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COSMOS Status Monitoring System

1 Introduction

The Pro-Bel **C**onfiguration and **S**tatus **M**onitoring **S**ystem (COSMOS) has been designed to provide status information and re-configuration capability for a complete broadcast installation.

COSMOS can interface with a wide range of equipment but this manual covers the monitoring, remote configuration and error status reporting of ICON modules. ICON is Pro-Bel's modular signal processing and distribution product range.

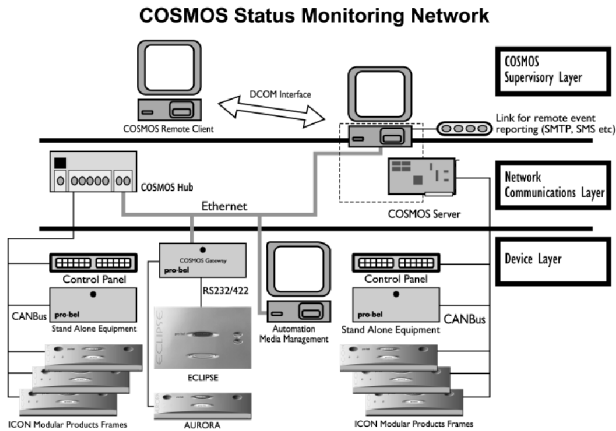
The system is supervised by a Windows NT application running on a PC networked to the ICON frames via COSMOS controllers in each frame. Changes occurring at the modules can be prioritised to signal on-screen warnings, raise two levels of alarms and/or generate logs. Every ICON module is programmed with a serial number that uniquely identifies it to COSMOS, together with its issue number and modification state. The system is aware of modules being removed or replaced and can automatically re-configure replacement modules.

1.1 System Overview

A typical COSMOS system may consist of one or more ICON modular product rackframes, stand alone COSMOS compatible equipment and interfaces to Pro-Bel software applications capable of COSMOS operation.

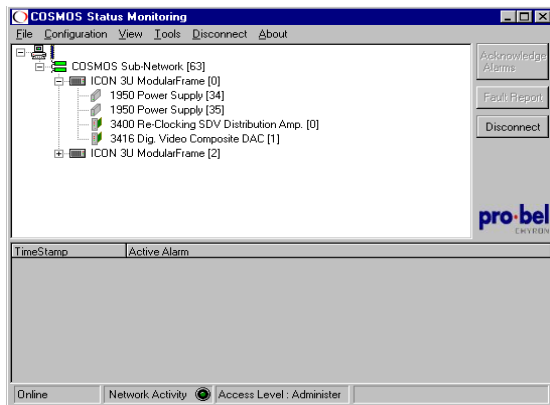
ICON uses CAN network technology, proven in industrial and automotive environments to guarantee delivery of prioritised short messages over UTP cabling.

Such CAN sub-networks are just part of Pro-Bel's overall 'PCN' status network which is not limited to a particular physical format or even common protocol.



The COSMOS 'front end' Monitoring and Configuration software is designed to run under Microsoft Windows NT.

It provides an Explorer style tree-view of monitored equipment and the network topology that connects them.



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The display is self-configuring when a network is connected, although it may be configured off-line from a palette of standard network objects.

Status windows may be opened for each piece of equipment monitored, from which configuration and performance data may be obtained. It is also possible to use the status display to change configuration parameters, for items of equipment whose remote control capability has been enabled.



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2 COSMOS Installation for ICON

The COSMOS status monitoring supervisory software can communicate with one or more ICON frames to allow status monitoring and configuration of individual ICON modules and ICON power supplies.

The COSMOS application runs only under Windows NT and requires a PCI CAN interface card connected to one or more ICON frames.

The pre-requisites to run COSMOS are as follows:

- a Windows workstation or server running NT4.0 with service pack 4.0 or later
- an SVGA monitor - 1024x768 or above recommended
- a CAN PCI interface card connected to one or more ICON frames over category 5 UTP cable

2.1 Installing the CAN Interface

COSMOS is currently designed to work with the CAN-PCI/331 interface. The card requires a free PCI slot and must be used with the supplied Pro-Bel adaptor to provide an RJ45 socket for the UTP cabling.

WARNING! To prevent static discharge from damaging any electronic equipment, discharge any personal static electricity before handling the CAN module or PC.

Installation will require disassembly of the PC to gain access to a free PCI slot. On no account should safety covers be removed from equipment that may contain live components. If in doubt, always refer this task to personnel with appropriate training.



Install the CAN-PCI interface card as follows:-

- where possible work at an antistatic workstation
- remove any personal static charge using the workstation earthing strap or by touching an appropriate ground - such as unpainted computer case metalwork prior to handling static sensitive components
- remove the mains cable from the computer
- remove the computer case cover(s) and retain the screws
- locate a free PCI slot and remove any blanking plate, taking care to retain any adaptor screws if present
- install the CAN-PCI card firmly into its slot taking care to press it evenly and snugly into position
- screw the CAN-PCI card into position using an appropriate adaptor screw - if necessary refer to the documentation and/or parts kit that came with the computer
- refit the computer cover taking care to refit any cables that may have been removed to gain access and refit the case screws

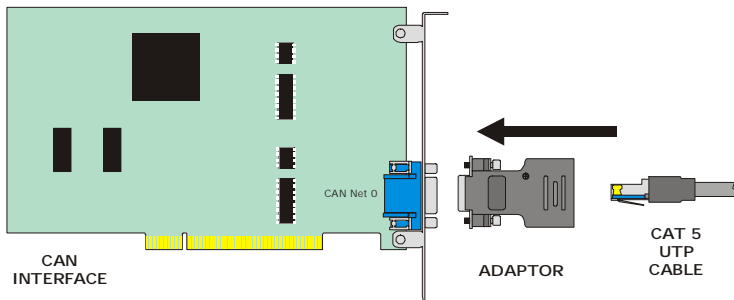
TIP: Do not remove the CAN-PCI card from its antistatic bag until ready to install it.

The next step is to connect the Pro-Bel RJ45 adaptor supplied to enable connection via UTP category 5 cable to one or more ICON frames.

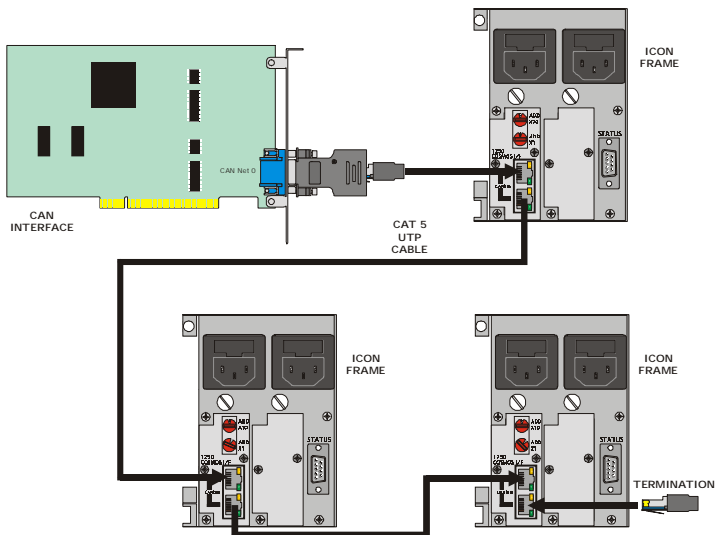
WARNING! The CAN bus drop-wire must be terminated at both ends.

The Pro-Bel RJ45 adaptor contains its own termination, but the 1250 controller in ICON frames only provides a CAN bus loop-through. This means that the last ICON frame in a chain must be terminated. A special Pro-Bel terminator is provided for this purpose.

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Once the CAN interface installation is complete fit the RJ45 adaptor by tightening both self-retaining screws. The ICON frames may now be connected using CAT5 UTP cable.



Note the use of a termination (supplied) on the last ICON frame. For RJ45 pin-out see the 1050 or 1051 frame manual.



2.2 CAN driver installation

To install the CAN driver proceed as follows:

- log on to the target NT system with administrator rights
- insert the distribution media supplied with the CAN-PCI card and run the setup.exe file
- the installation should proceed and will require the system to re-boot to be effective

NOTE: The setup.exe file may be run from the **Run** command on the start menu or by using the Install button in the **Add/Remove Programme** facility in the **Control Panel** folder.

If the driver starts without complication, the driver should be set to run automatically after each re-boot. To make the driver start automatically, proceed as follows:-

- double-click the **Devices** icon in the **Control Panel** folder
- move down the list of drivers until the CAN-PCI driver is found - in the current distribution this is c331
- use the Startup button dialogue to select **Automatic** for the chosen driver

TIP: In the event of problems starting the driver use the NT Event Viewer in Administrative Tools to investigate possible causes.

Please check the Pro-Bel support web site (<http://www.cosmos-support.com>) to obtain the latest recommended driver and special instructions for early versions.

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2.3 Uninstalling the driver

To uninstall the driver proceed as follows:

- log on to Windows NT with administrator rights
- terminate all applications which use the driver
- stop the driver using Devices in Control Panel
- **OR** type **net stop cxxx** at the command line to stop the driver, where xxx is the driver reference number, i.e. c331
- select the entry for the CAN driver in the **Add / Remove Programs, Install / Uninstall** dialog in the **Control Panel** folder
- click **Add / Remove** to delete all files and registry entries for the driver

2.4 Installing COSMOS

To install the COSMOS application proceed as follows:

- log on to the target NT system with administrator rights
- insert the distribution media and run the setup.exe file
- the installation should proceed and should not require a system re-boot unless Windows Common Controls are automatically updated during the installation

NOTE: The setup.exe file may be run from the **Run** command on the start menu or by using the install button in the **Add/Remove Programs** facility in the **Control Panel** folder.

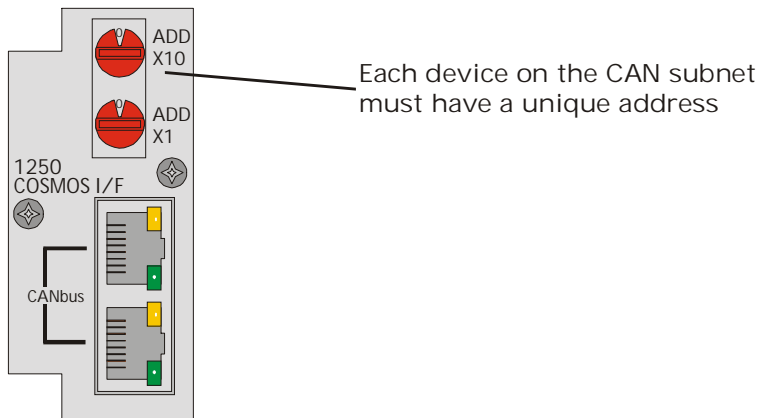
2.5 Uninstalling COSMOS

COSMOS may be uninstalled as follows:

- select COSMOS in the **Add / Remove Programs Install Uninstall** dialog in the **Control Panel** folder
- click **Add/Remove** to delete all files and registry entries related to COSMOS
- alternatively use the **Uninstall** COSMOS icon in the COSMOS program group

2.6 Configuring the CAN PCN Interface

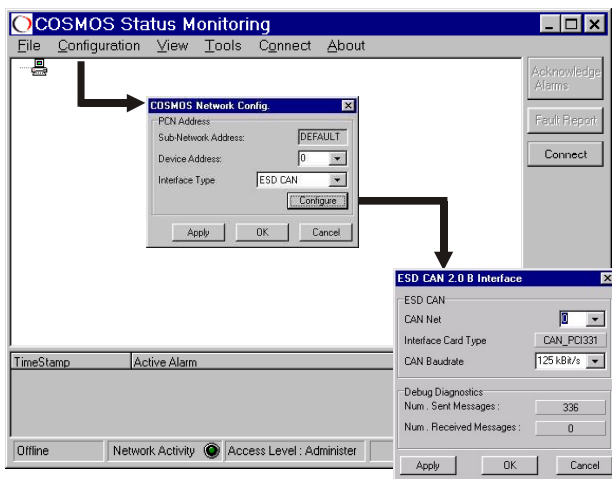
A single CAN sub-network can interface up to 55 ICON frames. Each ICON frame must be configured for a unique address using the address selector on the 1250 controller(s) in each frame.



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Configure COSMOS to communicate with ICON frames as follows:

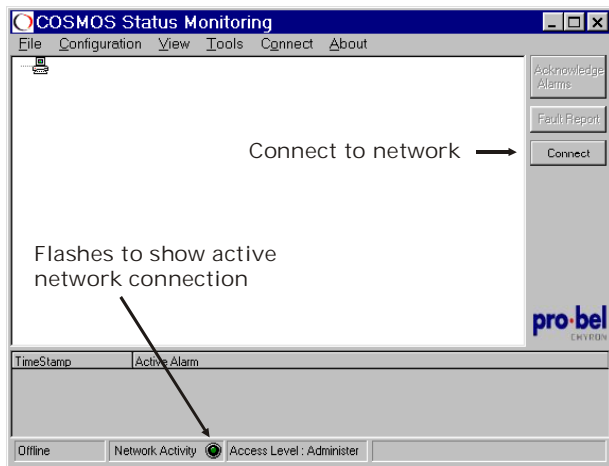
- run the COSMOS application from the **Start / Programs** menu
- select **Configuration Network Interface** and choose **ESD CAN** as the interface type
- select a unique **Device Address** for the CAN interface card - remember to check the addresses of all devices (i.e. ICON frames) on the same sub-network as the CAN interface and ensure that they are different
- select the **Configure** button to set up the interface
- select the **CAN Net** port number from the drop down list - if only one single port CAN interface is installed leave the setting at the default
- the default setting for **CAN Baudrate** MUST be left at 125kbit/s
- confirm your choices by selecting the **Apply** or **OK** button



2.7 Connecting COSMOS to the network

The Network Interface must be configured for the network it is required to operate with prior to connection.

Connect COSMOS by clicking on the Connect button in the main application window.



Once connected the green Network Activity indicator should flash every two seconds.

The status bar at the bottom of the screen contains various indicators, such as connect status, access level, network activity and modem dial-out status.

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2.8 Installing a GPI card in the PC

COSMOS is designed to work with the HW-0200-01 GPI card to provide alarm outputs to external devices.

Please refer to the documentation that came with the card for installation information.

2.9 Adding or updating device library files

The latest device library file which contains details of specific modules may be obtained from the COSMOS support web site.

To update the library file proceed as follows:

- download the appropriate library file (such as ICONModularProductsLibrary.bpl) file from <http://www.cosmos-support.com> to a convenient directory
- close down the COSMOS application
- move the .bpl file to the COSMOS main directory
- re-start COSMOS
- for new product families use the Register Library facility under the Tools menu to register the downloaded new library file

COSMOS supports multiple library file families covering different product ranges and multiple library files may be registered. Updates for previously registered product families do not need to be re-registered.

NOTE: An Unregister Library facility is also provided in the Tools menu to unregister library families for modules no longer used.

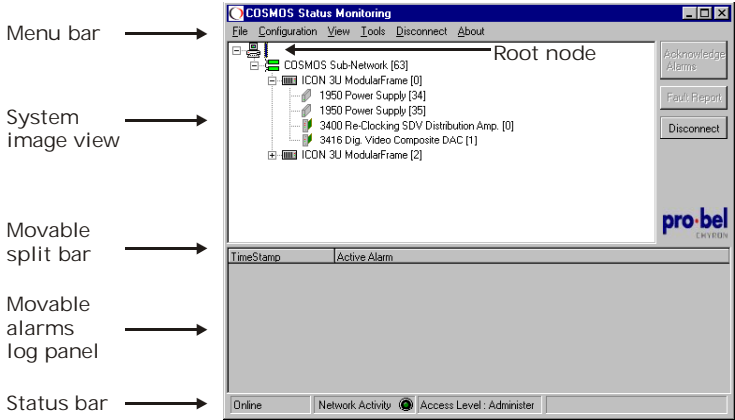


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3 Getting started

3.1 The status monitoring display

The main application window shows all equipment monitored in a Windows Explorer style tree view.



The root node of the system image 'tree' depicts the local status monitoring platform. In the example above it connects to the COSMOS sub-network with the default address of 63.

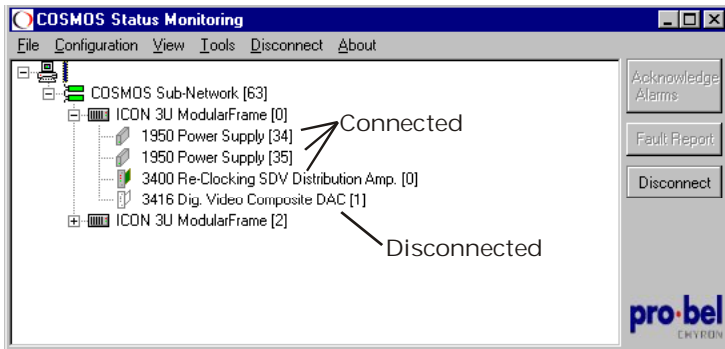
Each device is displayed in its logical position within the hierarchical network 'tree' and its device address is shown in brackets.

TIP: To expand a branch of the tree click on the '+' sign. Use the '-' sign to collapse a branch.

In the example shown there are two ICON frames with the addresses 1 and 2. These are the addresses set on the 1250 controller cards in each frame, as explained in the installation chapter. Power supplies are shown with their default addresses and individual modules take the address of the slot into which they are installed.

3.2 Icons and alarms

Each device is associated with an icon which can convey status information. For example, connected equipment icons are shaded grey, whilst an unshaded outline icon shows equipment that has been removed or disabled.



There are a variety of events that may occur within the network and within each device. These events may be assigned for each monitored device to provide status logging, warnings or two levels of alarm. For further information please refer to Chapter 4.0 for details of Event Management.

If an event has been assigned to either warn or raise an alarm, then the occurrence of such an event will cause a corresponding symbol to appear next to the affected device entry and the Acknowledge Alarms button will flash.

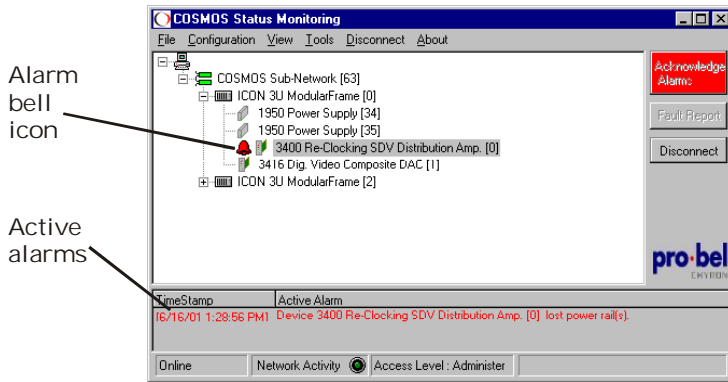
The Acknowledge Alarms button will cease flashing when clicked, but will remain red until the associated alarm(s) have been cleared.

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Audible alarms, such as a warning beep on the PC speaker, can be set to accompany unacknowledged alarms.

If the COSMOS application has been minimised, then the COSMOS symbol will also flash on the task bar.

The following example shows a typical alarm:












The 3400 re-clocking distribution amplifier has developed a serious fault that has prevented it from connecting to the network. This 'event' has been assigned to bring up a level 1 alarm and the red 'bell' icon has appeared alongside the 3400 entry. In addition, the 3400 icon is in outline only, indicating its disconnection from COSMOS.

Further confirmation of the type of event that COSMOS has monitored is given in the active alarm summary panel at the bottom of the main window together with the time the event occurred.

Double clicking on any of these entries will cause the window focus to jump to the associated device icon in the tree view, expanding collapsed tree branches as necessary.

The alarm indications will only be cleared when the associated alarm state is cleared and the alarm event itself is acknowledged.

The following table lists some of the most frequently used device icons and alarm symbols.

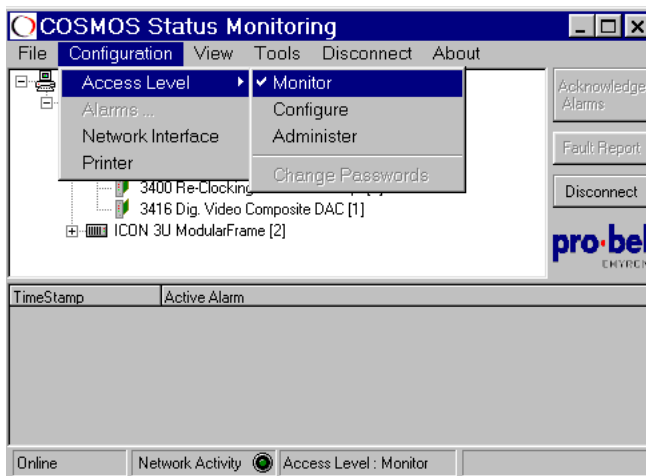
ICON	DESCRIPTION
	Warning
	Alarm
	Unknown device
	Sub-network
	Icon frame
	Power supply
	Icon module
	PC application
	COSMOS symbol

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4 Operation

4.1 Setting access levels

To ensure that certain COSMOS functions are limited to specified users, there are three password protected access levels, Monitor, Configure and Administer. For example only the Administer level can change passwords and only the Configure level and above allow module or alarms configuration and the ability to modify system mapping.



The default password to allow access to the Administer and Configure levels is blank (unassigned).

TIP: Access passwords should be changed as soon as an administrator has been chosen.

4.2 Saving and loading the system image

COSMOS will prompt users with Configure or Administer status to save the system image if there have been any changes since the system initialised. However, users with Monitor status are not allowed to save system images but are allowed to load system images at start up.

The File Menu system image options of Save, Load and New are not available unless COSMOS is disconnected.

System images files always have the extension **.stm** and there is no limit to the number that may be saved.

Users with Configure and Administer status may also load any saved image or create a new image using the Device Palette; this is explained more fully in section 4.5.

Card parameters are not saved with the system image, but the temporary configuration buffer contents are. This is discussed more fully in section 4.3.

NOTES:

If an attempt is made to load a system image containing devices for which there is no entry in the device library file, it will fail. Obtain an update from the COSMOS support website as explained in section 2.

If a new image file has been saved after modules have been temporarily removed, those modules will not appear when COSMOS is re-started.

If the system image file is not loaded prior to connection, COSMOS will build a new network tree by interrogating the system.

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4.3 Accessing device properties

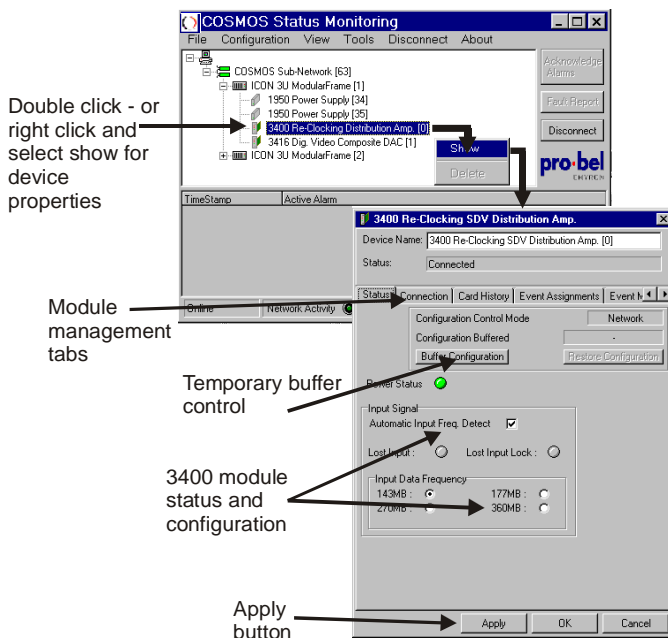
Access to device properties may be gained by double clicking a selected device or by right clicking a selected device in the system image tree view and selecting Show.

This will bring up a series of tabbed forms that present information, management data and configuration options for each device. Some of the details are common across many different device types, whilst others are specific to one device type.

Users with configure access and above have full access, users with monitor status have read only access.

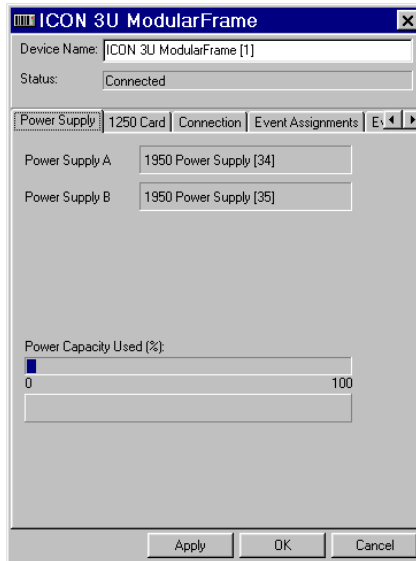
Device status

The status tab form provides both an alternative display of most card edge controls and a convenient means of configuring remote controlled cards.



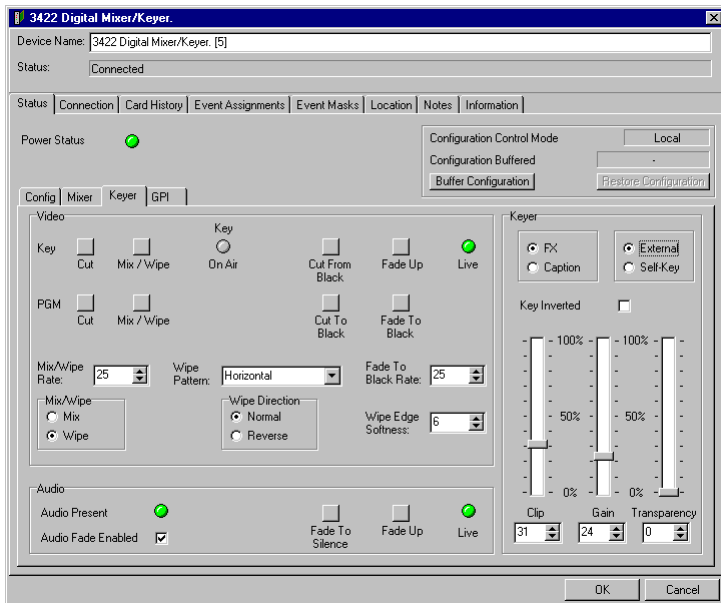
Remote control is only available for modules that support that function and have their remote/local switch in the remote position. Refer to the appropriate manual for each card for local configuration details including the position of the local/remote switch if present.

Module status and remote control examples



In this example of an ICON frame, there are no configuration controls, but a useful indication of power drain is shown in bar-graph form.

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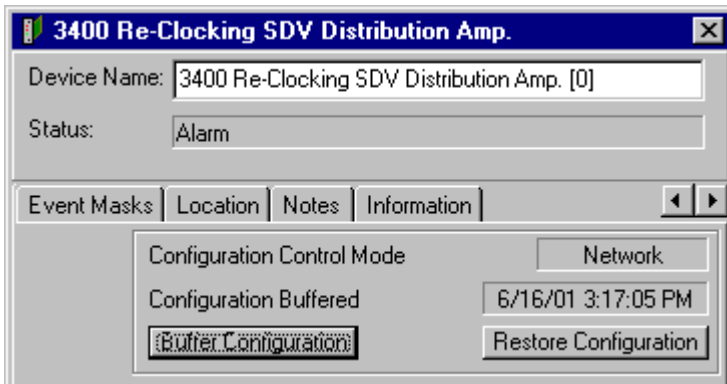


COSMOS remote control and status of the 3422 Keyer Mixer

In this example there is comprehensive remote control provided for the 3422 Keyer-Mixer. Note the live control of keyer functions provided by slider controls.

Using the temporary buffer

A Buffer Configuration facility is provided on the status tab for cards that support remote configuration. This allows configuration settings to be saved to a temporary buffer and timestamped. This is designed to allow temporary configuration changes for individual devices to be quickly restored with the Restore Configuration control.



Buffered configuration settings are also saved in the system image file. When the image file is loaded the temporary configuration buffers are also loaded, but the cards are not re-configured until each temporary buffer is restored.

If the temporary buffer associated with a module is empty after a system image re-load, the restore button will be disabled.

NOTE: It is possible to save any configuration settings made in local mode, provided COSMOS could have controlled them in remote mode.

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Connection details

The screenshot shows a dialog box titled "3400 Re-Clocking Distribu...". It contains the following fields and controls:

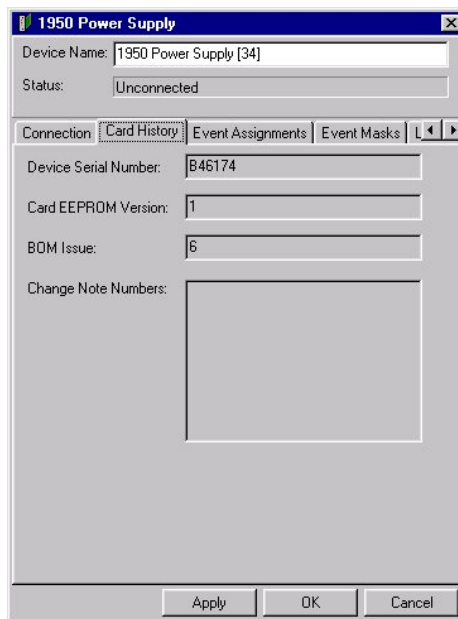
- Device Name: 3400 Re-Clocking Distribution Amp. [0]
- Status: Connected
- Tabs: Status, Connection (selected), Card History, Event Assign
- Enabled: ☒
- Sub-Network Address: DEFAULT
- Device Address: 1
- Card Address: 0
- Buttons: Apply, OK, Cancel

The connection form provides the sub-network, device (frame) and card address where relevant for the device monitored. Note that it is possible to temporarily disable devices from being monitored from this form. Disabled devices will appear as outline icons in the system image, as if they had been removed from the system.

However, it is not possible to save the monitoring disablement in the system image file and a disabled device will be enabled if COSMOS is re-started and the device is functioning normally.

Card history

The card history form is designed to allow the firmware and manufacturing build data such as serial number (bar-code number), BOM (Bill of Materials issue number) and change note information, to be read for each module. This tool may be required to maintain the installed module firmware and to ensure accurate and appropriate Pro-Bel support.



The screenshot shows a software window titled "1950 Power Supply". It contains the following fields and controls:

- Device Name:** 1950 Power Supply [34]
- Status:** Unconnected
- Tabs:** Connection, **Card History** (selected), Event Assignments, Event Masks
- Device Serial Number:** B46174
- Card EEPROM Version:** 1
- BOM Issue:** 6
- Change Note Numbers:** (An empty rectangular box for listing change notes)
- Buttons:** Apply, OK, Cancel

The data is read directly from the firmware present on the card and cannot be edited by the user.

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Event management

An event can be a notification of a fault or a change of state in any device monitored by COSMOS. The event management tool in COSMOS is very flexible. It allows any event that may be reported by a device to be assigned to one of four event categories.

The screenshot shows a window titled "ICON 3U ModularFrame" with a close button (X). Inside, there are fields for "Device Name: ICON 3U ModularFrame [1]" and "Status: Connected". Below these are tabs: "Power Supply", "1250 Card", "Connection", and "Event Assignments" (which is selected). The "Event Assignments" tab contains a table with columns: "Log", "Warning", "Level 1 Alarm", and "Level 2 Alarm". The rows represent different events: "Connect", "Dis-Connect", "Comms Failed", "Cleared State", and "Supply overload possible". Each cell in the table contains a radio button. The "Connect" row has the "Log" radio button selected. At the bottom of the dialog are buttons for "Load Defaults", "Apply to Peers", "Apply", "OK", and "Cancel".

	Log	Warning	Level 1 Alarm	Level 2 Alarm
Connect	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Dis-Connect	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Comms Failed	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Cleared State	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Supply overload possible	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>

All devices are initialised with sensible default event categories and devices may be reset to these defaults at any time. In addition, event assignments configured for one device may be copied to peers of the same type, such as similar ICON cards within the same frame.



The event types are summarised in the following table:

Event assignments	
Event type	Description
Unassigned	No action taken
Log	Event is timestamped and recorded in the History Log
Warning	Event is logged and a warning icon will be attached to the appropriate entry in the system image view
Level 1 alarm/ Level 2 alarm	Event is logged and an alarm icon will be attached to the appropriate entry in the system image view

In addition to registering warnings and alarms in the system image view, the active alarms log panel and the history log there are five further 'actions' that may be defined.

These actions include audio alarms and message delivery to other systems, as explained in Chapter 5, Event Response.

NOTE: A level 2 alarm has a higher priority than a level 1 alarm.

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Event masks

Devices may have event masks set, disabling the systems normal response to events reported by the device. These masks may also be set to mask child (descendent) devices. For example, a mask configured for an ICON frame may be set to apply to all the cards it contains.

The screenshot shows a dialog box titled "ICON 3U ModularFrame". It has a "Device Name" field containing "ICON 3U ModularFrame [1]" and a "Status" field containing "Connected". Below these are four tabs: "Connection", "Event Assignments", "Event Masks", and "Local". The "Event Masks" tab is selected. It contains a list of maskable events: "Mask Descendants" (checked), "Mask Logs", "Mask Warnings", "Mask Level 1 Alarms", and "Mask Level 2 Alarms". Below this list is a "Mask Messages" section with three radio buttons: "Always", "One Off" (selected), and "Periodic". At the bottom of the dialog are three buttons: "Apply", "OK", and "Cancel".

Masks are a great way of temporarily preventing devices that are under construction or undergoing maintenance from raising alarms or causing entries in history or fault logs.

NOTE: Masks are set at a particular event severity level, disable all lesser events as well.

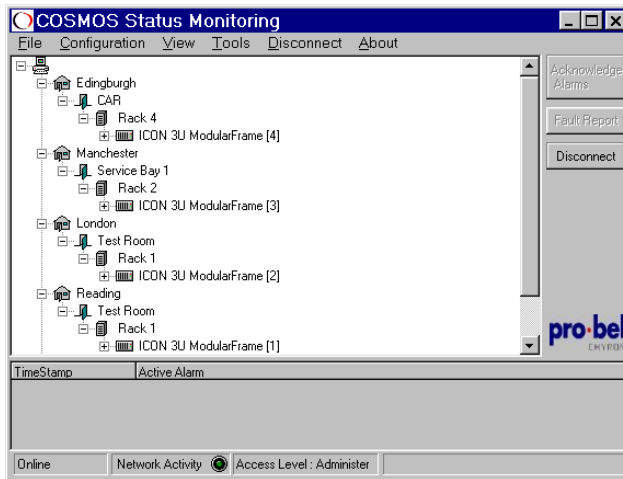
The masks may be set to one of three categories, 'Always', 'One Off' and 'Periodic'. Use 'Always' to create event response masks indefinitely. Use 'One Off' for a single scheduled occasion such as the re-configuration of an existing ICON frame or the addition of a new frame. Use 'Periodic' for work carried out at regular time slots such as routine maintenance.

When setting periodic masks note that more than one day can be selected by re-visiting the 'day' drop down list.

Masks that have been set can be saved to the system image map.

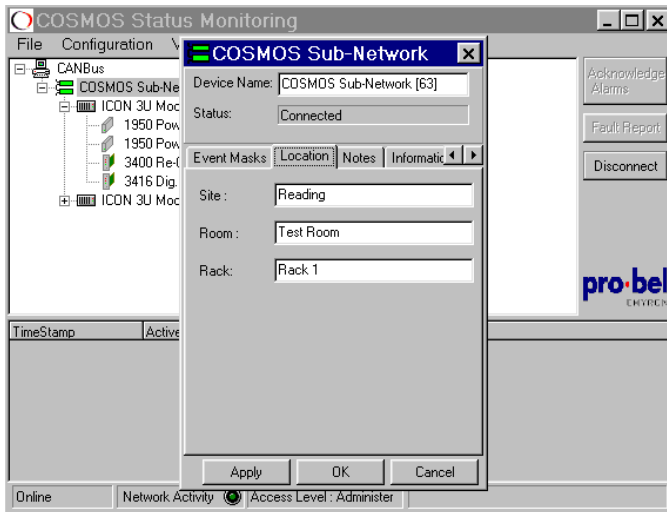
4.4 Network and physical views

The standard network view of the system image tree can be redrawn using physical locations rather than network topology, provided that location information has been entered for each device. The physical view is selected from the View menu.



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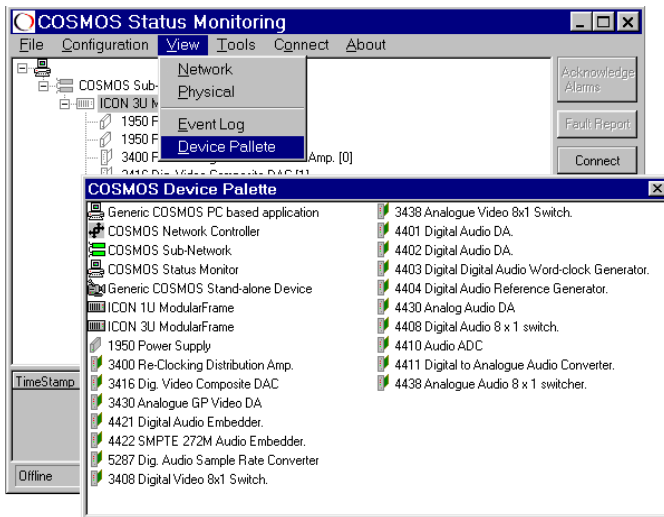
Use the Device Properties Location tab to enter location information. It is not necessary to change to the physical view. Start at the top of the tree entering location information for the top level network, then the next level or Sub-Network, then each ICON Modular Frame.



Modules indicate the location of their parent rack but cannot be edited individually. This means that modules cannot have independent location. However, all other types of device can have independent location.

4.5 Using the Device Palette

The status monitoring platform system image may be manually constructed whilst off-line. The Device Palette provides a list of available device types which can be added to the system image by a simple drag-and-drop process.



The Device Palette allows a map of a system to be constructed and device configuration information to be entered before a system has been physically built and brought on-line. System images may be saved to a file and reloaded as needed.

When an off-line COSMOS platform with an existing system image loaded is connected to an actual system, any discrepancies between the image and actual system are reported. Devices present are filled, whilst those not responding to polling remain in outline form.

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4.6 Using Notes

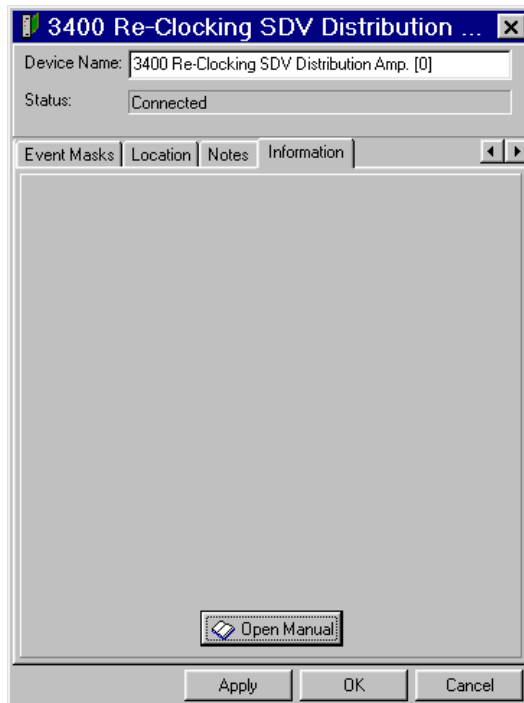
The Notes tab in Device Properties is provided to allow operators and others to add useful information related to each device in the system image.

These notes are specific to the location and not the module that occupies it. Notes on specific modules may be added to the Event Log file.



4.7 Using Information

The Information tab is intended to allow access to PDF versions of each manual. The freely available Acrobat Reader will be required to view the PDF files.



The Open Manual button will seek the appropriate manual in PDF form in the ICON documents folder in the program install directory. This is typically C:\Program Files\Pro-Bel\COSMOS\ICON Documents.

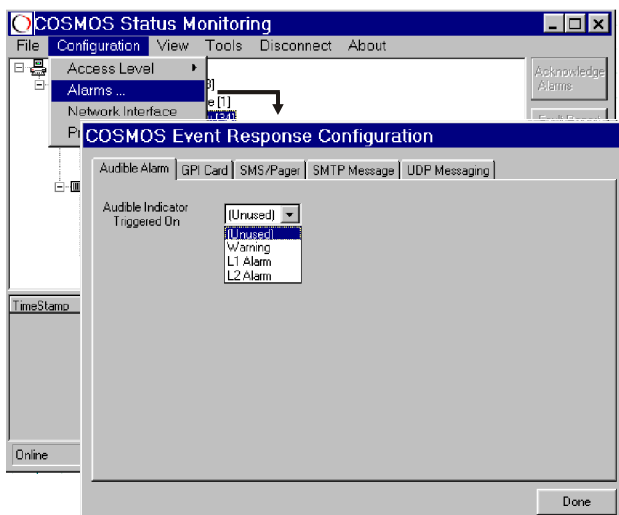
COSMOS Status Monitoring System

5 Event response

In addition to the on-screen responses, warnings and alarms can be programmed to trigger a variety of actions that include audible alerts, GPIs and automatic dial out to paging services, e-mail delivery mechanisms or UDP messaging. The Alarms menu is located under Configuration in the main Menu Bar.

5.1 Audible alarm

A simple audible alarm can be provided using the internal speaker in the PC that COSMOS is run on.

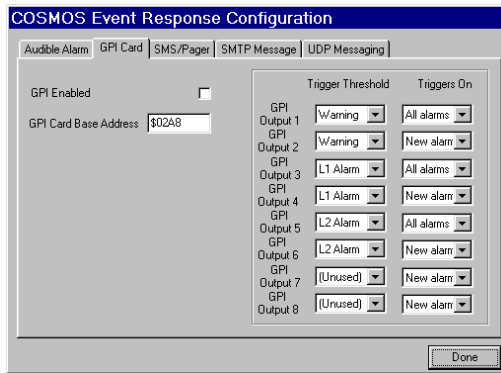


The alarm will sound at the same time as the Acknowledge Alarms button in the main screen flashes and will cease when it is pressed.

5.2 Assigning GPIs

COSMOS is designed to work with the PC mounted HW-0200-01 GPI card for external alarms signalling.

The GPI card provides eight contact closures available for various external functions such as visual or audible alarms. Each alarm can be deactivated or configured to trigger on any of the three alarm events, Warning, Level 1 alarm or Level 2 alarm.



The image shows a screenshot of the 'COSMOS Event Response Configuration' dialog box. It has a title bar with the same text. Below the title bar are five tabs: 'Audible Alarm', 'GPI Card', 'SMS/Pager', 'SMTP Message', and 'UDP Messaging'. The 'GPI Card' tab is selected. Inside the dialog, there is a section for 'GPI Enabled' with a checkbox that is currently unchecked. Below this is a text field for 'GPI Card Base Address' containing the value '\$02A8'. To the right of these fields is a table with two columns: 'Trigger Threshold' and 'Triggers On'. The table has eight rows, each corresponding to a GPI output (Output 1 through Output 8). The 'Trigger Threshold' column contains dropdown menus with the following values: Warning, Warning, L1 Alarm, L1 Alarm, L2 Alarm, L2 Alarm, (Unused), and (Unused). The 'Triggers On' column contains dropdown menus with the following values: All alarms, New alarm, All alarms, New alarm, All alarms, New alarm, New alarm, and New alarm. At the bottom right of the dialog is a 'Done' button.

	Trigger Threshold	Triggers On
GPI Output 1	Warning	All alarms
GPI Output 2	Warning	New alarm
GPI Output 3	L1 Alarm	All alarms
GPI Output 4	L1 Alarm	New alarm
GPI Output 5	L2 Alarm	All alarms
GPI Output 6	L2 Alarm	New alarm
GPI Output 7	(Unused)	New alarm
GPI Output 8	(Unused)	New alarm

The same alarm configuration drives the output contacts of the 2550 GPI Concentrator module, which is a standard ICON module.

In addition each GPI output can be configured to operate when any alarm (All Alarms) has been generated, but not cleared, or just unacknowledged (new) alarms. For example, an external audio alarm might be appropriate for only unacknowledged alarms whilst an external alarm light could be driven by any uncleared event.

NOTE: New alarms are unacknowledged alarms.

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5.3 Sending alarm messages to other systems

COSMOS provides three mechanisms to send messages to other systems.

The three main messaging systems are as follows:

- GSM, SMS and pager networks via a dial up modem
- SMTP e-mail via an ISP
- UDP messaging - used here for relaying messages over a local network

Setting up an SMS/Pager service

The Short Message Service or Paging data communications package used in COSMOS is based on Message-Master supplied by Derdack Software.

The screenshot shows the 'COSMOS Event Response Configuration' dialog box with the 'SMS/Pager' tab selected. The dialog has a title bar and several tabs: 'Audible Alarm', 'GPI Card', 'SMS/Pager', 'SMTP Message', and 'UDP Messaging'. The 'SMS/Pager' tab contains the following elements:

- A checkbox for 'SMS/Pager Messaging Enabled' which is checked.
- A 'Config. Utility' button.
- A 'SMS/Pager Triggered On' dropdown menu set to 'L1 Alarm'.
- A 'Number to dial' text field containing '44 1234 123456'.
- A 'Comms. Device' dropdown menu set to 'Lucent Win Modem', with 'Device Setup' and 'Dial Parameter' buttons below it.
- A 'Message Type' section with radio buttons for 'Terse' (selected) and 'Verbose'.
- A 'Service Provider' dropdown menu set to 'Cellnet 44', with 'New' and 'Edit' buttons below it.
- A 'Message Precursor' text field containing 'COSMOS Status monitoring platform reported event'.
- A 'Done' button at the bottom right.

It provides a choice of using a DTMF (tone based message transmission) or data connection based protocols such as TAP or UCP which require a modem. Most US services use



TAP (Telecator Alphanumeric Protocol) whilst some European carriers use UCP (Universal Computer Protocol).

To set up SMS or Paging proceed as follows:

- click on the SMS/Pager tab and select an Alarm level to trigger messages
- select a number to dial for the recipient
- select a message type - terse identifies module, verbose describes problem
- create a message precursor to identify the source of the message such as, 'COSMOS Status monitoring platform reported event'
- choose a communications device
- select a service provider

If a service provider has not been defined, click on New to set one up. This will launch the Derdack Message-Master Wizard that will guide you through the process. When completed, click on 'SMS/Pager Messaging Enabled' and then click Done.

TIP: If you need help using the Message Master Wizard, click on the Help button inside the Wizard.

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Setting up an SMTP message service

The SMTP message facility is provided to allow text based alarms to be sent by e-mail via any ISP with an e-mail system compatible with SMTP.

The screenshot shows the 'COSMOS Event Response Configuration' dialog box with the 'SMTP Message' tab selected. The dialog has a title bar and five tabs: 'Audible Alarm', 'GPI Card', 'SMS/Pager', 'SMTP Message', and 'UDP Messaging'. The 'SMTP Message' tab is active. Inside the tab, there are several fields and a checkbox. The 'SMTP Messaging Enabled' checkbox is unchecked. The 'SMTP Message Triggered On' dropdown menu is set to 'Warning'. The 'SMTP Host' text box contains 'Exchange'. The 'Destination Addresses' text box contains 'COSMOS_Support@pro-bel.co.uk'. The 'Message Precursor' text box contains 'COSMOS has reported the following error:'. A 'Done' button is located at the bottom right of the dialog.

COSMOS Event Response Configuration	
Audible Alarm GPI Card SMS/Pager SMTP Message UDP Messaging	
SMTP Messaging Enabled	<input type="checkbox"/>
SMTP Message Triggered On	Warning
SMTP Host	Exchange
Destination Addresses	COSMOS_Support@pro-bel.co.uk
Message Precursor	COSMOS has reported the following error:
Done	

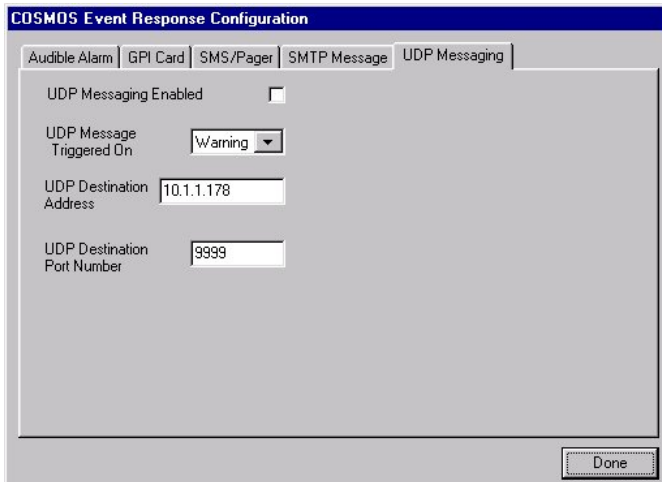
To set up the SMTP facility proceed as follows:

- click on the SMTP Message tab and select an Alarm level to trigger messages
- enter an SMTP Host name
- enter the address(es) for the intended recipient(s) of the e-mail message
- create a message precursor to identify the source of the message such as, 'COSMOS Status monitoring platform reported event'
- click on 'SMTP Messaging Enabled' and then click Done

The SMTP Message Service uses the default network access settings on the PC COSMOS is set up on.

Setting up UDP Messaging

The UDP messaging service is provided to allow text based messages to be sent via networks that support UDP. Typically this will be used on Local Area Networks, where message delivery is reliable without the need for advanced error correction.



The image shows a screenshot of the 'COSMOS Event Response Configuration' window. It has a title bar with the text 'COSMOS Event Response Configuration'. Below the title bar are five tabs: 'Audible Alarm', 'GPI Card', 'SMS/Pager', 'SMTP Message', and 'UDP Messaging'. The 'UDP Messaging' tab is selected. Inside the window, there is a section for 'UDP Messaging Enabled' with a checkbox that is currently unchecked. Below this is a label 'UDP Message Triggered On' followed by a dropdown menu showing 'Warning'. Underneath is a label 'UDP Destination Address' followed by a text box containing '10.1.1.178'. Below that is a label 'UDP Destination Port Number' followed by a text box containing '9999'. At the bottom right of the window is a 'Done' button.

To set up the UDP facility proceed as follows:

- click on the UDP Message tab and select an Alarm level to trigger messages
- enter a UDP destination address
- enter the UDP destination port address
- select 'UDP Messaging Enabled' and then click Done

NOTE: The UDP destination address and port number must not be configured to be the same as any COSMOS application running on the network which is using UDP for its interface.

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Multicast UDP event notification messages

The event notification messages sent have the following (Pascal pseudocode) structure:

TCOSMOSUDPAAlarmMessage = packed record

 EventID: Integer; (4 byte, Intel byte ordering)

 SourceCategory: Byte;

 SourceTag: Integer;

 SourceSerialNum: Char[20]; (NUL terminated)

 EventData: Integer;

 EventSeverity: Byte;

 TimeStamp: TDateTime;

 EventMessage: Char[255]; (NUL terminated)

end;

Field meanings are as described in Chapter 6, Section 6.5, Event Log structure.



6 System tools and reports

A variety of tools, fault reports and logging facilities are provided to ease the task of administration, tracking errors and looking at system performance over time.

6.1 Searching for a device

The Find Device facility located under Tools in the Menu Bar, will allow all users to search through the system image for devices with specified characteristics. Searches may be based upon device name, type or physical location. If it is preferred simply to obtain a list of the equipment in the system image, use the Inventory command.



6.2 Generate an inventory

The Inventory facility located under Tools in the Menu Bar, generates an inventory report in a CSV (Comma Separated Variable) file format in the COSMOS directory. This can be brought into a spread sheet package such as Microsoft Excel and a variety of operations can be carried out and reports produced using the tool sets of the spread sheet package.

6.3 Produce a fault report

This facility creates a report detailing all currently active alarms to a printer selected via the Printer menu option, found under Configuration in the Menu Bar.

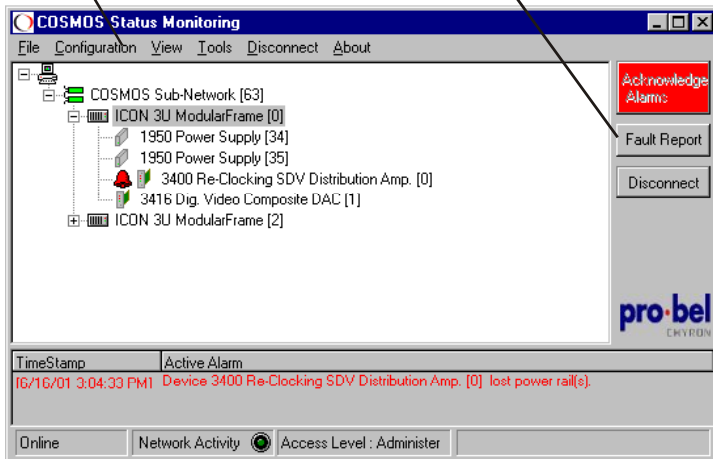
COSMOS System active faults report

Timestamp	Event Message	Device Type	Site	Room	Bay
[7/7/00 11:04:53 AM]	Device 3400 Re-Clocking Distribution Amp. [0] connection lost unexpectedly	Device 3400 Re-Clocking Distribution Amp. [0]	Reading	Test Room	1

NOTE: Location information will be printed if it has been entered via the Location tab in Device Properties.

Configure printer

Produce a fault report

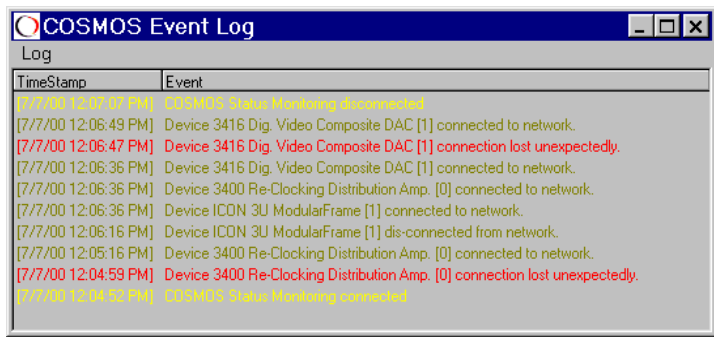


TIP: Configure the Printer driver to print to a file or use a PDF printer, if an electronic copy is required.

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6.4 Using the Event Log

The COSMOS Event Log provides a persistent log of events detected. All events are time stamped.



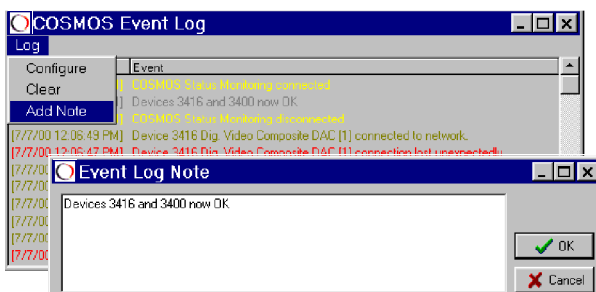
New events are listed at the top and colour coding is used to distinguish different categories of events.

Event log colours	
Type	Colour
Event	Olive
Warning	Orange
Alarm	Red
COSMOS connect/disconnect	Yellow
Event log note	Grey

TIP: If an event in the log relates to a device and the device still exists within the tree view, double clicking an event entry shifts focus to the associated device icon within the system image view, expanding the tree where necessary.

Adding notes to the log

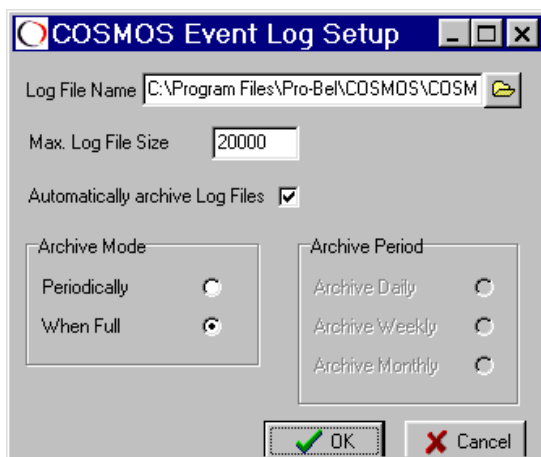
With Configure access and above it is possible to add informative notes to the Event Log to document changes.



Click on the Log menu within the Event Log form to access the Add Note menu. Notes appear in the log coloured grey and are time stamped.

Clearing and configuring logs

With access privilege of Administer, users may configure the Event Log facility or delete the entire log contents.



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The event log may be configured from the Log/Configure menu.

Archive options are available for periodic archiving or automatically when the log file is full.

The Event Log file name, maximum size and destination can be chosen here but it will always have the log creation date appended and the extension **.log**.

The Event Log is stored as a simple CSV file, which may be easily imported into other applications.

6.5 Event log structure

The COSMOS Event Log is written as a comma separated variable (CSV) file. Each line in the file details a single event and is written with the following structure:

<EventID,SourceCategory,SourceTag,SourceSerialNum,EventData,EventSeverity,TimeStamp,EventMessage>

The Delphi TDateTime format is a double precision floating point number in which the integer component details the days since 12/30/1899 and the fractional component details a fraction of a 24-hour period.

Event Log Field name and meaning	
Field name	Meaning
EventID	Unique Event identifier tag
SourceCategory	0 Event originated from device monitored by COSMOS
	1 Event generated by COSMOS application itself
SourceTag	COSMOS internal field If <i>SourceCategory</i> = 0 (Device) contains a unique tag value identifying the device object that generated the Event, otherwise set to -1
SourceSerialNum	Serial number of device from which Event originated. Empty if <i>SourceCategory</i> –1 or no serial number available
EventData	COSMOS internal field
EventSeverity	1 Log event
	2 Warning event
	3 Level 1 Alarm event
	4 Level 2 Alarm event
TimeStamp	Event timestamp in Delphi TDateTime format
EventMessage	Up to 255 characters

7 Trouble shooting

Since the CAN bus uses a multi-drop or 'daisy-chain' communications protocol, there are three important physical criteria that must always be satisfied:

- the loop-through CAN bus wiring must not be broken
- every device must have a unique address
- the last device must have a termination fitted

Most problems in setting up one or more CAN systems can probably be traced to a failure to observe the three basic rules.

Example problems and their solution

A new ICON frame added to a system appears only as an outline icon in the system view:

- change the address of the second frame to a different address than the first

Communication with all ICON frames and modules seems erratic:

- fit a Pro-Bel CAN bus termination to the last frame in the system

Certain modules are set incorrectly and cannot be controlled from the Device Status tab:

- where possible, change the switch on these cards to the remote position

A device appears with only an outline icon, but it is known to be in working order:

- read the Notes tab for the device, it may have been disabled temporarily pending planned engineering work



A question mark icon appears against a new device:

- the new device is producing responses unrecognised by COSMOS
- obtain updated device library files from COSMOS Support as explained in section 2.9

NOTE: The question mark symbol does not necessarily mean that a module is defective, only that unrecognised messages have been received.

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8 Glossary

ActiveX	Microsoft technology that allows different programs to share information. Often used to create user interactivity in programs and Web pages.
CAN	An industrial communications protocol electrically similar to RS-485 but including an implementation of various Data Link Control functions.
COSMOS	Pro-Bel system for remote status, monitoring and configuration of modular equipment over a communications network.
CSV	Comma separated variable text file format that may be easily imported into a variety of different applications.
Device	A piece of equipment to be monitored by the Status Monitoring System.
Distributed Component Object Model (DCOM)	The Distributed Component Object Model (DCOM) allows client/server applications to share components over a network.
Ethernet	A hardware standard for implementing Local Area Networks.
Event	A change in a device's state reported to the Status Monitoring system.



Gateway	Network interconnection device and software, typically used to provide access to Wide Area Networks from a Local Area Network.
Hypertext Transfer Protocol (HTTP)	Communication protocol used by Web browsers to communicate with Web servers.
IP	Internet Protocol. A protocol concerned with the routing of individual datagrams over the Internet.
Integrated Services Digital Network (ISDN)	A switched public network capable of handling a range of digital voice and data traffic. Typical uses include high quality voice contribution circuits set up as needed by broadcasters. Typical data rates are 64Kbit/s and 128 Kbit/s.
PCN Network	A compound network, consisting of many sub-networks linked together with Network Communications Controllers. Any device on the network can potentially communicate with any other device.
PCN Network Communications Controller	Device within a PCN network acting as a switching hub and/or bridge, linking several sub-networks and routing messages between them.

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SMS	Short Message Service used for simple wireless data communication.
Status Monitoring Platform	Hardware and software providing status monitoring functionality.
Status Monitoring System	System comprised of one or more Status Monitoring platforms, the devices to be monitored and the network connecting them.
Sub-network	One region of a PCN network in which all devices are directly linked by a common medium.
System Image	Representation of the external system maintained within the status monitoring application software.
TAP	Teleocator Alphanumeric Protocol used widely in the US for Short Message Services.
Transmission Control Protocol/Internet Protocol (TCP/IP)	It is based on packaged data with sufficient error correction to guarantee delivery of every data packet in most circumstances.
UCP	Universal Computer Protocol for Short Messaging Services mainly used in Europe.
User Datagram Protocol (UDP)	A data transmission standard commonly used for broadcast over IP networks. It lacks many of the error correction features of TCP, but is ideal for closed systems or where occasional lost packets may be tolerated. Supports 'multicast' mode.



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9 Specification

Device limit	<p>Practical limit of a PCN Network, and therefore Local Status Monitoring platform using it is 3,300 devices.</p> <p>However, Remote Status monitoring platforms may link to more than one Local Status Monitor and therefore are effectively unlimited in the number of devices they may access.</p>
ICON devices	<p>An ICON Modular Products frame counts as one device but may contain up to 17 modular cards and two monitored power supplies.</p>
Communications interface	<p>CAN industrial communications protocol or standard Ethernet controller.</p>
Hardware platform	<p>IBM compatible PC running Windows NT 4.0 with service pack 4 or higher. An SVGA colour monitor, GPI card, modem connection and a LAN or CAN interface are recommended options.</p>
GPI card	<p>COSMOS uses the HW-0280-01 8 way GPI card to provide relay alarm interfaces.</p>



GSM SMS	COSMOS currently makes use of an ActiveX control that is part of the Message-Master Developer Suite supplied by Derdack Software Engineering for accessing GSM SMS and pager networks. The ActiveX control must be installed for COSMOS to support this feature.
CAN I/F card	COSMOS currently uses the CAN-PCI/331 CAN bus interface.
Network wiring	UTP category 5 cabling or better for CAN Bus.
CAN Bus termination	120 Ohm termination included in 'D' type to RJ45 adaptor and supplied as separate termination for 'last' device.

10 Ordering information

Part number	Description
COS-ICON-0001	COSMOS configuration and status monitoring software package for ICON including PCI CAN card for controller PC
HW-0200-01	8 output ISA relay card