SPC-2
Single Point Controller

Operation Manual

1 INTRODUCTION

1.1 Overview

Thank you for purchasing the SPC-2 (Single Point Controller-2) monitoring system. The SPC-2 is the interface method between a computer and the PPM Technology range of hand-held instruments that enables the discrete-time monitoring of hazardous formaldehyde. Monitoring software used together with its related hardware enables the SPC-2 to allow a number of PPM Technology hand-held instruments to be automated when connected to either the COM or USB ports of your PC. Through using the SPC-2 programme it will be possible to list the available hand held instruments; schedule the monitoring; collect and archive data; show graphical representation of the data collected; set alarm threshold levels; and generate graphs or reports from the stored data.

Figure 1.1.1 – Picture of the Single Point Monitor SPC-2 with one unit connected to a laptop.

2 GETTING STARTED

2.1 Software Installation

Please place the CD into the CD-ROM drive and the software will automatically run the installation program. Clicking on to the "SPC-2 for Windows XP / 2000" button to launch the installation wizard. Using the installation wizard, complete the installation by following the instructions onscreen.

If the auto run function on your computer is disabled, you can install the software as follows:

1. From the Start Menu, Select Run.
2. Type D:\INSTALL.EXE (where D: is you CD-ROM drive).
3. Click on to the "SPC-2 for Windows XP / 2000".
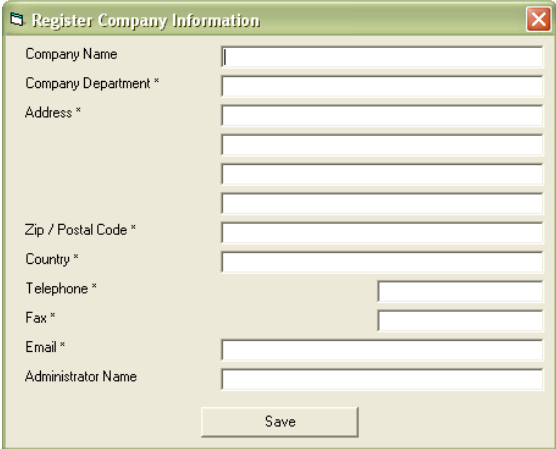4. Follow the instructions on screen.

Your software is now installed. To run the software, from the Start menu, select Programs, PPM Technology and PPMonitor SPC-2 (if default settings were used). Before running, the system will ask for a software activation key. Visiting **http://www.ppm-technology.com/register.shtml** can generate your activation key.

2.2 Running the Software

When running the software for the first time, please complete the *Company Information* details. This information can be used and displayed on various Reports. Information must be entered in the fields without a star in order to progress to the Main Screen.

Figure 2.2.1 – Screenshot of the initial Register Company Information screen.

2.3 Hardware Installation

Connect instrument(s) to PC via the SPC-2 box either using Serial or USB. For USB please use supplied USB to Serial adaptor, device drivers and USB cable. For installation instructions for the USB to Serial adaptor see the included device documentation. **Please ensure that the battery has been removed from each instrument before connecting power to the SPC-2 board.**

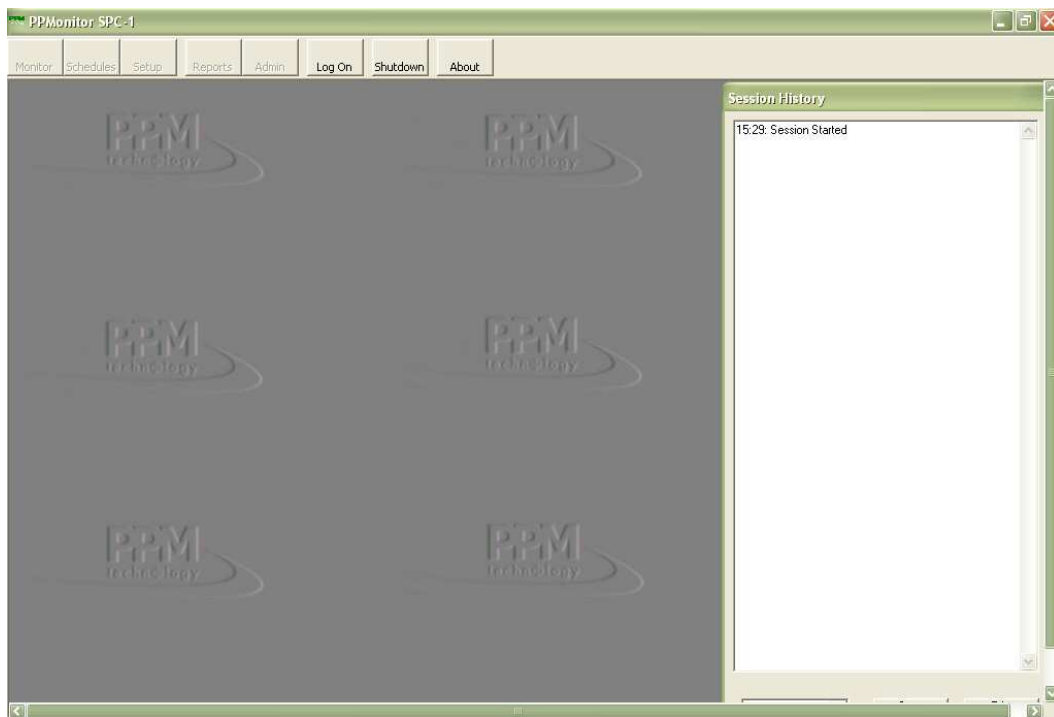**Figure 2.3.1 – A line drawing of the SPC-2 box.**
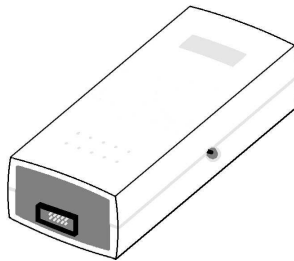
3 Program Screens

3.1 Main Screen

Once the *Company Information* has been entered and saved, the main screen form will be displayed where all functions can be performed and accessed.

Figure 3.1.1 – Screenshot of the main screen.

The main screen of the SPC-2 Single Point monitoring software has eight buttons, which are:

- *Log On / Log Off*
- *Monitor*
- *Schedules*
- *Setup*
- *Reports*
- *Admin*
- *Shutdown*
- *About*

When a button is pressed then the related screen appears. These screens will now be explained:

3.2 Log On / Log Off

The system is password protected and in order to start monitoring or accessing the data, you need to *Log On*.

The program is supplied with two users already created. These are `Administrator` (password: `letmein`) and `Guest` (password: `password`). Access to all areas of the program is given to the Administrator, while the Guest only has access to the monitoring and reports sections of the program. The Administrator, who can edit user privileges and passwords, can also create more users.

Figure 3.2.1 – Screenshot of the Login screen.
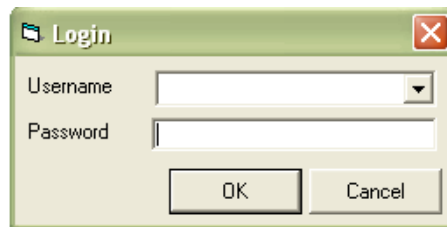
Once *Log On* is successful the button name changes to *Log Off* which can be used to end the users session on the program. The availability of some features will depend on your privileges – if you do not have access then the button will be grayed out.

Figure 3.2.2 - A screenshot of the main screen of the SPC-2 Single Point monitoring software when logged on as Administrators.
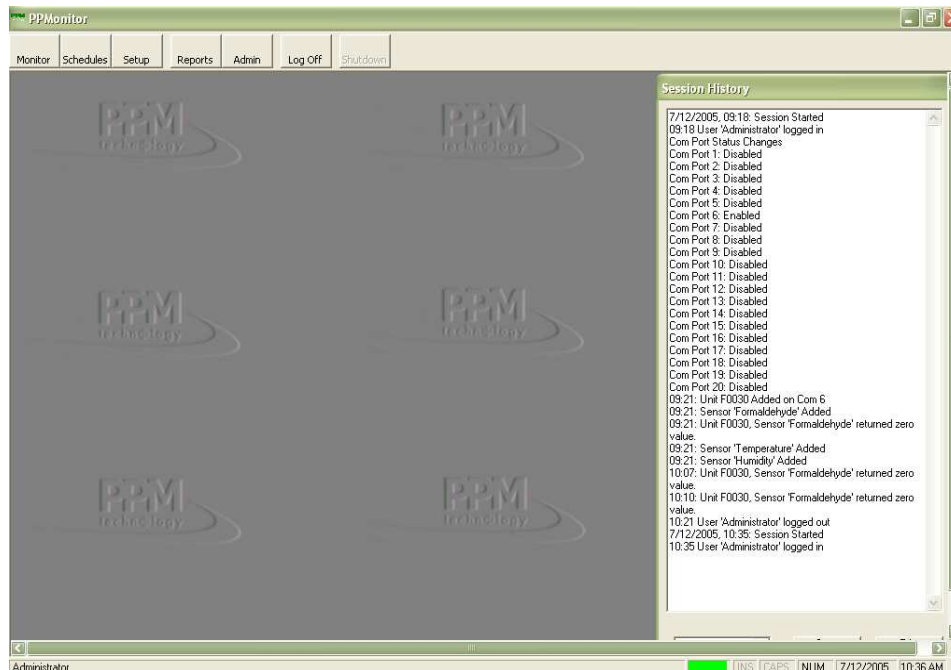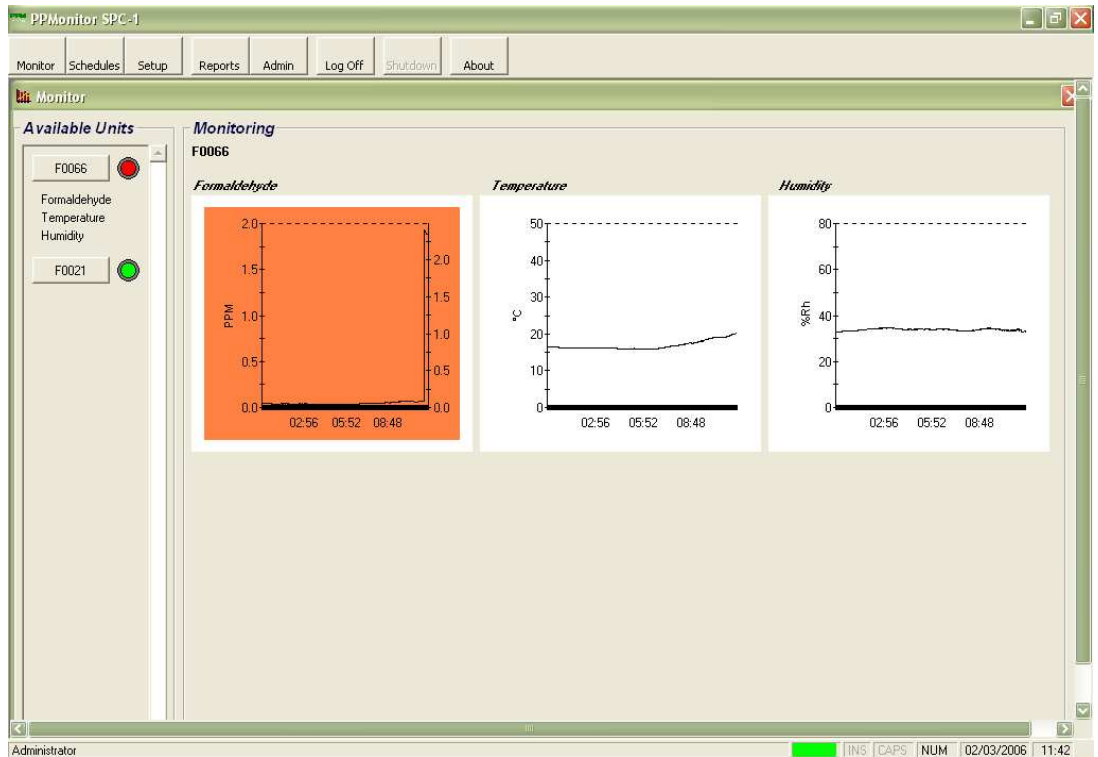
3.3 Monitoring Screen

By clicking the *Monitor* button, a list of available instruments (units) is shown. This list is common to several screens and will change automatically when units are connected and disconnected. An indicator is situated next to every unit on the list. The indicator shows the status of each unit. The table below explains these:

Table 3.3.1 – Table of indicator status colour descriptions.

| Status Colour	Description
Red	Faulty / Missing
Flashing Red	Alarm
Amber	Idle
Amber (Italic name)	Unit disabled
Green	Sampling

If a schedule is active then by selecting a particular unit, a graphical representation of results from each of the sensors within that unit is shown, for example when monitoring using a Formaldemeter *htV* the display will show graphical representation of Formaldehyde, Temperature and Humidity. Formaldehyde is shown in ppm and mg/m³.   A unit is selected by clicking on an unit button, for instance Figure 3.3.1 is the result of clicking on the *F0066* unit button.

Figure 3.3.1 – A screenshot of the Monitor Screen.

3.3 Monitoring Screen

Figure 3.3.2 – A screenshot of the enlarged graph in the monitor screen.
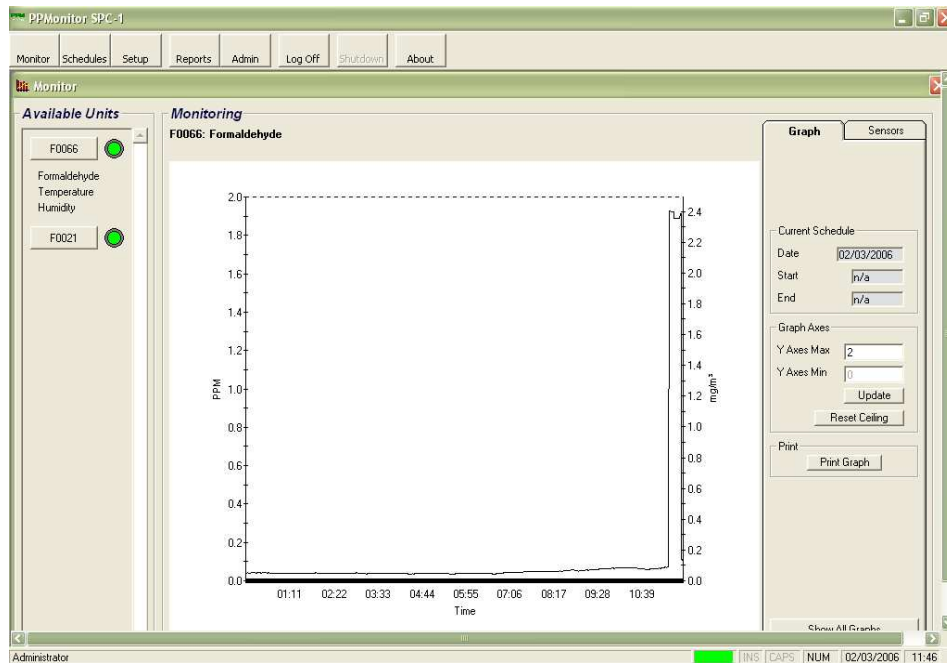
By clicking on one of the small graphs in the monitor screen you are able to view a zoomed version of this graph. In Figure 3.3.2, the information at the right hand side of the graph shows:

Current Schedule: The schedule start and end times are displayed when scheduling is activated. If schedule override is being used, then "n/a" is displayed in these boxes.

Current Axes Settings: These settings allow the user to adjust the values in the y-axes. By entering different values and pressing the Update button, the graph will resize to the entered values. To return to the default size, press the Reset Ceiling button. The values shown in these boxes are for the primary y-axis. That is "ppm" in this case.

Graph Printing facility: This button allows you to print out the current graph with some of the statistics shown under the *Sensors* tab. The current graph will be printed by the default printer and if no default printer is found then this button will be disabled.

Show all graphs: This button returns to the screen where the three smaller graphs are shown for the unit.

3.3 Monitoring Screen

Figure 3.3.3 – A screenshot of the enlarged graph in the monitor screen, sensors section.
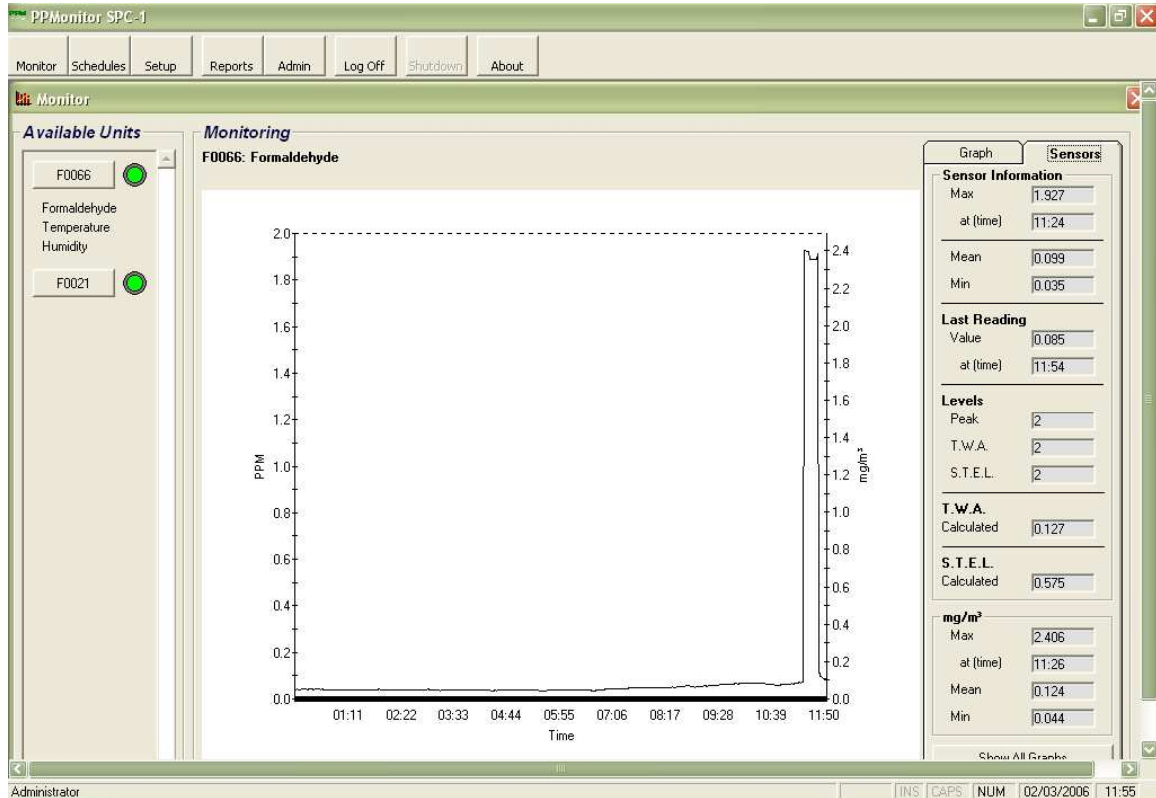
By changing to the *Sensors* tab on the top right hand corner of the *Monitor* screen more information about the readings is shown, these include:

Maximum, Minimum and Mean - When a graph is displayed, the highest, lowest and mean values are displayed here. Also shown is the recorded time when the maximum reading was last taken. The values shown in these boxes are for the primary y-axis. That is ppm in this case.

Last Readings - These are the last readings collected by the software. The values shown in these boxes are for the primary y-axis. That is ppm in this case.

Peak, T.W.A. and S.T.E.L. default values - These are alarm levels set for the sensors. Changes to these alarm levels can be made using the *Setup* screen. The values shown in these boxes are for the primary y-axis. That is ppm in this case.

3.3 Monitoring Screen

Calculated T.W.A. and S.T.E.L. values - These are the calculated values for Time Waited Average and Short Term Exposure Level based on the current and previous readings. The values shown in these boxes are for the primary y-axis. That is ppm in this case. T.W.A and S.T.E.L are industry standard measurements for prolonged exposure to environmental conditions.
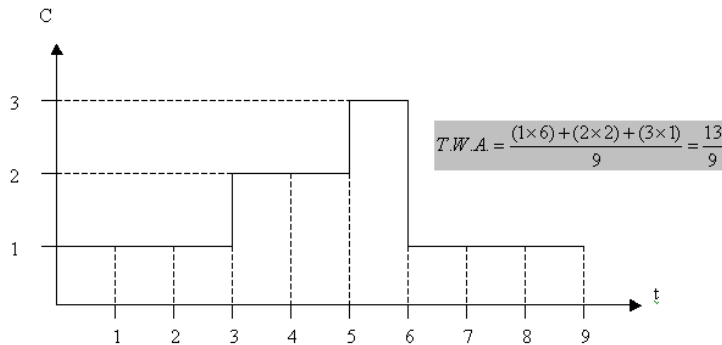
The T.W.A. is used when both the chemical concentration and exposure time varies. It is usually calculated over 8 hours, which is the standard daily work shift.

Equation 3.3.1 – Equation for T.W.A.

$$TWA = \frac{\sum_{i=0}^{n}(C_i \times t_i)}{\sum_{i=0}^{n} t_i}$$
 Where C = Concentration
t = Duration at level 'C'
n = Session length

Figure 3.3.4 – Example of a simple T.W.A. calculation.

$$T.W.A = \frac{(1 \times 6) + (2 \times 2) + (3 \times 1)}{9} = \frac{13}{9}$$

S.T.E.L. is usually the average concentration for the last 15-minutes.

mg/m³ values - These readings are currently only shown against the Formaldehyde graph. The mg/m³ calculation is based upon the temperature when the reading was taken. Because of this the mg/m³ axis is only relevant for the last reading.

Show all graphs: This button returns to the screen where the three smaller graphs are shown for the unit.

3.4 Schedules Screen

The *Schedules* Screen allows the user to allocate schedules to individual units.

Figure 3.4.1 – A screenshot of the Schedule Screen.
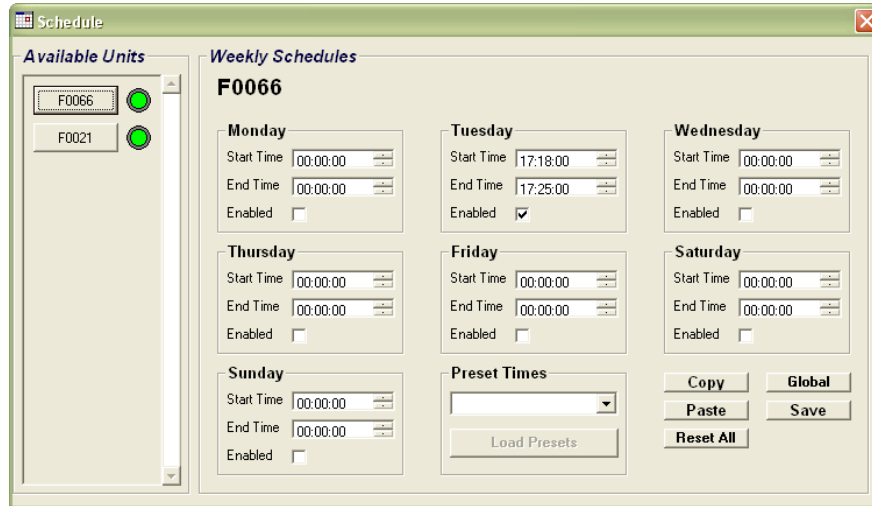
A *Schedule* can be set any time during a 24-hour period for each day of the week. In order to create a schedule for a given unit, select the unit using the unit buttons on the screen, and select the days you wish the unit to be active by ticking the *Enabled* checkbox for each day. *Start Time* and *End Time* can be entered manually or by using the *Preset Times* dropdown list at the bottom of the screen.

New *Preset Times* can be created in the *Admin* screen described later in the manual. Once the *Start Time* and *End Time* have been enter for the *Enabled* days, press the *Save* button. These schedules are now bound to the particular unit. To load the same settings for all other units, click on the *Global* button. There is no need to press *Save* with the *Global* button, after pressing the *Global* button all available units should have an active schedule. The schedules for one unit can be copied using the *Copy* button and reused on another individual unit using the *Paste* button. You will need to *Enable* and *Save* the schedule when using the *Copy* and *Paste* function.

Schedule Override function: This allows the system to monitor 24 hours a day without the need to set up existing schedules for each unit. This function can be found in the Admin Screen. If the system is sampling without any enabled schedules then the administrator has enabled the *Schedule Override* function. The *Schedule Override* function also takes over from any schedules that are in place.

3.5 Setup Screen

The *Setup* screen consists of two tabs: *Unit* and *Sensors*. The *Unit* tab is for general setup options whilst the *Sensors* tab contains sensor specific options.

The *Unit* section allows the names of the units to be changed from the serial number of the unit and to generate a *Unit Diagnostic Report*, which gathers information about the unit and prints the results to your default printer. Units can also be enabled or disabled using the *Enabled* tick-box. All changes need to be saved for them to be affective, this is done by pressing the *Save* button.

If the *Unit Diagnostic Report* is grayed out, it is because there is an active schedule on the system. In-order to create a *Unit Diagnostic Report*, all schedules for all units need to be disabled. The *Unit Diagnostic Report* prints one A4 page to your default printer that can be faxed to PPM Technology if you are encountering any problems (Fax: 44 (0) 1286 671 811). If there is no default printer connected to your PC then the *Unit Diagnostic Report* will always be greyed out. If problems occur whilst printing then an error message will be displayed.

**Figure 3.5.1 – A screenshot of the Setup Screen.**
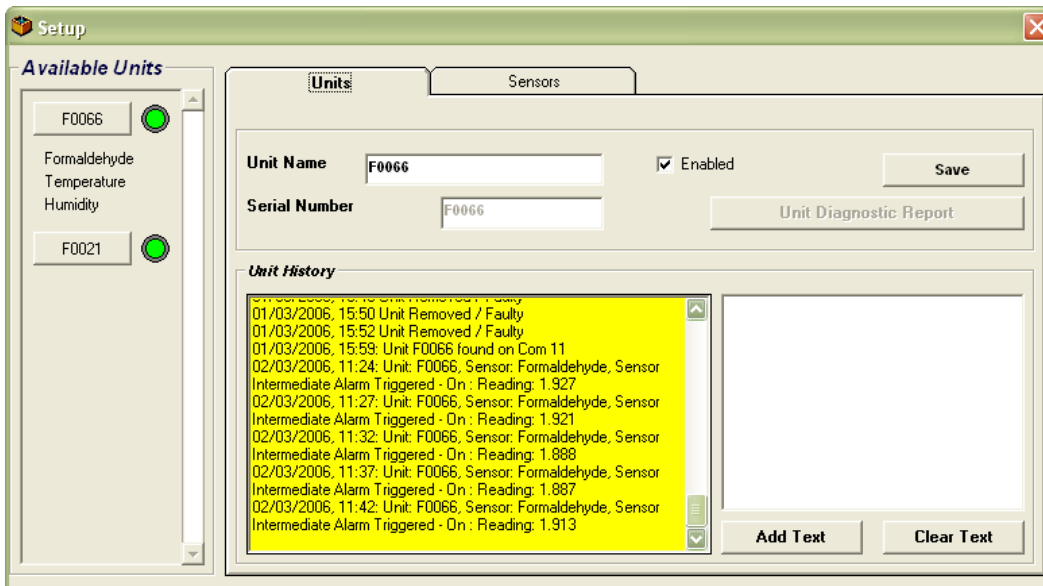
The *Unit History* automatically gathers information from the program including unit failures, alarm status and firmware changes. Text can be entered into the right hand box and entered into the unit History by clicking on the *Add Text* button; this allows the user to bind free text to a selected unit. Clicking the *Clear Text* button gets rid of all typed text in the right hand box.

3.5 Setup Screen

Clicking on a Sensor name allows us to view and edit the values for that sensor. The *Sensor* section allows the names of individual sensor to be changed from their defaults. The sensor can also be disabled from this screen by using the *Disable this sensor* checkbox. Sensor Ceiling, Intermediate, T.W.A. and S.T.E.L. threshold levels can also be altered from their default values and changed dependant upon your requirements. All changes need to be saved for them to be affective, this is done by pressing the *Save* button.

The *Sensor History* automatically gathers information from the program including alarm status. Text can be entered into the right hand box and entered into the *Sensor History* by clicking on the *Add Text* button; this allows the user to bind free text to a selected unit. Clicking the *Clear Text* button gets rid of all typed text in the right hand box.

Figure 3.5.2 – A screenshot of the Setup Screen, sensors section.
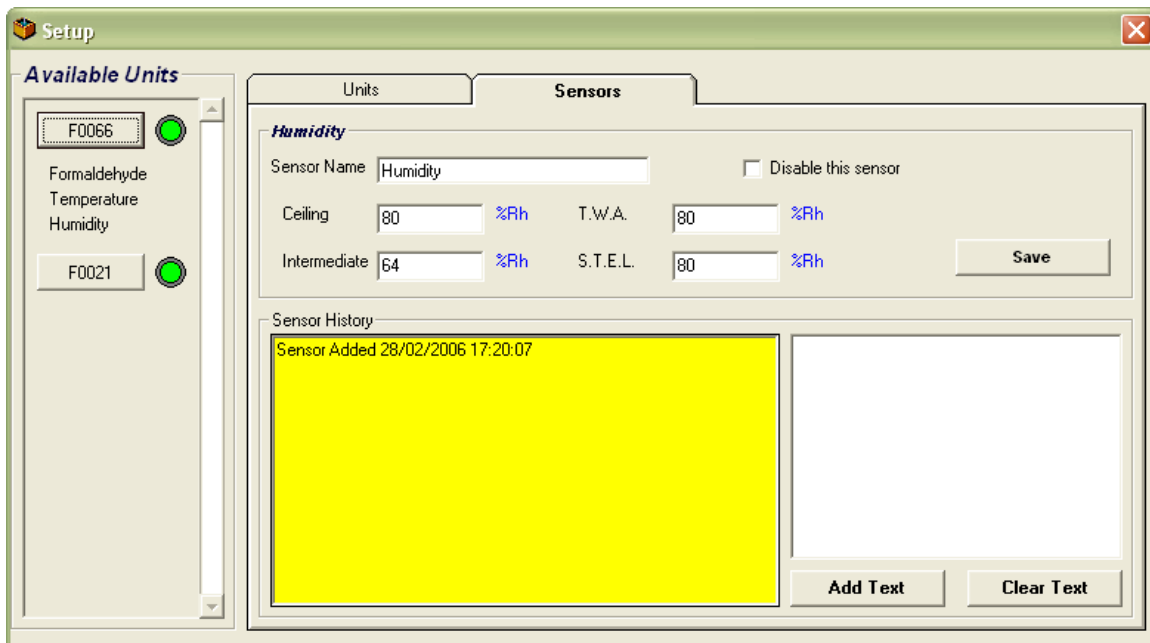
3.6 Reports Screen

The *Reports* Screen is used to generate *Reports* in printed or Coma Separated Variable (.csv) format. The type of reports is selected in the Output section. The information shown in the reports can be filtered by units or by schedules. For each Unit all sensors are selected.

Figure 3.6.1 – A screenshot of the Reports Screen.

A further level of filtering is used for the Date and Time sections. *Company Information* is included on all the reports generated. If *Start Date* is set to 01/03/2008, *End Date* is set to 03/03/2008, *Start Time* is set to 9:00 and *End Time* is set to 17:00 then the system does not create a report from 01/03/2008 9:00 to 03/03/2008 17:00. The system will produce a report that runs from 9:00 to 17:00 on the 1st, 2nd or 3rd of March 2008.

When the dates, times, units and type of report have been selected, clicking the *Generate Report* button generates the *Report*. Selecting "*File.csv*" output causes a "Save As" dialogue to appear but sending output to the *Printer (Graphs)* will send the report directly to the default system printer. If there is no default printer connected to your PC then the *Printer (Graphs)* will always be greyed out. If problems occur whilst printing then an error message will be displayed.

3.7 System Admin Screen

The *System Admin* Screen allows the Administrator to control the internal sections of the program. The *System Admin* is split up into 4 sections:

Users/Groups: Groups are used to categorise users. By default these are administrators, users and guests. Administrators have access to everything; Guest can only access monitoring and reports. New groups can be created and existing groups can be changed to suit the needs of the company. Use the tick-boxes to change the access permissions for each user. All changes need to be saved for them to be affective, this is done by pressing the *Save* button.

Figure 3.7.1 – A screenshot of the System Admin Screen.

Selecting a group will list the users in that group. Users can be added, edited and deleted at any time however the default groups and users cannot be deleted. When creating a new user, they are assigned to the selected group and this sets their access to the system. *User Timeout* further restricts access to the system by setting a maximum time a user is allowed on the system. After this time the system will logout the user automatically. The language of the program can also be selected using the *Language* section.

3.7 System Admin Screen

Preset Times: When scheduling units, the ability to select existing preset times can save a great deal of set up time. Any preset times created here will appear in the schedule screen.

**Figure 3.7.2 – A screenshot of the Admin Screen, preset times section.**
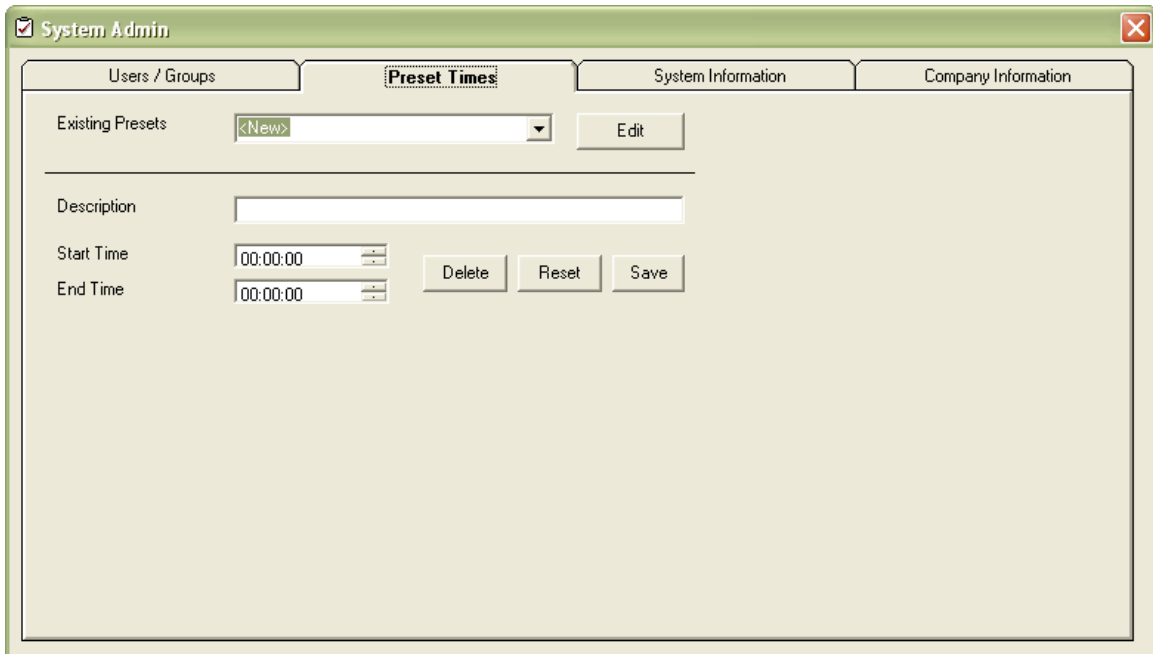
3.7 Admin Screen

System Information: The *Default Language* section takes advantage of the multilingual functionality of the program. The user can create and download new languages that can be used in this section. As well as individual language settings for each user, the *Default Language* setting is the common language used before logging in takes place.

Figure 3.7.3 – A screenshot of the Admin Screen, system information section.
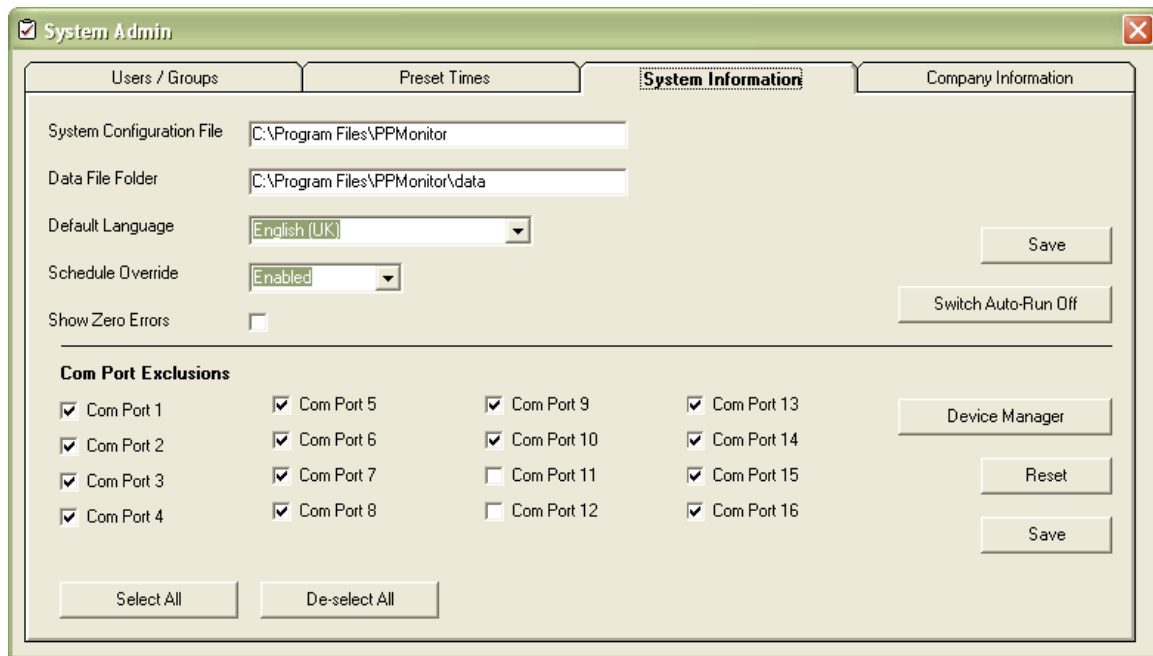
The *Schedule Override* function allows the system to monitor 24 hours a day without the need to set up existing schedules for each unit. If the *Show Zero Errors* checkbox is enabled then a report will be generated when a zero value of Formaldehyde is detected. All changes need to be saved for them to be affective, this is done by pressing the *Save* button.

The *Switch Auto-Run [On/Off]* will run the software automatically each time the Operating System is started (when it is in the On state), preventing the accidental loss of information by forgetting to start the software manually. Use the *Switch Auto-Run [On/Off]* button to toggle the state of the Auto-Run function.

Com Port Exclusions let you control which ports are scanned each minute for units and thus can improve performance. Use the *Device Manager* to check which Comm Ports are on your systems (in this case COM11 and COM12). Only enable ports that have SPC-2 devices connected to them.

3.7 Admin Screen

Company Information: This section allows the user to make amendments to the company information should it become necessary. The Company Information is used within the reports section. The Fields that are indicated with a star are required and the *Company Information* will not *Save* without values in these fields. All changes need to be saved to be affective, this is done by pressing the *Save* button.

Figure 3.7.4 – A screenshot of the Admin Screen, company information section.

3.8 Shutdown

When a user is Logged In then the *Shutdown* button is disabled. The *Shutdown* closes the program and ends the monitoring and archiving of data. In-order to *Shutdown* the system the user needs to *Log Off* and then click the *Shutdown* button. This will bring up a message that asks if we are sure we want to exit the program, press *Yes* in order to leave. The cross in the top right hand of the main screen that usually allows the user to close the program is disabled so that the program cannot mistakenly be closed.

3.9 About Screen

The PPMonitor SPC-2 program version number and release date is given in the *About PPMonitor SPC-2* screen. Contact information for PPM Technology if any problems occur and quote these details. If possible include your registration details too.

Figure 3.9.1 – A screenshot of the About PPMonitor SPC-2 Screen.

4 System Operation

4.1 Introduction

In this section we will give examples of how the program can be used. To find all available units *Log In* as Administrator, go to *Admin* and select *System Information*. Let us assume for the purpose of our example that we have two units F0066 and F0021 connected to our system.

Figure 4.1.1 – Screenshot of the System Admin, System Information screen.
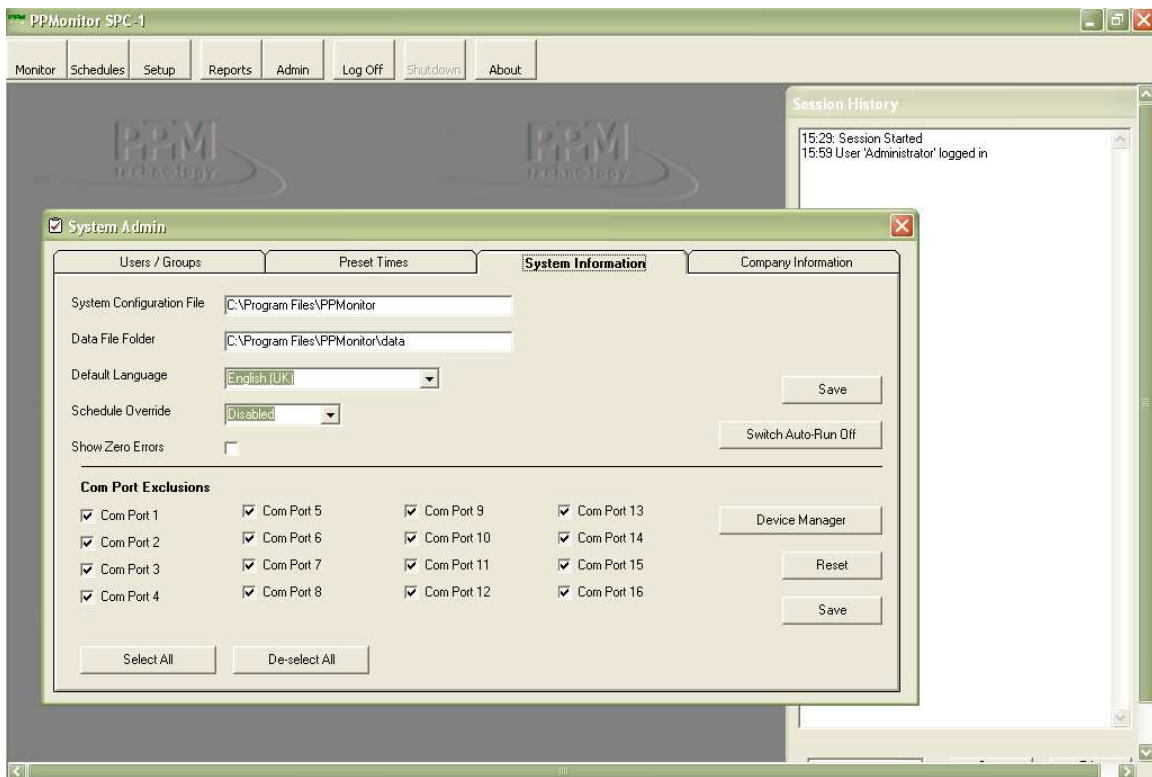
Click on *Device Manager* and look at ports to find which Comm. Port(s) the instrument(s) have been connected to. The two devices connected to the system are using the USB to Serial adaptors and are listed in Ports as USB Serial Port (in this case COM11 and COM12). Close the De*vice Manager*, deselect the corresponding ports on the list and press *Save*.

4.1 Introduction

Figure 4.2.2 – Screenshot of the System Admin, System Information screen and Device Manager.
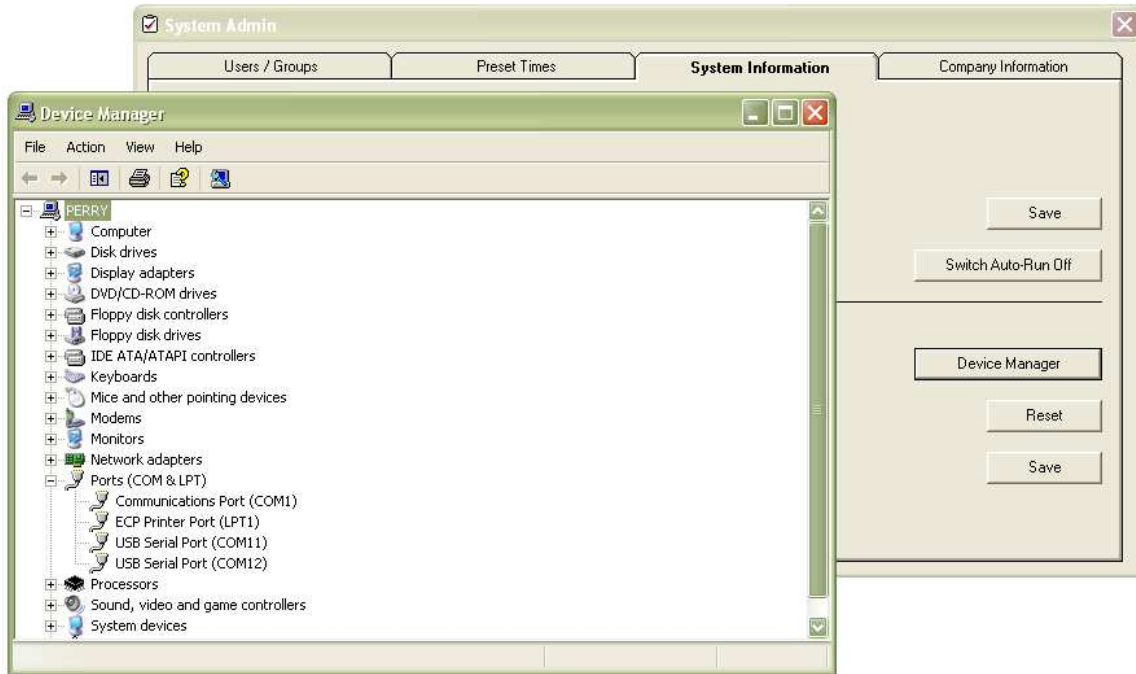
Once the *Save* button is pressed the `Com Port Status Changes` report should appear in the Session History of the Main Screen. After this the units that are on the un-excluded ports should be found on the next port sweep. If we now look on the *Monitor* screen the two units should be listed. However the schedule for these two units has not set up and therefore no readings are taken from the units and no graphs can be displayed for these two units.

4.2 Setting up a Schedule

Figure 4.2.1 – Screenshot of the Monitor screen and Session history once the two units have been found.
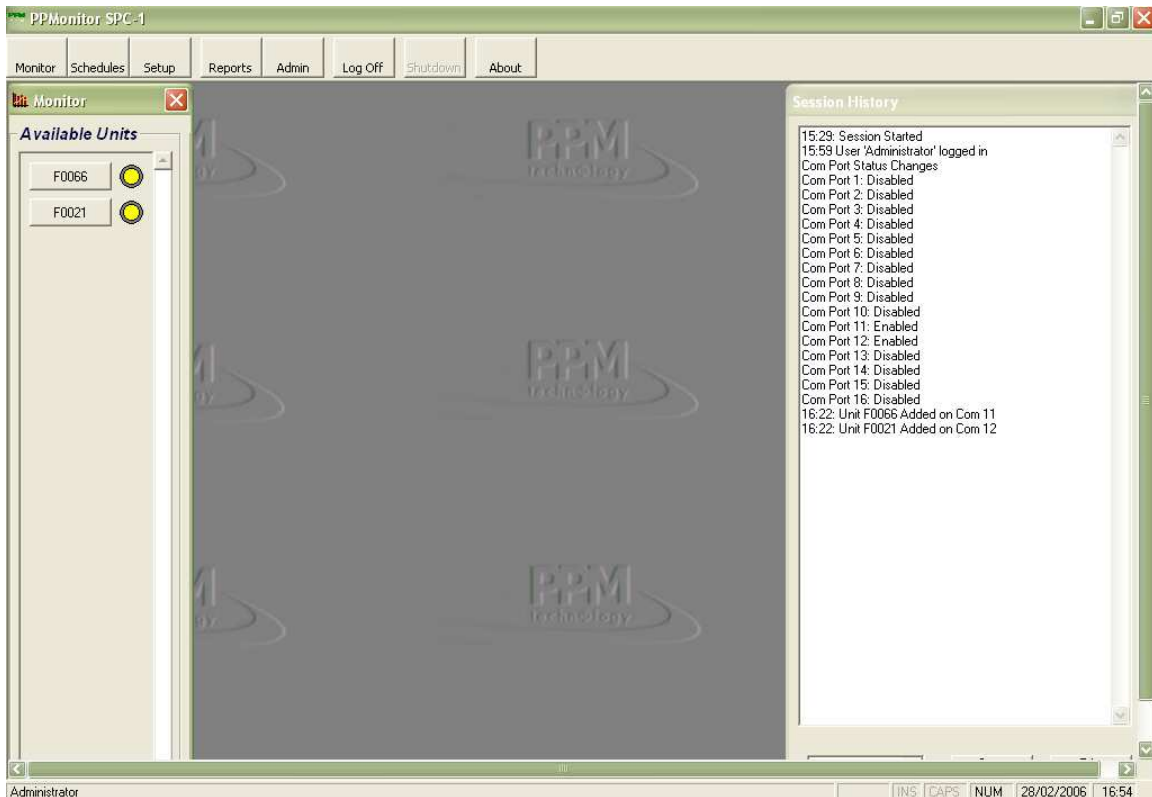
There are two ways to enable a schedule in the program we can either go to *Admin >> System Information* and enable the *Schedule Override* function or click on the *Schedule* button to launch the *Schedule* screen.

In this section we will explain how to set up a schedule using the *Schedule* screen. Using the *Schedule* screen we can set up a schedule for various days of the week. Let us assume that today is a Tuesday, so to start an immediate schedule we need to set up the schedule for that day. In Figure 4.2.2 the time is 17:17, the schedule starts at 17:18 and ends at 17:25. To initialise this schedule the *Enabled* checkbox needs to have a tick in it before we press the *Save* button. Press OK to any messages that may be displayed. Pressing the *Save* button only activates the schedule for Unit F0066. However if we press the *Global* button the schedule will be enabled for both F0066 and F0021.

4.2 Setting up a Schedule

Figure 4.2.2 – Screenshot of the Schedule Screen with a schedule set up for both units between 17:18 and 17:25 once the Global button has been pressed.
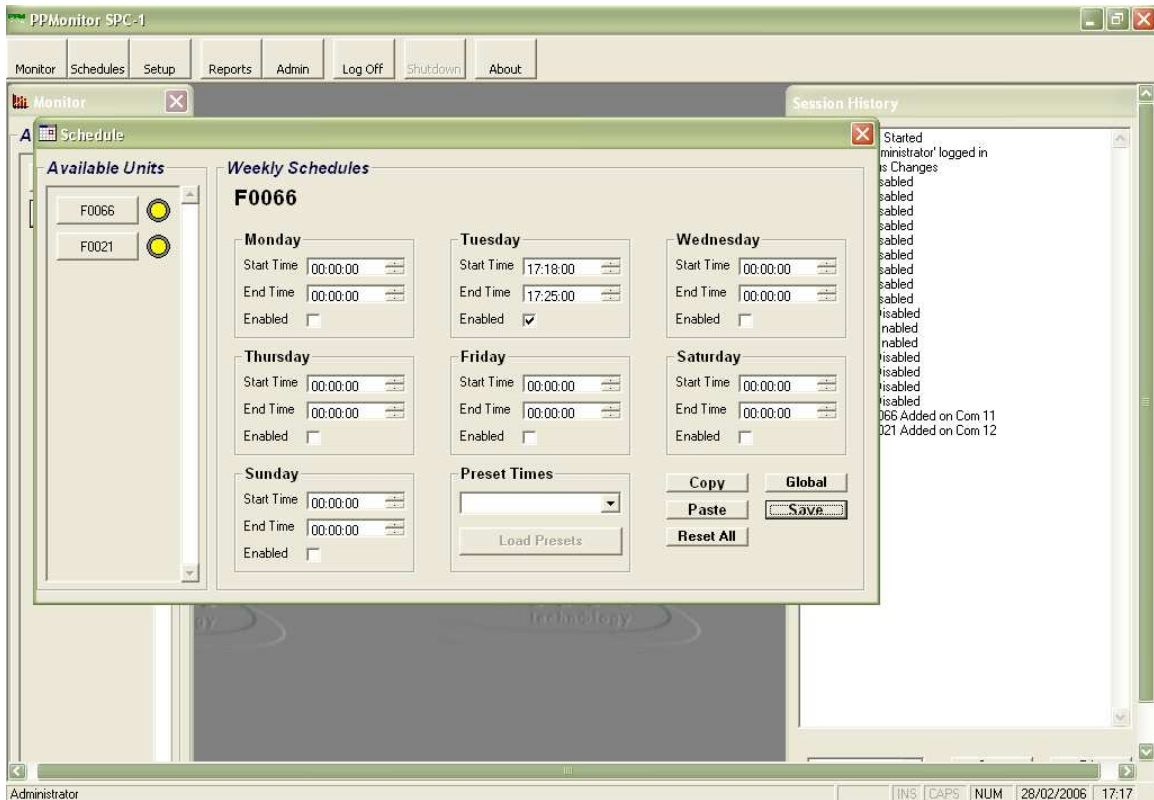
The system will now start sampling at 17:18 with the sensors for each unit being found. Data from each unit will be stored by the system and the values will be displayed on the monitor graphs and the sensor information. Once the schedule has ended the graphs will close and a schedule end report for the two units will be displayed in the *Session History*.

4.2 Setting up a Schedule

Figure 4.2.3 – Screenshot of the Monitor screen with the three small graphs displayed.
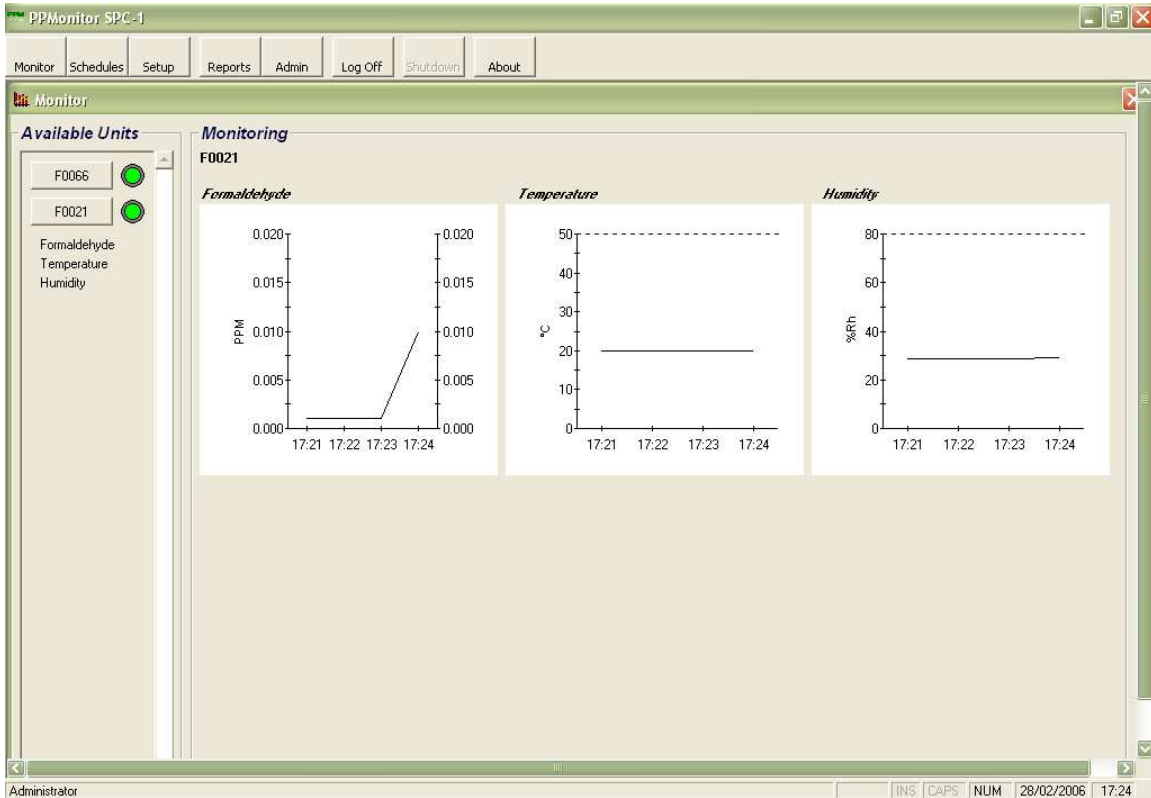
When the schedule is running the graphs of the measured and archived data can be viewed by clicking on an unit button. With a Formaldemeter 400 only a graph for formaldehyde with ppm values is displayed, but when using a Formaldemeter *htV* the display will show graphical representation of formaldehyde (in mg/m³ as well as ppm), Temperature (in °C) and Humidity (in %Rh).

4.2 Setting up a Schedule

Figure 4.2.4 – Screenshot of the Session history once the schedule is finished.
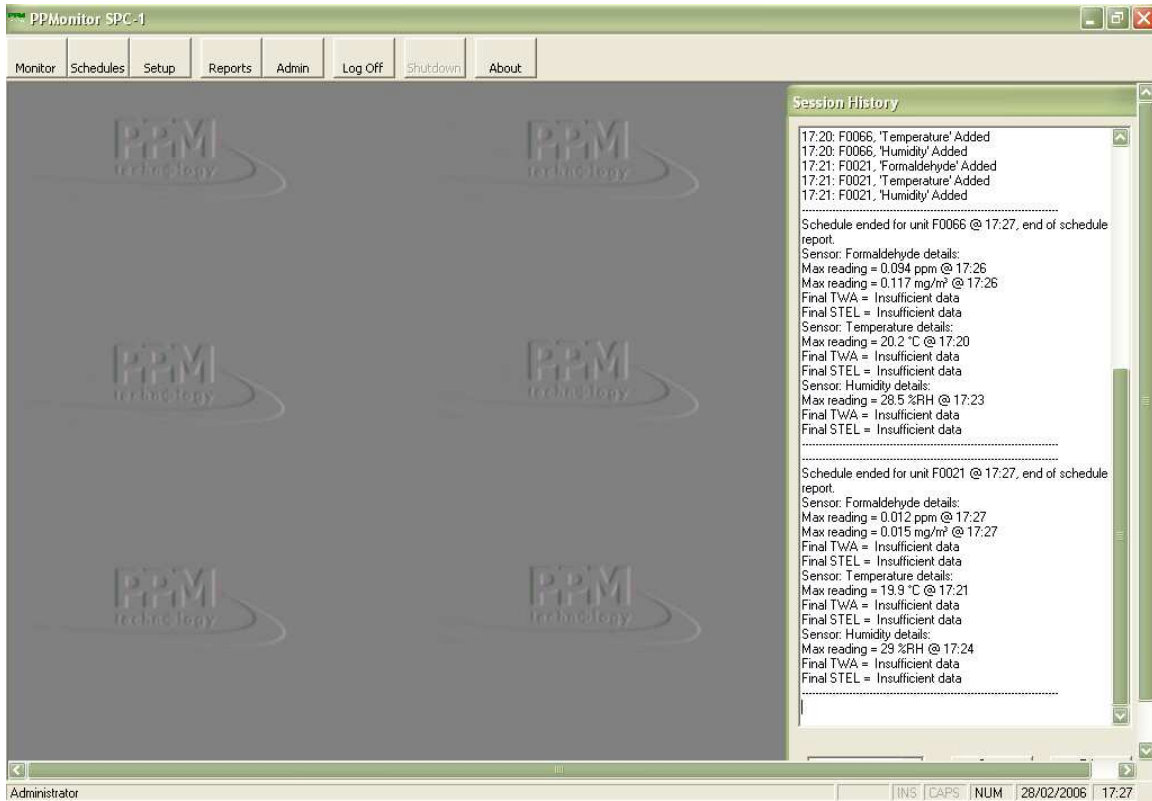
Once the Schedule is finished the data collected can be viewed using the Monitor screen and pressing a Unit Button. Doing this should bring up a screen asking if we want to view the past data [see Figure 4.2.3]. Pressing the *Yes* button will then re-open the graphs for this unit.

4.2 Setting up a Schedule

Figure 4.2.5 – Screenshot of the Monitor screen outside of a schedule as we view previous data for that day.
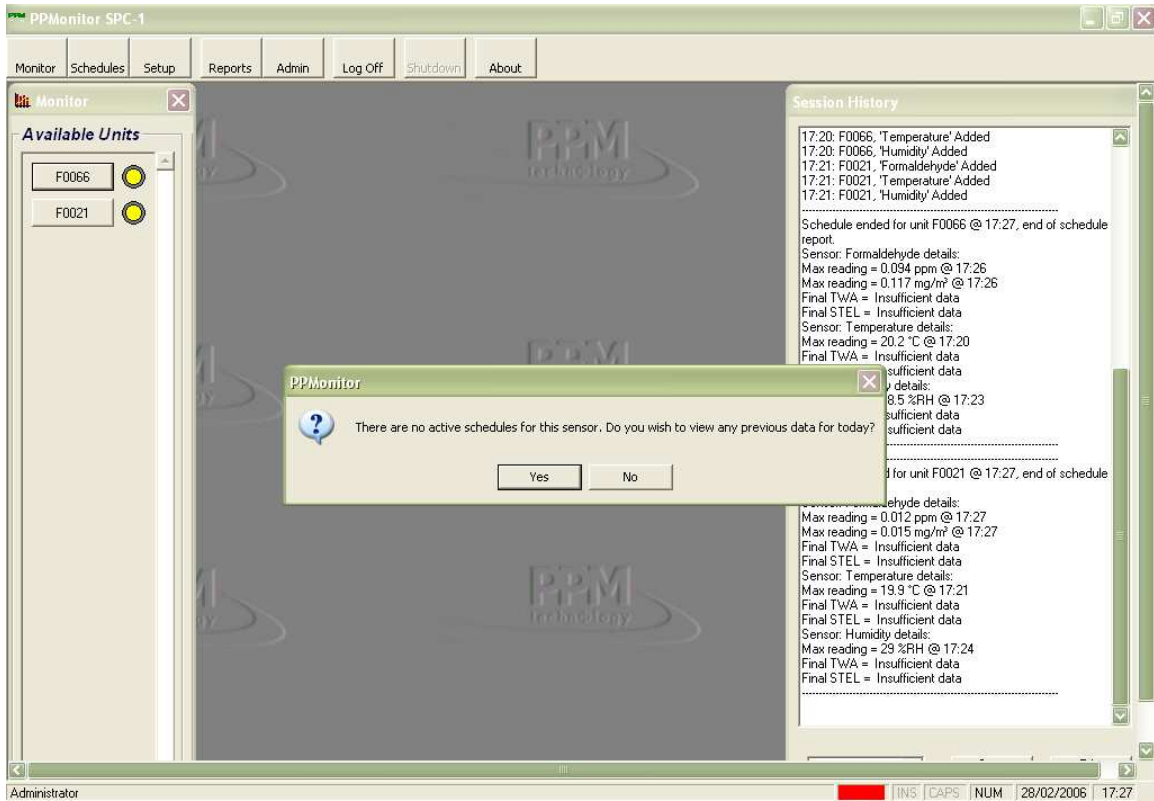
New schedules can be set up in a similar manner so that we can schedule the monitoring of the system on a weekly basis.

4.3 Creating a Report

Reports can be generated using the *Report* screen [See Figure 3.6.1]. The *Reports* screen can generate two types of *Report*, which are: *File.csv and Printer*.

The *Reports* to file can be opened using the Microsoft Excel program. ".csv" files are generated using the regional decimal and list separators. In the report we have the Software Serial Number, Start Date, End Date, Start Time, End Time and the Report Filter Settings. The columns of the report have Unit Name, Date, Time, Formaldehyde (ppm), Formaldehyde (mg/m^3), Temperature (^{o}C) and Humidity (%Rh) values.

Figure 4.3.1 – The report to file as generated and viewed using the Dutch(Netherlands) Regional and Language Options.

4.3 Creating a Report

Reports can also be printed to the default printer. These reports will have graphs for formaldehyde temperature and humidity displayed on one page for every Unit selected.

Figure 4.3.2 – Example of the report generated to the Default Printer showing the graph of Formaldehyde and Temperature and Humidity for unit F0022.
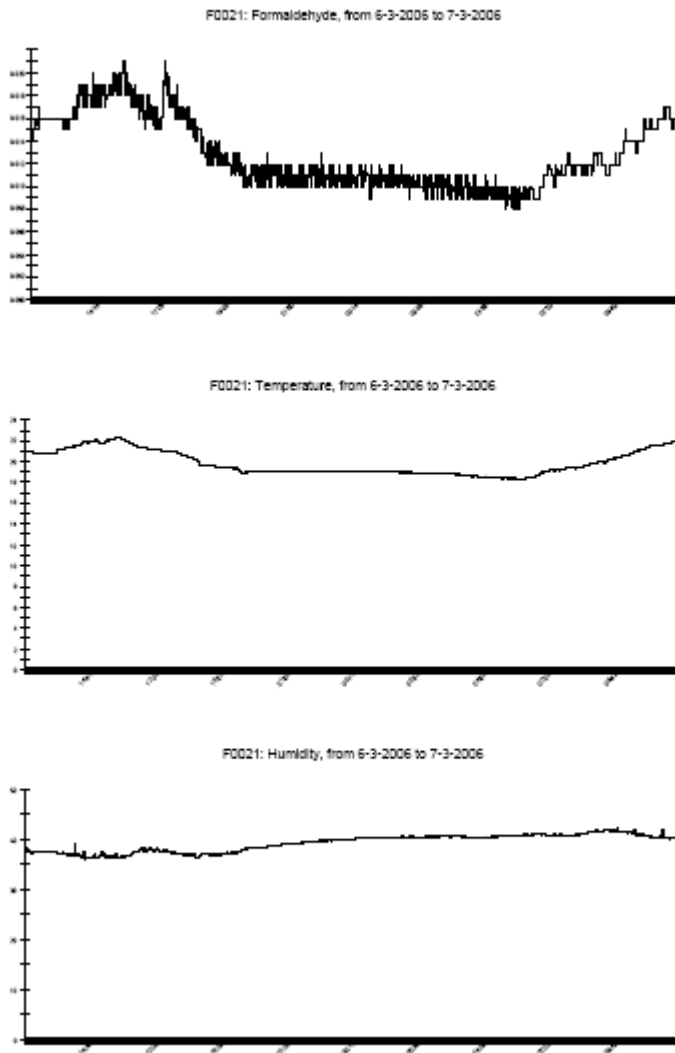
4.4 Changing Units

It is advisable that for each unit that is connected to the SPC-2 software to have a different Com port and a different SPC-2 box. However if this is not possible it is recommended that you follow the procedure bellow to change between units.

Figure 4.4.1 – Unit F0002 connected on Com 11.
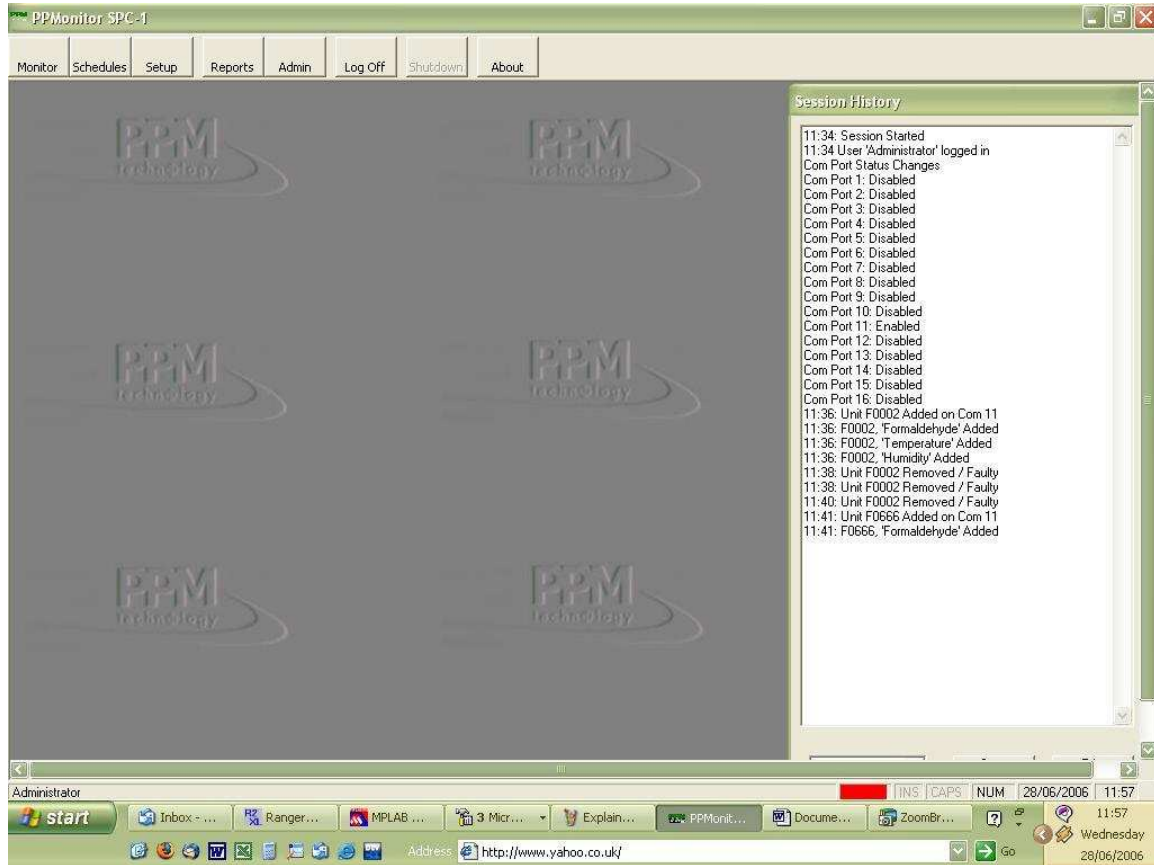
As we see from the Session History, in this particular example Unit F0002 is connected to Com 11. In order to change the instrument connected to this port we firstly need to remove Unit F0002 from the port. Disconnecting the Serial connection from the SPC-2 box does this.

4.4 Changing Units

Figure 4.4.2 – Example of the serial connection removed from the SPC-2 box.

Ensure that the Unit Removed/Faulty message appears before disconnecting the instrument, wait for two and a half minutes before removing the instrument and replacing with a new one. Now connect the new instrument and the black connector, if using the Formaldemeter 400 put into **time mode**.

4.4 Changing Units

Figure 4.4.3 – Unit F0666 found on Com 11.
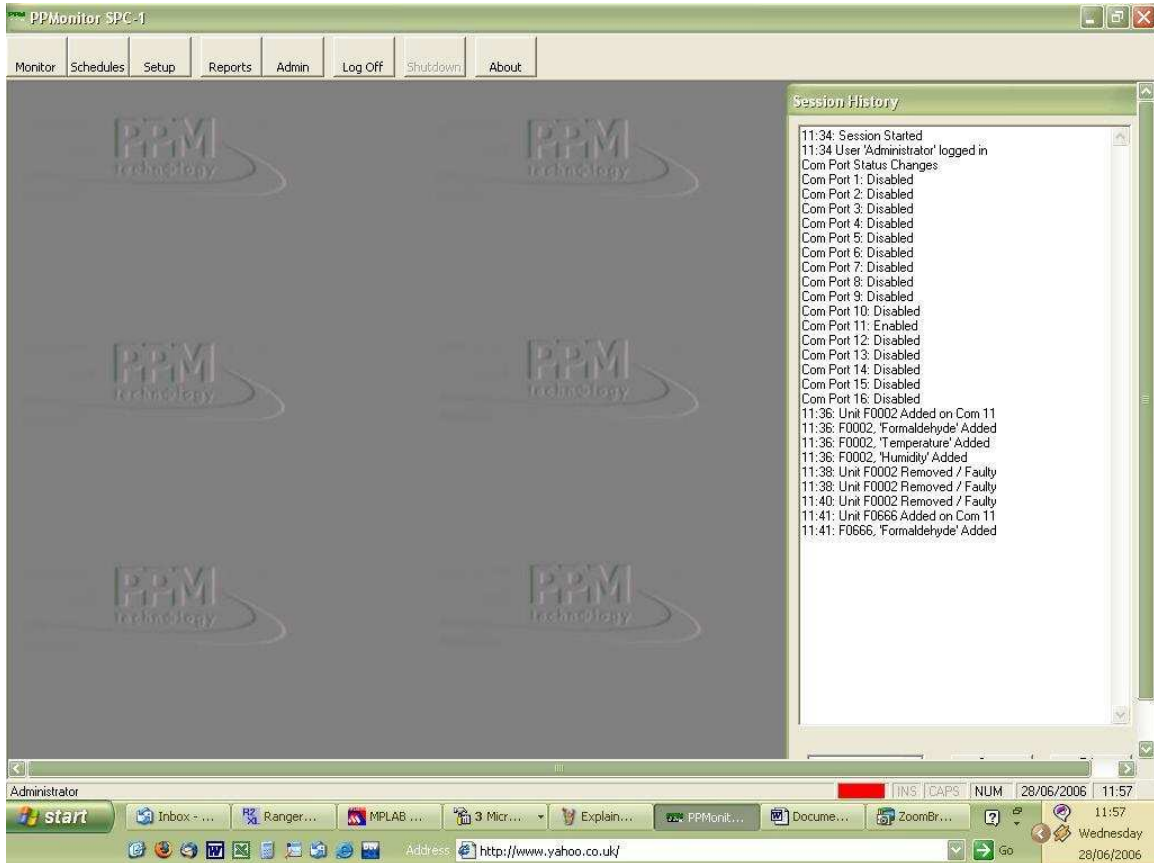
The new unit is now found and the readings will be recoded and stored as before. If you wish to change instruments again, you will need to reapply the procedure above.

4.5 Uninstalling SPC-1 / SPC-2

Ensure that you are not running the PPMonitor SPC-1 / SPC-2 program when you uninstall. Begin by going to the Control Panel of your PC and selecting Add or Remove programs. To uninstall previous versions of PPMonitor SPC-1 (v1.05) you will need to remove both `Microsoft SQL Server Desktop Engine (PPMonitor)` and the `PPMonitor SPC-1` from your machine. For the current PPMonitor SPC-1 (v1.06+) you will only need to remove the `PPMonitor SPC-1` program.

Figure 4.5.1 – Screenshot of the Add or Remove Programs list.
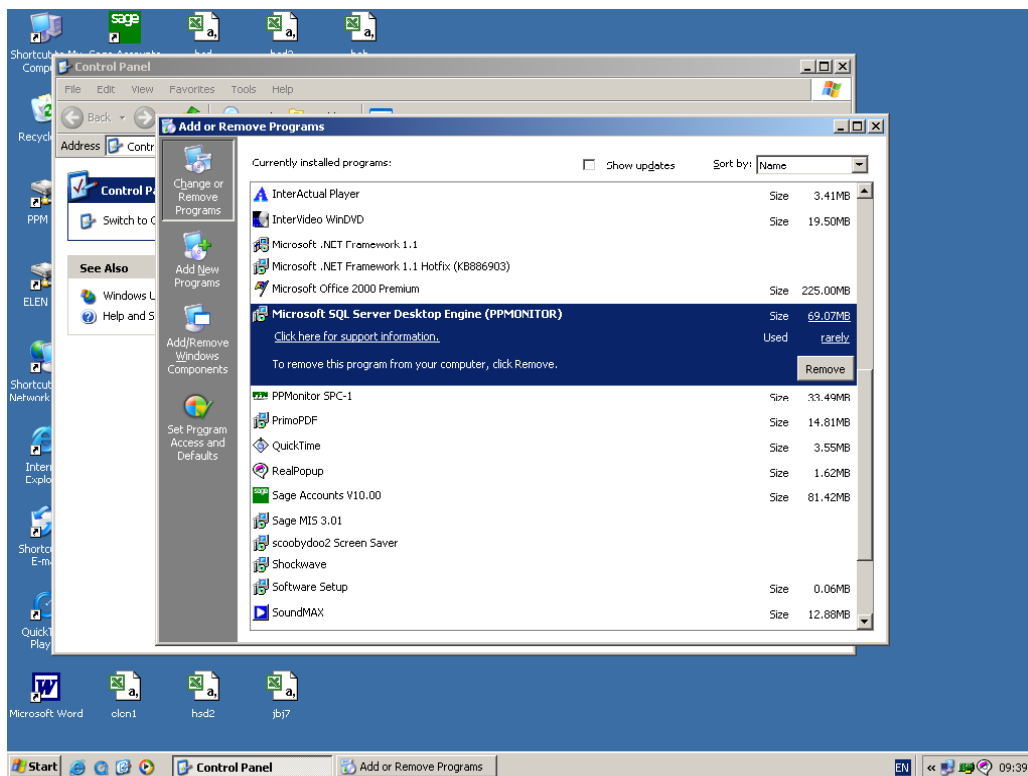

It is recommended that you uninstall the SQL engine first. After this it is safe to remove the `PPMonitor SPC-1` program.

4.5 Uninstalling SPC-1 / SPC-2

You now need to remove the old database files from your system. For the SPC-1 v1.05 you need to go to `Program Files` then click on the `MSDEMSSQL$PPMONITOR` folder and delete. The computer will then ask if we wish to continue with the removal of this folder. Press *Yes* to continue with the complete removal of the SPC-1 system files from the computer.

**Figure 4.5.2 – Screenshot of the Program Files with MSDEMSSQL$PPMONITOR and PPMonitor.**
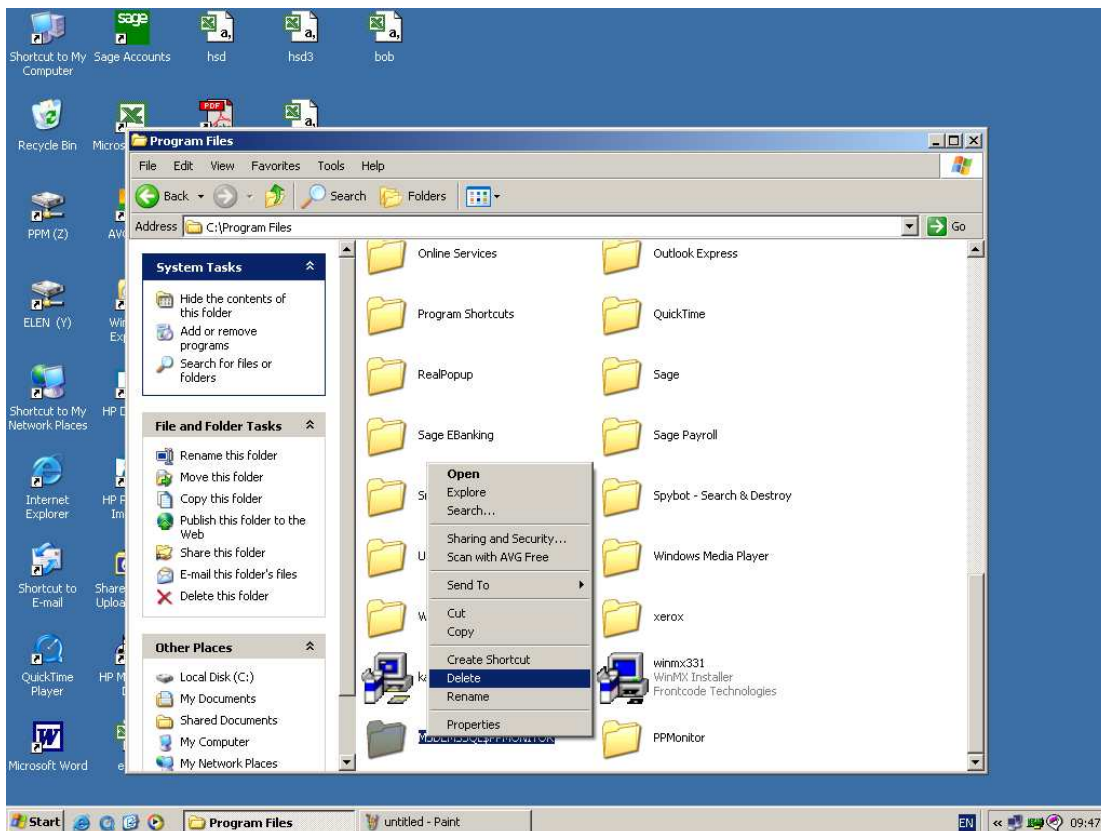
In `C:\Program Files` the `PPMonitor` Folder contains the data collected by the system since it was installed, you may wish to make a copy of this for your records before you delete it. For v1.06 and v1.05 you will need to delete the `PPMonitor` folder. Click the *Yes* button when the computer asks if you are sure you want to remove this folder.

4.5 Uninstalling SPC-1 / SPC-2

Some systems do not remove all the installed components correctly which may lead to problems when a newer version is being installed. To remove these components manually you will need to launch the command prompt. Go to the *Start Menu* and select *Run* then open the command prompt by typing in `cmd` and pressing enter.

Figure 4.5.3 – Screenshot of the command prompt.
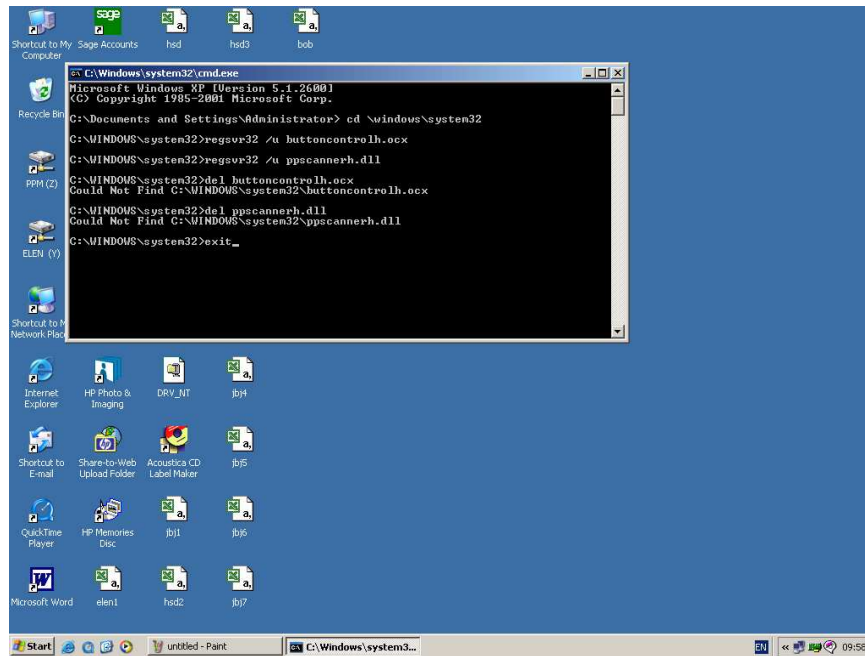
In the command prompt you will need to type the following:
1. `cd \windows\system32` and press enter.
2. `regsvr32 /u buttoncontrolh.ocx` and press enter. Click ok to any messages that may appear
3. `regsvr32 /u ppscannerh.dll` and press enter. Click ok to any messages that may appear.
4. `del buttoncontrolh.ocx`, press enter.
5. `del ppscannerh.ocx`, press enter.

This should remove the important shared components. Type `exit` and enter. This should completely remove the remaining PPMonitor SPC-1 components from your system.