

IQ Express Docking Station for MultiPro



Reference Manual

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WARNING

THE MULTIPRO IQ EXPRESS IS DESIGNED TO INTERFACE WITH SPERIAN GAS DETECTORS.

SPERIAN GAS DETECTORS HAVE BEEN DESIGNED FOR THE DETECTION OF DEFICIENCIES OF OXYGEN, ACCUMULATIONS OF FLAMMABLE GASES AND VAPORS AND ACCUMULATIONS OF TOXIC VAPORS.

IN ORDER TO ENSURE THAT THE USER IS PROPERLY WARNED OF POTENTIALLY DANGEROUS ATMOSPHERIC CONDITIONS, IT IS ESSENTIAL THAT THE INSTRUCTIONS IN THIS MANUAL AND THE OPERATIONS AND/OR REFERENCE MANUAL(S) FOR THE GAS DETECTOR(S) BE READ, FULLY UNDERSTOOD, AND FOLLOWED.

THIS MANUAL IS NOT INTENDED TO REPLACE THE OPERATIONS AND/OR REFERENCE MANUALS FOR THE GAS DETECTOR. THIS MANUAL IS ONLY DESIGNED TO AID IN THE INSTALLATION AND OPERATION OF THE IQ EXPRESS SYSTEM AND SHOULD BE USED IN CONJUNCTION WITH THE INSTRUMENT REFERENCE OR OPERATIONS MANUAL AT ALL TIMES.

**MultiPro IQ Express
Reference Manual
Sperian Instrumentation Part Number 13-287
Version 3.11
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Middletown, Connecticut 06457**

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Warnings and Cautions

A. Signal Words

The following signal words, as defined by ANSI Z535.4-1998, are used in the MultiPro IQ Express Reference Manual.

⚠ DANGER indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

⚠ WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

⚠ CAUTION indicates a potentially hazardous situation, which if not avoided, may result in moderate or minor injury.

CAUTION used without the safety alert symbol indicates a potentially hazardous situation which, if not avoided, may result in property damage.

1. Overview

The MultiPro IQ Express Docking Station is an automatic calibration station for use with MultiPro Gas Detectors. The MultiPro IQ Express Docking Station automatically performs up to eight critical tests including sensor identification, instrument performance, bump and alarm tests and record-keeping procedures in 1 minute. The station also retains a historical record of testing and instrument maintenance in the system's onboard memory.

The MultiPro IQ Express Docking Station may be operated as a stand-alone calibration station, or may be connected to a PC via USB cable for increased control over system operations.

When the Dock is operated without a PC interface, it will operate with the last set of calibration gas settings that were uploaded into the instrument.

Unless otherwise specified at the time of purchase, all MultiPro IQ Express Docks are shipped from Sperian Instrumentation configured for instruments containing LEL, O₂, CO and H₂S sensors with the standard calibration gas settings. In the event that the dock is to be used as a stand-alone calibration station with non-standard alarm settings, the dock must be reprogrammed with the MultiPro IQ Express Software.

The IQ Express Configuration Software must be loaded onto the PC prior to completing the USB connection.

Note: Do not connect the MultiPro IQ Express Dock to the PC until the software has been installed.

1.1 Tests and record keeping

The MultiPro IQ Express Docking Station automatically performs the following procedures whenever an instrument is placed in the dock.

- Instrument identification
- Battery test
- Audible alarm test
- Visual alarm test
- Vibrating alarm test (if applicable)
- Fresh air calibration
- Bump test
- Record-keeping

- Datalogger and Eventlogger download (Dock must be connected to PC)

In the event that an instrument fails the bump test, or if the instrument's calibration due date has passed, the MultiPro IQ Express Docking Station will automatically proceed to a full calibration without further intervention from the user.

Note: The MultiPro IQ Express Dock only tests the sensors that are currently detected by the MultiPro. The MultiPro only displays readings for sensors that are actively detected by the instrument. If the MultiPro does not show gas readings for a specific sensor on the instrument display, then it is not detecting that sensor.

If the instrument fails any of the tests listed above, the MultiPro IQ Express Dock will notify the user through the display on the dock, and through the PC if the dock is connected to a computer and the software is running.

Results of tests and calibration attempts are stored in the dock and uploaded to the PC if the software has been loaded and the USB connection is active.

1.2 PC Connection

PC Software must be installed prior to connecting the MultiPro IQ Express Dock to the PC. An overview of the installation procedure is given below in section 2.1.

1.2.1 USB Connection

Every MultiPro IQ Express Dock can be connected to the PC via the PC's USB port.

Note: USB cable length from PC to dock may not exceed 10 feet.

1.2.2 Ethernet Connection and E-mail

MultiPro IQ Express Docks with the Ethernet upgrade may be connected to the PC via USB or via a network. For Ethernet Connection instructions, follow the directions given in the IQ Express Ethernet Instructions booklet.

Docks that are connected by Ethernet have additional controls at the PC to ping the dock, to view the Ethernet settings and to view and test the e-mail system.

In the MultiPro IQ Express, e-mail may be sent by the dock to a single e-mail address when a fault is detected at the dock, but for no other reason. The dock must be connected to a network via

Ethernet for the e-mail function to work. E-mail capability is controlled entirely through the IQ Database Manager Pro program. For more information on the e-mail function see Ethernet Controls in section 3.2.1 below or the IQ Database Manager Pro manual.

1.3 PC Requirements

- Pentium II Processor 400MHz or better or equivalent.
- 128MB RAM.
- Windows 98*/2000**/XP.
- 30MB hard drive disk space.
- USB Port.

***Sperian Instrumentation discourages multiple IQ Express Dock setups with PC's running Windows 98.**

****Service Pack 3 for Windows 2000 is highly recommended.**

1.4 Instrument Firmware Requirements

Instrument firmware version 1.32 or higher is required in the MultiPro. Firmware upgrades to the MultiPro may be made with a PC through the IrDA port.

1.5 Power Requirements

Power requirements for MultiPro IQ Express Docks vary with whether the dock is currently connected to the PC via USB cable.

If the dock is to be run as a stand-alone calibration station and will not be permanently connected to a PC, the dock must be plugged in to an appropriate electrical outlet using the power supply / wall cube that was included with the dock at the time of purchase.

For docks that will remain connected to the PC, follow the relevant instructions below in section 1.5.1 or 1.5.2.

The MultiPro IQ Express Dock is delivered with an appropriate power supply for the shipping destination.

- 100-120 VAC, 60Hz, 9A
- 200-240 VAC, 50Hz, 4.5A

If the power supply includes a voltage input selector switch, be sure to set the switch to the appropriate voltage for your electrical supply.

1.5.1 Dock with direct USB Connection to PC

If each MultiPro IQ Express Dock can be given its own USB port and connected

directly to the PC via USB cable, then the PC will provide enough power to run the dock(s).

1.5.2 Multi-Dock Setup with USB Connection

For multi-dock configurations, Sperian Instrumentation recommends the use of a powered USB hub, which is able to power multiple USB devices directly through their USB cables.

Under no circumstances can multiple docks be run from a single USB port without supplemental power.

Power and Connectivity are discussed in greater detail in section 2.3.

1.6 Sensor compatibility

The MultiPro IQ Express Dock is capable of processing instruments containing any combination of O₂, LEL, CO and H₂S sensors.

1.7 Default Calibration Gas Settings

Dock Setting	Default Cal Gas Setting
O ₂	18% vol.
LEL	50% LEL
CO	50 PPM
H ₂ S	25 PPM

Default Calibration Gas Settings and Dock Requirements

1.8 Calibration Gas Cylinder Regulator Requirements

A demand-flow regulator must be used with the IQ Express.

1.9 Dock Location

The MultiPro IQ Express Dock should be located in an area that is not exposed to direct sunlight.

1.10 Delivery

Each MultiPro IQ Express Calibration Station is delivered with the following items:

- MultiPro IQ Express Docking Station.
- MultiPro IQ Express Configuration Disc with MultiPro IQ Express Pro Software, IQ Database Manager Pro Software and PostgreSQL Database Server Software.
- USB Cable.
- Power Supply.

- 2' piece of calibration gas tubing with pre-installed white quick disconnect fitting.

2. Installation

The MultiPro IQ Express Docking Station must be configured with a PC prior to use. Once it has been configured, it may be used as a stand-alone calibration station without a PC connection, or connected to a PC for increased control over system operations.

Unless otherwise specified at the time of purchase, all MultiPro IQ Express Docks are shipped from Sperian Instrumentation configured with the standard calibration gas settings, which are shown in section 1.7.

Whenever the user chooses to activate the MultiPro IQ Express without an active PC connection, the dock will operate with the last set of calibration gas settings that were uploaded into the instrument.

Note: Do not connect the MultiPro IQ Express to the PC until all three items on the MultiPro IQ Express Installation disc have been installed.

2.1 Installation Overview

A number of software programs and a PostgreSQL Database Server must be installed to control the MultiPro IQ Express.

1. Install the PostGreSQL Database Server and the IQ Administrator Pro Program as described in the IQ Administrator Pro Reference Manual.
2. Install the IQ Database Manager Pro program as described in the IQ Database Manager Pro Reference Manual.
3. Install the MultiPro IQ Express PC Software as described below in section 2.4.
4. Create a default PostgreSQL database as described in section 6 of the IQ Administrator Pro Reference Manual.
5. If connecting the dock to the PC via USB, follow the instructions in section 2.6. If connecting the dock via Ethernet, follow the Ethernet Instructions booklet.

6. Follow the instructions in section 2.7 for providing calibration gas and fresh air to the dock(s).
7. For docks that will be connected permanently by USB port, configure the docks by connecting them to the PC's USB port. If the instrument is to be connected via Ethernet, follow the Ethernet Instructions that came with the dock.

2.2 IQ Administrator Pro and PostgreSQL Database Server Installation

The IQ Administrator Pro Program is contained on the IQ Express Installation Disk. Place the disk in your PC's CD tray and follow the installation instructions given in the IQ Administrator Pro Reference Manual that is included with the IQ Express.

2.3 IQ Database Manager Software Installation

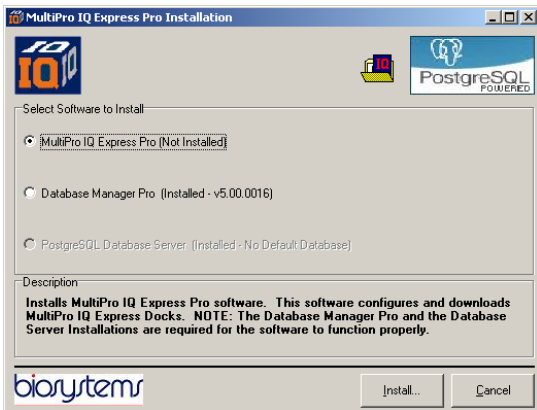
The Database Manager Pro Program is contained on the IQ Express Installation Disk. Place the disk in your PC's CD tray and follow the installation instructions given in the IQ Database Manager Software manual that is included with the IQ Express.

2.4 MultiPro IQ Express PC Software Installation

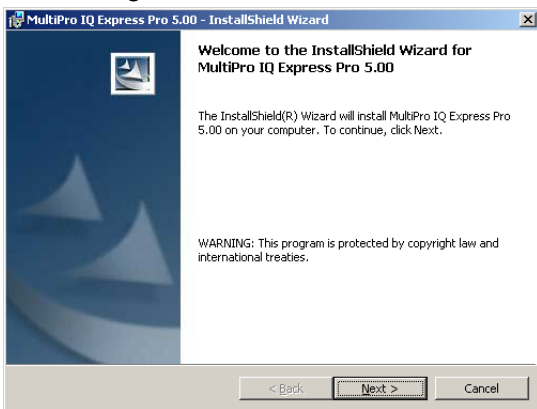
The PostgreSQL Database Server and IQ Database Manager Pro Programs should be installed before proceeding to step 1.

Note: Screens shown below may be slightly different depending on your PC's operating system.

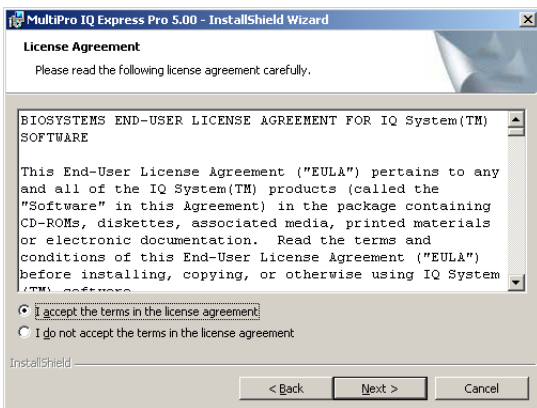
1. The Software Installation screen should come up automatically once the installation of Database Manager is complete. If this screen does not come up, access the CD drive using Windows Explorer.



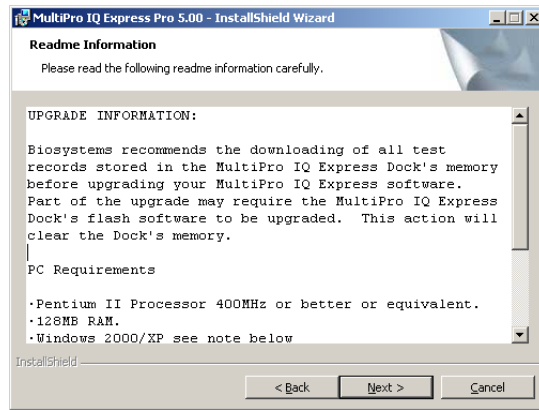
2. Select "MultiPro IQ Express Pro" and click "Install". The InstallShield Wizard will begin the installation.



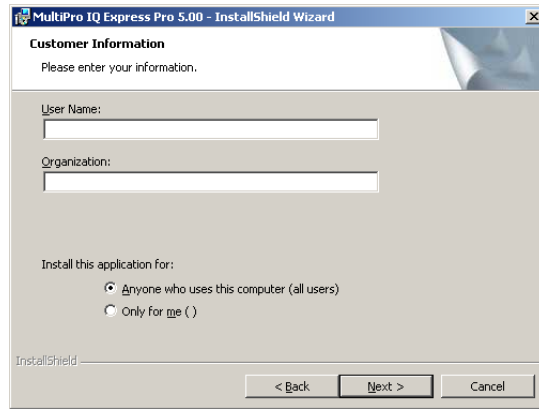
3. Click "Next" to continue with the installation. The Licensing Agreement screen will be shown.



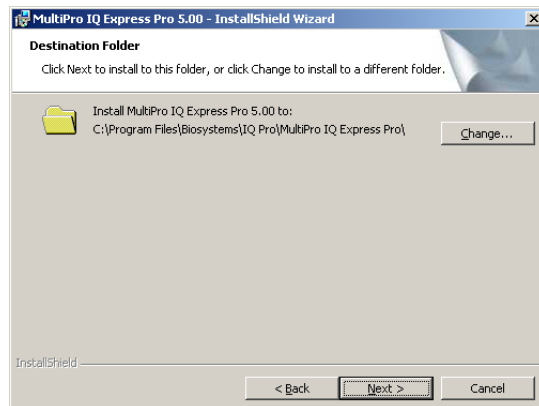
4. If you accept the terms of the License Agreement, click "I accept....." and then click "Next" to continue. The upgrade information and PC requirements will be shown.



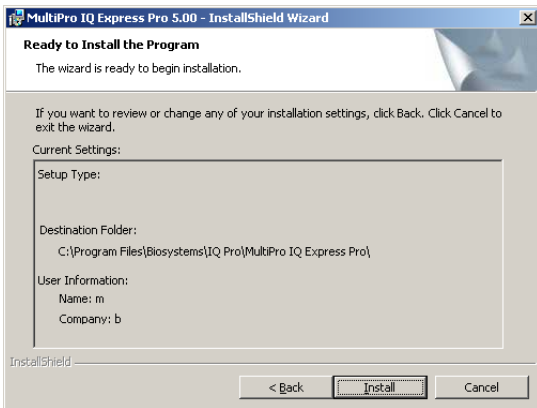
5. Click "Next" to continue. The Customer Information screen will be shown.



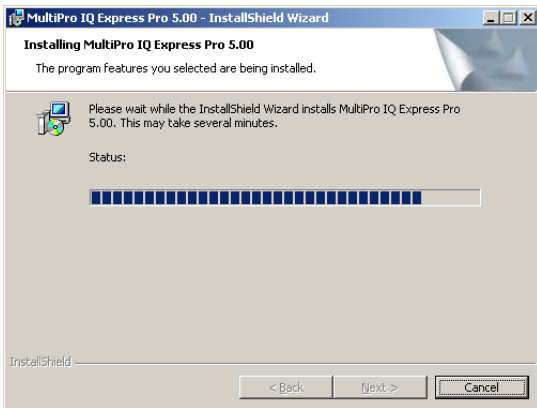
6. Enter the name of the user and the name of the organization. Then select whether this application may be used by "Anyone who uses this computer" or "Only for me". Then click "Next". The destination folder screen will be shown.



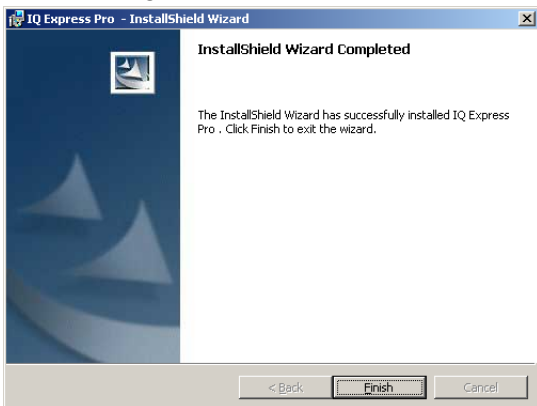
7. To install IQ Express in the default directory at "C:\Program Files \ Biosystems \ IQ Pro \ MultiPro IQ Express Pro \" click "Next". To install the files to another directory, click "Browse" and use Windows Explorer to specify the new location. Click "Next" once this is accomplished. The following screen will then be shown.



8. Click “Next” to continue. The status of the file decompression will be shown.



Once the installation is complete, the following screen will be shown:



9. Click Finish to conclude the installation. The IQ Express logo will appear on your desktop.



Note: Do not launch the MultiPro IQ Express Software again until the instructions in sections 2.5 – 2.8 below have been completed.

2.5 Install IQ Administrator Pro and PostgreSQL database.

Proceed to the IQ Administrator Pro Reference Manual section 6 and follow the instructions to create and specify the PostgreSQL database.

2.6 Power and Connectivity

This section covers providing power to the IQ Express Docks and connecting them to your PC. The instructions given below pertain to standard connections via the PC’s USB port.

Note: Disregard this section if you are planning to connect the docks via Ethernet or if you have purchased the IQ Express Mounting Bracket.

IQ Express Docks that are Ethernet-ready are shipped with an Ethernet Instructions booklet. Proceed to the Ethernet Instructions booklet if you are planning to connect the dock to the PC via Ethernet. Once the instructions in the booklet have been followed and the IQ Express Dock is connected, return to section 2.7 for calibration gas cylinder connection instructions.

If you have purchased the IQ Express Mounting Bracket, proceed to the Assembly Instructions for IQ Express Mounting Bracket. Once the docks are correctly installed on the mounting bracket, proceed to section 2.7.3 for instructions concerning the Fresh Air Port(s).

2.6.1 PC – Single Dock via USB

For single dock setups that will be run from the PC via USB, the power from the PC via the USB cable is sufficient to power the dock. Simply connect the dock to the PC with the USB cable that was included with the dock and proceed to section 2.7 for instructions concerning calibration gas.

Note: USB cable length from PC to dock may not exceed 10 feet.

2.6.2 PC – Multi Dock via USB

For multi-dock configurations that will be connected via USB, Sperian Instrumentation recommends the use of a powered USB hub, which is able to power multiple USB devices directly through the USB cable. With a powered USB hub, it is not necessary to use the wall cube

power supplies that are included with the MultiPro IQ Express Docks.

Note: With a USB hub, USB cable length from hub to dock may not exceed 10 feet.

If you prefer to not use a powered USB hub, the following other options are available:

1. If you have enough open USB ports on your PC to connect each of the docks directly to its own USB Port, you may connect each dock directly to the PC. Most users decide against this option either because their PC doesn't have enough USB ports, or because it is an inappropriate use of their PC's system resources.

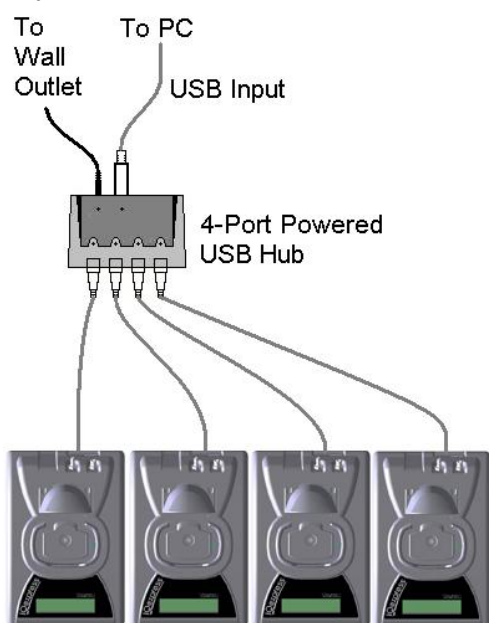


Figure 2.3.2 Preferred Method for Connecting and Powering Multiple IQ Express Docks.

2. Use a non-powered USB hub to connect the PC to the docks by USB cable. Although the PC has enough power to run one dock from one USB port, it will be unable to power the 2nd, 3rd and 4th docks in the series. There are two options in this case. The first option is to connect each dock to a suitable power source using the wall cube power supply that was included with the dock. A suitable, grounded power strip may be used. The second option is to purchase the optional power supply that is capable of running up to four MultiPro IQ Express Docks from a single electrical outlet.

Under no circumstances can multiple IQ Express Docks be run from a single USB port without supplemental power.

2.7 Connecting the Calibration Gas Cylinder to the Dock(s)

Connection requirements for calibration gas cylinders vary with how many docks will be connected to the cylinder.

For instructions on connecting the gas cylinder to a single dock proceed to section 2.7.1.

For instructions on connecting the gas cylinder to multiple docks proceed to section 2.7.2.

2.7.1 Single Cylinder to Single Dock

1. Insert the demand flow regulator into the calibration gas cylinder.
2. Slide the open end of the tubing assembly over the regulator.
3. Connect the end of the tubing with the white quick disconnect fitting to the toxic GAS port on the dock (see figure 2.4).



Figure 2.4: Gas Ports

4. Proceed to section 2.4.3 for further instructions concerning the fresh AIR port.

2.7.2 Single Cylinder to Multiple Docks

When multiple IQ docks are connected to a single cylinder of calibration gas, a manifold is used to disperse the calibration gas from the cylinder to the docks.

The manifold is Sperian part number 54-46-115 and includes a detailed instruction sheet for its use. The manifold comes with tubing and fittings necessary for

connecting up to 4 docks to a single cylinder of calibration gas.

Note: Do not exceed the output capacity of your demand flow regulator. Each IQ Express dock is able to draw calibration gas at a maximum rate of 0.75 liters/minute. The demand flow regulator supplied by Sperian Instrumentation (part number 12-039) has a maximum output capacity of 3 liters per minute, so it can be used to calibrate up to 4 docks simultaneously. Do not connect more than 4 docks to a single cylinder of calibration gas while using the 12-039 demand flow regulator.

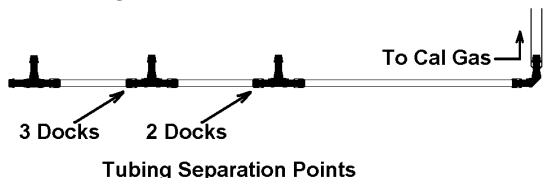
The 54-46-115 manifold is comprised of:

- (1) small black elbow fitting
- (3) small black T-fittings
- (2) pieces of gas tubing 5" long
- (1) piece of gas tubing 10" long
- (1) piece of gas tubing 1" long

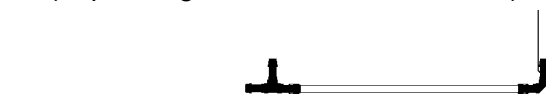


54-46-0115 Manifold

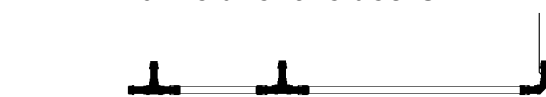
1. Insert the Demand Flow Regulator into the calibration gas cylinder.
2. Modify the tubing assembly as follows depending on how many docks will be connected. If 4 docks will be used, no modifications are necessary. For 2 or 3 docks, begin by separating the tubing at the location described below.



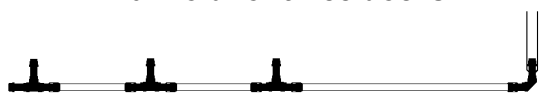
Once this is accomplished, set the two parts aside. The section that will be used is shown in the following images (depending on the number of docks).



Manifold for two docks



Manifold for three docks



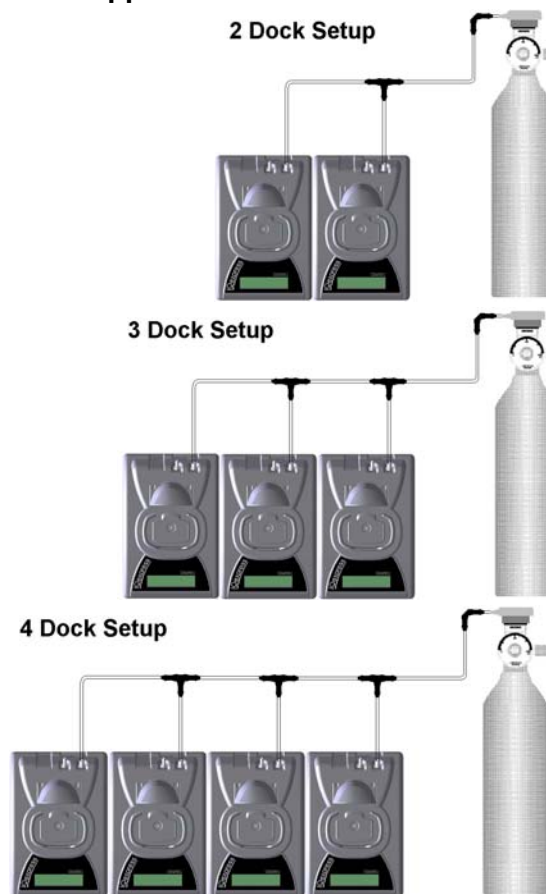
Manifold for four docks

3. Each dock is delivered with a 24" piece of tubing with a white quick disconnect fitting, which is normally used to connect a single gas cylinder directly to a single dock. Connect the white quick disconnect fittings to the GAS ports on the docks and connect the open ends to the manifold's open t-fittings.

At this point, tubing should run from each dock's GAS port to the t-fittings. There should be no open T-fittings in the procedure, but there should be one piece of open tubing on the elbow fitting.

4. Connect the open piece of tubing on the elbow fitting to the Demand Flow Regulator.

Final Appearance



Note: Tubing lengths in these images are not to scale.

2.7.3 Fresh Air Port Instructions

The Fresh Air Port is used to draw the fresh air sample into the dock for instrument processing. Check valves and/or fresh air filters are required depending on how fresh air is delivered to the dock. See the chart below for specific requirements for your setup.

	Air Filter at Dock	Check Valve(s)
Single Dock in Fresh Air	Yes	N/A
Multiple Docks in Fresh Air	Yes	N/A
Single Dock w/Zero Air Cylinder	No	No
Multiple Docks w/Zero Air Cylinder	No	Yes
Single Dock w/Sealed Fresh Air Conduit	Yes	No
Multiple Docks w/ Sealed Fresh Air Conduit	Yes	Yes

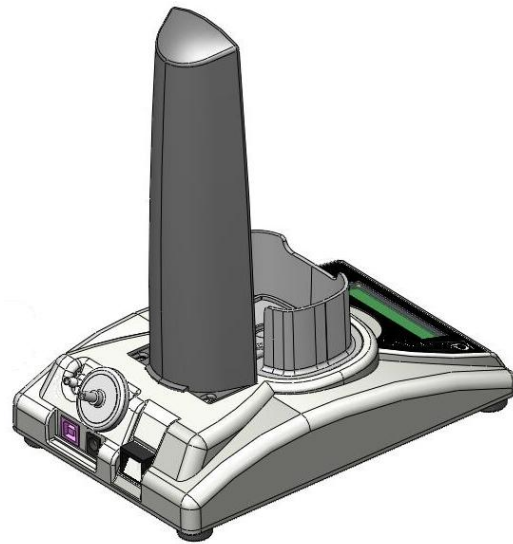
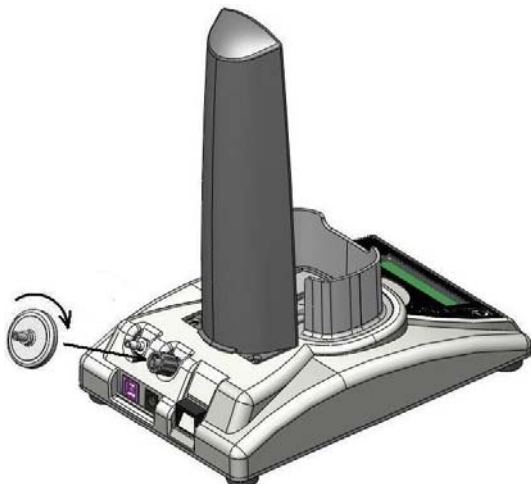
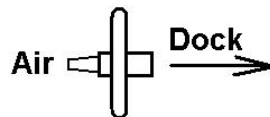
Air Filter / Check Valve Requirements Chart

The fresh air filter is placed on the Air Port at the dock to protect the dock from contaminants. Check valves are used to ensure the purity of external fresh air sources when more than one dock is used.

Fresh Air Filter

Under normal circumstances, the IQ Express Dock is located in a fresh air environment and fresh air is drawn in from the local environment. A filter is included with the dock that is used to protect the dock from contaminants that may inadvertently enter the dock. The air filter should be installed if the dock is drawing fresh air from the immediate surroundings or if it is drawing fresh air from an external source via a sealed conduit. The fresh air filter can be left off if the fresh air source is a calibration cylinder.

Only one side of the filter will screw into the Air Port on the dock.



Providing Fresh Air in a Contaminated Environment

If the IQ Express is to be located in a potentially contaminated environment, fresh air must be delivered to the Air Port on the dock for use during instrument processing. This can be accomplished either by using a cylinder of “zero air” with a demand flow regulator (option 1 below) or by plumbing fresh air into the dock in a sealed conduit from an outside location that has known fresh air (option 2 below).

⚠WARNING Performing the fresh air calibration in a contaminated atmosphere will lead to inaccurate and potentially dangerous readings. Fresh air containing 20.9% oxygen and no contaminants must be provided to the IQ Express Dock for instrument processing. If fresh air is unavailable in the immediate area, steps must be taken to provide fresh air to the dock.

When a secondary fresh air source (either gas cylinder or sealed conduit) is used with two or more IQ Express Docks, a one-way check valve must be placed in line between the common section of the fresh air manifold and each of the docks to ensure the purity of the fresh air source. See the section below titled “Fresh Air Manifold” for further instructions.

Option 1: Using a Gas Cylinder to Provide Fresh Air to the Dock

A calibration cylinder containing “zero air”, which contains 20.9% oxygen and no contaminants may be connected to the gas port labeled “AIR” to provide fresh air to the dock for calibration. The cylinder must be equipped with a demand flow

regulator. The connection from the cylinder and regulator to the dock may be made with standard gas tubing.

For single docks, simply connect the “zero air” cylinder and demand flow regulator to the dock’s AIR port using standard gas tubing. A check valve is not necessary when a cylinder is used to provide fresh air to a single dock. The fresh air filter is also not required in this configuration.

For multiple dock setups (up to 4), a one-way check valve must be placed in the line between each T-fitting and dock to ensure the purity of the fresh air source. See “Multi-Dock Setups with Fresh Air Manifold” below for further instructions. The fresh air filter is not necessary when a gas cylinder is used to provide fresh air to the dock(s).

Option 2: Using a Sealed Conduit to Provide Fresh Air to the Dock

Fresh air may also be delivered to the dock from a known fresh air source via a sealed conduit that feeds directly from the source into the AIR port on the dock.

For single docks, install the fresh air filter as discussed above and simply plumb the fresh air source directly into the dock’s AIR port.

For multiple dock setups in which fresh air is provided to the dock via sealed conduit, begin by installing the fresh air filter on each dock. A one-way check valve must be placed in the line between the t-fitting in the fresh air manifold and each dock to ensure the purity of the fresh air source. See “Multi-Dock Setups with Fresh Air Manifold” below for further instructions.

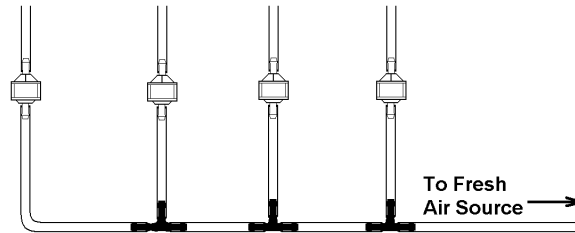
Multi-Dock Setups with Fresh Air Manifold

For more information on this, see Applications Note # AN20050722, which is available at <http://www.biosystems.com>.

The 54-46-116 manifold is necessary for use when more than one dock is to be used with an external fresh air source, whether is be a cylinder of “zero air” or a sealed conduit to a fresh air source.

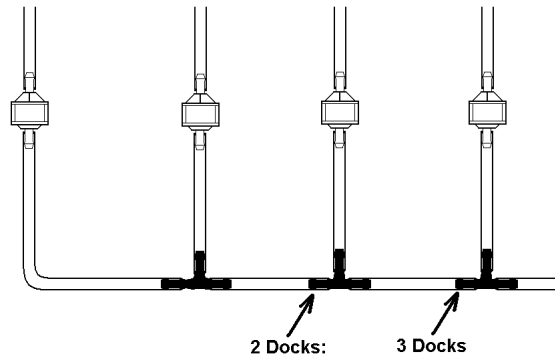
The 54-46-116 manifold is comprised of:

- (3) small black T-fittings
- (4) clear one-way check valves
- (10) pieces of gas tubing 5” long
- (1) piece of gas tubing 10” long



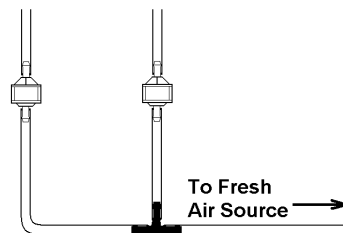
54-46-115 Tubing Assembly

- 1a. If the fresh air source is a calibration gas cylinder, insert the Demand Flow Regulator into the calibration gas cylinder and proceed to step 2.
- 1b. If the fresh air source is a sealed conduit from an external fresh air source, install the fresh filter on each dock as described above and proceed to step 2.
2. Modify the tubing assembly as follows depending on how many docks will be connected. If 4 docks will be used, no modifications are necessary. For 2 or 3 docks, begin by separating the tubing at the location described below.

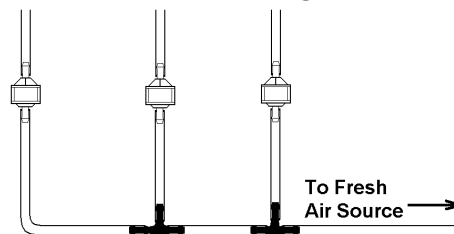


Tubing Separation Points

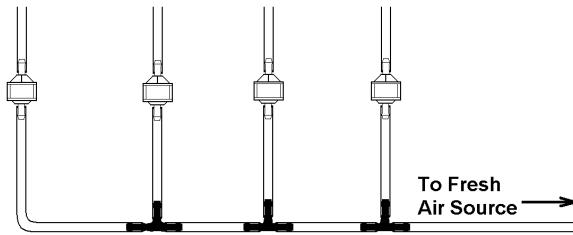
Once this is accomplished, set the two parts aside. The section that will be used is shown in the following images (depending on the number of docks).



Fresh Air Tubing for 2 Docks



Fresh Air Tubing for 3 Docks



Fresh Air Tubing for 4 Docks

3. Connect the pieces of tubing above the check valves to filter that was installed on the dock in step 2.

At this point, the tubing assembly should be connected to each dock's AIR port.

4. Connect the only open piece of tubing (below the black t-fittings) to the demand flow regulator on the gas cylinder or to the conduit for the external source of fresh air.

2.8 Initial PC- Dock Connection

Once the software has been installed, and the USB wire(s) is/are plugged into the USB port, the Found New Hardware Wizard screen will be shown on the PC and a number of messages will be shown on the MultiPro IQ Express Dock.

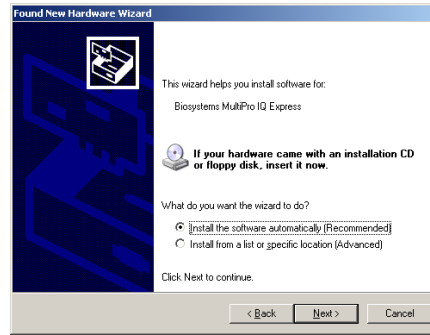
2.8.1 PC screens

The Found New Hardware screens will be shown whenever a dock is plugged into a new USB port, and also whenever a dock is plugged into a USB Port that was most recently used for a different device.

NOTE: These screens will vary depending on your PC's operating system.



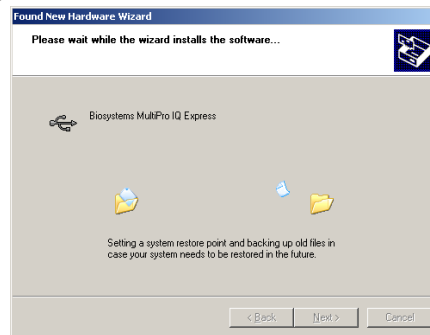
The software will prompt to ask if it should connect to Windows Update to search for software. Make a selection based on how you would like to use your PC's operating system and click Next to continue. The Wizard will proceed to search for the USB drivers.



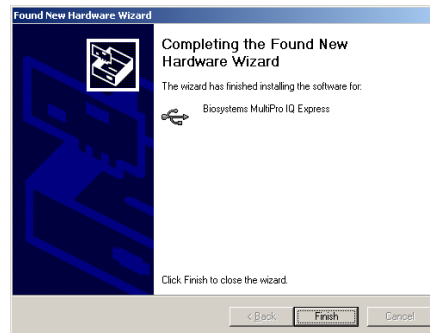
Select "Install the software automatically" and click "Next".



In Windows XP, a warning screen will be shown stating that MultiPro IQ Express software has not passed Windows Logo testing. Click "Continue Anyway" (XP Only). The installation will then continue.



The software will notify you when the process is complete.

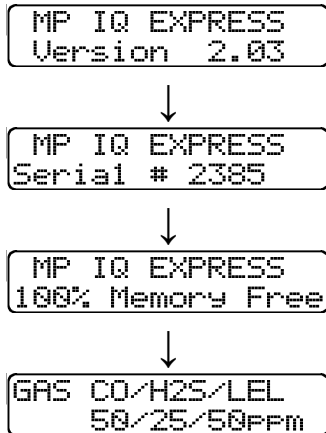


Click "Finish".

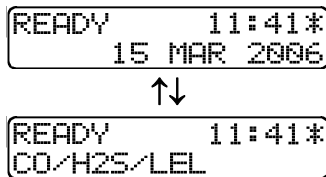
2.8.2 Dock screens

Once the connection is made, the dock will display its software version number, serial number, and the calibration gas type and expected calibration gas

concentration whenever it is plugged in. The MultiPro IQ Express Dock is ready to go once it displays “READY” with the gas type, time and date.



The IQ Express is ready to go once it alternates between the following two screens.



Note: The asterisk to the right of the time indicates that the dock is connected to the PC and that the MultiPro IQ Express Pro PC software is running.

3. Software

To launch the IQ Express Software, click on the IQ Express icon on your PC’s desktop.

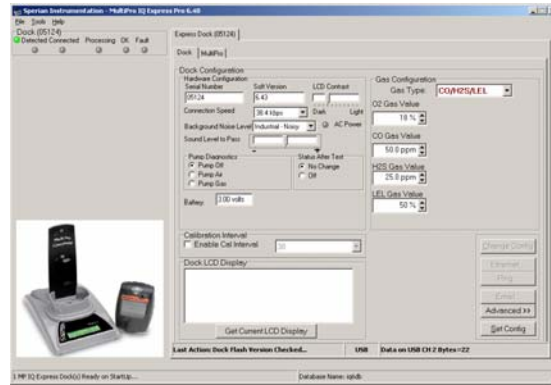


Note: The Database Manager must be launched prior to launching the MultiPro IQ Express Software to establish a database.

The software may also be launched by accessing the program through the start button and selecting Programs / Biosystems / MultiPro IQ Express / MultiPro IQ Express (unless another location was specified during the installation).



The following screen will be shown once the software is launched.

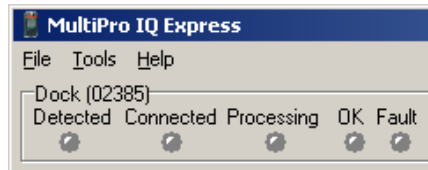


The screen is divided into right and left sides. The left side gives the status of the docks that are currently installed and recognized. At the top of the right side of the screen there is a tab for each dock that is currently installed and recognized. Within each dock tab are two sub-tabs: one for dock controls and one that shows the calibration status and details for the instrument that is currently in the dock.

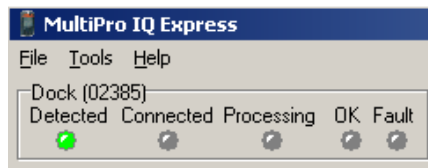
3.1 Dock Status (USB Connection)

Note: If the dock is connected to the PC via Ethernet, see the Status Indicators section of the IQ Ethernet Instructions Booklet.

The current status of each dock is shown in the left column. When there are no detectors in the dock, each of the status indicators will be shown in grey.



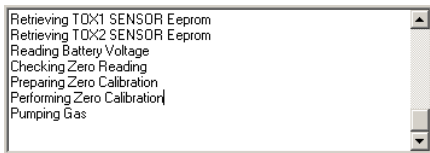
When a detector is placed in the dock, the indicator will change to reflect the new status. Status changes are also shown on the dock’s LCD.



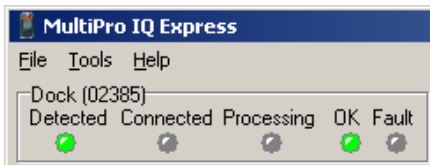
During processing, the Processing Indicator is shown in yellow.



The operations being performed on the instrument are listed as they occur.

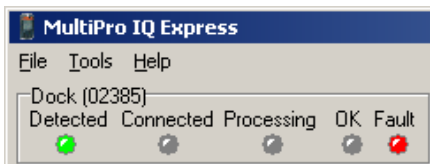


If the dock is able to successfully complete the processing dictated by the instrument's template in the IQ Database Manager Pro Program, OK will be shown in green.



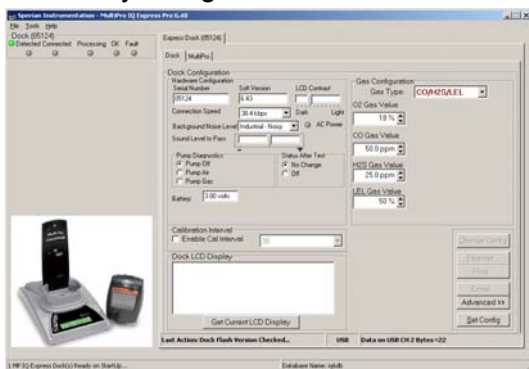
For more information regarding template settings, see the IQ Database Manager Pro Reference Manual.

If a fault is detected and the dock is unable to complete the tests, the red fault light will be shown on the screen. Details of the fault will be listed in the input box on the right side of the screen under the instrument tab. See section 3.2.2 for details on faults.



3.2 Dock Controls and Instrument Status

The right side of the screen contains individual controls for each MultiPro IQ Express Dock. Each dock has its own page, which can be accessed by clicking on the appropriate tab at the top of the page. Within each dock's page are two sub-tabs. One contains specific information on the dock itself. The other displays information on the instrument that is currently recognized in the dock.



Note: If the "Change Config" button is enabled, press it before making any changes to the settings.

3.2.1 Dock Configuration

Click on the Dock tab to access the dock settings.



To change the configuration of the MultiPro IQ Express Dock that is displayed, click on the "Change Config" button at the lower right of the screen. Once the dock configuration is uploaded, the "Set Config" button will be enabled. Once changes are made, click on the "Set Config" button to save the new settings.

⚠WARNING Calibration values shown in the Gas Values columns must match those appearing on the calibration gas cylinder(s) that will be used to calibrate the detector. Non-matching calibration gas and calibration gas value settings will lead to inaccurate and potentially dangerous readings.

Hardware Configuration

The hardware configuration section contains the serial number and software version number of the dock at the upper left corner.



This information may not be changed with the software. Software updates will cause the software version to change.

Connection Speed

The IrDA connection speed is given below the serial number and software version. The default connection speed is 38.4 kbps, although settings from 2400 bps to 115.2 kbps are available.

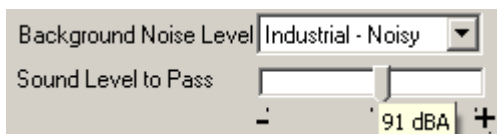


Sperian Instrumentation recommends leaving the connection speed at the default setting unless you are experiencing frequent communication problems in the form of a loss of

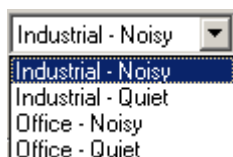
connection. If connection is frequently lost, adjust the connection speed down gradually until the problem is resolved.

Audible Alarm Sensitivity Controls

The audible alarm sensitivity controls allow the user to customize the audible alarm test criteria.



The Background Noise Level adjustment offers four levels of background noise levels. For the best results, select the one that most closely approximates the background noise level expected during testing.



The Minimum Sound Level setting determines the minimum amount of sound required to pass the alarm test. The higher the setting, the louder the alarm will need to be to pass the test. The sound level is given in decibels when the cursor is placed over the slider.



The minimum sound level that will be accepted by the software is 85 dBA.

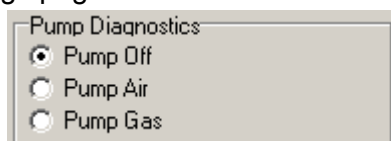
AC Power

The AC Power indicator is located directly beneath the connection speed setting. If the dock is being powered by the USB cable, the AC Power will appear grey. When the dock is being powered by an AC power source, the AC Power indicator will appear green.



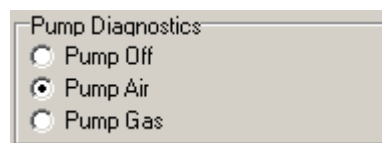
Pump Diagnostics

Pump settings are controlled through the Pump Control section on the Dock Settings page.



Click "Pump Gas" to draw span calibration gas through the right gas port at the back of the dock. Click "Pump Air" to draw the

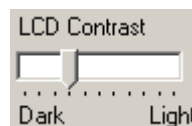
fresh air sample through the left gas input port.



Either pump will run until "Pump Off" is selected.

LCD Contrast Control

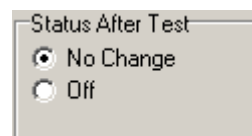
At the right side of the Dock Configuration box is the LCD (Liquid Crystal Display) Contrast Control.



To darken or lighten the display on the dock, move the slider as appropriate. The dock will not show the new LCD setting until the "Set Config" button is pressed.

Status After Test

Once the MultiPro IQ Express Dock finishes processing an instrument, it can be programmed to turn the instrument off, or to leave it in the state that it was in (either on or off) when it was placed in the dock. The Status After Test control is located beneath the LCD Contrast Control near the center of the screen.

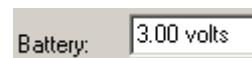


If "Status After Test" is set to Off, the MultiPro will automatically be turned off by the dock once the instrument has been processed.

If "Status After Test" is set to "No Change", the instrument will return to the state it was in when it was placed in the dock.

Battery

The battery level shown on the dock tab is for the internal battery in the MultiPro IQ Express Dock. This battery serves to keep the real time clock accurate while the dock is unplugged and should not be a concern to the user unless the battery level drops below 2.50 Volts.



Calibration Interval

The Dock's calibration interval settings are controlled from the Dock Tab and are

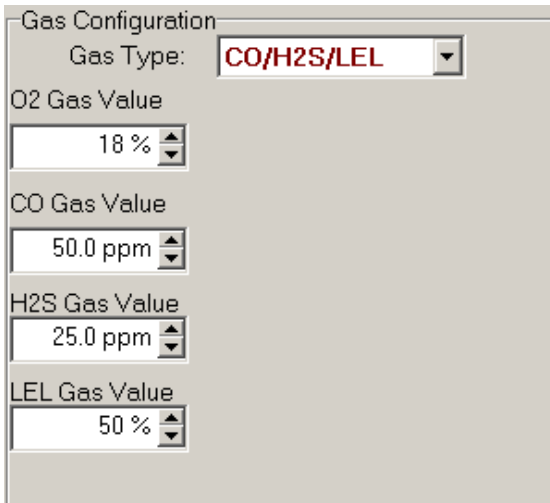
located below the battery level and above the LCD Display box. The dock's calibration interval is the maximum number of days that the dock will allow to pass between calibrations for any instrument that is placed in the dock. If an instrument is placed in the dock and the interval has been exceeded, the dock will automatically initiate a full span calibration of the instrument regardless of the results of the bump test or the instrument's own calibration status.



To use the setting, click on Enable Cal Interval and set the interval to the number of days between calibrations. **Note that this setting may cause the instrument to undergo a full calibration even when the instrument itself is not due for calibration.**

Gas Configuration

The calibration gas configuration for the dock is located on the right side of the window. If the values are shown in red text, they can be changed. If the values are shown in black text and you wish to change them, press "Change Config".



Note: The gas values shown in the gas configuration screen are the values that will be used in calibrating the MultiPro instruments that interface with the dock regardless of the MultiPro's own built-in calibration gas settings.

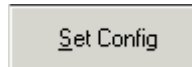
To change the calibration gas value, use the arrows to the right of the gas value input box to increase or decrease the value.

⚠️ WARNING Calibration values shown in the Gas Value column must

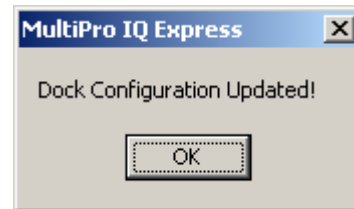
match those appearing on the calibration gas cylinder(s) that will be used to calibrate the detector. Non-matching calibration gas and calibration gas value settings will lead to inaccurate and potentially dangerous readings.

Saving new settings

When all necessary changes have been made, press the "Set Configuration" button to upload the new settings to the dock.

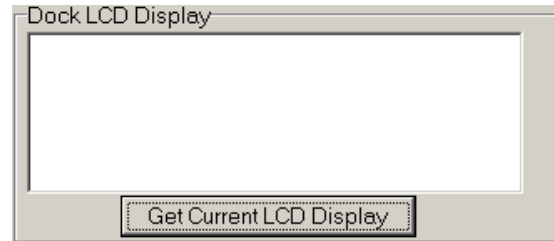


The software will notify you once the dock configuration has been updated.

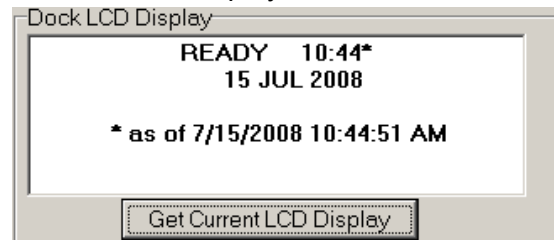


Dock LCD Display

At the lower left corner of the Dock status tab is Dock LCD Display window. This is most often used when a dock is controlled remotely via Ethernet where the PC user is unable to physically see the dock.

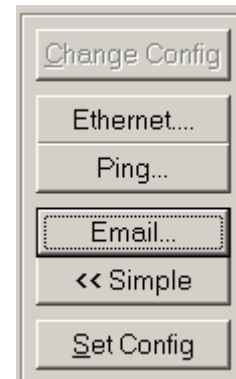


To view the dock's Display, click on "Get Current LCD Display".

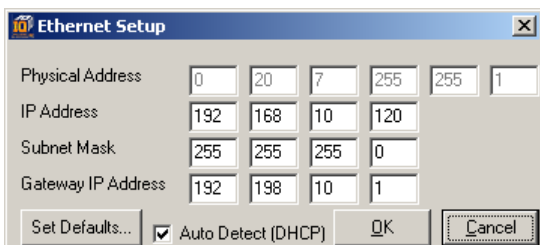


Ethernet Controls

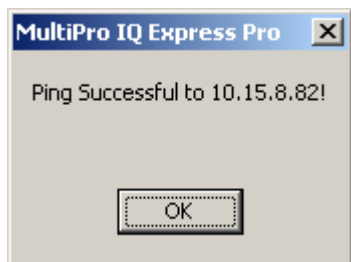
For docks that are connected by Ethernet, there are three additional controls on the lower right corner of the display: Ethernet, Ping and E-mail.



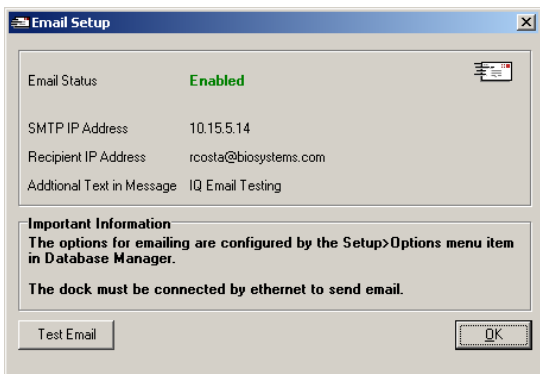
To view the Ethernet settings, click on the Ethernet button



To test the dock connection, press the Ping button. A status window will be shown to indicate whether the ping was successful or not.



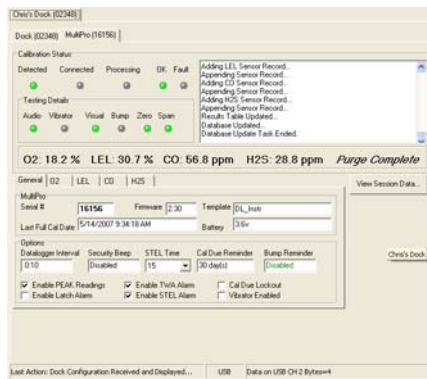
The dock's e-mail settings are controlled through the Database Manager Pro program, but can be viewed by clicking on the e-mail button. The e-mail status, IP Address of the dock, recipient e-mail address and text of the e-mail message are shown.



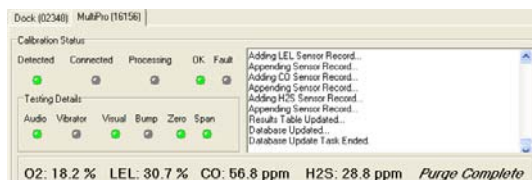
To test the e-mail ability of the dock, press the Test E-mail button at the lower left. An e-mail will be generated and sent to the recipient e-mail address that is listed. Press OK to close the Email Setup window.

3.2.2 Instrument Tab

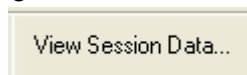
The MultiPro tab shows instrument information for the detector that is currently in the dock. The right side of the tab is identical to the Dock Status tab section discussed above. The blank space at right is an output box that shows detailed instrument information as it is processed.



The output box is updated as the instrument is detected, connected, and processed. When faults occur, the details of the fault will be shown and a red fault light will be shown. Below, a span calibration failure is the cause of the fault.



If the datalogger has been downloaded, the "View Session Data" control will appear on the right. Click on "View Session Data" to directly access session information for the instrument using the BioTrak Program.



If the dock is currently empty, none of the status indicators will be lit.



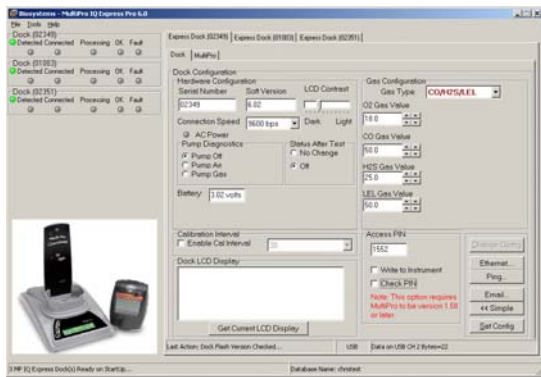
3.3 Advanced Settings / Passcode

The MultiPro IQ Express Dock may be set to verify a specific 4-digit passcode (PIN) in any instrument that interfaces with the dock. If the dock detects a PIN in the instrument that matches its own PIN, it will process the instrument. If the dock fails to detect a PIN, or recognizes a non-matching PIN, it will not process the instrument.

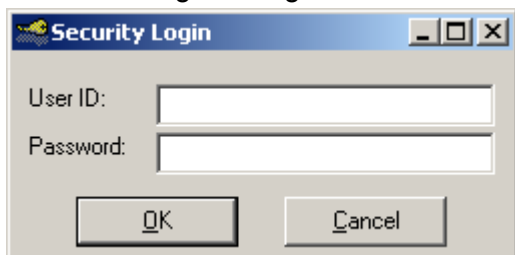
To use the passcode feature a PIN must be entered into the MultiPro IQ Express Software and then uploaded to every instrument that will interface with the dock. Each dock must then be programmed with the same PIN and set to check for the code in the instruments.

1. Verify that the MultiPro instruments have firmware version 5.0 or higher. Instrument firmware version is shown in the start up screens for the instrument.
If needed, new MultiPro Firmware can be downloaded at no charge from Sperian Instrumentation's download website at <http://www.biodownloads.com>.
2. Verify that the MultiPro IQ Express Dock contains firmware version 5.0 or higher. New dock firmware can also be downloaded at no charge from Sperian Instrumentation's download website at <http://www.biodownloads.com>.

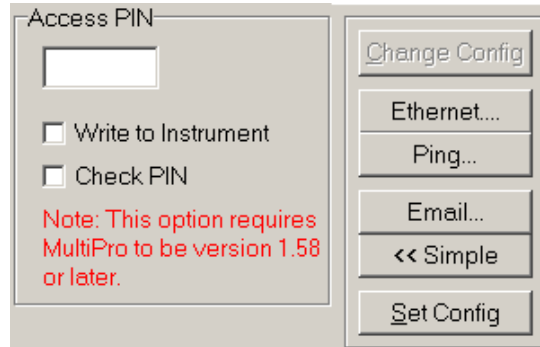
3. Select the dock that will be used to write the PIN (Personal Identification Number) to the instrument. Connect the dock to the PC either by USB port or by Ethernet port. If using an Ethernet connection, the Ethernet setting must be configured to "Live". If more than one dock will be used to update the instruments, perform steps 4-10 for each dock.
4. Open the IQ Express software.



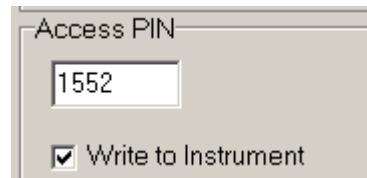
5. Click "Advanced" in the row of buttons on the lower right. The software will automatically show the Security Login screen and prompt you for your user name and password. If the "Advanced" button is not shown, click on "Change Config" first to access it.



6. Enter a valid User ID and Password. The Access PIN settings will be shown:



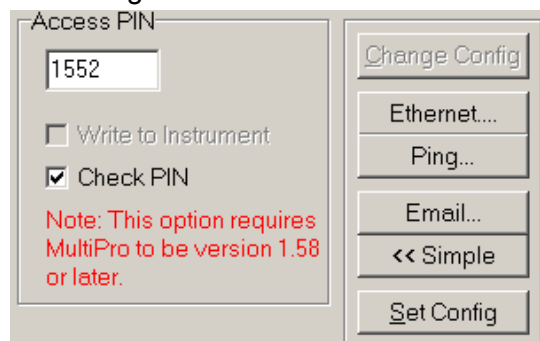
7. Enter a unique 4-digit PIN in the input box under Access PIN and click on "Write to Instrument".



8. Click "Set Config" to tell the dock to upload the PIN setting to the instruments. The software will automatically show the Security Login screen a second time and prompt you for your user name and password. Once a valid User ID and Password have been entered, "PIN Lock Writing Enabled" will be shown in the dock configuration window. The dock is now ready to upload the PIN to the instruments.

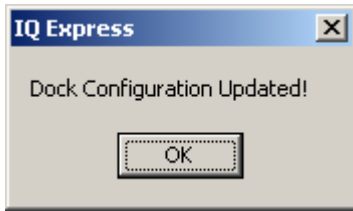


9. Place the instrument(s) that is/are to be configured with the PIN in the dock while PIN Lock Writing is enabled.
10. Once the PIN has been uploaded to all of the instruments, access the dock's advanced settings again and click on "Check PIN". Then click the "Set Config" button.



Enter your User ID and password again when the Security Login window is shown.

A window will be shown to indicate that the dock configuration has been updated.



11. Click OK. "PIN Lock Enabled" will then be shown in the PC software in the dock configuration window.



The dock will now verify the PIN in any instrument that interfaces with it.

12. For every other dock in the system, access the dock's advanced settings, enter the PIN, click on "Check PIN" and click the "Set Config" button.

With PIN lock enabled, only instruments with a PIN matching the dock's PIN will be processed.

4. Dock Use

Once the MultiPro IQ Express is connected to the gas cylinder(s) and has been properly configured, it is ready to accept the MultiPro gas detector.

The MultiPro must be turned on when it is placed in the dock.



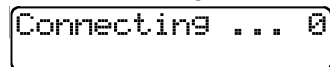
Note: If the MultiPro has just been turned on, wait at least three minutes after the conclusion of the startup sequence to allow the readings to fully stabilize before placing the instrument in the dock.

Note: If a sensor has just been replaced, it must be allowed to stabilize before placing the instrument in the dock. See the sensor replacement section of the MultiPro Reference Manual for further information on sensor stabilization.

If you plan to test the instrument with the pump attached, insert the orange spacer between the pump and the MultiPro IQ Express Dock as shown below. The nubs on the spacer should face down and be flush with the IQ Express Dock housing. Once the spacer is in, insert the detector into the dock.



Once the dock recognizes the instrument, it will show the following screens.



Once the connection is made, the IQ Express will display "Connected", followed by the instrument type, software version and recognized sensors.



Note: MultiPro Instrument firmware version 1.26 or greater is required for interface with the MultiPro IQ Express Dock. Attempts to use the MultiPro IQ Express Dock with instruments with earlier firmware versions will result in errors.

If the dock recognizes the MultiPro but is unable to maintain the connection, the following screen will be shown:



See section 4.2 for more information of connection issues

4.1 Test Sequence

Once the instrument has been recognized, the zero calibration will begin.

⚠WARNING Performing the fresh air calibration in a contaminated atmosphere will lead to inaccurate and potentially dangerous readings. The IQ Express must be located in a fresh air

environment containing 20.9% oxygen and no toxic gases during calibration. If fresh air is unavailable, a cylinder of “zero air” containing 20.9% oxygen and 0 PPM toxic gases must be connected to the fresh air port with a demand flow regulator and a piece of tubing whenever an instrument is in the MultiPro IQ Express Dock.

```
Zero
Calibrating
```

Once the zero calibration is complete, the dock will flow gas to the instrument in order to perform the “bump” test. If the instrument is due for calibration, the dock will bypass the bump test and proceed directly to the span calibration.

```
ZERO BUMP
PASS Gas Flow
```

Once the instrument responds to the gas, the dock will analyze the response to determine if the instrument passes the bump test.

```
ZERO BUMP
PASS Analyzing
```

The gas detector will pass the bump test if the sensor response to the gas is within 10% if the reading is lower than the expected sensor output or within 20% if the reading is higher than the expected sensor output. If the bump test is passed, the dock will proceed to the alarm tests.

```
ZERO BUMP
PASS PASS
```

If the instrument fails the bump test or if the instrument’s calibration due date has passed, the dock will automatically bypass the bump test and proceed to a full instrument calibration without further input from the user.

```
ZERO SPAN
PASS Calibrating
```

Following successful bump test or calibration, the dock will test the instrument’s alarm systems.

```
HORN LIGHT VIBR
TESTING -
```

If all alarms are operational, the following screen will be shown.

```
HORN LIGHT VIBR
OK OK OK
```

See section 4.3 for further details on assessing test failures.

If all tests have been passed, the following screen will be shown.

```
* READY *
ALL TESTS PASSED
```

Remove the detector from the dock. The detector is now fit for use.

Once the detector is removed from the dock, the dock will reset itself and prepare itself for the next instrument. In approximately 10 seconds the display will show the READY screens. The dock is then ready for the next detector.

```
READY 11:41
15 MAR 2005
```

4.2 IrDA Connection Issues

4.2.1 Connection Lost

In the event of a loss of communication between the dock and the instrument, the LCD will first indicate that the IrDA is not responding.

```
IrDA Not Respon-
ding. Pls wait
```

If the dock fails to reestablish the connection, the LCD will indicate “Connection Lost”.

```
CONNECTION LOST!
```

Remove the instrument from the dock. The dock should reset itself in approximately 10 seconds.

“IrDA Busy” may also be shown.

```
IrDA Busy
```

4.2.2 Outright Failure to Connect

If the MultiPro is placed in the dock and connection fails outright, a dot will appear on the screen to the right of the date. The dot is an indicator that the instrument IS in the dock, but the dock is unable to establish any type of connection to it.

```
READY 11:41.
CO/H2S/LEL
```

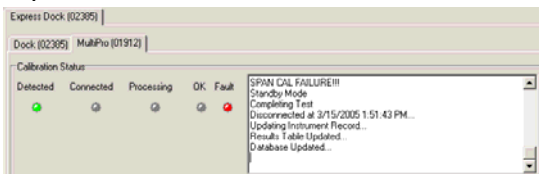
Instrument in dock indicator

The dot will disappear as soon as the dock establishes connection with the dock.

If the dot persists, take the MultiPro out of the dock and turn it on before returning it to the dock. If that fails to correct the problem, call Sperian Instrumentation for more information.

4.3 Test Failures

Failures can occur for a number of reasons. When a fault occurs, the reason for the failure will be shown on the dock's LCD. If the Express Software is running and the dock is properly connected to the PC, the fault will also be indicated in the output box on the instrument tab in the IQ Express software.



4.3.1 No gas detected

If the detector fails to respond to the calibration gas, the message "NO GAS DETECTED" will be shown.

```
* TEST FAILED *  
NO GAS DETECTED
```

4.3.2 Span calibration failure

If the IQ Express is unable to complete the span calibration, the dock will show the failure on the LCD. The failure will also be shown in the output box on the instrument page in the PC software.

```
** 1 FAULT **  
SPAN CALIBRATION
```

4.3.3 Alarm test failure

If the dock fails to recognize an alarm that should be present, it will indicate it on the display screen following the alarm test.

```
** 1 FAULT **  
AUDIBLE ALARM
```

The failure will also be indicated in the software in the instrument information.

4.3.4 PC Aborted Test

If the PC is unable to complete the tests for any reason, the following screen will be shown:

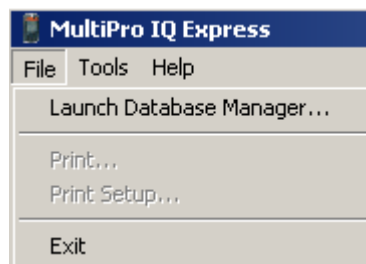
```
* TEST FAILED *  
PC ABORTED TEST!
```

This message may be shown for a variety of reasons. See the Calibration Status output box for further details.

5. Menu Items

5.1 File Menu

The File menu contains the Exit Control and a control for directly launching the Database Manager program.



5.2 Tools Menu

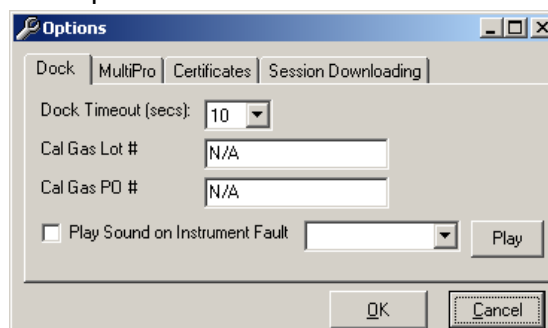
The Tools menu contains options for the MultiPro IQ Express including the following:

- Dock Timeout Setting
- Calibration Gas Lot Number Entry (for tracking purposes)
- Instrument Settings for the detector including the Timeout Setting and the Calibration Due Reminder Setting
- Settings for Printing Calibration and Bump Test Certificates.

Click on Tools / Options to access the settings.

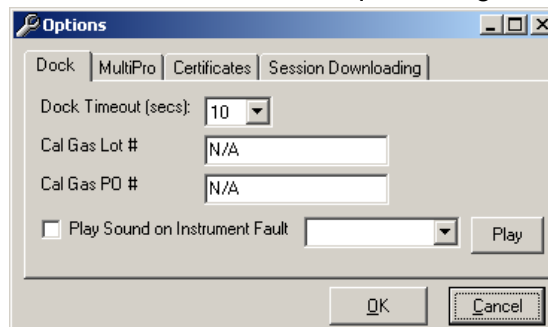


The Options screen will then be shown.



5.2.1 Dock

The Dock Tab under Tools / Options includes settings for the Dock Timeout, Calibration Gas Lot Number, Purchase Order # and the sound setting that the dock will use to indicate instrument faults. Each dock has its own unique settings.

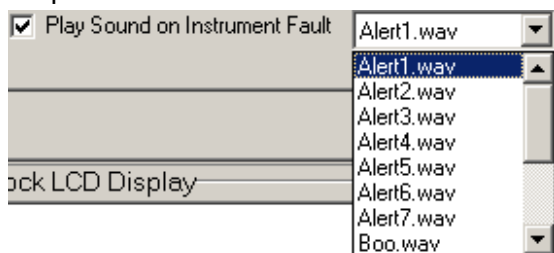


The Dock Timeout Setting controls the amount of time that needs to pass after connection between the dock and the PC is lost before the system will notify you that the connection has been lost.

Options are given in whole numbers between 1 and 10 seconds. To change the setting, click on the arrow to the right of the timeout setting to access the list and select the new setting.

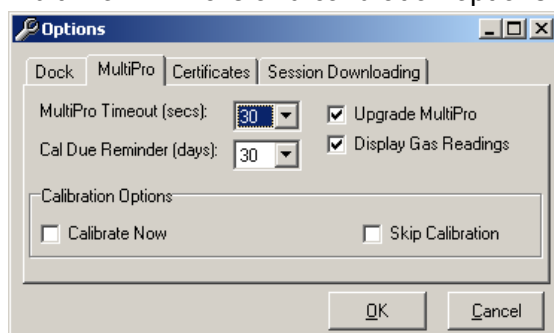
The Calibration Gas Lot Number is an input box that allows the user to enter the lot number into the PC's records. The lot number will then be shown on any calibration certificates that are printed.

To select a specific sound that will be played when the dock experiences a fault condition, first click the checkbox next to "Play Sound on Instrument Fault" and then select the sound from the list in the drop down box.



5.2.2 MultiPro

The MultiPro tab contains settings for the MultiPro instrument including the Timeout setting, the Calibration Due Reminder setting, the option to automatically update MultiPro Firmware and calibration options.



The Timeout setting controls the amount of time that needs to pass after connection between the dock and the PC is lost before the instrument will reset itself. Options are in 5-second increments from 5 to 30 seconds. To change the setting, click on the arrow to the right of the timeout setting to access the list and select the new setting.

The Calibration Due Reminder setting controls the amount of time that needs to

pass without a successful calibration before the MultiPro will remind you that calibration is due. The reminder can be set to any whole number between 1 and 180 days. To disable the calibration due reminder, change the setting to "0". To change the setting, click on the arrow to the right of the timeout setting to access the list and select the new setting.

The checkbox to the left of "Upgrade MultiPro" controls automatic MultiPro Firmware updates by the IQ Express Dock whenever a MultiPro is placed in the dock. Click on the box to enable the automatic updates.

The checkbox to the left of "Display Gas Readings" controls whether gas readings are shown on the IQ Express dock during instrument processing.

The MultiPro firmware must be downloaded and stored in the appropriate folder for the updates to take place. The folder location is on your local hard drive under Program Files.

New firmware files for MultiPro instruments must be stored in the following folder: C:\Program Files \ Biosystems \ Flash Upload Utilities \ MultiPro .

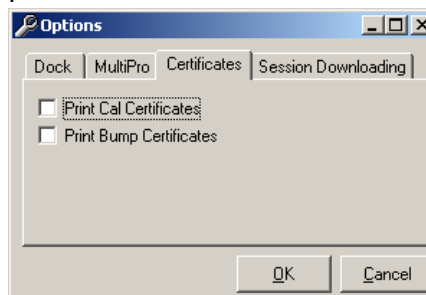
Two calibration options are listed near the bottom of the window.

Select "Calibrate Now" to automatically perform a full calibration whenever an instrument is placed in the dock.

Select "Skip Calibration" to automatically skip the calibration of any instrument that is placed in the dock.

5.2.3 Certificates

The Certificates tab provides controls for the automatic printing of Calibration and Bump Test Certificates.

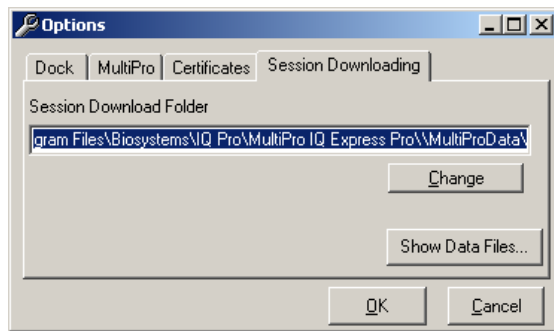


Click on the check box next to the option to select it. Note that a great deal of paperwork could be generated if "Print Bump Certificates" is selected and a large number of instruments are in use that are

bump-tested daily though the IQ Express Dock.

5.2.4 Session Downloading

The session downloading option contains the control for the file location for session downloads.

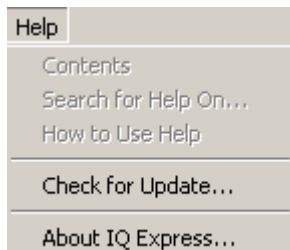


To change the destination directory for the downloaded files, either type the address in directly or use the “Browse” button to locate it.

To view stored data files in the download folder, press the “Show Data Files” button. Once the data files are shown, if BioTrak version 7.40 or later is installed, clicking on one of the stored files will automatically launch BioTrak.

5.3 Help Menu

The Help menu contains two options “Check for Update” and “About IQ Express”.



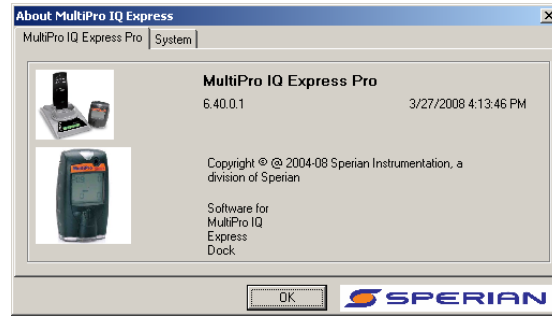
5.3.1 Check for Update

The “Check for Update option links to Sperian Instrumentation’s Software Download site at:

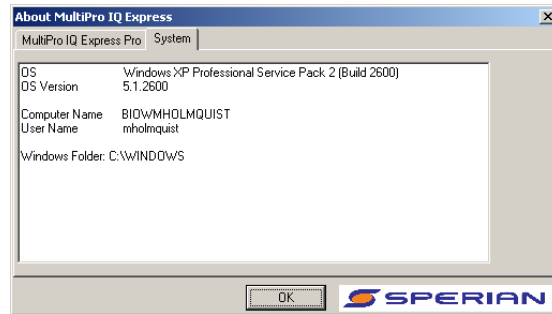
<http://www.biodownloads.com> .

5.3.2 About IQ Express

The About IQ Express contains two tabs to convey information about the dock and the PC that is controlling it. The MultiPro IQ Express Pro tab shows the dock’s firmware version and basic information



The System tab contain specific information about your PC’s operating system.



6. Software Upgrades

Sperian Instrumentation will release new versions of MultiPro IQ Express software from time to time. Upgrades may be loaded onto the PC from a CD or may be downloaded from the Internet.

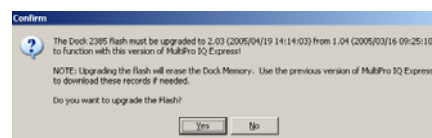
To install the new version from CD, simply place the disk in your PC’s CD-tray. The upload will start automatically and will immediately prompt you to install the software.

To upload the new Flash File from the Internet, go to the Sperian Instrumentation Software Downloads website at:

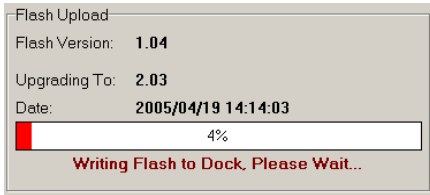
<http://www.biodownloads.com>

To upgrade the flash, download the new flash from Biodownloads.com to the following folder: C:\Program Files \ Biosystems \ MultiPro IQ Express \ Dock Flash. Then run the Flash Upload program, which is located in the same directory.

The following screen will be shown when the PC is ready to proceed with the flash upgrade.



Click Yes. The status of the upload is shown at the far right of the screen in the dock’s information page.

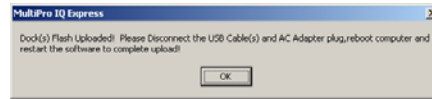


The dock will also indicate that the Flash is being uploaded.

UPLOADING FLASH
DONT DISTURB

CAUTION Interfering with the flash upload may result in damage to the MultiPro IQ Express Dock.

Once the upload is completed, you'll need to restart the PC for the new settings to take effect.



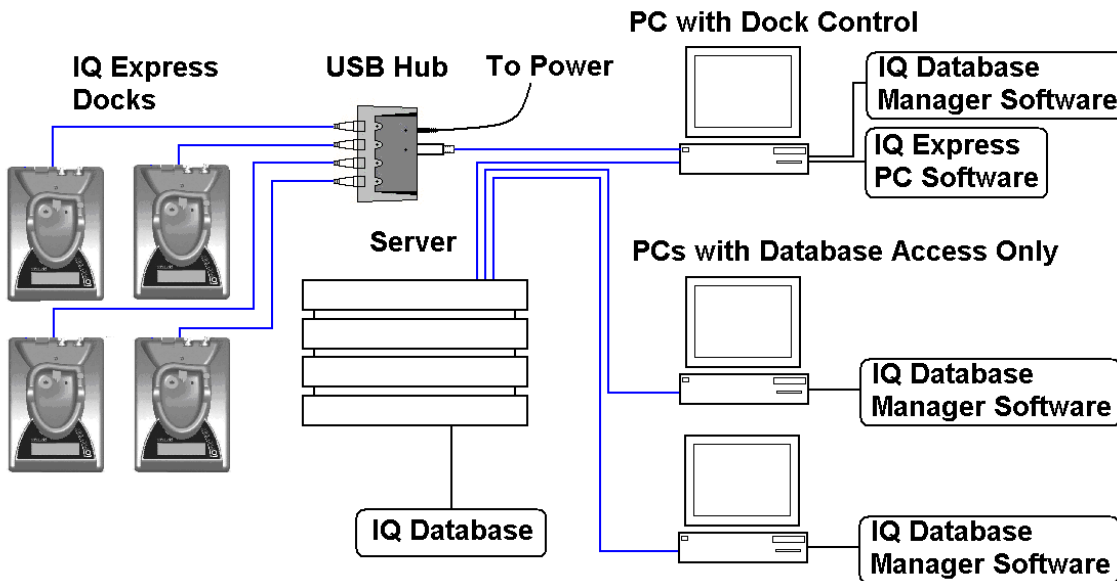
The dock will instruct you to unplug it.

UPLOAD COMPLETED
UNPLUG DOCK

Disconnect the MultiPro IQ Express Dock from the PC and click OK. If an AC power supply is being used to power the dock, unplug it as well. Once the display on the dock goes blank, reconnect the dock to the PC. The AC power supply may also be plugged back in at that time.

Appendix A: USB Architecture with Network Access

USB Architecture with powered USB Hub



Appendix B: Calibration Frequency

One of the most common questions that we are asked at Sperian Instrumentation is: ***“How often should I calibrate my gas detector?”***

Sensor Reliability and Accuracy

Today's sensors are designed to provide years of reliable service. In fact, many sensors are designed so that with normal use they will only lose 5% of their sensitivity per year or 10% over a two-year period. Given this, it should be possible to use a sensor for up to two full years without significant loss of sensitivity.

Verification of Accuracy

With so many reasons why a sensor can lose sensitivity and given the fact that dependable sensors can be key to survival in a hazardous environment, frequent verification of sensor performance is paramount.

There is only one sure way to verify that a sensor can respond to the gas for which it is designed. That is to expose it to a known concentration of target gas and compare the reading with the concentration of the gas. This is referred to as a “bump” test. This test is very simple and takes only a few seconds to accomplish. **The safest course of action is to do a “bump” test prior to each day's use.** It is not necessary to make a calibration adjustment if the readings fall between 90%* and 120% of the expected value. As an example, if a CO sensor is checked using a gas concentration of 50 PPM it is not necessary to perform a calibration unless the readings are either below 45 PPM or above 60 PPM.

***The Canadian Standards Association (CSA) requires combustible gas sensors to undergo calibration when the displayed value during a bump test fails to fall between 100% and 120% of the expected value for the gas.**

Lengthening the Intervals between Verification of Accuracy

We are often asked whether there are any circumstances in which the period between accuracy checks may be lengthened.

Sperian Instrumentation is not the only manufacturer to be asked this question! One of the professional

organizations to which Sperian Instrumentation belongs is the Industrial Safety Equipment Association (ISEA). The “Instrument Products” group of this organization has been very active in developing a protocol to clarify the minimum conditions under which the interval between accuracy checks may be lengthened.

A number of leading gas detection equipment manufacturers have participated in the development of the ISEA guidelines concerning calibration frequency. Sperian Instrumentation's procedures closely follow these guidelines.

If your operating procedures do not permit daily checking of the sensors, Sperian Instrumentation recommends the following procedure to establish a safe and prudent accuracy check schedule for your Sperian instruments:

1. During a period of initial use of at least 10 days in the intended atmosphere, check the sensor response daily to be sure there is nothing in the atmosphere that is poisoning the sensor(s). The period of initial use must be of sufficient duration to ensure that the sensors are exposed to all conditions that might have an adverse effect on the sensors.
2. If these tests demonstrate that it is not necessary to make adjustments, the time between checks may be lengthened. The interval between accuracy checking should not exceed 30 days.
3. When the interval has been extended the toxic and combustible gas sensors should be replaced immediately upon warranty expiration. This will minimize the risk of failure during the interval between sensor checks.
4. The history of the instrument response between verifications should be kept. Any conditions, incidents, experiences, or exposure to contaminants that might have an adverse effect on the calibration state of the sensors should trigger immediate re-verification of accuracy before further use.

5. Any changes in the environment in which the instrument is being used, or changes in the work that is being performed, should trigger a resumption of daily checking.
6. If there is any doubt at any time as to the accuracy of the sensors, verify the accuracy of the sensors by exposing them to known concentration test gas before further use.

Gas detectors used for the detection of oxygen deficiencies, flammable gases and vapors, or toxic contaminants must be maintained and operated properly to do the job they were designed to do. Always follow the guidelines provided by the manufacturer for any gas detection equipment you use!

If there is any doubt regarding your gas detector's accuracy, do an accuracy check! All it takes is a few moments to verify whether or not your instruments are safe to use.

One Button Auto Calibration

While it is only necessary to do a “bump” test to ensure that the sensors are working properly, all current Sperian gas detectors offer a one-button auto calibration feature. This feature allows you to calibrate a Sperian gas detector in about the same time as it takes to complete a “bump” test. The use of automatic bump test and calibration stations can further simplify the tasks, while automatically maintaining records.

**Don't take a chance
with your life.
Verify accuracy frequently!**

Please read also Sperian Instrumentation's application note: AN20010808 “Use of ‘equivalent’ calibration gas mixtures”. This application note provides procedures to ensure safe calibration of LEL sensors that are subject to silicone poisoning.

Sperian Instrumentation's website is located at

<http://www.biosystems.com>

Sperian Instrumentation Warranty Gas Detection Products

General

Sperian Protection Instrumentation, LLC (hereafter Sperian) warrants gas detectors, sensors and accessories manufactured and sold by Sperian, to be free from defects in materials and workmanship for the periods listed in the tables below.

Damages to any Sperian products that result from abuse, alteration, power fluctuations including surges and lightning strikes, incorrect voltage settings, incorrect batteries, or repair procedures not made in accordance with the Instrument's Reference Manual are not covered by the Sperian warranty.

The obligation of Sperian under this warranty is limited to the repair or replacement of components deemed by the Sperian Instrument Service Department to have been defective under the scope of this standard warranty. To receive consideration for warranty repair or replacement procedures, products must be returned with transportation and shipping charges prepaid to Sperian at its manufacturing location in Middletown, Connecticut, or to a Sperian Authorized Warranty Service Center. It is necessary to obtain a return authorization number from Sperian prior to shipment.

THIS WARRANTY IS EXPRESSLY IN LIEU OF ANY AND ALL OTHER WARRANTIES AND REPRESENTATIONS, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO, THE WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE. SPERIAN WILL NOT BE LIABLE FOR LOSS OR DAMAGE OF ANY KIND CONNECTED TO THE USE OF ITS PRODUCTS OR FAILURE OF ITS PRODUCTS TO FUNCTION OR OPERATE PROPERLY.

Instrument & Accessory Warranty Periods

Product(s)	Warranty Period
Biosystems PHD6, PhD ⁵ , PhD Lite, PhD Plus, PhD Ultra, Cannonball3, MultiVision, Toxi, Toxi/Oxy Plus, Toxi/Oxy Ultra, ToxiVision, Ex Chek	As long as the instrument is in service
ToxiPro [®] , MultiPro	2 years from date of purchase
ToxiLtd [®]	2 years after activation or 2 years after the "Must Be Activated By" date, whichever comes first
Toxi3Ltd [®]	3 years after activation or 3 years after the "Must Be Activated By" date, whichever comes first
Mighty-Tox 2 Prorated credit is given towards repair or purchase of a new unit of the same type.	0 – 6 months of use 100% credit 6 – 12 months of use 75% credit 12 – 18 months of use 50% credit 18 – 24 months of use 25% credit
IQ Systems, Series 3000, Airpanel, Travelpanel, ZoneGuard, Gas✓Chek1 and Gas✓Chek4	One year from the date of purchase
Battery packs and chargers, sampling pumps and other components, which by their design are consumed or depleted during normal operation, or which may require periodic replacement	One year from the date of purchase

Sensor Warranty Periods

Instrument(s)	Sensor Type(s)	Warranty Period
Biosystems PHD6, PhD Plus, PhD Ultra, PhD ⁵ , PhD Lite, Cannonball3, MultiVision, MultiPro, ToxiVision, ToxiPro [®] , Ex Chek	O ₂ , LEL**, CO, CO+, H ₂ S & Duo-Tox	2 Years
	All Other Sensors	1 Year
Toxi, Toxi/Oxy Plus, Toxi/Oxy Ultra	CO, CO+, H ₂ S	2 Years
	All Other Sensors	1 Year
All Others	All Sensors	1 Year

** Damage to combustible gas sensors by acute or chronic exposure to known sensor poisons such as volatile lead (aviation gasoline additive), hydride gases such as phosphine, and volatile silicone gases emitted from silicone caulks/sealants, silicone rubber molded products, laboratory glassware greases, spray lubricants, heat transfer fluids, waxes & polishing compounds (neat or spray aerosols), mold release agents for plastics injection molding operations, waterproofing formulations, vinyl & leather preservatives, and hand lotions which may contain ingredients listed as cyclomethicone, dimethicone and polymethicone (at the discretion of Sperian's Instrument Service department) void Sperian Instrumentation's Standard Warranty as it applies to the replacement of combustible gas sensors.