®

fireye

ComFire 2 Combustion Analysis Tool

For use with
Fireye Nexus/PPC Controllers
Using Windows 95 or XP software

DESCRIPTION

ComFire software is a Windows based program designed to expand on the capabilities of the Fireye Nexus and PPC5000 products. The software program requires an IBM compatible PC and allows the user to communicate with the controllers to provide the following capabilities:

- Communicate with up to 10 Nexus or PPC Series Controllers wired in a multi-drop wiring configuration via RS485

- Upload/ download Nexus parameter or profile files to/from an IBM compatible PC

- Create "Watch" windows or graphical plant mimic panels to display data

- Provide logging and graph trending functions of multiple controller values

- Create plant switching stations for adjusting set-points and unit values

- Review fault history and current faults

- Use as a remote service tool

To assist the user in the operation of this software program, the technical bulletins for both the Nexus and the PPC Series Controllers should be reviewed.

THE BASICS - Introduction & Connections

ComFire is a windows based application for monitoring a network of Fireye PPC Series / Nexus fuel / air ratio controllers. It allows the reading and writing of option parameters and profiles, the reading of faults (alarms) and live values from a network of units into one application. It also allows a degree of remote control of these units and is totally configurable to match each installation.

This help file version 2.1.0 covers ComFire for 32-bit operating systems - Windows 95 to Windows XP.

Safety Information

WARNING: The equipment in this manual is capable of causing property damage, severe injury or death. It is the responsibility of the owner or user to ensure that the equipment described herein is installed, operated and commissioned in compliance with the requirements of all national and local legislation which may prevail.

When this equipment is mounted on a burner/boiler, due regard must be given to the requirements of that appliance.

Before attempting to install, commission or operate this equipment, all relevant sections of this document must be read and fully understood. If in doubt about any requirements consult the supplier. Installation, commissioning or adjusting of this product MUST be carried out by suitably trained engineers or personnel qualified by training and experience.

The manufacturer of this equipment accepts no liability for any consequences resulting from the inappropriate, negligent or incorrect installation, commissioning or adjustment of operating parameters of the equipment.

This equipment MUST only be mounted on to burners as detailed in the contracted specification. The supplier must approve any change in the specification in writing.

Control panels MUST NOT be left uncovered while power is on. If it is essential to do so while rectifying faults, only personnel qualified by training and experience should be involved.

The time any covers are off must be kept to a minimum and warning notices MUST be posted.

Before attempting any work on this equipment, the electrical supplies MUST be isolated.

Safety interlocks MUST NOT be removed or over-ridden. Any faults detected MUST be corrected before the unit is operated.

CAUTION: Some versions of this equipment contain a lithium battery.

Note: The manufacturer of this equipment has a policy of continual product improvement and reserves the right to change the specifications of the equipment and the contents of this manual without notice.
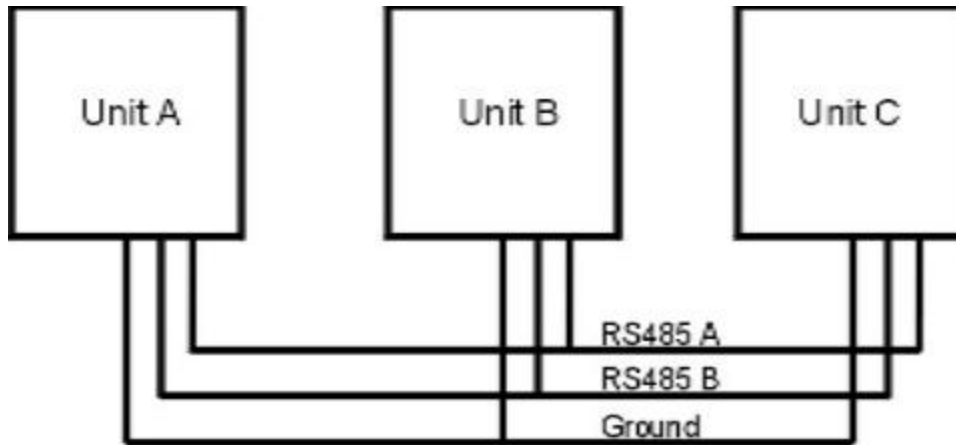
WARNING: Explosion of fire hazard can cause property damage, severe injury or death. To prevent possible hazardous burner operation, verification of safety requirements and interlocks must be performed each time a control is installed on a burner.

Overview

The Fireye equipment communicates over a link known as RS485. This allows many devices to be connected together, by a data link with a maximum cable length of 1200m, without the use of a modem.

The units must be connected together via their RS485 interfaces. The connection is a simple 'daisy chain' from one unit to the next as shown below.

```
┌──────────┐   ┌──────────┐   ┌──────────┐
│          │   │          │   │          │
│  Unit A  │   │  Unit B  │   │  Unit C  │
│          │   │          │   │          │
└──────────┘   └──────────┘   └──────────┘
```
                                    RS485 A
                                    RS485 B
                                    Ground

Personal Computers use USB or RS232 serial ports (COM 1, COM 2). These ports are in the form of a USB connector or 9-way 'D' connector (although they may use a 25 way connector). RS232 is a different standard that only allows two devices to be connected together, and the specified maximum cable length is only 15 meters.

To connect a PC (or a modem) RS232 signals to the controller network requires a converter to change the RS232 signals to RS485 and vice versa. This converter could be in the form of an inter-face card fitted to the PC or an external in-line converter. PPC5000 devices may be connected directly to the PC when they support RS232 communications.

USB to RS232/RS485 converters are also available. Not all computers have 9 pin serial adaptors. In some cases it is necessary to use a USB 9 pin Serial adaptor. Please note that when this is done the adaptor may have a different com address for each USB port that it is plugged into. In this instance it is important to use the same USB port every time.

Termination Resistors

Usually, it is best to leave all termination resistor jumpers switched OUT - especially when cable runs are short. There is usually no need for them to be in circuit.

In rare circumstances, termination resistors may be required - and when this is the case, the units at each end of the chain (A and C in this example) should have their RS485 TERM jumpers set to the IN position. For further information on the location and setting of these jumpers please refer to the product manuals.

Termination resistors are sometimes used to prevent reflections ('ringing') on the data cables when the RS485 changes state. When these reflections happen, they can be seen as spurious data by the receiving device and cause communication errors.

The frequency and level of the reflections is dependant on the switching speed of the data (slew rate), the characteristics of the cable and the cable length.

Termination resistors are NOT NORMALLY REQUIRED because the slew rate of the RS485 driv-ers is limited, and on cables below about 300 meters long, the reflections will decay within the rise time of the signal.

When driving very long cable runs, in excess of 300 meters, the reflections may start to become an issue. Termination resistors are the best way to remove this problem.

The termination resistors should roughly match the characteristic impedance of the cable, and since the communication is bi-directional need to be fitted BOTH ENDS of the cable run, across the A and B lines.

Most NX / PPC products have internal 'jumpers' allowing termination resistors to be switched in without them needing to be placed directly in the terminals. The value of the internal termination resistors are 120 ohms, so with resistors switched in at both ends, the RS485 drivers will be driving into a resistance of 60 ohms. This is within the specification for RS485 and the driver circuits used are more than capable of doing this.

Problems with termination resistors:

Termination resistors should only be fitted when absolutely necessary because they can introduce another problem.

For RS485, when no device is actually transmitting data, the B line (sometimes labelled RS485 -) must be at a HIGHER voltage than the A line (sometimes labelled RS485+). This is ensured by weak pull-up and pull-down resistors (typically 10k or 22k) fitted in each device on the bus. When no data is transmitted, these resistors ensure that the bus is held in this 'idle' state.

When termination resistors are placed directly across the A and B lines, these internal pull-up / pull-down resistors cannot always pull hard enough to guarantee that the B line will be sufficiently higher than the A line. The B line should be 100mV to 200mV or more higher than A during the idle state, to ensure reliable communication. Since each device on the bus has its own pair of pull-up resistors, the more devices there are on the bus, the more likely the system is to work.

This idle level voltage can easily be measured by simply connecting a voltmeter across the lines, ideally when no communications are taking place.

There are three solutions to this problem:

1. Fit 10nF capacitors in SERIES with the 120 ohm termination resistors to eliminate this DC loading. These capacitors are not provided by the internal termination of Nexus / PPC products, so the internal termination resistors cannot be used. External 120 ohm resistors and series capacitors must be fitted across the A/B lines at both ends of the bus.

2. Fit external termination resistors of a higher value than 120ohm. Two 330ohm resistors could be used, for example. These will not be so good at removing the reflections, but will reduce the DC loading considerably.

3. Fit external pull-up and pull down resistors on the A and B lines, and use the internal termination resistors. This is technically the 'correct' option and may be quite easy because only one pair is needed, and they can be fitted anywhere on the bus. The ideal values of these resistors will depend on the number of units connected, since each has it's own weak internal set, but values of 1Kohm have been found to be a good compromise for a bus with two to five units connected.

Where external pull-up and pull-down resistors are deemed necessary, they should ideally be connected to a 5 volt supply that is NOT isolated from the A and B signals. Where this supply is not available, the connection can be made to an isolated supply and will work fine, but the isolation will be lost between the two supplies.

It has been our experience that the best option is nearly always not to fit termination resistors at all, unless there is a specific problem that can be traced to signal reflections in the cables.

Using 'Direct' RS232 connection

If the direct RS232 connection cannot be used, or the device is a Fireye Nexus, which does not have an RS232 port, a converter is needed to enable the two different systems to communicate.

If the unit(s) are to be directly connected to the PC, an EC485 converter may also be used. A standard 9 way to 25 way serial lead will be required to connect from the PC RS232 socket (most PC's have a 9 way plug) to the 25 way for the EC485 converter. The EC485 also requires a local power outlet for powering the 12volt DC power supply supplied with it.
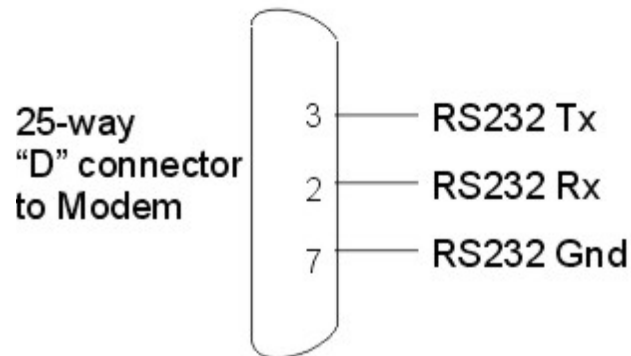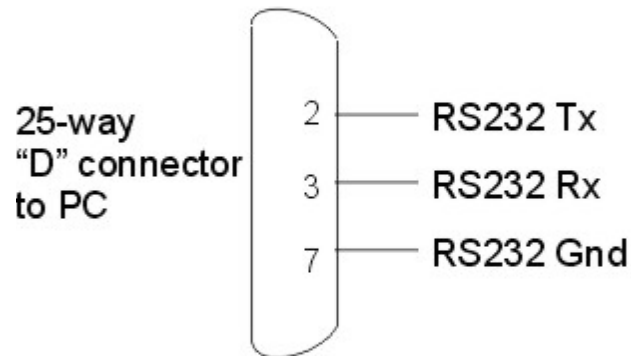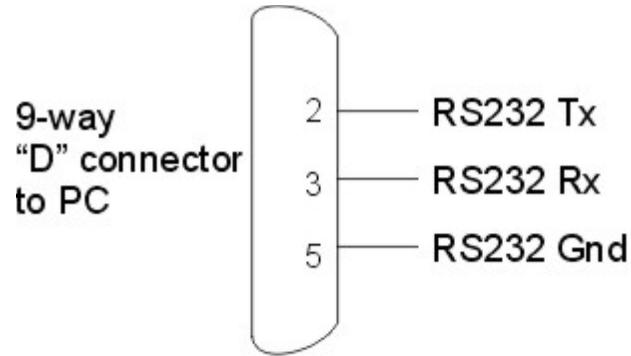
Where the PC / modem is to be within approximately 15 meters of an PPC5000, the PPC5000's RS232 interface can be connected directly to the PC / modem, provided the unit has standard communications software such that the RS232 interface is not being used for anything else.

The unit itself effectively performs the conversion, and the PC / modem can communicate through the unit it is connected to, to any other units on the RS485 network. However, since the PPC5000 takes time to perform the conversion, the performance will not be as good as using a discrete converter.

This method of connection is useful if a laptop computer is to be temporarily connected to download information by an engineer, for example.
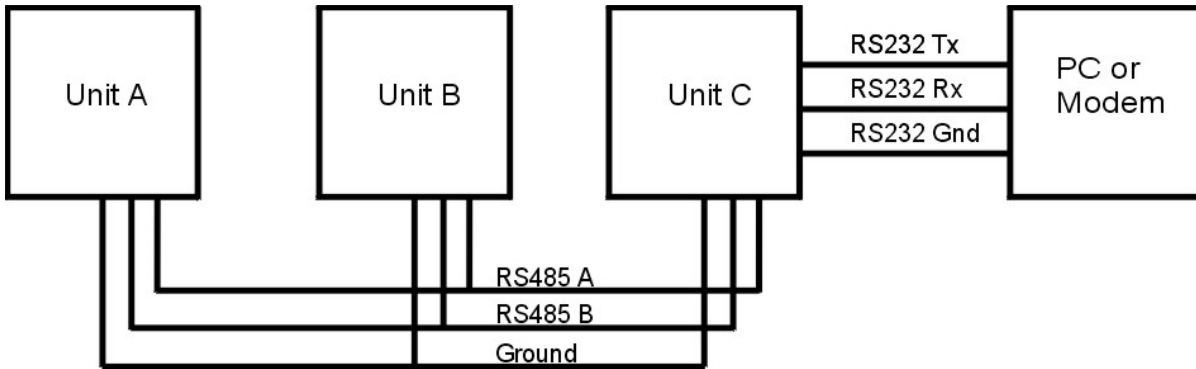
The connections should be as follows (depending on whether the PC has a 9 way or 25 way COM port):

9-way "D" connector to PC		
2	—	RS232 Tx
3	—	RS232 Rx
5	—	RS232 Gnd

25-way "D" connector to PC		
2	—	RS232 Tx
3	—	RS232 Rx
7	—	RS232 Gnd

25-way "D" connector to Modem		
3	—	RS232 Tx
2	—	RS232 Rx
7	—	RS232 Gnd

Important: If the PC is to be connected to the unit(s) via a modem link, then a RS485 to RS232 converter must be used and the converter must provide Automatic Driver Enable (ADE) to handle the modem correctly.

Using a protocol converter

If the devices on the RS485 bus don't support direct RS232 connection then a protocol converter is needed to enable the two different systems to communicate. This converter may take the form of a PC I/O card added to the PC or an in-line converter. The converter will change the communications signals and may also convert messages into another data message system e.g. Modbus.

A typical connection scheme for RS485 to RS232 conversion:
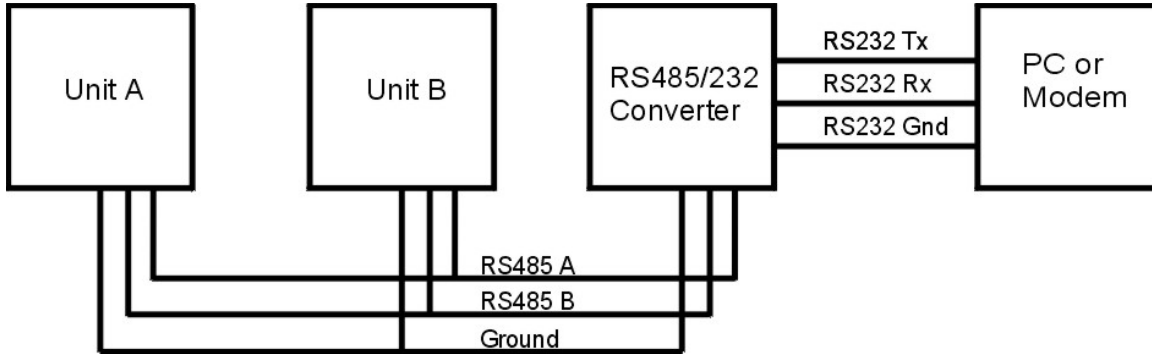
Available options include conversion units from RS485 to Profibus, Modbus and LAN if required. Please contact your equipment supplier for further details.

Important: If a PC is to be connected to the unit(s) via a modem link, then a RS485 to RS232 converter must be used and the converter must provide Automatic Driver Enable (ADE) to handle the modem correctly.

The RS485 connections to the 'solder bucket' terminals are identical for either converter:

Solder Bucket Pin No.	Connection on Unit(s)
1	RS232 GND
2	RS485 +
7	RS485 -
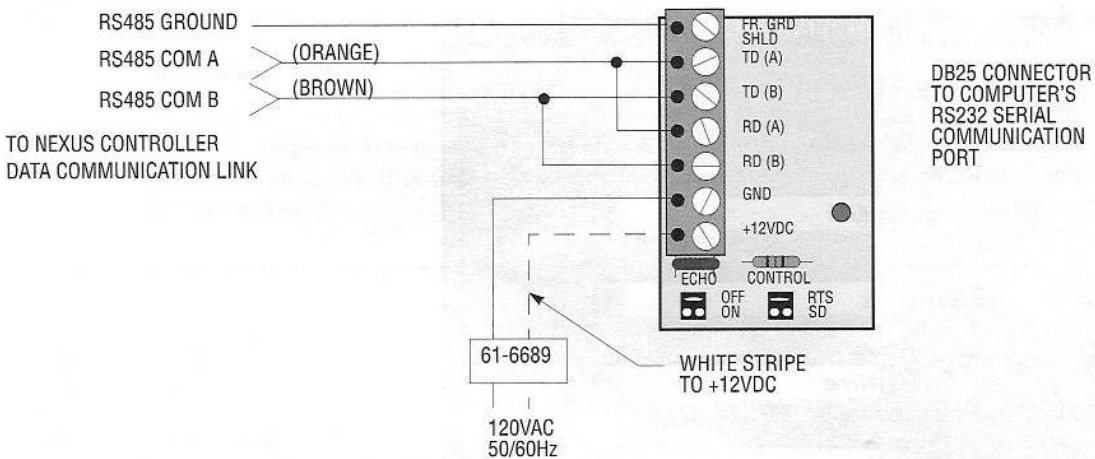
Note: The two jumpers on the 485CON converter should be set to "RTS" and "Echo Off."
Note: TD (A) and RD (A) on EC485 converter connected to COMA of NEXUS controller.
*   TD (B) and RD (B) on EC485 converter connected to COMB of NEXUS controller.*

Modem operation

The use of a pair of modems allows the PC to communicate with a network of units over an internal or public telephone system. The modem must be capable of communication at 9600 baud, and can be connected via a converter (as below), or directly to an RS232 port of a PPC5000 unit with standard communications software. The diagram below shows the configuration of the system.
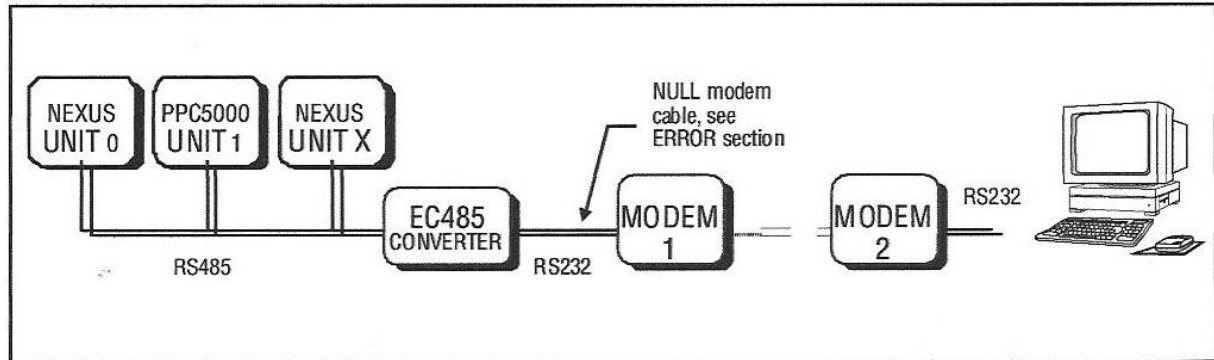
The modem labelled 'Modem 1' must be configured during installation to behave in the required way on power up. This is usually done by setting it's registers for the required operation, then storing this configuration as a 'configuration profile', then selecting this profile to be used on power up. All these functions are performed via 'AT' commands, however your supplier can supply a modem already configured for the purpose.

Modem 1 **must** be initialized as follows:

Table 1:

Step	Behavior	Command
1	DTE baud rate = 9600	When configuring the modem from a PC, select the PC baud rate to be 9600. The modem will automatically switch its baud rate to match.
2	Auto Answer after 5 rings (recommended)	ATS0=5 + ENTER The modem should answer automatically after several (e.g. 5) rings. The modem should not answer immediately on the first ring.
3	Commands Echo Disabled	ATE0 + ENTER The modem must not echo data sent to it.
4	Dumb Mode (optional)	AT%D1 + ENTER Dumb mode may be set only if none of the units on the network are set to dial out, as it prevents the modem from receiving commands. The advantage of dumb mode is that there will be no disruption to the comms when the modem is dialled up from outside. If dumb mode is not set, sequencing may deactivate for a short while when a connection is being established.
5	Store as profile 0	AT&W0 + ENTER Save these settings in the modems non-volatile memory.
6	Select profile 0 on power up	AT&Y0 + ENTER Select these settings on power-up.

The modem will then need to be switched off then back on again to enter dumb mode, if selected. If further commands are to be issued, dumb mode can be exited by sending AT*** + ENTER.

Note: Some of these commands may vary with different modems. If in doubt, consult the product manual for the modem.

Control Configuration

Unit Address

Communication between multiple units is made possible by each unit having its own unique address, such that, for example, unit 7 can send a message to unit 3, then unit 3 can send a reply to unit 7.

The unit address for each unit must be entered as option parameter 1.2, and must be a different number for each unit. The range is 0 to 15, but the choice of number is arbitrary. It will have no effect on the operation of ComFire, except that ComFire on the PC also needs its own unique address.

Program installation

To install the program onto your computer, turn on the computer and start up Windows™, insert the CD-ROM into the drive and run the install program.

The software should now install.

When it has finished installing, the software can be run by double clicking the icon from the "start" button, 'Programs' menu in Windows.

ComFire is configured to use COM2 as the default for communicating with the Units.

If COM2 cannot be opened, it will attempt to open COM1.

If the control units(s) are to be connected to a different communications port, then the configuration will have to be changed using the Setup button.

Program Operation

Site Configuration

When ComFire is starting the program will ask for a site configuration to use. Many different site configurations can be setup and stored and all will be available from the 'Select Configuration' window.

A site configuration contains the settings for ComFire (such as communications settings), information about the controls (i.e. names, 'boiler 1' for example) installed at a particular site as well as the configurations for the Watch windows. Also, all parameter / profile and fault lists read over from controls into ComFire are stored in the site configuration database, so the user doesn't need to store these as separate files on the hard disk. All parameter / profile and fault lists can be retrieved from the database by searching for data from a specific site, or searching by date. The parameter / profile and fault lists can in addition be saved as XLS files for use with other programs.

ComFire is shipped with a site configuration called "Demo" and will offer this using the dialogue box show below:
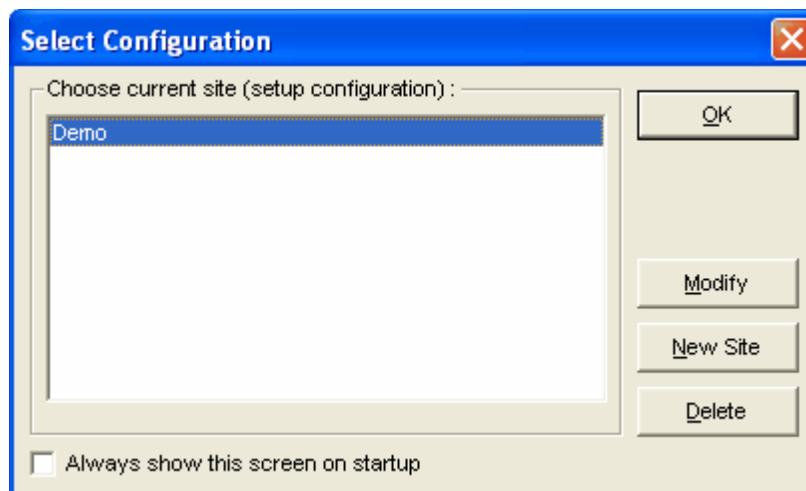
Select a site file by clicking on it, the site file name will be highlighted, and then the OK button. The site file will load into the ComFire environment and run. Alternatively, the modify button will open the Setup units window allowing changes to be made.

The current site file is displayed in the bottom left corner of the ComFire window as shown below:
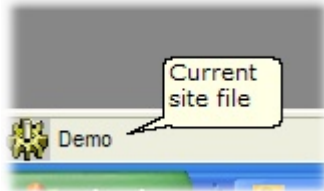
The status of ComFire is shown in the bottom right corner of the window, showing the current access rights (Security), the communications connection details and the error status if there are any errors.
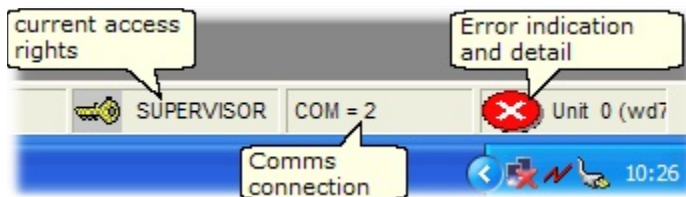
The error status may be interrogated if there are errors indicated, by clicking on the .

Communications Settings

The communications settings can be accessed by choosing 'Communications' from the Setup menu, or by clicking the 'Communications' button from the Setup units window. It has four tabs.

Table 2:

The General tab:
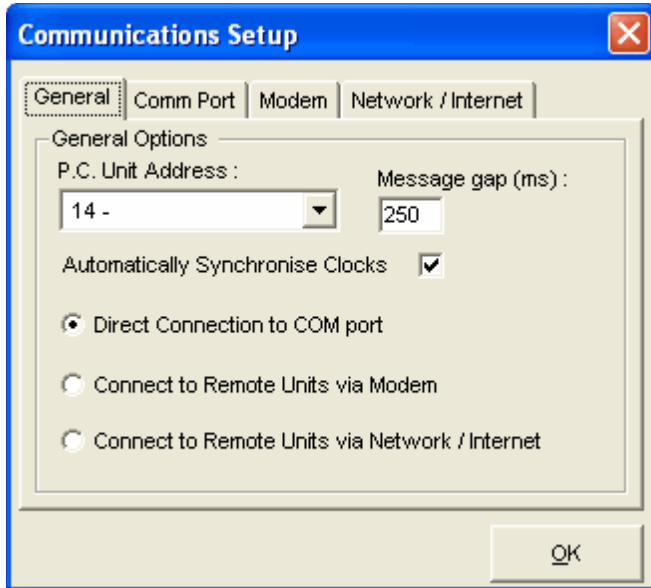
The unit address of the ComFire software on the bus must be set to a unit address that is not used by any other device. The default is address 15, which is normally unused. If two PC's running ComFire are connected together on the bus, they should have different addresses.

The message gap is normally 250ms allowing four communications messages a second. It should not be set to a value lower than this. If the communications appears to be unreliable, this value could be increased to 500, which will slow the communications down to two messages per second. Different controls can handle different amounts of messages per second - generally the newer controls can handle more comms messages. If another master device (such as a modbus or profibus converter) is running on the RS485 bus, it will be advantageous to increase the message gap to 500ms.

The 'Automatically synchronize clocks' option will ensure that all devices connected have their internal real-time clocks (if present) set to the same time as the PC running ComFire.

The choice also is made here of the connection type:
- Direct (RS485 / RS232 with conversion)
- Modem (see modem tab)
- Network / Internet (see Network/Internet tab).

Table 3:

The Comm Port tab:
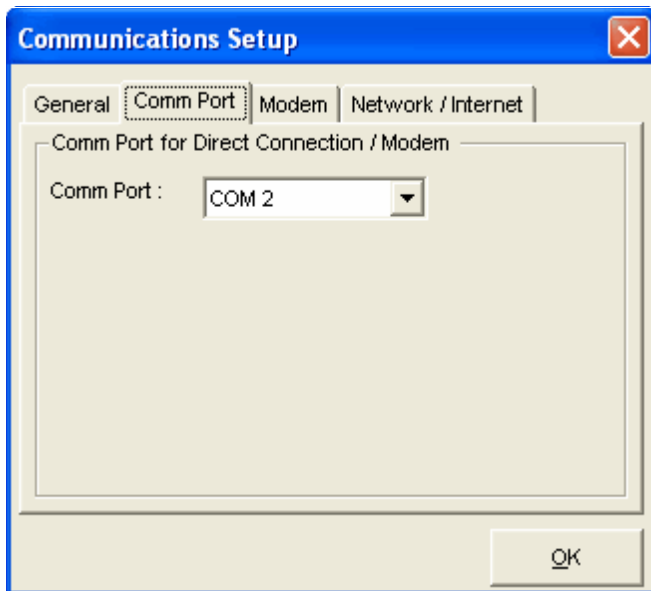
The communications port to be used needs to be set here. This is required if the connection type is 'direct' or 'modem', but is not needed for network / internet connections.

Table 4:

The Modem tab:

This frame is available only if the connection type was set to 'Modem' in the General tab.

Some types of controls can be configured to dial out in the event of a fault. The 'Answer Incoming' box will allow Com-Fire to answer these calls if it 'hears' the modem ring.

To dial out to a network of controls, the phone number must be entered into the appropriate box, and a name for the modem location can be entered too. These settings will be stored by ComFire for use next time.

Once the number has been entered, push the dial button to begin dialing. If successful, the message in the progress box will change to 'ON LINE' and the OK button can be pushed.

The disconnect button can be pushed to disconnect the call, and the 'advanced' button can be used to modify the modem settings (AT commands) if necessary.

Table 5:

The Network / Internet tab:
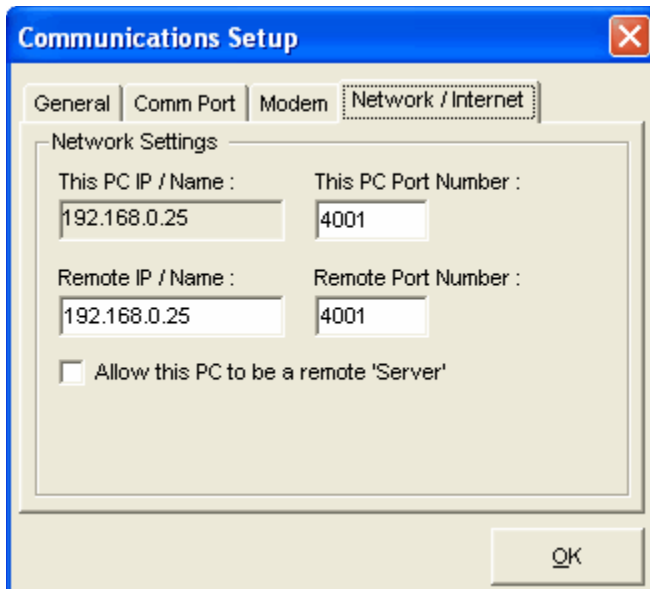
This frame is always available, but only needed if connection to a remote device is required.

The first box shows the IP address of this PC. A port number can be allocated to ComFire by entering a value in the adjacent box. This is needed for ComFire to listen for incoming data.

A remote IP and PORT number can be entered too. This should correspond with the address / port of the remote device.

There are two ways to use ComFire over a network.
1 - Using a Lan Interface box (available from your supplier)
2 - Using two ComFires.

If the second option is used, one ComFire uses direct connection and is set to 'Allow the PC to be a remote server', and the second ComFire will use the RS485 connection of the first one, accessing it through its IP address and PORT number.

Any firewalls must be set not to block the specified ports. The communication is via UDP.

Language Settings

The language settings can be accessed by choosing 'Language' from the <u>Setup menu</u>.
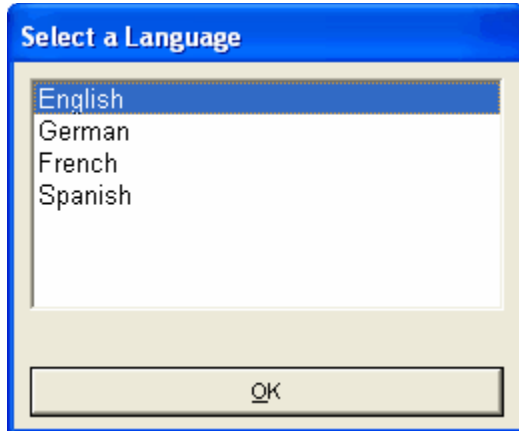
Currently a translation has only been done for GERMAN.

Language change will only take affect after the program has been re-started.

Command Buttons

The ComFire screen has a series of command buttons to start functions within the program.

Security button

The security button gives access to the security options within ComFire.

The security options allow three levels of user within the ComFire environment.

Table 6:

Supervisor -	Highest level which allows access to all features of the program and the ability to create watch windows and configure data logging.
User -	The user level allows access to screens of information and the ability to set functions on the controls via sliders and buttons programmed by the Supervisor
None -	Minimal access, which allows the viewing of mimic screens and other control data as setup by the supervisor.

These access levels are controlled by **Security Options** window.

Normally this window opens with the **Current Level** tab selected, and showing the current setting. The level can be changed by entering the password (if required), then setting the radio button corresponding the new security level. If the password is incorrect, the selection will fail.
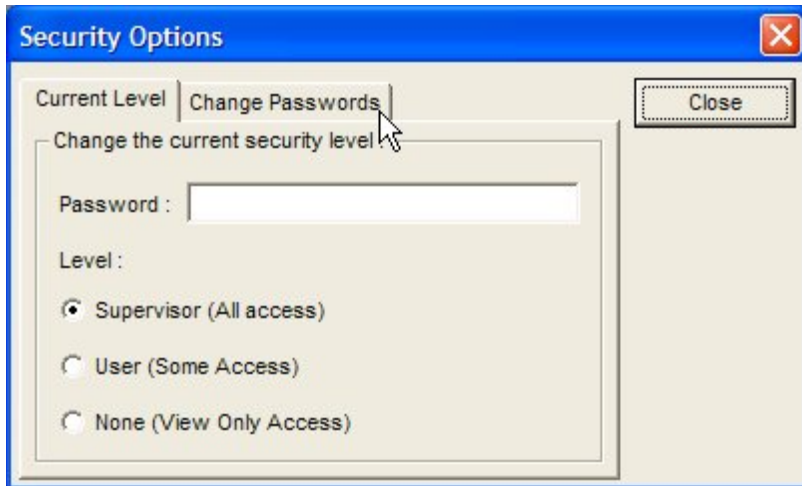
If the passwords are to be set or changed then the **Change Passwords** tab should be selected to show the following window format.
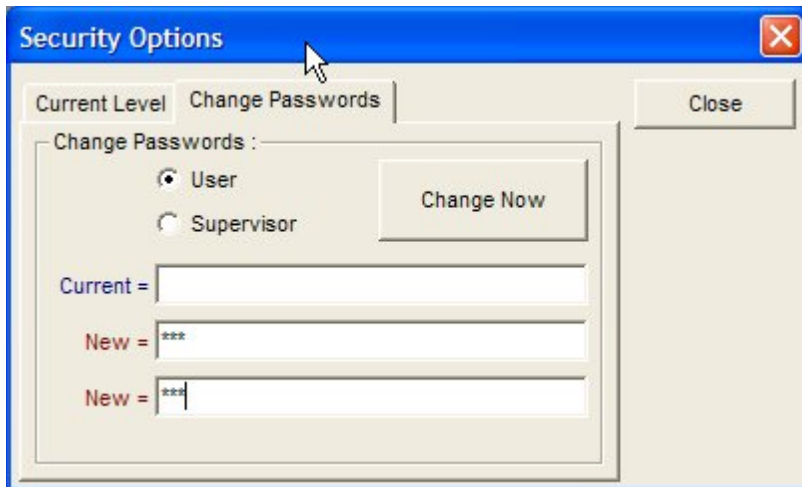
New passcodes are programmed by selecting the radio button for the user type then typing the current passcode and then the new passcode twice. Clicking the Change Now button will make the change.

There are no passwords set when ComFire is shipped. When no password is set, the user can freely switch between security levels leaving the 'password' box empty. A password can be cleared simply by leaving the 'new' password boxes empty.

Setup button

The setup button is used to select site files and change communications configurations. Clicking on this button will start the **Select Configuration** window.
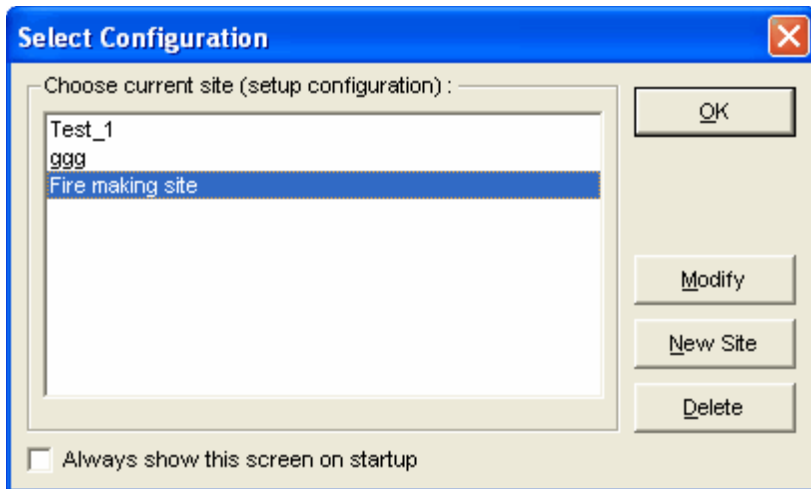
By clicking on a site file name then OK the site file will open the Watch windows and start monitoring parameters on the controls.

If the Modify button is selected then the Setup Units window will open as show below:
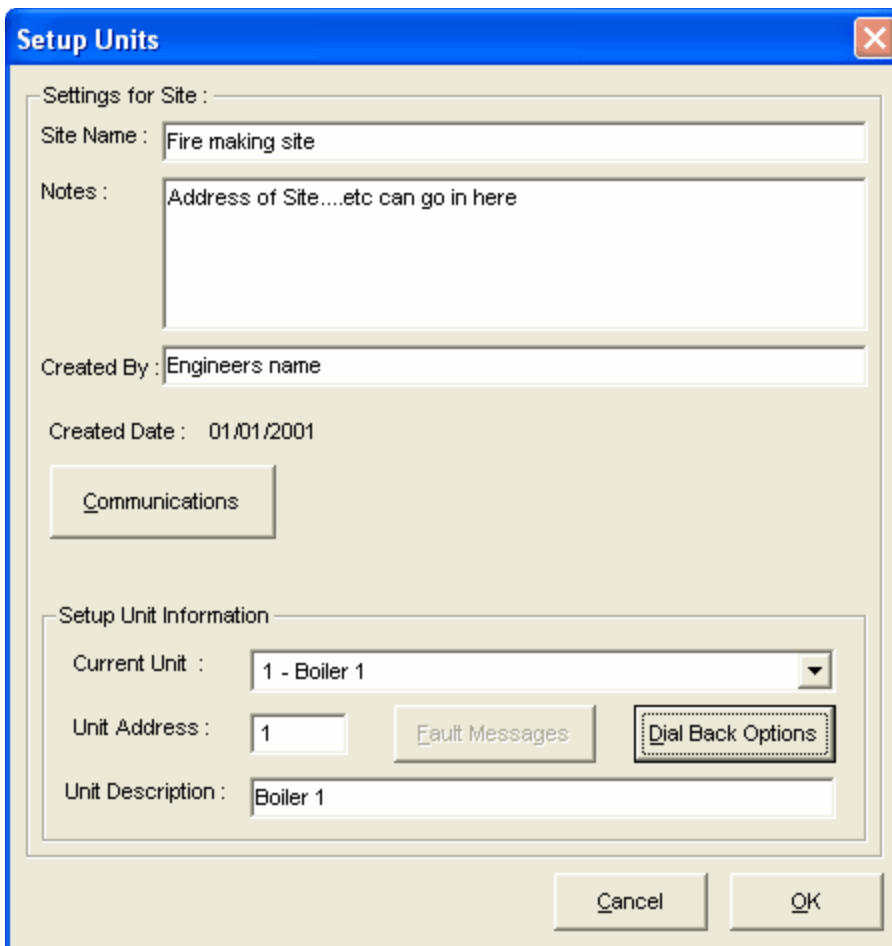
Enter data for the Site Name, Notes about the site file, and details on the Creator of the files.

Each control on the RS485 bus can be given a name by filling out the 'Setup unit information' for that unit.

Commission button

The Commission button allows access to the programmed configuration and profile data.

Clicking on this button opens the following selection screen:
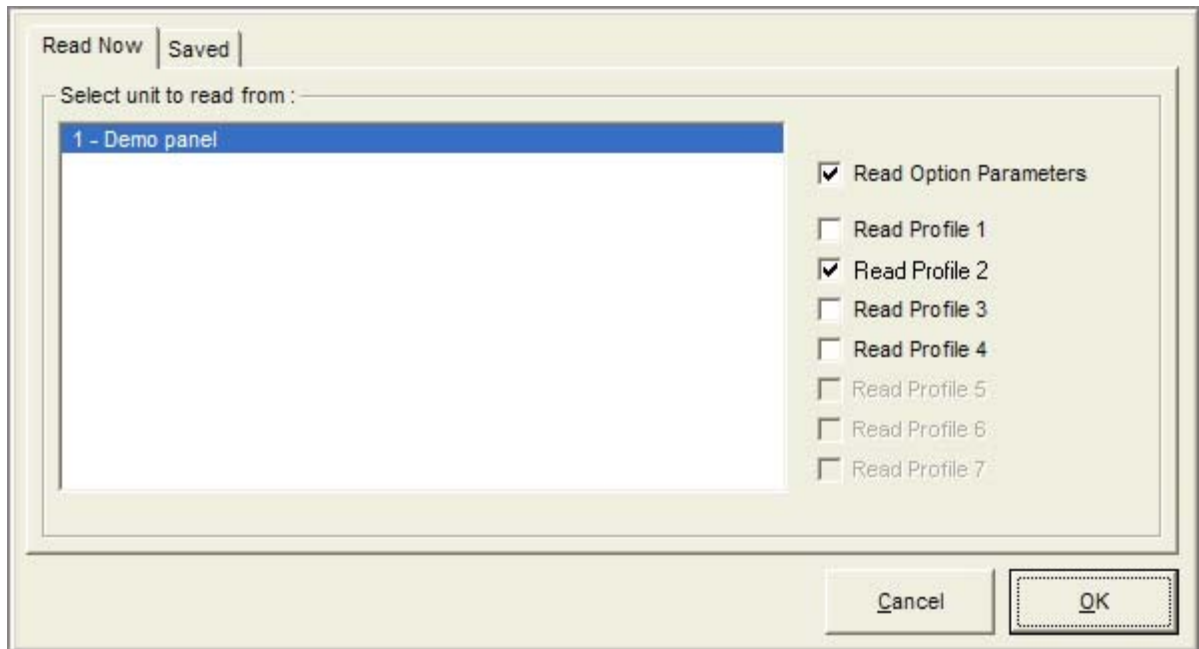
In this example the user has selected to read the Option Parameters and the Profile data for profile 2, from control unit 1 (which is currently connected).

The 'Saved' tab allows previously read data to be retrieved from the database to be displayed once more.
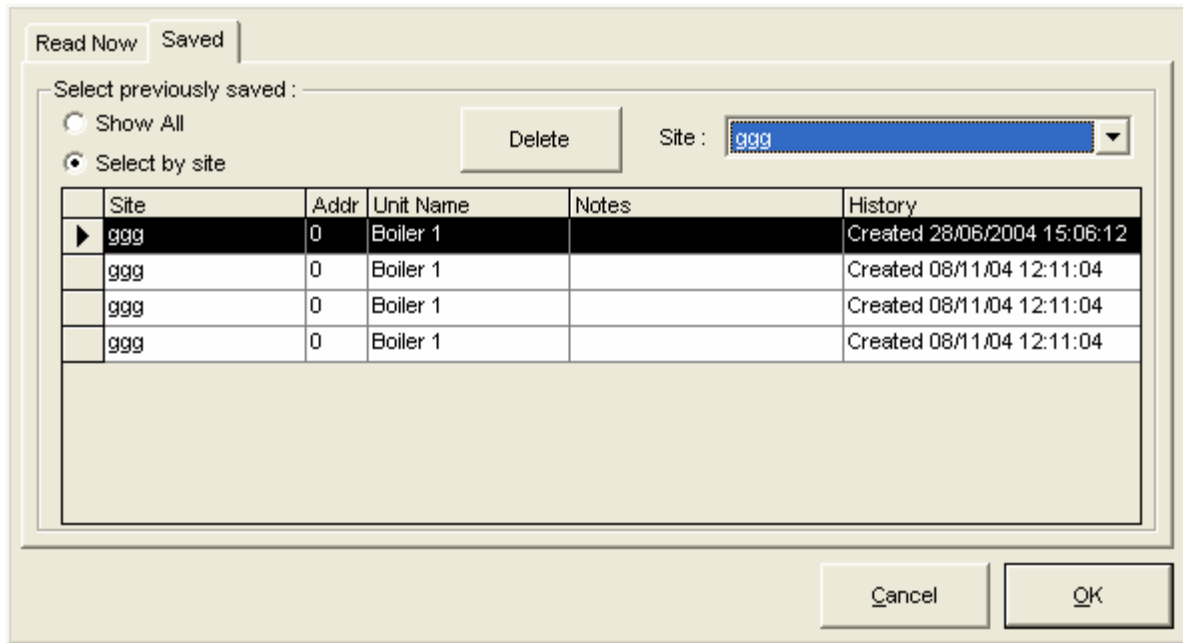
In this case, the user has chosen to see the list of all previous commissioning information from site 'ggg'.

Clicking the OK button will load the data (either old or new) into a series of tables selected by the tabs as show below:
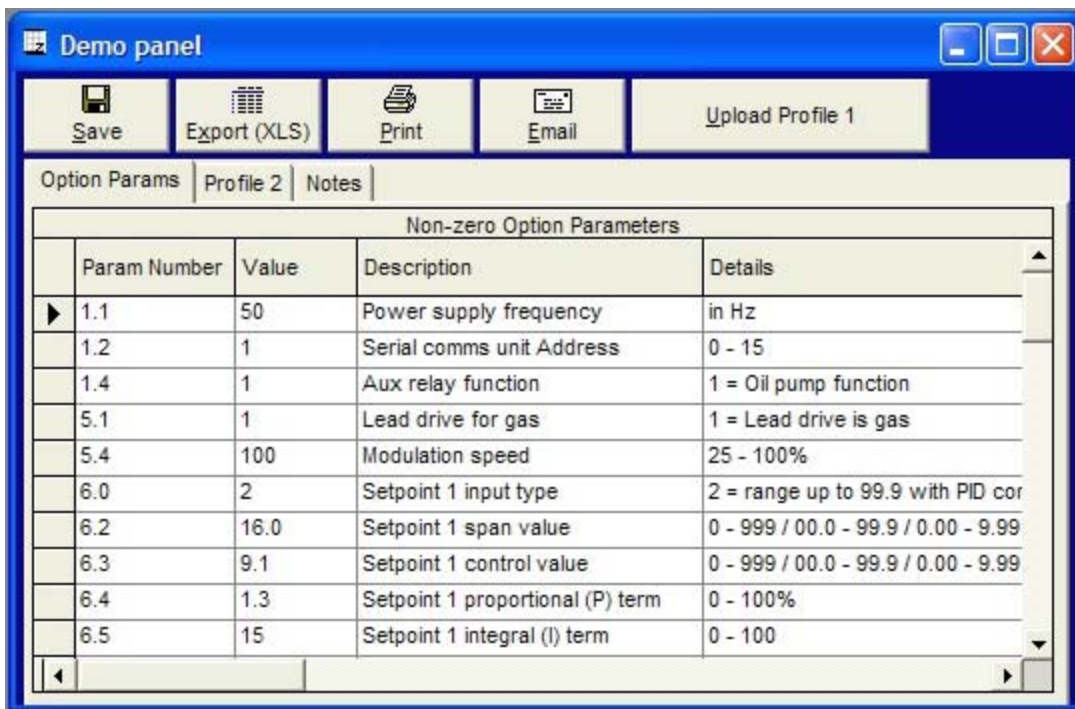
The buttons at the top of the window allow the user to Save, Export, Print and Email the data from the table. The Upload button allows data to be uploaded into a control when it is in commission mode. Refer to the appropriate commissioning manual for more information on Uploading data.

The tabs along the top of the table allow access to different parts of the commissioned data (profiles, option parameters etc.).

Clicking the tabs at the left side of the window selects the profile data in graphical format (if available). Clicking Table reverts to the tabular information.
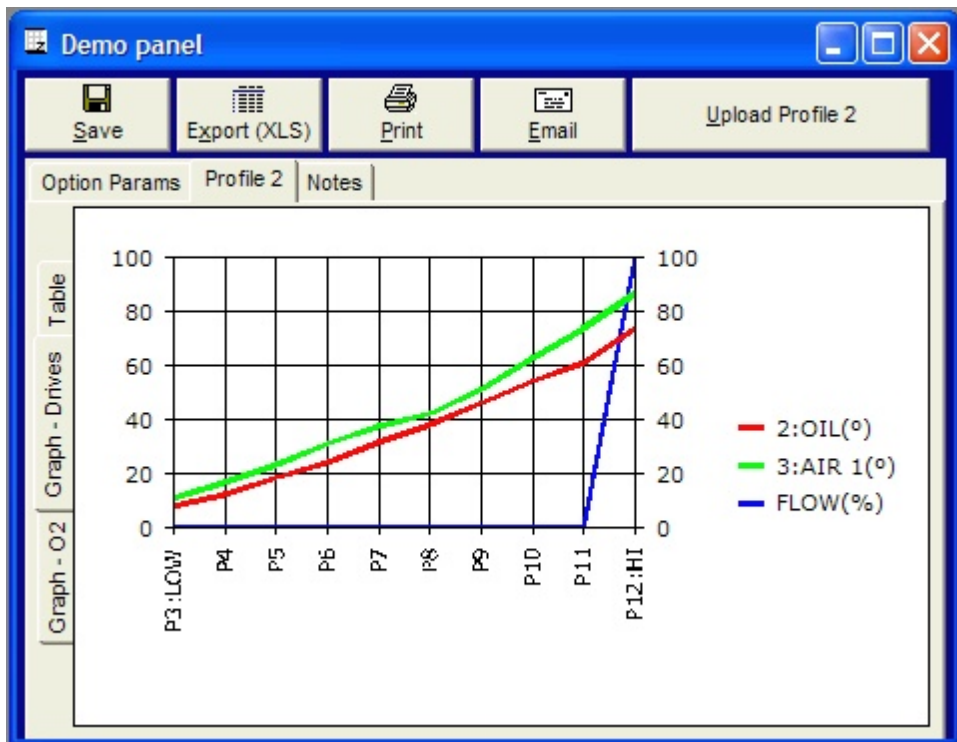
Faults button

Clicking the Faults button starts the following window:
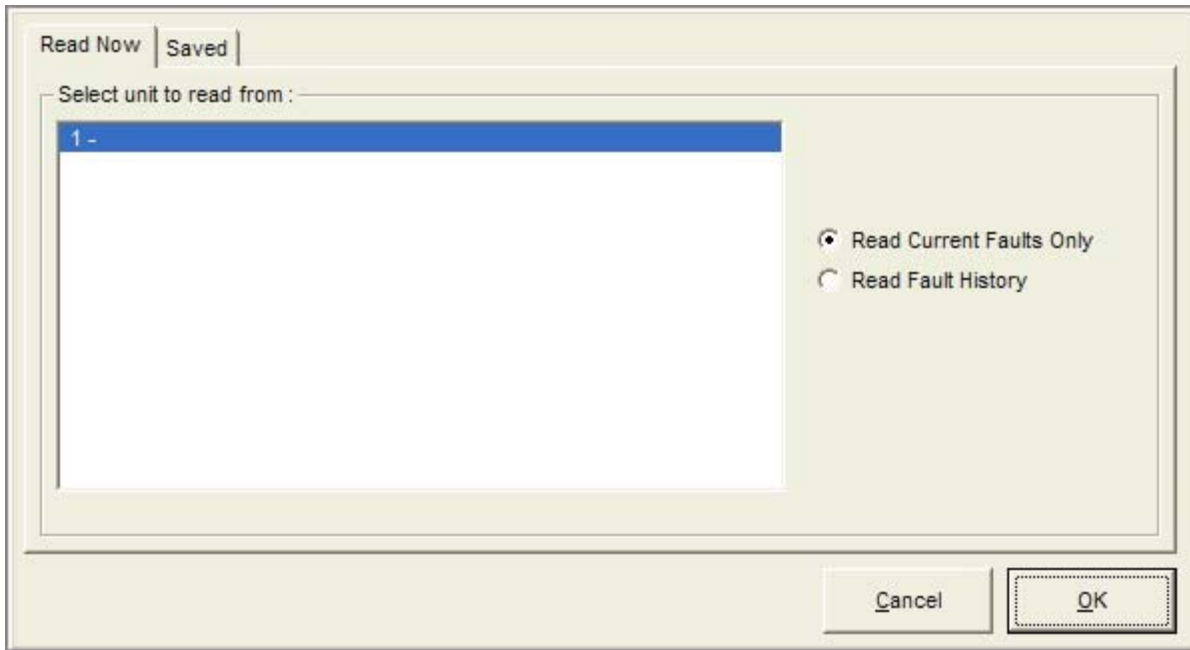
The 'Saved' tab allows previously read data to be retrieved from the database to be displayed once more. This is identical as for the <u>Commission button</u>.

Current Faults
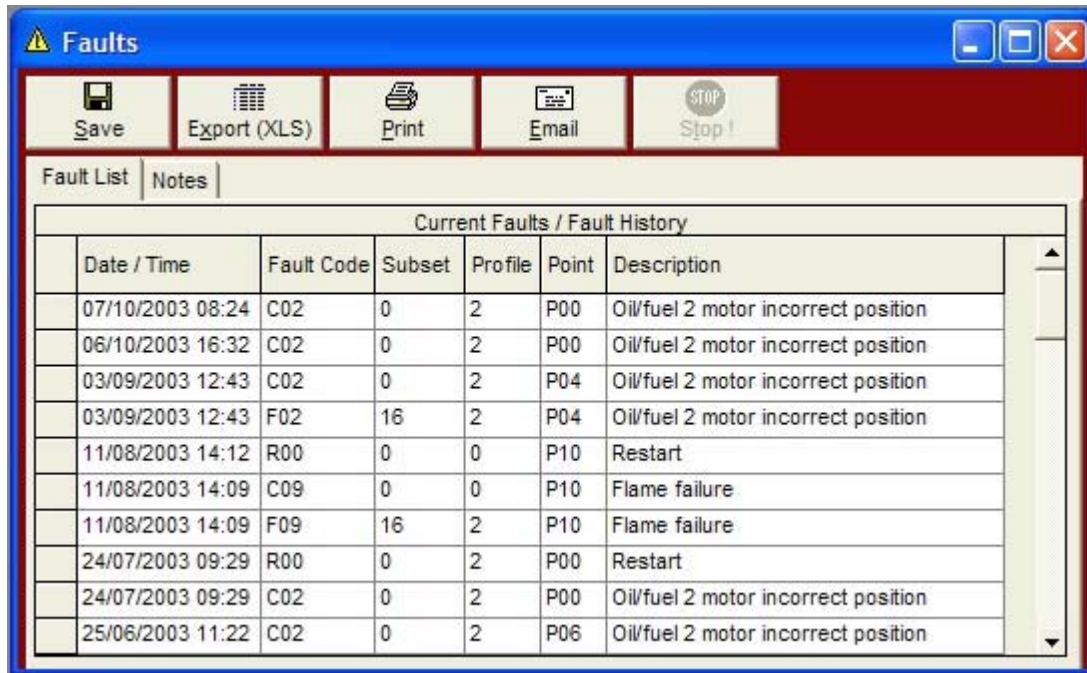
Selecting Current Faults then clicking OK will interrogate and display the current faults for the selected unit, in this case unit 1, as follows:
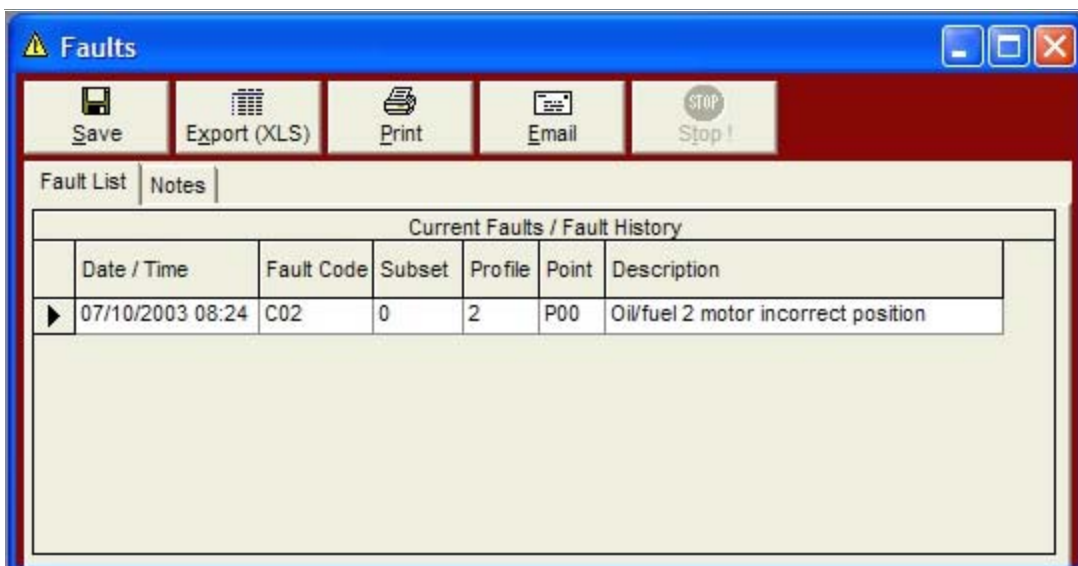
The buttons along the top of the window allow the user to Save, Export, Print and Email the Fault report as required.

Fault History

Selecting Fault History then clicking OK will interrogate the selected unit, in our example unit 1, for the stored fault history and display the information in a table as shown below. Up to 128 fault conditions are stored in the fault history and the scroll bar is used to move through the fault history.

Date / Time	Fault Code	Subset	Profile	Point	Description
07/10/2003 08:24	C02	0	2	P00	Oil/fuel 2 motor incorrect position
06/10/2003 16:32	C02	0	2	P00	Oil/fuel 2 motor incorrect position
03/09/2003 12:43	C02	0	2	P04	Oil/fuel 2 motor incorrect position
03/09/2003 12:43	F02	16	2	P04	Oil/fuel 2 motor incorrect position
11/08/2003 14:12	R00	0	0	P10	Restart
11/08/2003 14:09	C09	0	0	P10	Flame failure
11/08/2003 14:09	F09	16	2	P10	Flame failure
24/07/2003 09:29	R00	0	2	P00	Restart
24/07/2003 09:29	C02	0	2	P00	Oil/fuel 2 motor incorrect position
25/06/2003 11:22	C02	0	2	P06	Oil/fuel 2 motor incorrect position

The fault history may be saved, exported, printed and emailed as required.

Watch Button

This button will bring up and activate the default <u>Watch window</u>. It will also start the watches running.

Scan Units button

Clicking the Scan Units button starts the About ComFire window, which shows information about ComFire and details about units connected to the RS485 bus.

In the example above, the window shows 1 unit connected to the communications bus, Unit 1, a PPC6000 running with version 0.50 firmware.

Clicking the OK button closes the window.

Drop down menus
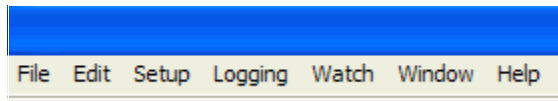
Clicking the mouse pointer over a menu title will cause the menu to drop down and show the menu options.

File menu

The file menu follows the windows format.

Table 7:
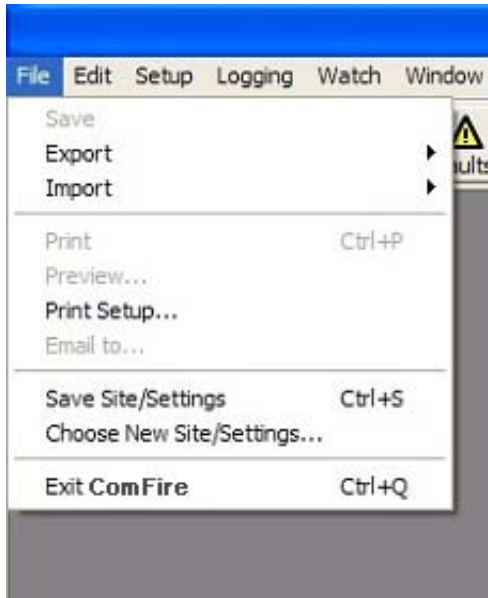
- Saves currently selected fault / commission data.
- Exports data to other file formats (such as XLS).
- Imports data from other file formats (such as XLS).

- Prints fault / commissioning data.
- Previews print files prior to printing.
- Allows the printer to be setup prior to printing.
- Passes data to an email as an attachment.

- Saves the current Site file within ComFire.
- Opens the site file selection window.

- Closes the ComFire program.

Edit menu

Table 8:
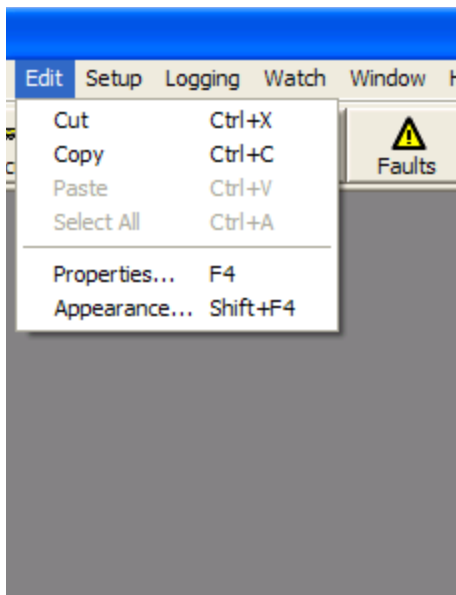
- Cuts selected objects from the window.
- Copies selected objects from the window.
- Pastes objects on the clipboard to the window.
- Selects all objects in the window.

- Displays the properties of an object.
- Opens the appearance dialogue for an object.

Setup menu

Table 9:
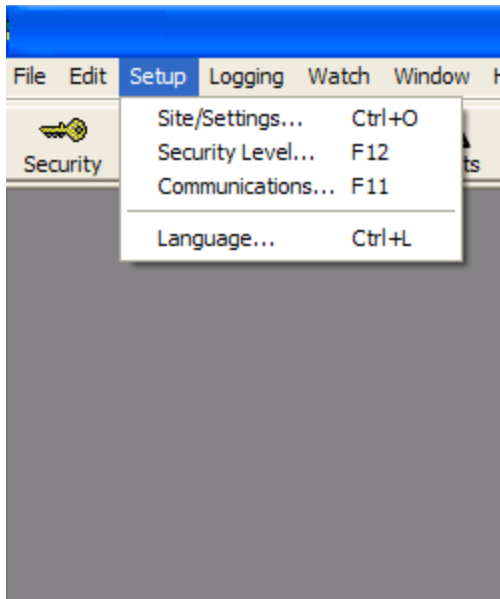
- Opens the site settings window.
- Opens the ComFire security window.
- Opens the Communications Settings window.

- Opens the Language Settings window.

Logging menu

Table 10:

- Switches the data logging on.
- Switches the data logging off.
- Opens the Set up datalogging window.

- Reads logged data from a control, which incorporates stand-alone data logging for display in a window.

Watch menu

Table 11:
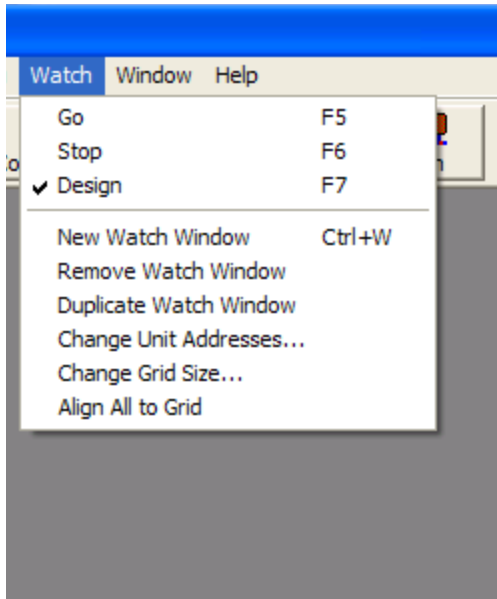
- Starts data acquisition for the <u>Watch windows</u>.
- Stops data acquisition for the <u>Watch windows</u>.
- Enables design mode for <u>Watch windows</u>.

- <u>Creates a new watch window</u> in design mode.
- Removes a <u>Watch windows</u>.
- Duplicates a <u>Watch windows</u>.
- Allows change the unit address for all items in the current <u>Watch window</u>.
- Formats a grid to align objects in current <u>Watch window</u>.
- Aligns objects to the current grid format in current <u>Watch window</u>.

Window menu

Table 12:
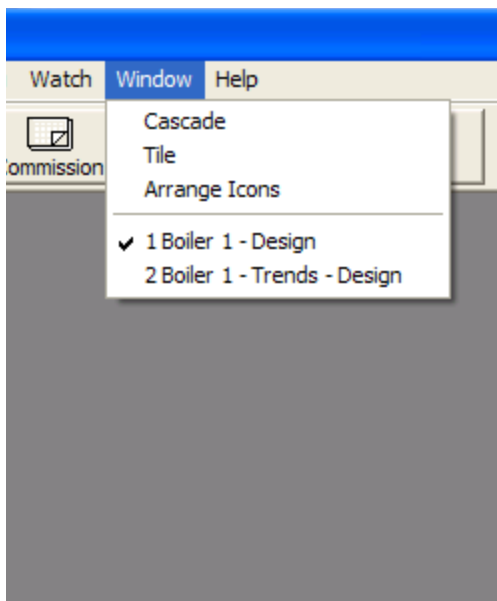
- Sets windows to Cascade in ComFire.
- Sets windows to Tile in ComFire.
- Arranges icons

- Clicking on one of these lines selects the window.

Help menu

Opens this help file at the Introduction page. Also provides another method to show the 'About Com-Fire' window. This is identical to pressing the <u>Scan Units button</u>.

Watch windows

Watch windows display live data values read from the units on the RS485 bus.

The format of the displayed data can be in a variety of formats:

Table 13:

Text <u>Value label</u> format, for example -   Hours Run = 032 ,

a <u>Dial</u>, for example -

Oil valve deg. 43.4
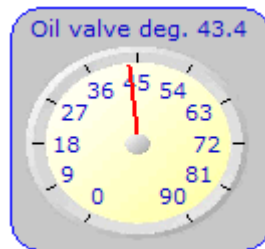
and a lamp (<u>Status indicator</u>),
for example -

STANDBY

Other features of watch windows include <u>Slider</u> controls, action <u>Buttons</u>, and <u>Hotspots</u>.

Watch windows have three modes of operation:

STOP - The watch windows do not update or send control messages to the control units.

RUN / GO - The watch windows will attempt to update and will send control messages to the control units, if required.

DESIGN - Allows interactive <u>design / modification</u> of any of the watch windows (requires <u>Security level</u> of SUPERVISOR).

Creating watch windows

Watch windows can only be created or modified in 'design mode'. This is selected from the Watch menu. The 'design' menu is only available if the currently selected security level is 'SUPERVISOR'. See Security button for more details.

When the watch functions are in design mode, the watch toolbox will be visible. To use this toolbox, a watch window must be open and currently on the screen. To create a new watch window, choose 'New Watch Window' from the Watch menu.

The buttons on the watch toolbox are used to edit the watch window.

 Adds a new Value label.

 Adds a new Chart.

 Adds a new Button.

 Add a new Dial.

 Adds a new Gauge.

 Adds a new Fault label.

 Adds a new Status indicator.

 Adds a new Slider.

 Adds a new Simple gauge (vertical or horizontal).

 Adds a new Simple slider (vertical or horizontal).

 Adds a new Display panel.

 Adds a new Hotspot.

 Opens the Appearance Settings dialog box (if available).

 Opens the Properties dialog box (if available).

All items on the watch window (except for the <u>Background Picture</u>) can be selected by clicking with the mouse. When selected, the item is highlighted and 'grab-handles' appear. The center grab-handle allows the item to be moved around the screen (simply drag it), and the outside handles allow the item to be re-sized (if allowed) in any direction by dragging the appropriate one.

Item not selected: Item selected with blue grab-handles showing:

Efficiency = 92.4%   :fficiency = .4%

The currently selected item can also be moved more precisely using the 'arrow' cursor keys on your keyboard.

Value label

A value label can be added to the currently selected watch window using the [ab] button and displays numerical information read back from one of the units on the RS485 bus.
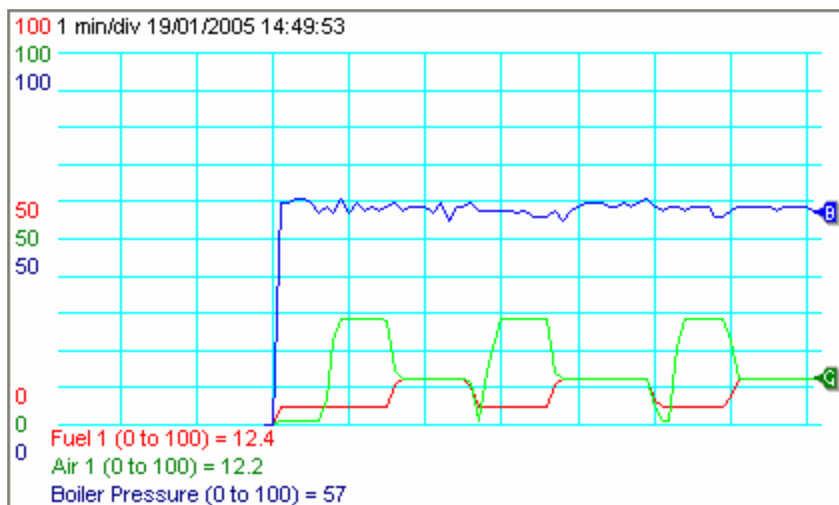
An example is:
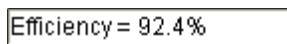
Efficiency = 92.4%

When selected (in design mode), the item can be moved or re sized in any direction using the blue grab-handles.

The properties for this item can be set using the [icon] button to display the <u>Properties</u> window, and the appearance (font, color, etc.) can be changed using the [icon] button to display the <u>Appearance Settings</u> window.

Chart

A chart can be added to the currently selected watch window using the [icon] button and displays numerical information read back from one or more of the units on the RS485 bus as a graph.

An example is:

When selected (in design mode), the chart can be moved or resized in any direction using the blue grab-handles.

The properties for this item can be set using the ![button icon] button to display the <u>Properties</u> window. The standard properties will be displayed allowing the values to monitor for the red, green and blue pens to be selected. In addition, some chart-specific properties will be shown:

Table 14:

- Plot Every (minutes / seconds). The graph is scrolled at this interval.
- Chart length - how far back in time the chart runs for.

- To enhance readability, vertical lines (divisions) are added to the chart at this interval
- For combustion controls, the chart can be frozen if the control (specified by the RED tab) performs a safety shutdown (lockout).

- Pens on Left / Right - specifies the direction which the chart scrolls.
- Scale color. Specified the color of the scale drawn on the chart.

Button

A button can be added to the currently selected watch window using the ![on button icon] button and allows remote control of certain functions of controls connected on the RS485 bus.

An example is:
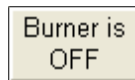
When selected (in design mode), the button can be moved or resized in any direction using the blue grab-handles.

A button effectively has three states, IN (ON), OUT (OFF), and DISABLED. The button shown above is in the OFF state. ComFire will be sending communications messages to the control telling it the function (in this case the burner itself) should be turned OFF.

The button will look like this, when turned ON:
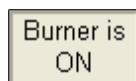
...and like this when it is disabled:
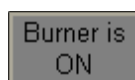
When the button is disabled, ComFire will stop sending communications messages to the appropriate control unit. In most cases, the control will timeout and revert to local control (in this case, let the burner come back on if it needs to). The button can be disabled by clicking the **right hand** mouse button over it. A disabled button is re-enabled by clicking with either mouse button.
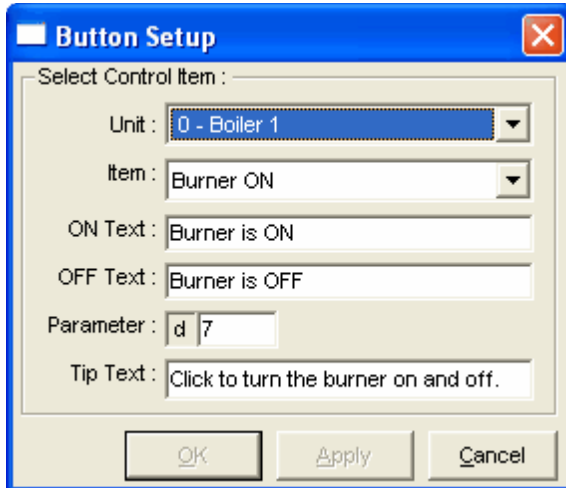
The properties for this item can be set using the ⬚ button to display the button properties window.

Table 15:

- Specifies the control unit (address) for the button.

- A drop-down list specifies which item the button is to control. This will change the value in the 'parameter' box below.
- The text to display in the button when it is pushed IN (ON).
- The text to display in the button when it is pushed IN (ON).

- The parameter number can be entered directly if the item is not in the drop-down list (advanced).
- Tip text is displayed when the user holds the mouse stationary over the button. This is intended to explain the function of the button.

NOTE: Buttons can only be clicked when the <u>security level</u> is USER or SUPERVISOR.

Dial

A dial can be added to the currently selected watch window using the ⬚ button and displays numerical information read back from one of the units on the RS485 bus on a dial.

An example is:
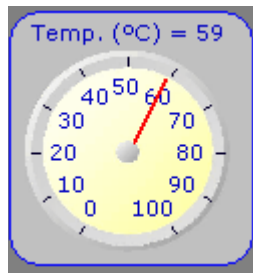
When selected (in design mode), the item can be moved or resized in any direction using the blue grab-handles.

The properties for this item can be set using the ⬚ button to display the <u>Properties</u> window.

Gauge

A gauge can be added to the currently selected watch window using the button and displays numerical information read back from one of the units on the RS485 bus on a gauge.
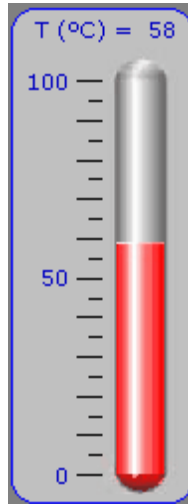
An example is:

When selected (in design mode), the item can be moved or resized in any direction using the blue grab-handles.

The properties for this item can be set using the button to display the <u>Properties</u> window.

Fault label

A fault label can be added to the currently selected watch window using the button and displays any faults when they occur, for a specific control.

An example is:

When selected (in design mode), the item can be moved, or resized in a horizontal direction only using the blue grab-handles.

In RUN mode, this will normally be invisible, but will appear is one of more faults occurs in the unit it is monitoring.
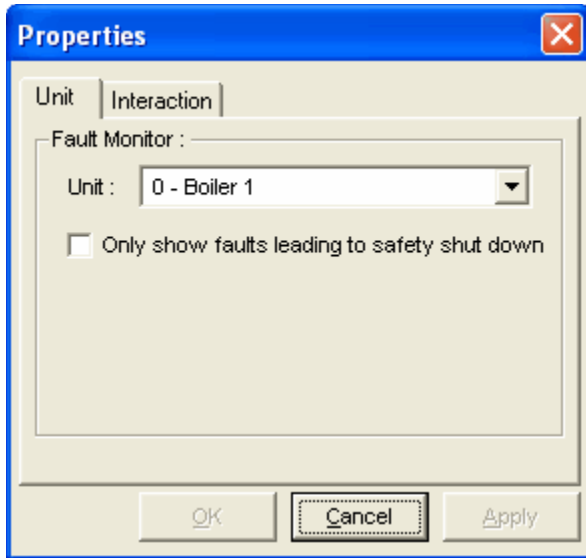
The properties for this item can be set using the 🖻 button to display the fault label properties window.

Table 16:

- The unit (control) to monitor is selected here.

- If selected, the appearance of the faults label can be suppressed for faults that do not cause the control to lockout.

The interaction settings can be set as described in <u>Properties</u>.

Status indicator

A status indicator can be added to the currently selected watch window using the 🔴 button and displays numerical information read back from one of the units on the RS485 bus as a set of pictures, depending on the value.

Examples is:

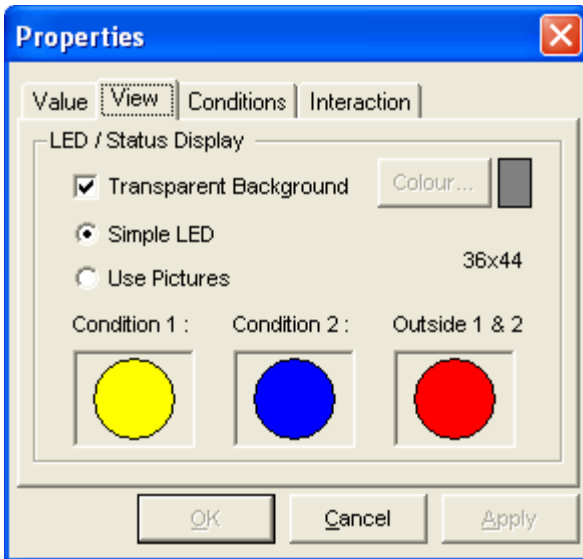When selected (in design mode), the item can be moved or resized in any direction using the blue grab-handles.

The properties for this item can be set using the 🖻 button to display the <u>Properties</u> window. Additional properties are available for this item on the 'View' and 'Conditions' tabs.

Table 17:

View Tab:

The View tab sets up the pictures that the status indicator displays for each of its three 'conditions' (ranges). See the Conditions tab below for details of the conditions.

- Transparent background / background color. Set as desired.

- Simple LED. Show as a circular disk which changes color with the value of the parameter specified in the 'value' tab.

- Use pictures. Show a picture, which changes with the value of the parameter specified in the 'value' tab.

- Image displays - If 'use pictures' is selected, click these to choose the picture files to display. The pictures can be of types BMP, JPG, WMF, ICO, and GIF. The picture will be stretched as to fit the size of the status indicator.

Conditions Tab:
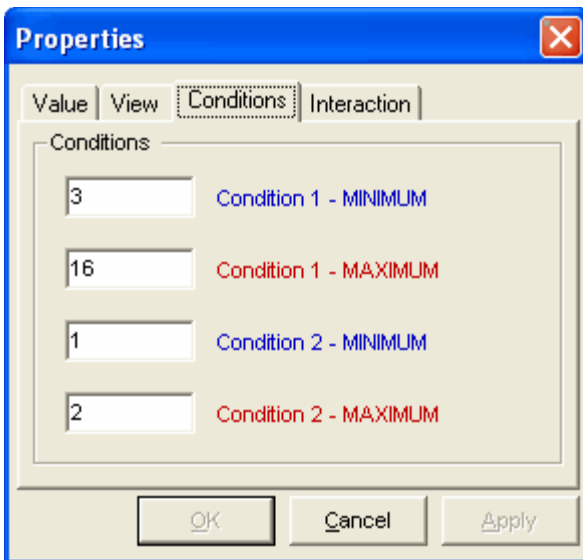
Two ranges of numbers are specified for the value, each comprising of an upper and lower limit.

The condition 1 picture will be shown if the value monitored is between 'condition1 MINIMUM' and 'condition1 MAXIMUM'.

Otherwise, the condition 2 picture will be shown if the value monitored is between 'condition2 MINIMUM' and 'condition2 MAXIMUM'.

Otherwise, the 'outside 1 & 2' picture will be displayed.

Slider

A slider can be added to the currently selected watch window using the [icon] button and allows remote control of certain functions of controls connected on the RS485 bus.

An example is:
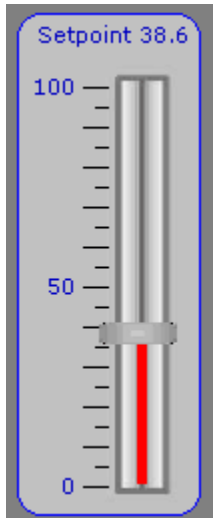
When selected (in design mode), the slider can be moved or resized in any direction using the blue grab-handles.
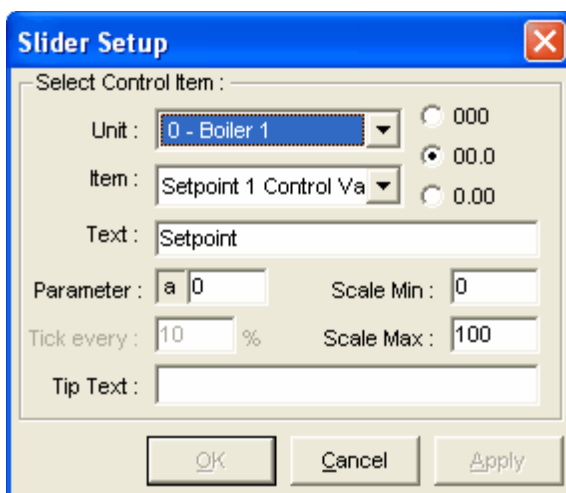
A slider is used to control analog parameters made available by the controls connected. These are parameters such as Setpoint control values, modulation rate, control limits etc. The user simply drags the slider up/down to the required value.

The slider can be disabled by clicking the **right hand** mouse button over it. A disabled slider is re-enabled by clicking with either mouse button.

When the slider is disabled, ComFire will stop sending communications messages to the appropriate control unit. In most cases, the control will timeout and revert to local control (in this case, the burner will control to its normal commissioned setpoint)

The properties for this item can be set using the [icon] button to display the slider properties window.

Table 18:

- Unit. Specifies the control unit (address) for the slider.
- '000', '00.0' & '0.00' specify the decimal places for the slider. It is important that this matches the decimal range expected by the control.
- Item. A drop-down list specifies which item the slider is to control. This will change the value in the 'parameter' box below.
- The text to display in the slider.
- The parameter number can be entered directly if the item is not in the drop-down list (advanced).
- Scale min/max is used to limit the adjustment range.
- Tick every (if available) adjusts the frequency of the scale marks (ticks) on the slider
- Tip text is displayed when the user holds the mouse stationary over the slider. This is intended to explain the function of the slider.

NOTE: Sliders can only be adjusted when the <u>security level</u> is USER or SUPERVISOR.

Simple gauge

The simple gauge is a stripped down version of the Gauge. It is setup in a similar way, but uses less screen area. It is designed to be placed over a Background Picture or Hotspot picture which will give the scale / text required for the user to understand the meaning of the gauge. The text entered in the Properties will be displayed in a 'pop-up' tip when the user holds the mouse pointer over the gauge.

The simple gauge can be oriented either horizontally ▬ or vertically ▮ by choosing the appropriate item on the toolbox.

When selected (in design mode), the item can be moved or resized in any direction using the blue grab-handles.

Examples are:

Simple slider

The simple slider is a stripped down version of the Slider. It is setup in a similar way, but uses less screen area. It is designed to be placed over a Background Picture or Hotspot picture which will give the scale / text required for the user to understand the meaning of the slider. The text entered in the Properties will be displayed in a 'pop-up' tip when the user holds the mouse pointer over the slider.

The simple slider can be oriented either horizontally -⬚- or vertically ⬚ by choosing the appropriate item on the toolbox.

When selected (in design mode), the item can be moved or resized in any direction using the blue grab-handles.
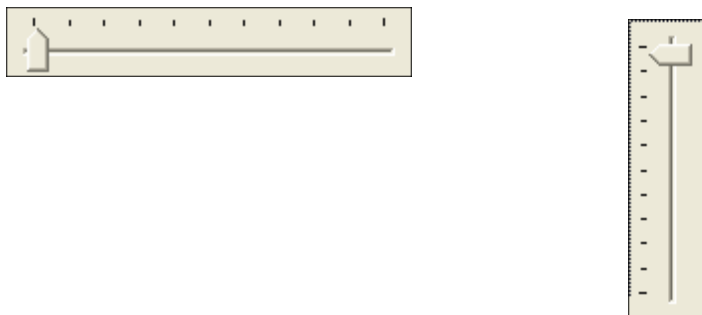
Examples are:

Display panel

A display panel can be added to the currently selected watch window using the button. It is used to display simple text on the screen, Value labels and some other items can be placed on a display panel to group them together visually.

Example:

When selected (in design mode), the item can be moved or resized in any direction using the blue grab-handles.

The properties for this item can be set using the button to display the Properties window (only 'interaction' settings apply), and the appearance (font, color, etc.) can be changed using the button to display the Appearance Settings window.

*NOTE: Dials, Gauges, and Hotspots will always appear **behind** display panels - so these can't be placed on them.*

Hotspot

A hotspot can be added to the currently selected watch window using the button. A hotspot is usually a picture, but it can be invisible too. Hotspots are areas of the screen which can have an 'interaction' property set - so that they cause other windows to open when they are clicked.

Hotspots can also be used (with no interaction setup) just to display static pictures.

Example of a hotspot::

This icon can be used to initiate an action.

When selected (in design mode), the item can be moved or resized in any direction using the blue grab-handles.

The hotspot properties window can be opened by clicking the button in design mode.

Table 19:

Hot Spot tab:
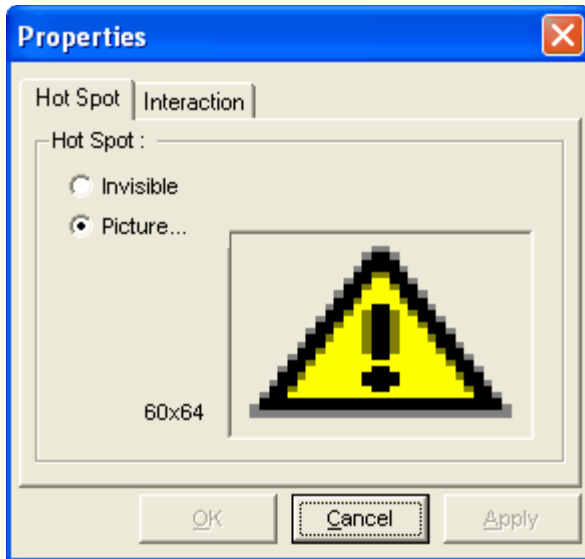
- Hotspot can be invisible so that an area of the <u>Background Picture</u> becomes available for the interaction, or a picture can be displayed.

- Click in the picture area to choose the picture file. The pictures can be of types BMP, JPG, WMF, ICO, and GIF. The picture will be stretched as to fit the size of the hotspot.

Interaction tab:

This is the same as the interaction tab shown in <u>Properties</u>

Appearance Settings

The appearance settings window is available for <u>Value labels</u> and <u>Display panels</u> only, and is activated using the [image] button on the toolbox or from the <u>Edit menu</u>, or by pressing shift+F4.

Table 20:
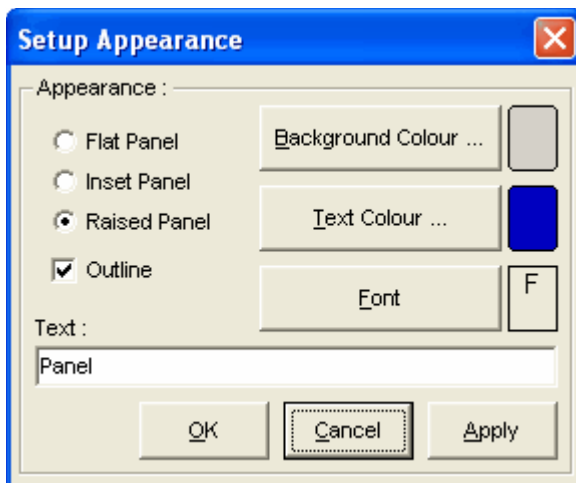
The appearance can be modified to give 3D raised / inset or flat appearance. The outline can be turner on or off and the font / color settings can be changed.

For display panels only, the displayed text is entered here.

Properties

The properties window can be opened using the [icon] button on the toolbar, or from the Edit menu, or by pressing F4.

If no items are currently selected in the watch window (if the background was clicked, for example), the Background Picture window will open.

Value label, Chart, Dial, Gauge, Status indicator, and Simple gauge items are setup using a common properties window as below.
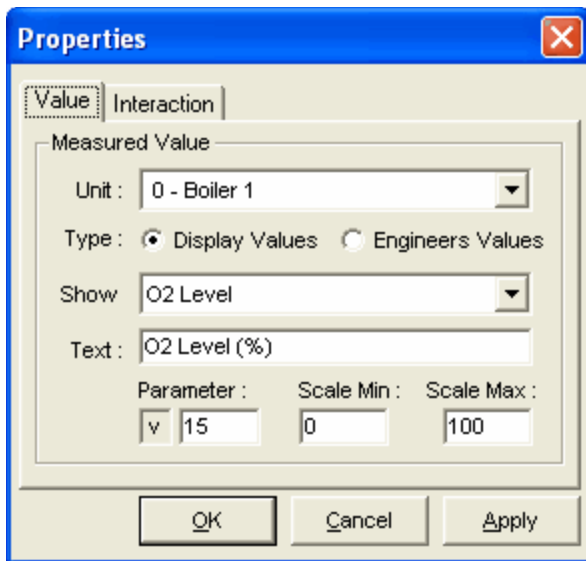
All these items have the 'Value' (called Red, Green, Blue for charts) and 'Interaction' tabs as shown here. Charts and Status indicators have additional tabs, which are explained, in the sections that detail these items.

Table 21:

Value Tab:

The value tab allows the items to be chosen that will be displayed on the screen, in the selected item.

- Specifies the control unit (address) from which the data is read

- Specifies whether to read 'display values' selected from the drop-down list, or values from the 'Engineers key' list of the specific control (advanced).

- If 'Display values' are chosen, this list gives a choice of commonly used parameters to read.
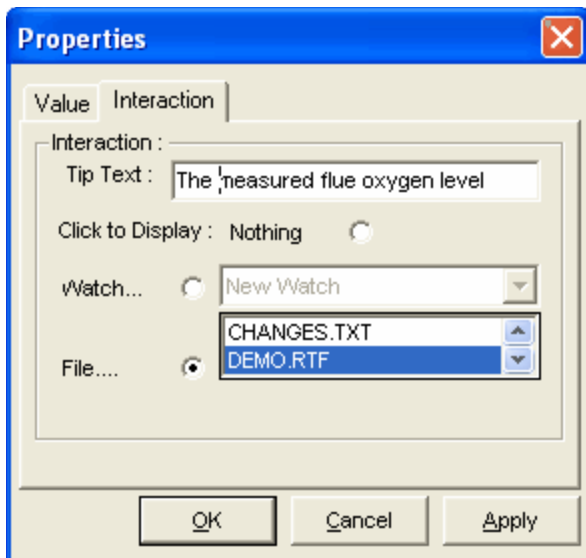
- The text to be displayed associated with this item.

- Parameter. This will override the selection given by the drop-down list. If 'engineers values' are selected, the EK number (see manual of control concerned) of the selected parameter can be entered here. If 'display values' are selected, you do not need to modify this number.

- Scale Min, Scale Max. These specify the minimum and maximum values for the scale used to display the data (Chart, Dial, Gauge, and Simple gauge only).

The interaction tab allows actions to be set if the user clicks or moves the mouse over the specified item.

Interaction Tab:

- Tip text is displayed when the user holds the mouse stationary over the item. This is intended to explain the meaning of the values / pictures displayed in more detail.

- Click to display:

When the user clicks the specified item, ComFire can open a different watch window (perhaps showing a Chart of the same data, for example), or it can open a pop-up window displaying a text (.TXT) or rich-text (.RTF) file for the user to read.

A text file can contain only unformatted text, but an RTF file can contain formatting and pictures also. RTF files can be created using word processors such as Microsoft word.

Background Picture

The background picture window can be opened using the button on the toolbar, or from the Edit menu, or by pressing F4 when no items are currently selected in the watch window. The easiest way to ensure no items are selected is to click the background. Effectively, the watch window itself is selected, and these are its properties.

Table 22:

A background color can be selected, or a background picture can be chosen. ComFire will display the size of the watch window in pixels (468x305 here), which can help when drawing new background pictures.

If a background picture is of type WMF, it will be stretched to fit the watch window and change size with it. Other types of pictures will be displayed at their actual size (i.e. 1:1) and the user will have to adjust the watch window size to match the picture.

If you need a BMP, JPG or GIF image that can be stretched, consider using a Hotspot with no interaction set to display it instead.

If 'Activate from main toolbar' is selected, then this watch window will be made visible when the user clicks the Watch Button. This is usually used for a top-level watch window with links to the other windows via interaction (like Hotspots).

Additionally, each watch window should have a name.

Datalogging

ComFire provides a data-logging function, logging live values to the hard disk of the PC either to a text file (.TXT, .CSV) or directly to Microsoft Excel, it available.

In addition, some of the control products that can be used with ComFire incorporate data logging internally. Where this is the case, ComFire allows the data to be read back from these devices into the above formats.

Setting up datalogging

The logging is setup by selecting 'Setup logging' from the 'Logging' menu. The 'Setup logging' window will appear, and it has two tabs to fill out.

The destination tab:
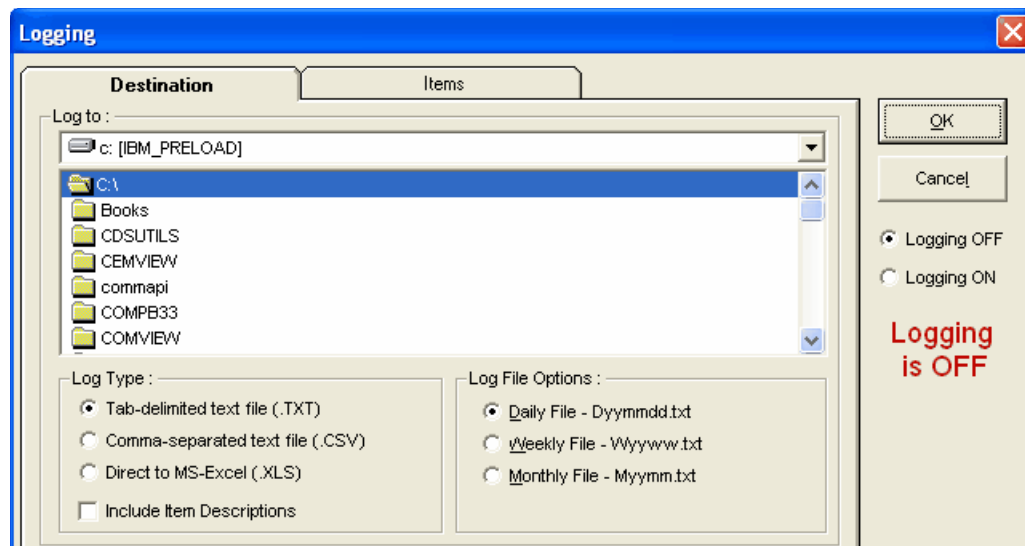
A folder must be selected to log the data to. This can be on the local PC hard-drive, or a network folder. Once the folder is chosen, the log file type should be chosen.

- Tab-delimited text tile (TXT). The different log items are separated with 'TAB' characters, and time items are split onto new lines. All spreadsheets etc. should be able to import this type of data.

- Comma-separated variables (CSV). The different log items are separated with commas, and each time is put onto a new line. Again all spreadsheets should be able to import this type if data, but it is more readable that TXT.

- Direct to MS Excel. ComFire will open MS Excel (which must be installed on the PC, obviously) and dynamically add the data to an XLS sheet as it gets it.

If the 'Include Item Descriptions' box is checked, the headings from the 'Items' tab will be copied to the log file in addition to the data.

For log types TXT and CSD, the file options are:

- Daily. A new file is created for each day that the logging is running. The file will have the name Dyymmdd where yy is the year (00 to 99), mm is the month (01 to 12) and dd is the day of the month (01 to 31).

- Weekly. A new file is created for the weekday that the logging is running. The file will have the name Wyyww where yy is the year (00 to 99), ww is the week number (01 to 52).

- Monthly. A new file is created for each month that the logging is running. The file will have the name Myymm where yy is the year (00 to 99) and mm is the month (01 to 12).
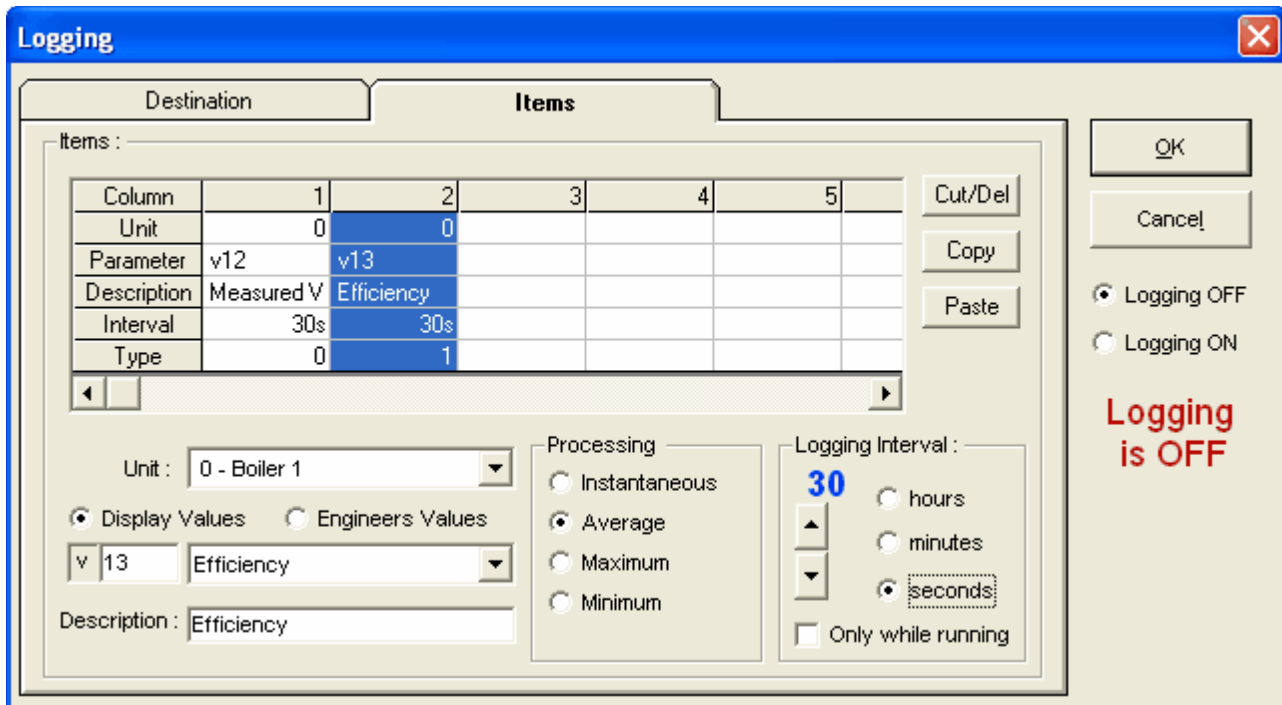
For XLS log types, the 'Log file Options' frame will change to:

Table 23:
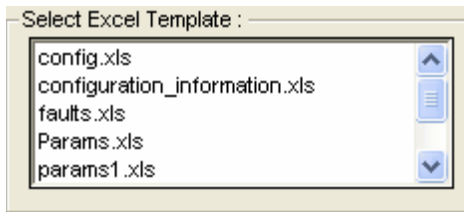
A 'template' file needs to be chosen. ComFire will open a new xls file, which looks like this template and log data to it. The original template file will remain unchanged. The data can be viewed as it arrives by switching to the excel program, leaving ComFire running to keep logging.

The Items tab:

The Items tab is complicated, but can be broken down easily. The grid shown represents the columns in the final log. There are up to 256 columns available, and each one represents a different item.

Note: Choosing a large amount of items will result in a longer uptake time.

To add or modify a log item, click the mouse in the desired column and it will be highlighted in blue. No data is actually entered directly in the grid, but all the other items in the frame now correspond to the selected column. In this example, column 2 is selected, and the 'unit', 'item' and 'description' fields on the bottom-left of the frame can be adjusted exactly as in the 'value tab' on <u>watch properties</u>.

For each column item, the processing type can be set to:

• Instantaneous. The value that is logged is the most recently received value when the log time comes.

• Average. The value is read over as often as possible, and all values are averaged over the logging interval.

• Maximum. The value is read over as often as possible and the maximum of all the values read in the logging interval is logged.

• Minimum. The value is read over as often as possible and the minimum of all the values read in the logging interval is logged.

The logging interval is set using the up/down and 'hours, minutes, seconds' buttons in the 'Logging interval' frame. Again, different intervals can be set for each log item. Items are always logged at time intervals synchronized with the PC clock. The allowable intervals are:

1, 2, 3, 5, 6, 10, 12, 15, 20, 30 seconds or minutes and

1, 2, 3, 4, 6, 12, 24 hours.

These values are chosen because they fit in exactly with no time gaps - for example 6 second logging will give 10 per minute. These will be logged at 00, 6, 12, 18, 24, 30, 36, 42, 48, 54, 00 seconds past each minute.

The logging then just needs to be turned on using the buttons on the right hand side, or from the <u>Logging menu</u>.

Reading logged data from a control

Some control types connected on the RS485 bus may incorporate stand-alone logging features. These units will log data in a binary format directly to either a PC (formally PCMCIA) card, or to an SD (secure digital) card. When it is required to read this data onto the PC in a meaningful form to be viewed, printed etc. 'read control log' should be chosen from the <u>Logging menu</u> and it will open the 'Retrieve Logged Data' window. This has four tabs.

The Source tab:
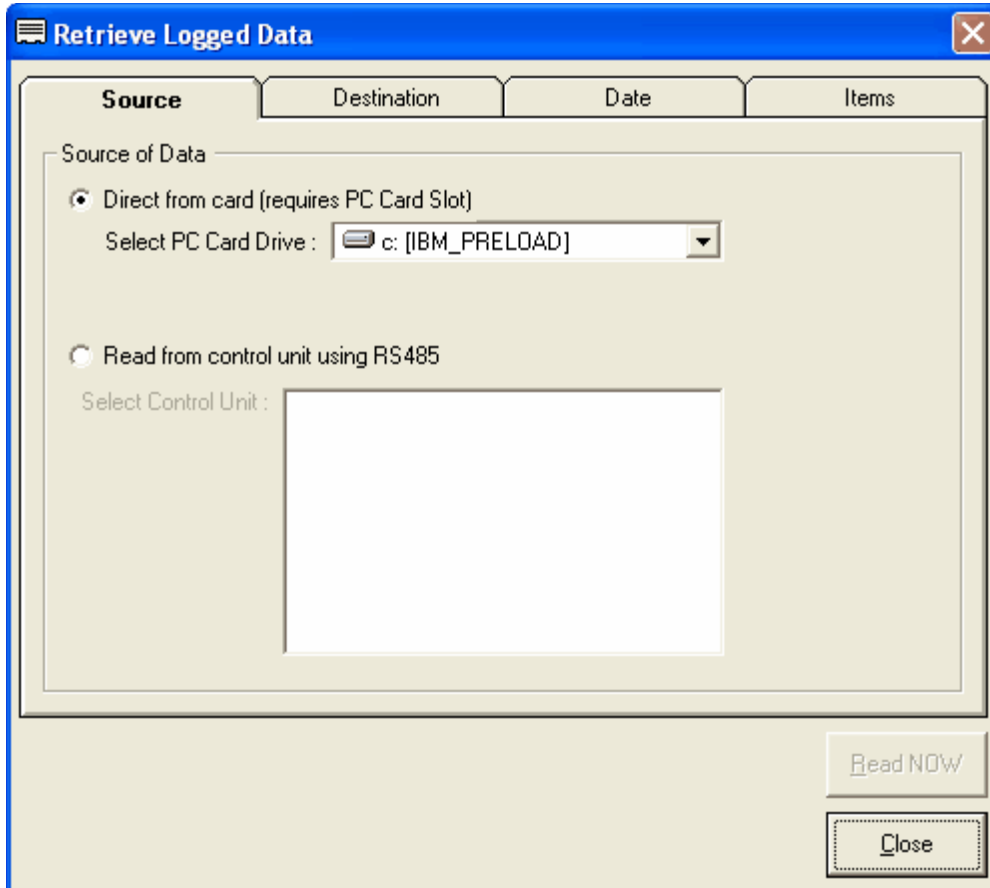
The data can be read directly from the PC / SD card if it is plugged into a suitable card reading slot in the pc or on an interface. USB interfaces are available for this purpose. When the card is plugged in, the appropriate windows 'drive' must be selected from the list.

This option requires that the PC / SD is removed from the control first. Note that this will interrupt the logging. See the manual for the specific control for information about doing this. This method offers near instant access to the data.

The data can also be read back via the RS485, in which case the unit must be selected here. This method is very slow and may take some hours to complete. However, neither the logging function or any other functions are interrupted and it can be done remotely.

The 'Read Now' button only becomes available once all tabs have been completed.

Click the 'Destination' tab to continue. If valid data is found, the destination tab will activate.

The destination tab:
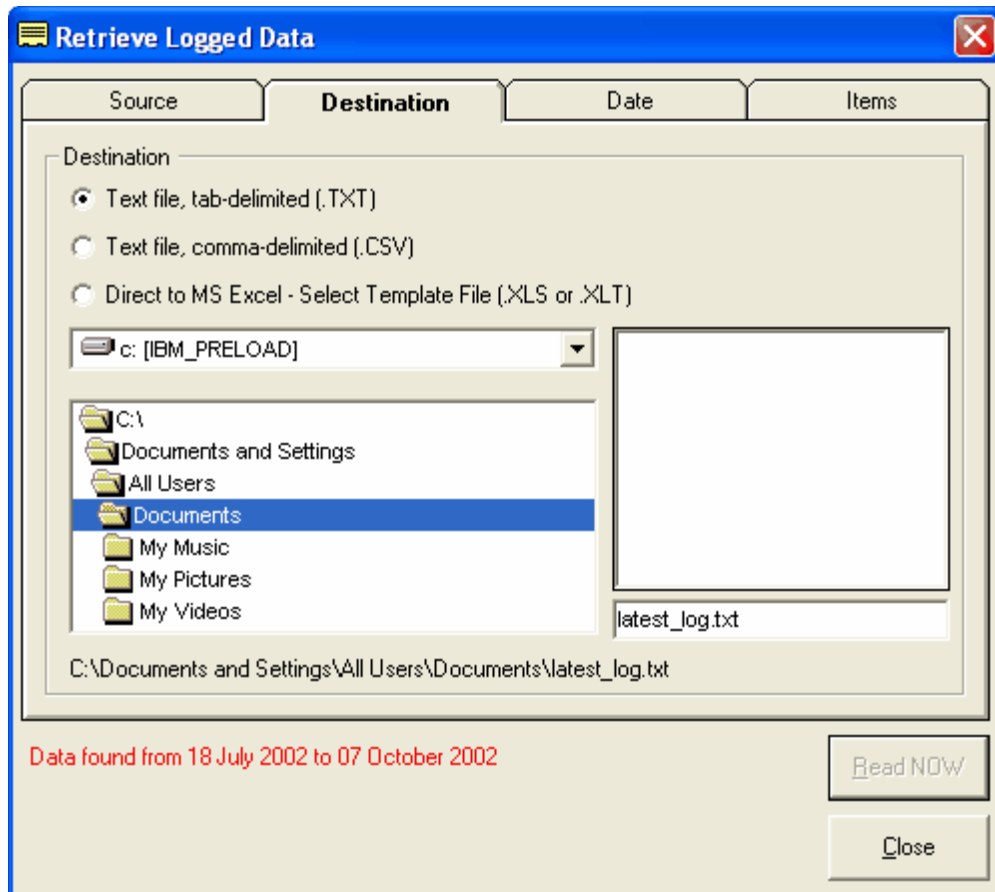
First, the file type should be chosen.

- Tab-delimited text tile (TXT). The different log items are separated with 'TAB' characters, and time items are split onto new lines. All spreadsheets etc. should be able to import this type of data.

- Comma-separated variables (CSV). The different log items are separated with commas, and each time is put onto a new line. Again all spreadsheets should be able to import this type if data, but it is more readable that TXT.

- Direct to MS Excel. ComFire will open MS Excel (which must be installed on the PC, obviously) and dynamically add the data to an XLS sheet as it gets it.

A folder must be selected to store the read back the data to. This can be on the local PC hard-drive, or a network folder.

For TXT and CSV options, a filename must be given, either by clicking an existing file in the list box, or typing the filename in the filename box.

For the XLS option, a 'template' file needs to be chosen. ComFire will open a new xls file, which looks like this template and log data to it. The original template file will remain unchanged. The data can be viewed as it arrives by switching to the excel program, leaving ComFire running continue reading data until it is finished.

Note: The date range of logged data is shown here.
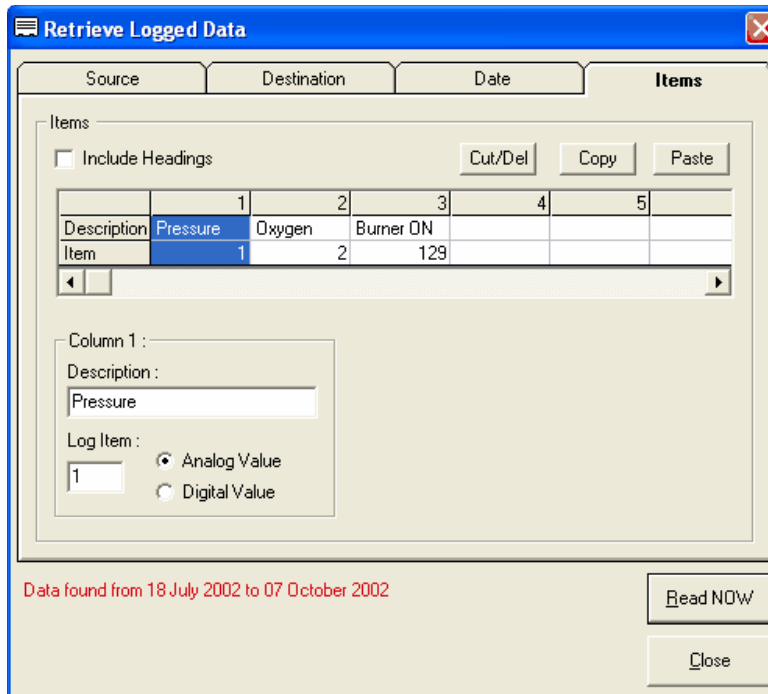
Click the 'Date' tab to continue.

The date tab:
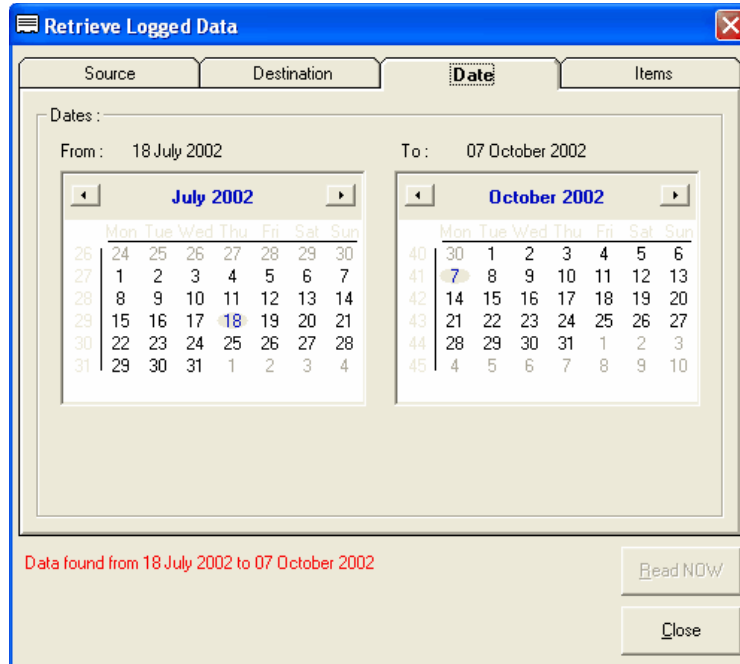
The start and end dates need to be set by clicking on the dates, having set the months first. The should be straight forward, and ComFire will not allow you to choose dates before or after the logged period.

Click the 'Items' tab to continue.

The items tab:

Finally, the required log items need to be chosen for each column in the new report. This is done by selecting the applicable column and choosing the log item numbers and digital / analog parameter in the 'column' frame.

When all desired columns are selected, the 'Read NOW' button can be pushed and the retrieval will begin.

NOTICE

When Fireye products are combined with equipment manufactured by others and/or integrated into systems designed or manufactured by others, the Fireye warranty, as stated in its General Terms and Conditions of Sale, pertains only to the Fireye products and not to any other equipment or to the combined system or its overall performance.

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