<CR>	<LF>	Up to 3 digits appended to the end of the response transmission, according to the entry for RS-Para 3.
15	1	New value to be entered for variable referenced by Program Register Code in bytes 11 to 13 above. NOTE: The value entered may be of varying length.	15	<LF>		
16			16			
17			17			
18			18			
19	<ETX>	ASCII code 003.	19			

AK Protocol

Set Function Command (SFxx)

COM 2-WAY SETTINGS

RS-Para 1	52	ASCII code for the 1-digit Station Number (for example "4": 052). The Station Number is always 1 digit in length.
RS-Para 2	75048	ASCII code representation of the 2-digit Channel Number (for example: "K0": 075, 048). The Channel Number is always 2 digits in length.
RS-Para 3	13010	Optional: Up to 3 ASCII codes can be added to response from instrument. In this case, <CR> and <LF> (ASCII codes 013 and 010) are appended to the response. Enter 0 if nothing is to be appended.
RS-Para 4	0	Not used.

Transmission to Instrument

Byte	Example	Description
1	<STX>	ASCII code 002.
2	4	1-digit Station Number, RS-Para 1.
3	S	Set Function command, where xx represents a 2-digit code. These codes are defined below.
4	F	
5	x	
6	x	
7	<space>	Space.
8	K	2-digit Channel Number, as defined by RS-Para 2.
9	0	
10	<ETX>	ASCII code 003.

LISTING OF FUNCTION CODES (xx)

01	Run
02	Stop
10	Set Time
11	Set Date
50	Switch to "None" RS232 Mode

Response from Instrument

B	No Err	Error	Description
1	<STX>	<STX>	ASCII code 002.
2	4	4	1-digit Station Number, RS-Para 1.
3	S	S	4-digit Set Function command, with the 2-digit xx code corresponding to the function that was set.
4	F	F	
5	x	x	
6	x	x	
7	<space>	<space>	Space.
8	0	0	Number of current status conditions.
9	<ETX>	<space>	Space.
10	<CR>	S	Up to 3 digits appended to the end of the response transmission, according to the entry for RS-Para 3.
11	<LF>	E	
12		<ETX>	
13		<CR>	
14		<LF>	
15			
16			
17			
18			
19			

AK Protocol

Ask Storage Command (ASTO)

COM 2-WAY SETTINGS

RS-Para 1	52	ASCII code for the 1-digit Station Number (for example "4": 052). The Station Number is always 1 digit in length.
RS-Para 2	75048	ASCII code representation of the 2-digit Channel Number (for example: "K0": 075, 048). The Channel Number is always 2 digits in length.
RS-Para 3	13010	Optional: Up to 3 ASCII codes can be added to response from instrument. In this case, <CR> and <LF> (ASCII codes 013 and 010) are appended to the response. Enter 0 if nothing is to be appended.
RS-Para 4	0	Not used.

Transmission to Instrument

Byte	Example	Description
1	<STX>	ASCII code 002.
2	4	1-digit Station Number, RS-Para 1.
3	A	Ask Storage command. Enter the number of records to be downloaded from storage in bytes 11 to 13 below.
4	S	
5	T	
6	O	
7	<space>	Space.
8	K	2-digit Channel Number, as defined by RS-Para 2.
9	0	
10	<space>	Space.
11	5	The number of records to be downloaded from the instrument's storage. Downloading begins at the storage marker, which can be set using the SSTO command.
12	0	
13		
14	<ETX>	ASCII code 003.

SET CURRENT DATA STORAGE BUFFER

0 in PRC 31	Filter Data
1 in PRC 31	Interval Data
2 in PRC 31	Input Data

Response from Instrument

B	No Err	Error	Description
1	<STX>	<STX>	ASCII code 002.
2	4	4	1-digit Station Number, RS-Para 1.
3	A	A	4-digit Ask Storage command.
4	S	S	
5	T	T	
6	O	O	
7	<space>	<space>	Space.
8	0	0	Number of current status conditions.
9	<space>	<space>	Space.
10	3	S	Records to be downloaded from storage. This can be smaller than requested number due to end of file. Storage marker moved to after last record transmitted. Not right-filled.
11	8	E	
12		<ETX>	
13	<ETX>	<CR>	ASCII code 003.
14	<CR>	<LF>	Up to 3 digits appended to the end of the response transmission, according to the entry for RS-Para 3.
15	<LF>		
16			

The instrument then transmits the number of storage records shown in response bytes 10 to 12 above. Each record is followed by <CR><LF>.

AK Protocol

Set Storage Marker Command (SSTO)

COM 2-WAY SETTINGS		
RS-Para 1	52	ASCII code for the 1-digit Station Number (for example "4": 052). The Station Number is always 1 digit in length.
RS-Para 2	75048	ASCII code representation of the 2-digit Channel Number (for example: "K0": 075, 048). The Channel Number is always 2 digits in length.
RS-Para 3	13010	Optional: Up to 3 ASCII codes can be added to response from instrument. In this case, <CR> and <LF> (ASCII codes 013 and 010) are appended to the response. Enter 0 if nothing is to be appended.
RS-Para 4	0	Not used.

Transmission to Instrument			Response from Instrument			
Byte	**Example**	**Description**	**B**	**No Err**	**Error**	**Description**
1	<STX>	ASCII code 002.	1	<STX>	<STX>	ASCII code 002.
2	4	1-digit Station Number, RS-Para 1.	2	4	4	1-digit Station Number, RS-Para 1.
3	S	4-digit Set Storage Marker command.	3	S	S	4-digit Set Storage Marker command.
4	S		4	S	S	
5	T		5	T	T	
6	O		6	O	O	
7	<space>	Space.	7	<space>	<space>	Space.
8	K	2-digit Channel Number, as defined by RS-Para 2.	8	0	0	Number of current status conditions.
9	0		9	<ETX>	<space>	ASCII code 003.
10	<space>	Space.	10	<CR>	S	Up to 3 digits appended to the end of the response transmission, according to the entry for RS-Para 3.
11	B	New location of the Storage Marker. B: move to beginning of storage buffer, E: move to end of storage buffer. Enter positive numbers such as 250 to move forward by n records, and negative numbers such as -1000 to move backwards by n records. Do not right-fill.	11	<LF>	E	
12			12		<ETX>	
13			13		<CR>	
14			14		<LF>	
15			15			
16	<ETX>	ASCII code 003.	16			
17			17			
18			18			
19			19			

AK Protocol

Response if Command Addressed to Instrument is Unrecognizable

COM 2-WAY SETTINGS

RS-Para 1	52	ASCII code for the 1-digit Station Number (for example "4"; 052). The Station Number is always 1 digit in length.
RS-Para 2	75048	ASCII code representation of the 2-digit Channel Number (for example "KO"; 075, 048). The Channel Number is always 2 digits in length.
RS-Para 3	13010	Optional: Up to 3 ASCII codes can be added to response from instrument. In this case, <CR> and <LF> (ASCII codes 013 and 010 are appended to the response. Enter 0 if nothing is to be appended.)
RS-Para 4	0	Not used.

Transmission to Instrument			Response from Instrument			
Byte	**Example**	**Description**	**Byte**	**No Err**	**Error**	**Description**
1			1		<STX>	ASCII CODE 002.
2			2		4	1-digit Station Number, RS-Para 1.
3			3		?	Question marks inserted in place of unrecognized command.
4			4		?	Question marks inserted in place of unrecognized command.
5			5		?	Question marks inserted in place of unrecognized command.
6			6		?	Question marks inserted in place of unrecognized command.
7			7		<space>	Space.
8			8		0	Number of current status conditions.
9			9		<space>	Space.
10			10		S	Syntax error.
11			11		E	Syntax error.
12			12		<ETX>	ASCII code 003.
13			13		<CR>	Up to 3 digits appended to the end of the response transmission, according to the entry for RS-Para 3.
14			14		<LF>	Up to 3 digits appended to the end of the response transmission, according to the entry for RS-Para 3.
15			15			
16			16			
17			17			
18			18			
19			19			

C.2. German Ambient Network Protocol

The German Network Protocol, as implemented in the Partisol-Plus Sampler, provides basic capabilities to obtain the current values of one to three pre-determined Program Register Codes. Due to the definition of this protocol, it is not possible to select from a remote location which system variable (Program Register Code, Appendix A) is to be queried.

The following pages show the manner in which RS-Para 1 to RS-Para 4 are defined in the German Ambient Network Protocol, and also detail the format of the transmission and response messages.

German Network Protocol

COM 2-WAY SETTINGS

RS-Para 1	56052053	ASCII codes for 3-digit Instrument Identifier (for example "845": 056, 052, 053). The Instrument Identifier must be 3 bytes in length.
RS-Para 2	48048049	ASCII codes for 3-digit Location ID (for example "001": 048, 048, 049). The Location ID must be 3 bytes in length.
RS-Para 3	122127133	PRC of the variable to be transmitted by the instrument. Up to 3 PRC's may be designated for transmission by the instrument (for example Flow 1, Amb Temp and Filt 1 Temp: 122, 127, 133).
RS-Para 4	13010	Optional: Up to 3 ASCII codes can be added to response from the instrument. In this case <CR> and <LF> (ASCII codes 013 and 010) are appended to the reponse. Enter 0 if nothing is to be appended.

Transmission to Instrument			Response from Instrument			
Byte	**Example**	**Description**	**B**	**No Err**	**Error**	**Description**
1	<STX>	ASCII code 002.	1	<STX>	<STX>	ASCII code 002.
2	D	The DA command signifies a request for data from the instrument.	2	M	M	Response identifier to the DA command.
3	A		3	D	D	
4	8	3-digit Instrument Identifier, as defined by RS-Para 1. These three bytes are optional.	4	0	0	Number of variables transmitted by the instrument, as specified by RS-Para 3. May be 01, 02 or 03.
5	4		5	1	1	
6	5		6	<space>	<space>	Space.
7	<ETX>	ASCII code 003.	7	8	8	3-digit Instrument Identifier, as defined by RS-Para 1. This code ncrements by one for each variable transmitted.
8	<CRC>	High byte followed by low byte of CRC. The CRC's may be replaced by a single <CR> character.	8	4	4	
9	<CRC>		9	5	5	
			10	<space>	<space>	Space.
			11	+ or -	+	Value of variable being transmitted, in the format +NNNN+EE. For example, a value of 63.7 is represented as +0637-01. If a syntax error exists or the value of the variable is 0, the instrument returns +0000+00.
			12	n	0	
			13	n	0	
			14	n	0	
			15	n	0	
			16	+ or -	+	
			17	e	0	
			18	e	0	
			19	<space>	<space>	Space.

DEFINITION OF CRC BYTES

The CRC bytes above (bytes 8 and 9) are the hexidecimal representation of the "exclusive or" of bytes 1 to 7. The high byte of the CRC is transmitted as byte 8 and the low byte is sent as byte 9.

German Network Protocol (continued)

Transmission to Instrument

Byte	Example	Description

CURRENT OPERATING MODE (Bytes 20, 21)

The current operating mode is determined as follows:

0	STOP	Stop
1	WAIT	Wait
2	SAMP	Sample
3	DONE	Done
5	ERR	Error
6	SVC	Service

CURRENT STATUS CONDITION (Bytes 23, 24)

The contents of bytes 23 and 24 indicate the existence of any status conditions in the monitor.

00	OK	No current status conditions
01	Error	Error Condition Exists
02	Crit Err	Critical Error Exists

DEFINITION OF CRC BYTES

The CRC information in bytes 38 and 39 is the hexidecimal representation of the "exclusive or" of all response bytes. The high byte of the CRC is transmitted as byte 38 and the low byte is sent as byte 39.

Response from Instrument

B	No Err	Error	Description
20	1	1	2-digit hexidecimal representation of current instrument operating mode (see description at left).
21	0	0	
22	<space>	<space>	Space.
23	0	0	2-digit hexidecimal representation of current instrument status condition (see description at left).
24	0	0	
25	<space>	<space>	Space.
26	0	0	3-digit Location ID, as defined by RS-Para 2.
27	0	0	
28	1	1	
29	<space>	<space>	Space.
30	1	9	3-digit PRC of the variable being transmitted, zero-filled from the left. These bytes are not defined in the German Protocol, but are included for informational purposes.
31	2	9	
32	2	9	
33	<space>	<space>	These bytes are not defined in the German Protocol, and are reserved for future definition.
34	<space>	<space>	
35	<space>	<space>	
36	<space>	<space>	Space.
37	<ETX>	<ETX>	ASCII code 003.
38	<CRC>	<CRC>	High byte and low byte of CRC. The CRC's are replaced by a single <CR> if transmit byte 8 was <CR>.
39	<CRC>	<CRC>	
40	<CR>	<CR>	Up to 3 digits appended to the end of the response transmission, according to the entry for RS-Para 4.
41	<LF>	<LF>	
42			

NOTE ABOUT MULTIPLE PRC CODES

If more than 1 Program Register Code is specified in RS-Para 3, byte 5 of the reponse transmission is either 2 or 3, and bytes 7 to 36 are repeated for each Program Register Code.

Appendix D: Installing New System Software

This appendix describes the steps involved in loading new system software into the Partisol-Plus Sampler with and without RPComm software. This section also explains how to obtain and load RPComm onto your personal computer (PC). The Partisol-Plus is equipped with flash memory, which allows its operating program to be downloaded from a PC.

> NOTE: Be sure to check R&P's website (www.rpco.com) before uploading new software to ensure that you have the latest software version for either the unit's operating software or RPComm.

System requirements for running RPComm software include a Pentium processor and 32 megabytes (MB) of random access memory (RAM). This amount of RAM is necessary for users who have multiple instrument connections.

Before updating the software, record the values of calibration constants stored in the I/O Calibration, Sensor Calibration, Filter Temperature Calibration and Flow Calibration screens in the sampler's Service Mode (Section 14).

Some of the sampler's operational settings also may need to be reentered as a result of the software download.

D.1. Loading Software Into Flash Memory Without RPComm

The software that operates the Partisol-Plus Sampler is stored in flash memory. It is not necessary to make any hardware changes to revise the software. Rather, the operating program is loaded into the sampler's RS232 port from a personal computer (PC).

✔ Record system calibration constants before upgrading the software.

Follow the procedure below to download new system software into the device without RPComm software:

1) **Record all of your unit's calibration constants (offset and span) from its calibration screens (Sensor Calibration and Flow Calibration screens). Record all required operating parameters.**

   IMPORTANT: After the new system software has been downloaded, you must do a total reset of the unit. This resets all of the unit's parameters to their default conditions and clears the system's data storage buffers, including the calibration constants. Be sure to record your operating parameters and calibration constants before uploading the new software and resetting your unit.

2) Return the sampler to the Stop Operating Mode (Section 5.1).

NOTE: This action can be performed remotely if the instrument is in the AK Protocol (Appendix C) by executing the appropriate SFxx command(s).

3) Using the 9-to-9 pin cable (07-000587) supplied with the sampler, connect the unit's RS232 port to your PC's RS232 port.

NOTE: Alternately, the sampler can be connected to a remote computer by modem and telephone lines. You can attach a modem to the RS232 port on the sampler using the 9-to-25 pin serial modem cable (51-002814) supplied with the unit (Appendix J).

4) Set the sampler's current RS232 Protocol to "None" in the RS232 Setup screen (Section 9). In the same screen, confirm that the RS232 communication is set up for 8 data bits, 1 stop bit and no parity. The downloading software supports a baud rate of 9600.

5) Load the following software provided with the system onto a PC (preferably all in the same directory) to perform the software download:

RPLOAD.EXE	Executable program for local or remote downloading.
RPLOAD.CFG	Configuration file containing the download parameters.
2025.BIN	Model 2025 operating program to be downloaded.

6) Using an ASCII text editor such as Windows™ Notepad, review the contents of the self-documenting RPLOAD.CFG file. Change the values of the listed download parameters, if necessary, to match the desired downloading operation:

COM=1	The communication port number. If a non-standard comm-port is being used, specify the correct port and IRQ values in the following lines.
PORT=3F8	This line is only used by the download program if the setting for COM above is 3. In this case, enter the port address (in hexidecimal) of the comm port being used. Otherwise, the download program disregards the value entered for PORT.
IRQ=4	This line is only used by the download program if the setting for COM above is 3. In this case, enter the interrupt request line of the comm port being used. Otherwise, the download program disregards the value entered for IRQ.

BAUD=9600	The baud rate of the program download. This value must match the setting entered in the sampler's RS232 Setup screen (Section 9). Permissible entries are 2400, 4800, 9600, 19200 and 38400 baud.
SETAK=1	Determines whether the sampler's RS232 mode changes to the AK Protocol after the download. A value of "0" causes the instrument to remain in the "None" mode, while a "1" instructs the sampler to enter the AK Protocol after the download.

7) Download the instrument control software according to the parameters in RPLOAD.CFG by issuing the following command from the PC:

RPLOAD 2025.BIN

As the software executes, it indicates and updates the current stage of the software transmission.

8) Perform a complete reset of your unit. Pressing <F5: Reset> (Figure D-1) while in the Title screen causes the unit to reset *all* of its operating parameters to their default conditions. This also clears the system's data storage buffers, including the calibration constants.

Figure D-1. Title screen.

```
      Partisol-Plus
 Model 2025 Sequential Air Sampler

 Version: 1.202   Date: 8-Dec-98

Copyright 1998
Rupprecht & Patashnick Co., Inc.
```

RDfault	RData			Reset	

9) Re-enter your required operating parameters and the calibration constants that you recorded before loading the new software. Calibration constants can be reentered in the appropriate calibration screens by pressing <EDIT>, entering the offset and span (where applicable) and pressing <ENTER>.

10) If performing a direct program download, disconnect the 9-to-9 pin computer cable from the unit to the PC.

D.2. INSTALLING RPCOMM

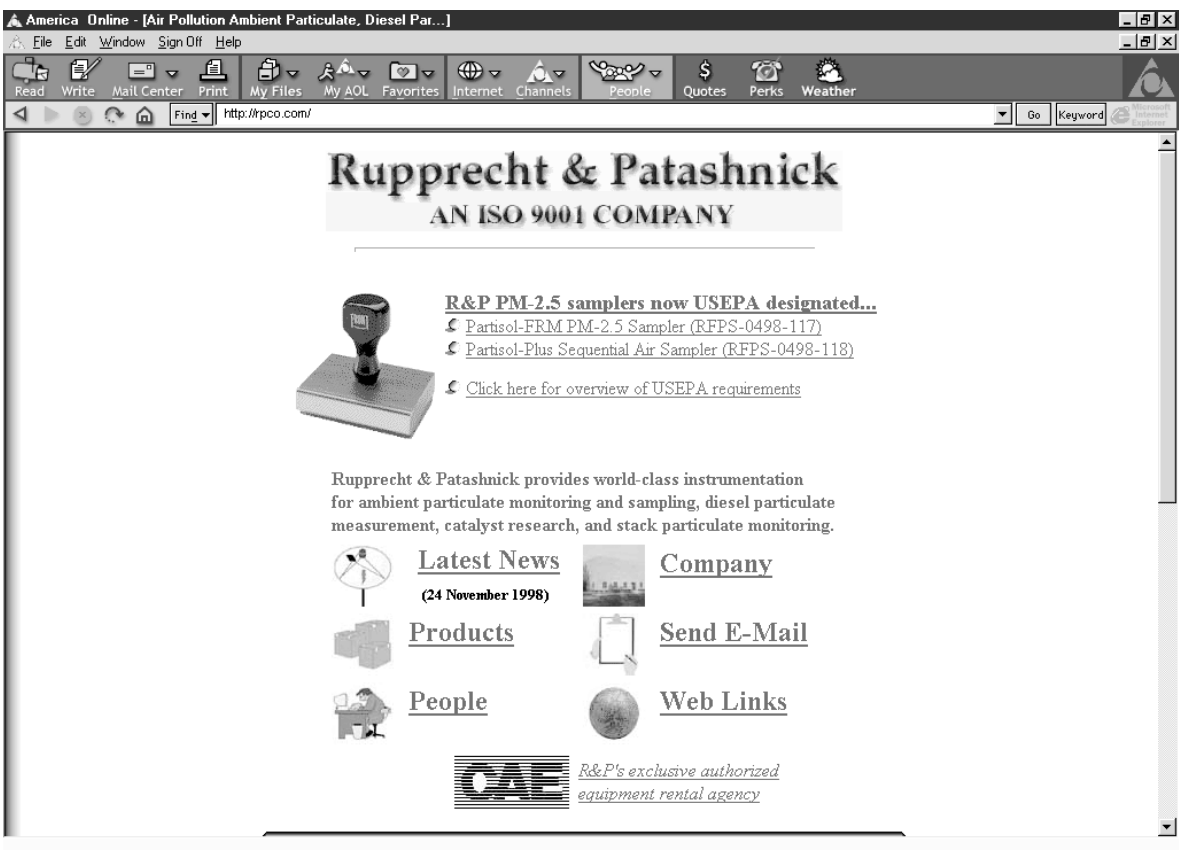
D.2.1. OBTAINING RPCOMM INSTALLATION FILES

The RPComm installation files can be downloaded from the R&P home page on the World Wide Web. The R&P home page address is: www.rpco.com.

Follow these steps to obtain the RPComm installation files:

1) **Access the R&P home page on the World Wide Web at: www.rpco.com (Figure D-2).**

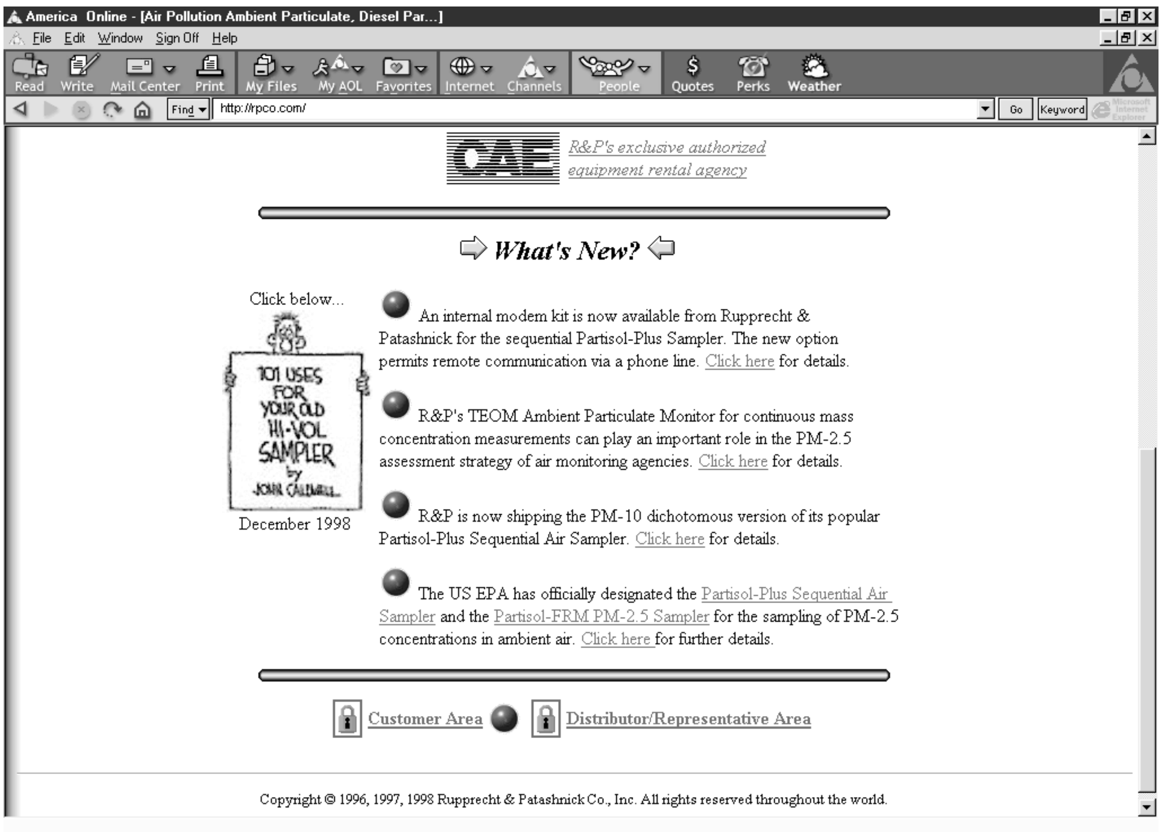
Figure D-2. R&P's home page on the World Wide Web.



2) Go to the Customer Area of the website by selecting "Customer Area" at the bottom of the home page (Figure D-3).

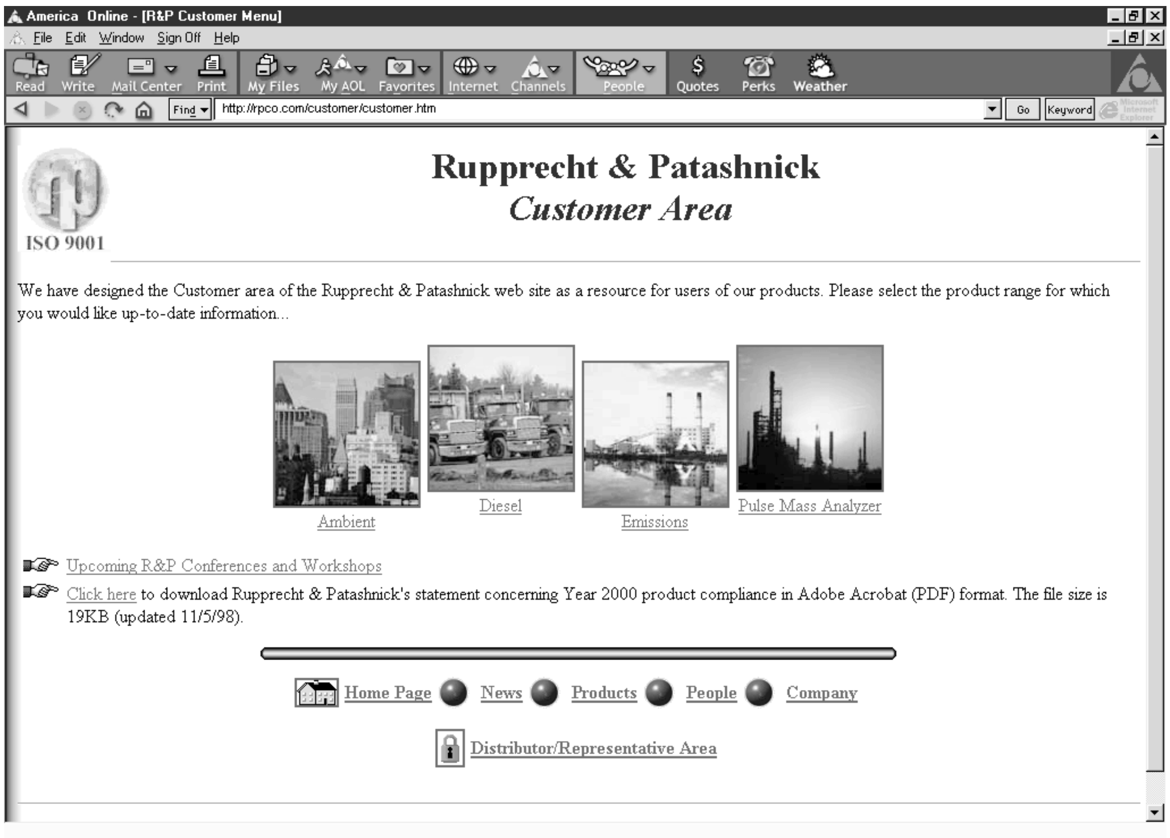
NOTE: A password is required to access the Customer Area of the R&P website. Contact R&P for password assignments.

Figure D-3. Bottom of R&P's home page.



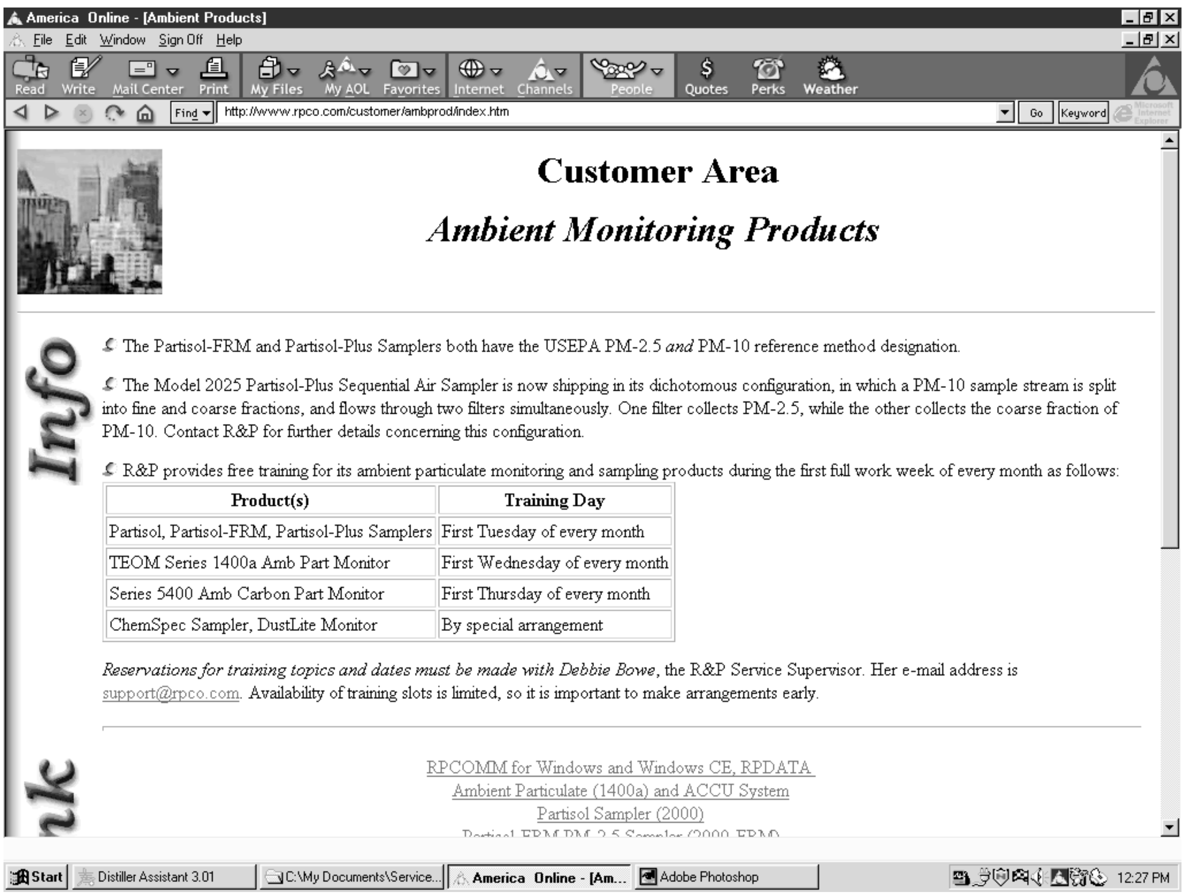
3) Go to the Ambient Monitoring Products area of the website by selecting “Ambient” while in the Customer Area (Figure D-4). “Ambient” is located beneath the picture of the city.

Figure D-4. Customer Area of R&P’s website.



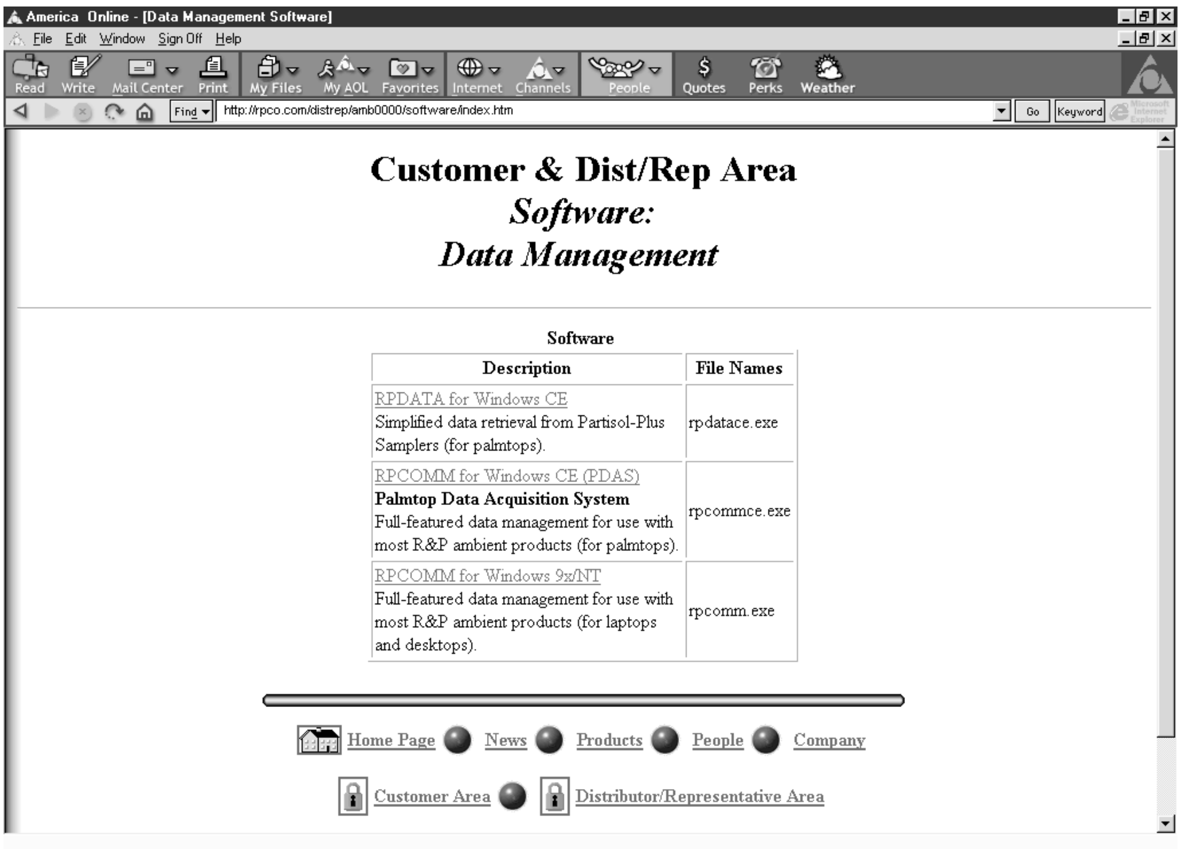
4) Go to the Data Management Software area of the website by selecting “RPCOMM for Windows and Windows CE, RPDATA” while in the Ambient Monitoring Products area (Figure D-5).

Figure D-5. Ambient Monitoring Products area of R&P’s website.



5) Go to the Software to Download area of the website by selecting "RPCOMM for Windows 9x/NT" while in the Data Management Software area (Figure D-6).

Figure D-6. Data Management Software area of R&P's website.



6) While in the Software to Download area, select “rpcomm.exe” and save to a file (Figure D-7).

NOTE: Be sure to remember what folder the file is saved in.

7) If desired, the “changelog.txt” file can be downloaded and saved to a file. The changelog.txt file gives a description of the changes made by R&P with each revision of its RPComm program.

8) The “packagelist.txt” file also can be downloaded and saved to a file. The packagelist text file contains a list of all the files needed to run RPComm. These files will be transferred to your computer when rpcomm.exe is downloaded to your computer and executed.

9) After downloading is complete, exit the World Wide Web.

Figure D-7. Software to Download area of R&P’s website.

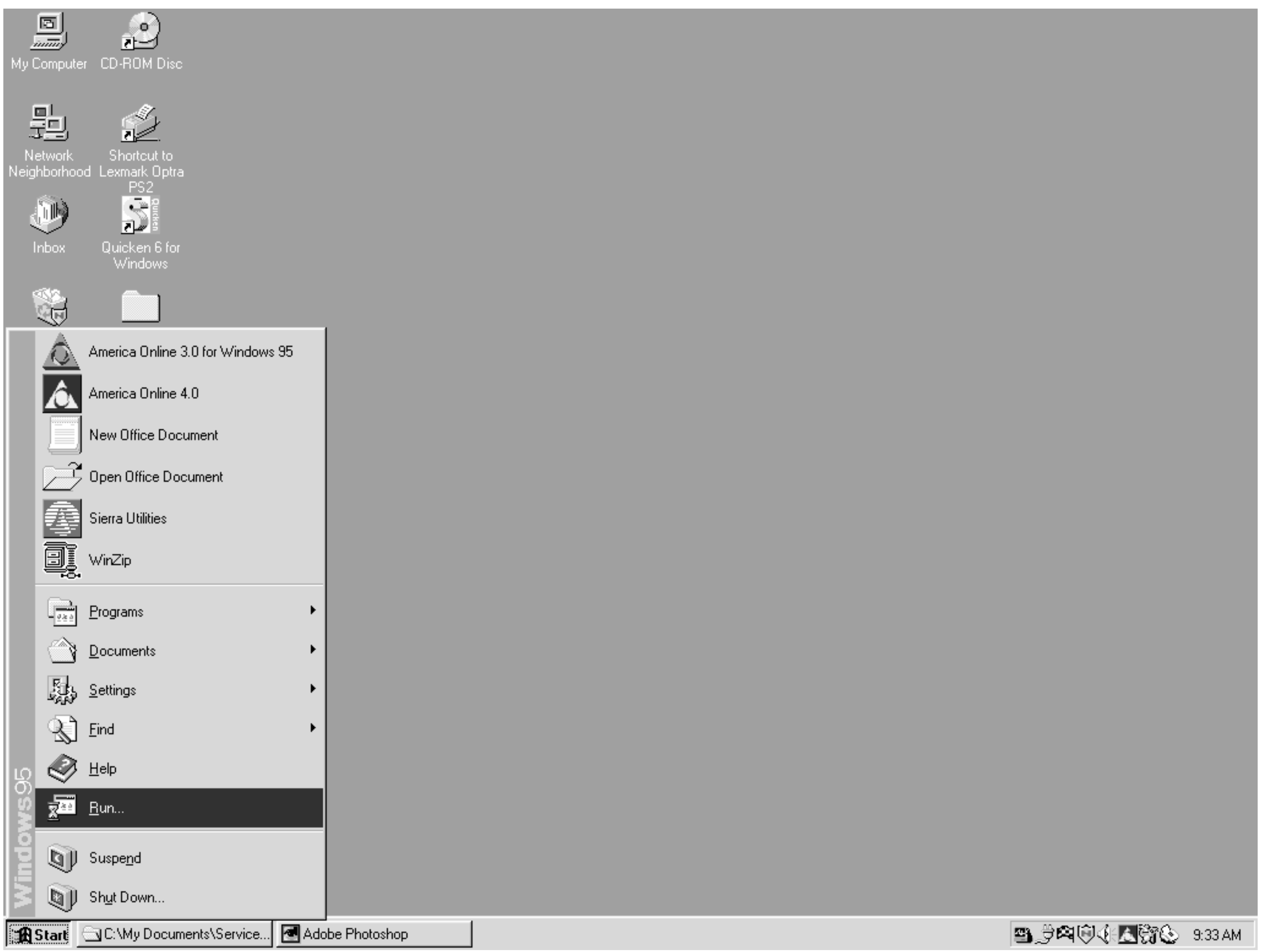
D.2.2. INSTALLING RPCOMM ONTO A COMPUTER

Perform the following steps to install RPComm onto a computer:

1) **Exit all Windows programs. The RPComm installation and setup programs may not run properly if other programs are running.**

2) **The software program "rpcomm.exe," as downloaded from the R&P website, is a self-executable file and will install itself onto the computer when executed. Select the "Start" button on your PC and highlight the "Run..." option (Figure D-8).**

Figure D-8. Accessing the Run Program screen.



3) **When the Run screen appears, enter the file name (including the directory path) and press "OK" (Figure D-9). An RPComm Installation Confirmation screen will be displayed (Figure D-10). Press "OK."**

Figure D-9. Run screen.

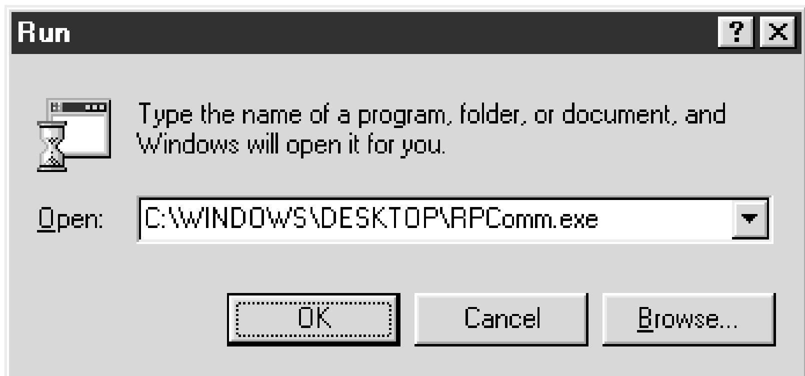


Figure D-10. RPCOMM Installation Confirmation screen.

4) **The WinZip Self-Extractor screen will be displayed (Figure D-11). This shows the PC's directory where the RPComm installation files will be saved (the default directory is "C:\RPDisks"). R&P does not recommend modifying this directory path. This will allow the setup program to run after the software installation is complete. Ensure that the two check boxes are checked and select "Unzip."**

NOTE: If the user wishes, the files be installed in a directory different from the default and the path can be modified. However, if you choose to do so, you must not check the second check box, "When done unzipping run: C:\RPDisks\Disk1\Setup." The setup routine will not run after installation is complete and must be executed manually.

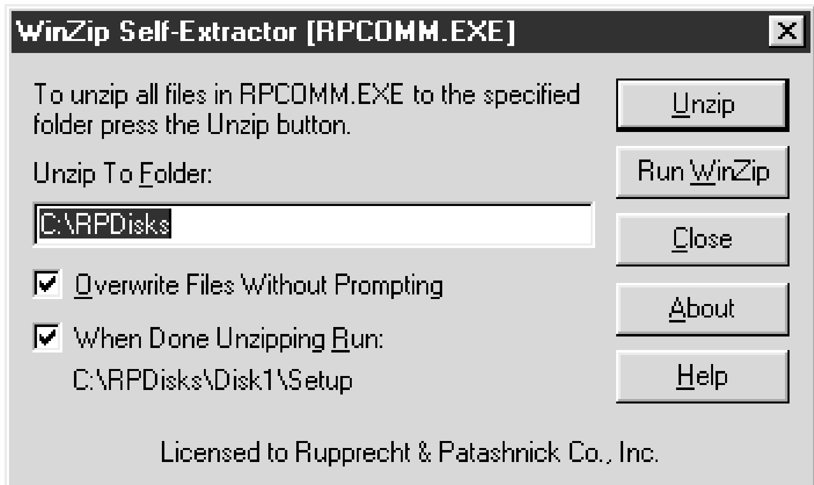


Figure D-11. WinZip Self-Extractor screen.

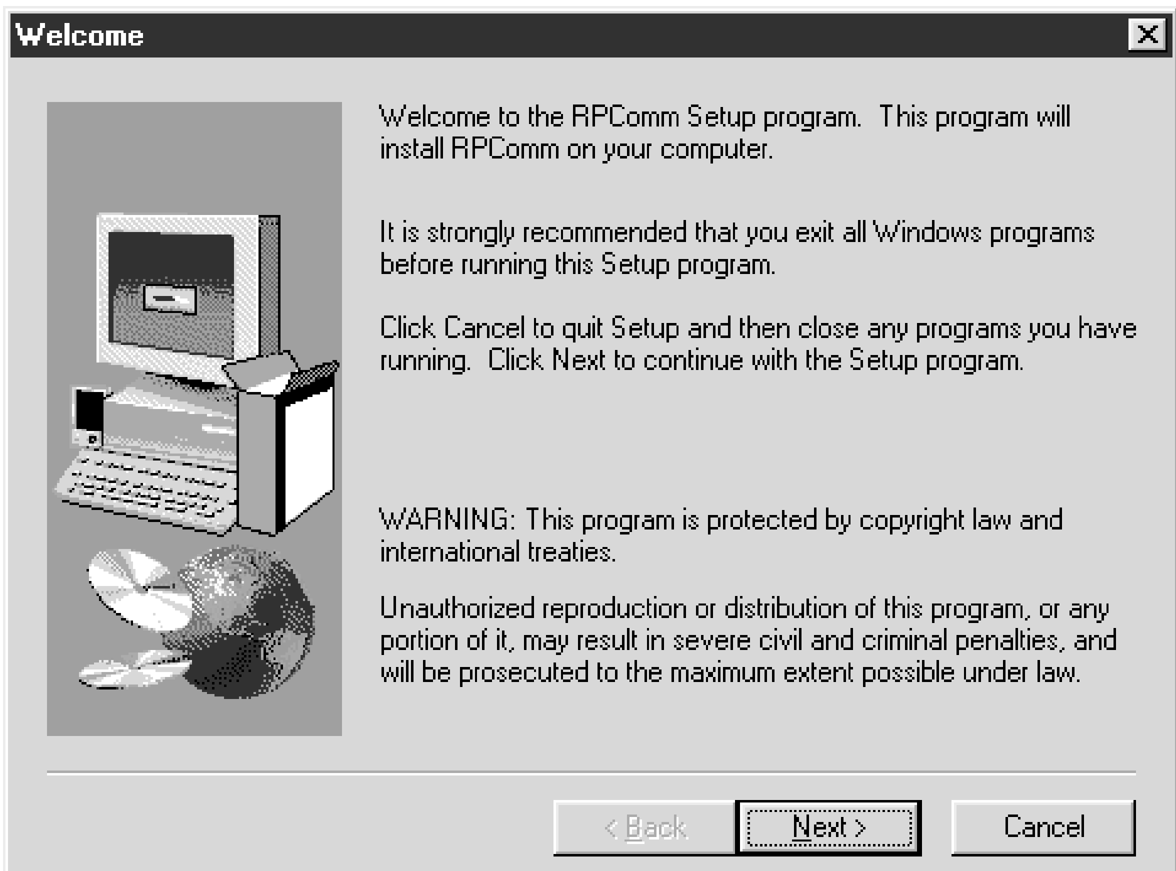
5) The RPComm setup files will now be copied to the directory named "RPDisks" on the "C:\" drive. Under the "C:\RPDisks" directory, several subdirectories will be created: Disk1, Disk2, Disk3, etc. These directories are organized so that the RPComm setup files can be copied onto floppy disks (1.44 MBytes). RP-Comm can then be installed onto other computers from those disks. When all files have been successfully copied to the PC's hard drive, the WinZip Self-Extractor Completion screen will be displayed (Figure D-12). Select "OK."

NOTE: When copying RPComm files to floppy disks, copy only the individual files under each Disk directory to the disk, not the directory itself. If the directory itself is copied, there may not be enought room on the floppy disk for all the required files.

Figure D-12. WinZip Self-Extractor Completion screen. The number of unzipped files will vary depending on the version of RPComm that you are loading.

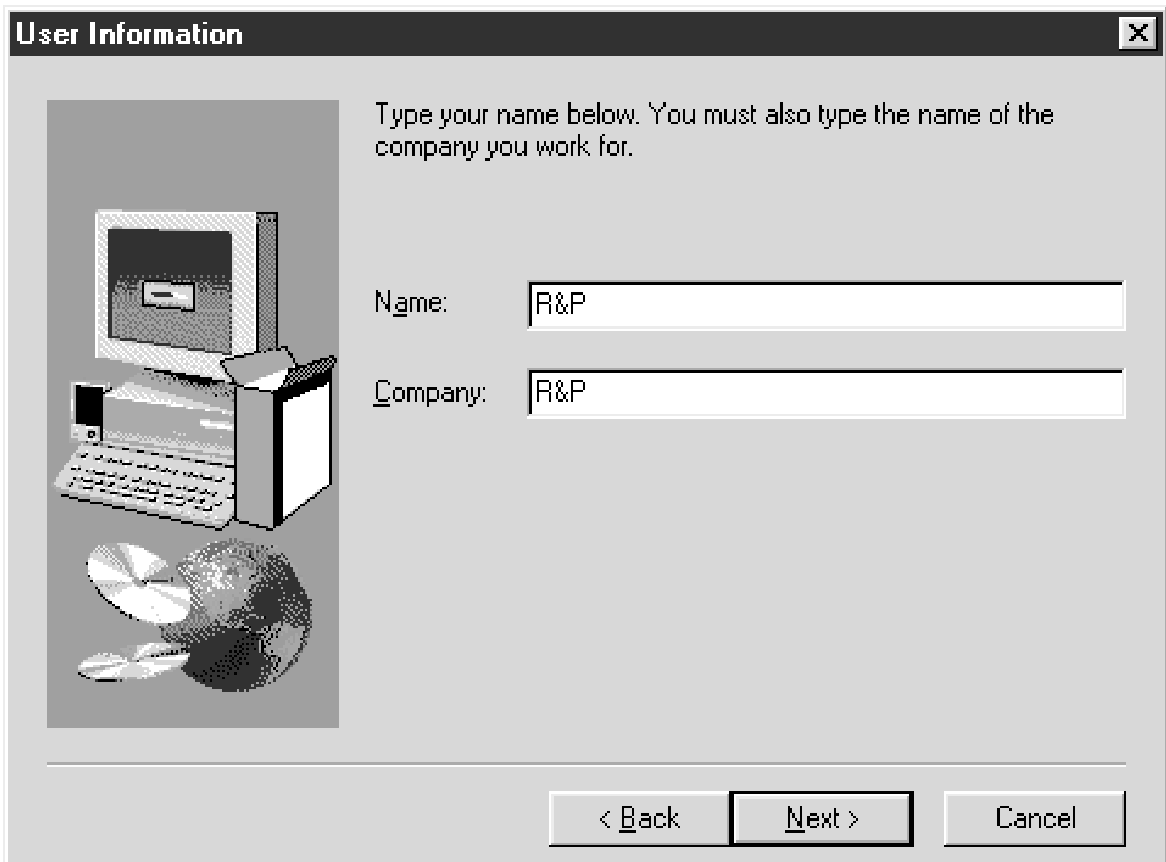
6) Press the "Next >" button when the RPComm Welcome screen appears (Figure D-13).

Figure D-13. RPComm Welcome screen.



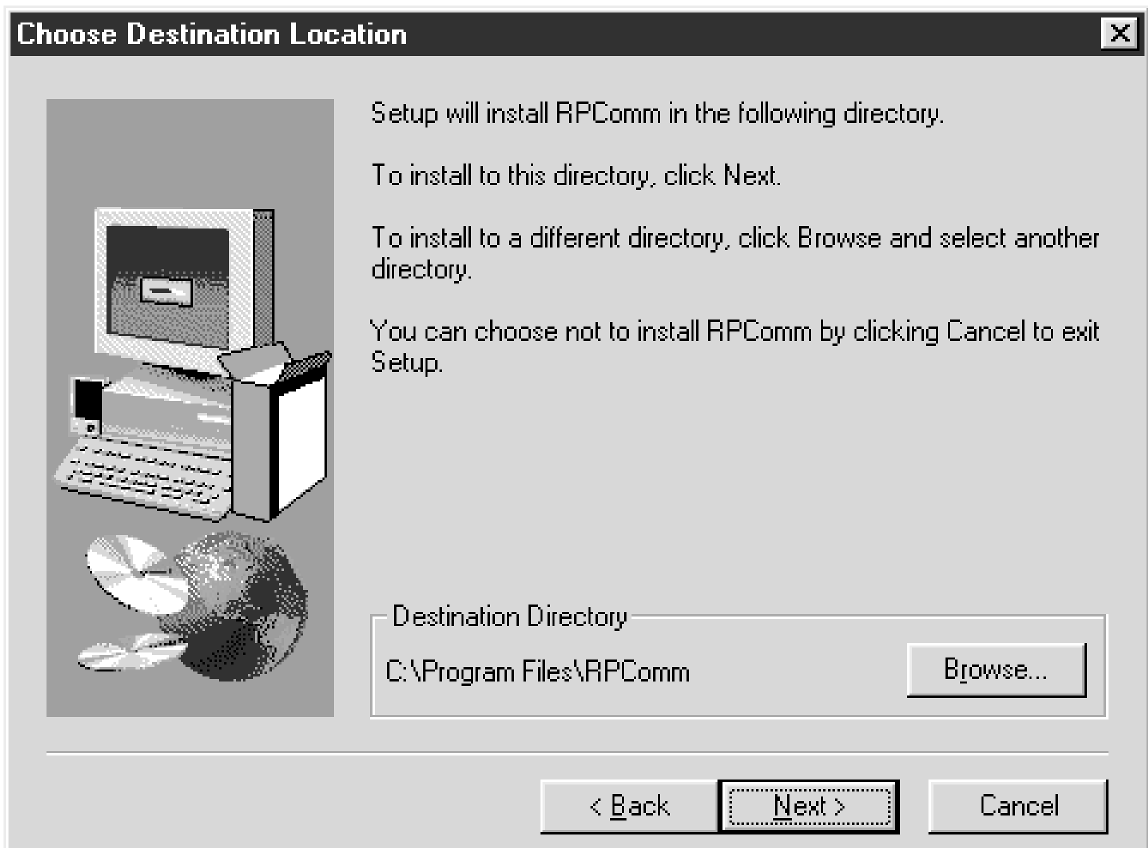
7) Enter a user and company name into the RPComm User Information screen and select “Next >” (Figure D-14).

Figure D-14. RPComm User Information screen.



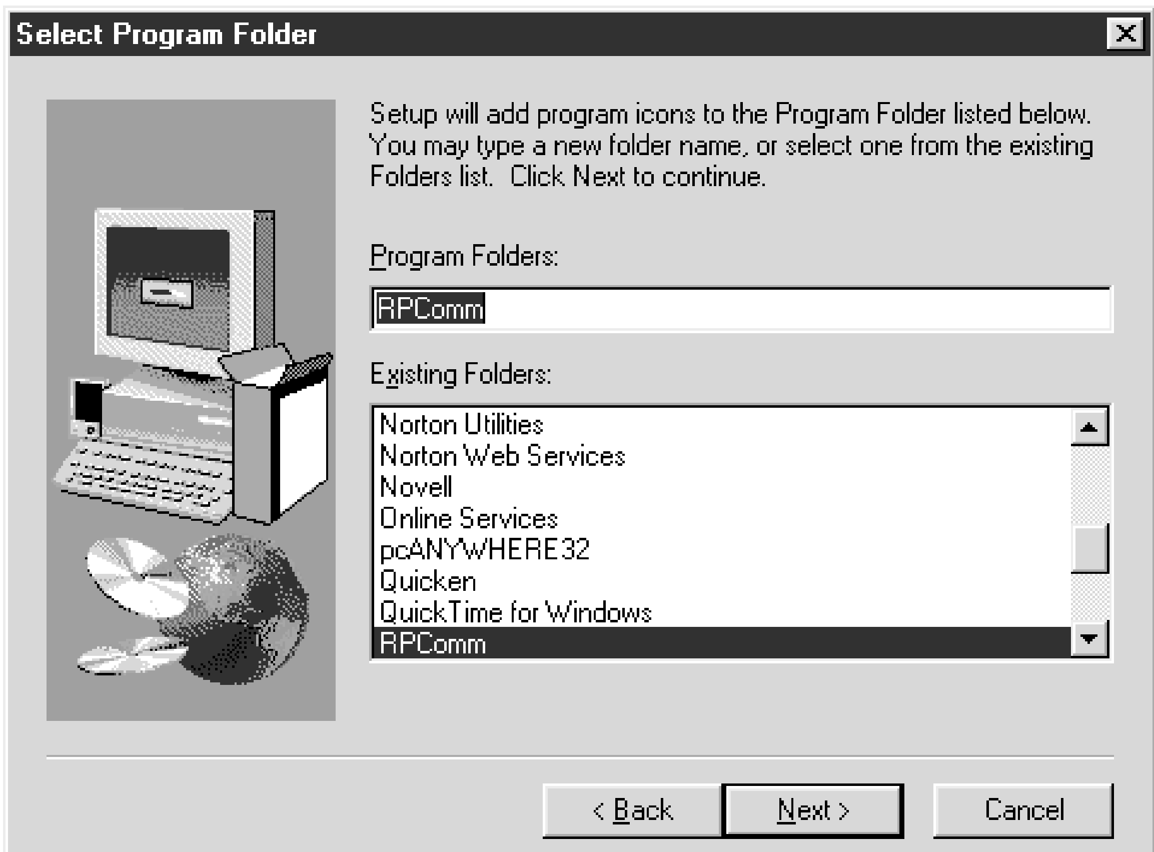
8) The RPComm Destination Location screen (Figure D-15) shows the directory that RPComm will be installed into (the default directory is "C:\Program Files\RPComm"). R&P does not recommend modifying the directory path. However, the directory can be modified by selecting "Browse" and by choosing the desired directory. Select "Next >."

Figure D-15. RPComm Destination Location screen.



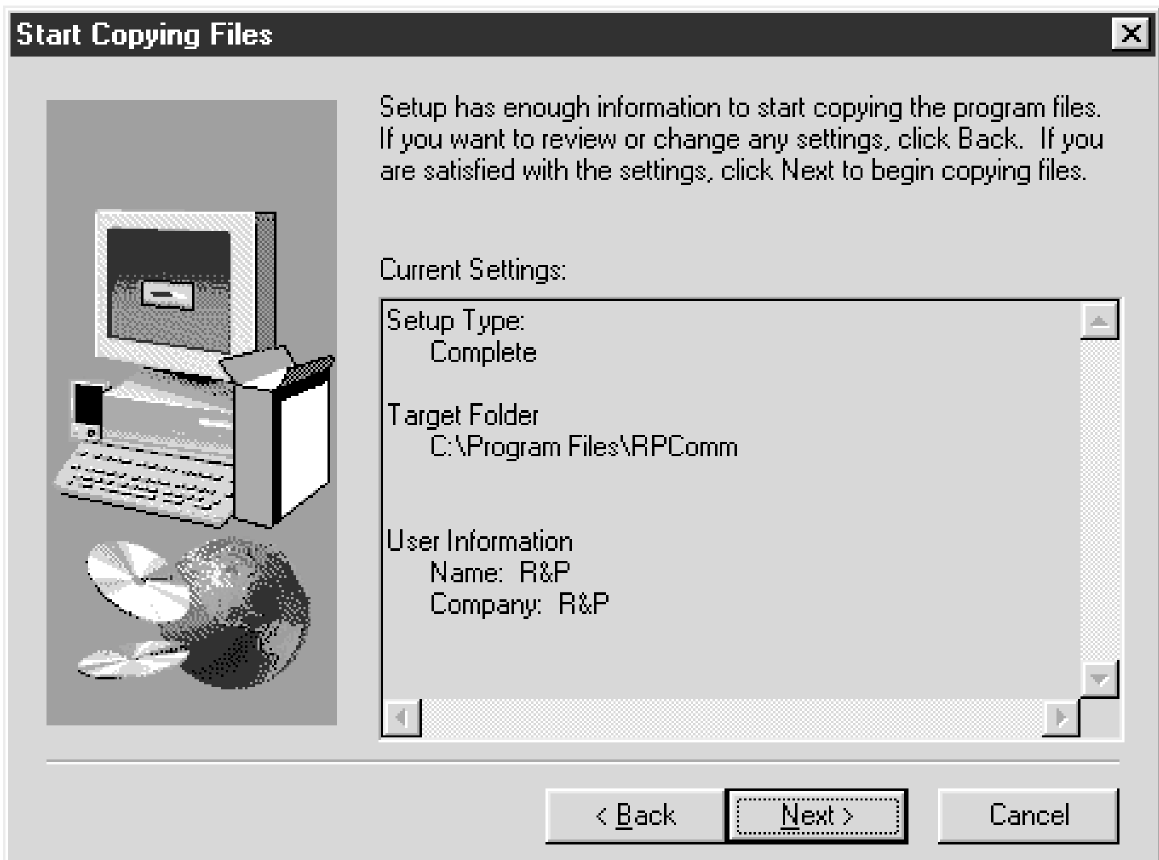
9) While in the RPComm Select Program Folder screen, choose the desired program folder for installation and press "Next >" (Figure D-16).

Figure D-16. RPComm Select Program Folder screen.



10) While in the RPComm Start Copying Files screen, verify that the setup information is correct and press “Next >” (Figure D-17). The RPComm files will now be copied to the specified directory.

Figure D-17. RPComm Start Copying Files screen.



11) When setup is complete, the user may be prompted to restart the computer. If prompted, it is recommended that you restart your PC before running RPComm (Figure D-18). If the setup program does not prompt you to restart your PC, it will instead ask you if you would like to start the RPComm program now.

Figure D-18. RPComm Setup Complete screen.

D.3. Loading Software Into Flash Memory With RPComm

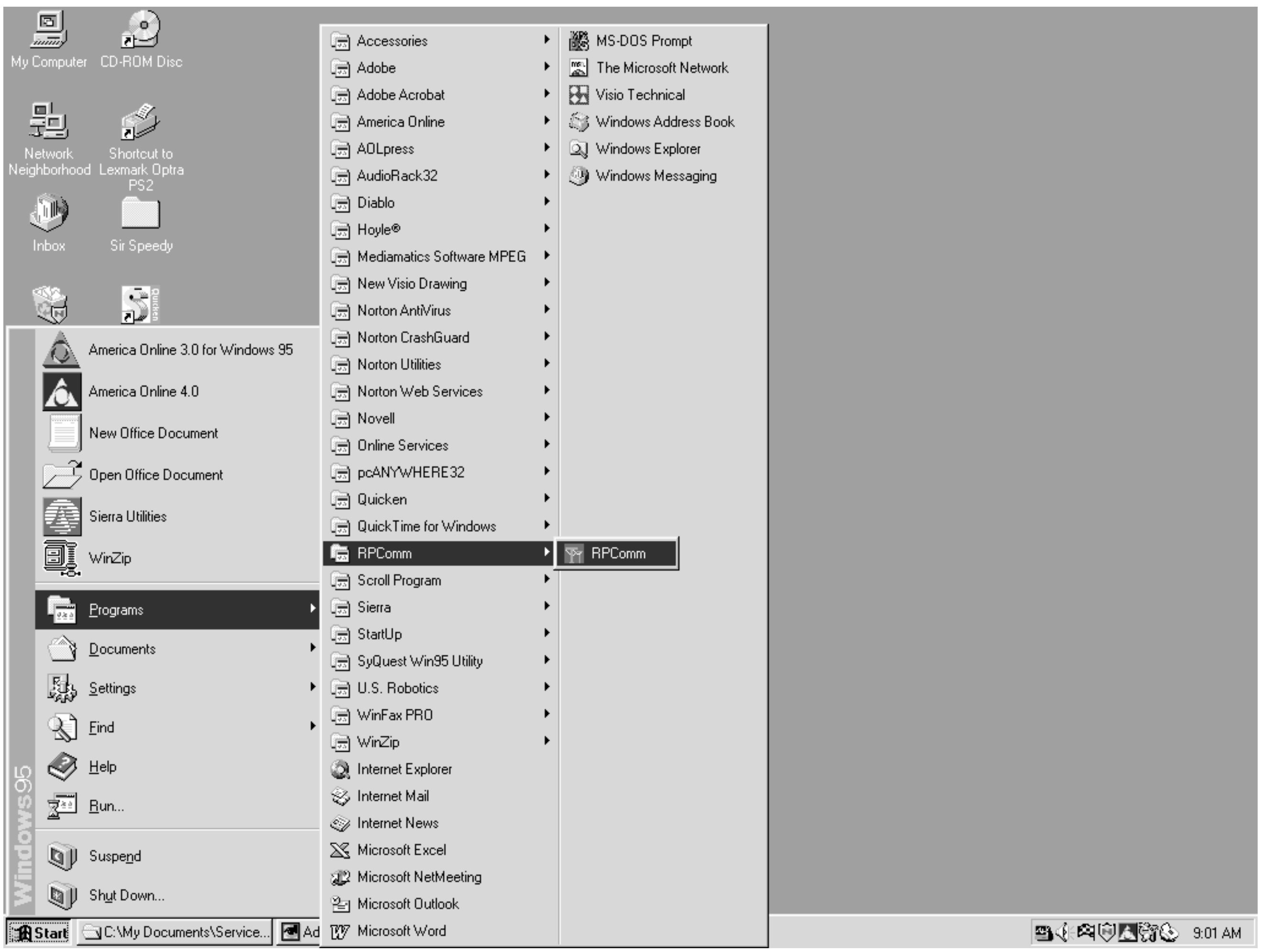
RPComm can be used as a vehicle through which new revisions of the unit's software can be uploaded. R&P recommends that this be done only when a direct connection is being used and not through a modem connection.

> NOTE: When uploading new sampler operating software with RPComm, it is *not* necessary to record your operating parameters and calibration constants and reset the unit. RPComm retains all of the unit's parameters to their default conditions and the system's data storage buffers, including the calibration constants, and then reinserts them into the operating software program after the upload.

Follow these steps to upload the system software with RPComm:

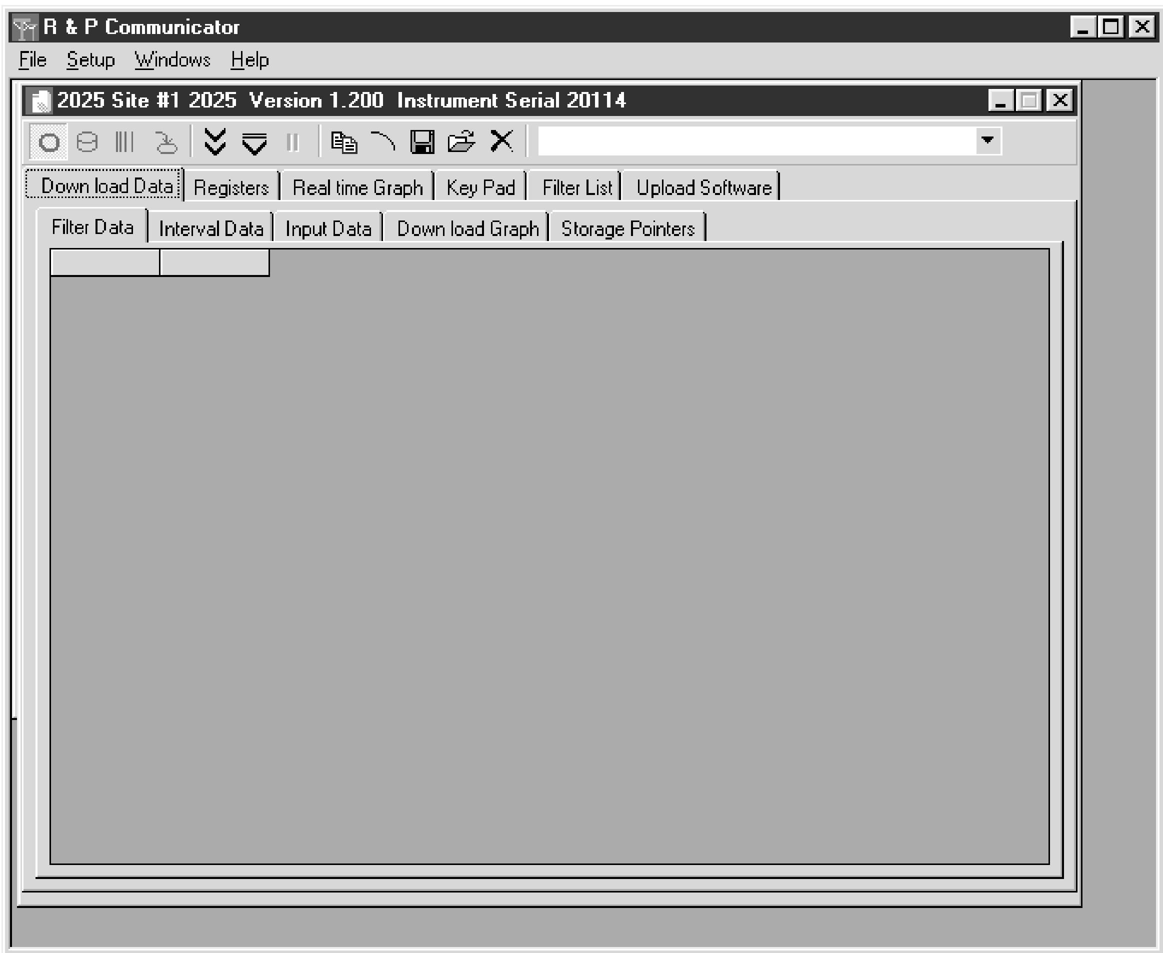
1) Select the “Start” button on your PC’s screen and highlight “Programs,” and then “RPComm.” Choose the RPComm icon to begin executing the RPComm program (Figure D-19).

Figure D-19. Executing RPComm.



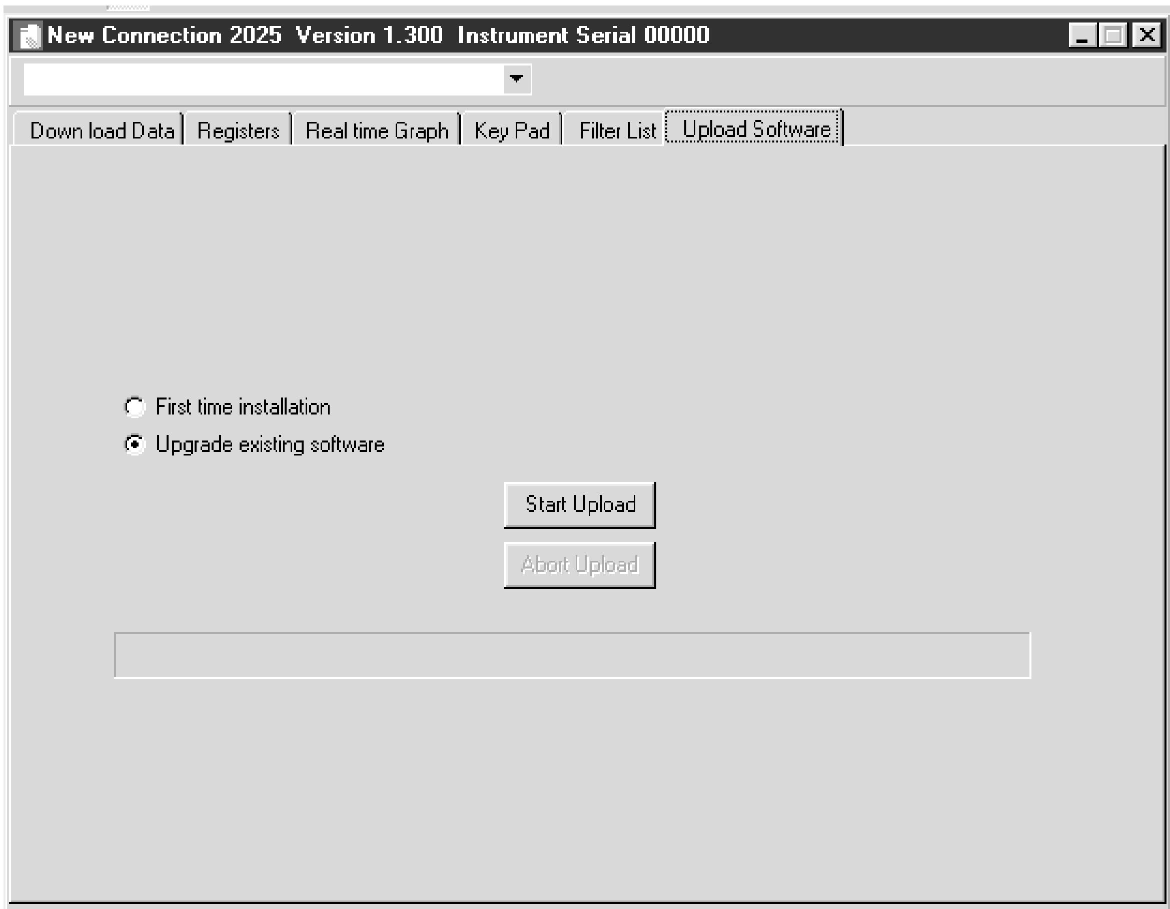
2) **When RPComm begins executing, two windows are always displayed: the 2025 Main screen (Figure D-20) and the Connection List screen.**

Figure D-20. 2025 Main screen.



3) From the 2025 Main screen, select the “Upload Software” tab to display the Upload Software screen (Figure D-21).

Figure D-21. Upload Software screen.



4) While in the Upload Software screen, move your cursor to the white circle to the left of "First time installation" and click once. A black circle should appear inside the white circle. Then select the "Start Upload" button. RPComm will prompt the user for the location of the program. Select the program and choose the "Open" button to begin the software download.

5) If you are upgrading your unit's software, move your cursor to the white circle to the left of "Upgrade system software" and click once. A black circle should appear inside the white circle. Then select the "Start Upload" button. RPComm will prompt the user for the location of the program. Select the program and choose the "Open" button to begin the software download.

If your unit has very old operating software that does not contain the appropriate PRCs, if you have installed a new motherboard or if your unit has simply lost its program, you may need to do a "First time installation" even though operating software is already installed on your unit.

When doing a "First time installation" through RPComm, you will need to re-enter your unit's calibration constants. However, when doing a "Upgrade system software," RPComm will retain all calibration constants and, after the upload is complete, will re-insert them into your unit's software program. Whether you are doing a first time installation or upgrading existing operating software, all filter, interval and input data will be lost.

D.4. Updating the List of Program Register Codes in RPComm

All R&P instrumentation have a list of system variables that is specific to that type of monitor. A system variable is any value that is entered into, calculated by, or measured by the instrument. This list is called the Program Register Code (PRC) list.

When the sampler's software is modified, the PRC list often is affected; usually, new PRCs must be added for software enhancement. If there are new PRCs, then the PRC list must be updated within the RPComm software program. This can be accomplished by:

1) The entire RPComm program can be downloaded from the R&P website (www.rpco.com) and installed on the computer, as described in Section D.2. However, this is necessary only if the revision number of the RPComm software program has changed. Changes to the unit's operating software do not always require that you update the RPComm program.

2) A new PRC list can be downloaded from R&P's website and installed on your computer. This will update the PRC list within RPComm without having to reinstall the entire program.

Follow these steps to update the PRC list within RPComm:

1) Go to the RPComm directory on your computer's hard drive and look at the files. The PRC lists are located in this directory. Determine which PRC list revision you have in your RPComm directory. The file name for the PRC lists have the following format:

Rp{instrument}n.nnn

where: {instrument} = instrument model (2000FRM, 2025 or 1400)

n.nnn = PRC list revision

2) Go to the Software to Download area of the R&P website as described in Section D.2.1 (Figure D-7). If there is a new PRC list available for the Partisol-Plus Sampler, it will be listed on this web page.

3) There may be multiple PRC lists on this page, one for each instrument that RPComm supports. Determine if there is an updated PRC list for the Partisol-Plus Sampler. Select the appropriate PRC list and save it to a file.

NOTE: Be sure to remember what folder the PRC list file is saved in.

4) Disconnect from the World Wide Web.

5) If RPComm is running, exit the program.

6) Copy the downloaded PRC list to the RPComm directory on your computer's hard drive. The next time you execute RPComm, the program will automatically use the new PRC list in its operations.

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Appendix E: Consumables and Parts

This appendix lists the consumables and parts available for the Partisol-Plus Sampler.

E.1. Consumables

R&P offers the following types of 47 mm filters and related accessories for the Partisol-Plus Sampler under the following part numbers:

Filter Cassettes and Accessories	
Partisol-FRM/Plus Filter Cassette	59-004648-0001
Pkg of 10 Partisol-FRM/Plus Filter Cassettes	59-004648-0010
Pkg of 25 Partisol-FRM/Plus Filter Cassettes	59-004648-0025
Pkg of 50 Partisol-FRM/Plus Filter Cassettes	59-004648-0050
Pkg of 5 Filter Cassette Screens	30-005147-0005
Anti-Static 3x5-inch Zip Lock Bags (1,000)	20-003772-1000
Tweezers	30-002566
Filter Cassette Magazine	55-005569
Filter Cassette Removal Kit	59-004733
Filter Cassette Separator Tool	38-004892
Magazine Transport Container	20-004997
Solid Filter Leak Check/Separator Disk	36-004768
Filter Media	
PTFE Filters, 2.0 µm, Box of 50	10-002322-0050
Pallflex TX40 Filters, Box of 100	10-002387-0100
Quartz Fiber Filters, Box of 100	10-002647-0100
Nylon 47 mm Filters, 1.2 µm, Box of 100	10-002544-0100
47 mm Anti-Stick Rings, Box of 100	32-003519
Hardware Items	
Particle Trap Filter	32-000393
Foam Fan Covers, Pkg of 5	10-003092
Partisol Pump Rebuild Kit (2 req'd per pump)	32-002642
AA Batteries (pack of 3)	06-003113-0003
Upper Cassette Seal	22-005958
Lower Cassette/Adapter Seal	22-005957
Partisol-Plus O-Ring/Seal Package	59-005515

E.2. Instrument Parts

The following is a listing of major parts in the Partisol-Plus Sampler, along with their R&P part numbers:

Sampling Hardware	
Stand for Partisol Sampler	57-004644
Wind Vane/Anemometer & 15 m Cable	59-004953
Pass Through Adapter Tube	57-005052
Dichotomous Splitter Assembly	55-005507
50/50 Splitter Assembly	55-005613
Inlets and Accessories (16.7 l/min, 1 1/4" ID)	
R&P First Stage FRM Inlet	57-004742
• O-Ring 1 1/4-inch ID	22-002853-3026
• O-Ring 2 3/8-inch ID	22-002853-3036
WINS PM-2.5 Impactor	57-004006
• O-Ring, 2 3/8-inch ID	22-002853-3036
Impactor Well Assembly	55-004289
• O-Ring, 1 5/8-inch ID	22-002853-3030
• Box of 25 Glass Fiber Filters, 37 mm	32-004294
• Bottle of WINS Impactor Oil, 30 ml	32-004292
• Bottle of WINS Impactor Oil, 100 ml	32-004292-0100
R&P PM-10 Inlet	57-000596
Japanese PM-10 Inlet	57-004307
• O-Ring, 1 1/4-inch ID	22-002853-3026
• O-Ring, 2 3/8-inch ID	22-002853-3036
• Glass Jar for PM-10 Inlet	32-000625
• Plastic Jar for PM-10 Inlet	32-001574
• PM-10 Screw, #6-32 x 1/4-inch	21-003721-0004
• PM-10 Standoff	12-000620-0020
US TSP Inlet	10-002929
German TSP Inlet	57-002269
R&P PM-1 Inlet	10-003056
Hardware Components	
CPU Board	10-003137
Partisol Pump, 60 Hz/120 VAC	54-005666-0120
Partisol Pump, 50 Hz/240 VAC	56-005666-0240
Connectors and Cables	
9-to-9 Pin RS232 Cable	07-000587

9-to-25 Pin Serial Adapter	51-001079
9-to-25 Pin Modem Cable	51-002814
9-Pin Null Modem Adapter	10-005671
Null Modem (25-to-25 Pin)	10-002661
6-Pin Cable Connector	06-002454
25-Pin Wiring Adapter	06-004521-0025

Flow Audit/Calibration

1-Flow Streamline FTS, 12-20 l/min	57-004506
1-Flow Streamline FTS w/10-inch H_2O Manometer	57-004506-0001
Additional High Flow Cell, 12-20 l/min	10-004684
10-inch H_2O Manometer	10-004373-0010

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Appendix F: Filter Log

This appendix contains a filter log to keep track of all important readings associated with each exposed filter. R&P encourages users to make photocopies of the form or to use a similar format.

Filter Log

R&P Partisol Plus Model 2025 Sequential Air Sampler

Filter Number	Initial Conditioning	Initial Weighing		Filter Exposure		Post-Collection Conditioning	Post-Collection Weighing		DW	Concentration
	Conditions	Weights	Conditions	Exposure Period	Exposure Stats	Conditions	Weights	Conditions	W(F)-W(I)	DWx10^6/Volume
	RH: Temp: Date: Time:	W1: W2: W3: W(I):	RH: Temp: Date: Time:		Val Time: Tot Time: Volume:	RH: Temp: Date: Time:	W1: W2: W3: W(F):	RH: Temp: Date: Time:		
	RH: Temp: Date: Time:	W1: W2: W3: W(I):	RH: Temp: Date: Time:		Val Time: Tot Time: Volume:	RH: Temp: Date: Time:	W1: W2: W3: W(F):	RH: Temp: Date: Time:		
	RH: Temp: Date: Time:	W1: W2: W3: W(I):	RH: Temp: Date: Time:		Val Time: Tot Time: Volume:	RH: Temp: Date: Time:	W1: W2: W3: W(F):	RH: Temp: Date: Time:		
	RH: Temp: Date: Time:	W1: W2: W3: W(I):	RH: Temp: Date: Time:		Val Time: Tot Time: Volume:	RH: Temp: Date: Time:	W1: W2: W3: W(F):	RH: Temp: Date: Time:		
	RH: Temp: Date: Time:	W1: W2: W3: W(I):	RH: Temp: Date: Time:		Val Time: Tot Time: Volume:	RH: Temp: Date: Time:	W1: W2: W3: W(F):	RH: Temp: Date: Time:		
	RH: Temp: Date: Time:	W1: W2: W3: W(I):	RH: Temp: Date: Time:		Val Time: Tot Time: Volume:	RH: Temp: Date: Time:	W1: W2: W3: W(F):	RH: Temp: Date: Time:		
	RH: Temp: Date: Time:	W1: W2: W3: W(I):	RH: Temp: Date: Time:		Val Time: Tot Time: Volume:	RH: Temp: Date: Time:	W1: W2: W3: W(F):	RH: Temp: Date: Time:		
	RH: Temp: Date: Time:	W1: W2: W3: W(I):	RH: Temp: Date: Time:		Val Time: Tot Time: Volume:	RH: Temp: Date: Time:	W1: W2: W3: W(F):	RH: Temp: Date: Time:		

Appendix G: Maintenance of Inlets

R&P recommends that users clean their size-selective inlets every 1 to 3 months to prevent contamination and to maintain proper performance. This appendix explains the procedures involved in cleaning the R&P first stage inlet (57-004742), R&P PM-10 inlet (57-000596), R&P PM-1 cyclone inlet (10-003056) and the WINS PM-2.5 impactor (57-004006).

G.1. Cleaning the R&P 1st Stage and PM-10 Inlets

Supplies and tools recommended for maintenance:

Ammonia-based, general-purpose cleaner
Cotton swabs
Small soft-bristle brush
Paper towels
Distilled water
Silicone-based stopcock grease
Small screwdriver
Small crescent wrench
Pocket knife

R&P recommends cleaning and maintaining the PM-10 inlet every 1 to 3 months of continuous operation. This includes removing the inlet from the unit, cleaning it and checking its O-ring for signs of damage or wear.

Follow these steps to remove and disassemble the inlets:

1) **To remove the inlet, lift the entire inlet assembly upward off the 1-1/4-inch OD sample tube.**

2) **Disassemble the upper and lower inlet halves by unscrewing counterclockwise the top acceleration assembly from the lower collector assembly (Figure G-1).**

Follow these steps to clean and maintain the top acceleration assembly:

1) **Mark the top plate deflector cone and lower plate with a pencil scribe to facilitate proper orientation when reassembling the assembly after cleaning and maintenance.**

2) **Using a Phillips-blade screwdriver, remove the four pan head screws from the top of the top plate. Lift the top plate off the four, threaded, spacer standoffs and set aside.**

Figure G-1. R&P PM-10 inlet.

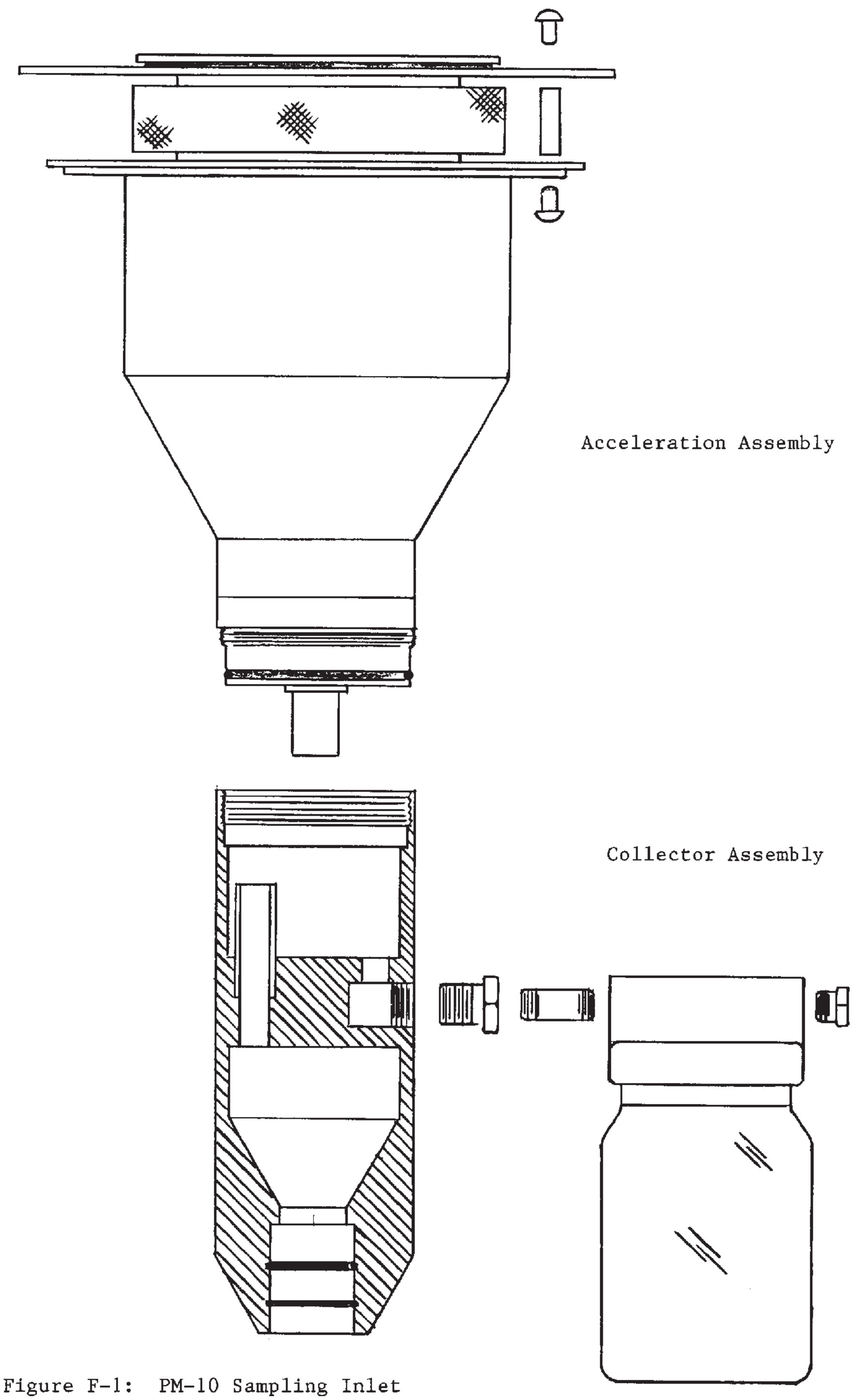


Figure F-1: PM-10 Sampling Inlet

3) **Inspect the insect screen for contamination. Clean the screen by lifting it off the lower plate rain deflector and brushing or rinsing it with water until it is clean. Dry and reinstall.**

4) **Using a general-purpose cleaner and paper towel, clean the top plate deflector cone and internal wall surface of the acceleration assembly.**

NOTE: Be sure that after cleaning the assembly the acceleration nozzle is clean. If not, use a cotton swab and cleaner to remove any contamination.

5) **Inspect the large diameter, impactor nozzle O-ring for damage or wear. Replace it, if necessary. If the O-ring is still in good condition, apply a thin film of silicone grease to the O-ring. Also, apply a light coating of silicone grease to the aluminum threads of the acceleration assembly.**

6) **After reinstalling the bug screen, align the top plate markings with the lower plate markings. The four holes in the top plate should align with the four spacer standoffs. Insert the top plate into the lower plate and tighten the four pan-head screws.**

Follow these steps to clean and maintain the lower collector assembly:

NOTE: Most of the contamination in the inlet is usually found on the collector plate.

1) **Using a general-purpose cleaner with a paper towel, clean the collector assembly walls and three vent tubes. You may need to use a cotton swab to clean these vent tubes. Also, clean the bottom side of the collector assembly.**

2) **Using a cotton swab, clean the weep hole in the collector plate where the moisture runs out to the moisture trap. Remove the rain jar and clean it. Inspect the rain jar's brass nipple fitting to ensure that it is secure and free from blockages. When reinstalling the rain jar, place a light coating of silicone grease on the gasket inside the cap of the rain jar. This will ensure a leak-free fit.**

3) **Inspect the two inlet-to-inlet, tube sealing O-rings for damage or wear. Replace, if necessary. Apply a light coating of silicone grease to these O-rings to ensure that a seal is made when they are reinstalled on the 1-1/4-inch OD sample tube.**

4) **Clean the lower collector assembly's threads to ensure a tight seal when the two halves are reassembled.**

Follow these steps to re-assemble and re-install the PM-10 inlet:

1) **Reassemble the top and bottom inlet assemblies until the threads tighten. Hand-tighten only.**
2) **Replace the inlet on the 1-1/4-inch OD sample tube. Take care not to damage the internal O-rings.**

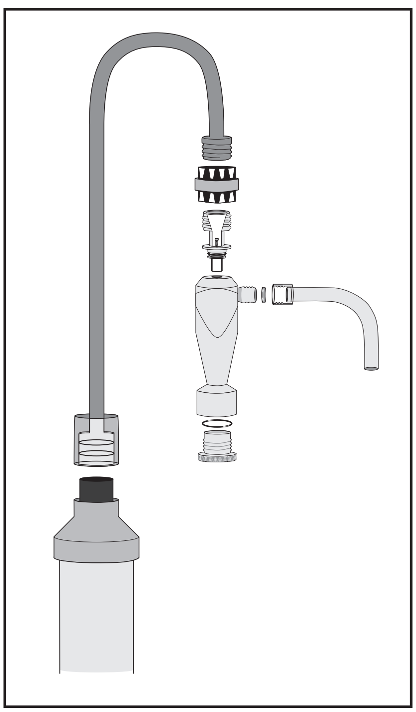
G.2. Maintenance of the R&P PM-1 Cyclone Inlet

The PM-1 inlet (Figure G-2) must be cleaned periodically to prevent buildup of particulate matter and contaminants. R&P recommends cleaning the inlet every 1 to 3 months. The frequency for routine maintenance may depend upon the average concentration of the particulate matter and/or the species being sampled.

Follow these steps to maintain the PM-1 cyclone inlet:

1) **Disassemble the inlet and its bottom from the main body.**

Figure G-2. Construction of R&P PM-1 inlet.



2) Soak the inlet in soapy water (any non-organic laboratory detergent). ***Do not scrub the interior of the inlet*****. Scrubbing may damage the Teflon® coating.**

3) Rinse the inlet several times with deionized water. The last rinse may be with acetone to facilitate drying. The inlet can also be dried with air.

4) Resemble and cap until ready for re-use, or reinstall the inlet on the 1 1/4-inch OD sample tube.

G.3. Maintenance of the WINS PM-2.5 Impactor

These procedures explain how to remove, clean and reinstall the WINS PM-2.5 impactor.

G.3.1. Removing the WINS Impactor

Follow these steps to remove the WINS PM-2.5 impactor:

1) WINS impactor maintenance and performance verification can be performed while in the Stop, Wait or Sampling Modes. If the unit is in the Stop Mode, press <RUN/STOP> twice to enter the Audit Mode. If the unit is in the Wait or Sampling Modes, press <RUN/STOP> once to enter the Audit Mode. The unit then will display the Audit Confirmation screen (Figure 6-2). Press <F1: Audit>, and then press any key to continue.

Figure G-3. Partisol-Plus Sampler with top panel elevated.

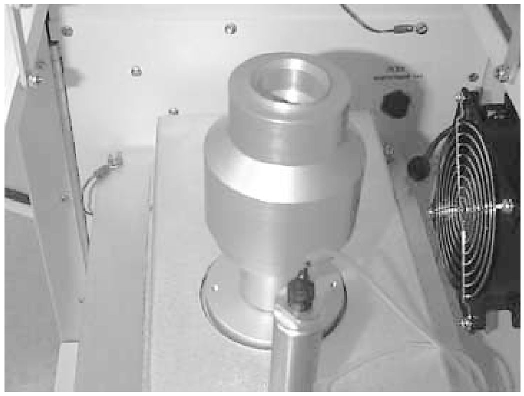


Figure G-4 (Left). WINS impactor in upper section of Partisol-Plus enclosure.

Figure G-5 (Right). Removing the WINS impactor from the sampler.

NOTE: The Audit Confirmation screen also will give you the option to select <F2: Stop> or <F5: Resume>, in addition to <F1: Audit>. **IMPORTANT:** If you are performing an audit from the Sampling Mode and you choose <F2: Stop> in the Audit Confirmation screen, the unit will not resume sampling (after your audit procedures are finished) at the set points that you previously entered. The unit will advance its sampling cycle to the next day and then enter the Wait Mode.

Press <MENU>, make sure that ">Audit" is selected and then press <ENTER>. This will display the Audit screen (Figure 6-3). Press <F4: FiltAdv> and wait for the filter exchange to occur. If the Partisol-Plus was previously in the sampling mode, a partially exposed sampling filter will advance into the empty storage magazine, and the empty cassette will move into the sampling chamber.

2) Unlatch and open the top cover of the Partisol-Plus Sampler with the down tube and first stage inlet attached to gain access to the WINS impactor (Figure G-3).

3) Lift the WINS impactor out of the upper part of the sampler enclosure (Figures G-4 and G-5).

4) The WINS impactor is connected on its top side to an adapter that makes contact with the external down tube. Separate the WINS impactor from its adapter.

Figure G-6. Upper and lower sections of the impactor assembly (on left and right sides of figure).

G.3.2. Cleaning the WINS Impactor

Figure G-7. Coating the 37 mm glass filter with oil.

Follow these steps to clean the WINS impactor:

1) **Unscrew the middle section of the WINS impactor to separate its top piece from its bottom section. This exposes the impactor assembly.**
2) **Remove the impactor assembly from the bottom section of the WINS impactor (Figure G-6).**
3) **With a dry paper towel, wipe off the inside surfaces of the WINS impactor. A general-purpose cleaner can be used, if necessary.**
4) **Inspect all O-rings in the top and bottom sections of the WINS impactor for damage and replace them, if necessary. Apply a thin coating of O-ring lubricant onto the O-rings, if necessary.**
5) **Remove the top of the impactor assembly by lifting upward.**
6) **Remove any filters that may have been previously installed, and clean the top and bottom of the impactor assembly using a dry paper towel. A general-purpose cleaner can be used, if necessary.**
7) **Inspect the O-ring in the top section of the impactor assembly for damage and replace it, if necessary. Apply a thin coating of O-ring lubricant onto the O-ring, if necessary.**
8) **Place a new 37 mm borosilicate, glass-fiber filter (32-004294) onto the bottom of the impactor assembly.**
9) **Place 42 to 44 drops of impactor oil (59-004292) onto the filter (Filter G-7).**

10) **Place the top of the impactor assembly onto the bottom section.**

11) **Place the impactor assembly into the bottom section of the WINS impactor.**

12) **Screw the top of the WINS impactor back onto the bottom section. Ensure that the WINS impactor remains in the upright orientation so that the oil in the impactor assembly does not spill.**

13) **Multiple WINS impactors can be prepared in this manner at one time and kept for later use.**

G.3.3. Replacing the WINS Impactor

Follow these steps to reinstall the WINS impactor:

1) **Attach the upper adapter to the WINS impactor by pressing the two pieces together.**

2) **Reinsert the WINS impactor into the upper section of the Partisol-Plus Sampler's enclosure (Figure G-4) by pressing downward.**

3) **Lower the top cover and re-latch it (Figure G-3).**

4) **Press <ESC> twice to return to the Main screen. Press <RUN/STOP> to resume sampling.**

Appendix H: Inlet Conversion

The Partisol-Plus Sampler can be configured with a variety of inlet systems. This appendix describes the components of the PM2.5 WINS inlet sampler configuration and the PM-10 sampler configuration and the procedures for converting the Partisol-Plus from a PM-2.5 to a PM-10 Particulate Air Sampler.

H.1. Partisol-Plus WINS PM-2.5 Components

The following components comprise the WINS PM-2.5 inlet configuration as shown in Figures H-1 and H-2:

A) WINS adapter
B) WINS impactor
C) Sample tube
D) 1st stage inlet

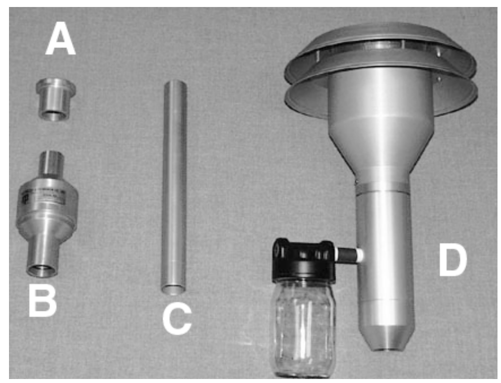


Figure H-1. WINS impactor, WINS adapter, sample tube and 1st stage inlet.

Figure H-2. Partisol-Plus Sampler with 1st stage inlet and WINS impactor installed.

H.2. PM-10 Components

The following components comprise the PM-10 inlet configuration as shown in Figure H-3:

A) Sample tube
B) Pass through adapter tube
C) PM-10 inlet

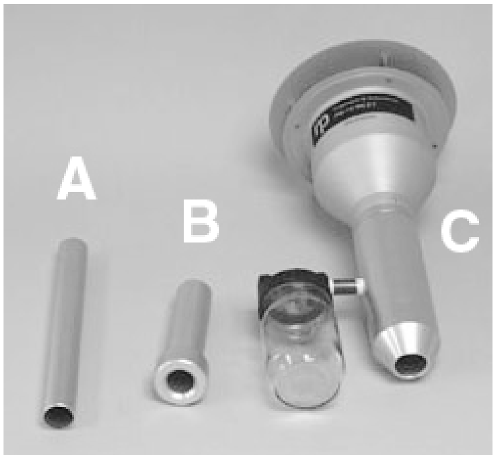


Figure H-3. Sample tube, pass through adapter tube and PM-10 inlet.

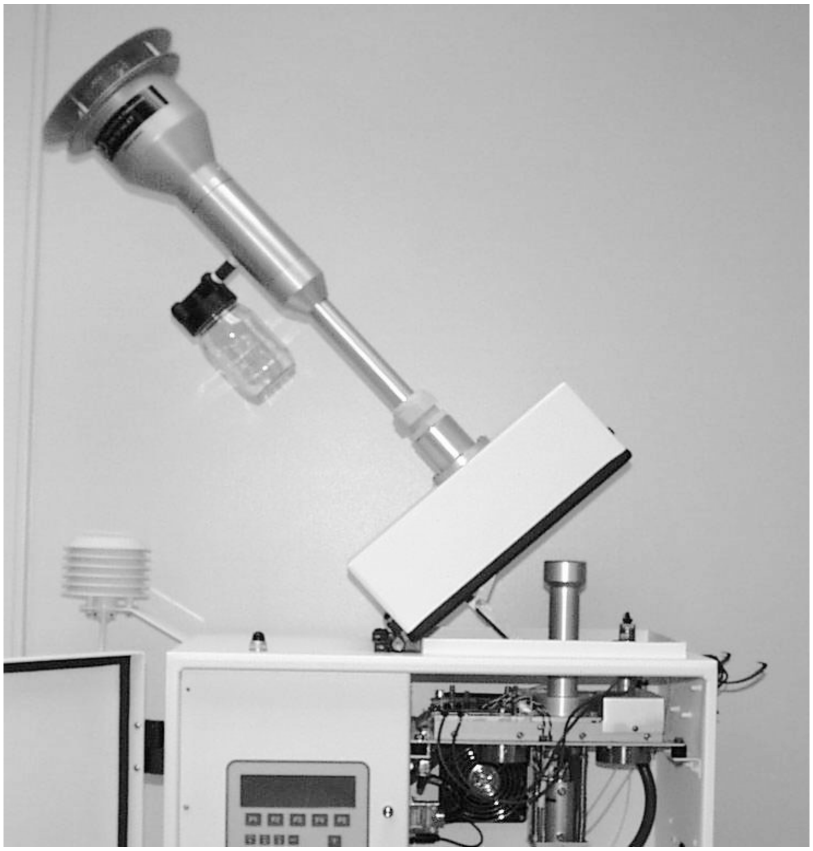


Figure H-4. Partisol-Plus Samler with pass through adapter tube and PM-10 inlet installed.

H.3. Converting from a WINS PM-2.5 Sampler to a PM-10 Sampler

Follow these steps to convert the Partisol-Plus PM-2.5 Sampler to a Partisol-Plus PM-10 Sampler:

1) **Unlatch and open the top cover of the Partisol-Plus Sampler, with the sample tube and 1st stage inlet attached, to gain access to the WINS impactor (Figure H-5).**
2) **Lift the WINS impactor out of the upper part of the sampler enclosure (Figures H-6 and H-7). The WINS impactor is connected to an adapter that makes contact with the external down tube.**
3) **Remove the 1st stage inlet from the sample tube by pulling straight upward.**

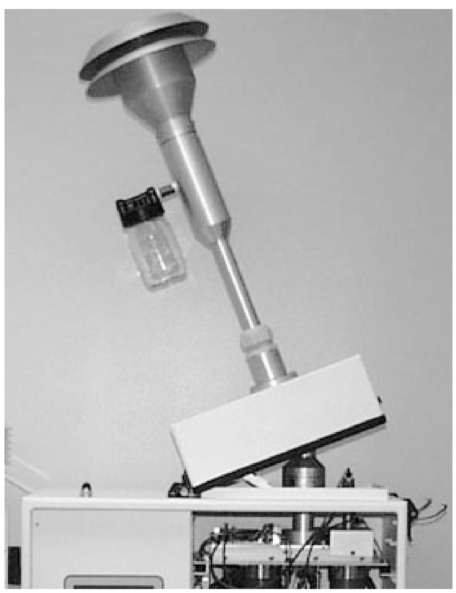


Figure H-5 (Left). Open top cover to access the WINS impactor and WINS adapter.

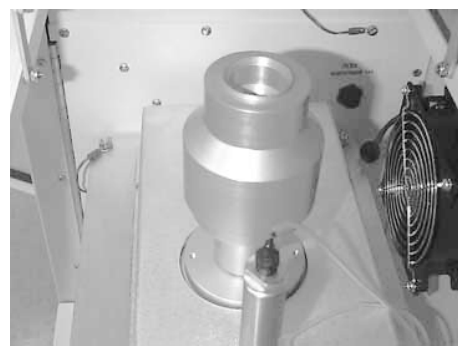


Figure H-6 (Upper Right). Partisol-Plus Sampler with WINS impactor installed.

Figure H-7 (Lower Right). Removing WINS impactor and adapter.

4) Install the pass through adapter tube in the sampler as shown in Figure H-8.

Figure H-8. Installation of the pass through adapter tube.

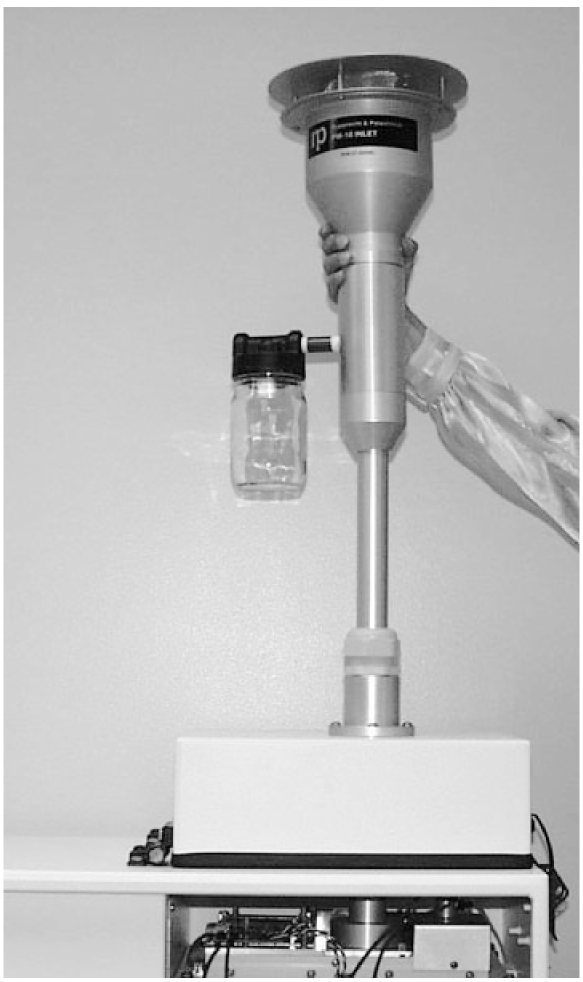
Figure H-9. Partisol-Plus with pass through adapter tube installed.

5) Close and relatch the top cover. Install the PM-10 inlet on the sample tube by pressing straight downward until it hits a stop (Figure H-10).

6) The Partisol-Plus is now configured as a PM-10 Sampler. There is no difference in sampler programming or operation with the PM-10 inlet installed.

NOTE: Make sure that filter cassettes, magazines, transport containers and data sheets are clearly labeled as PM-10 sampling filters or sampling data when the PM-10 inlet and pass through adapter tube are installed in the Partisol-Plus Sampler.

Figure H-10. Installing the PM-10 inlet.

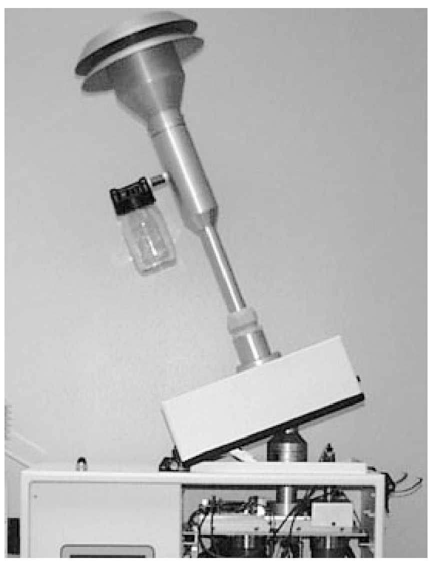


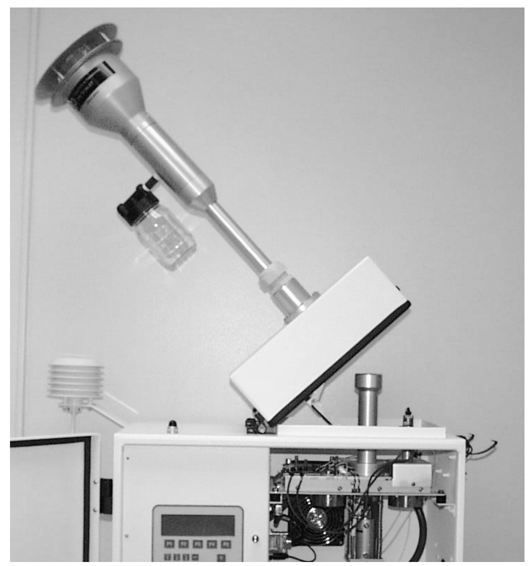
H.4. Partisol-Plus PM-2.5 and PM-10 Inlet Configuration

The Partisol-Plus Sampler can be easily converted from a PM-2.5 Sampler to a PM-10 Sampler (as described in Section H-3). It also can be converted from a PM-10 Sampler into a WINS PM-2.5 Sampler by removing the PM-10 inlet and pass through adapter tube and installing the WINS impactor with adapter, sample tube and 1st stage inlet. Figures H-11 and H-12 illustrate the correct sampler configuration for the WINS PM-2.5 and the PM-10, respectively.

Figure H-11 (Left). WINS PM-2.5 Partisol-Plus configuration.

Figure H-12 (Right). PM-10 Partisol-Plus configuration.





Appendix I: Using the Palmtop

This appendix explains how to use the palmtop, which is also referred to in this section as the "handheld personal computer," "handheld PC" or "H/PC." This section describes how to install and use RPComm and RPData for Windows CE onto your palmtop, and explains how to use the software. These applications are designed to run on handheld PCs running the Windows CE operating system version 2.0 with service pack SP1 installed. R&P uses this software on the HP360LX, the handheld PC that R&P recommends that you use with its instrumentation.

When purchased from R&P, the HP360LX has RPData and RPComm software already installed on it. Although the following instructions were written with the HP360LX in mind, they also should apply to any handheld PC.

I.1. Commercially Available Handheld PC Requirements

If you wish to purchase your own handheld PC it must meet the following requirements:

- It must be able to run the Windows CE operating system 2.0 or greater.
- It must be based on the Hitachi SH3 or MIPS processor.
- It must have at least 8MB of RAM in its base memory.
- The screen size must be at least 640 x 240 pixels. Whether the display is color, is optional. However, you should test the handheld PC under the lighting conditions in which you expect to be using it, to make sure that the display is clear and readable. Some handheld PC color displays can be difficult to read in direct sunlight.

There is another class of handheld devices running the Windows CE operating system that Microsoft designates as "Palm-sized PCs." These devices are typically smaller than handheld PCs and have no alphanumeric keypad. None of these devices are compatible with R&P software.

The terms "handheld PC" and "H/PC" mean the same thing. They are both Microsoft terms to describe a class of handheld computer with a keypad and a serial port that are capable of running Windows CE. Hewlett Packard uses the brand name "Palmtop" in the model names of their 300 and 600 series of H/PCs, nevertheless these computers are not Palm-sized PCs, they are H/PCs.

I.2. H/PC Compilation Package

If you ordered your H/PC directly from R&P, you should receive a package consisting of the following:

One HP360LX palmtop computer with stylus tool
HP CD-ROM(s)
Synch cable/mounting plate (RS232 cable)
AC/DC power adapter
2 Disk R&P software package
1 Null modem adapter
Instruction sheet and packet

The software packet includes RPComm for Windows CE (RPCommCE) and RPData on Disk 1. Windows CE service pack SP1 for Hewlett Packard palmtops is on Disk 2. The null modem adapter must be used to connect the H/PC with R&P instruments.

> NOTE: If you did not order your palmtop from R&P, you will need to obtain a null modem adapter from R&P to properly communicate with R&P instruments.

All H/PC packages ordered from R&P will come preloaded with RPCommCE and RPData. Both programs will be configured and ready for use with R&P particulate monitors. If you misplace your batteries, or if you purchase your palmtop from another source, the following section will assist you in installing RPComm and RPData onto your palmtop.

I.3. Setting Up Your Palmtop

Before you can install R&P's Windows CE software, you need to set up communications between your palmtop and desktop computer. Much of this section has been taken from HP's Getting Started guide. Please refer to HP's operating manuals for additional guidance.

Follow these steps to set up a communications link between your palmtop and desktop computer:

1) **Open the main battery compartment and insert two "AA" alkaline or rechargeable batteries. Be sure to pay attention to polarity. Insert the batteries before installing the 3-volt CR2032 cell battery.**

2) If you are using rechargeable batteries, connect the power adapter to the palmtop and plug the adapter into an AC outlet.

3) Remove the backup battery cover and install the 3-volt CR2032 cell battery that came with the palmtop. Again, be sure to pay attention to polarity.

4) Ensure that all battery compartments are closed.

5) Slide the stylus tool (it looks like a fake plastic pen or pointer) out from the base of the palmtop and proceed through the H/PC Setup Wizard. Proceed through the calibration of the stylus, and enter the time/date, location and your personal information in the Owner Properties screen when it is displayed.

6) After completing the H/PC Setup Wizard, use your stylus tool to tap on the "Start" button, "Settings" and then select "Control Panel" (Figure I-1).

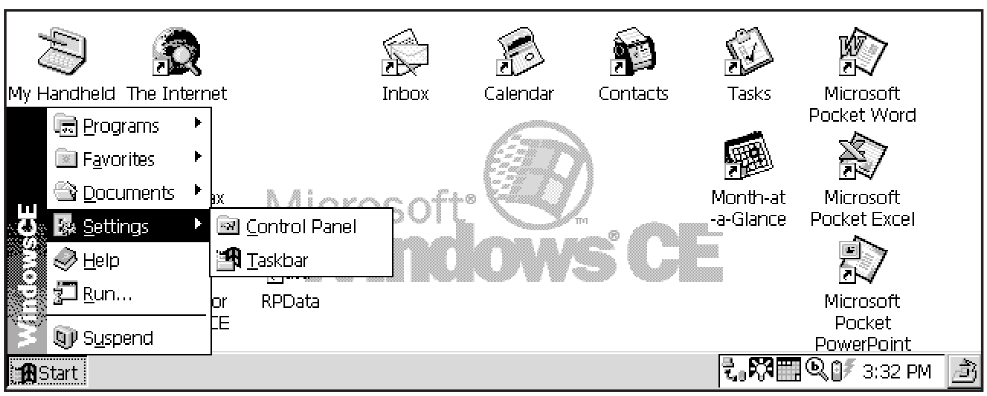


Figure I-1. Selecting the Control Panel.

7) On the Control Panel screen, use your stylus tool to double-tap on the Power icon to reach the Power Properties screen (Figure I-2). If you are using alkaline batteries, be sure that "Alkaline" is selected. If you are using rechargeable batteries, select "NiCd / NiMH" and then choose "Enable charging."

NOTE**:** HP recommends that you wait 9 hours to allow the batteries to fully charge. You do not have to wait for recharging to complete before you can use your palmtop.

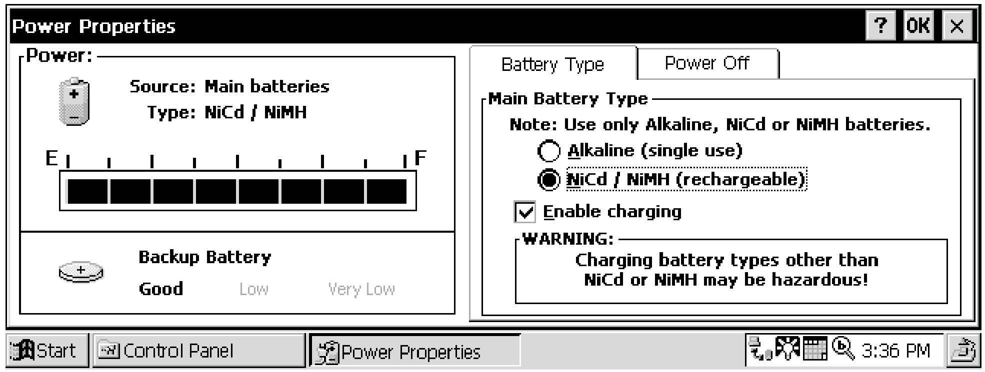


Figure I-2. Power Properties screen.

You now need to set up your desktop computer with Microsoft Windows CE Services software from the CD-ROM that came with your palmtop. Follow the documentation included with your palmtop for setting up your desktop computer.

Once you have your desktop computer configured and you have successfully established communication between your palmtop and your desktop computer using the synch cable (RS232 cable) that came with your palmtop, you must install service pack SP for Windows CE onto your palmtop.

Follow these steps to install service pack SP for Windows CE onto your palmtop:

1) **Insert the SP1 disk into your desktop PC drive.**
2) **Execute the file: SP1.EXE.**
3) **Follow the online screen instructions and then reboot your palmtop. Your palmtop is now initialized and ready to be loaded with RPComm and RPData for Windows CE.**

   NOTE: See the Microsoft Windows CE Services online help reference for any problems you may encounter in getting a connection established.

I.4. Installing RPComm and RPData for Windows CE

There is only one file distributed for each program. The RPCOMM distribution file is called: `RPCommCE.exe`, and the RPData distribution file is called: `RPDataCE.exe`. If you downloaded the software from the Internet, or if you received the software on a disk from R&P, you should have the appropriate file for the program you want to install.

Follow these steps to install RPComm and RPData for Windows CE onto your palmtop:

1) **Establish a connection between your desktop and your palmtop computer using the synch cable that came with your palmtop. See the Microsoft Windows CE Services online help reference for troubleshooting procedures if you have any problems establishing a connection.**

2) **From your desktop computer, run** RPCommCE.exe **either from Windows Explorer (double click on the file:** RPCommCE.exe**) or by clicking the "Start" button at the bottom of your screen then selecting "Run." The RPComm for Windows CE start-up screen will be displayed (Figure I-3).**

Figure I-3. Executing RPComm for Windows CE.

3) **Assuming you have a connection established, press the "Setup" button. A few more informational windows will appear. Proceed through them by pressing "OK." While the setup program is copying files over, you will see the Loading Files screen (Figure I-4).**

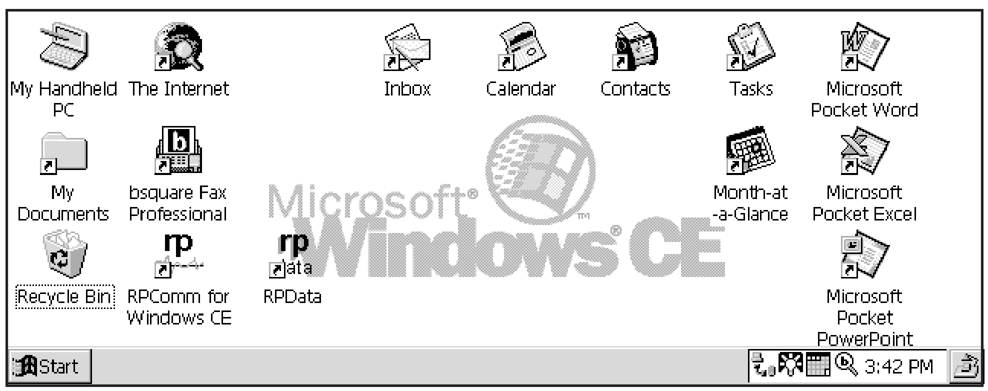
Figure I-4. Loading Files screen.

4) When all the files have been copied over, your palmtop will display the Installation Confirmation screen (Figure I-5). Press "OK." The palmtop should now display its Main screen (Figure I-6). You should see an icon for RPComm for Windows CE.

Follow the same procedures for installing RPData onto your palmtop.

Figure I-5. Installation Confirmation screen.

Figure I-6. The palmtop's Main screen.



I.5. Using RPComm for Windows CE

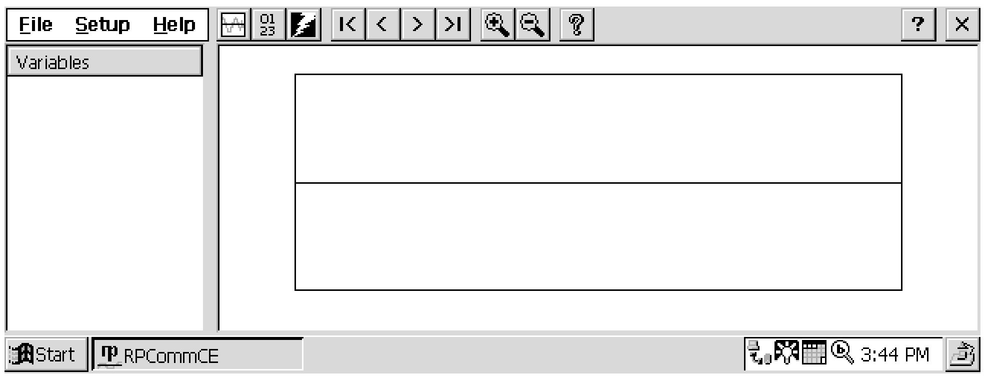
RPComm for Windows CE is a program designed by R&P to make your infield data acquisition and review tasks as simple as possible. By using the AK communications protocol available in most R&P products and connecting the palmtop to the serial port, you can perform the following tasks:

- Download new data from a Partisol-Plus Sampler into files to be stored on your palmtop. These files can remain on your palmtop or on the built-in PC Card socket on a flash/SRAM card. When you get back to the office, you can then easily transfer all the files collected that day to your desktop computer.
- View and modify the current data storage pointer.

- View downloaded data files in a graph or in a raw data format.
- View instrument variables, or program register codes (PRCs), such as various temperatures or flow rates in real-time.
- Edit and upload filter and cassette identifiers.

Start the RPComm software by using your stylus tool to double-tap the RPComm for Windows CE icon on the Main screen (Figure I-6). RPComm's Main screen is displayed in Figure I-7.

Figure I-7. RPComm's Main screen.



I.6. Before You Begin

Before you begin, you must be sure that your communication parameters between the palmtop and the R&P instrument that you are communicating with both agree. To view or modify the communication settings on your palmtop, select "Setup" from the Main screen, then "Setup Communications." This will bring you to the Setup Communications screen (Figure I-8).

Follow these steps to ensure that your palmtop and R&P instrument are communicating properly:

1) **On the Setup Communications screen (Figure I-8), select the instrument that you are currently connected to.**
2) **Select the baud rate that you wish to use.**
3) **For flow control, select "None.**

NOTE: If the palmtop is connected to R&P's TEOM Series 1400 Ambient Particulate Monitor, select "RTS/CTS" for the flow control.

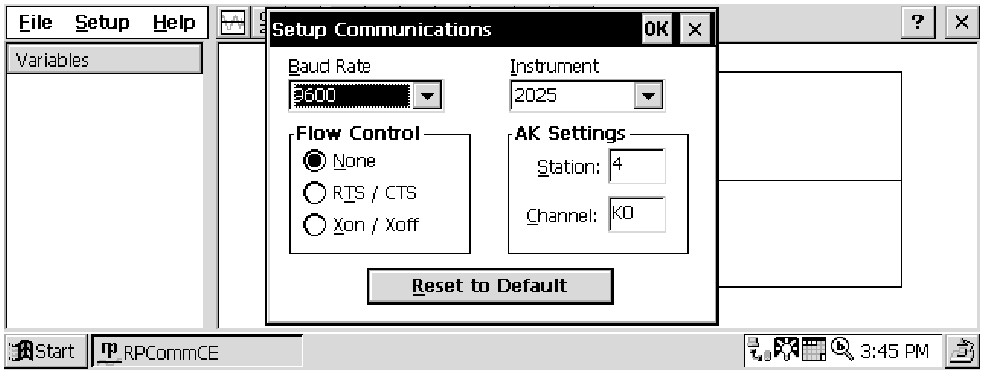


Figure I-8. Setup Communications screen.

4) AK settings are very important. All R&P instruments default to the AK settings of Station: 4 and Channel: K0. If you have not modified the settings on your R&P instrument, then you probably do not need to do anything with these settings. However, if you wish to verify the settings on your instrument, go to the instrument's RS232 Setup screen, and you will see its RS232 parameters entered here. You should see "52" for AK Station (sometimes called RS Parameter 1) and "75048" for AK Channel (RS Parameter 2). Please consult your instrument's Operating Manual for more details.

NOTE*:* You must use a null modem adapter and a gender changer hooked to the synch cable to allow the palmtop to communicate with the R&P instrument. Some commercially available null modem adapters are not standard. R&P has a standard null modem/gender changer in one adapter that you may purchase if you experience problems (Appendix E).

I.7. Downloading Data

To download data, from the Main screen (Figure I-7) select "File," and then "Download Data." At this point, the palmtop will ask you whether you would like to use the serial number of the R&P instrument for the file name. If you choose "Yes," RPComm can set up default file names for you. If you want to choose your own file name, then select "No" and then select a file name to use for storing the data. RPComm uses ".txt" as a default file extension. The Download Data screen (Figure I-9) will now be displayed.

If your sampler has more than one type of data storage, select which type of data storage you would like to download. Your unit has an internal storage pointer that

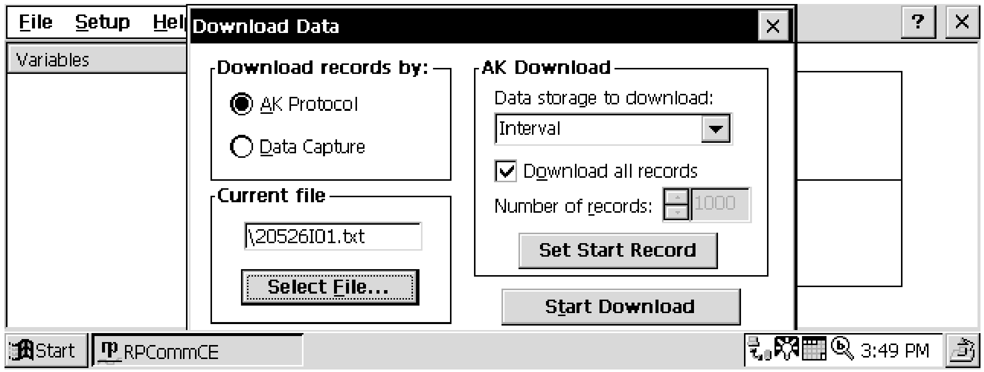


Figure I-9. Download Data screen.

points to the next record that is to be downloaded. If you want to select the first record that will be received, select “Set Start Record.” If you want to download all available records from the storage pointer to the end of all data records, select “Download all records.” Otherwise, deselect the “Download all records” option and then select how many records you would like to download. If you want to change the name of the file that will store the downloaded data, choose “Select File…”

> NOTE: You may use RPComm to capture data from any device that outputs data to a RS232 serial port. If you want to simply capture any data coming in on the serial port, select the “Data Capture” button.

When you are satisfied with your download parameters, press “Start Download” to start the downloading process. If you are capturing data, press “Start Download” before triggering the data output option on your sampler. You will see the current download progress on screen. Your Partisol-Plus Sampler and/or palmtop will display a screen to notify you when the download process is complete.

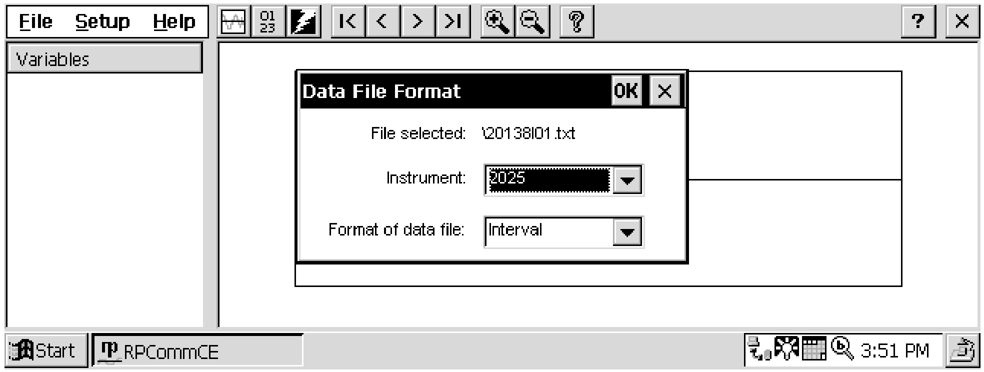
I.8. Viewing Your Data

Follow these steps to view data:

1) **From the Main screen (Figure I-7), select “File,” and then “Open File...” Select the file you would like to display.**

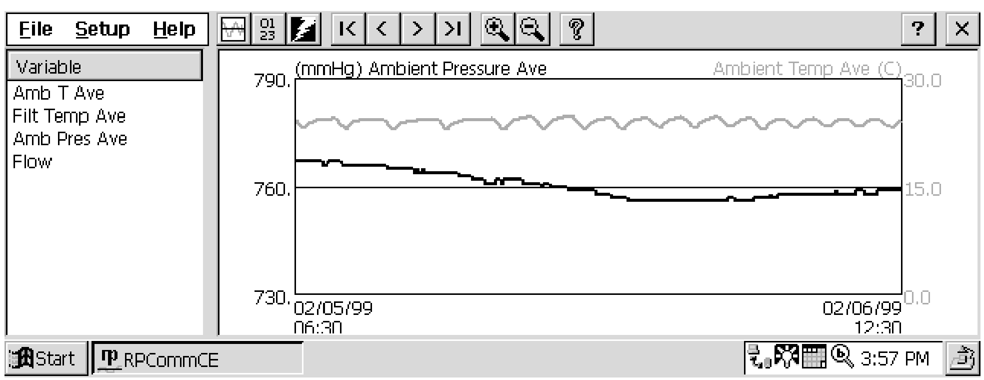
2) **The palmtop will display the Data File Format screen (Figure I-10), which will ask you to select the instrument that the data was downloaded from and the type of data that was downloaded from it. As long as you are viewing data files that were downloaded by RPComm, the palmtop will always prompt you with the correct instrument and file format. Press “OK.”**

Figure I-10. Data File Format screen.



3) Depending on the size of the file, it may take up to 30 seconds or more to read and parse the entire file. When the palmtop's hour-glass cursor disappears, your file has been read into RPComm successfully. The left side of the screen will now show the current program register codes (PRCs) that are available for viewing. RPComm can display two variables at a time. With the stylus tool, tap on the PRC that you would like to view in your graph. An example of a graph of interval data from a Partisol-Plus Sampler is displayed in Figure I-11.

Figure I-11. Interval data graph.



Follow these steps to adjust the x- and y-axis on your graphed data, and to view raw data:

1) **To adjust the x-axis: Use the zoom buttons on the toolbar on the top of your screen to zoom in and out of your graph. You can use the zoom buttons only for adjusting the time scale. Use the arrow buttons to jump back and forth in the data that you are viewing.**

2) **To adjust the y-axis: With your stylus tool, tap on any one of the numbers on the y-axis. A window will appear that will allow you to manually adjust the values for your scale. You also can press “Auto Scale,” which will automatically adjust the scale so that the majority of the data will be centered on the graph.**

3) **To view raw data: To view your data in the format that it was downloaded from your sampler, from the palmtop’s Main screen (Figure I-7), press the “View Raw Data” button on the toolbar at the top of the screen. Figure I-12 contains an example of the screen you would see if you were viewing interval data downloaded from a Partisol-Plus Sampler. Use the scrollbar at the right side of the screen to go through the data.**

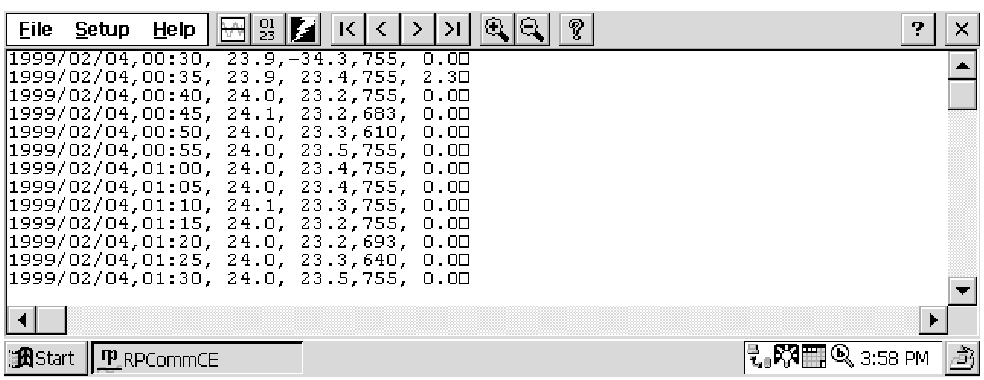


Figure I-12. Interval Data screen.

I.9. Managing Filter Identifiers

Entering filter and cassette identifiers using the Partisol-Plus Sampler's keypad can be cumbersome, especially if your unit is not located in a shelter. With the RPComm program, filter numbers can be loaded into the palmtop prior to the site visit. Once you are at the site and the palmtop is connected to the Partisol-Plus, the palmtop with RPComm can do the work of entering filter and cassette identifiers into the unit's memory.

Follow these steps to enter, modify, download or upload filter and cassette identifiers:

1) **From the Main screen (Figure I-7), select "Setup," and then "Filter Identifiers." The palmtop will display the Filter Identifiers screen (Figure I-13).**
2) **To view all 16 filters, use the stylus tool to tap the "<<Prev" and "Next>>" buttons.**

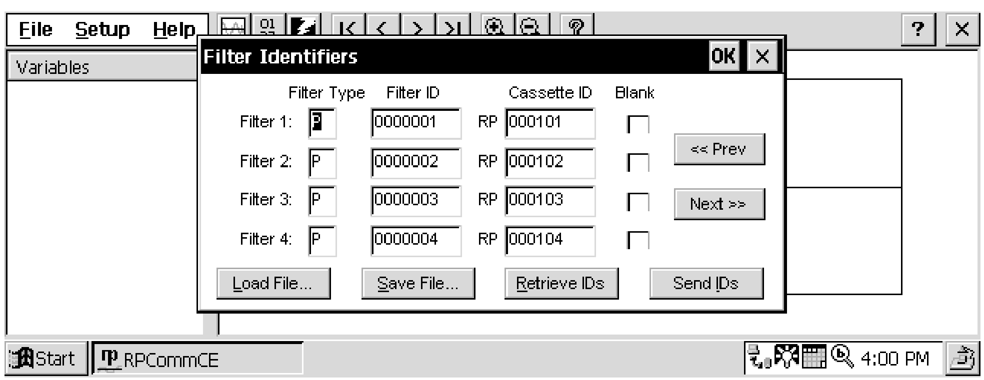


Figure I-13. Filter Identifiers screen.

3) To load your filter identifiers from a file, use the stylus tool to tap "Load File…" If you did not save your current identifiers first, the palmtop will now prompt you to do so.

4) To save your current filter identifier settings to a file, use the stylus tool to tap "Save File…"

5) To retrieve the filter identifiers currently entered in the unit, use the stylus tool to tap "Retrieve IDs." If you did not save your current identifiers first, the palmtop will now prompt you to do so.

6) To upload the filter identifiers from the palmtop to the unit, use the stylus tool to tap "Send IDs."

I.10. Transferring Data to Your Desktop Computer

Storing your data permanently on the palmtop is not recommended because of its storage limitations and the potential for losing data due to battery failure.

Follow these steps to copy your files from your palmtop to your desktop computer:

1) Establish a connection between your palmtop and desktop computer. Remove the null modem adapter if it is still attached. Open the Windows CE Services program on your desktop computer. Select "Mobile Devices."

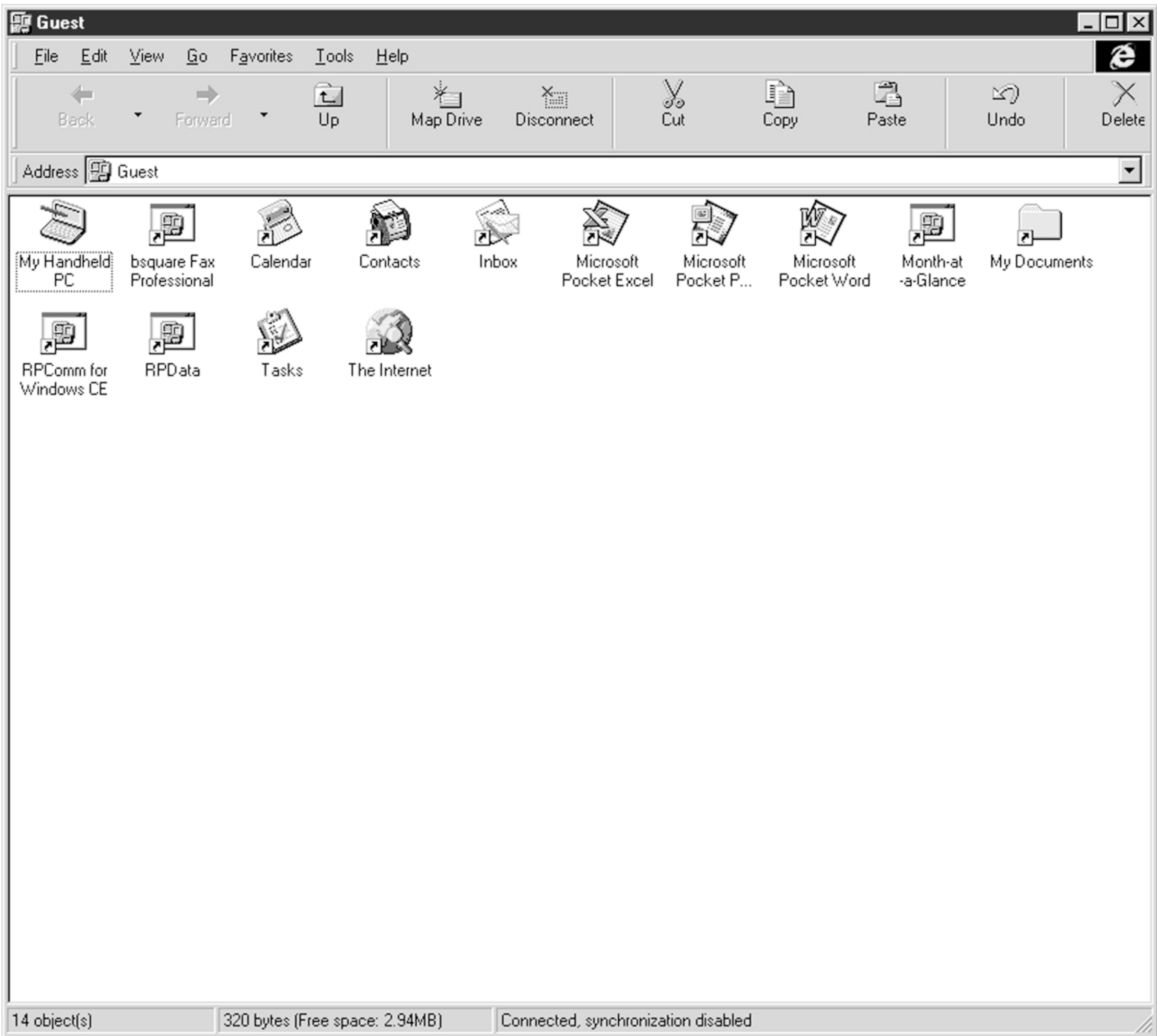
2) From the Mobile Devices screen, double-click on the palmtop icon to open the Explorer screen for the palmtop.

3) From the Explorer screen (Figure I-14), double-click on the icon that represents your palmtop. This icon is most likely called "My Handheld PC." You should now see the data files in the Explorer screen. If you are not storing the files in the root directory on the palmtop, locate the directory where you are storing your files.

4) Start the Windows Explorer program on your desktop computer.

5) To copy a file, select the file in the Explorer screen for the palmtop and drag it to the desired directory in the Explorer screen for your desktop computer.

Figure I-14. Desktop computer's Explorer screen.



I.11. Using RPData for Windows CE on your Palmtop

RPData has only one purpose: It easily retrieves all data from your Partisol-Plus Sampler. When you initiate your RPData program, only one screen with one option will be displayed and available. The RPData Main screen (Figure I-15) will be displayed when you initiate your RPData program. To retrieve your data, use the stylus tool to tap "Retrieve Data." Status messages will be displayed for every step that RPData performs.

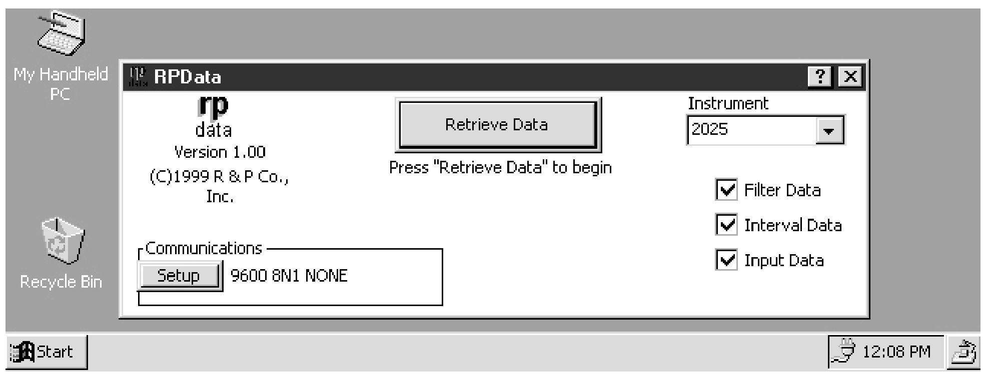


Figure I-15. RPData's Main screen.

To select your unit, use your stylus tool to tap on the list in the upper right-hand corner of the PRData Main screen (Figure I-16).

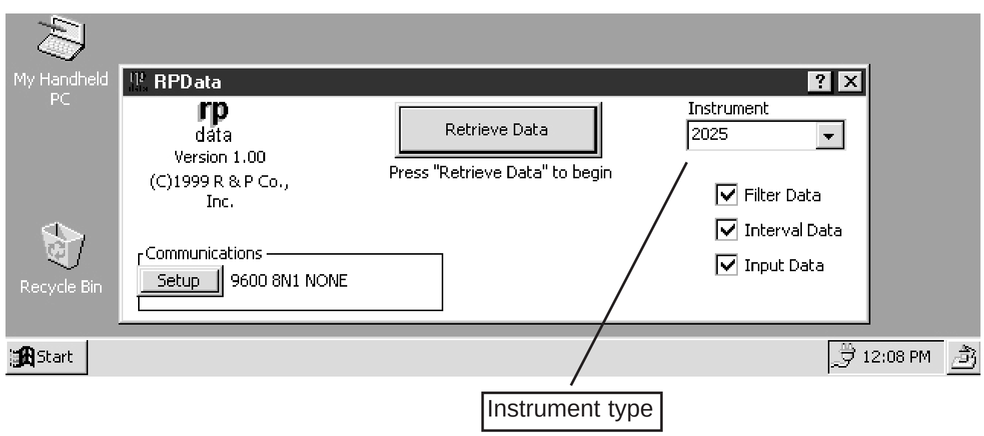
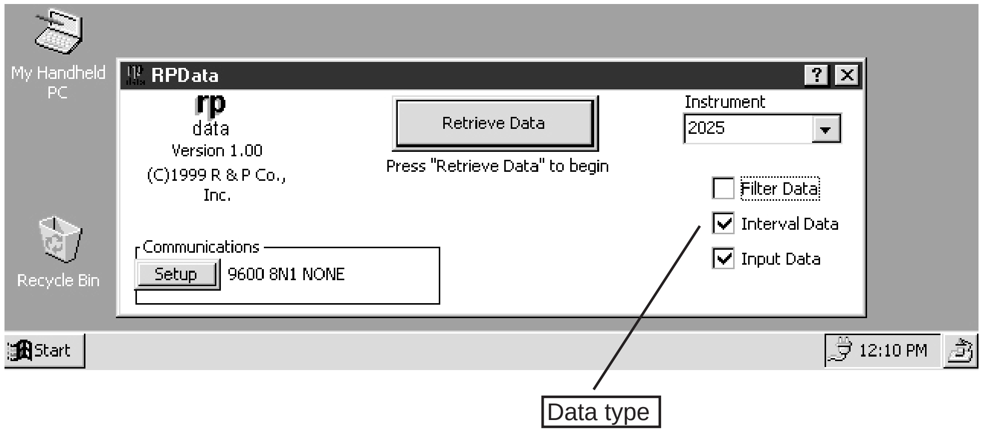


Figure I-16. RPData Main screen with instrument type highlighted.

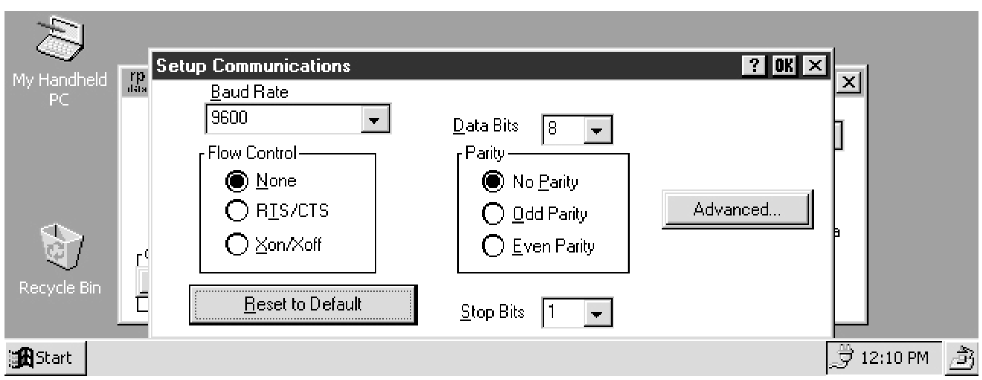
To select the type of data you wish to download, select or deselect the checkboxes located beneath the sampler's name on the RPData Main screen (Figure I-17).

Figure I-17. RPData Main screen with data type highlighted.



To configure the RS232 setting for the program, use the stylus tool to tap on the "Setup" button on the RPData Main screen. This will display the Setup Communications screen (Figure I-18).

Figure I-18. RPData's Setup Communications screen.



To configure the proper AK protocol settings, use your stylus tool to tap on the "Advanced" button in the Setup Communications screen. This will display the Setup AK Protocol Parameters screen (Figure I-19).

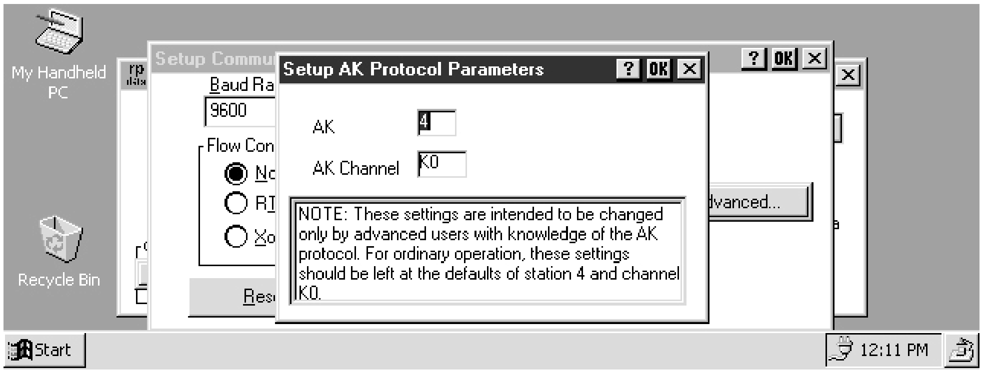


Figure I-19. RPData's Setup AK Protocol Parameters screen.

Data files loaded onto the palmtop will be named in the following manner:

SSSSSTNN.txt

where:
SSSSS = the instrument serial number
T = the type of data that was downloaded
NN = the file number(s).

The type of data downloaded will be represented by "F" for filter data, "I" for interval data, and "P" for input data.

Each data file is stored just as the sampler outputs it. See Section 10 for the proper formatting of data files. To view the files, you can use RPComm for Windows CE, RPComm for Windows 95/NT, or you can load the files into a spreadsheet program.

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Appendix J: Modem Communications

This section describes how to connect the Partisol-Plus Sampler to a modem for offsite communications and how to set up a serial switching device for use with multiple instruments.

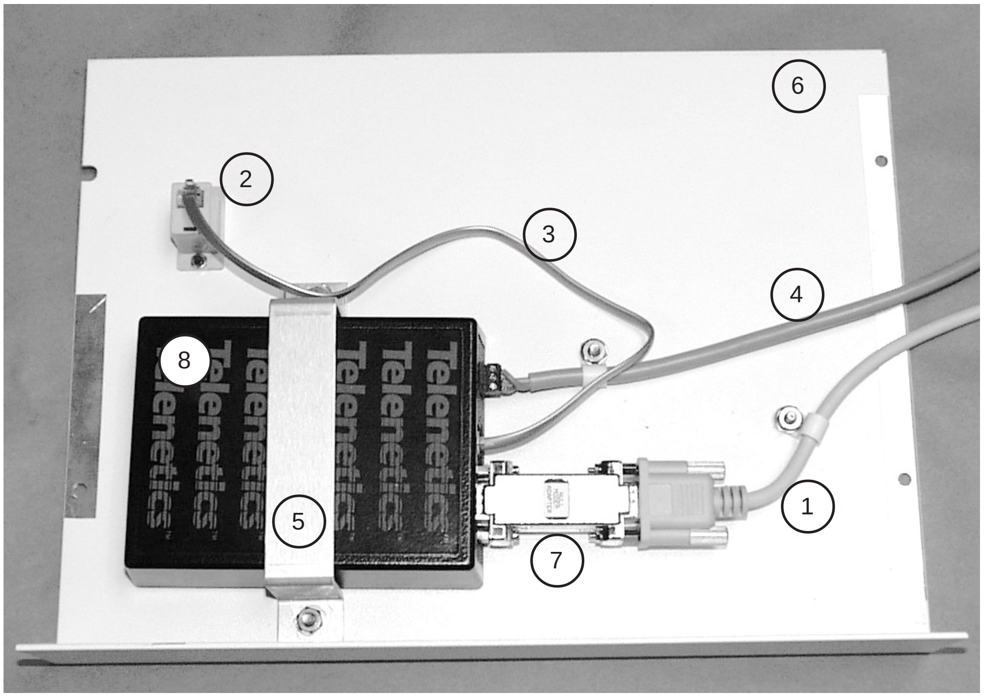
Modem communications can be used to remotely download data from the unit, check instrument operation and to change system variables. All R&P instrumentation can be connected to a standard external modem for communications. However, R&P recommends that you use the modem available from R&P as part of the internal modem kit (59-005707) be used rather than a standard commercial model for the following reasons:

- The R&P modem is a heavy-duty industrial model with a rated temperature range of -40° to 85° C. This temperature range is important because the temperatures inside the Partisol-Plus Sampler can vary greatly. Most standard commercial modems are designed to operate at room temperature and will not operate properly at the extreme temperature ranges that the unit is subjected to.

- The R&P modem is factory-configured to operate properly with R&P instrumentation. Most standard commercial modems can be configured to operate with R&P instrumentation. However, because command codes are not standard among different modem manufacturers, it is the user's responsibility to determine the correct codes to configure the modem.

- The R&P modem can be purchased as part of the internal modem kit (59-005707) which provides all the parts needed to install the modem inside the Partisol-Plus Sampler. Commercially available modems can not be simply placed inside the unit's enclosure due to temperature concerns (see above) and because placing the modem on one of the unit's components (such as the pump or power supply) may cause the unit to malfunction. Also, because commercial modems have varying electrical requirements, these modems can not receive power from the sampler. R&P recommends that you place your commercial modem in a separate, environmentally controlled enclosure with a separate power source.

Figure J-1. Internal modem assembly.



J.1. Installing the Internal Modem

The following parts are included with this kit (Figure J-1):

Item #	Qty	Part Number	Description
1	1	07-005708	Double-shielded data cable, 9-pin M-F
2	1	06-005709	Panel-mounted modular coupler
3	1	07-005710	Flat modular data cable, 4 conductors
4	1	51-005711	Modem power cord
5	1	38-005712	Modem mounting bracket
6	1	38-005713	Pump compartment cover
7	1	10-005671	Null modem adapter, 9-to-9 pin
8	1	07-005601	Modem, 14.4 kbs

Follow these steps to install the internal modem:

1) **Turn off the power to the Partisol-Plus Sampler. Unplug the unit's power cord from the AC power outlet.**

2) **Remove the pump compartment cover (Figure J-2).**

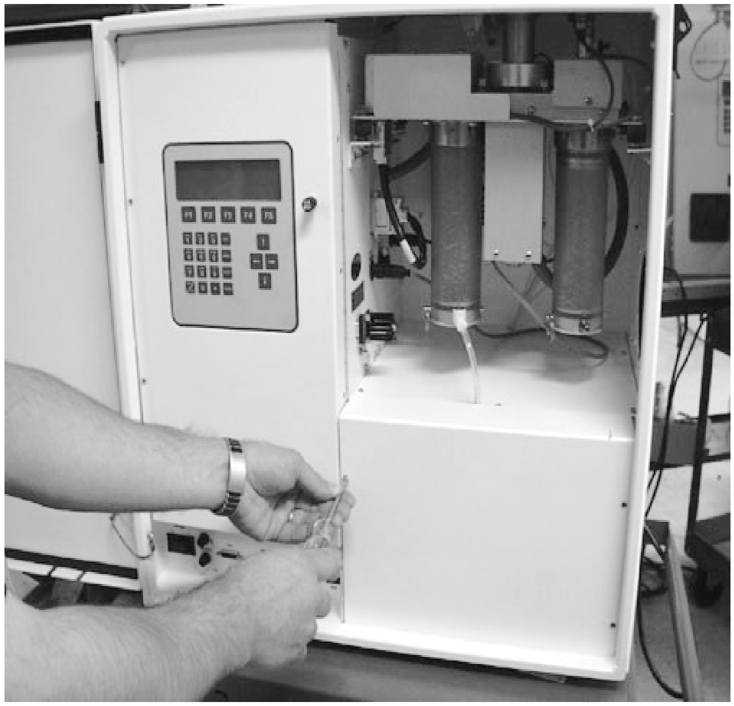


Figure J-2. Removing the pump cover.

3) **Locate the modem power cord on the modem assembly. Plug the modem power cord into the connector labeled "Pump 2" in the pump compartment. Slide the metal clip over the connector to secure it in place (Figure J-3).**

4) **Locate the 9-pin serial cable on the modem assembly. Place the serial cable through the notch on the left side of the cover so that it extends out of the pump compartment (Figure J-4).**

5) **Replace the pump compartment cover into the correct position and secure.**

6) **Plug the serial cable into the connector labeled "RS-232" on the front of the unit (Figure J-5).**

7) **Plug the unit's power cord into the AC power outlet. Turn on power.**

8) **Plug an outside telephone line into the RJ-11 connector on the front of the pump compartment cover (Figure J-6).**

9) **The modem is now ready for communications. Communications can be accomplished using RPComm software which is available from R&P.**

Operating Manual, Partisol-Plus Model 2025 Sequential Air Sampler

Figure J-3. Location of
"Pump 2" connector.

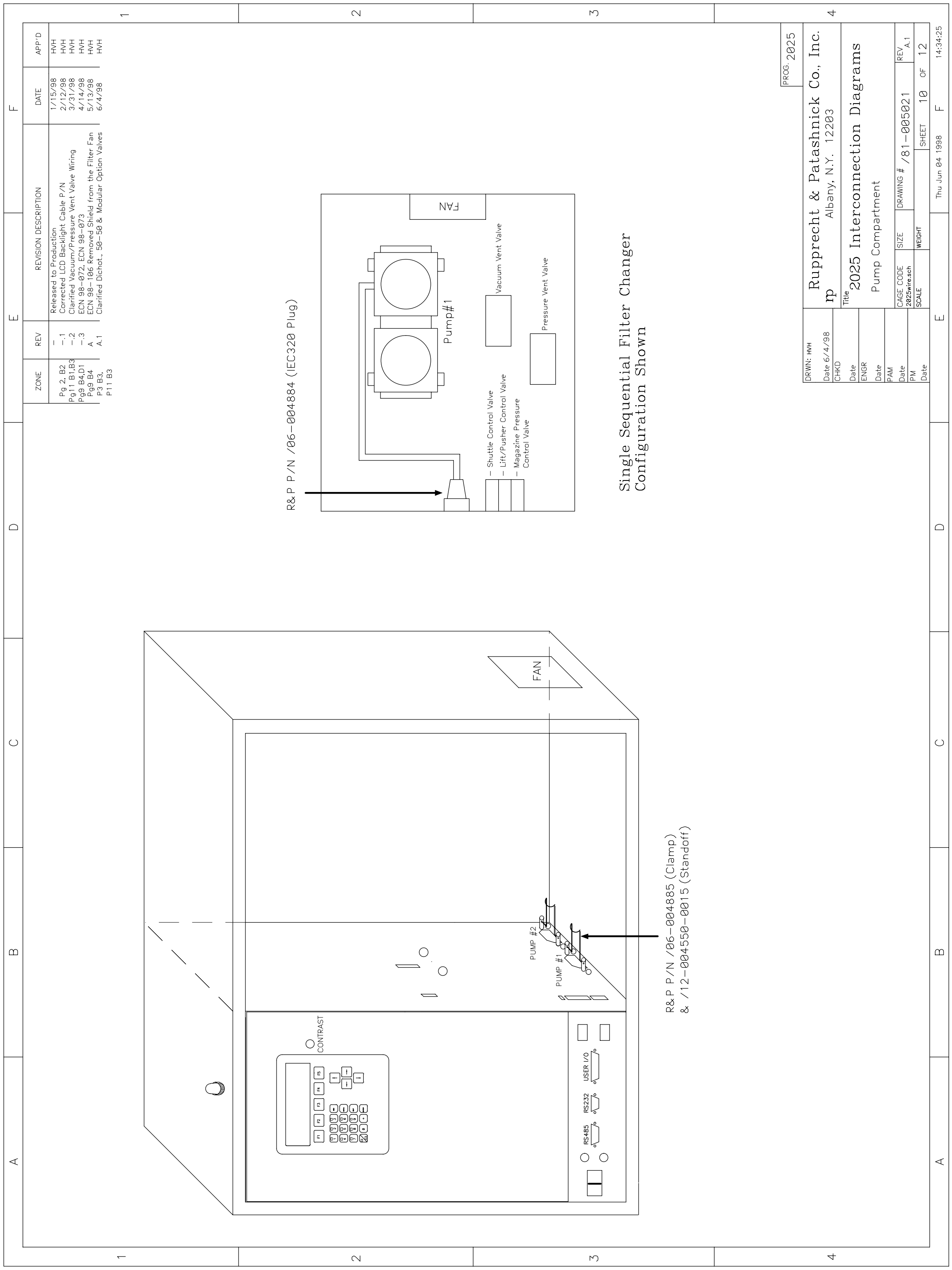


Figure J-4. Installing the internal modem assembly.

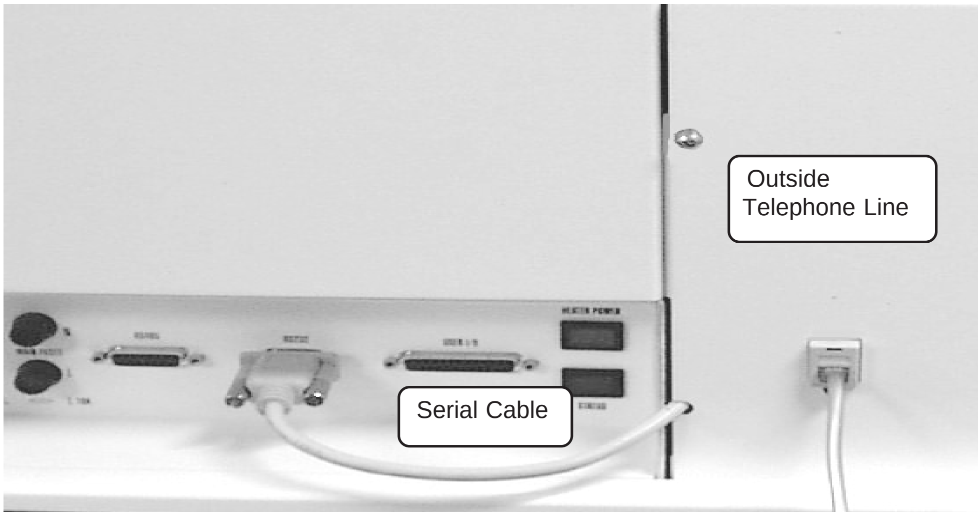


Figure J-5. Detail of serial connection from Partisol-Plus to modem and RJ-11 jack to outside telephone line.

Figure J-6. Front view of a Partisol-Plus Sampler with an internal modem installed.

J.2. Setting up a Standard Commercial External Modem

R&P recommends that you use the R&P modem, as part of the internal modem kit (59-005707), rather than a standard commercial model for the following reasons:

- The temperatures inside the Partisol-Plus Sampler can vary greatly. Most standard commercial modems are designed to operate at room temperature and will not operate properly at the extreme temperature ranges that the unit is subjected to.
- Most standard commercial modems can be configured to operate with R&P instrumentation. However, because command codes are not standard among different modem manufacturers, it is the user's responsibility to determine the correct codes to configure the modem.
- Commercially available modems can not be simply placed inside the unit's enclosure due to temperature concerns (see above) and because placing the modem on one of the unit's components (such as the pump or power supply) may cause the unit to malfunction. Also, because commercial modems have varying electrical requirements, these modems can not receive power from the sampler. R&P recommends that you place your commercial modem in a separate, environmentally controlled enclosure with a separate power source.

Required parts:

9M-to-9F pin straight-through serial cable (07-000587)
9M-to-9F pin null modem adapter (10-005671)
9-to-25 pin serial adapter (06-005895-0925)
Commercial external modem.

Follow these steps to set up an external commercial modem:

1) **Connect your computer directly to the modem (follow the instruction manual that came with the modem).**
2) **Begin executing any communication software which will allow direct communications with the modem. Communication software is included with most modems. If no software program was included, Hyper Terminal (which is included with the Windows operating system) can be used.**

3) Set the modem's communication parameters to work with the Partisol-Plus Sampler. A typical command string to send to the modem to configure it for use is:

AT &F0 &C0 &D0 S0=1 &K0 &W0 &Y0

where:

AT	Command prefix
&F0	Software reset; restore default parameters
&C0	Force DCD (Data Carrier Detect) "ON" at all times
&D0	Ignore DTR (Data Terminal Ready) from instrument
S0=1	Set auto answer to one ring
&K0	Disable local flow control
&W0	Store settings in profile "0"
&Y0	Use stored settings in profile "0" on power up.

Various commercial (especially older) modems may have different commands for the functions listed above. Consult your modem's instruction manual for the proper commands. Also, some modems limit the length of the command string that may be sent. The command string can be broken into two or more segments and sent individually.

4) Disconnect your computer from the modem.

5) Open the door to the sampler. Attach the male end of the 9-to-9 pin cable to the RS232 connector on the front of the unit. Close the unit's door ensuring that the 9-to-9 pin cable is placed in one of the slots on the bottom of the door to allow it to close properly.

6) Attach the null modem adapter to the female end of the 9-to-9 pin cable.

NOTE: Not all null modem adapters can be used in this application because pin connections are not standard. The null modem adapter (10-005671) that is available from R&P is acceptable for use with the Partisol-Plus Sampler. The schematic of this adapter can be found in the Service Manual.

7) If your modem is equipped with a 9-pin connector, attach the cable and null modem adapter to the modem. If your modem is equipped with a 25-pin connector, attach a 9-to-25 pin serial adapter to the null modem adapter and plug it into the modem.

NOTE: Not all 9-to-25 pin serial adapters can be used in this application because pin connections are not standard. The 9-to-25 pin serial adapter (06-005895-0925) that is available from R&P is acceptable for use with the sampler. The schematic of this adapter can be found in the Service Manual.

8) Attach a phone line to the modem. The modem is now ready to communicate with the unit.

J.3. Setting up RPComm for use Through a Modem

NOTE: The Windows operating system screens shown in this section are from the Windows 95 operating system. The screens may vary slightly if you are operating RPComm under the Windows 98 or Windows NT operating systems.

The first two steps of this procedure describe setting up the unit for direct communications. Direct communications must be successfully completed before modem communications are attempted. This will verify that RPComm and the unit have been configured properly.

Follow these steps to set up RPComm for use through a modem:

1) Set up the Partisol-Plus Sampler for direct communications (Section 10.1).

2) Create a new connection according to Section 10.2.2 and verify that the unit is communicating properly.

NOTE: If the connection is successful, the unit's serial number will be displayed at the top of the screen. If the connection is not successful or if there is no unit attached, then the serial number area will be blank or will display "99999."

3) Disconnect the direct connection.

4) Set up the unit for modem communications according to Section J.1 or J.2.

NOTE: R&P recommends that the modem connections be tested before the unit is placed in the field. The test will require the use of two phone lines.

5) With the RPComm Connect List screen displayed (Figure J-7), select the name of the connection used to verify the direct connection above and choose the Edit Selected Connection icon.

 **The Connection Type screen will then be displayed (Figure J-8).**

6) From the Connection Type screen, ensure that the correct instrument type is selected and select "Settings" to display the AK Protocol Setup screen (Figure J-9).

Figure J-7. Connect List screen.

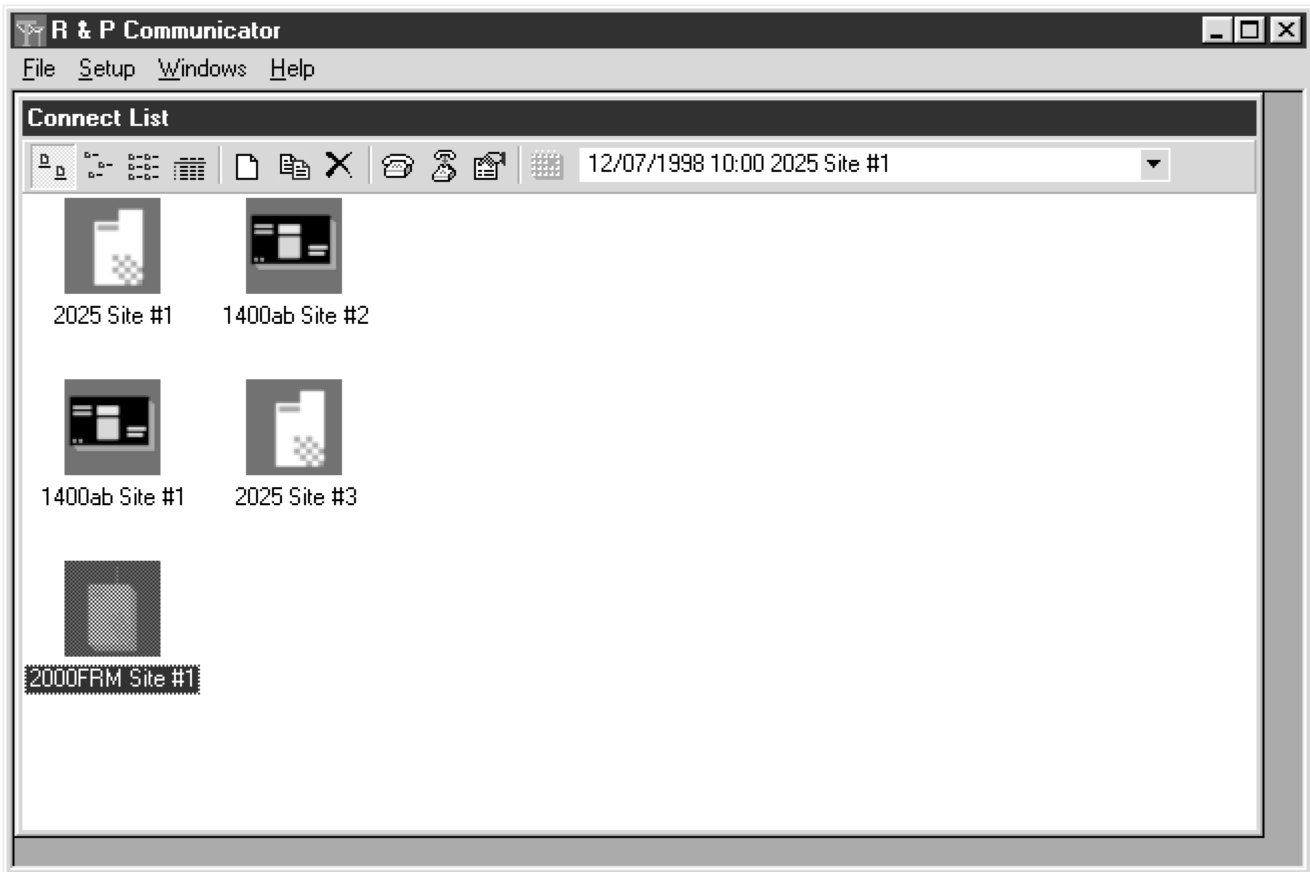
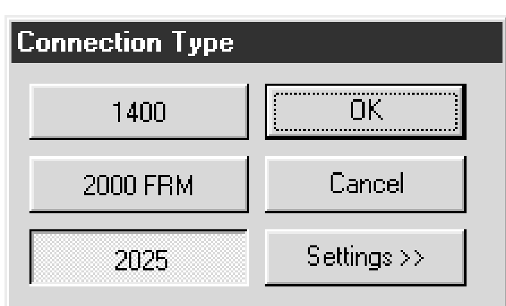


Figure J-8. Connection Type screen.



7) **Place your cursor in the small white box located to the left of "Connect using Modem" and click once with your mouse. A checkmark should appear in the box.**

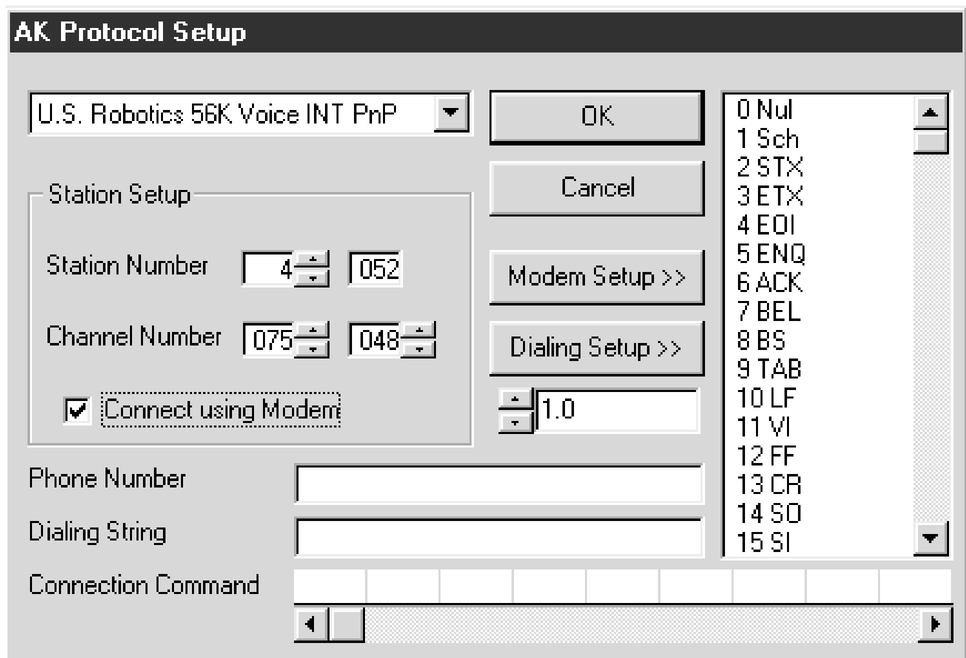


Figure J-9. AK Protocol Setup screen.

8) **To set up the unit for a modem connection, the Connection Description box (in the top left corner) should be set to your modem's description. In Figure J-9, the modem description is "U.S. Robotics 56K Voice INT PhP." The description will vary depending on factors such as your modem type, whether it is an internal or external modem and which COM port the modem is connected to.**

9) **The Station Setup portion of the screen should have been set when you established your direct connection (steps 1 and 2). Do not modify these settings.**

10) **Select the "Modem Setup >>" button to display the Modem Properties screen (Figure J-10).**

11) **Generally, the values that your system chooses for variables on this screen are appropriate for a proper connection. However, if your unit and modem experience communication difficulties, these setting may need to be altered. Contact your modem's**

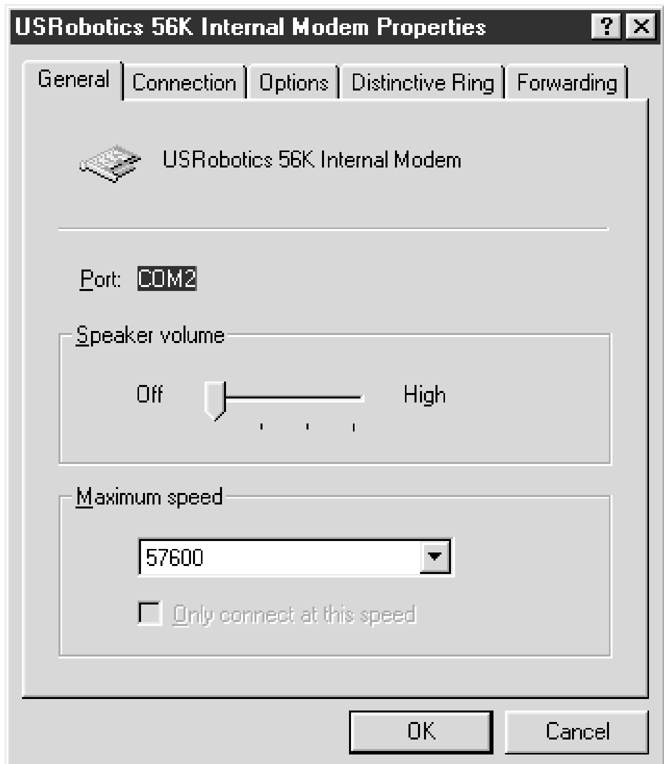


Figure J-10. Modem Properties screen.

manufacturer for more information, if necessary.

12) **Select “OK” to exit the Modem Properties screen. The AK Protocol Setup screen (Figure J-9) will now appear as the active screen on your computer.**

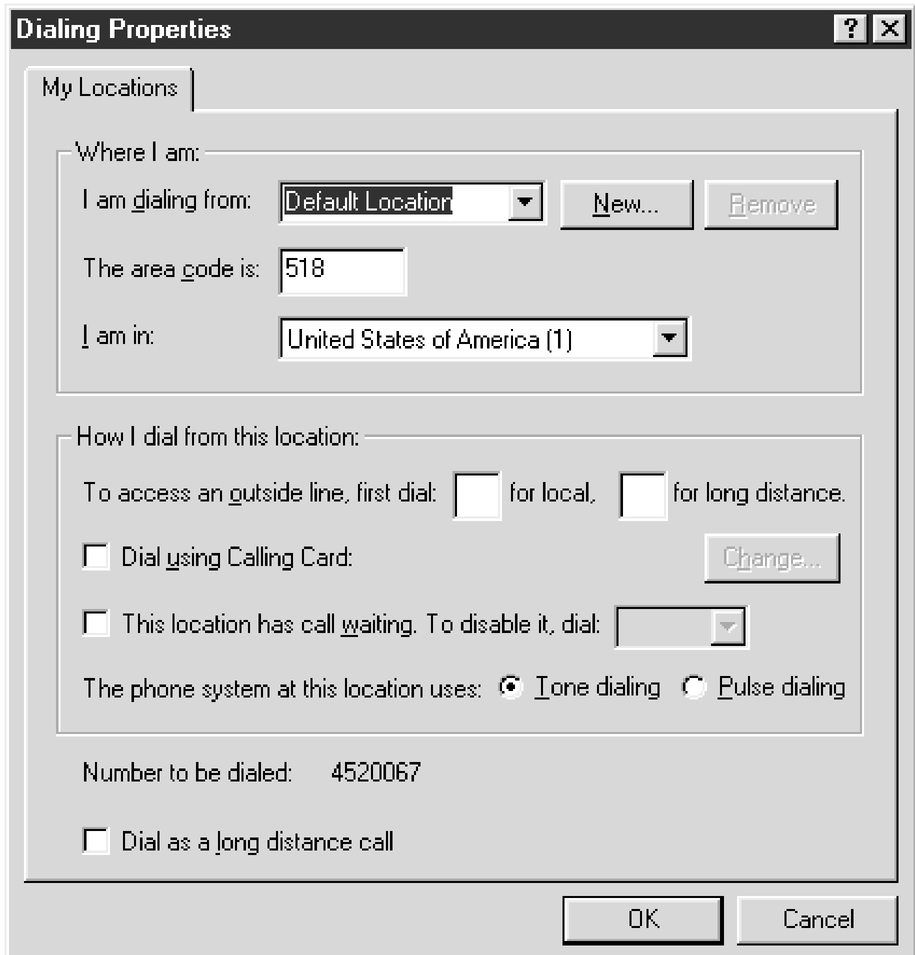
13) **In the AK Protocol Setup screen, enter the phone number to be called in the “Phone Number” box at the bottom of the screen. Do not enter anything in the “Dialing String” box. This setting will be automatically configured by the system.**

14) **Select the “Dialing Setup >>” button to display the Dialing Properties screen (Figure J-11).**

15) **Fill in the required information on the Dialing Properties screen. Verify that the “Number to be dialed” shown at the bottom of the screen matches the phone number as it should be dialed. If the phone number is not correct, there is an error on this screen or you may have incorrectly entered the phone number on the AK Protocol Setup screen.**

16) **Select “OK” when the proper settings have been confirmed. This**

Figure J-11. Dialing Properties screen.



will return you to the AK Protocol Setup screen.

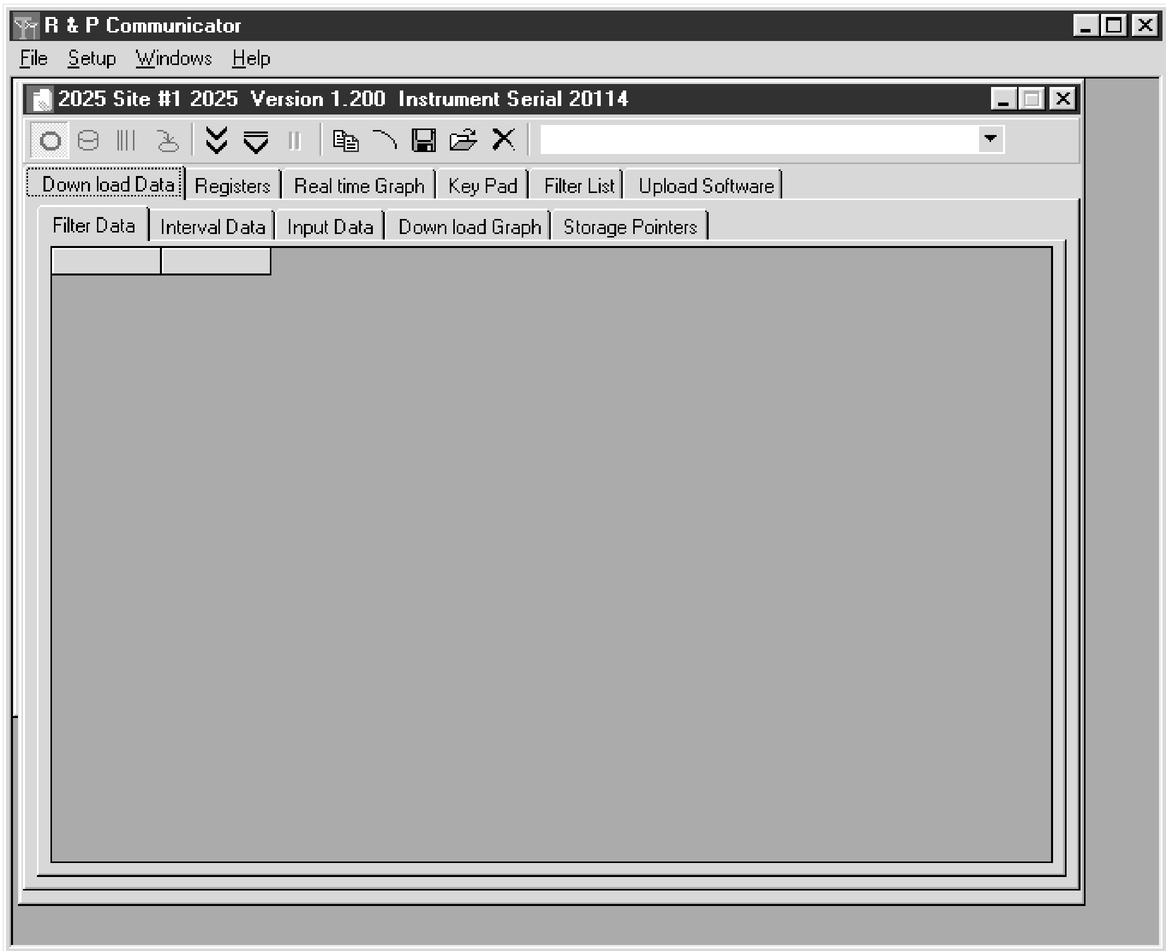
17) Select “OK” while in the AK Protocol Setup screen. This will return you to the Connection Type screen. To finish the connection setup, select “OK” while in the Connection Type screen.

18) To connect to your Partisol-Plus Sampler through the modem, highlight the connection name on the Connection List screen (Figure J-7) and then select the Connection icon on the tool bar.

 **The modem connection will now be initiated. When communication is established, the 2025 Main screen will be displayed (Figure J-12).**

NOTE: If the connection is successful, the unit’s serial number will be displayed

Figure J-12. 2025 Main screen.



at the top of the screen. If the connection is not successful or if there is no instrument attached, then the serial number area will be blank or will display “99999.” If the modem loses its connection, wait at least 1 minute before trying to establish another connection. This allows the modem to reset itself.

19) RPComm can now be used as described in Section 10.

J.4. Setting up the Serial Switching Device

For applications where two or more R&P instruments are installed at the same

location, a serial switching device can be installed to help with communications. The serial switching device enables communication to occur with multiple instruments (including non-R&P serial devices) with the use of only one phone line. Command codes can be sent over the phone line to trigger a particular serial port and, therefore, allow communication with the connected instrument. RPComm can be configured to operate with these devices and send the required command codes.

J.4.1. Multiple R&P Instruments of the Same Model

Refer to this section if you are connecting two or more R&P instruments of the same model to a serial switching device.

Follow these steps to set up a serial switching device:

1) **Set up the unit for modem communications (Section J.1 or J.2). Verify that modem communications to each instrument are successful before adding the serial switching device.**
2) **Obtain a serial switching device from a commercial manufacturer. R&P has found that devices manufactured by Black Box Corp. work properly with its instrumentation, although other devices should function properly. The part number and cost of the device will vary depending on how many serial devices the user wishes to connect to it.**
3) **From the serial switching device's instruction manual, determine the command codes required to trigger activation of each serial port being used.**
4) **Unplug the serial cable and its adapter(s) from the modem and then plug the cable assembly into the serial switching device. Follow the instructions provided with the serial switching device and connect it to the modem.**

   NOTE: R&P recommends that the serial device's connections be tested before the unit is placed in the field. This test will require the use of two phone lines.
5) **With the RPComm Connect List screen displayed (Figure J-7), select the name of the connection used to verify the modem connection above and then choose the Edit Selected Connection icon.**  **The Connection Type screen will then be displayed (Figure J-8).**
6) **From the Connection Type screen, ensure that the correct instrument type is selected and select "Settings" to display the AK**

Protocol Setup screen (Figure J-9).

7) **From the list of command codes on the right side of the AK Protocol Setup screen, select the correct series of command codes needed to trigger the desired instrument. As codes are chosen, they will appear on the bottom of the screen in the Connection Command box. If a code is entered incorrectly, it can be deleted by selecting the code in the Connection Command box and pressing the Delete key on your computer's keyboard.**

8) **The remaining portions of the screen should have been set while establishing the modem connection (step 1). Do not modify these settings.**

9) **Select "OK" to exit the AK Protocol Setup screen. This will display the Connection Type screen.**

10) **Choose "OK" from the Connection Type screen to finish the connection setup.**

11) **To initiate a modem connection to a selected instrument, highlight the connection name on the Connect List screen (Figure J-7) and select the Connection icon on the tool bar.**  **The connection to the instrument will be initiated and the proper command codes sent. When communication is established, the 2025 Main screen will be displayed (Figure J-12).**

NOTE: If the connection is successful, the unit's serial number will be displayed at the top of the screen. Ensure that the correct serial number is displayed to verify that the proper command codes were sent and that the serial port trigger is functioning properly. If the connection is not successful or if there is no instrument attached, then the serial number area will be blank or will display "99999." If the modem loses its connection, wait at least 1 minute before trying to establish another connection. This allows the modem to reset itself.

12) **RPComm can now be used as described in Section 10.**

13) **To connect to a different instrument through the serial switching device, the current connection must be terminated. Enter the proper command codes for the desired instrument as described in step 7 and initiate the modem connection as explained in step 11. If the modem loses its connection, wait at least 1 minute before trying to establish another connection. This allows the modem to reset itself.**

J.4.2 Multiple R&P Instruments of Different Models

Refer to this section if two or more R&P instruments of different models are being connected to a serial switching device. The following combinations can be supported at this time:

Series 1400a and a Model 2025
Partisol Model 2000-FRM and a Model 2025

Although RPComm supports both the Series 1400a monitor and the Partisol Model 2000-FRM sampler, it is not possible to connect these instruments to a single serial switching device. This is because the Series 1400a monitor requires the local communication flow control to be set to "RTS/CTS" and the Partisol Model 2000-FRM sampler does not support any local communication flow control. If a Series 1400a monitor and a Partisol Model 2000-FRM sampler are co-located, two modems and phone lines must be used for communications.

J.4.2.1 Connecting a Series 1400a and Model 2025

Follow these steps to connect a Series 1400a monitor and a Model 2025 sampler to a serial switching device:

1) **Set up the 1400a monitor and Model 2025 sampler for direct communications (Section 10.1).**

2) **Create a new connection to each instrument according to Section 10.2.2 and verify that the units are communicating properly.**

   NOTE: If the connection is successful, the unit's serial number will be displayed at the top of the screen. If the connection is not successful or if there is no unit attached, then the serial number area will be blank or will display "99999."

3) **Once the RPComm software and instrument configurations have been verified, disconnect the direct connection.**

4) **Connect your computer directly to the modem that will be connected to the serial switching device.**

5) **Begin executing any communication software which will allow direct communications with the modem. Communication software is usually included with most standard commercial modems. If no software program was included with your standard commercial modem, Hyper Terminal (which is included with the Windows operating system) can be used.**

6) **Set the modem's communication parameters to work with the Series 1400a monitor. The following list contains the commands**

that should be set and their corresponding command codes. Various commercial (especially older) modems may have different command codes for the functions listed. Consult your modem's instruction manual for the proper commands.

Communication Parameter	Command Code
Software reset; restore default parameters	&F0
Force DCD (Data Carrier Detect) "ON" at all times	&C0
Ignore DTR (Data Terminal Ready) from instrument	&D0
Set auto answer to one ring	S0=1
Set local flow control to "RTS/CTS"	{varies}
Store settings in profile "0"	&W0
Use stored settings in profile "0" on power up.	&Y0

7) **Disconnect your computer from the modem.**

8) **Attach the male end of the 9-to-9 pin cable to the RS232 connector on one of the instruments.**

9) **Attach the null modem adapter to the female end of the 9-to-9 pin cable.**

NOTE: Not all null modem adapters can be used in this application because pin connections are not standard. The null modem adapter (10-005671) that is available from R&P is acceptable for use with the sampler. The schematic of this adapter can be found in the Service Manual.

10) **If your modem is equipped with a 9-pin connector, attach the cable and null modem adapter to the modem. If your modem is equipped with a 25-pin connector, attach a 9-to-25 pin serial adapter to the null modem adapter and plug it into the modem.**

NOTE: Not all 9-to-25 serial pin adapters can be used in this application because pin connections are not standard. The 9-to-25 serial pin adapter (06-005895-0925) that is available from R&P is acceptable for use with the sampler. The schematic of this adapter can be found in the Service Manual.

11) **Attach a phone line to the modem.**

12) **With the RPComm Connect List screen displayed (Figure J-7), select the name of one of the connections used to verify the direct connection above and choose the Edit Selected Connection icon.**  **The Connection Type screen will then be displayed (Figure J-8).**

13) **From the Connection Type screen, ensure that the correct instrument type is selected and select "Settings" to display the AK Protocol Setup screen (Figure J-9).**

14) **Place your cursor in the small white box located to the left of "Connect using Modem" and click once with your mouse. A checkmark should appear in the box.**

15) **To set up the unit for a modem connection, the Connection Description box (in the top left corner) should be set to your modem's description. In Figure J-9, the modem description is "U.S. Robotics 56K Voice INT PhP." The description will vary depending on factors such as your modem type, whether it is an internal or external modem and which COM port the modem is connected to.**

16) **The Station Setup portion of the screen should have been set when you established your direct connection. Do not modify these settings.**

17) **Select the "Modem Setup >>" button to display the Modem Properties screen (Figure J-10).**

18) **Generally, the values that your system chooses for variables on this screen are appropriate for a proper connection. However, if your unit and modem experience communication difficulties, these setting may need to be altered. Contact your modem's manufacturer for more information, if necessary.**

19) **Select "OK" to exit the Modem Properties screen. The AK Protocol Setup screen (Figure J-9) will now appear as the active screen on your computer.**

20) **In the AK Protocol Setup screen, enter the phone number to be called in the "Phone Number" box at the bottom of the screen. Do not enter anything in the "Dialing String" box. This setting will be automatically configured by the system.**

21) **Select the "Dialing Setup >>" button to display the Dialing Properties screen (Figure J-11).**

22) **Fill in the required information on the Dialing Properties screen. Verify that the "Number to be dialed" shown at the bottom of the screen matches the phone number as it should be dialed. If the phone number is not correct, there is an error on this screen or you may have incorrectly entered the phone number on the AK Protocol Setup screen.**

23) **Select "OK" when the proper settings have been confirmed. This will return you to the AK Protocol Setup screen.**

24) **Select "OK" while in the AK Protocol Setup screen. This will return you to the Connection Type screen. To finish the connec-**

tion setup, select “OK” while in the Connection Type screen.

25) From the R&P Communicator Main screen (which is located just behind the Connect List screen), select the “Setup” pull down menu and choose “RS232.” The Communication Port Setup screen will appear. The settings on this screen should match the Series 1400a settings as shown in Figure J-13. Select “OK” to verify these settings.

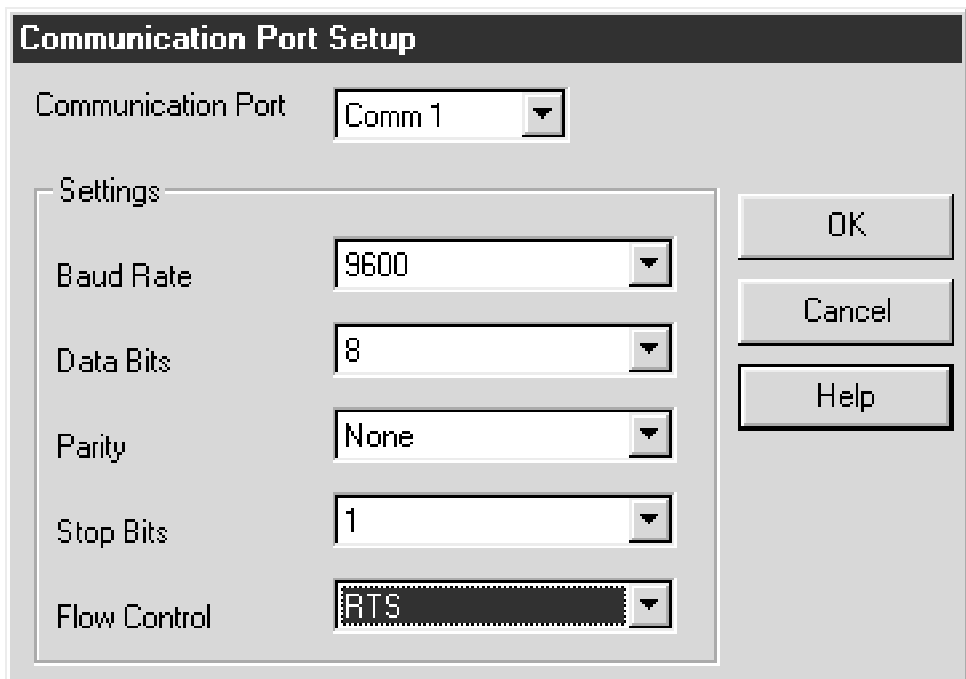


Figure J-13. Communication Port Setup screen configured for a 1400a monitor.

26) Connect to one of the instruments through the modem by highlighting the connection name on the Connect List screen (Figure J-7) and then select the Connection icon on the tool bar.  **The modem connection will now be initiated. When communication is established, the instrument’s main screen will be displayed.**

NOTE: If the connection is successful, the unit’s serial number will be displayed at the top of the screen. If the connection is not successful or if there is no instrument attached, then the serial number area will be blank or will display “99999.” If the modem loses its connection, wait at least 1 minute before trying to establish another connection. This allows the modem to reset itself.

27) **Once you have verified the connection, disconnect the modem connection to the instrument.**

28) **Attach the male end of the 9-to-9 pin cable to the RS232 connector on the other instrument.**

29) **Repeat steps 12 through 27 for the other instrument.**

30) **Disconnect from the instrument.**

31) **Obtain a serial switching device from a commercial manufacturer. R&P has found that devices manufactured by Black Box Corp. work properly with its instrumentation, although other devices should function properly. The part number and cost of the device will vary depending on how many serial devices the user wishes to connect to it.**

32) **From the serial switching device's instruction manual, determine the command codes required to trigger activation of each serial port being used.**

33) **Unplug the serial cable and its adapter(s) from the modem and then plug the cable assembly into the serial switching device. Follow the instructions provided with the serial switching device and connect it to the instruments and the modem.**

34) **With the RPComm Connect List screen displayed (Figure J-7), select the name of one of the connections used to verify the modem connection above and then choose the Edit Selected Connection icon.**  **The Connection Type screen will then be displayed (Figure J-8).**

35) **From the Connection Type screen, ensure that the correct instrument type is selected and select "Settings" to display the AK Protocol Setup screen (Figure J-9).**

36) **From the list of command codes on the right side of the AK Protocol Setup screen, select the correct series of command codes needed to trigger the desired instrument. As codes are chosen, they will appear on the bottom of the screen in the Connection Command box. If a code is entered incorrectly, it can be deleted by selecting the code in the Connection Command box and pressing the Delete key on your computer's keyboard.**

37) **The remaining portions of the screen should have been set while establishing the modem connection. Do not modify these settings.**

38) Select "OK" to exit the AK Protocol Setup screen. This will display the Connection Type screen.

39) Choose "OK" from the Connection Type screen to finish the connection setup.

40) Connect to one of the instruments by highlighting the connection name on the Connect List screen (Figure J-7) and select the Connection icon on the tool bar.  **The connection to the instrument will be initiated and the proper command codes sent. When communication is established, the instrument's main screen will be displayed.**

NOTE: If the connection is successful, the unit's serial number will be displayed at the top of the screen. Ensure that the correct serial number is displayed to verify that the proper command codes were sent and that the serial port trigger is functioning properly. If the connection is not successful or if there is no instrument attached, then the serial number area will be blank or will display "99999." If the modem loses its connection, wait at least 1 minute before trying to establish another connection. This allows the modem to reset itself.

40) RPComm can now be used as described in Section 10.

41) To connect to the other instrument through the serial switching device, the current connection must be terminated. Enter the proper command codes for the desired instrument as described above and initiate the modem connection. If the modem loses its connection, wait at least 1 minute before trying to establish another connection. This allows the modem to reset itself.

J.4.2.2 Connecting a Model 2000-FRM and Model 2025

Follow these steps to connect a Partisol Model 2000-FRM sampler and a Model 2025 sampler to a serial switching device:

1) Set up the Partisol 2000-FRM sampler and the Model 2025 sampler for direct communications (Section 10.1).

2) Create a new connection to each instrument according to Section 10.2.2 and verify that the units are communicating properly.

NOTE: If the connection is successful, the unit's serial number will be displayed at the top of the screen. If the connection is not successful or if there is no unit attached, then the serial number area will be blank or will display "99999."

3) Once the RPComm software and instrument configurations have been verified, disconnect the direct connection.

4) Connect your computer directly to the modem that will be connected to the serial switching device (Section J.1 or J.2).

5) Begin executing any communication software which will allow direct communications with the modem. Communication software is usually included with most standard commercial modems. If no software program was included with your standard commercial modem, Hyper Terminal (which is included with the Windows operating system) can be used.

6) Set the modem's communication parameters to work with the Partisol-Plus Sampler. A typical command string to send to the modem to configure it for use is:

AT &F0 &C0 &D0 S0=1 &K0 &W0 &Y0
where:

AT	Command Prefix
&F0	Software reset; restore default parameters
&C0	Force DCD (Data Carrier Detect) "ON" at all times
&D0	Ignore DTR (Data Terminal Ready) from instrument
S0=1	Set auto answer to one ring
&K0	Disable local flow control
&W0	Store settings in profile "0"
&Y0	Use stored settings in profile "0" on power up.

7) Disconnect your computer from the modem.

8) Attach the male end of the 9-to-9 pin cable to the RS232 connector on one of the instruments.

9) Attach the null modem adapter to the female end of the 9-to-9 pin cable.

NOTE: Not all null modem adapters can be used in this application because pin connections are not standard. The null modem adapter (10-005671) that is available from R&P is acceptable for use with the sampler. The schematic of this adapter can be found in the Service Manual.

10) If your modem is equipped with a 9-pin connector, attach the cable and null modem adapter to the modem. If your modem is equipped with a 25-pin connector, attach a 9-to-25 pin serial adapter to the null modem adapter and plug it into the modem.

NOTE: Not all 9-to-25 pin serial adapters can be used in this application because pin connections are not standard. The 9-to-25 pin serial adapter (51-001079) that

is available from R&P is acceptable for use with the sampler. The schematic of this adapter can be found in the Service Manual.

11) **Attach a phone line to the modem.**

12) **With the RPComm Connect List screen displayed (Figure J-7), select the name of one of the connections used to verify the direct connection above and choose the Edit Selected Connection icon.**  **The Connection Type screen will then be displayed (Figure J-8).**

13) **From the Connection Type screen, ensure that the correct instrument type is selected and select “Settings” to display the AK Protocol Setup screen (Figure J-9).**

14) **Place your cursor in the small white box located to the left of “Connect using Modem” and click once with your mouse. A checkmark should appear in the box.**

15) **To set up the unit for a modem connection, the Connection Description box (in the top left corner) should be set to your modem’s description. In Figure J-9, the modem description is “U.S. Robotics 56K Voice INT PhP.” The description will vary depending on factors such as your modem type, whether it is an internal or external modem and which COM port the modem is connected to.**

16) **The Station Setup portion of the screen should have been set when you established your direct connection. Do not modify these settings.**

17) **Select the “Modem Setup >>” button to display the Modem Properties screen (Figure J-10).**

18) **Generally, the values that your system chooses for variables on this screen are appropriate for a proper connection. However, if your unit and modem experience communication difficulties, these setting may need to be altered. Contact your modem’s manufacturer for more information, if necessary.**

19) **Select “OK” to exit the Modem Properties screen. The AK Protocol Setup screen (Figure J-9) will now appear as the active screen on your computer.**

20) **In the AK Protocol Setup screen, enter the phone number to be called in the “Phone Number” box at the bottom of the screen. Do not enter anything in the “Dialing String” box. This setting will be automatically configured by the system.**

21) Select the “Dialing Setup >>” button to display the Dialing Properties screen (Figure J-11).

22) Fill in the required information on the Dialing Properties screen. Verify that the “Number to be dialed” shown at the bottom of the screen matches the phone number as it should be dialed. If the phone number is not correct, there is an error on this screen or you may have incorrectly entered the phone number on the AK Protocol Setup screen.

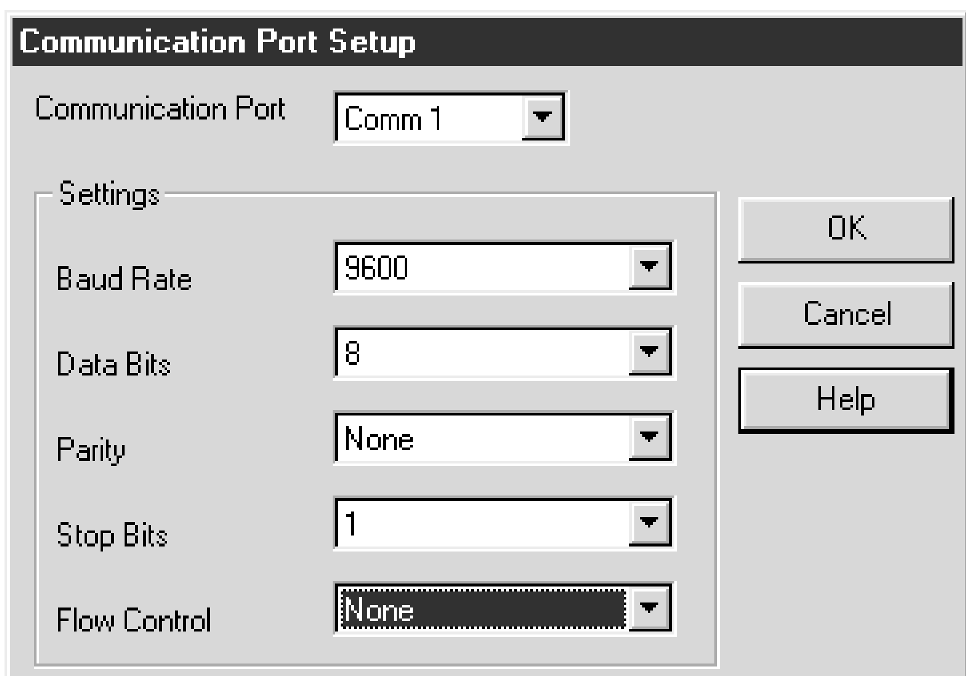
23) Select “OK” when the proper settings have been confirmed. This will return you to the AK Protocol Setup screen.

24) Select “OK” while in the AK Protocol Setup screen. This will return you to the Connection Type screen. To finish the connection setup, select “OK” while in the Connection Type screen.

25) From the R&P Communicator Main screen (which is located just behind the Connect List screen), select the “Setup” pull down menu and choose “RS232.” The Communication Port Setup screen will appear. The settings on this screen should match the Model 2025 settings as shown in Figure J-14.

26) Connect to one of the instruments through the modem by highlighting the connection name on the Connection List screen (Figure J-7) and then select the Connection icon on the tool bar.

Figure J-14. Communication Port Setup screen configured for a 2025 monitor.



The modem connection will now be initiated. When communication is established, the instrument's main screen will be displayed.

NOTE: If the connection is successful, the unit's serial number will be displayed at the top of the screen. If the connection is not successful or if there is no instrument attached, then the serial number area will be blank or will display "99999." If the modem loses its connection, wait at least 1 minute before trying to establish another connection. This allows the modem to reset itself.

27) **Once you have verified the connection, disconnect the modem connection.**

28) **Attach the male end of the 9-to-9 pin cable to the RS232 connector on the other instrument.**

29) **Repeat steps 12 through 27 for the other instrument.**

30) **Disconnect from the instrument.**

31) **Obtain a serial switching device from a commercial manufacturer. R&P has found that devices manufactured by Black Box Corp. work properly with its instrumentation, although other devices should function properly. The part number and cost of the device will vary depending on how many serial devices the user wishes to connect to it.**

32) **From the serial switching device's instruction manual, determine the command codes required to trigger activation of each serial port being used.**

33) **Unplug the serial cable and its adapter(s) from the modem and then plug the cable assembly into the switching device. Follow the instructions provided with the serial switching device and connect it to the instruments and the modem.**

34) **With the RPComm Connect List screen displayed (Figure J-7), select the name of one of the connections used to verify the modem connection above and then choose the Edit Selected Connection icon. The Connection Type screen will then be displayed (Figure J-8).**

35) **From the Connection Type screen, ensure that the correct instrument type is selected and select "Settings" to display the AK Protocol Setup screen (Figure J-9).**

36) From the list of command codes on the right side of the AK Protocol Setup screen, select the correct series of command codes needed to trigger the desired instrument. As codes are chosen, they will appear on the bottom of the screen in the Connection Command box. If a code is entered incorrectly, it can be deleted by selecting the code in the Connection Command box and pressing the Delete key on your computer's keyboard.

37) The remaining portions of the screen should have been set while establishing the modem connection. Do not modify these settings.

38) Select "OK" to exit the AK Protocol Setup screen. This will display the Connection Type screen.

39) Choose "OK" from the Connection Type screen to finish the connection setup.

40) Connect to one of the instruments by highlighting the connection name on the Connect List screen (Figure J-7) and select the Connection icon on the tool bar.  **The connection to the instrument will be initiated and the proper command codes sent. When communication is established, the instrument's main screen will be displayed.**

NOTE: If the connection is successful, the unit's serial number will be displayed at the top of the screen. Ensure that the correct serial number is displayed to verify that the proper command codes were sent and that the serial port trigger is functioning properly. If the connection is not successful or if there is no instrument attached, then the serial number area will be blank or will display "99999." If the modem loses its connection, wait at least 1 minute before trying to establish another connection. This allows the modem to reset itself.

41) RPComm can now be used as described in Section 10.

42) To connect to the other instrument through the serial switching device, the current connection must be terminated. Enter the proper command codes for the desired instrument as described above and initiate the modem connection. If the modem loses its connection, wait at least 1 minute before trying to establish another connection. This allows the modem to reset itself.

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Appendix K: Overview of RPComm Software Screens

This appendix contains all the software screens displayed by the RPComm software program.

Figure K-1. Connect List screen.

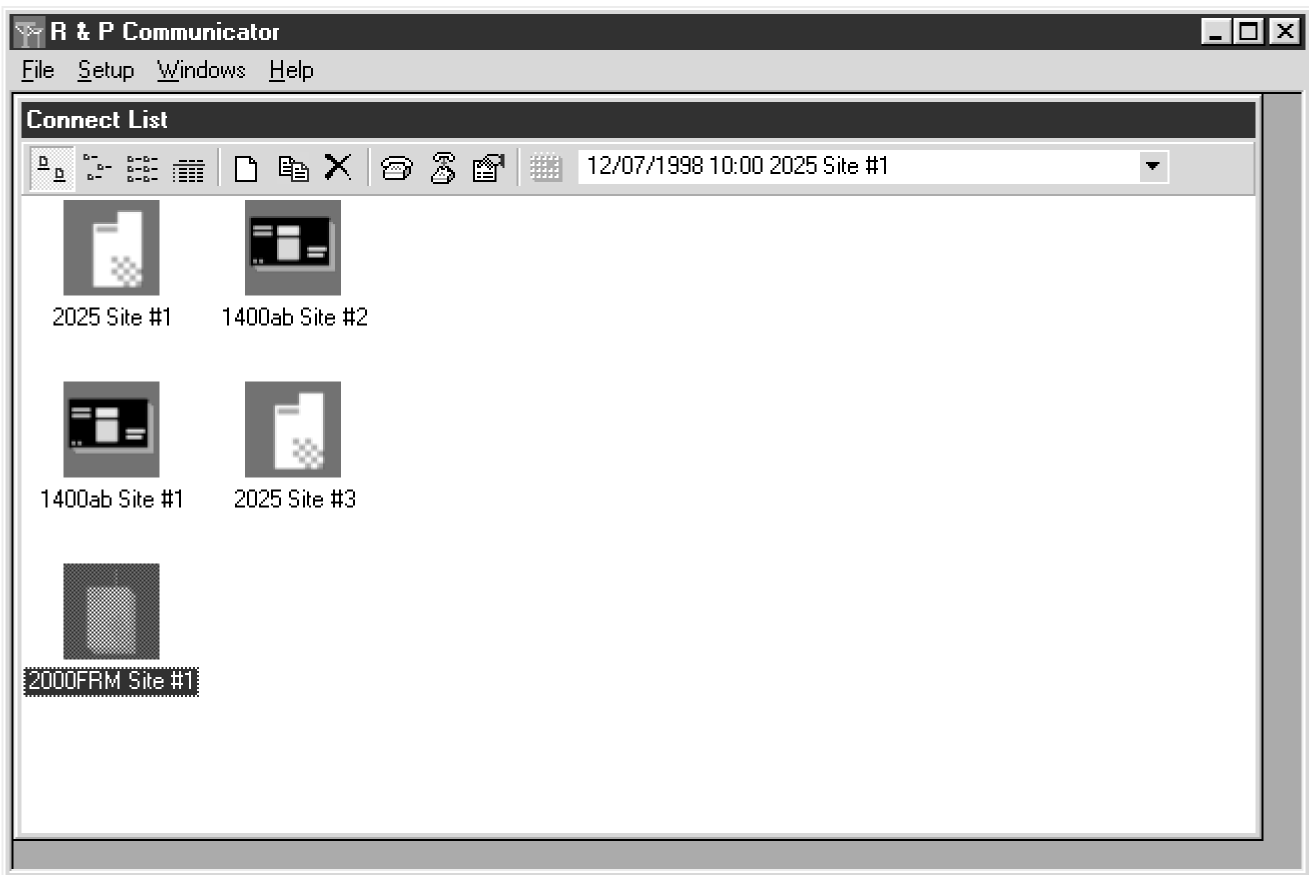
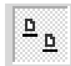
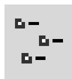
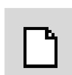
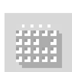
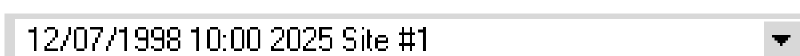


Figure K-2. Control buttons on the Connect List screen.

	Displays the instrument connections on the screen as large icons.
	Displays the instrument connections on the screen as small icons.
	Displays the instrument connections on the screen as a list.
	Displays the instrument connections on the screen as a list with details such as instrument type and status.
	Creates a new instrument connection.
	Edits the settings of the instrument connection currently selected.
	Deletes the instrument connection currently selected.
	Establishes a connection to the selected instrument.
	Disconnects from the instrument connection.
	Displays the AK Protocol screen showing the connection properties for the selected instrument.
	Displays the Schedule Download screen which allows the user to schedule automatic data downloads of the selected instrument.



Contains a list of the data downloads currently scheduled.

Figure K-3. Download Data screen - filter data.

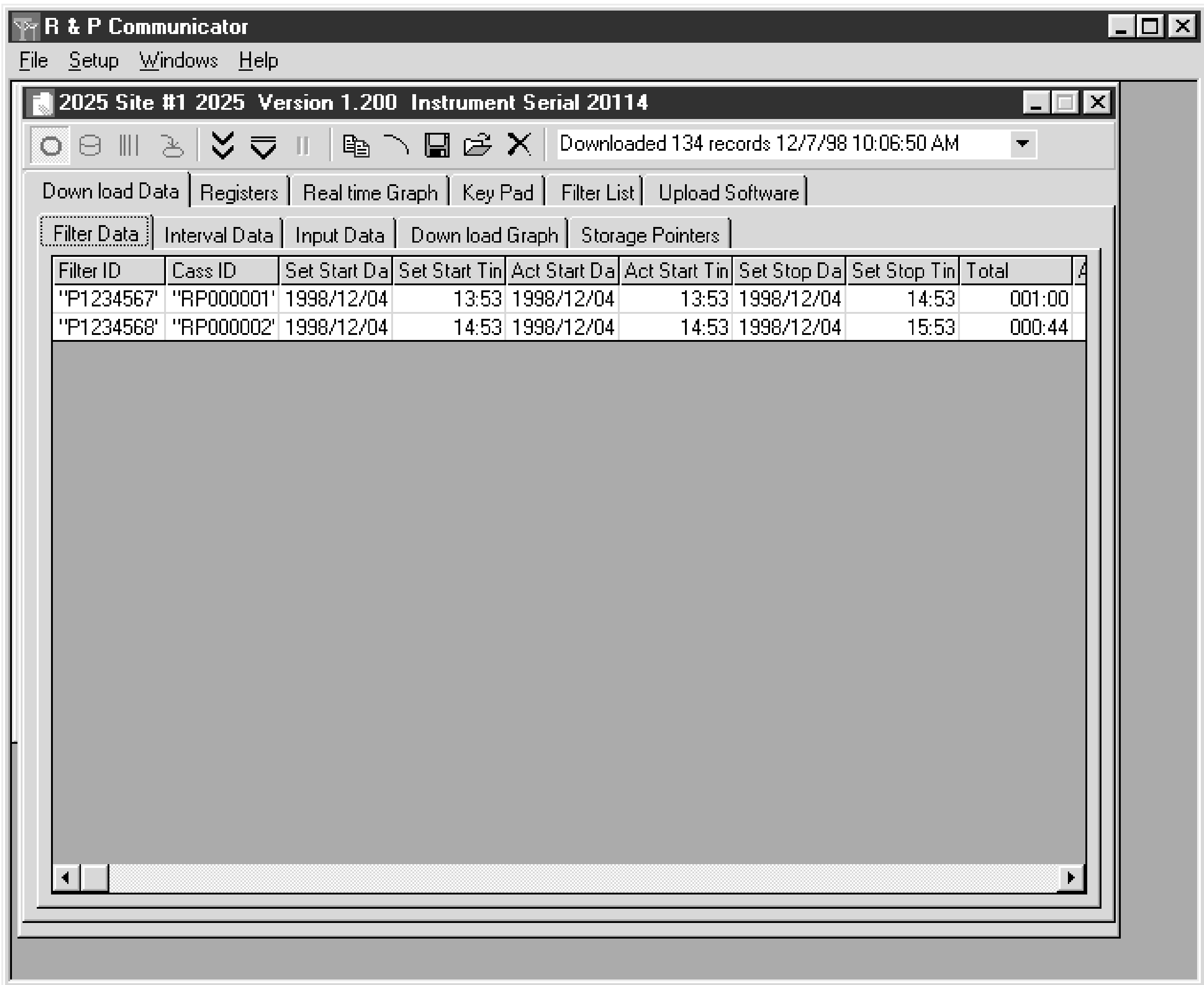


Figure K-4. Download Data screen - interval data.

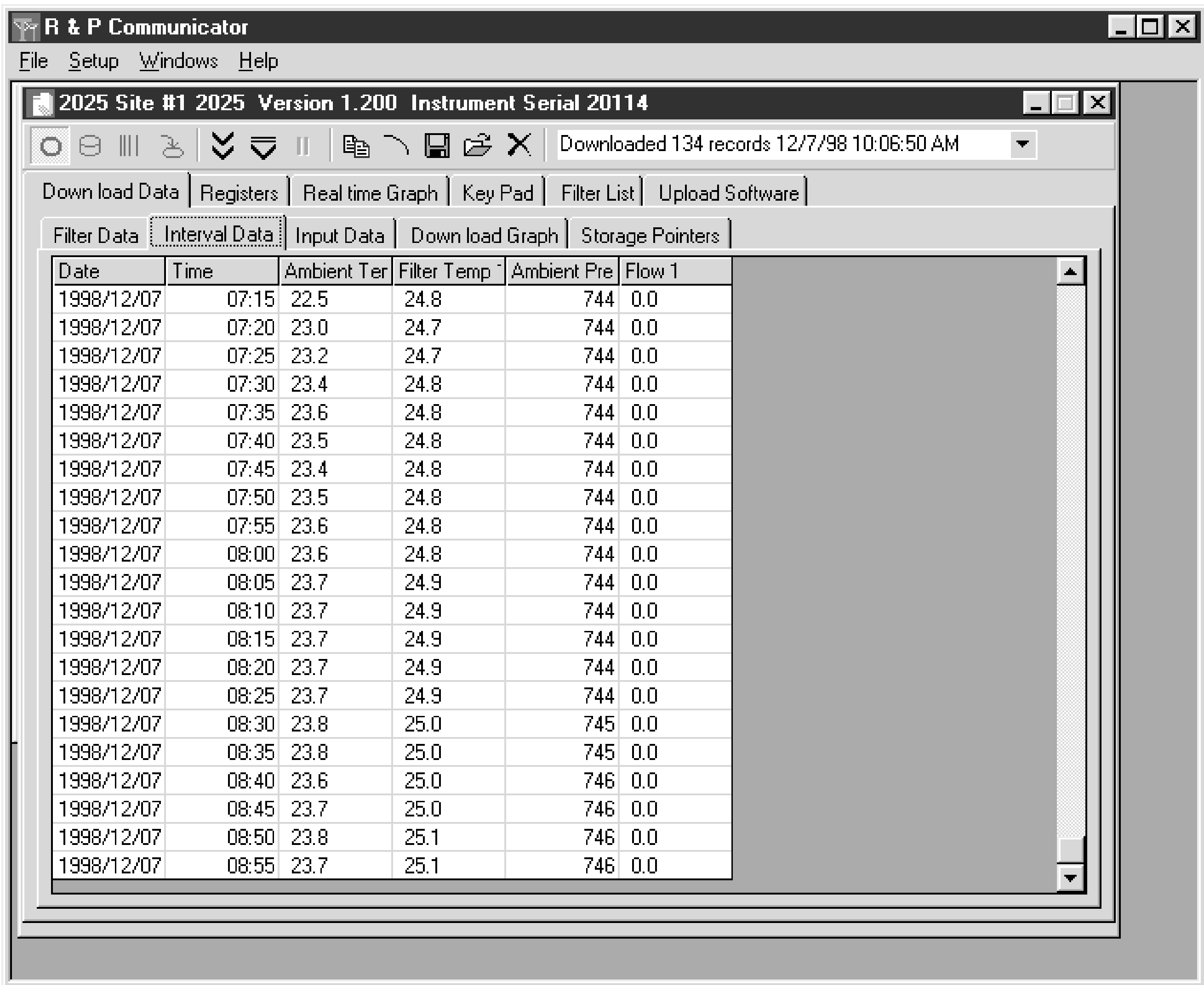
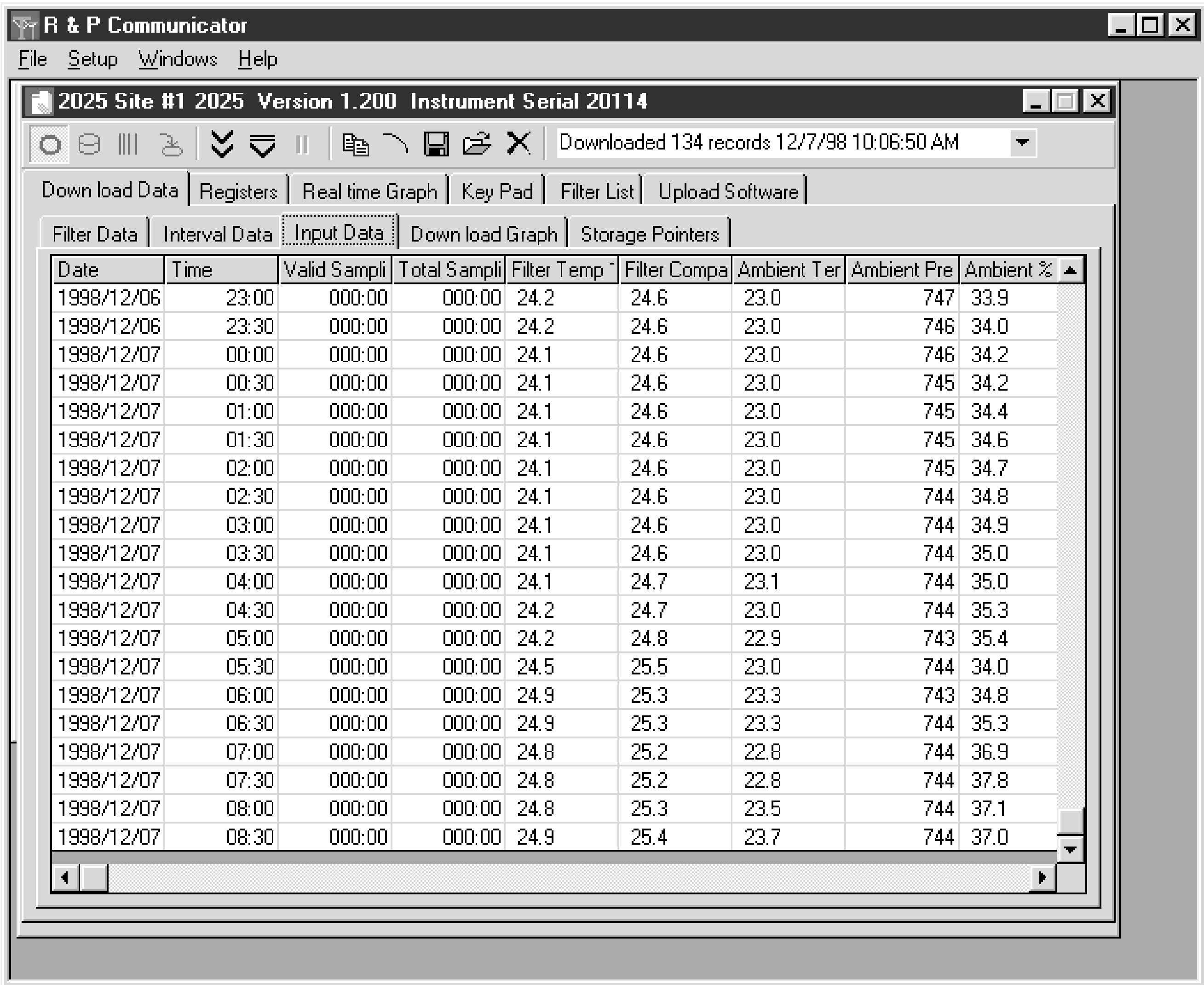
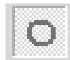


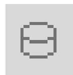
Figure K-5. Download Data screen - input data.



Date	Time	Valid Sampli	Total Sampli	Filter Temp	Filter Compa	Ambient Ter	Ambient Pre	Ambient %
1998/12/06	23:00	000:00	000:00	24.2	24.6	23.0	747	33.9
1998/12/06	23:30	000:00	000:00	24.2	24.6	23.0	746	34.0
1998/12/07	00:00	000:00	000:00	24.1	24.6	23.0	746	34.2
1998/12/07	00:30	000:00	000:00	24.1	24.6	23.0	745	34.2
1998/12/07	01:00	000:00	000:00	24.1	24.6	23.0	745	34.4
1998/12/07	01:30	000:00	000:00	24.1	24.6	23.0	745	34.6
1998/12/07	02:00	000:00	000:00	24.1	24.6	23.0	745	34.7
1998/12/07	02:30	000:00	000:00	24.1	24.6	23.0	744	34.8
1998/12/07	03:00	000:00	000:00	24.1	24.6	23.0	744	34.9
1998/12/07	03:30	000:00	000:00	24.1	24.6	23.0	744	35.0
1998/12/07	04:00	000:00	000:00	24.1	24.7	23.1	744	35.0
1998/12/07	04:30	000:00	000:00	24.2	24.7	23.0	744	35.3
1998/12/07	05:00	000:00	000:00	24.2	24.8	22.9	743	35.4
1998/12/07	05:30	000:00	000:00	24.5	25.5	23.0	744	34.0
1998/12/07	06:00	000:00	000:00	24.9	25.3	23.3	743	34.8
1998/12/07	06:30	000:00	000:00	24.9	25.3	23.3	744	35.3
1998/12/07	07:00	000:00	000:00	24.8	25.2	22.8	744	36.9
1998/12/07	07:30	000:00	000:00	24.8	25.2	22.8	744	37.8
1998/12/07	08:00	000:00	000:00	24.8	25.3	23.5	744	37.1
1998/12/07	08:30	000:00	000:00	24.9	25.4	23.7	744	37.0

Figure K-6. Control buttons on the Download Data screen.

 Downloads all three types of data.

 Downloads filter data only. Interval and input data will not be downloaded.

 Downloads interval data only. Filter and input data will not be downloaded.

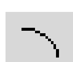
 Downloads input data only. Filter and interval data will not be downloaded.

 Downloads all stored data in the data buffer for the selected data type(s). After the data are downloaded, the storage pointer for the selected data type(s) will move to the end of the buffer. Once the data have been downloaded, each data type can be viewed by selecting the appropriate tab.

 Downloads data from current storage pointer position(s) to the end of the data buffer for the selected data type(s). After the data are downloaded, the storage pointer for the selected data type(s) will move to the end of the buffer. Once the data have been downloaded, each data type can be viewed by selecting the appropriate tab.

 Aborts download. This action will set the storage pointer for the selected data type(s) to the record location where the download was aborted.

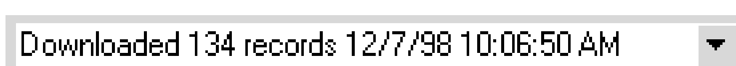
 Copies selected data to the Windows clipboard. The data can then be imported and used in other programs.

 Sends selected data to the Download Graph tab. NOTE: Filter data cannot be graphed.

 Stores desired data to a file. The file is saved in a comma-delimited ASCII format.

 Opens a data file that has been previously saved to disk for display and graphing.

 Clears data currently being displayed.



When the download has been successfully completed, a message will appear in the Dialog box indicating how many records were downloaded. If multiple types of data were downloaded, the user can select the down arrow on the right of the Dialog box to see the results of each download type.

Figure K-7. Download Graph screen.

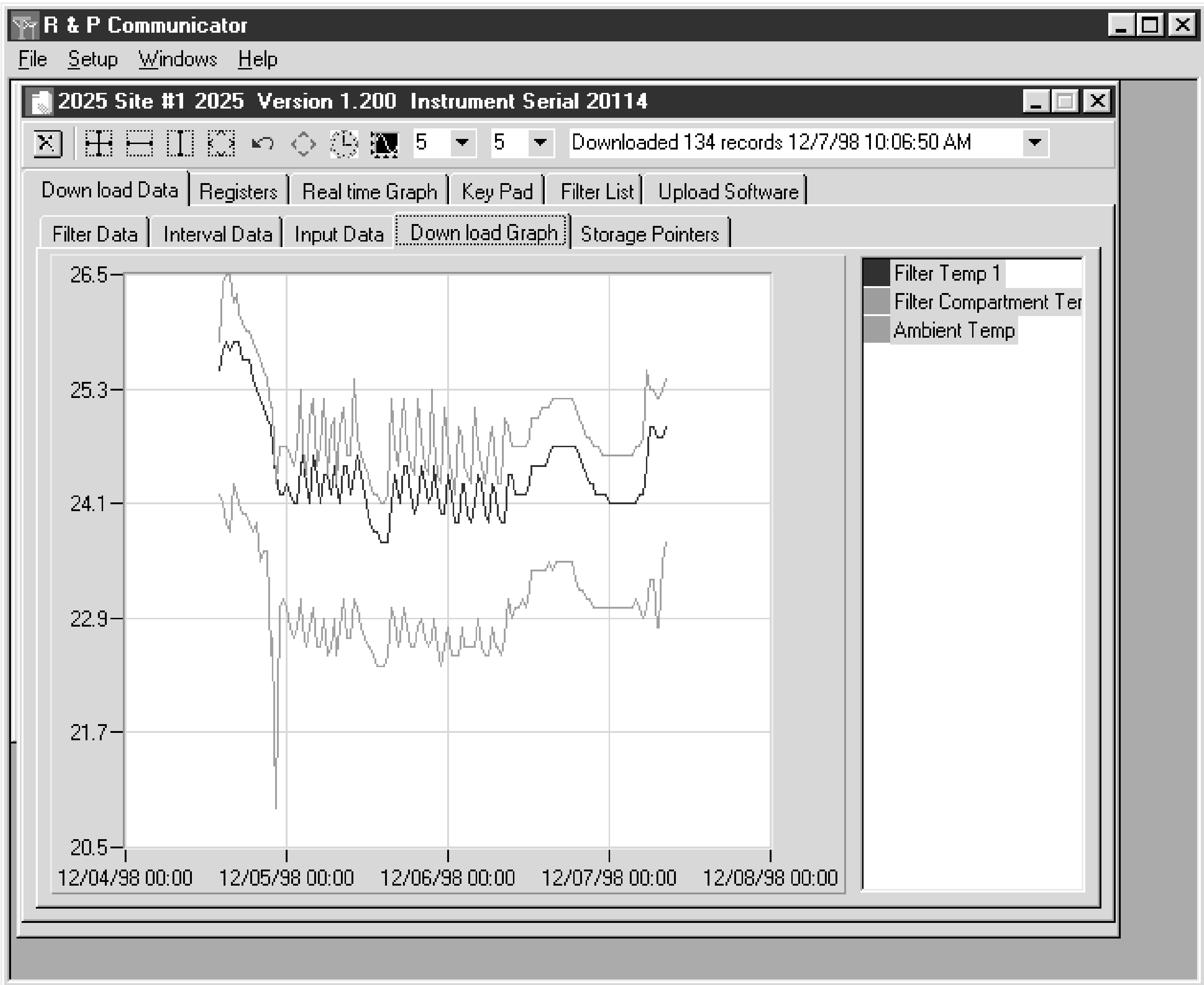
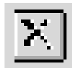
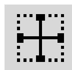


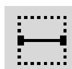
Figure K-8. Control buttons on the Download Graph screen.



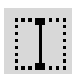
Clears all data listed on the right portion of the Download Graph screen. This includes data being displayed.



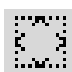
Decreases the scale of the x- and y-axis concurrently. With this icon selected, press and hold down the left mouse button and make a box around the area that you want to zoom into. Once the box is finished, let go of the mouse button. The graph will be resized according to the box dimensions.



Decreases the scale of the x-axis. With this icon selected, press and hold down the left mouse button at the beginning of the area that you want to zoom into. Drag the cursor to the end of the zoom area and let go of the mouse button. The graph will be resized according to the new x-axis dimensions.



Decreases the scale of the y-axis. With this icon selected, press and hold down the left mouse button at the beginning of the area that you want to zoom into. Drag the cursor to the end of the zoom area and let go of the mouse button. The graph will be resized according to the new y-axis dimensions.

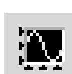


Enables panning. Panning allows the user to move the graph area so that a different section of the x- or y-axis is being displayed without effecting the scale of either axis. With this icon selected, place the mouse cursor somewhere within the graph area and hold down the left mouse button. Move the mouse so that the desired section of the graph is displayed.

Selecting this icon will undo the last zoom or panning step.

Rescales the x- and y-axis so that all the graphs for the selected data are displayed.

Toggles between the two possible x-axis scales: date and time, and time only. This does not effect the way the data are displayed on the graph.



Sends the graph currently being displayed to the Windows default printer.

These two boxes define the number of axis divisions on the graph. The box on the left refers to the x-axis and the right box refers to the y-axis. The number of divisions can be set to 5, 10, 15 or 20 divisions. Increasing the number of divisions results in a finer axis grid. Decreasing the number of divisions results in a courser axis grid. This does not effect the way the data are displayed on the graph.

Figure K-9. Storage Pointer screen.

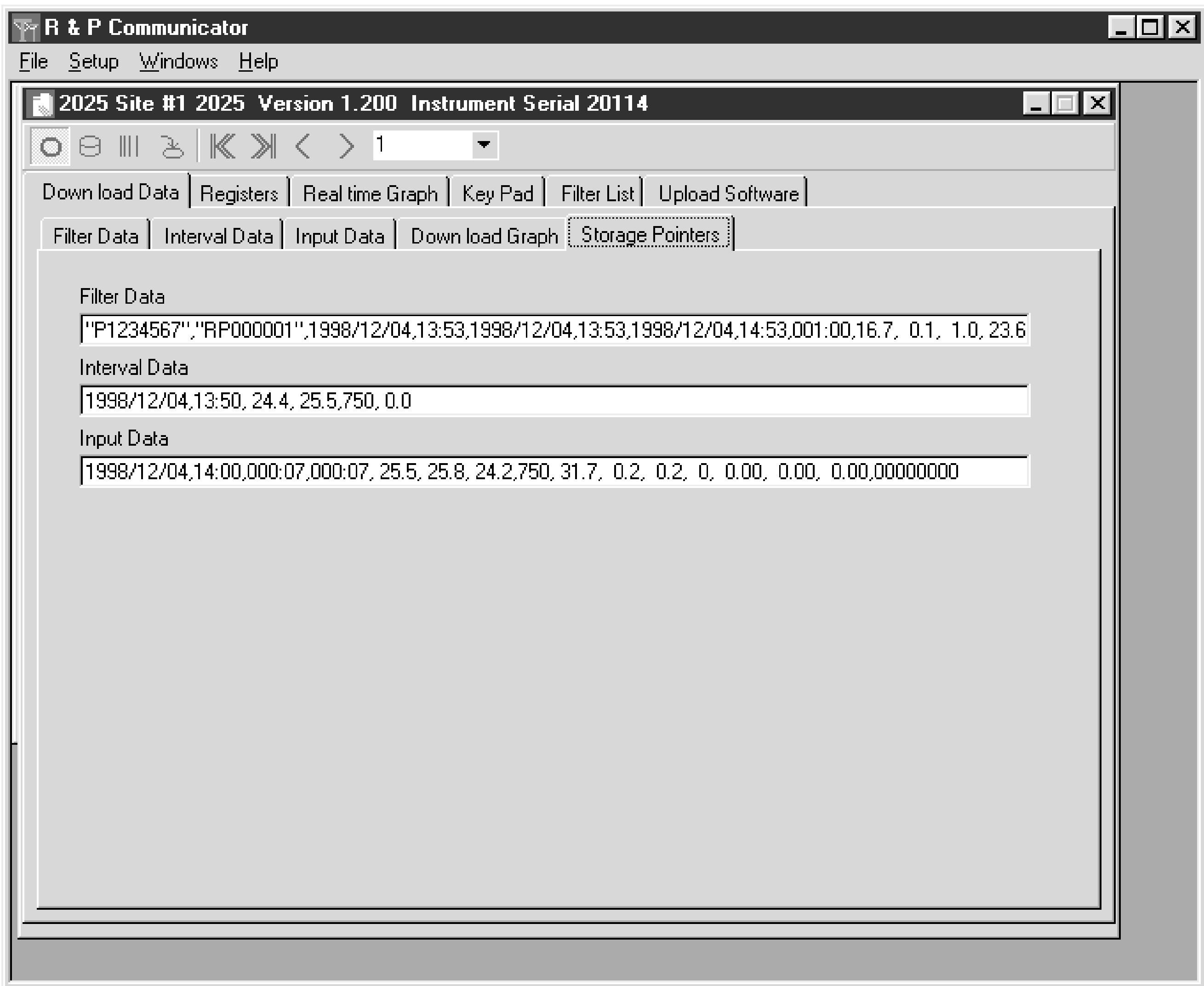


Figure K-10. Control buttons on the Storage Pointer screen.

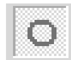
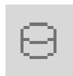
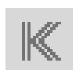
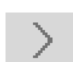
	Moves the storage pointer for all data types.
	Moves the storage pointer for only the filter data. The storage positions of the other two pointers will not change.
	Moves the storage pointer for only the interval data. The storage positions of the other two pointers will not change.
	Moves the storage pointer for only the input data. The storage positions of the other two pointers will not change.
	Moves the selected storage pointer(s) to the first record in the buffer. The displayed position of the selected storage pointer(s) will change, unless the pointer was already at the beginning of the buffer.
	Moves the selected storage pointer(s) to the last record in the buffer. The displayed position of the selected storage pointer(s) will change, unless the pointer was already at the end of the buffer. This is useful if the user wishes to download only the last 10 records, for example. Once the end of the buffer is reached, the pointer can be stepped back 10 records using the Move Back icon.
	Moves the selected storage pointer(s) back "x" number of records, where "x" is defined in the Change Record Step box. The displayed position of the selected storage pointer(s) will change, unless the pointer was already at the beginning of the buffer.
	Moves the selected storage pointer(s) forward "x" number of records, where "x" is defined in the Change Record Step box. The displayed position of the selected storage pointer(s) will change, unless the pointer was already at the end of the buffer.
	Change Record Step box. The step size can be 1, 5, 10, 100 or 1000.

Figure K-11. Registers screen.

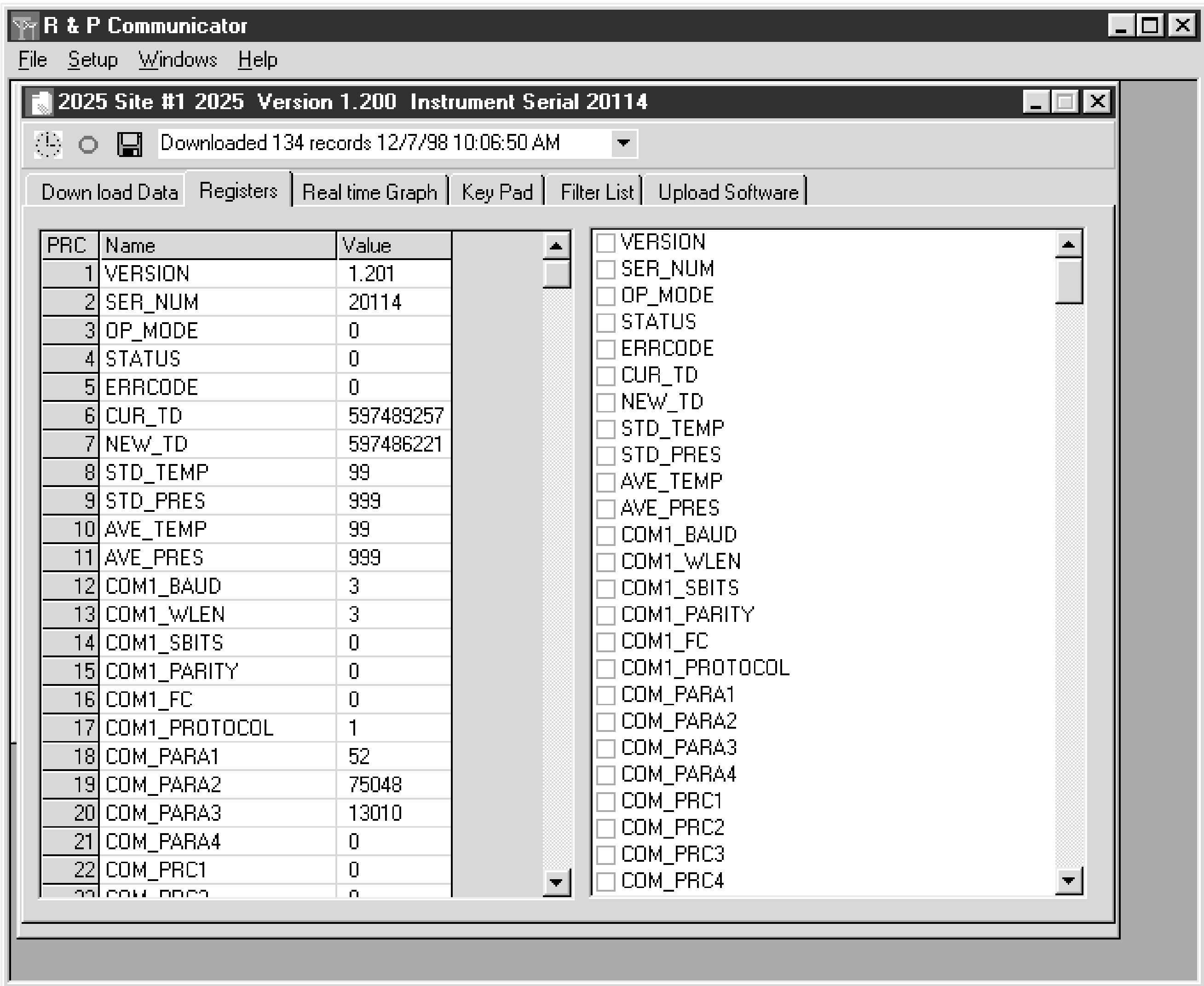


Figure K-12. Control buttons on the Registers screen.

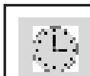
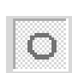
	Reads selected register values from the unit.
	Selects all registers.
	Saves register data to a file.

Figure K-13. Real-Time Graph screen.

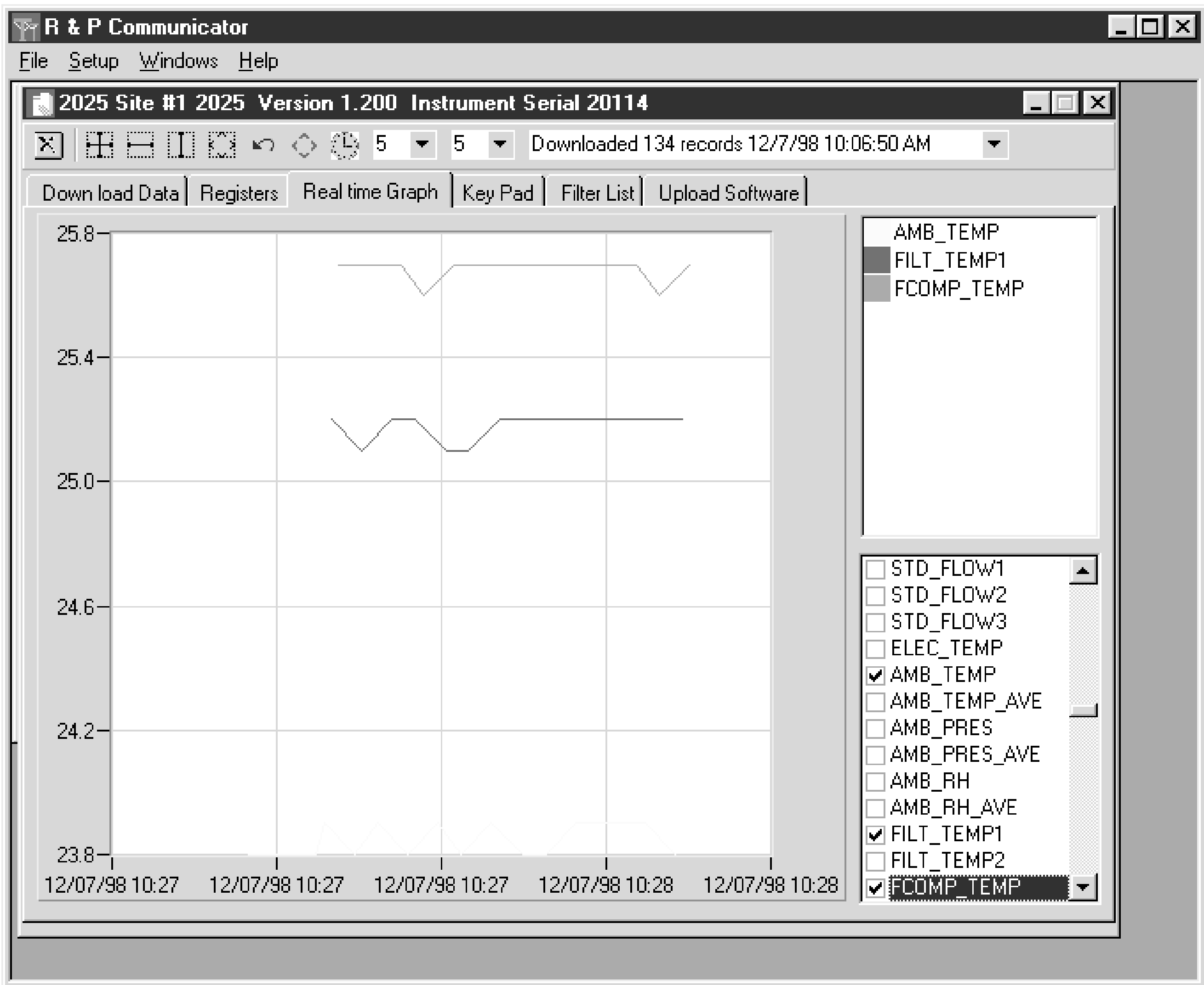
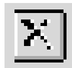
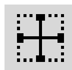


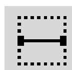
Figure K-14. Control buttons on the Real-Time Graph screen.



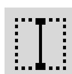
Clears all data listed on the right portion of the Real-Time Graph screen. This includes data being displayed.



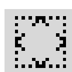
Decreases the scale of the x- and y-axis concurrently. With this icon selected, press and hold down the left mouse button and make a box around the area that you want to zoom into. Once the box is finished, let go of the mouse button. The graph will be resized according to the box dimensions.



Decreases the scale of the x-axis. With this icon selected, press and hold down the left mouse button at the beginning of the area that you want to zoom into. Drag cursor to the end of the zoom area and let go of the mouse button. The graph will be resized according to the new x-axis dimensions.



Decreases the scale of the y-axis. With this icon selected, press and hold down the left mouse button at the beginning of the area that you want to zoom into. Drag cursor to the end of the zoom area and let go of the mouse button. The graph will be resized according to the new y-axis dimensions.



Enables panning. Panning allows the user to move the graph area so that a different section of the x- or y-axis is being displayed without effecting the scale of either axis. With this icon selected, place the mouse cursor somewhere within the graph area and hold down the left mouse button. Move the mouse so that the desired section of the graph is displayed.

Selecting this icon will undo the last zoom or panning step.

Rescales the x- and y-axis so that all the graphs for the selected data are displayed.

Toggles between the two possible x-axis scales: date and time, and time only. This does not effect the way the data are displayed on the graph.

These two boxes define the number of axis divisions on the graph. The left box refers to the x-axis and the right box refers to the y-axis. The number of divisions can be set to 5, 10, 15 or 20 divisions. Increasing the number of divisions results in a finer axis grid. Decreasing the number of divisions results in a courser axis grid. This does not effect the way the data are displayed on the graph.

Figure K-15. Virtual keypad.

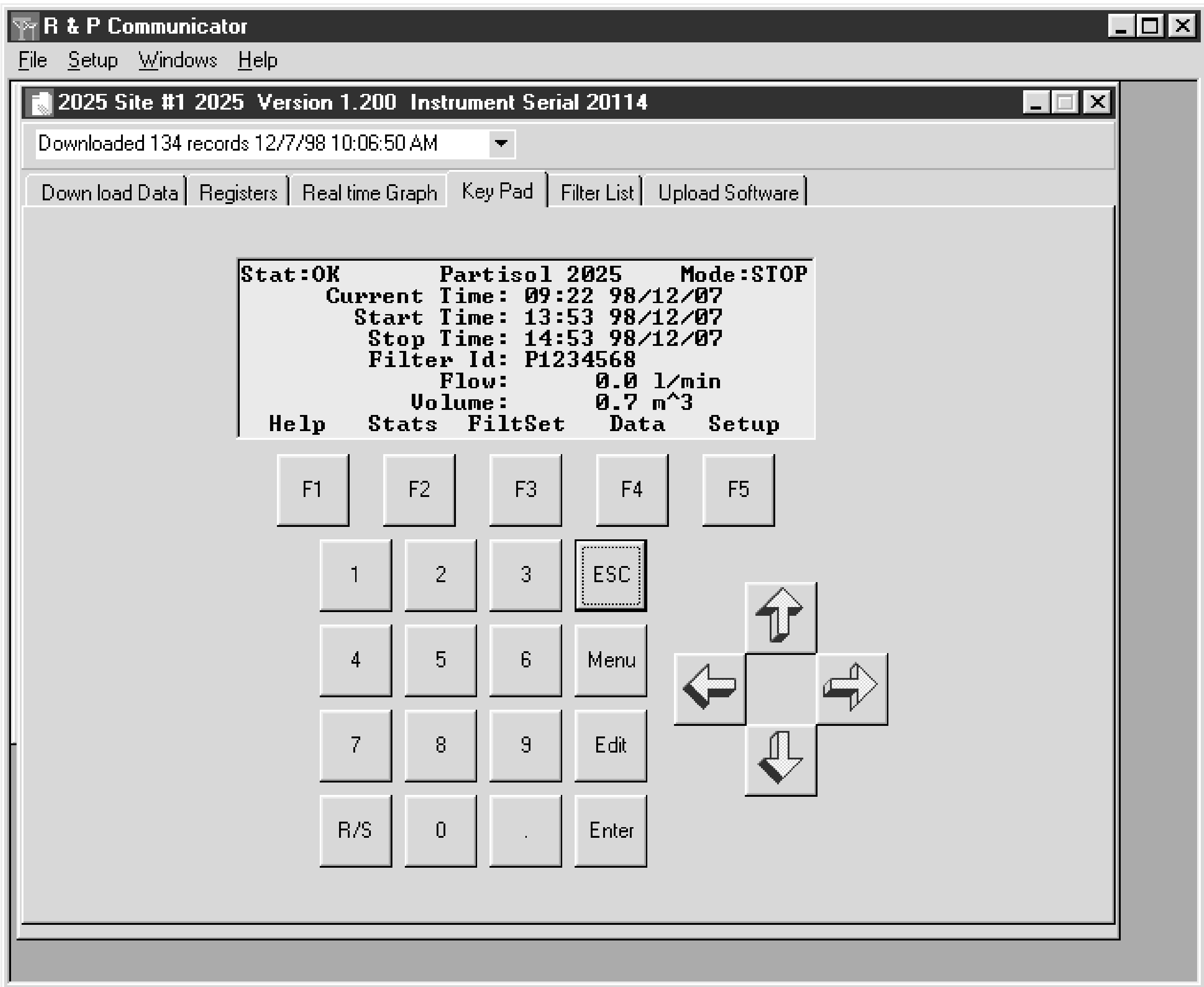
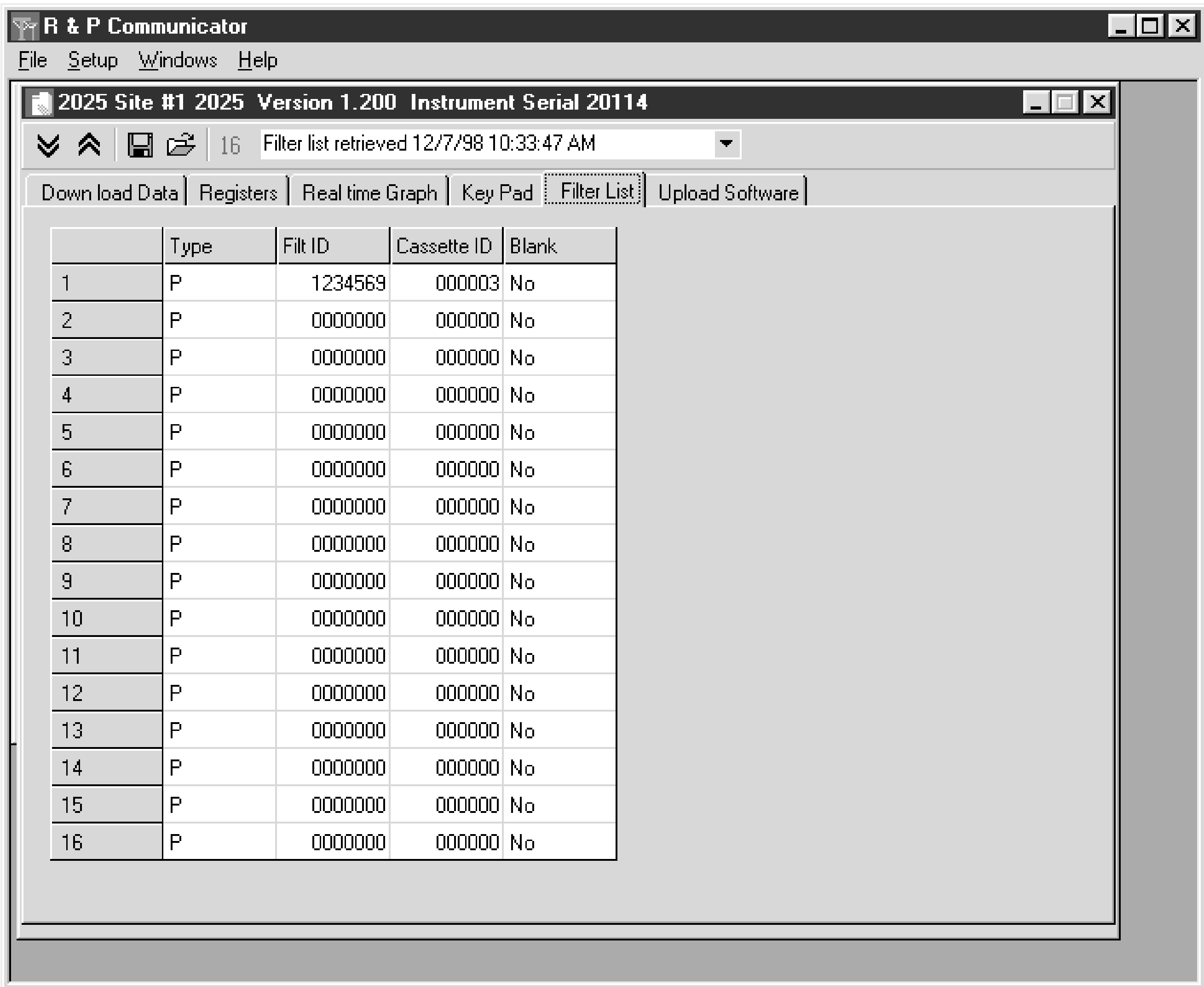


Figure K-16. Filter List screen.



	Type	Filt ID	Cassette ID	Blank
1	P	1234569	000003	No
2	P	0000000	000000	No
3	P	0000000	000000	No
4	P	0000000	000000	No
5	P	0000000	000000	No
6	P	0000000	000000	No
7	P	0000000	000000	No
8	P	0000000	000000	No
9	P	0000000	000000	No
10	P	0000000	000000	No
11	P	0000000	000000	No
12	P	0000000	000000	No
13	P	0000000	000000	No
14	P	0000000	000000	No
15	P	0000000	000000	No
16	P	0000000	000000	No

Figure K-17. Control buttons on the Filter List screen.

Retrieves the filter list currently loaded in the unit.

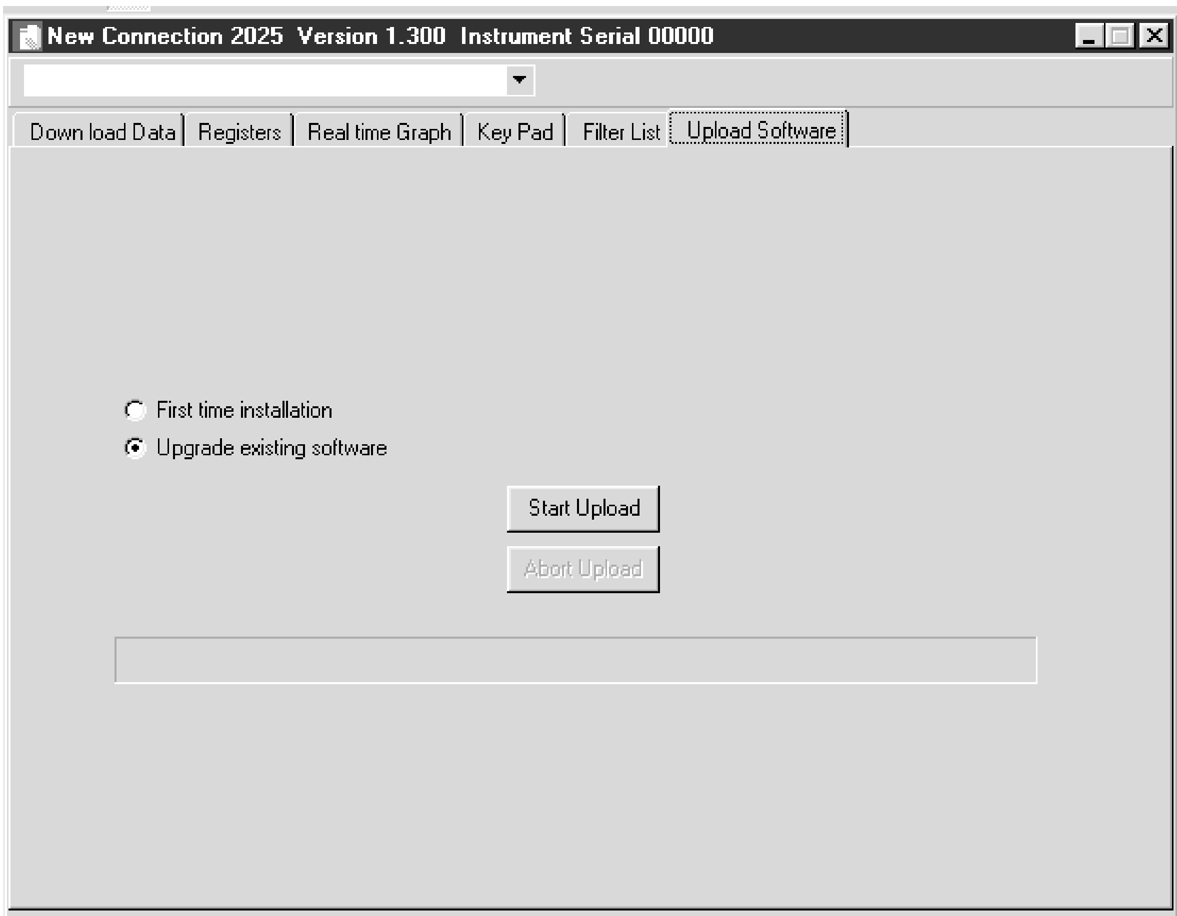
Sends the filter list to the unit.

Saves the filter list to a file.

Opens a filter list previously saved to a file.

Displays the maximum filter capacity of the unit (16 or 32). Standard Partisol-Plus Model 2025 Sequential Air Samplers have a 16-filter capacity (one filter exchanger) while the Dicot Series 2025 Monitors have a 32-filter capacity (two filter exchangers).

Figure K-18. Upload Software screen.



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