# CheckBox IMH Operating Manual



Installation, Operating and Maintenance of the CheckBox IMH automated calibration and datalogging system.

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**CROWCON**
Gas Detection You Can Trust

# Table Of Contents

# Introduction to CheckBox.

CheckBox is an automated system that provides calibration, bump testing, configuration, updating and datalog collection for compatible Crowcon gas detectors. It is designed for use with a PC running Windows XP and the CheckBoxPC Software.

The purpose of this manual is to explain how to set up and use the CheckBox and the CheckBoxPC Software. You will learn how to:

- install and launch the software
- install the hardware
- set up the CheckBox software and hardware
- collect data from compatible gas detectors
- perform a bump test
- perform a calibration
- view, print, and save data
- change instrument parameters
- change data logging parameters
- use the CheckBox to charge an instrument

## Compatible Crowcon Gas Detectors:
- **Tetra**
- **Gasman**

*CAUTION:* *The operator of this instrument is advised that if the equipment is used in a manner not specified in this manual, the protection provided by the equipment may be impaired.*

# CheckBox Warranty.

CROWCON Detection Instruments Ltd, warrants equipment sold by us to be free from defects in materials and workmanship, and performance for a period of one year from date of shipment from CROWCON.  Any parts found defective within that period will be repaired or replaced, at our option, free of charge. This warranty does not apply to those items which by their nature are subject to deterioration or consumption in normal service, and which must be cleaned, repaired, or replaced on a routine basis.

Warranty is voided by abuse including mechanical damage, alteration, rough handling, or repair procedures not in accordance with the instruction manual. This warranty indicates the full extent of our liability, and we are not responsible for removal or replacement costs, local repair costs, transportation costs, or contingent expenses incurred without our prior approval.

THIS WARRANTY IS EXPRESSLY IN LIEU OF ANY AND ALL OTHER WARRANTIES AND REPRESENTATIONS, EXPRESSED OR IMPLIED, AND ALL OTHER OBLIGATIONS OR LIABILITIES ON THE PART OF CROWCON, INCLUDING BUT NOT LIMITED TO THE WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT SHALL CROWCON, BE LIABLE FOR INDIRECT, INCIDENTAL, OR CONSEQUENTIAL LOSS OR DAMAGE OF ANY KIND CONNECTED WITH THE USE OF ITS PRODUCTS OR FAILURE OF ITS PRODUCTS TO FUNCTION OR OPERATE PROPERLY.

This warranty covers instruments and parts sold to users only by authorized distributors, dealers, and representatives as appointed by CROWCON.  We do not assume indemnification for any accident or damage caused by the operation of this system and our warranty is limited to replacement of parts or our complete goods.

# CheckBox System Requirements.

To use the CheckBox and the CheckBoxPC software, your personal computer must meet the following requirements:

- **Operating System:** Windows$^®$ XP.
- **Processor:** IBM$^®$ compatible PC running Pentium$^®$ 2 processor or equivalent minimum processing speed of 400 MHz.
- **Memory:** 128 MB RAM minimum
- **Hard Disk Space:** 20GB minimum
- **CD-ROM Drive**
- **Communications ports:** 1off USB port
- **Graphics adapter:** 1024 x 768
- **VDU:** minimum 800x600 (Although CheckBoxPC can be used with a keyboard and mouse, we have optimised the software for use with a touch screen.  Touch screens may be more suitable for workshop environments.  Crowcon can supply several optional touch displays)

## Please install the CheckBoxPC software BEFORE plugging in the CheckBox Hub.

This will simplify the installation process, as Windows needs access to drivers on the CD in order to install the hardware contained in the Hub.

# CheckBox Specifications.

| Input Power | 15V DC via the supplied PSU |
|---|---|
| Environmental | For indoor use only<br>0 Deg.C to +40 Deg.C<br>< 80% RH non-condensing |
| Applicable Instruments | Tetra, Gasman |
| Maximum number of Instruments | 10 |
| Maximum number of Gases | 8 (one of which must be air) |
| Gas fittings | 3/16" I.D. (4.7mm) |

# What is CheckBox?

CheckBox consists of the following components:

- The Hub
- Mains power supply for the Hub
- USB interface cable for connection of the Hub to a PC
- Gas Detector Interfaces
- Gas detector aspirator plates and tubing
- RS232 connection cables for connection of the gas detector interfaces to the Hub
- A gas cylinder with a Demand Flow Regulator
- CheckBoxPC Windows software

CheckBox is designed to be used with up to 10 compatible gas detectors. Any mix of compatible gas detectors can be used.



**5-station CheckBox (showing optional 7" touch display)**

# What is the Hub?

The Hub manages communications and gas distribution to allow calibration, bump test and information exchange with the attached gas detectors. The Hub provides visual feedback on the status of its gas solenoids and the internal pump.

CheckBox is designed to operate with Crowcon's existing charger/interface products for compatible gas detectors. The Hub centralises the functions of communications and gas distribution. Gas cylinders fitted with Demand Flow Regulators (DFR's) are connected to the Hub using 3/16" I.D. (4.7mm) tube. An inlet and outlet are selected using a matrix of gas solenoids. Gas is then drawn from the inlet and pumped to the outlet using an internal pump. The internal pump can deliver gas at two different flow rates depending on the requirements of the gas being delivered. A gas flow sensor fitted inside the Hub ensures that gas is flowing at the selected rate during calibration. This flow sensor can also detect empty gas cylinders and excess flow conditions.

## Front Panel
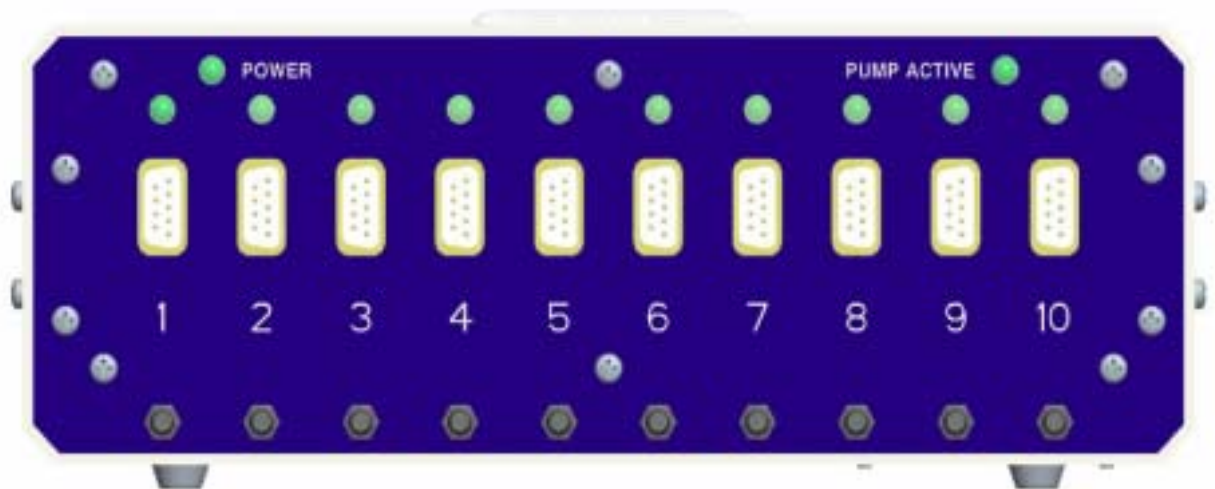


The front panel provides connections for communications and gas outlets. It also provides an LED to indicate when gas is being delivered to a particular outlet. A power LED is lit when power is connected to the Hub and a pump active LED is lit when the internal pump is running.

**Back Panel**



The back panel provides access to the DC power inlet, power switch, USB in, 8 gas inlets and 8 status LED's indicating that of the inlet gas solenoids are active.  Gas inlet 1 is normally used for fresh Air when CheckBox is purging or performing a zero operation.  The remaining inlets can be configured to connect to a variety of gases or gas mixtures.  The most basic application will use air and a single cylinder quad gas mixture containing $CH_4/O_2/CO/H_2S$.

Uniquely, CheckBox allows the connection of multiple cylinders of the same gas type and automatically manages the change over when cylinders become exhausted.

**Note: If the environment in which the system will be used is not known to have clean air, then a cylinder of air should be connected to inlet 1. Alternatively, a tube could be fitted and routed to a clean environment.**

# Communication Connections.

CheckBox must be connected to a PC's USB port using a USB cable (supplied), not connected via a Hub.  Within the Hub are a multi-way RS232 communications system and a bi-directional control system that is used to control the pump and gas solenoids.

Connections to compatible gas detectors are made using RS232 cables to the front of CheckBox.  CheckBox uses male 9-way D-type connections (as used on the rear of a PC).  Therefore, if longer cable lengths are required to reach instrument interfaces, standard RS232 extension cables can be used.

# Gas Cylinder and Regulator.

## Quad Gas Mix Cylinder

In the majority of applications CheckBox will be used with a single cylinder of Quad gas mix suitable for bump tests and calibrations. This mixture typically contains 50 %LEL $CH_4$/18.0 % oxygen/250 ppm CO/15 ppm $H_2S$. The majority of multi-gas and single gas detectors are designed to sense these gases making this a simple configuration for general use.

## Demand Flow Regulator & Tube

Cylinders of gas are connected to CheckBox using a DFR (Demand Flow Regulator). This type of regulator is screwed onto the top of a gas cylinder and supplies gas only when a partial vacuum is applied to its outlet. In other words, CheckBox draws the gas from the cylinder at the rate needed. DFR's also provide peace of mind as no gas can leak from a cylinder if the connection to CheckBox is accidentally broken or removed.

**It is essential that a DFR is used with CheckBox in order to ensure accurate calibrations.**

# Gas Detector Interfaces.

Gas detectors are attached to the system using their own specific charger/interface accessories. These accessories support the instrument while providing charging and communications connections. Gas is applied to the detectors using a standard aspirator plate connected to the Hub. Exhaust gas is routed to a suitable vent.

### Gasman Charger Interface

# Tetra Interface

The Tetra gas detector uses Infra Red communications and a conventional DC jack plug for power.  The Tetra interface is a moulded support that provides space to fit the standard IR communications device.  The support has slots to route the cable neatly.  There are also slots in the base of the support to provide cable clamping for the power cable, see figure below.  These slots are provided on three sides allowing flexible routing and organisation of Tetra interfaces.  Two mounting holes are provided to allow permanent installation onto shelving or benching.  An indent in the support is provided to locate the aspirator plate when no Tetra is present.  When calibrating, testing or recording date from a Tetra with a permanent aspirator plate attached, simply connect the tubing directly to the gas inlet and gas outlet on the fixed plate.

**Tetra Interface showing cable routing and clamp (above and below)**

# Preparing CheckBox for Use.

There are two parts to preparing CheckBox for use: hardware setup and software setup. This section describes hardware setup. The hardware setup consists of connecting the instrument interfaces communications, power and gas connections.

**Please note**: Install the CheckBoxPC software **BEFORE** plugging the Hub into the PC.  This will reduce the time for installation.

# Mechanical Assembly.

CheckBox is designed for bench use. Perform the following steps to assemble the system, referring to the illustration below.

1.  Find a location that is well ventilated.  It is common to use H2S in gas mixtures which can be unpleasant therefore a location close to a window will make it easy to route the exhaust out of the window. Otherwise, a low level of extraction can be used.  **However, an extractor must never be attached directly to the exhaust tube, as this will affect the calibration of gas detectors.**  Use an extractor with a cowl and point the exhaust at it. (See Instrument Interface Setup for advice on exhausts).
2.  Find a bench or other at surface that is large enough to accommodate CheckBox and the number of modules in your system.
3.  Place CheckBox on the at surface with enough room in front of CheckBox to fit all of the gas detector interfaces side by side and sufficient space for routing of cables and pipes.
4.  Connect each of the communications cables from the gas detector interfaces to consecutive D-type connectors on the front of the Hub
5.  Connect each of the aspirator plate inlets to their respective gas outlet on the Hub.
6.  Route each exhaust pipe to a suitable vent or common exhaust tube (see Instrument Interface Setup)
7.  Connect power cables from the gas detector interfaces either to an appropriate multi-way charger or the individual charger supplied with the gas detector.
8.  Crowcon recommends using a cable tidy system to help route the tubes and cables in an orderly fashion. Several types of cable tidy systems are available to help. See Accessory listing.
9.  Run the exhaust tube or tubes to a window or extraction area.

# Gas Bottle Connections.

Calibration and Bump test gases are connected to the rear of the Hub. Gas bottles must be fitted with a 1 litre/min DFR. Air is normally sampled from gas inlet 1. However, if the area around the calibration station is not considered as a fresh air area, (an area free of combustible and toxic gases and having normal oxygen content, 20.9%) then install a tube on the AIR fitting, on the back of the Hub and route it to a fresh air area, or connect a cylinder of zero air to the fitting using a DFR.

1. Screw the DFR(s) on to the calibration gas cylinder(s).
2. Connect the DFR for each gas cylinder that will be used with CheckBox to the desired gas port, GAS2,3,4,5,6,7 or 8.
3. Use CheckBoxPC to configure the available cylinders and which cylinder is connected to which gas inlet (see Configuring and Assigning gas cylinders in CheckBoxPC).

# Instrument Interface Setup.

CheckBox is designed to work with a range of Crowcon gas detectors. Uniquely, CheckBox makes use of existing gas detector charger/interfaces. These interfaces are connected to the communications and gas supplies of the CheckBox Hub. Power for charging is provided through the charger interfaces (or separate PSU in the case of Tetra).

To simplify the construction of a CheckBox system, Crowcon supply an assembly of items needed to connect one of the compatible gas detectors to the CheckBox Hub (see Accessory List). This assembly assumes that you only have the relevant gas detector (and a PSU in the case of Tetra). All other items necessary to construct a fully functional system are included.

Instrument interfaces consist of the following items:

- Charger/Interface (Gasman). Holder and PSU (Tetra)
- Communications lead (IR communications lead for Tetra)
- Aspirator plate
- 2m length (approx.) of 3/16" I.D. tube for connection of the Hub to the aspirator plate inlet and the aspirator plate outlet to the common exhaust, where applicable.
- T-piece connector for connecting aspirator plate outlet tube into the common exhaust, where applicable.

## Creating the exhaust for Tetra.

### Individual Exhaust

The recommended solution to exhaust used gas when pumped Tetra are used, is to connect a 3/16" I.D. tube to each of the aspirator plate exhaust ports and route them to a suitable vent or window. This system is simple to implement using readily available tubing. Crowcon recommend a maximum of 15m of exhaust for any single Tetra. Additional lengths of exhaust tube can be purchased.

### Common Exhaust

If a number of instruments are being used, a common exhaust could be created using a large bore pipe with exhaust tubes connected. Some form of low level extraction is then needed to prevent gas travelling back up the exhaust tubes of other connected instruments. It is important that direct suction is not applied to the exhaust pipes of the gas detectors as this can alter the accuracy of the calibrations.

**NOTE: Forced extraction should not be used on the exhaust tube.** Even

though the exhaust gas can be routed to an area to be safely dispersed, CheckBox should still be installed in a well-ventilated area as small amounts of gas can escape.

# An important note about pumped gas detectors.

*Some gas sensors are sensitive to pressure. If gas is applied at high or low pressure to such sensors, their readings will vary. For this reason, pumped gas detectors are tested with their pumps disabled as their internal pumps will "fight" against the pump delivering the gas creating either over or under pressure depending on the pump flow rate. Tetra disables the pump in different ways.*

## Tetra

Tetra uses an internal pump with no external tube. CheckBox has a unique feature, which prevents Tetra's pump from stalling when it is connected to CheckBox. When Tetra is connected to the CheckBox aspirator, the pump continues to run without stalling. When Tetra is about to be bump tested or calibrated its pump is switched off. At the end of the bump test or calibration, the pump is switched back on. For this reason, creating a common exhaust with multiple pumped Tetra can cause backpressure as all the Tetra are pumping into the exhaust.

**NOTE: DO NOT REMOVE A TETRA FROM CHECKBOX BEFORE COMPLETION OF A CALIBRATION OR BUMP TEST, ITS PUMP MAY NOT BE SWITCHED BACK ON. WAIT UNTIL THE FINAL STATUS IS INDICATED ON THE PC.**

# Installing CheckBoxPC Software.

**NOTE:** CheckBoxPC software has been designed and tested to run under Microsoft Windows XP operating system. Please make sure the PC you intend for CheckBoxPC to be used with has XP installed and meets the minimum system requirements.

**NOTE:** In order to install the software you must be logged into the PC as an administrator. If you are using XP Home, you will already be an administrator. Please remember not to connect the CheckBox hub until the software has been loaded successfully.

1. If your CD is configured to automatically run CD software then the installation will start shortly after inserting the CD in the drive.
2. If your CD does not autostart, then, from the top level of the Installation CD, double click Setup.Exe.
3. CheckBoxPC Setup Wizard will guide you through the installation process.
4. Read the copyright statement, then click **Next.** There is an OEM screen followed by a machine name screen, please ignore this screen and click **Next.**
5. You are now in the Select Installation Folder window. The default installation folder (C:\Program Files\Crowcon\CheckBoxPC) is displayed. If you want to install the software in a different location, choose a new installation folder now and then continue with step 6.
6. Click **Next** again and the installation process will begin.
7. During software installation, the installation program may find newer versions of Windows files on your computer than those in the Installation CD. If this happens, the installation software will ask you if you want keep these newer files. Click **Yes** to do so.
8. Follow the on-screen instructions to complete software installation.

# Plugging in the Hub for the first time.

Now connect the Hub to the PC using the USB cable, and switch on power to the Hub.

**Please have patience! Installing the Hub for the first time requires 20 Windows drivers to be installed; this will take 10-15 minutes.**

The Hub uses USB to link the PC to 11 different devices. Ten of these devices require a software driver, which is provided on the installation disk. Once these are installed, Windows will detect ten new RS232 devices and then prompt to install the relevant drivers. The following screens will be presented during the installation.

## 1



When installing the CheckBox software, the screen above may appear. You do not need to access the Internet to install this programme. Please select the "No, not this time" option from the list, and click Next.

## 2
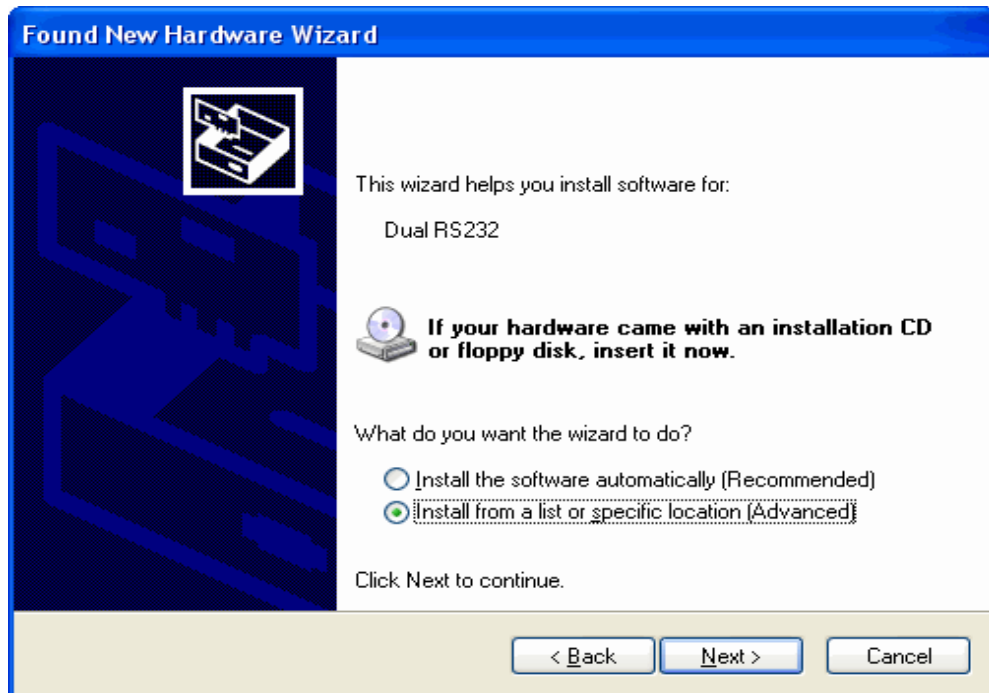


Ignore the option of automatic installation, and select the "Install from a list or specific location (Advanced)" option, and press Next.

## 3
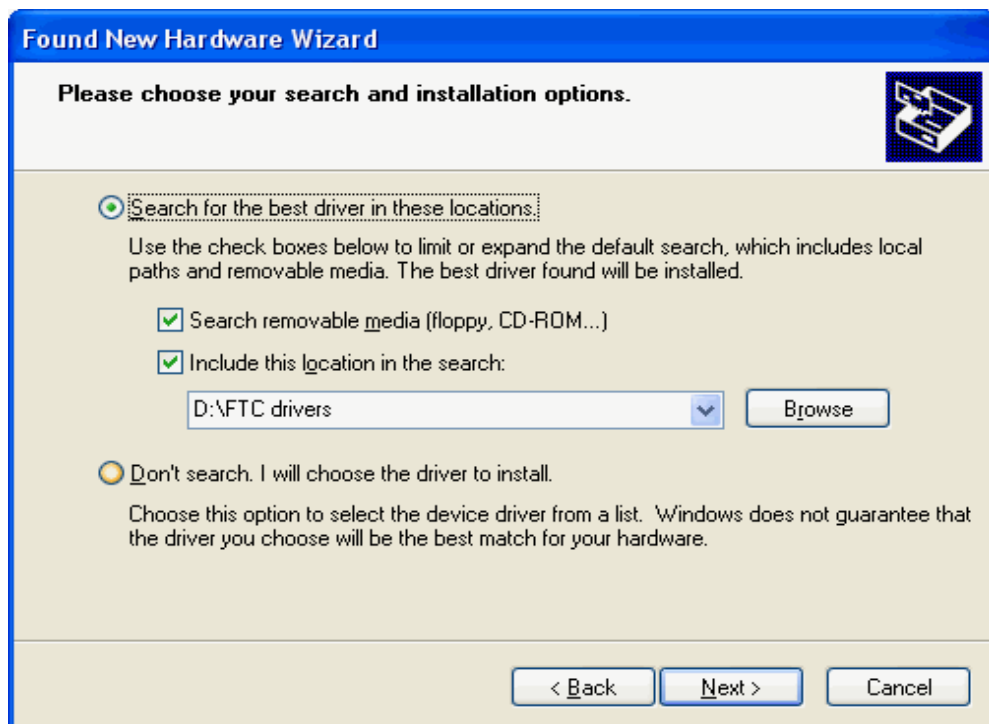


Select "Search for the best driver in these locations", as shown above.
Use the drop-down box to select the location of the "FTC Drivers". Click Next, to continue with the installation process.

**4**
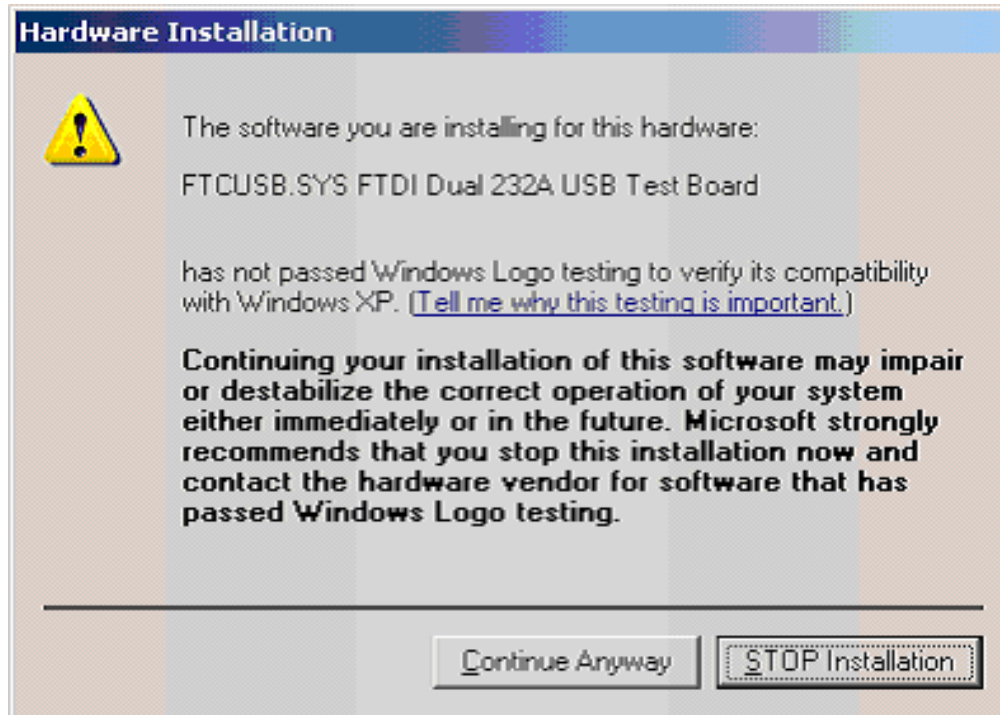


You may see the screen above if you have "driver signing" enabled. Press "Continue Anyway".

**5**
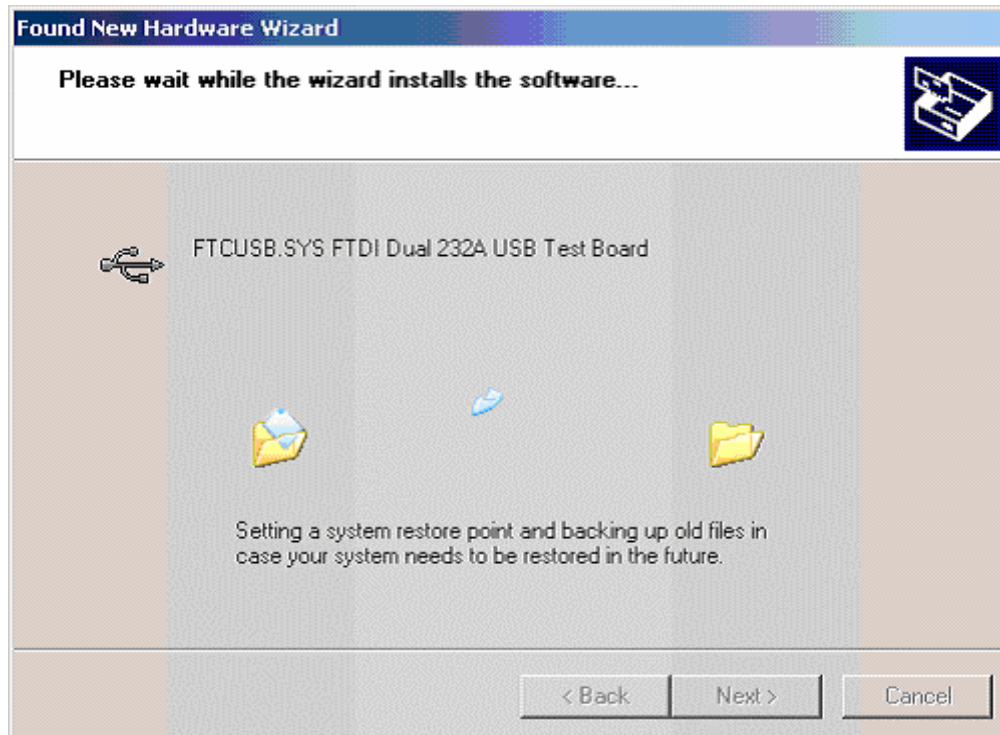


Next, Windows will identify the device details and load its driver.

**6**



Finally, Windows will indicate the driver has loaded, click Finish.

**The sequence above, steps 2-6, will occur 10 times, once for each device.**
**Then the following sequence, steps 7-10, will also occur 10 times.**

**7**
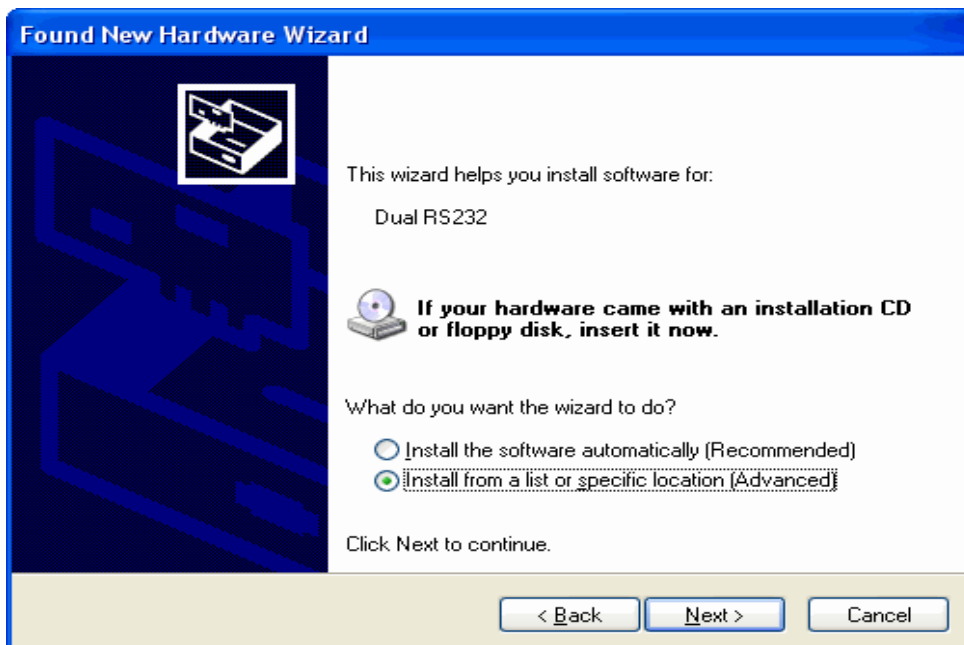


As before, select "Install from a list or specific location". Windows detects that the connected hardware supports a USB serial port. A new wizard will take you through the installation process as Windows loads its own serial port driver.

**8**
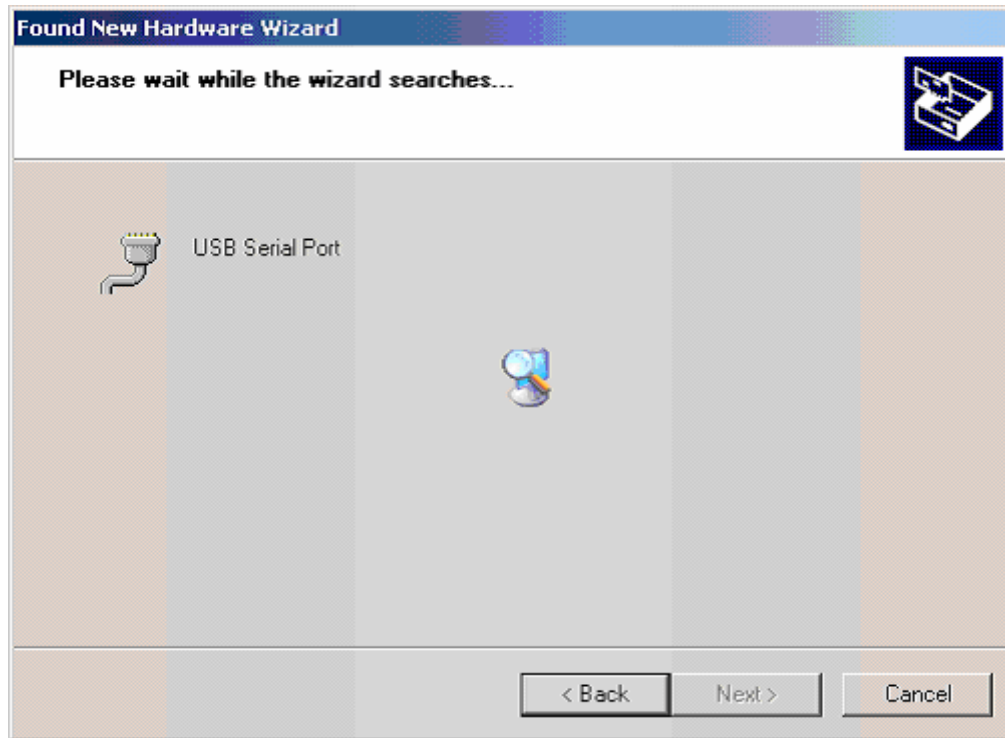


Click Next when appropriate.

**9**
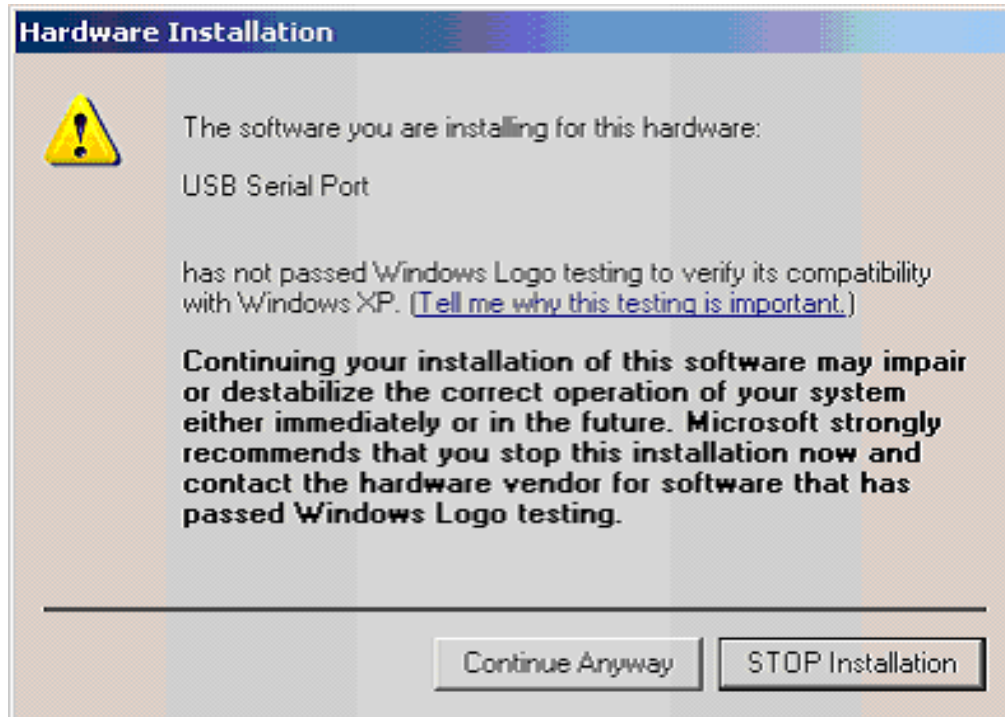


As for step 4, select "Continue Anyway".

**10**
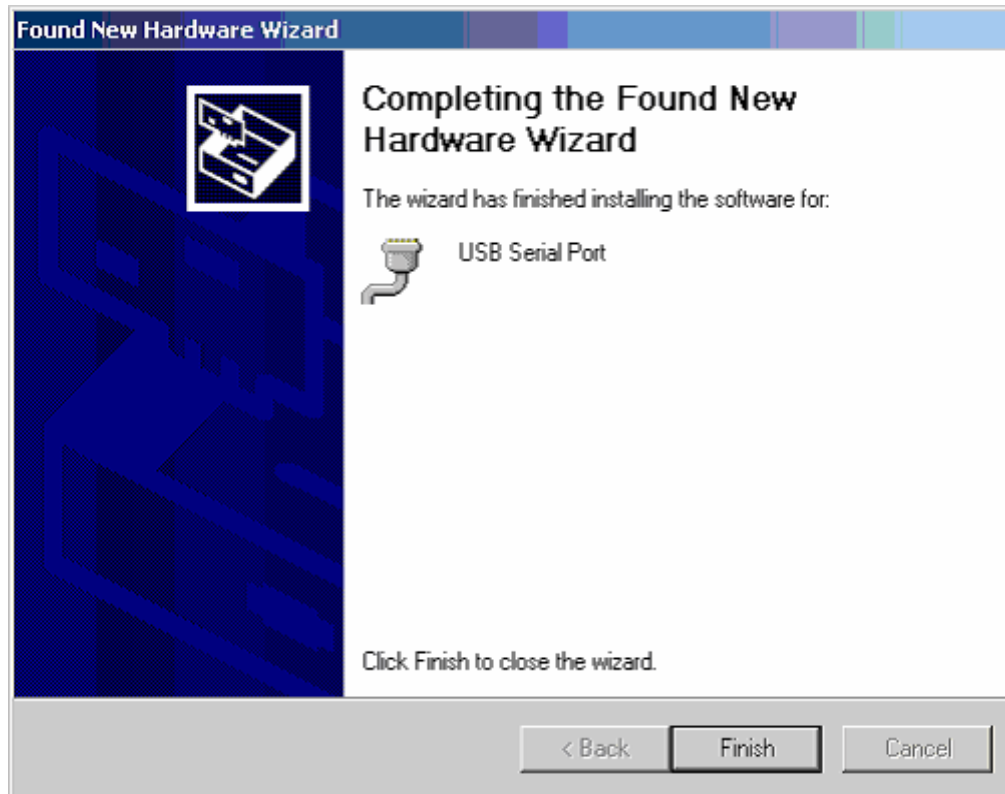
The USB serial port is now fully loaded. Click Finish to complete installation. Everything is now loaded and the CheckBoxPC software can now communicate with the Hub and connected gas detectors.

**N.B. If your PC has more than one USB port, ensure that the Hub is always plugged into the same USB port, otherwise the installation procedure will have to be repeated.**

# Launching the CheckBoxPC Software.

1. Double Click the CheckBoxPC icon installed onto your desktop, this will open the Logon screen. If this is the first time the application has been run, select **Administrator** for the username and type **Administrator** as the password. **Note:** the password is case sensitive.
2. The main program window then appears.
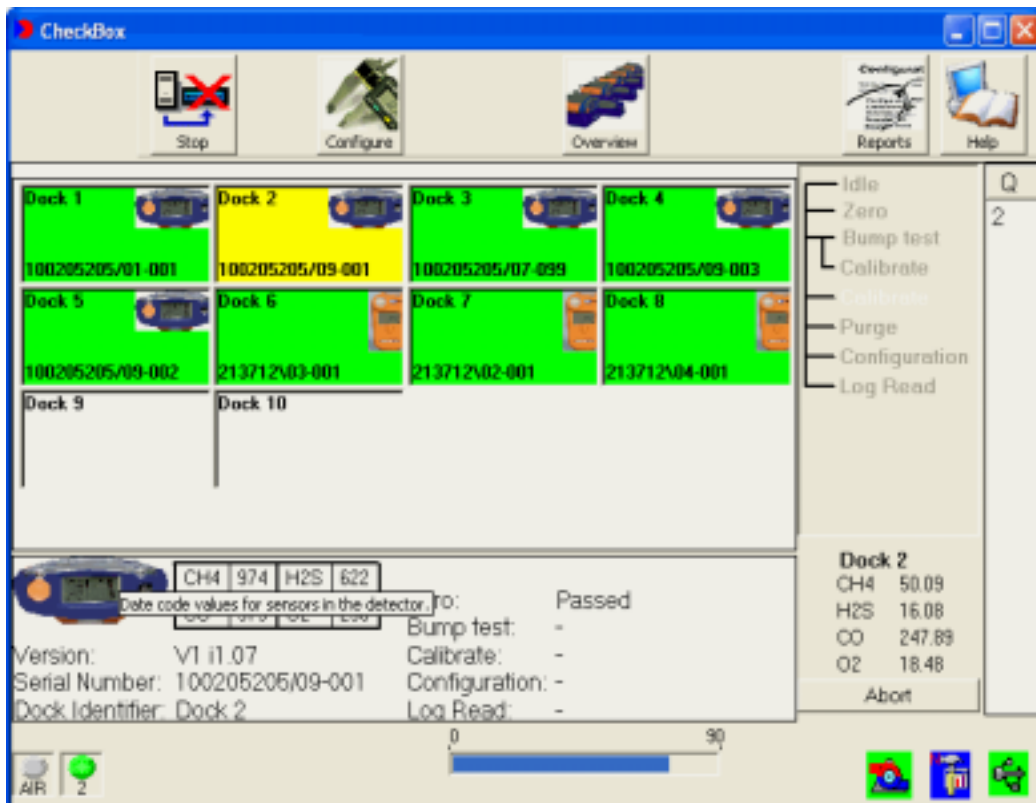


(You can also start the software by pressing START\Programs\Crowcon\CheckBoxPC)

# Overview of the CheckBoxPC Software.

This section provides an overview of the software, more detail is provided in later sections.

The CheckBoxPC Software is designed to provide manual or automated calibration, bump testing, and audit trail functions for a range of Crowcon gas detectors. It also provides the capability to restore original configurations and alter instrument parameters such as alarm levels.

CheckBox automates many tasks.  By default, when a gas detector is inserted into its relevant interface, the detector is placed in a queue.  Once it reaches the head of the queue, a pre-defined sequence of actions takes place and an overall PASS / FAIL result is recorded.  The user interface presents a clear view of the status of the detectors and the system, making it quick and easy to work with.

CheckBoxPC uses a database to store information about instruments that have been connected to the CheckBox.  This information builds over time and can be viewed or printed to form an audit trail relating to a specific gas detector.

# CheckBoxPC Functions.

The main screen of CheckBoxPC provides an overview of the system.
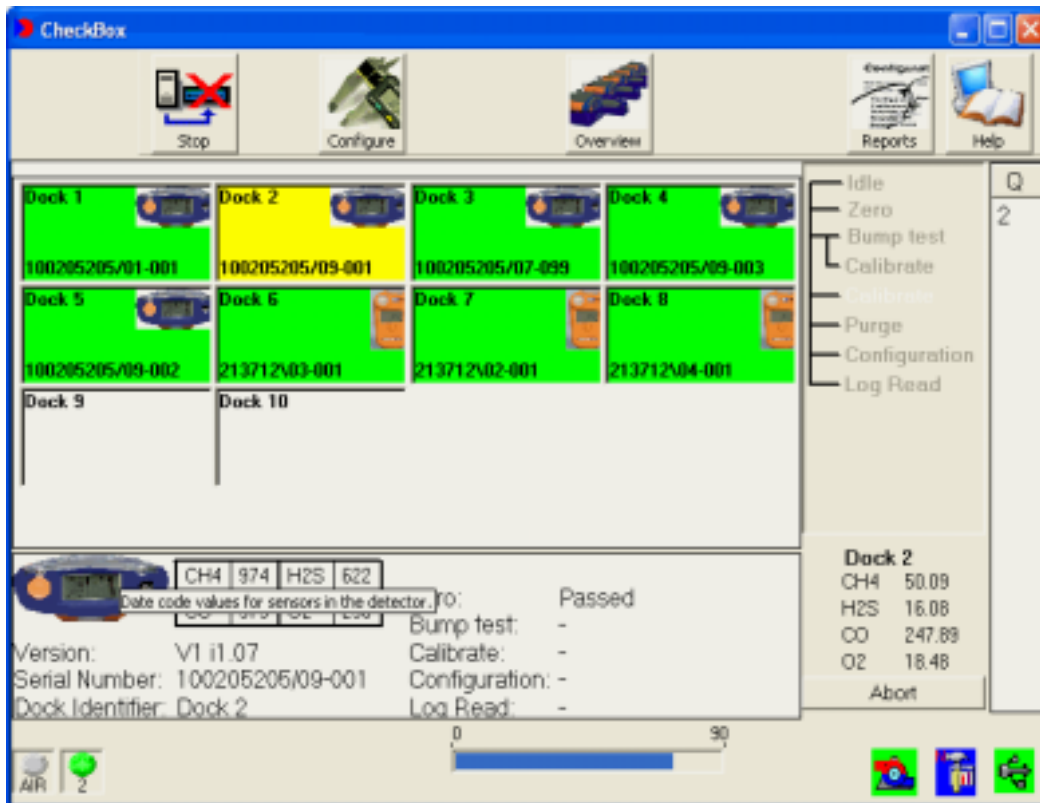


# Gas Detector Status Window

The central area is split into two sections.  In the top section each instrument interface is shown with a colour coding to allow quick identification of the state of each connected gas detector.  The number of boxes present depends on the number of instrument interfaces configured.

- White empty box - no gas detector present
- White box with a picture of a gas detector in - gas detector found, this detector will now be in the queue.
- Yellow - CheckBox is currently working with this gas detector
- Green - Gas detector has successfully completed automated actions and is still present
- Red - Gas detector has failed automated actions and is still present

In the lower area of the central section a summary is shown of the currently active gas detector.  However, clicking on a dock will change this view to the detector selected.  Once CheckBox moves to a new detector, this view is automatically updated to the currently active detector.

During a sequence, a panel is shown, below the progress tree, which shows the gas values of the instrument that is currently being sequenced. This panel also contains a button that will allow the user to abort the current sequence only. Once a sequence is aborted, the dock will show a failed result. The grid to the right of the detector picture contains a list of the gas channels fitted to the unit in the relevant positions. This panel is updated when an instrument is detected in a dock.

# Control Buttons

At the top of the screen are several buttons for the following functions:
- Stop - Press this button to stop the automatic sequencing functions. The button changes to Start, pressing it will restart the automatic functions.
- Configure - This accesses an area to configure:
  - Cylinders - Used to define a range of gas cylinders which can be used with CheckBox
  - Inlets - Identifies which cylinders are connected to which inlets on the back panel of CheckBox
  - Settings - accesses a set of detailed settings for CheckBox
- Overview - This returns the system to the default overview mode
- Reports - This accesses the reporting system where reports can be configured, viewed and printed
- Help - This calls up the help file

# Progress Tree

On the right of the main screen is a progress tree. This tree indicates each of the functions that can be performed on a gas detector and for the currently active gas detector, which function is in progress.

# Queue

Also on the right is a queue. The queue is a list of the interface numbers. At the top of the queue is the interface, which CheckBox is currently working with. As detectors are inserted into their interfaces, their respective interface numbers are added to the queue. In this way it is possible to see at a glance when a particular gas detector will be selected.
The central area and the two panes on the right make it easy to see what is happening in the system and what activities remain.

# Valves

At the bottom of the screen there are indicators showing which inlet valve is activated. A lamp lights up green to indicate when a valve has been activated. The lamps are located in a box, which is colour coded in the

following way:
- Grey - A cylinder is connected to this inlet
- Red - A cylinder is connected but it is empty
- Yellow - A cylinder is connected but has passed its expiration date

# Pump

Next to the valve lamps is a pump indicator.  This shows the flow rate the pump is set to using colour coding.

All Red - Pump is stopped
Lower half Blue, Upper half Red - Flowing at 0.5 l/min
All blue - Flowing at 1 l/min

# Progress

When activities are being performed a progress bar appears indicating the time for the activity.

# USB

In the bottom right a USB symbol indicates the health of the USB link.  This symbol is usually green, but if red indicates an error occurred during CheckBox startup.  If the symbol is red, double clicking will cause a re-try of the USB connection.

# Setting Up the CheckBoxPC Software.

Once the software is installed, you must set up the software for your system. Setting up the CheckBoxPC software consists of the following essential tasks:

1. Selecting the number and type of Gas Detector interfaces connected to your system
2. Selecting the automatic functions (Sequencing) performed when a gas detector is added to the system
3. Defining Gas Cylinders and their contents
4. Defining which gas cylinders are connected to which gas Inlets

Additional tasks may be necessary; these are covered later in this section. However, the general defaults will probably be acceptable for most users.

- Setting up different users
- Configuring gassing times and bump test limits

# Configuring Gas Detector Interfaces.

CheckBoxPC needs to know how many gas detector interfaces are connected to the system so that it does not waste time trying to find gas detectors that do not exist. In addition, it is necessary to tell CheckBoxPC what type of gas detector is connected to which input on the Hub. To configure the gas detector interfaces, select the **CONFIGURE** button from the main screen then the **SETTINGS** button. Then select the **GAS DETECTORS** tab. For each of the ten positions select the gas detector type, or **NOT USED** if no interface is connected. On the right hand side the PC communications port number used is listed. Windows automatically assigns this number to CheckBox.
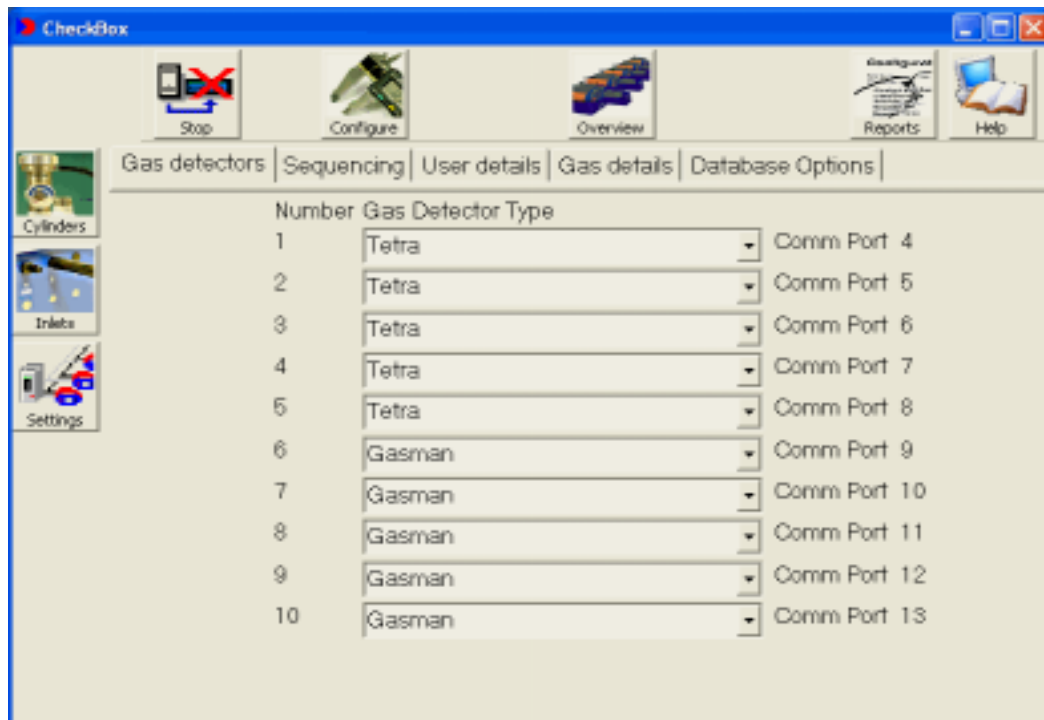


**Configuring Gas Detector Interfaces**

# Configuring Sequencing.

When a gas detector is inserted into its interface, CheckBox automatically detects it and places it in the Queue. Once at the top of the queue, an automated sequence of actions is performed. To select what actions are

performed, press the **CONFIGURE** button from the main screen, then **SETTINGS** and finally select the **SEQUENCING** tab.
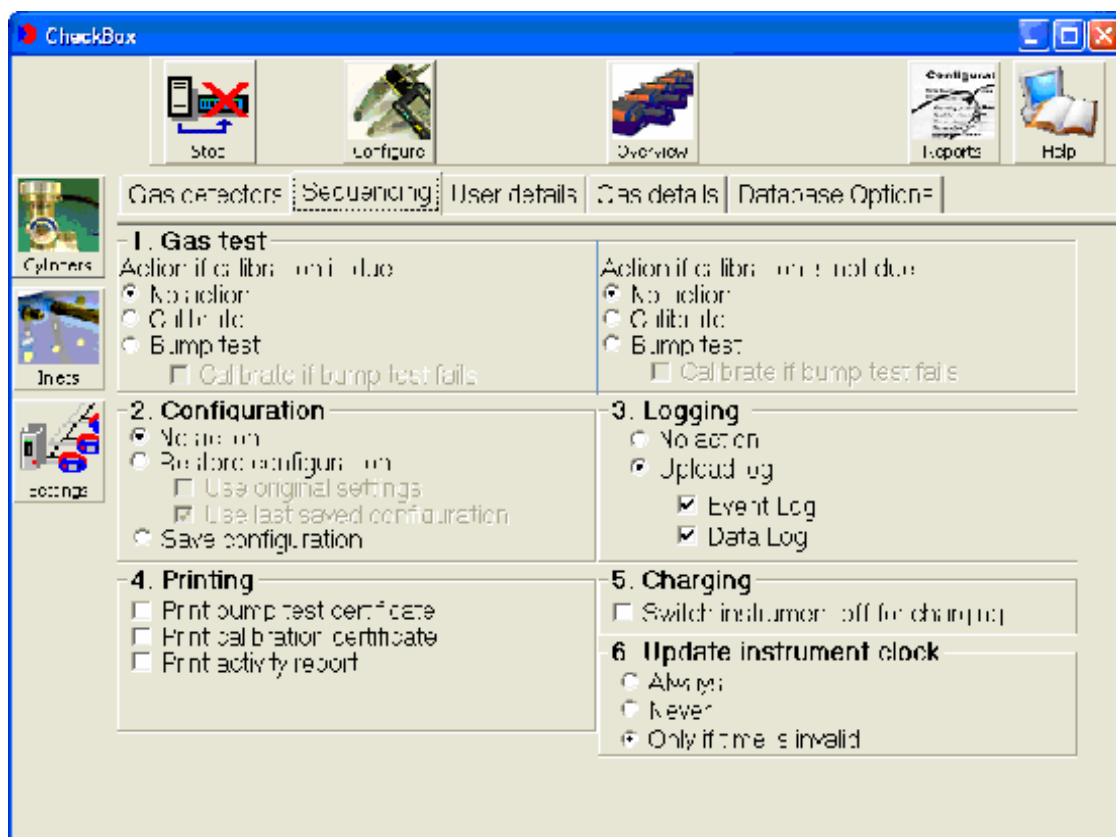


**The Sequencing Configuration Screen**

There are five elements to the sequencing:

1. Gas testing
2. Configuration
3. Logs
4. Printing
5. Charging

# Gas Testing

Gas testing allows the user to decide if a calibration or bump test should be performed. This selection is split into two parts. If the gas detector has reached or exceeded its re-calibration date (Calibration-due), then the left-hand pane is used. If the Calibration-due has not been reached, then the right hand pane is used. Using these two panes the user can easily configure CheckBox to choose what type of gas test/calibration is performed.

# Configuration

After gas testing, the detector configuration can optionally be restored to a known state or saved.  Using this option, the user can ensure a gas detector is always configured back to a known state.  The **Original settings** configuration is the first recorded configuration in the CheckBoxPC database for this serial numbered gas detector.  Alternatively, if gas detector configurations are maintained by a different system or by individuals, a copy can be saved of the current configuration.  CheckBox then provides an audit trail of configuration changes.

# Logs

Crowcon gas detectors provide different types and sizes of data/event logs.  If selected, CheckBoxPC will record all data and event log information from the connected gas detector.  After recording the data the gas detectors internal log will be cleared.  This helps to reduce the amount of data stored in the gas detector and reduces the time taken to upload data from the gas detector.

**NOTE:** Some gas detectors contain very large logs.  If a log has never been cleared it may take a considerable time to upload the first time this option is selected.  A progress indication is provided.

# Printing

After all the above activities have been completed, a range of reports can be printed.  The **Activity Report** is a summary of the selected actions performed from the above list and their respective status.

**NOTE:**  Reports can be re-printed at any time in the future from the **reports** page, so it is not essential to print reports as the testing is performed.

# Charging

At the end of the automatic sequence, the gas detector can be switched off to reduce the time for charging.

When 'Switch off instrument' is checked, the instrument will be switched off **only on successful completion of a sequence.** Once switched off, the dock view for the instrument on the overview will show as a green background with white text to indicate that the instrument is in an off state.  In this way, the status of the unit can be checked quickly if the system is left un-attended. The dock view will remain in this state until that dock detects an instrument in an on state.

# Cylinder Configuration.

CheckBox can have a maximum of 8 gas cylinders connected at any time. However, CheckBoxPC needs to know what is in each cylinder so that it can chose the appropriate one for each gas detector during bump tests and calibrations. The **Cylinders** screen shown below, is where previously defined gas cylinders are listed.
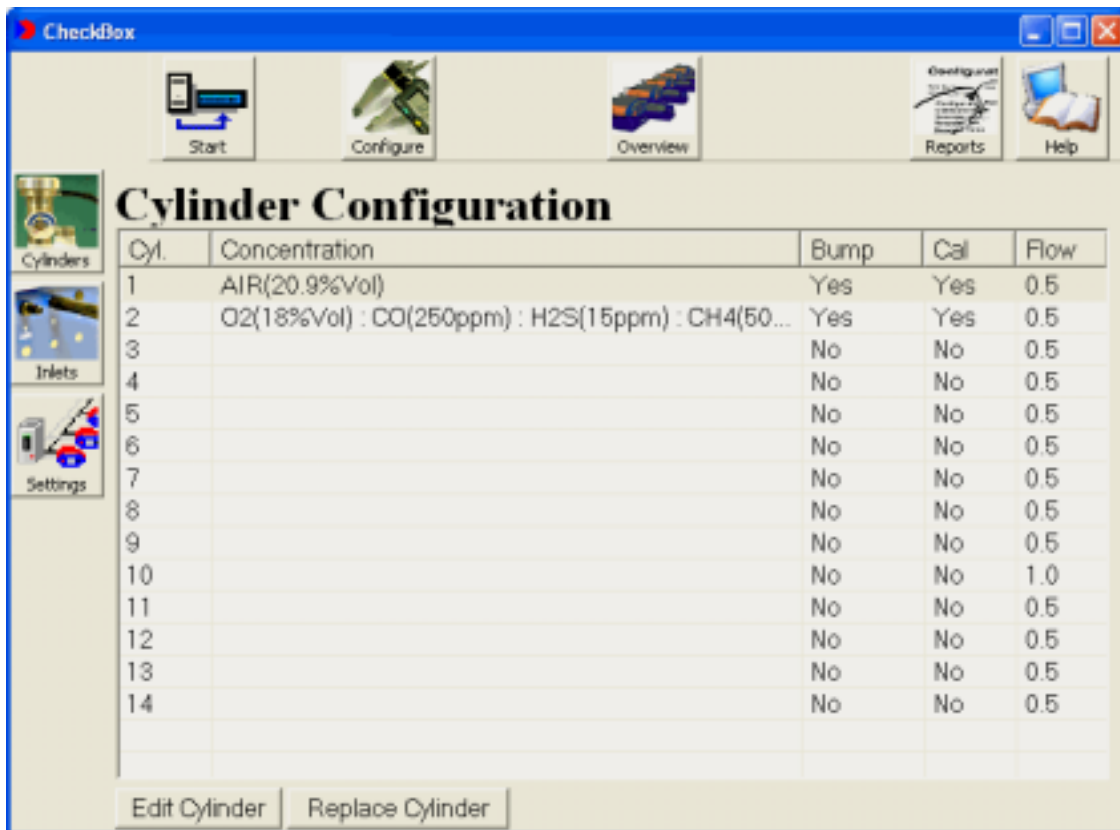


**The cylinders configuration screen**

A maximum of 14 cylinders can be defined and are listed in the central pane. Each cylinder lists the gases and concentrations. CheckBox needs air for purging and setting the zero points on all but oxygen sensors. For this reason, cylinder 1 is allocated to air (20.9% O2) and is automatically connected to gas inlet 1 (see **Inlets** section).

# Bump & Calibration

Also listed in the central pane are columns marked **Bump**, **Cal** and **Flow**. Bump and Cal indicate if the gas is intended to be used for bump testing,

calibration or both.  For example, a quad gas blend could be selected for bump testing while single gas bottles of each of the individual gases could be selected for calibration.  In the same way, the air cylinder could be selected only for calibration and a bottle of 18% O2 selected for bump testing.  This would result in calibrations for oxygen sensors being performed with fresh air while bump tests would be performed with 18% bottled oxygen.

# Flow

The flow column indicates the flow rate CheckBox will use to deliver the gas. Most gases can be delivered at 0.5 litres per minute but some gases (such as heavy hydrocarbons and some toxic gases) benefit from higher delivery rates.

At the bottom of the Cylinders screen are buttons that are used to **Add**, **Edit**, **Remove** and **Replace** cylinders.

# Multiple Cylinders of the Same Type

You can use multiple cylinders of the same content with CheckBox.  However, you must define a new cylinder in the list above for each one.  This is needed so that the Lot numbers, expiry dates and empty status are correctly updated.

# Add / Edit Gas Cylinders.

CheckBoxPC allows the user to define up to 14 different gas cylinders. Pressing the Add button brings up the following screen:



**Adding a new gas cylinder**

## Use for bump test & Use for calibration

These check boxes allow the user to decide if the gas can be used for bump testing, calibration or both.

## Cylinder number

The cylinder number is automatically allocated from the next available.

## Lot Number & Expiration Date

Gas cylinders used for calibration have an identification, allowing the user to trace their contents to the source gases. This lot number should be entered

so that traceable calibrations can be produced.  When bump tests and calibrations are performed CheckBoxPC stores this information along with the cylinder contents and expiration date in the database.  Bump test and calibration printouts include details of the cylinders used, their lot numbers and expiration dates.

# l/min

The flow rate for this gas can be selected as 0.5 litres per minute or 1.0 litres pre minute.

# How does CheckBox decide which cylinder to use?

If more than one cylinder is selected for bump testing and/or calibration, CheckBox decides which one to use in the following way:

1. First, CheckBox identifies the gases in the connected gas detector.
2. CheckBox then looks at the gas cylinders connected to the gas inlets (see **Inlets**) starting from inlet 1.
3. For each cylinder, CheckBox confirms that the cylinder is available for the chosen action (bump or cal) **AND** that it is not empty.
4. For each available cylinder, CheckBox scores the cylinder based on the number of gases it contains that match those in the gas detector.
5. Single gas cylinders are prioritised over mixtures if both are available.
6. CheckBox then uses the cylinder with the highest score.

Using this system, CheckBox will automatically work its way through multiple cylinders connected with the same gas, as they become empty.  This feature is very useful when running the system unattended.  This system also automatically minimises the number of cylinders used when various mixtures are available, thus keeping bump test and calibration times to a minimum.  In addition, using the single cylinder priority, air can be calibrated using the air inlet by selecting the air inlet for calibration, even though oxygen may be available in a blend also selected for calibration.

For example, setting the air inlet for calibration and connecting a single cylinder of CH4/CO/O2/H2S selected for calibration would result in the air inlet being used to calibrate the O2 channel while the blend being used for the other 3 gases.  If the air inlet were not selected for calibration, then all channels would use the mixture.

# Adding, Editing and Removing Gas.

Pressing **Add Gas** allows a gas type to be selected from a list. The

concentration can also be entered.
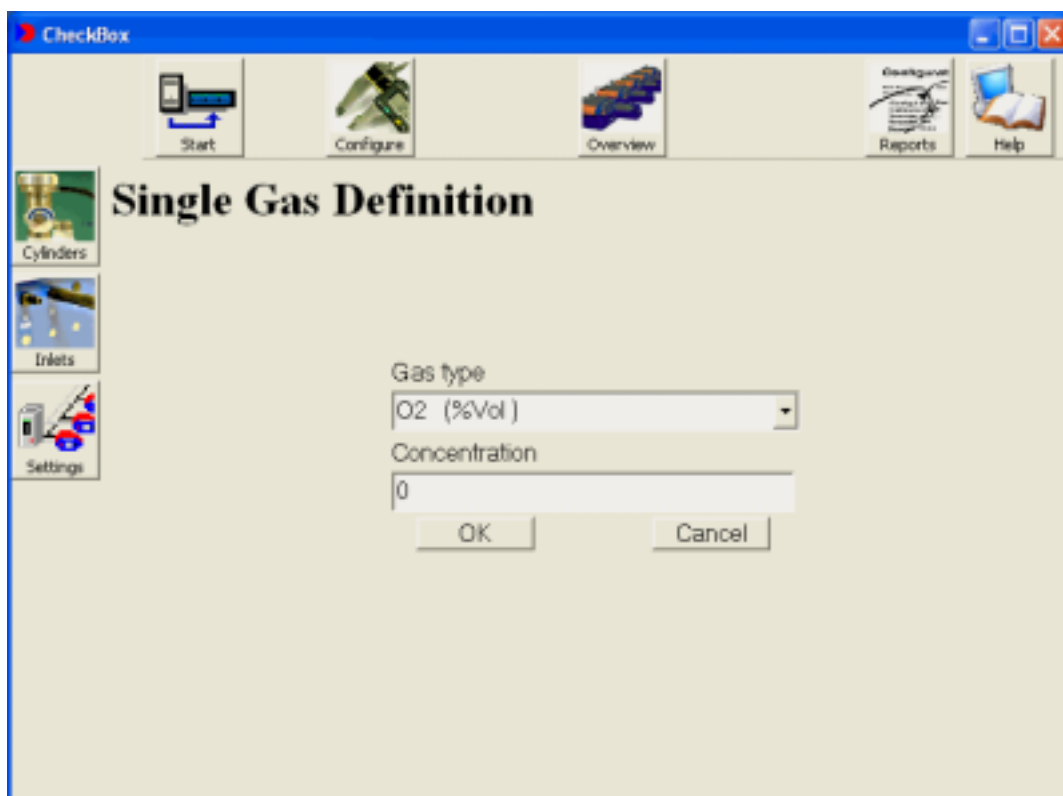


Once OK is pressed; this new gas is added to the cylinder details.  Additional gases can be added creating gas blends.  **Edit Gas** is used to change a gas in an existing cylinder definition.  Simply click on the existing gas and press Edit Gas, the gas type and concentration can then be altered.  Selecting a gas in the list and pressing **Remove Gas** will remove the gas from the list.

**Note:** Cylinder 1 is reserved for air.  This cylinder can be edited but the gas type and concentration cannot be altered, neither can any other gases be added.  The default expiration date is set to 2199 preventing it from expiring. The user can select whether air is used for bump and/or calibration allowing flexibility with bottled oxygen.  CheckBox does check the flow rate of the air inlet, in order to correctly detect empty cylinders, if cylinder air is used.
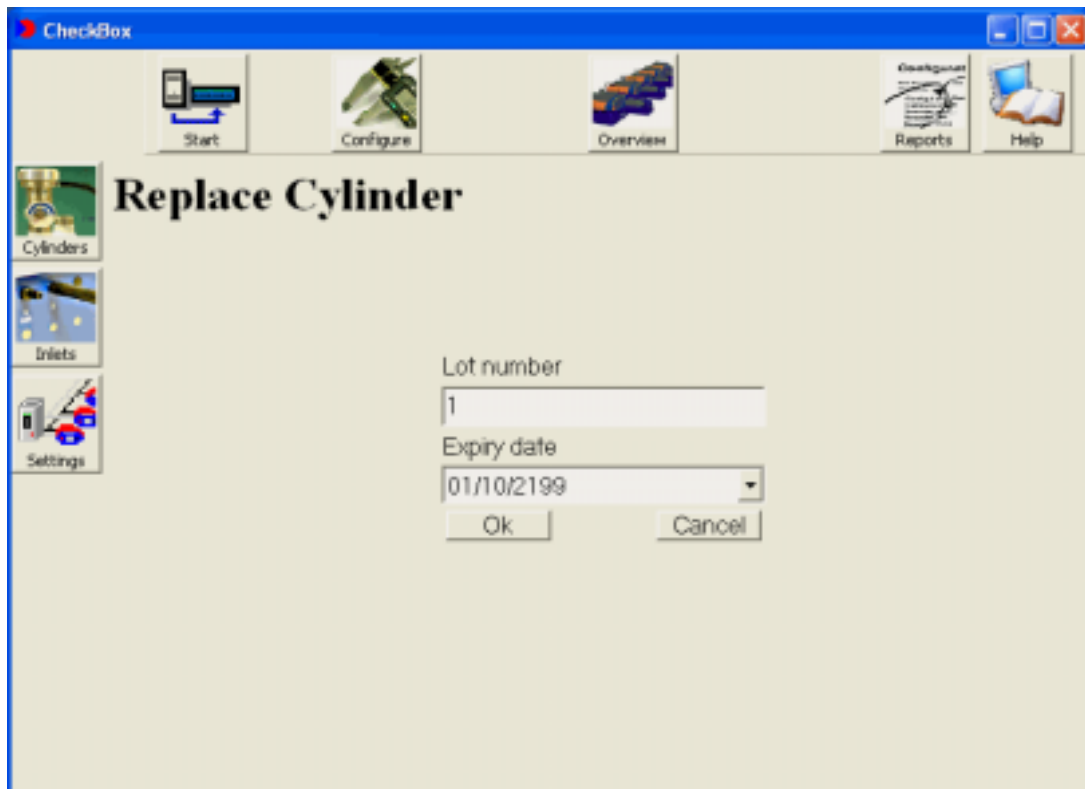
# Remove / Replace Gas Cylinders.

## Removing a gas cylinder

To remove a cylinder from the cylinder list, select it by clicking on the appropriate line in the main window and press the remove cylinder button. The details will be removed from the main screen.

## Replacing a gas cylinder

Once a cylinder has passed its expiration date, or become empty, the cylinder will need to be replaced.  Press the **Replace Cylinder** button and enter the new lot number and expiration date.



The cylinder will now become usable again.  Empty cylinders are indicated on the main screen by their background being Red.

**Note:** CheckBox insists that a different lot number is used for a replacement cylinder.  If a cylinder has been incorrectly identified as empty (perhaps because the tube was kinked) or the lot number is the same for the replacement cylinder, simply delete and re-insert a digit of the lot number and CheckBox will now accept it.

# Assigning Gas Cylinders.

Once gas cylinders have been configured, they need to be assigned to specific inlets on the Hub.  To do this, press the **Inlets** button to open the following screen.
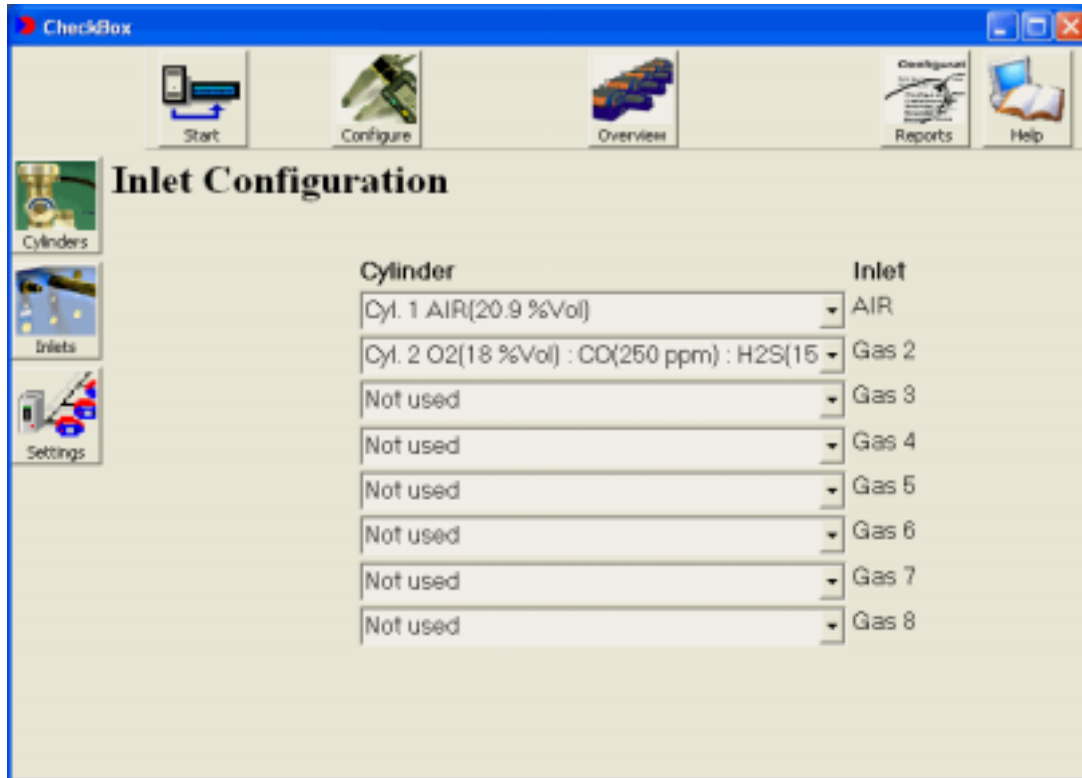


**Inlets Screen**

A list of up to 8 cylinders is shown on the left connected to each of the 8 physical inlets on the CheckBox Hub.  Simply select one of the pre-defined cylinders from each of the drop down lists in order to assign a cylinder to an inlet.

**NOTE:**  If you are connecting several cylinders of the same type, define multiple cylinders of the same type in the Cylinder page.  This is necessary so that the lot number, expiry and empty status are correctly assigned to the specific cylinder.

**NOTE:**  Remember to connect the actual cylinder to the correct inlet on the Hub!!!

# User Details.
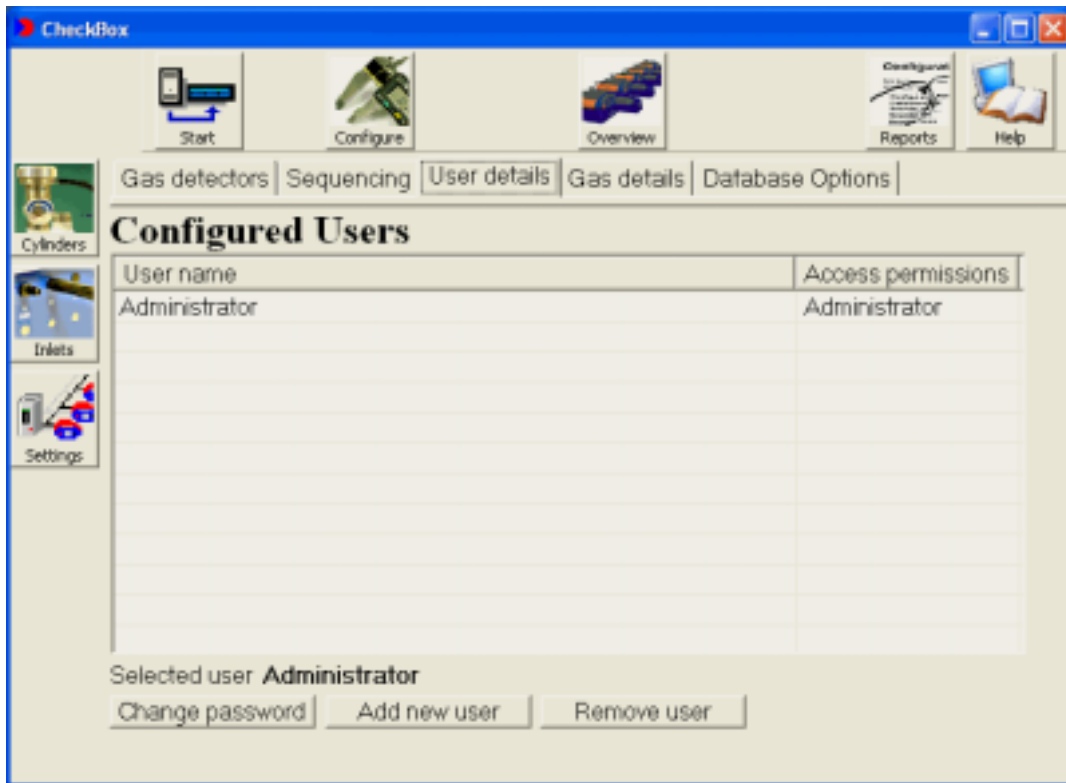


This screen allows the creation of different users.  Users can then log on to CheckBoxPC with their own passwords.  All actions recorded in the database are recorded against the user logged in at the time.  There are two types of user, each with their own type of access to the system:

1. Administrator - allows access to all facilities, including the user details screen
2. Standard User - allows limited access to screens and manual operations

The following features are not accessible from a standard user account.

- Configuration/Settings - none of the settings screens are accessible
- Configuration/Inlets - standard users cannot re-assign the inlets
- Configuration/cylinders - standard users are only allowed to change cylinders when the become empty
- Reports - standard users can produce reports, but cannot change their layout or configuration
- Overview - standard users cannot edit or download configurations

# Add User

Press this button to add a new user to the system.
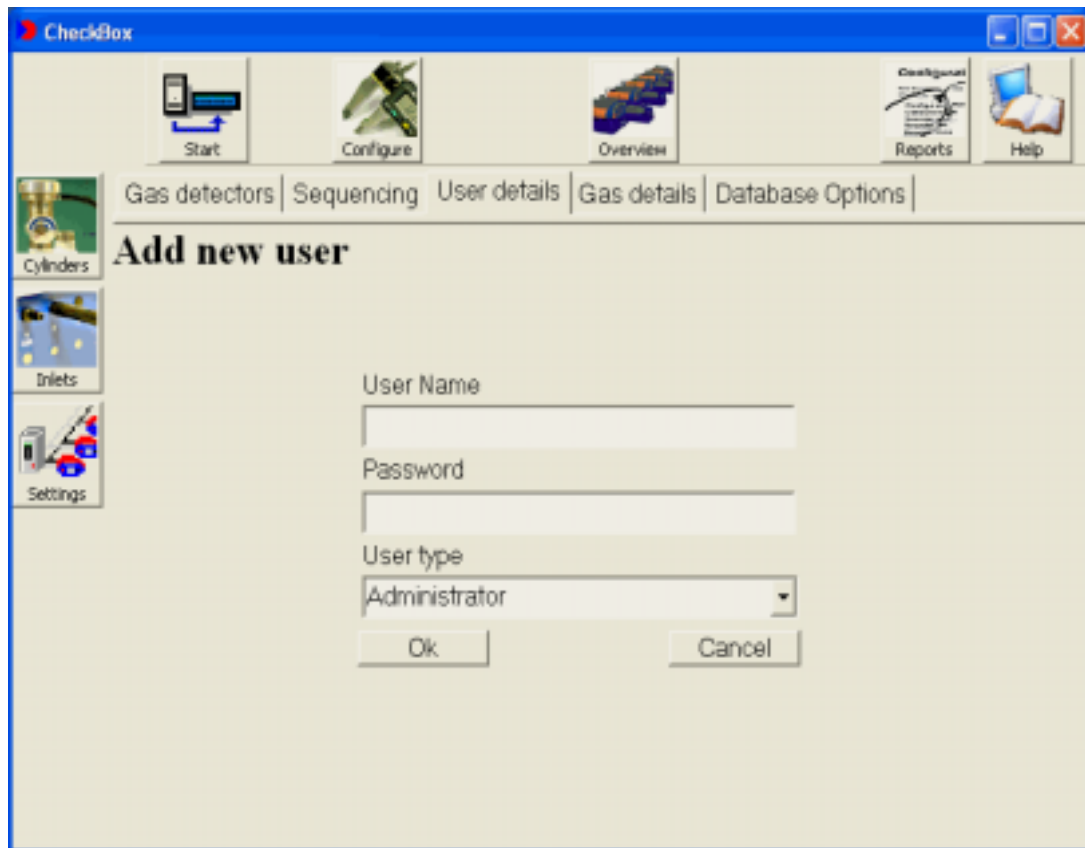


# Remove User

Selecting a name from the list and pressing this button will remove the user from the system. This does not alter information already recorded in the database against this user. It is not possible to remove the Administrator account.

# Change Password

This button allows the administrator to change the password of an existing user.  Pressing the button produces two boxes where the new password should be entered.  It is not possible to show the current password of a user.
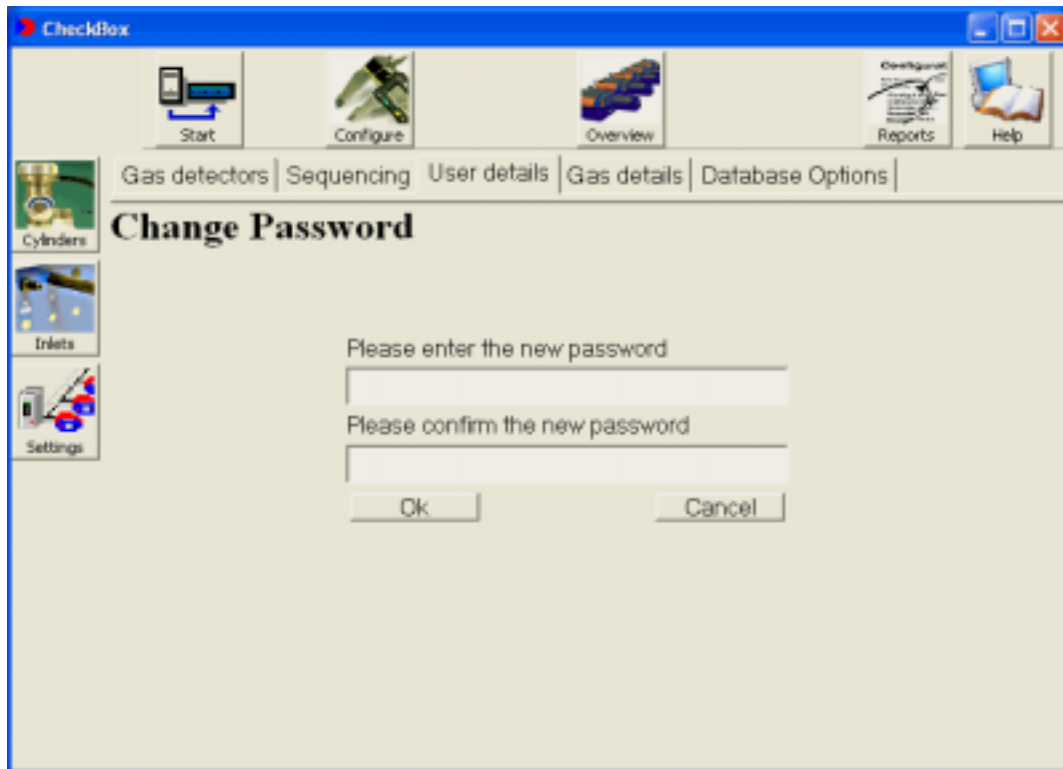


**NOTE:  The default password for the Administrator account is Administrator.  Please remember that passwords are CASE SENSITIVE! Administrators should change the Administrator password if security is to be managed.**

# Gas Details.

The Gas Details tab in the Configuration/Settings section allows configuration of several parameters related to bump testing and calibration.
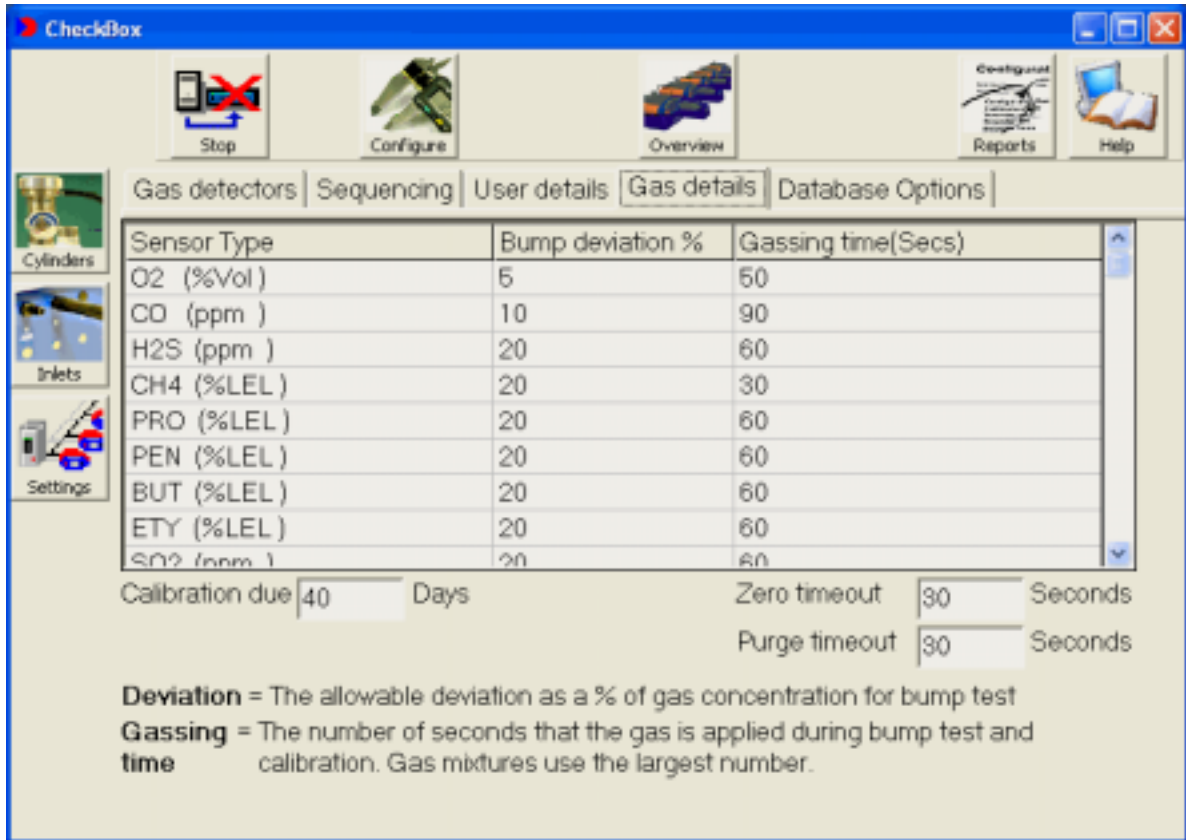


**The Gas Details Screen**

## Sensor Type

This column lists all of the gases that CheckBoxPC is able to use.  Where a gas may be available with different concentration units, it will appear separately e.g. CH4 (%LEL), CH4 (%v/v).  These two gases are treated differently and allow bumps and calibrations to select the appropriate gas cylinders.

## Bump Deviation %

When a bump test is performed, the gas detector readings are compared to the expected value.  A PASS is recorded if the reading deviates by no more than the listed percentage from the expected value.

Example:

Bump test gas = Oxygen with concentration of 20.9 %v/v
Bump deviation = 10%
Lower PASS limit = 20.9 - 2.09 = 18.81%
Upper PASS limit = 20.9 + 2.09 = 22.99%

Therefore a PASS will result if the gas detectors reading is between 18.81% and 22.99%

# Gassing Time (s)

This column lists the time each gas is applied to the gas detector before a bump test or calibration is performed.  Different gases require different lengths of time before the sensor stabilises.  Using the times in this column, bump test and calibration times can be optimised.  If a gas mixture is used, the gassing time will always be the longest of each of the components in the mix.

# Calibration Due

When a calibration is performed on a gas detector, the calibration due dates for each sensor module are set to a future date based on this interval.  By default this is set to 180 days, approximately 6 months.  Therefore, if a full calibration has just been performed, the gas detector will indicate that a calibration is due in 6 months time.

# Database Options.

Checkbox is designed to run on either a local or network database as a means of recording operational data. Supported databases are Microsoft Access and Microsoft SQL Server. Database configuration is performed using the 'Configuration→ Database Options' screen. Using this screen it is possible to change the database type, change the database location, and archive a database.

"Out of the box" checkbox will install a Microsoft Access database on the local PC. If an alternate location is required, then see the section 'Configuring a database'
Changes to the database configuration can only be performed when the system is in 'Stop' mode.

Whilst the Microsoft Access database for checkbox is provided with the installation, it must be noted that Microsoft SQL Server is not provided, as checkbox only permits configuration of its database on an existing Microsoft SQL installation.

## Database Connection

On running the application, checkbox will try to connect to the last configured database that it knows about. If this database is unavailable due to say, a network outage, or SQL Server downtime, then checkbox will automatically use the local database located at

"C:\Documents and settings\All Users\Checkbox\Database\Checkbox.mdb"

When a connection problem has been encountered, Checkbox will set the local database as its configured active database until you change the active database. To assist in informing you of the current connection, a set of icons on the main screen change according to the active database.

This icon depicts that the default (local) Access database is active.

This icon depicts that the user defined Access database is active.

This icon depicts that the user defined SQL database is active

Using these icons as a guide, you should ensure that the correct database is active on running the checkbox application.

# Default Database.

## Database Configuration

Checkbox PC allows the user to configure the type and location of the database used for recording operational data.
The system must be in stop mode when performing changes to the database configuration.
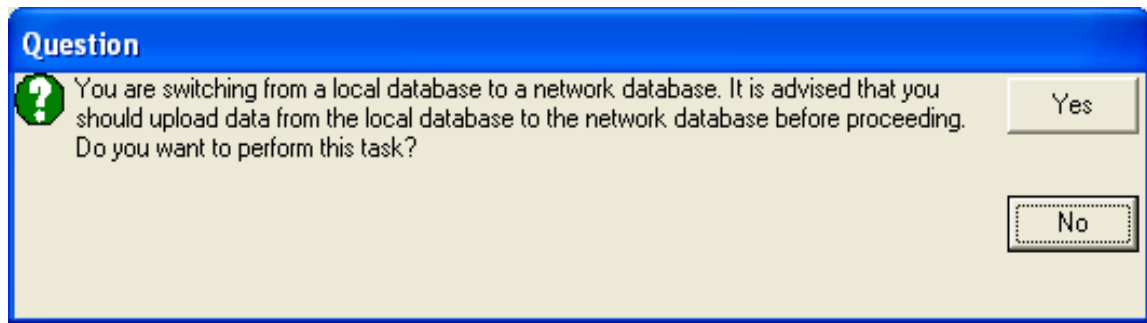Please note that all CheckBox application change data is stored on the local database. It is NOT uploaded to the network database.

## The active database
Using the active database screen, you can swap from a Microsoft Access database to a Microsoft SQL database and vice versa. Clicking on the option for a database type will show the current configuration for that type in the properties section of the screen.
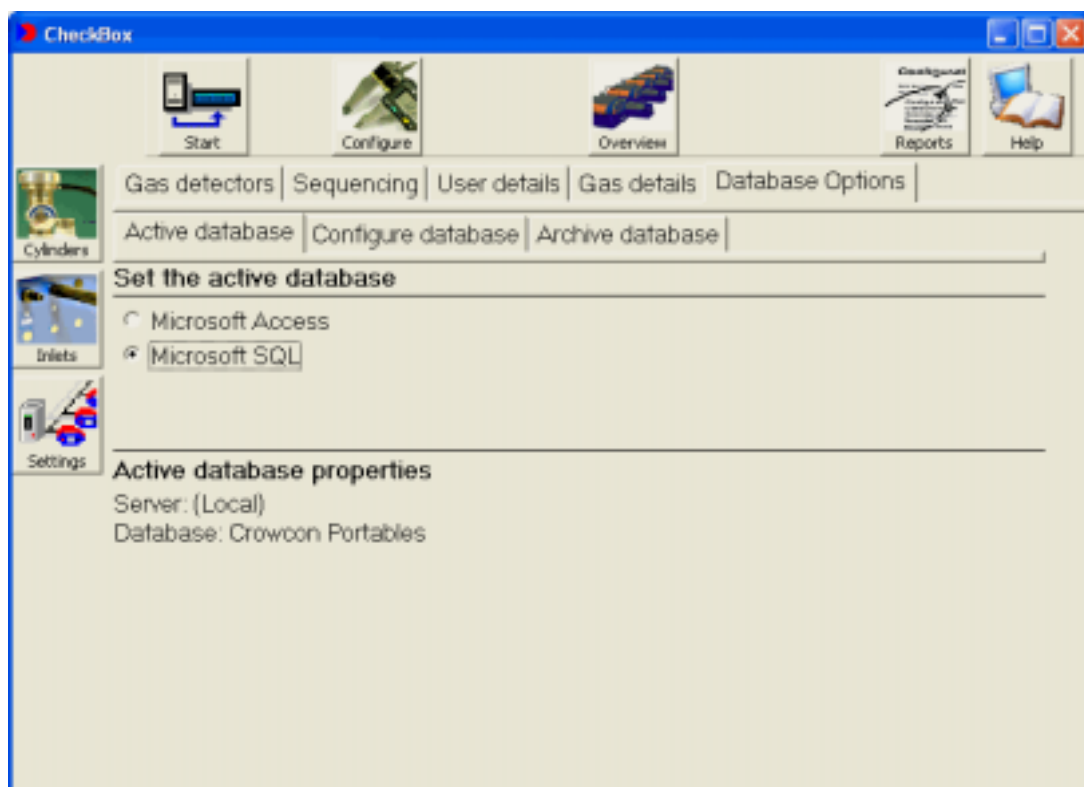


On a change of database type, Checkbox will determine if the current active database is the local database. If this is the case, then you will be prompted to upload the data held in the local database to the database you have selected.

**Question**

You are switching from a local database to a network database. It is advised that you should upload data from the local database to the network database before proceeding. Do you want to perform this task?

[Yes]   [No]

Once you have made your selection on this screen, then you will be informed of the success or failure of the database change.



**Information**

Live database type has now been changed

[Ok]
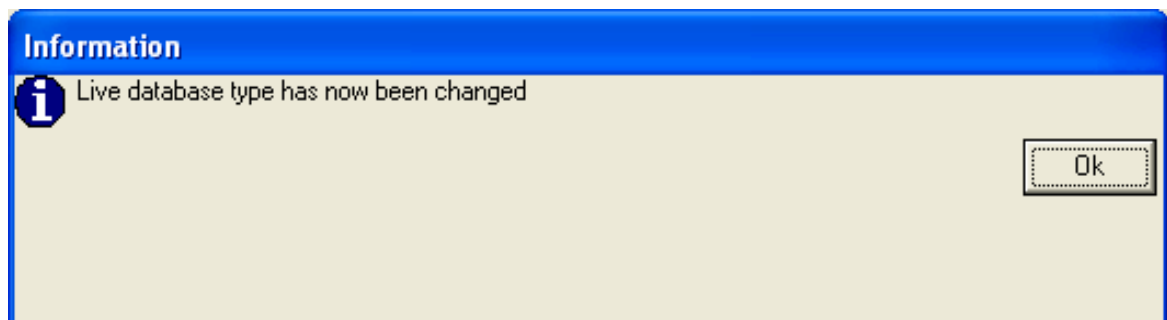
If you select the Microsoft SQL option, and either the database has not been created, or the SQL Server is offline etc. you will be shown a screen informing you of that fact.

# Configure Database.

## Configuring a database

Checkbox provides you with two methods of configuring the database properties, one for Microsoft Access, and one for Microsoft SQL Server.
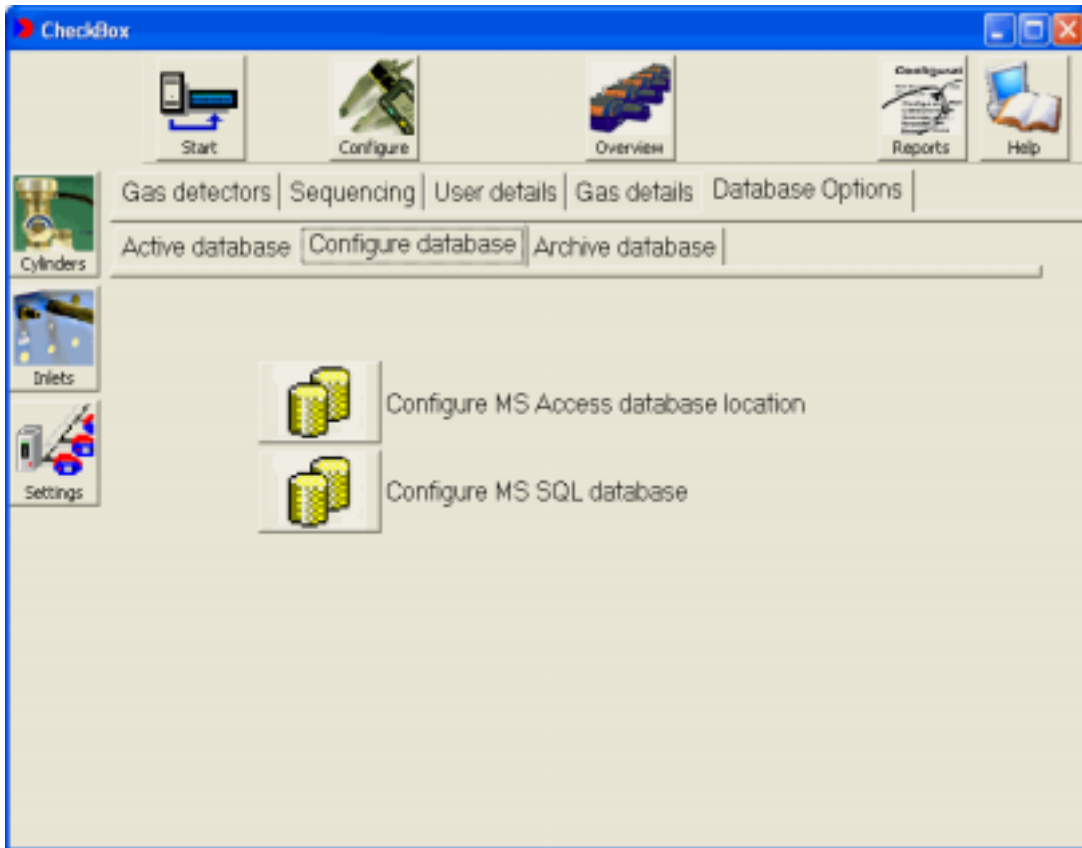


## Microsoft Access Configuration

Selecting to configure a Microsoft Access database will allow you to select a location on your system for the checkbox database to be located. The selection of the location may include the local checkbox database if you require.
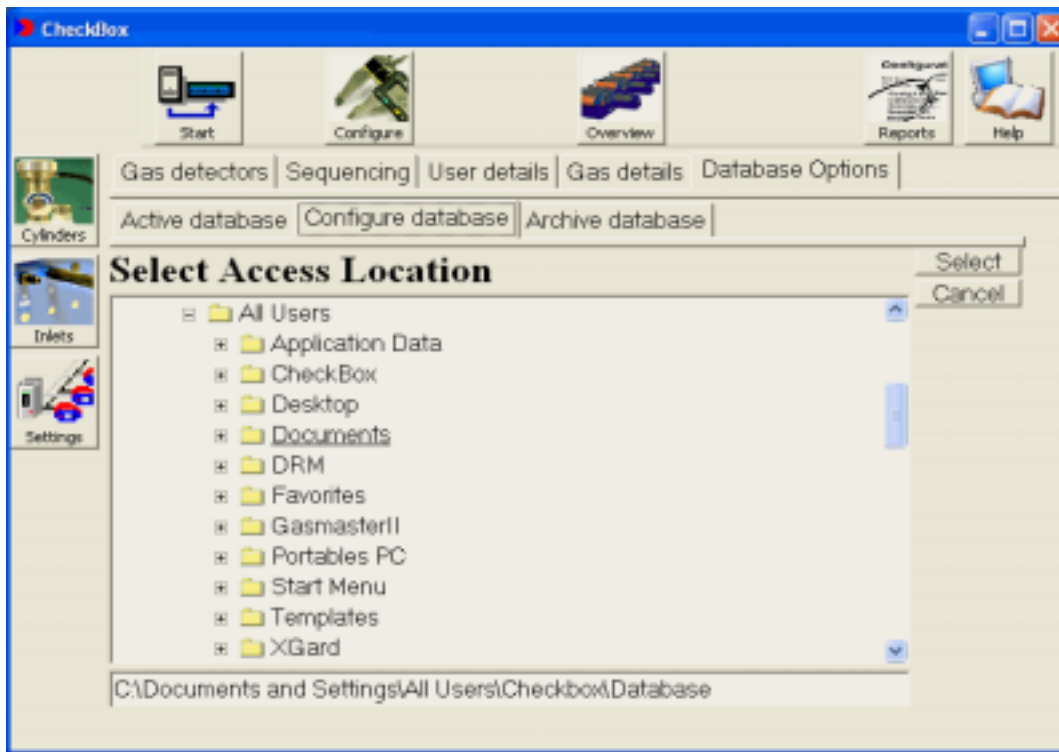
You may use this screen to either create a new path for the location of your database using right click functionality, or to navigate to a location on your system where the checkbox database is located.

Once you have determined the location you require, clicking the select button will set the selected location as the Microsoft Access database path. If you select a location where a checkbox database does not exist, then a copy of the local database will be placed at that location, otherwise, the database that exists will be used as the checkbox database.

Once complete, you will be informed that the database has changed.
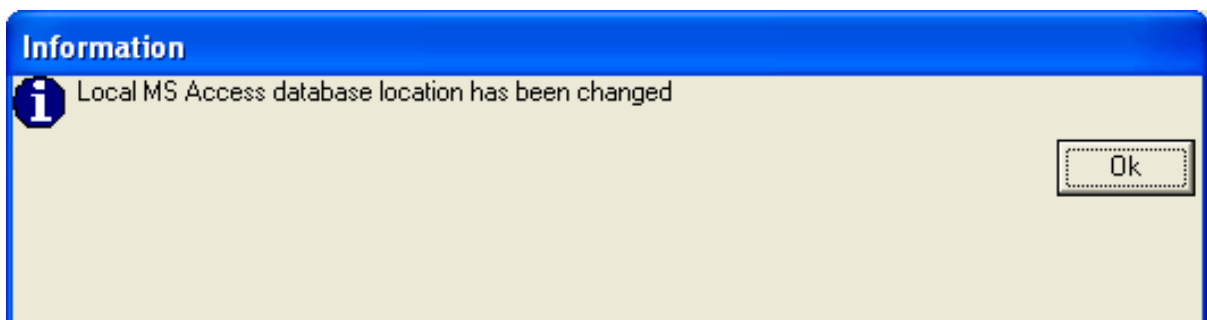


NOTE: You should not use a third party tool such as Windows explorer to move the checkbox database as this could impact on the ability of checkbox to connect to the database.

## Microsoft SQL Configuration

Selecting to configure a Microsoft SQL Database will allow you to select an existing SQL server that resides on your system.
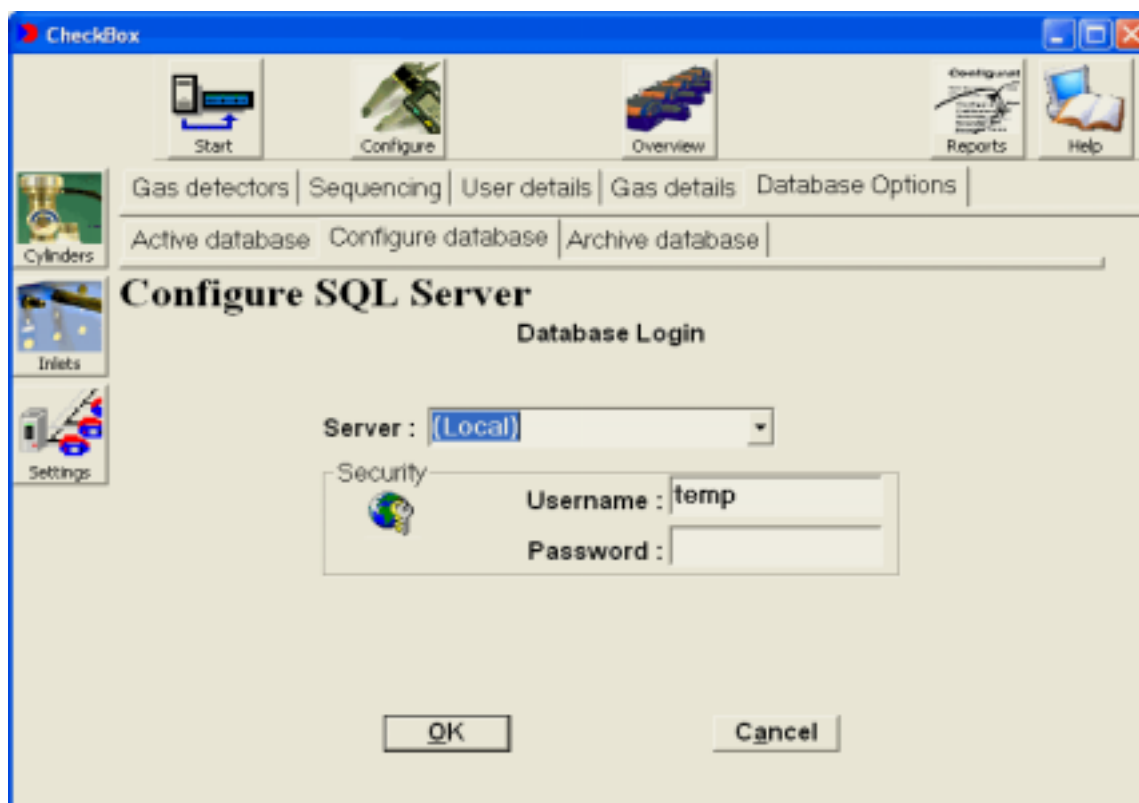


Selection of a server is made through the list of servers that have been located on your system. Connection to a server is handled in one of two ways. If the Crowcon Portables database has previously been created, then the user can select the server, and will be informed that the database already exists.
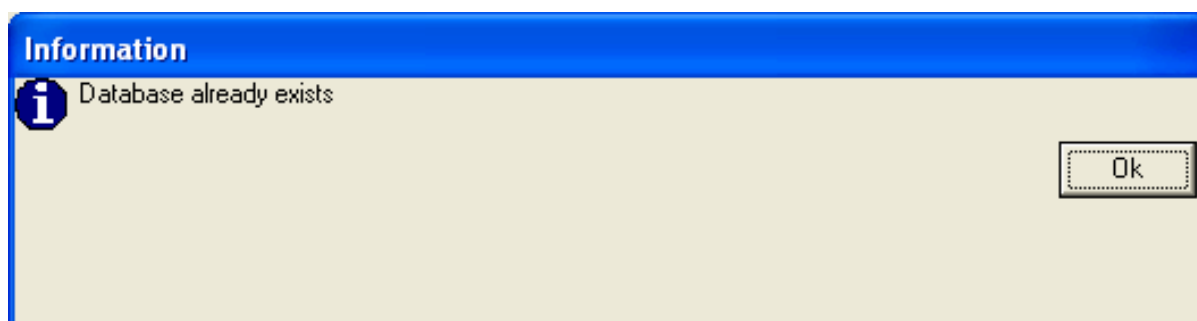


If on the other hand, a previous creation of the database has not been performed, then the database login will perform this task. To create a

checkbox database, the SQL Administrator must have created a SQL user profile in the chosen SQL server users group that initially has the equivalent security permissions as the special SQL 'sa' account. The user name and password must be entered correctly. Once this has been performed, the Crowcon Portables database will be created on the server and you will see the following screen.
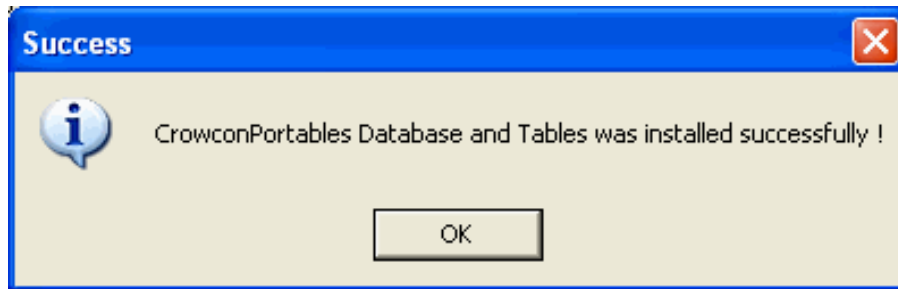
# Archive Database.

## Archiving the database(s)

Checkbox allows the user to archive existing databases, both for Microsoft Access databases, and for SQL Server databases.
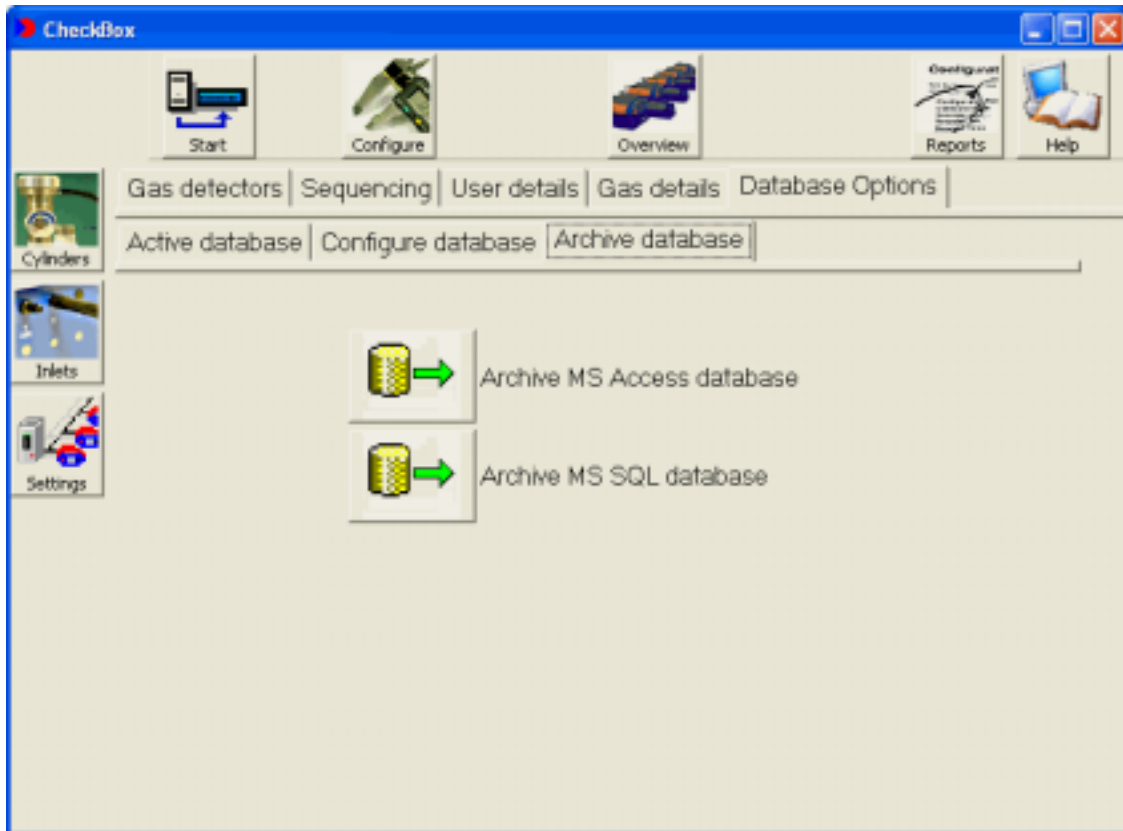


## Microsoft Access Archive

Selecting to archive a Microsoft access database will cause a file selector screen to be shown. Typing a name into the name box, or selecting an existing file name will copy the currently configured access database to the archive folder as the name selected
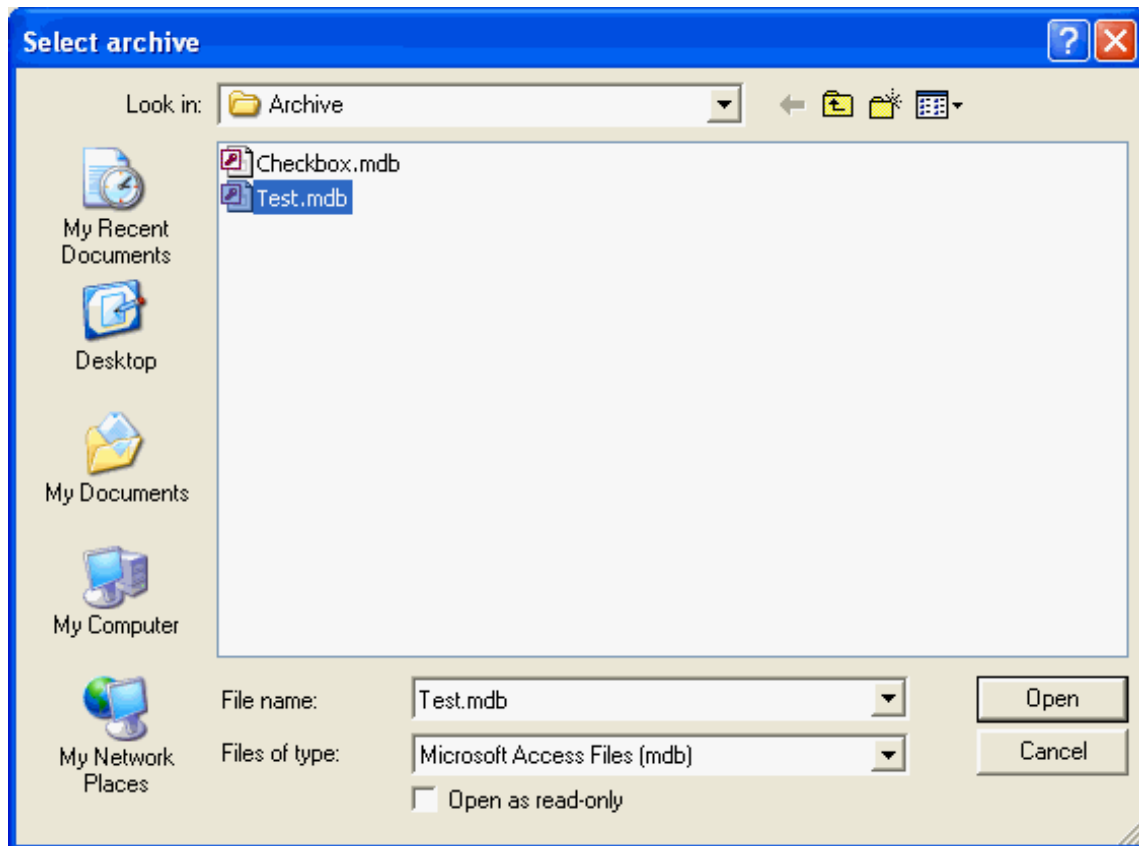
Once a file name has been selected to archive to, and the open button has been clicked a dialog asking if deletion of data on the current database is shown.
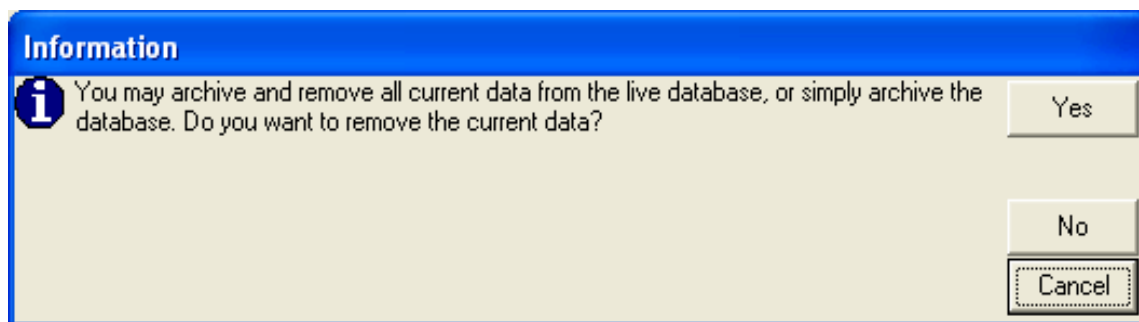


Selecting yes will perform the archive and delete all operational data from the access database, whilst selecting no will perform the archive, leaving the original data on the access database. Selecting cancel will cancel the archive operation.

## Microsoft SQL Archive

The selection of the SQL archive button will perform a backup operation of the Crowcon portables database.
On selecting the Archive SQL button, a dialog is shown asking for permission to delete the current SQL database data.
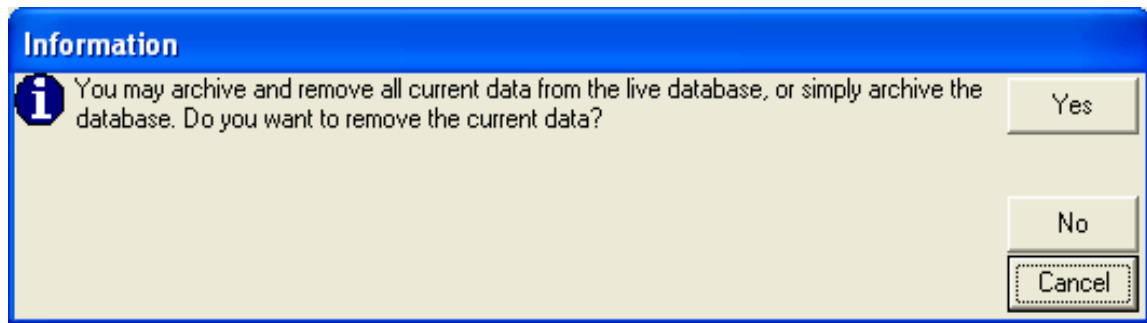
Selecting yes will perform the archive and delete the data from the current database,
selecting no will archive the database without clearing the current data, whilst selecting cancel will cancel the archive process.
This backup will be performed to the archive folder and will be named 'CrowconPortables' followed by the timestamp of the archive operation as an SQL .dat file. On successful completion, a confirmation dialog will be shown.
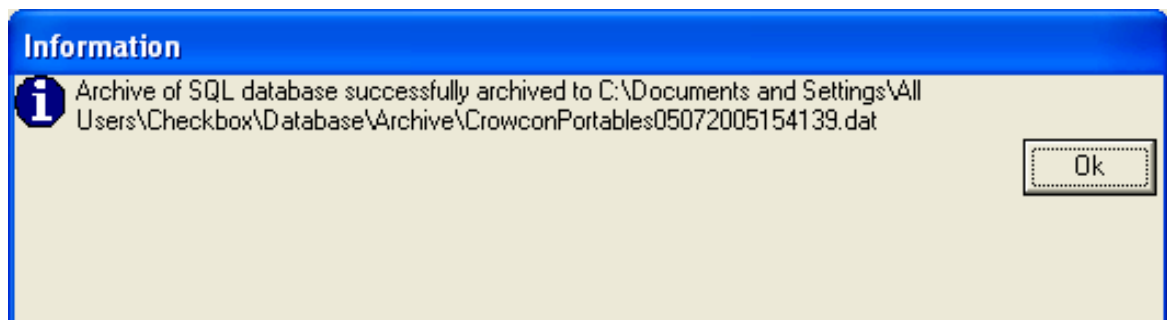


## Viewing archive files.

The viewing of archived data is covered in the Reports section.

# Manual Options.

CheckBox is designed to automatically perform a sequence of operations on a gas detector as it is connected. However, it may be necessary sometimes to perform specific functions manually, perhaps because they are not always required.

Manual operations can be performed when there is no activity currently being performed automatically. Press the stop button before adding a unit to an interface if you wish to prevent gas sequencing.

From the overview screen, right click the icon for the detector you wish to operate on. A menu appears allowing the following selections:

1. Bump Test
2. Calibrate
3. Zero
4. Configuration
5. Log Upload
6. Service Report
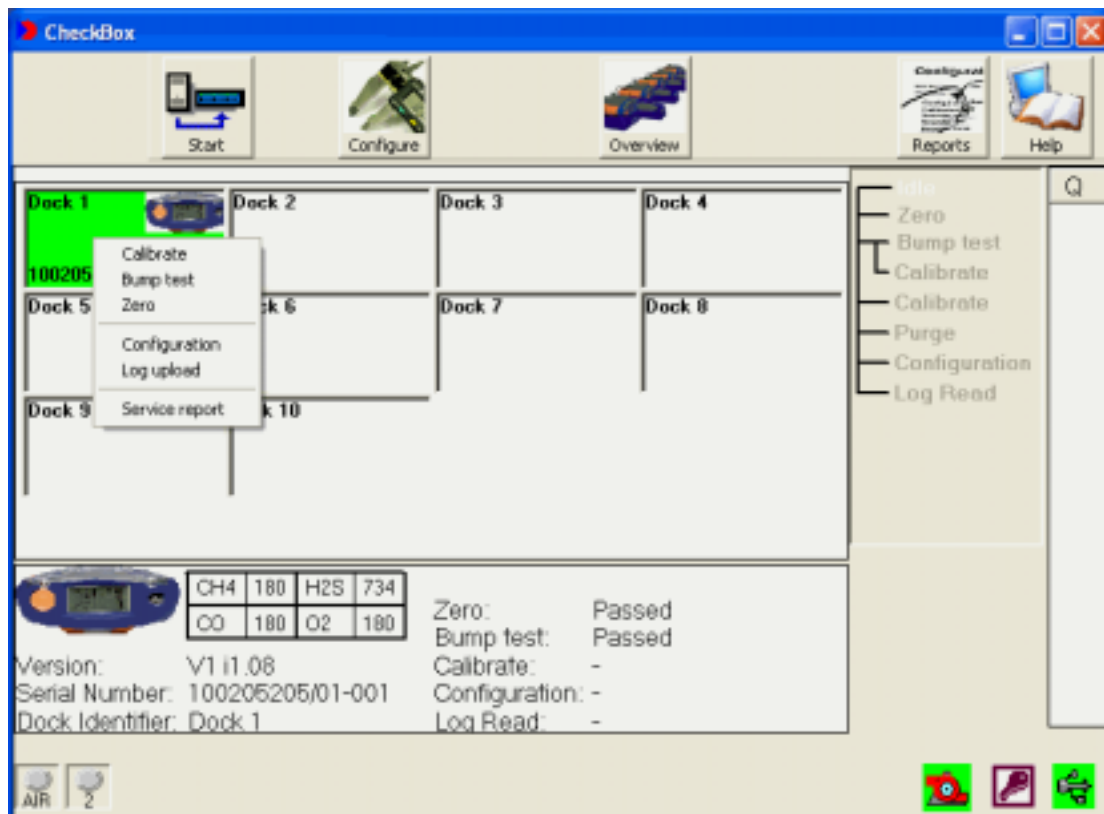


**Add a Service Report** is useful for noting service or relevant issues against a gas detector. For example, after an automatic calibration, CheckBox may have failed a gas detector due to the life of the sensor being exceeded. Once

the sensor has been changed, the gas detector can be attached to CheckBox to perform a calibration. A note can then be recorded that a sensor change has occurred. Other relevant details could also be recorded such as battery changes etc. By recording comments in this way a Service Report can be generated detailing the service history of the gas detector.

# Bump Testing.

Bump testing is the name given to a process by which gas is applied to a gas detector and its response is compared to a pre-defined acceptable window. A PASS / FAIL results is provided for the gas detector as a whole, and in the case of a multi-gas detector, individual channels are also marked as PASS / FAIL. Bump test results will be stored in the database whether they are performed manually or automatically.

Generally, a bump test is intended to confirm that a gas detector is functioning correctly and entering alarm conditions when alarm levels of gas are applied. Therefore, the accuracy of readings need not be very high. For this reason, a cheaper test gas may be used for bump testing while high quality gases are reserved for calibration.

The following sequence is used for bump testing.

1. Prior to a bump test, air is used to ensure the detector is not contaminated with other gases. The duration of this purging process is controlled by the duration assigned to the O2 gas type found in the **Settings\Gas Details** page, the default is 60 seconds.
2. At this point all channels are set to zero (except for oxygen channels, which are calibrated to 20.9%).
3. Gas is then applied for the duration specified in the **Settings\Gas Details** page. Each gas has its own time.
4. Each channel is compared to the expected reading and if found to be with the allowable tolerance, a PASS is recorded.
5. For multi-gas gas detectors, an overall pass is only recorded if all channels pass.

If a multi-gas detector is tested for which CheckBox does not have all the necessary gases, the overall result will be recorded as fail. However, the details of the report will indicate the status of each sensor that gas was available for and "Gas not available" for the sensor that was not tested.

Suitable multi gas mixtures can be used to make bump testing very fast for multi-gas detectors. The bump test time for a gas mixture is taken from the slowest gas component in the mixture.

To perform a manual bump test, right click on an icon in the overview window and select bump test from the pop-up menu.

# Calibration.

Calibration is the systematic adjustment of a gas detector's electronics/software in response to a known concentration of calibration gas applied to its gas sensors.  Calibration is normally performed on a gas detector at some regular interval, e.g. 3 months.  CheckBox is able to identify if that interval has elapsed by checking the gas detectors Calibration date.  For multi-gas detectors, this date will be the earliest date of each of the installed sensors.

**Note: Unlike bump testing, calibration alters the gas detectors internal electronics/software to make the gas detector indicate the reading expected for the applied gas.  For this reason, it is extremely important that the correct gases and concentrations have been attached to the Hub and the correct details recorded on the relevant screens.**

The calibration sequence proceeds as follows:

1.  Calibration starts using the air line to purge any contaminating gases from the detector.  As with bump testing, the purging time is set using the duration found in the **Settings\Gas Details** page for O2, the default is 60 seconds.
2.  At this point all channels are set to zero (except for any oxygen channels, which are calibrated to 20.9%).
3.  If an oxygen channel is fitted, this channel will be calibrated first, normally using air but a cylinder of oxygen can be used.
4.  Gas is then applied from the appropriate cylinder(s) for the duration specified in the **Settings\Gas Details** page, each gas has its own setting.  (Suitable multi gas mixtures can be used to make this process very fast for multi-gas detectors.)
5.  A calibration command is sent to the gas detector for the appropriate channels.
6.  This sequence repeats until all channels have been calibrated.

Calibration will continue until all channels have been calibrated even if some fail.  This is necessary so that the state of all channels is known.

Manual calibration is also possible by right clicking on the gas detector icon in the overview screen and selecting Calibration.

# Configurations.

The first time CheckBoxPC sees a new serial numbered gas detector, its configuration will be uploaded and saved into the database as the **Original Configuration**.  This configuration will remain in the database and will never be overwritten.

## Uploading.

Gas detector configurations can be stored in the database if they are uploaded, manually or automatically.

When a configuration is uploaded to the PC a check is performed against the last recorded configuration for that serial numbered detector.  All differences are recorded.

## Downloading.

It is possible to download a configuration from the PC to a gas detector.  The user can select to download the **Original Configuration** or the **Last Configuration**.

In order to minimise the possibility of supporting multiple original configurations on a networked system, original configurations in the active database will be compared to a PC's database when joining the network. At such time, the earliest configuration will be replicated to the database that contains the most recent of the two configurations.

## Editing.

Configurations can be edited.  A configuration can be uploaded from a gas detector and the edit screen then opened.  Once changed, a configuration can then be saved in the database and/or downloaded to the gas detector.

# Logs.

Gas detectors contain various event and data logs.  These logs can be uploaded from the gas detector and saved to the database for later inspection and printing.  In this way, the database builds an ever-growing history of the gas detector.  Once uploaded, CheckBoxPC clears the log held in the gas detector.

## Tetra

Tetra contains an event log.  This log contains many different types of events, including alarm events, calibration events, power on events etc.  The event log within Tetra is quite large and can take some time to transfer all its contents to the PC.  For this reason, it is recommended that the log is automatically uploaded every time Tetra is connected to CheckBox.  This will not only ensure all data is recorded safely, but also that the Tetra event log is cleared preventing the size of the log becoming too great and causing excessive communications times.  Once logs are uploaded, reports can be generated using all the data available in the database.

## Datalogging

At present, a view of the data logs held in the CheckBox databases does not exist. If you require a view of this data, you should use a third party tool such as Microsoft Excel, and ensure that Microsoft Query is installed on the PC. Using Microsoft Excel, you should use the Excel menu to navigate to 'Data -> Import External Data -> New Database Query'. The following is an example of a query used to return data log information from the database.

> 'SELECT KeyTable.SerialNumber, Sequence.UserName, DataLog.TimeStamp, DataLog.Data FROM (KeyTable INNER JOIN Sequence ON KeyTable.LookupID = Sequence.ID) INNER JOIN DataLog ON Sequence.DataLogID = DataLog.ID WHERE ( (KeyTable.SerialNumber) = "100193513/01-002");'

Alternatively, you can use Microsoft Access to create a 'View' of the data log information, either by creating a SQL statement as above, or using the Query designer to create one for you instead. Once the view is created and saved, then the data can be loaded into Microsoft Excel by selecting 'Data -> Import External Data -> Import Data' and selecting the current CheckBox database (Default is C:\Documents and Settings\All Users\CheckBox\Database\Checkbox.MDB). Once you have selected this database, you will be presented with a select table dialog. If you select the 'View' you have created, then the data will be loaded into the Microsoft Excel worksheet.

# Generating Reports.

The reports button from the overview screen allows access to the various reports which can be generated by CheckBoxPC.  A format area allows the user to edit headers, footers and some standard text blocks used with these reports.

The following report types can be printed:

1. Calibration (Reports created by the calibration sequence)
   - Detailed report
   - Certificate
2. Bump (Reports created by the bump test sequence)
   - Detailed report
   - Certificate
3. Zero Report (Reports created by the zero sequence)
4. Configuration (Reports created by the configuration sequence)
   - Change report
   - Latest configuration
   - Original Configuration
5. Event Log Report (Reports created by the Event log upload sequence)
6. Data log Report (Reports created by the data log upload sequence)
7. Activity Report (Reports by each activity performed by checkbox)
8. Service Report (Manually entered comments)
9. CheckBox (Reports by changes to the setup of checkbox)
10. Report Format (Header and footer configuration for the reports)

CheckBoxPC generates reports related to a specific gas detector (except for 9 above)

Reports are generated by:

1. Selecting the gas detector serial number from a drop down list.  This list contains the serial numbers of all gas detectors found in the database that have undergone an operation of the type selected.
2. In some cases a date range may be selected from a drop down list to refine the amount of data shown in the report.

Each report uses a common Header and Footer, which can be customised using the format tab.

The reports generated by Checkbox PC are previewed on the PC screen. Once generated they can be printed, exported, or closed depending on requirements.

Printing a report is performed using the Print icon located in the top left corner of the report viewer, and will use the current Windows default printer set in 'Start→ Printers and Faxes'

Exporting a report can be performed by selecting the Export icon located in the top left corner of the report viewer. Once the export icon has been selected, a choice of export formats are available. These consist of: -

- Abode Acrobat (PDF)
- Crystal Reports (RPT)
- HTML 3.2
- HTML 4.0
- Microsoft Excel 97-2000 (XLS)
- Microsoft Excel 97-2000 – Data Only (XLS)
- Microsoft Word (RTF)
- Microsoft Word Editable (RTF)
- ODBC
- Record Style columns with spaces (REC)
- Record Style columns without spaces (REC)
- Report Definition (TXT)
- Rich Text Format (RTF)
- Separated Values (CSV)
- Tab separated text (TTX)
- Text (TXT)
- XML

# Calibration Reports.

There are two types of printed output for calibrations, Certificate and Report. The Certificate contains a summary of the calibration while the Report contains details of the calibration.

## Calibration Certificate

The Calibration Certificate contains the following information:

1. User defined Header
2. The date the report was printed on
3. Gas detector serial number
4. User id logged in at the time the calibration was performed
5. Date the calibration was performed
6. An overall PASS / FAIL status
7. A table of PASS / FAIL results for each sensor fitted to the gas detector, including gas cylinder details
8. An optional block of user defined text
9. User defined Footer
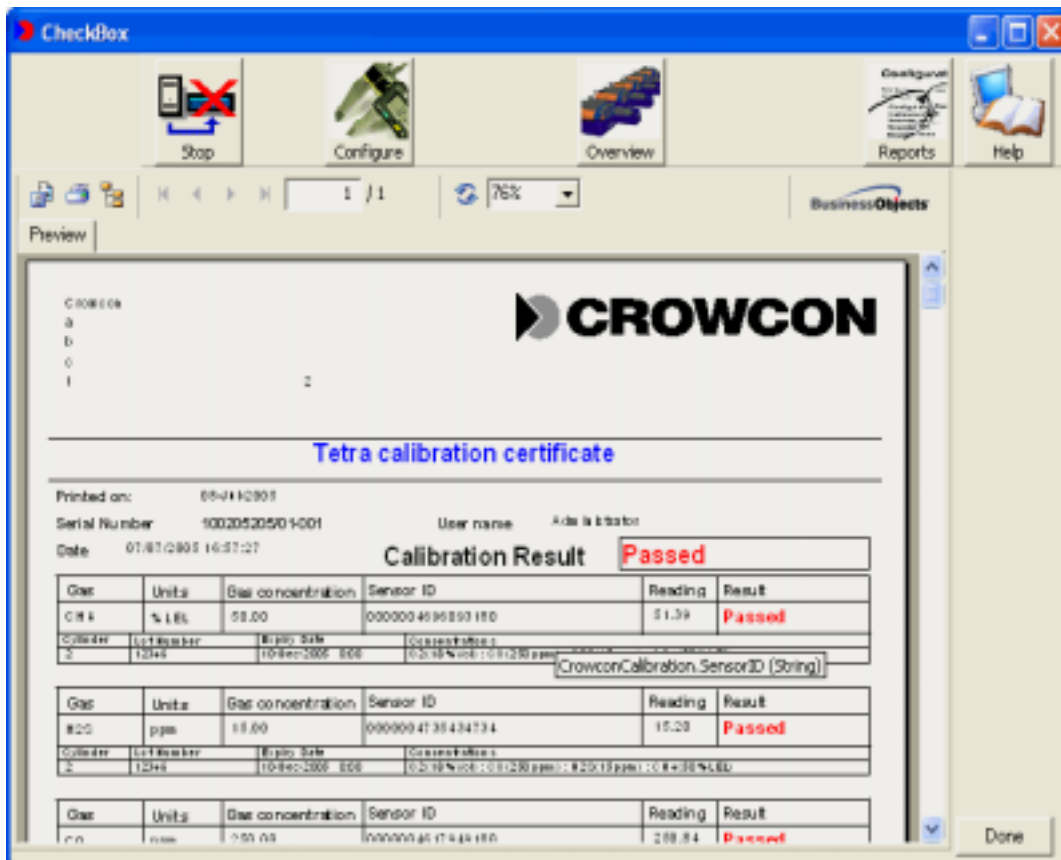
# Calibration Report

The Calibration Report contains the following information:

1. User defined Header
2. The date that the report was printed
3. Gas detector serial number
4. User id logged in at the time the calibration was performed
5. Date the calibration was performed
6. Overall PASS / FAIL status
7. Full details of each sensor, its readings and PASS/FAIL status, including details of the gas cylinder used
8. User defined Footer

# Bump Test Reports.

There are two types of printed output for bump tests, Certificate and Report. The Certificate contains a summary of the bump test while the Report contains details of the bump test.

## Bump Test Certificate

The Bump Test Certificate contains the following information:

1. User defined Header
2. The date that the report was printed on
3. Gas detector serial number
4. User id logged in at the time the test was performed
5. Date the bump test was performed
6. An overall PASS / FAIL status
7. A table of PASS / FAIL results for each sensor fitted to the gas detector including details of the gas cylinder used
8. An optional block of user defined text
9. User defined Footer
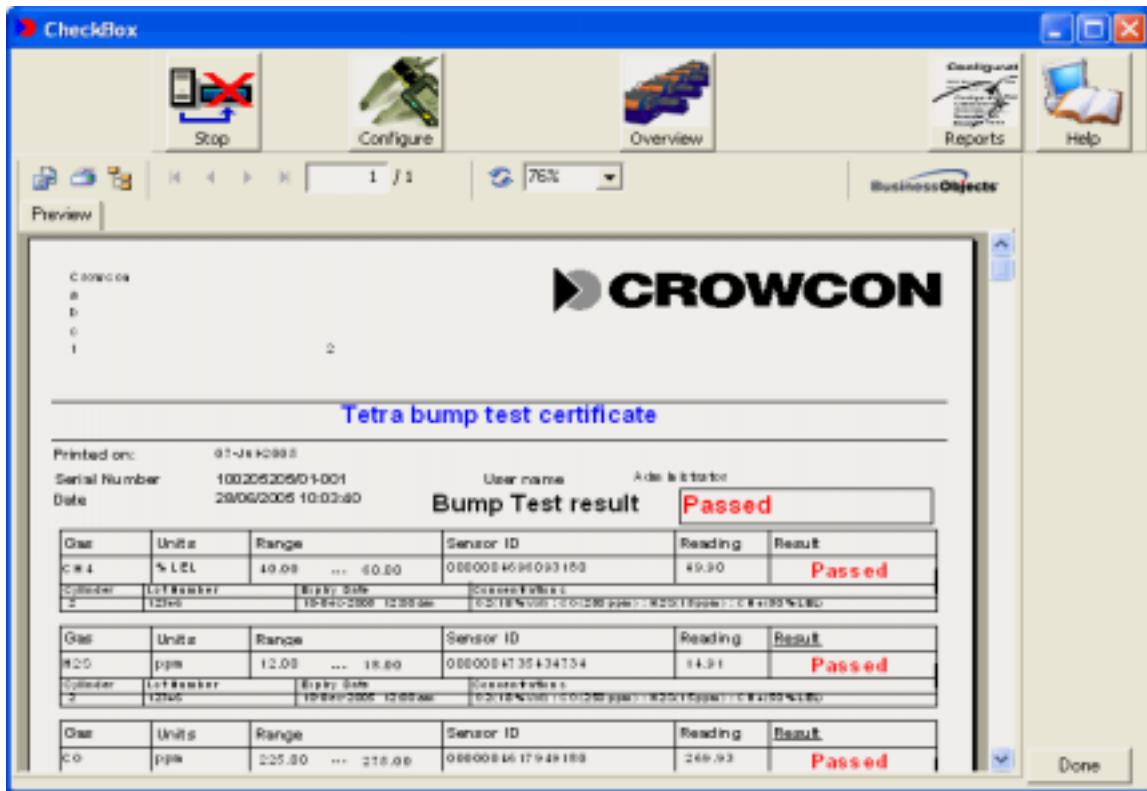
# Bump Test Report

The Bump Test Report contains the following information:

1. User defined Header
2. The date that the report was printed
3. Gas detector serial number
4. User id logged in at the time the test was performed
5. Date the bump test was performed
6. Overall PASS / FAIL status
7. Full details of each sensor, it readings, allowable deviation and PASS/FAIL status including Gas Cylinder details
8. User defined Footer

# Zero Report.

The Zero Report contains the following information:
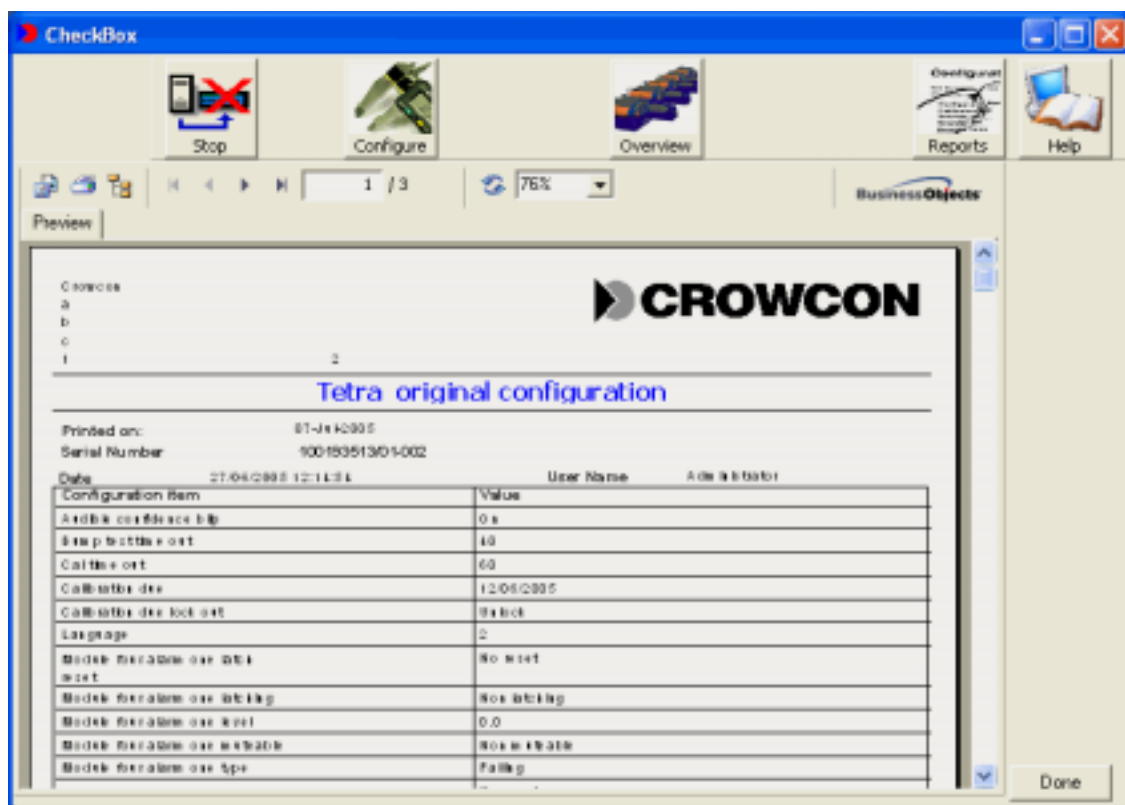
1. User defined Header
2. The date that the report was printed on
3. Gas detector serial number
4. User id logged in at the time the zero was performed
5. Date the Zero was performed
6. Overall PASS / FAIL status
7. Full details of each sensor, its readings and PASS/FAIL status including details of the gas cylinder used
8. User defined Footer

# Configuration Reports.

There are three types of configuration reports, selected using the buttons at the bottom of the screen.

The Configuration Report allows printing of the **Configuration Change Report** of the gas detector which is the change configuration report, the **Original Configuration** or the **Latest Configuration**.

The report contains the following information:

## Configuration Changed Report

The Configuration Changed Report shows all changes that have been made using the checkbox system.  The report contains the following information:

1. User defined Header
2. The date that the report was printed on
3. Gas detector serial number
4. The user id of the logged on user at the time of the configuration change
5. The configuration details grouped by the date of change, with columns for the item changed followed by old and new values for each item
6. User defined Footer
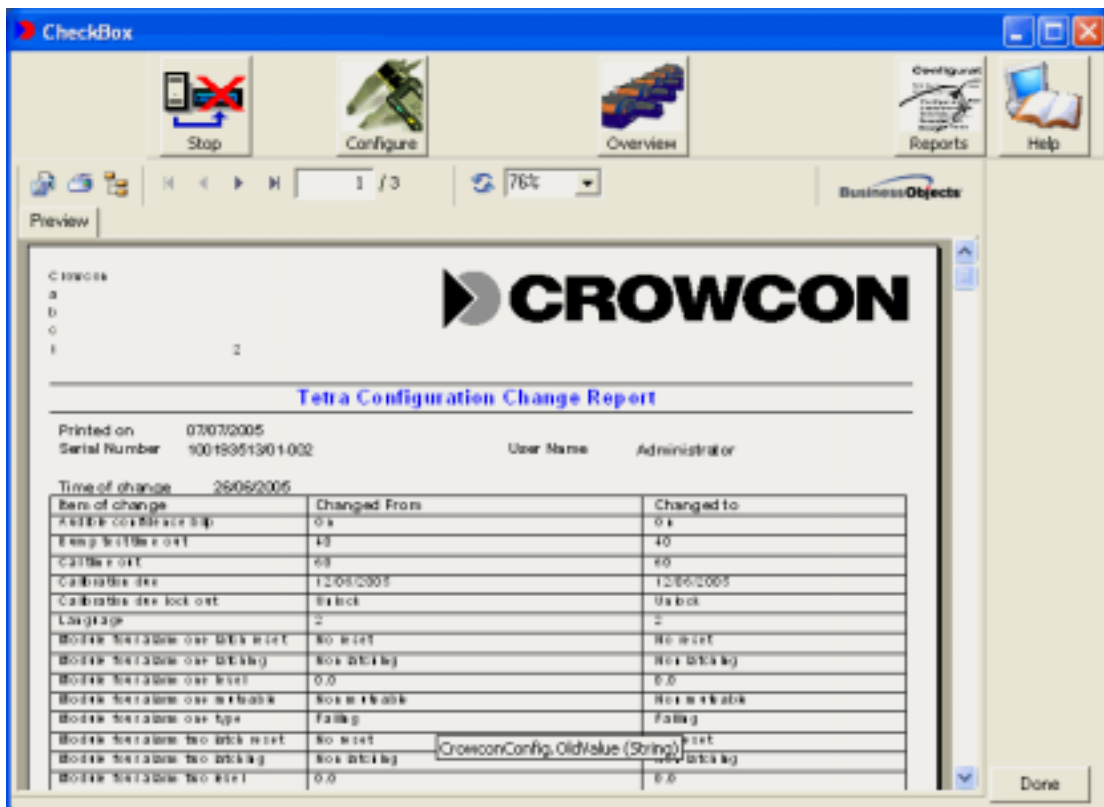
# Original Configuration

The Original configuration report shows the first recorded configuration of a detector by the system.  The report contains the following information:

1. User defined Header
2. The date that the report was printed on
3. Gas detector serial number
4. Current user id
5. The date that the original configuration was recorded
6. A list of configuration items which shows the name of the configuration item and its value at the time
7. User defined Footer



# Latest Configuration

The Latest configuration report shows the last recorded configuration of a detector by the system.  The report contains the following information:

1. User defined Header
2. The date that the report was printed on
3. Gas detector serial number
4. The user id of the logged on user at the time of recording the configuration
5. The date that the configuration was recorded

6. A list of configuration items which shows the name of the configuration item and its value at the time
7. User defined Footer
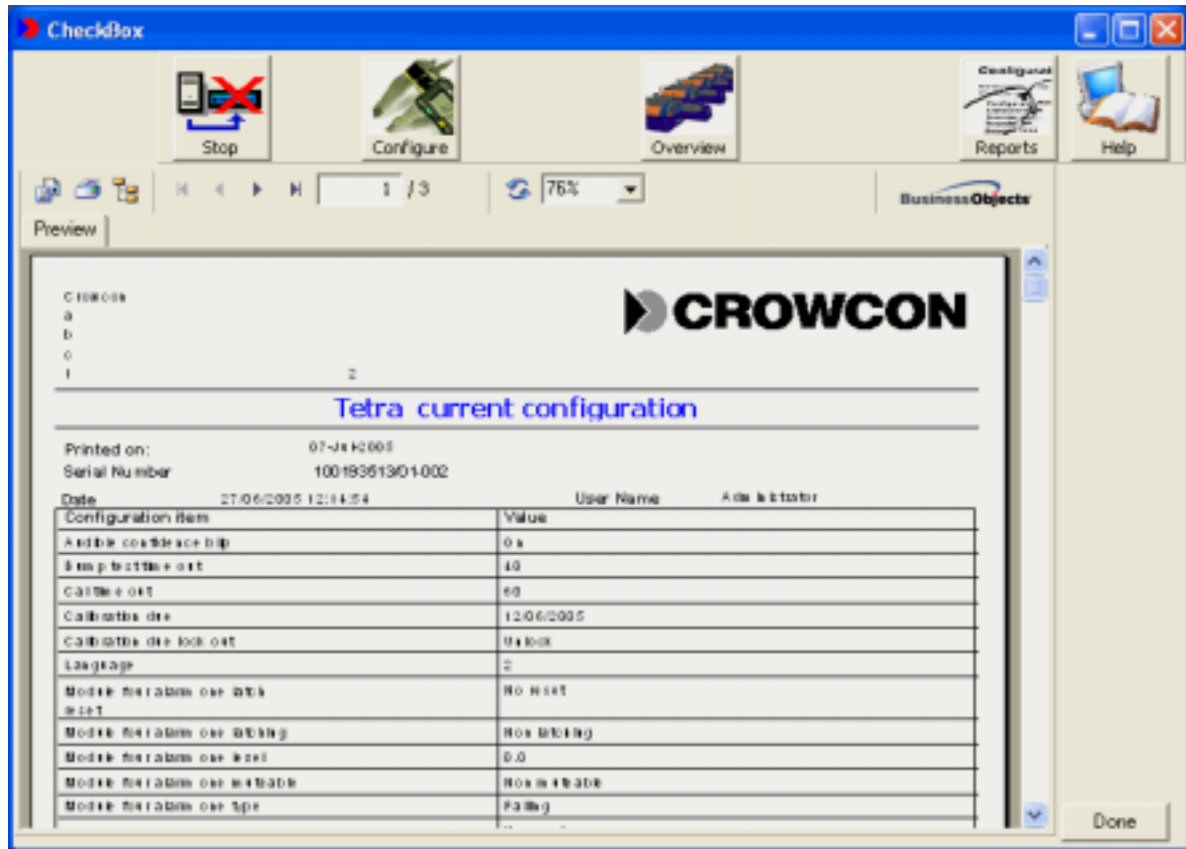
# Event Log Report.

Selecting the Event Log tab will present a screen that allows the selection of different event types to be reported for a gas detector.
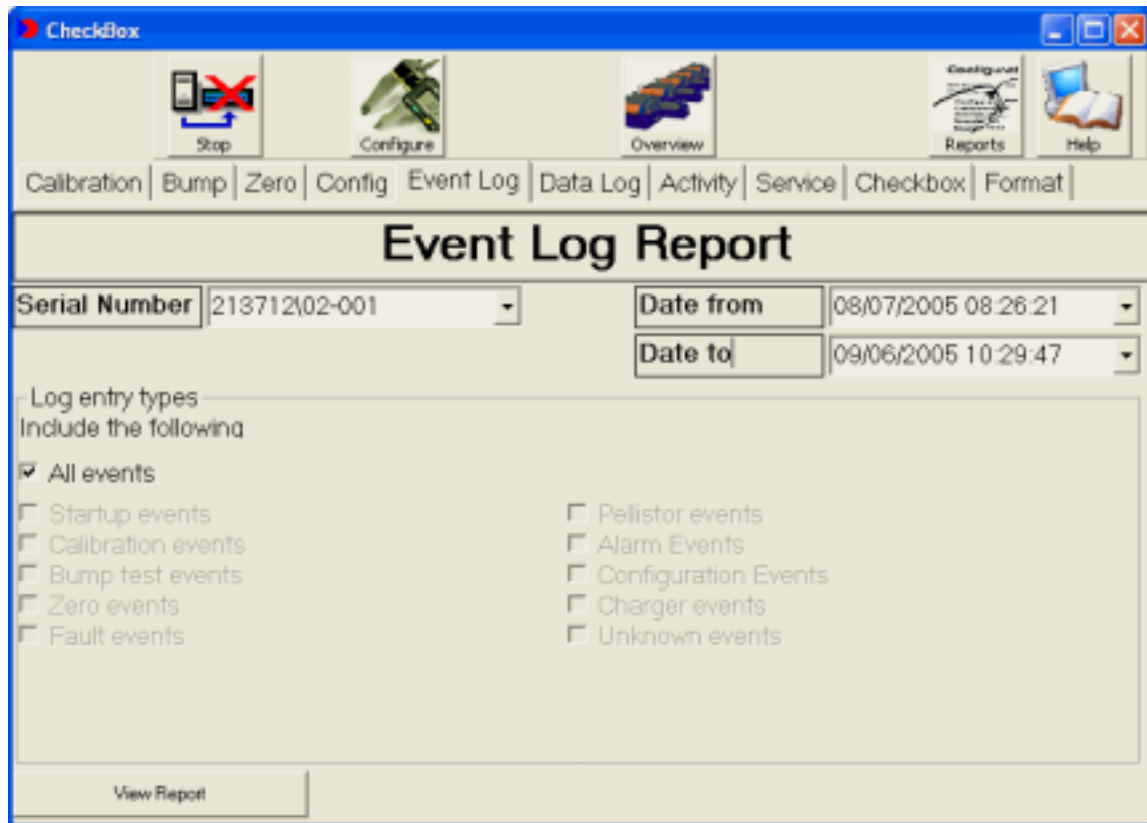


The event types can be either all events, or a selection of:

- Startup Events
- Calibration Events
- Bump Test Events
- Zero Events
- Fault Events
- Pellistor Events
- Alarm Events
- Configuration Events
- Charger events
- Unrecognised events

The Event Log report contains information from the gas detector's event log. The report contains the following information:

1. User defined Header
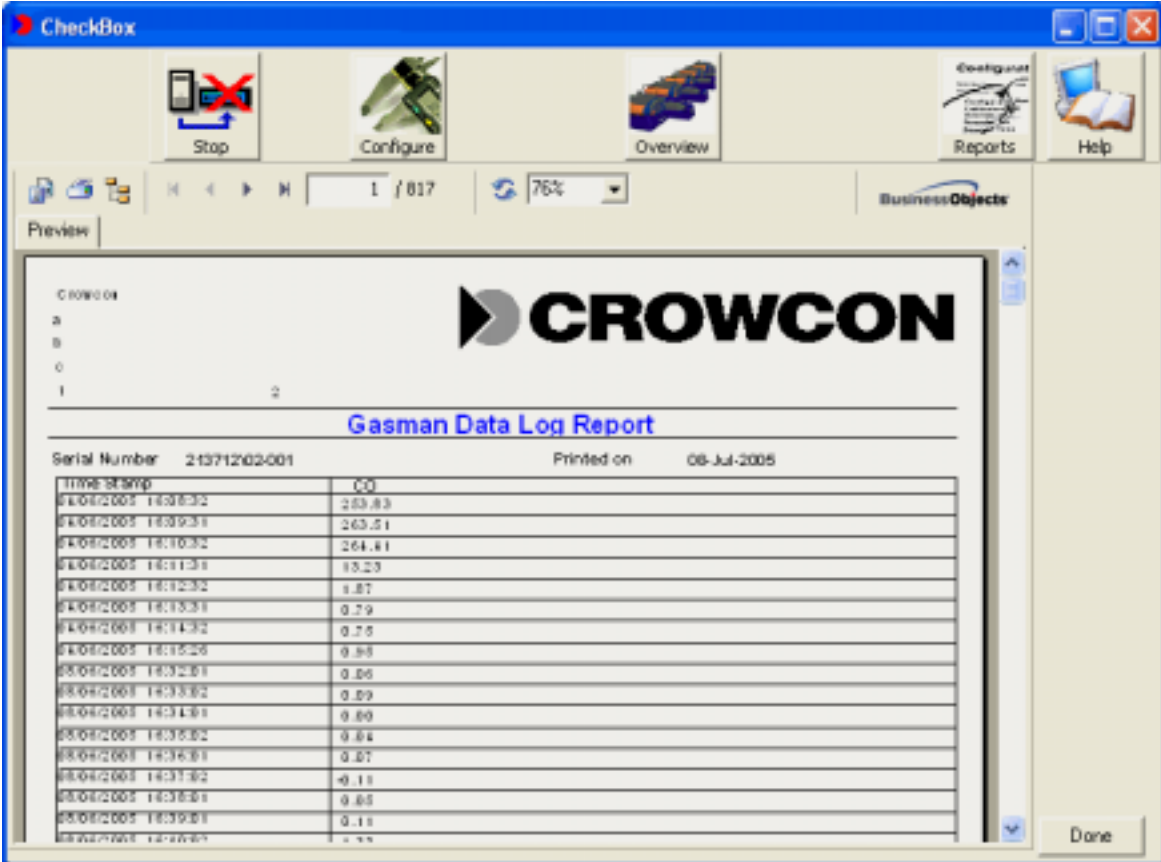
2. The date that the report was printed
3. Gas detector serial number
4. Date range the report covers
5. The user name of the logged on user at time of log upload
6. A table of data the size of which reflects the date range selected, grouped by the timestamp at the time of upload.
7. User defined Footer
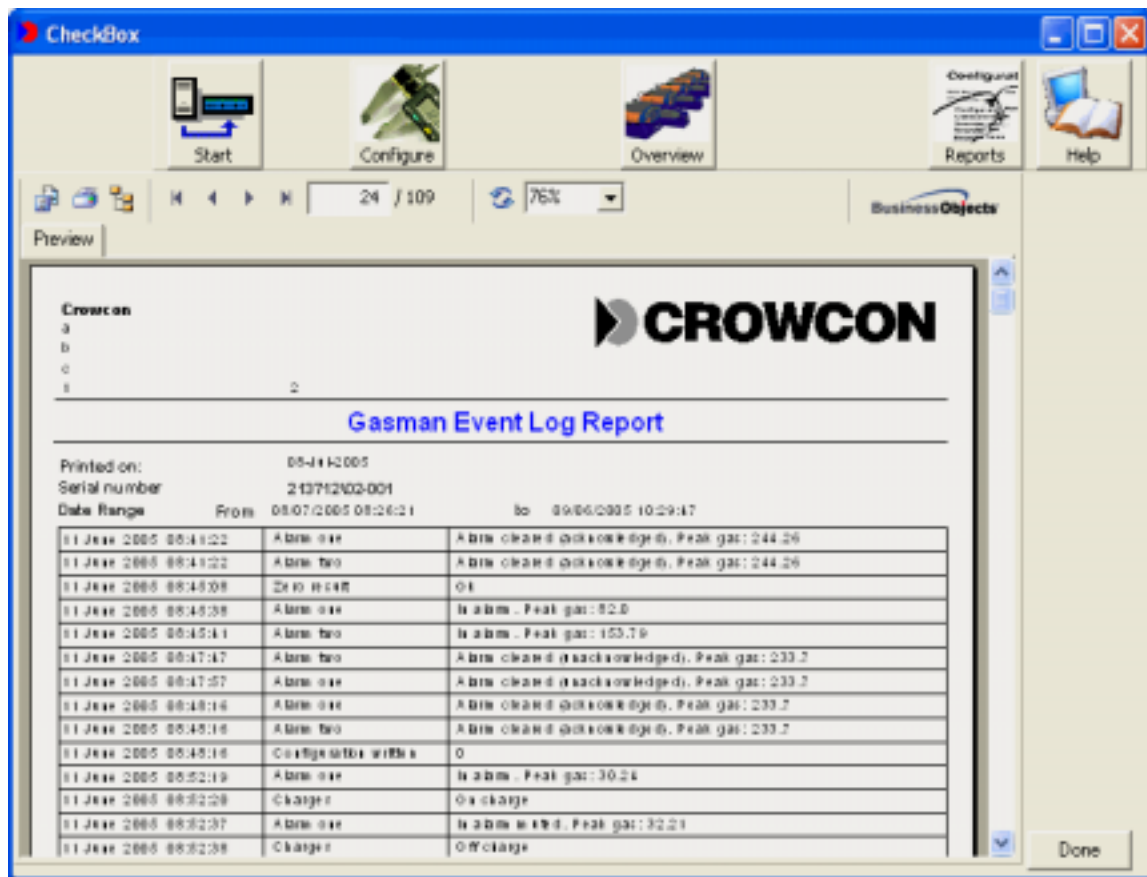
# Data Log Report.

The Data log report displays all data log information uploaded to the system from a detector. The data logs are held as full logs and added to over time. The report consists of:

1. User defined Header
2. The date of printing
3. The serial number of the detector
4. Timestamp and gas reading pairs
5. User defined Footer



This data can be exported to Microsoft Excel using the export feature described at the beginning of this section.

# Activity Report.

The Activity Report contains a summary of the actions performed, manually or automatically on the gas detector by CheckBox. This is a simple way to trace the work performed on a gas detector over a period of time. The following information is printed on an activity report:
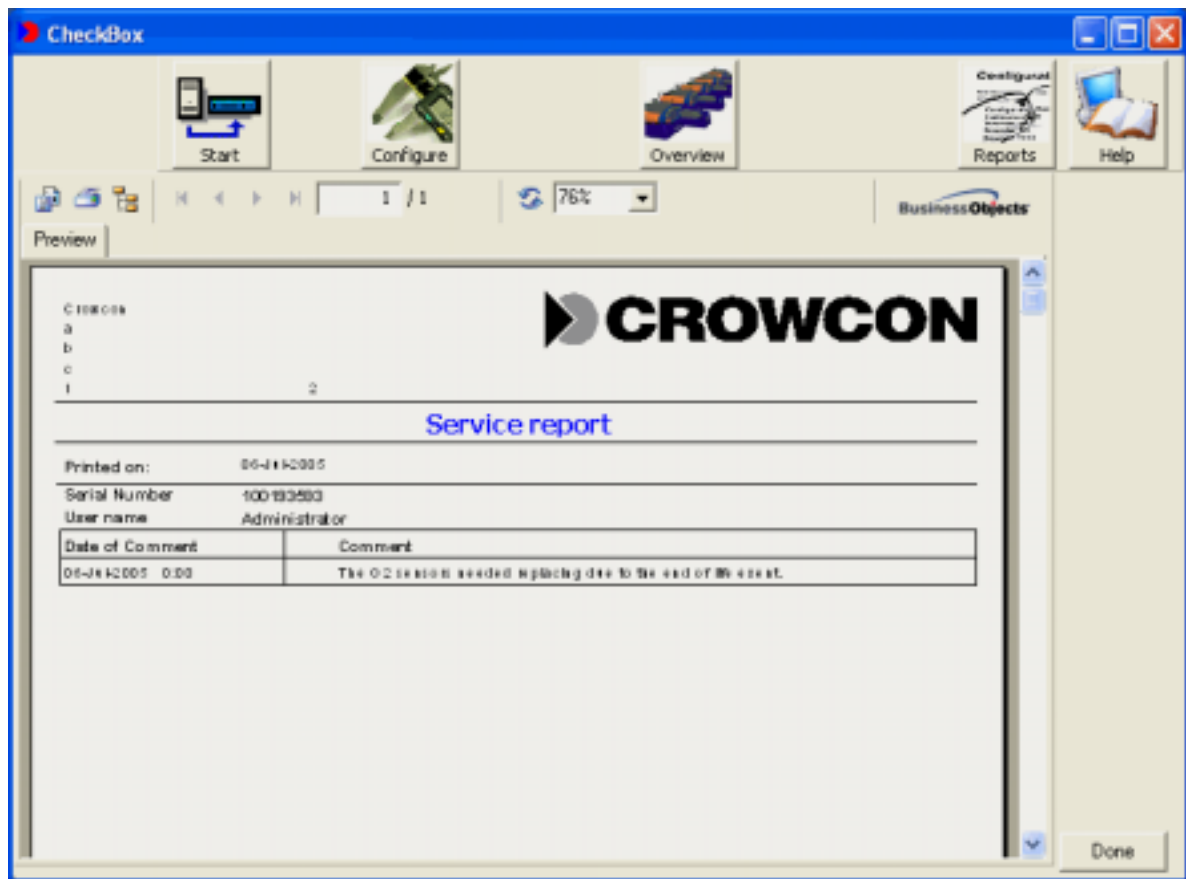
1. User defined Header
2. The date that the report was printed on
3. Gas detector serial number
4. The user name of the logged on user at time of log upload
5. Date range covered by the Activity Report
6. A table of activities with Yes/No indication of the tasks performed
7. User defined Footer
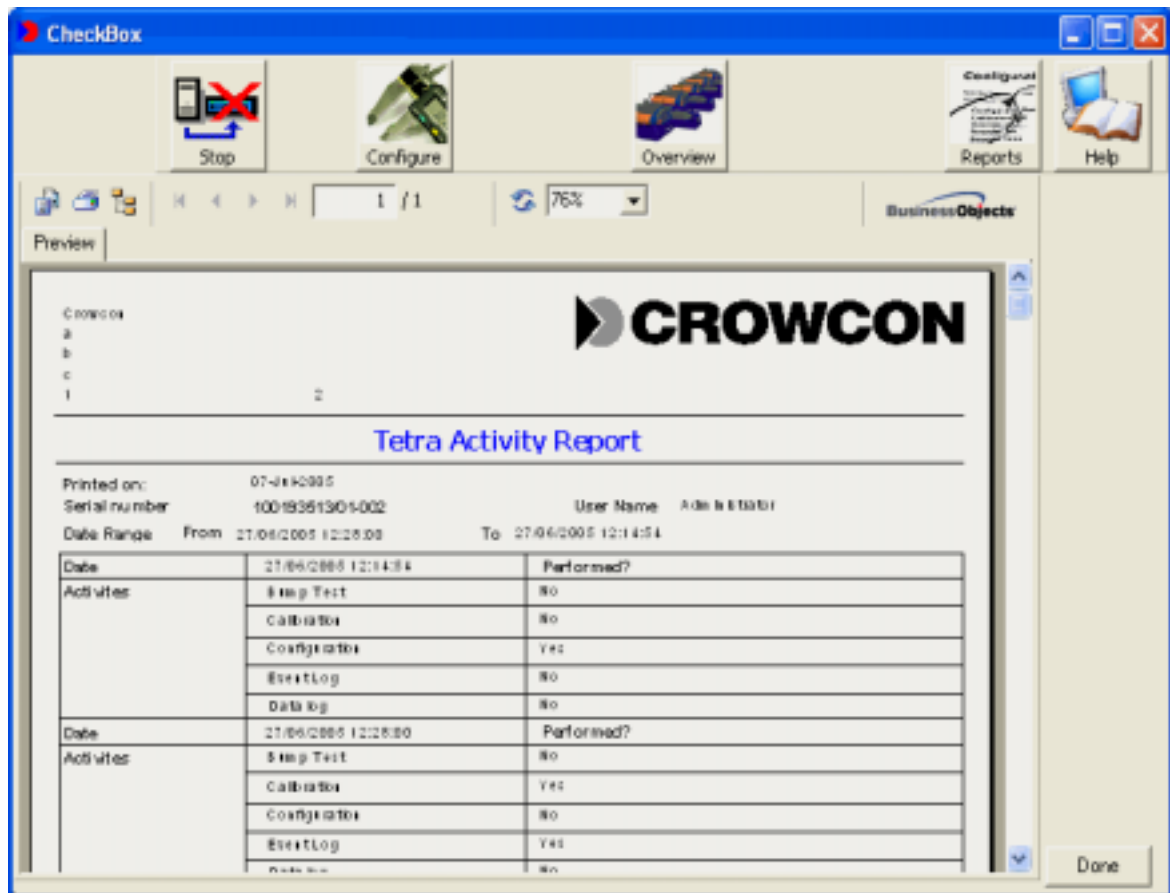
# Service Report.

The Service Report contains a table of manually entered text related to a gas detector. This text can be used to record such information as "sensor changed as a result of calibration failure" or any other service activity performed on the unit.  Service data is entered for a gas detector by right clicking on its icon in the overview screen and selecting Add a Service Report. The following information is printed on a service report:

1. User defined Header
2. The date that the report was printed on
3. Gas detector serial number
4. The id of the logged on user when the report was entered
5. A list of comments entered by a user, and the date that the comment was made
6. User defined Footer

# CheckBox Change Report.

The Checkbox Change report tracks all of the changes made to system settings.
The report consists of:

1. User defined Header
2. The date of printing
3. Date the change was performed
4. User id logged in at the time of the change
5. Full details of each item changed and the value it was changed to
6. User defined Footer

# Report Format.

All the reports use a common header (address details) and footer (legal statements etc.)  The contents of these can be defined using this page.



In addition there is a block of text that can be entered (g to k above).  This block appears on the Calibration Certificate and Bump test Certificate allowing customisation of the summary sections of these certificates.

# Accessory List.

| Part Number | Description |
|---|---|
| C03327 | Calibration Quad Gas Mix (50%LEL CH4, 250ppm CO, 18% O2, 15ppm H2S) |
| | |
| M04032/X | 3/16" I.D. (4.7mm) tubing (used to connect gas to CheckBox IMH and CheckBox to each gas detector aspirator)<br><br>X = 1,2,5,10,20,25  length in meters |
| C01970 | Demand Flow Regulator (50/103 litre - 1 litre/min) including 1m 3/16" I.D. tube |
| C03332 | Demand Flow Regulator (50/103 litre - 1 litre/min) |
| | |
| E01535 | Mains PSU - UK |
| E01553 | Mains PSU - US (leaded) |
| | Mains PSU - Australian |
| E01536 | Mains PSU - etc etc etc............. |
| | |
| E07647 | USB lead for PC connection to CheckBox |
| E07404 | RS232 extension lead 1m |
| C01971 | CheckBoxPC software |
| | |
| C01972 | Tetra Interface assembly (includes IR lead, Tetra aspirator plate, inlet and outlet tubing, T-piece for exhaust daisy chain) |
| C01973 | Triple Plus + Charger interface (includes all cables) UK / ROW |
| C01974 | Gasman charger interface (includes communications lead) |
| | |
| C01969 | Tube cutter |
| | |
| Enquire | 7" Touch LCD (USB) |
| Enquire | 3M 15" rugged touch LCD (USB) |
| Enquire | Cable tidy accessories. |