



Dolphin PCI Express IXS600 Switch



IXS600 8 ports PCI Express x8 switch users guide

This guide is only valid for revisions IXS600-HI and newer

Version 2.07

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Overview

This document describes the Dolphin IXS600 PCI Express switch used in combination with other Dolphin PCI Express products. Dolphin is currently provides the following PCI Express products:

- PXH810 PCI Express Gen3 x8 NTB iPass cable adapter card
- PXH812 PCI Express Gen3 x8 Transparent Host and Target iPass cable adapter card
- PXH830 PCI Express Gen3 x16 NTB MiniSAS-HD cable adapter card
- PXH832 PCI Express Gen3 x16 Transparent Host and Target MiniSAS-HD cable adapter card
- IXH610 PCI Express Gen2 x8 NTB and Host iPass cable adapter card
- IXH611 PCI Express Gen2 x8 Host and Target iPass cable adapter card
- IXS620 XMC PCI Express Gen2 x8 NTB, Host and Target adapter card
- IXS600 8 port PCI Express Gen3 x8 rack mountable iPass cable switch
- IXE60X PCI Express expansion products (contact Dolphin for details)
- IXC0M 50cm PCIe Gen3 x8 Copper Cable
- IXC1M 1 Meter PCIe Gen3 x8 Copper Cable
- IXC2M 2 Meter PCIe Gen3 x8 Copper Cable
- IXC3M 3 Meter PCIe Gen3 x8 Copper Cable

The IXS600 switch can be used to connect to any of the above iPass cable-based products or to any compliant existing PCI Express downstream device having a standard PCI Express x8 iPass connector (PCI Express Gen 1 or Gen2 auto detect). The IXS600-Hx revision and newer is PCI Express Gen3 ready but requires a firmware update to operate at Gen3 speeds between IXS600 switches. The IXS600-HN revision is required to support the new PXH810 card at Gen3 speed.

All Dolphin PCI Express NTB adapter cards support the complete suite of Dolphin PCI Express Software including Dolphin SuperSockets™, optimized TCP/IP drivers, and SISCI Embedded software. They are also compliant with the PXImc software specification.

Dolphin SuperSockets is a Berkeley Sockets compliant library that provides a socket latency below 1 microsecond, and close to the wire speed streaming bandwidth for networked applications. SuperSockets™ is currently available on Linux, RedHawk and Windows. It is a 100% transparent plug-and-play solution for commercial and embedded applications. More on SuperSockets is located at <http://www.dolphinics.com/products/dolphin-supersockets.html>

Dolphin's optimized TCP/IP driver enables PCI Express to be used as a traditional 10G Ethernet / 40G Ethernet replacement such as for NFS sharing and legacy networking that does not need the low latency provided by SuperSockets. The TCP/IP driver supports gateway functionality.

The SISCI software provides a well-defined, easy to use shared memory programming API for PCI Express over cable. More on SISCI is located at <http://www.dolphinics.com/products/embedded-sisци-developers-kit.html>

More information about the software provided for the Dolphin PCI Express adapter cards is located at http://www.dolphinics.com/products/dolphin_pci_express_software.html.

Revision history

The IXS600 switch has been undergoing a number of changes to adopt to new requirements and improved performance made available through new revisions of the PCIe chipset.

Hardware revisions

The following table gives a general overview of the hardware capabilities.

Switch revision	Capabilities
IXS600-Bx	<ul style="list-style-type: none">• PCI Express Gen2 only• No cascading of switches.
IXS600-BE	<ul style="list-style-type: none">• Minor service level update• Current Gen2 revision
IXS600-Hx	<ul style="list-style-type: none">• Introduced updated IDT PCIe Gen3 chipset.• A firmware upgrade is required to interconnect switches at PCIe Gen3 speed.• Enables cascading of switches to support 20/56 nodes using IXH610/IXH620 adapter cards.
IXS600-HN	<ul style="list-style-type: none">• Improved power supply to support Gen3 PXH810 cards on all ports• Current Gen3 revision, full support for all Gen2 and Gen3 IXH and PXH iPass based cards from Dolphin.

Management software revisions

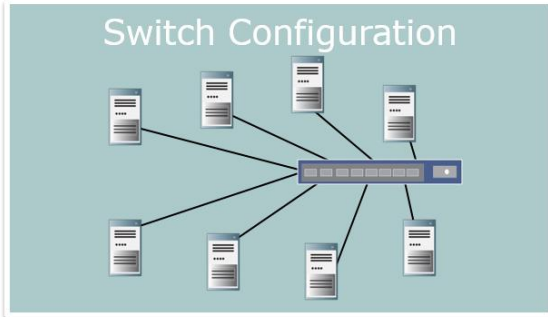
The following table gives a general overview of the management software capabilities. All versions contain various bug fixes, security patches, and stability improvements.

Revision	Capabilities
1.0.0 - 1.3.1	<ul style="list-style-type: none">• Initial functionality
1.3.2	<ul style="list-style-type: none">• Added optional management web interface, disabled by default.
1.3.3	<ul style="list-style-type: none">• Web interface enabled by default• File upload support from web interface
1.3.5	<ul style="list-style-type: none">• Select active EEPROM from web interface
1.3.6	<ul style="list-style-type: none">• Support for web interface upgrades• Added support for USB stick status dump and management• Automatic fan speed control
1.3.7	<ul style="list-style-type: none">• Added web interface authentication• Changed back to constant fan speed due to dynamic speed issues
1.3.8	<ul style="list-style-type: none">• Fixed EEPROM upgrade issues, that caused slow upgrades of empty EEPROMs• Implemented the reset button on the management page
1.3.9	<ul style="list-style-type: none">• Added support for DHCP. Default off.• Added link watchdog with management page.• Removed unnecessary reset on boot, which caused transparent issues• Included Gen 3 EEPROMs and configured Gen 3 as default (for HN revisions and newer)
1.3.9.1	<ul style="list-style-type: none">• Fixed a BE revision (and older) bug where EEPROM is not loaded on boot.
1.3.9.2	<ul style="list-style-type: none">• Stability fixes• Added NOCLOCK transp EEPROMs supporting no clock on upstream port

Configuration examples

The IXS600 switch can be used as a standalone switch, for larger transparent PCIe expansion systems or PCIe cluster systems using multiple switches. Some examples can be found below.

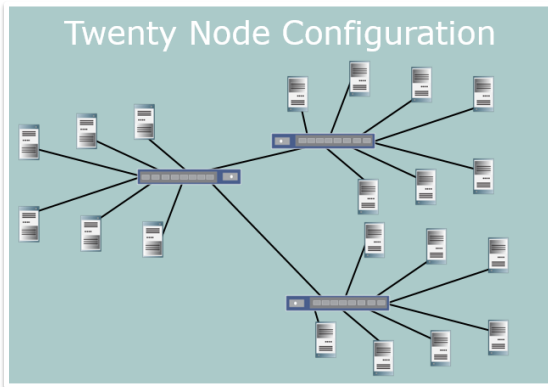
8 node PCIe Gen2 and Gen3 NTB Cluster



Each node has a Dolphin Express PXH810, IXH610 or IXH620 adapter. Up to eight systems can be connected to the Dolphin IXS600 switch using the default firmware configuration with the front panel configuration switch set to M1.

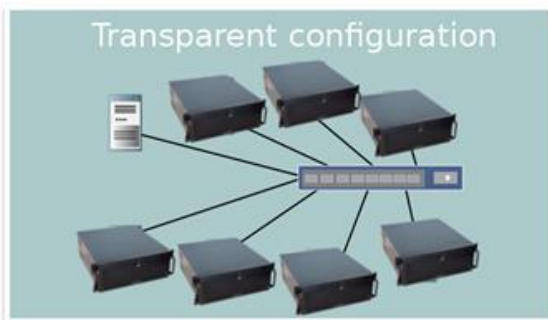
The IXS600-HN revision is required to support the PXH810 Gen3 card on all ports.

20 node PCIe Gen2 NTB Cluster



Three IXS600 switches are connected together to create a 20 node PCI Express cluster. Two switches can be used to build a 14 node system. In reflective memory mode, you can connect up to 56 nodes. The correct firmware must be loaded on the switches to establish this configuration. See page 15 for more details.

Transparent PCIe Gen3 expansion – up to 7 Expansion chassis connected to one server



A Dolphin Gen2 or Gen3 adapter card in upstream transparent mode is connected to switch port 8. Any standardized PCI Express x8 downstream device or expansion chassis is connected to switch port 1-7. No special device driver is required for the IXH6xx, PXH812 adapter card or the IXS600 switch. Any device in the PCI Express IO system will operate using its standard device driver. With the default firmware configuration, the front-panel configuration switch must be set to M2 (PCI Express Gen2) or M3 (PCI Express Gen3).

Quick install guide

The IXS600 can be mounted in a 19-inch rack or used in a standalone setup. Rack mount ears are included in the package and can be mounted on both sides of the switch depending on user requirements. Rubber feet are included in the package and should be applied beneath the switch to avoid scratches.

Note: *Static electricity from your clothes or work environment can damage your PCI Express adapter card or your PC. Always wear a grounded antistatic wrist strap while opening the PC and when the card is removed from the anti-static bag.*

IXS600 operating modes

The Dolphin PCI Express IXS600 switch has two main operational modes: *Transparent* and *Non Transparent Bridge* (NTB) mode. The switch operating mode is controlled by the available EEPROMs, which can be selected with the small switch knob on the front panel. A thin non-electrically leading tool (e.g. a toothpick) should be used to move the switch knob. An enlarged picture of the selector is shown in picture 1 below:



Picture 1: IXS600 configuration switch mode selector

Configuration switch setting	Factory default functionality
M1	NTB mode – (Dolphin software) – TOP switch configuration
M2	Transparent mode, Gen2
M3	Transparent mode, Gen3

The IXS600 switch must be power cycled to enable a full reconfiguration after moving the configuration switch selector. It is possible to change the functionality of each configuration switch setting, see page 24 for further details. Please be careful when reprogramming the EEPROMs.

Cable connections

The IXS600 supports x8 iPass™ PCI Express standard cables as well as PCI Express x8 to x4 iPass™ Transition cables. A single cable per switch port is used to connect to other devices having a x8 or x4 iPass connector; Standard transparent I/O devices, IXE60x expansion boxes, or PCs with an IXH610, IXH611 or IXH620 cards.

To install the cable, match the male portion on the x8 cable with the female connector on the IXS600 switch. Use even pressure to insert the connector until it locks and is secure.

Transparent mode port usage

In default transparent mode, Port 8 is the upstream port. Port 1-7 is downstream.

NTB mode port usage

Any port can be used in any order, no restrictions. Dolphins NTB software and adapter cards will auto detect ports and automatically connect at the highest speed possible. Customers writing their own low-level drivers need to contact Dolphin for further technical information.

Cascading switches

The IXS600 (revisions Hx and higher) supports cascading multiple switches into larger PCI Express networks. In combination with the IXH610 adapter, up to 20 nodes can communicate using Dolphins NTB driver. In reflective memory configurations, up to 56 nodes can be interconnected. More details can be found on page 15.

Partitioning – mixed transparent and NTB usage

The switch supports partitioning into separate switch domains, enabling a single switch to be used as two or more independent logical switch domains. The switch hardware prevents unintended data communication and reset / configuration cycles to propagate between separate domains. This configuration can be easily enabled by loading the partitioning firmware. Please contact Dolphin for more information and instructions.

PCI Express Gen3 Switch - IXS600

The IXS600 is a PCI Express Gen3 x8 switch available from Dolphin providing an easy to use, multi-functional solution.

IXS600 high level specification

- PCI Express Gen1 2.5 Gbps / Gen2 5.0 Gbps / Gen3 8.0 Gbps per lane signaling – 8 lanes – up to 64 Gbps total signaling pr port.
- Compliant with PCI Express Gen1 and Gen2 computers and IO systems, auto detection. Each port operates independently at Gen1 or Gen2 speeds.
- Lane width auto-training to connected cable width (x8, x4, x2, x1)
- 19-Inch 1U rack mountable chassis, optional rack mount ears.
- Physical dimensions 440mm x 300mm x 45mm (WxDxH).
- Supports NTB connections to other hosts and transparent connections to IO systems as a transparent P2P device.
- PCI Express Base Specification Rev 3.0
- PCI Express External Cabling Specification, Rev. 1.0
- Eight PCI Express Gen2 x8 iPass Cable connection.
- Link clock isolation. Automatic support for hosts running CFC or SSC mode.
- Support for hot plugging of the PCI Express cable (NTB mode, SISCi and SuperSockets)
- Built in management processor for monitoring and firmware management.
- Optional firmware upgrade and configuration via web interface or USB.
- RJ45 Ethernet (10/100) connector (optional use)
- Front and rear operational status and alert LEDs
- Three programmable 128 KB EEPROM for switch configuration data.
- No PCI Express power domain isolation.
- Partitioning
- Redundant fans
- Operating systems supported:
 - NTB mode: Full SuperSockets, TCP/IP driver, Reflective Memory and SISCi compliance. Linux, RedHawk, Windows, RTX and VxWorks support.
 - Transparent mode: All (No drivers required)
- Power supply input 100 - 240VAC 50/60 Hz – 2.2A
- Power Consumption: Max 80 Watt (including active optical transceivers).
- Operating temperature 0°C to 55°C, Relative Humidity 5% - 95% non-condensing
- Storage temperature -25°C to 70°C, Relative Humidity 10% - 90% non-condensing
- Weight : 4.0 Kilo
- JTAG programming and test
- RoHS compliant
- CE Mark



Picture 2: IXS600 front view

Cables

The IXS600 switch supports iPass x8 copper cables. The maximum cable distance will depend on the actual cable quality, the device in the other end of the cable, and the cable link speed (Gen1, Gen2 or Gen3).

Speed and medium, card	Max cable length
Gen1, copper	7 meter
Gen2, copper, IXH610, IXH611, IXH620	5 meter
Gen3, copper, PXH810, PXH812	3 meters
Between IXS600 switches (Gen3)	2 meters

Transition cable to lower lane width

The IXS600 switch can be connected to other PCIe equipment having a lower lane width (x4, x2, or x1) using a transition cable. The switch will automatically adjust to the lower lane width as well as lower PCIe speed (Gen1, Gen2) to meet the requirement for the connected PCIe device.

Management processor

The actual configuration of the switch is controlled by the onboard firmware loaded from onboard EEPROMS and will be enabled immediately after power is applied to the switch. The built in management processor has no active role in normal operations except for firmware management and simple port monitoring.

Do not connect or try to exploit the management processor functionality without further written instructions from Dolphin.

The management processor's status can be retrieved by accessing its Web GUI described on page 15, or by using a USB flash drive. The USB option is only available on HI revision switches with firmware 1.3.6 and newer. Insert an empty USB flash drive into one of the front USB ports while the switch is running. Observe that the Power LED starts flashing and wait until it becomes stable green. This takes approximately 30 seconds. Remove the USB drive and insert it into a regular computer. A text file should be present on the drive named *ixs-status-<SERIAL>.txt*. The file contains information about the switch's status and configuration, which is useful to retrieve the switch's network configuration and when contacting Dolphin support.

Use cases summary and settings

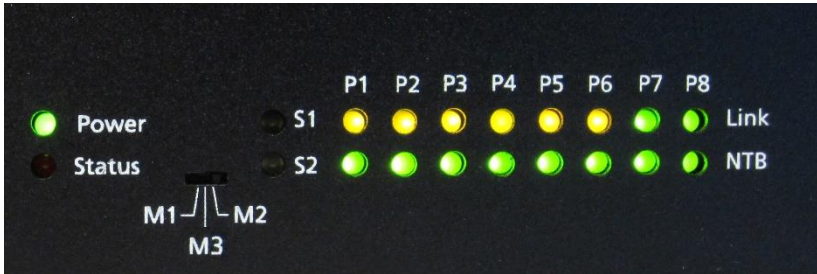
The table below gives an overview of the default configuration settings and limitations.

Use Case	Description	Clock Source	Cable Hot Plug	Power Sequence Requirements	Software/ Driver
Transparent	Transparent – Dolphin adapter card connects to downstream PCI Express devices or PCI Express expansion systems through the IXS600 switch	Upstream adapter card drives CREFCLK. IXS600 generates independent CREFLOCK to all downstream devices	Not supported by legacy device drivers	IO system and IXS600 must power on before PC	No driver required for IXH610 card or IXS600 switch. Legacy drivers for IO Devices
NTB	NTB configuration. All connected hosts have Dolphin adapter card	Adapter card transmits clock on PCI Express cable	Fully supported	No limitations	Dolphin SISCi, SuperSockets, TCP/IP, PXImc
Mixed	Switch is portioned. Behavior depends on configuration data. May combine use case A and B				

Table 3: Switch use cases

LEDs

The switch has several LEDs on both sides to signal various operating modes and its status. A picture of the front side LEDs and the configuration switch is shown in picture 3 below.



Picture 3 : Front panel LEDs and control switch

Management processor LEDs

The management processor has two LEDs next to the RJ45 Ethernet connector.

Management	Description
Power	Dark: Power off or failure. Green: Power on.
Status	Dark: Normal operation. Red: Failure. Blinking red: Software upgrade in progress.

Table 1 Management Processor LED overview

Switch status LEDs

The IXS600 front panel has two status LEDs

Status LEDs	Description
S1	Lit green when the switch is configured for stand-alone use (CASCADE_TOP)
S2	Lit green when the switch is configured as a leaf-switch (CASCADE_SUB). The NTB-led of the corresponding port will also be lit yellow.

Table 2 Switch status LED overview

Front and rear panel link LEDs

The switch has two bi-color LEDs visible through the cabinet on both sides indicating status for each of the 8 PCI Express links.

Name	Dark	Yellow	Green	Green - blinking
Link	Power off or failure	Power on, Link down	Power on, Link Up	Power on, Link active, data transmitted
NTB	Transparent mode	Indicates uplink-port for CASCADE_SUB configuration.	NTB mode (The switch is managed and used by PXImc, SISCO, SuperSockets, TCP/IP software)	NA

Table 2: Link LED overview

The NTB link LED is only controlled by firmware. Both LEDs depends on GPIO registers initialized by EEPROM. An incorrect EEPROM can cause dark LEDs.

Installation

Safety instructions

Always use caution when working with computers, IO Devices and electrical components.



High voltages are present inside the IXS600 cabinet that may cause severe harm to your body if opened. Never open the switch cabinet, no user serviceable parts are available inside the cabinet. Opening the cabinet will void your warranty.

Static electricity from your clothes or work environment can damage your PCI Express adapter card or your PC. Always wear a grounded antistatic wrist strap while opening the PC and when Dolphin PCI Express adapter is removed from the anti-static bag. The IXS600 switch requires no special anti-static protection and should be handled in line with other electronic equipment.

Special National notes:

Norway: "Apparatet må tilkoples jordet stikkontakt"

Sweden: "Apparaten skall anslutas till jordat uttag"

Finland: "Laite on liitettävä suojamaadoituskoskettimilla varustettuun pistorasiaan"

Installing the Switch in a rack

The IXS600 shipping box includes rack mount ears that can be used to fix the IXS600 into a 19-inch standard rack.

Installing and removing the cable

The IXS600 supports PCI Express x8 iPass cables. Installing and removing cables should be done with both upstream and downstream devices powered off. The Dolphin SuperSockets, TCP/IP drivers and SISCO fully supports hot plugging (*Note: installation and removal of cables while the system is running*). Standard PCI Express cables are not designed for a high number of installations and removals; the gold applied to the connector head may wear out and cause loss of communication. Please contact your Dolphin representative if you intend to continuously connect and disconnect the PCI Express cables.

Connecting the cable

Please carefully install the PCI Express cable connector into the connector housing on the adapter card or IXS600 Switch box. Computer cables should always use strain relief to protect the connected equipment from excessive force via the cable. This is especially important for cables between racks.

Disconnecting the cable

Carefully pull the thumb tab in the direction of the cable to release the cable from the connector house and eject the cable.

Connecting multiple switches

Connecting up to 14 nodes using two switches

To establish this configuration, you need to

- 1) Designate one switch as the TOP switch. This switch should have the MODE selector in M1. No special firmware configuration is needed for this switch (factory default).
- 2) Designate the other switch as SUB1. This switch should have the MODE selector in M1. This switch needs to be re-configured using the WEB GUI to load the SUB1 firmware. More information on the WEB GUI can be found on page 17.
- 3) Install a standard iPass x8 cable between the Top switch port 1 and the Sub switch port 1

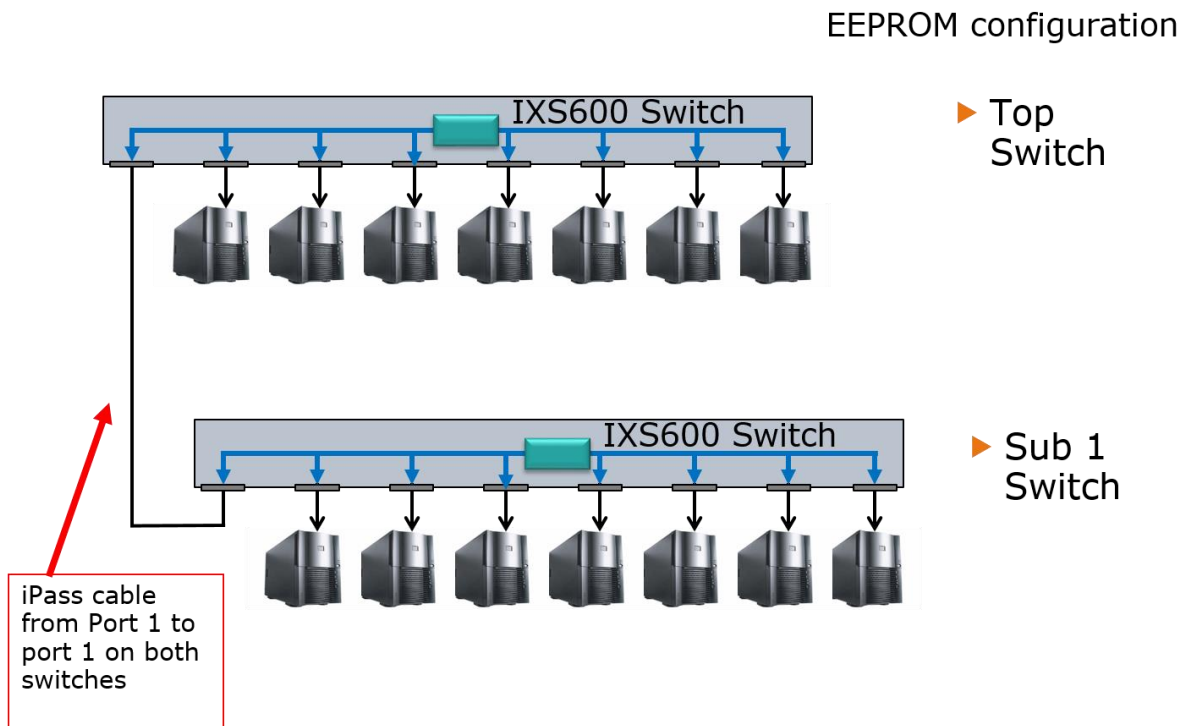


Figure 1: 14 node configuration and setup

Connecting up to 20 nodes using three switches

To establish this configuration, you need to

- 1) Designate one switch as the TOP switch. This switch should have the MODE selector in M1. No special firmware configuration is needed for this switch (factory default).
- 2) Designate the second switch as SUB1. This switch should have the MODE selector in M1. This switch needs to be re-configured using the WEB GUI to load the SUB1 firmware.
- 3) Designate the third switch as SUB2. This switch should have the MODE selector in M1. This switch needs to be re-configured using the WEB GUI to load the SUB1 firmware.
- 4) Install a standard iPass x8 cable between the Top switch port 1 and the Sub switch port 1.
- 5) Install a standard iPass x8 cable between the Top switch port 2 and the Sub switch 2 port 2.

EEPROM configuration

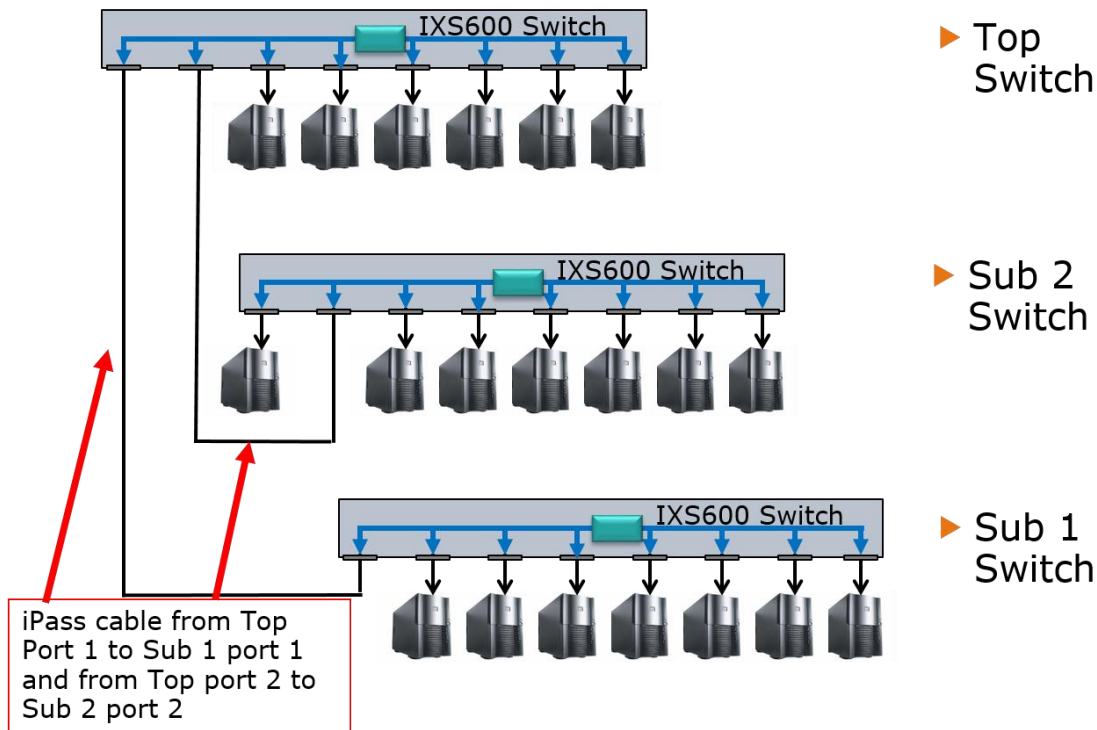


Figure 2: 20 node configuration and setup

Connecting up to 56 nodes for reflective memory

The IXS600 and IXH610/IXH620 cards can be used to build reflective memory systems with up to 56 nodes. Please contact Dolphin for configuration details.

Web GUI

The IXS600-HI and later revisions with firmware 1.3.3 or newer ship with a Web GUI for monitoring and management use. In the shipping-configuration, the network-address is set to 192.168.0.50 with a 255.255.255.0 netmask. Configure a system with a web-browser to a suitable address (e.g. 192.168.0.51), and point your browser to the default switch address:

<http://192.168.0.50>

Please note that the Web GUI is not optimized for *Internet Explorer*, and it is hence recommended to use the latest version of *Firefox* or *WebKit* based browsers such as *Google Chrome* or *Safari* for the best experience.

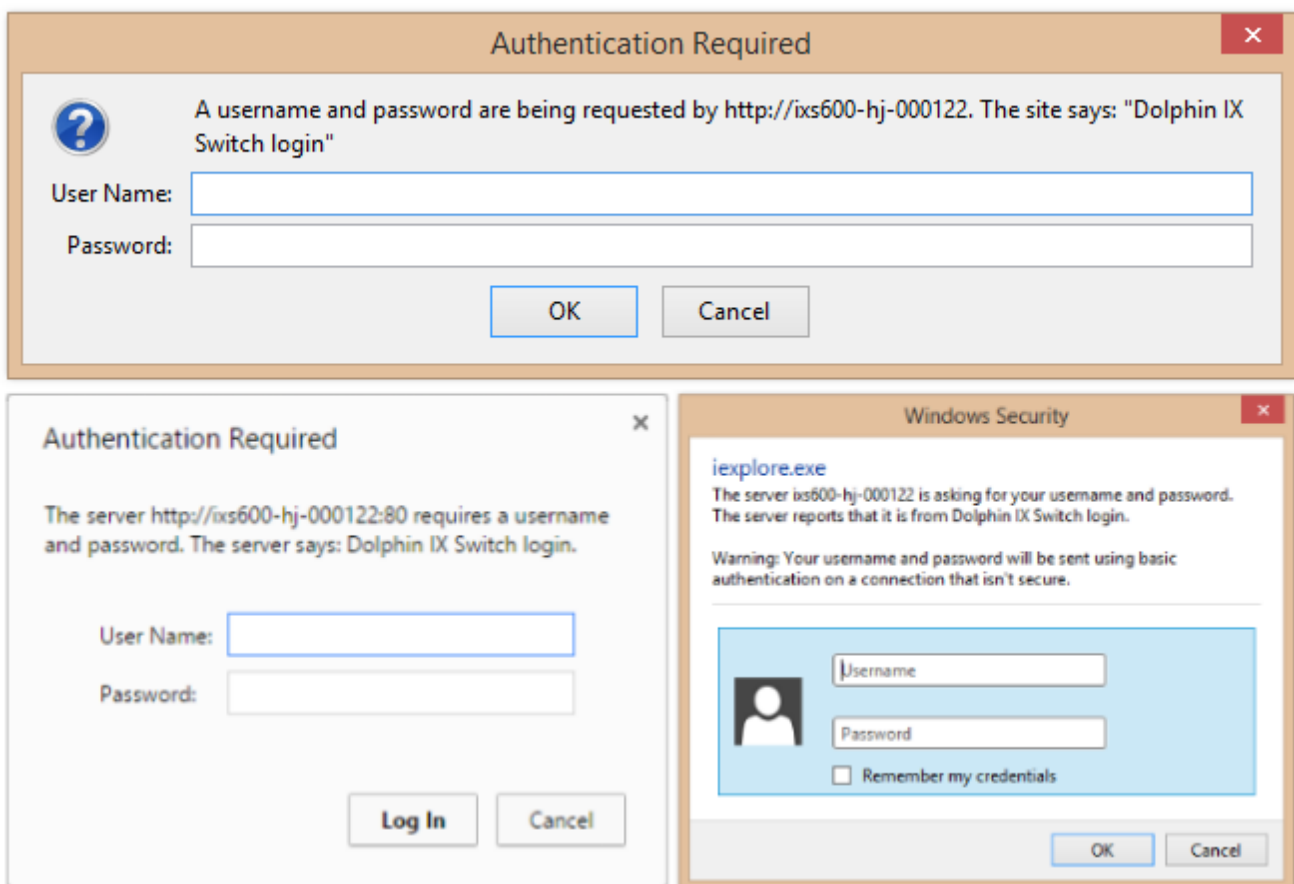
Authentication

The Web GUI is protected by HTTP Basic authentication (BA) and you will be presented with an authentication form, similar to one of the dialog boxes presented in picture 4 below. The default credentials are:

User Name: admin
Password: admin

The password can be changed by clicking the *Auth...* button on the *Management* page, or by accessing the authentication page directly: <http://192.168.0.50/passwd.shtml>.

Please note that the HTTP BA provides limited security. We do not recommend exposing the switch outside of a limited network.



Picture 4: HTTP Basic authentication dialog boxes from *Firefox*, *Google Chrome*, and *Internet Explorer*

The user is redirected to the welcome page on successful authentication, as shown in picture 5 below. Unsuccessful authentication will re-launch the authentication dialog box, while pressing *Cancel* will present the user with a *401 Access Denied* page.



Picture 5: Default welcome-page of the switch

The /index.shtml –webpage is the default welcome-page of the switch. Use the provided navigation alternatives to access the switch monitoring functions, the network configuration functions, the switch management functions, and to review the logs.

Finding switch network configuration on configured switches

Switch network information can be retrieved by following the USB flash drive procedure described in section *Management processor* on page 10. Use this if you are unable to connect to a switch on the expected IP address.

Switch IP configuration

The screenshot shows the 'IX Switch Configuration' web interface. At the top, there is a navigation bar with five tabs: 'Home', 'Monitoring', 'Configuration' (which is highlighted in blue), 'Management', and 'Logs'. Below the navigation bar, the main content area is divided into two sections. The first section, 'Network Configuration', has a blue header and contains several configuration fields: 'Use DHCP' (a dropdown menu currently showing 'Use DHCP'), 'IP Address' (text input with '192.168.0.50'), 'Netmask' (text input with '255.255.255.0'), 'Gateway' (text input with '192.168.0.1'), 'DNS Domain' (text input with 'localdomain'), and 'DNS Server' (text input with '192.168.0.1'). The second section, 'Internet Time Settings', also has a blue header and contains two fields: 'NTP Server' (text input with 'pool.ntp.org') and 'Timezone' (text input with 'UTC'). At the bottom of the configuration area is a large blue button with a checkmark icon and the text 'Save configuration'. The footer of the page reads 'Dolphin ICS © 2011-2016'.

Picture 6: Switch configuration page

The /Configuration.shtml –page provides control over network settings – The switch supports both DHCP and static IP configuration. DHCP is off by default. It needs a valid configuration for the DNS-server to resolve the configured NTP-server to get proper date/time information. The switch will function properly without this, but will not be able show the date correctly in the monitoring screen. Please make sure the chosen IP-address and netmask are correct before saving the settings, as the switch will no longer respond to the old settings. Note that the same usually applies when changing from static configuration to DHCP. Enabling DHCP requires that a DHCP server is reachable on the same network as the switch. The switch will distribute its configured hostname to the DHCP server. The hostname is usually equal to the serial number for newer switches. It is usually “ixs600” for older switches.

On the configuration tab, please enter IP-settings suitable for your network. Ask your systems administrator for the correct configuration on your network. The network adapter’s hardware address is available on the monitoring page. Press ‘Save configuration’ when done editing the settings.

After this, you should be able to access the web GUI normally on your network using the new IP-address or a named alias. The web GUI will allow you to monitor port and fan-status, update the firmware-images available on the switch, and program the switch EEPROMs.

Configuring the proper time zone

You must be careful when changing the IXS600 time zone setting to make it work properly. Please note that it only support POSIX style time zones. This means that the offset signs are reversed from the standard ISO 8601 convention, e.g.:

- GTM = Greenwich mean time
- GMT-2 = GMT plus 2 hours
- GMT2 = GMT minus 2 hours

Please also note that not all time zones are supported, CET/CEST is not. Some of the tested and working time zones are UTC, GMT, PST8PDT, VNM, JST, MST7MDT.

Network configuration without the web interface

You may configure the network settings without the web interface by utilizing a USB memory stick, and a small shell script. We recommend using a high quality and stable USB drive for this procedure. Cheaper USB drives typically used for marketing purposes tend to be unstable. Store one of the scripts below as a text file named *tsusb* on the USB flash drive. It is important that you use Unix-style line endings for the script or it will not run successfully. The use the following procedure to perform the configuration:

1. Power-cycle the switch
2. Wait for the Power LED to become stable green for at least 5 seconds
3. Insert the USB stick in one of the USB-A slots. Power LED should start blinking.
4. Wait ~35 seconds for the procedure to complete.
5. Power LED should have been stable green for at least 5 seconds
6. Eject the USB and power-cycle the switch
7. Review the new files present on the USB stick

tsusb script toggling DHCP on/off

```
#!/bin/sh
echo "This script toggles DHCP on the IXS600 switch"
echo "-----"
if [ ! -e /opt/DIS/sbin/ixsctl ]; then
    echo "ERROR: ixsctl is not present on this device."
    exit 1
fi
killall ixsctl
dhcp=$(/opt/DIS/sbin/ixsctl config CONF_NET_DHCP | sed 's/[^0-9]//g')
if [ $dhcp -eq 1 ]; then
    echo "DHCP is on, turning it off"
    dhcp=0
else
    echo "DHCP is off, turning it on"
    dhcp=1
fi
/opt/DIS/sbin/ixsctl config CONF_NET_DHCP $dhcp
echo "Done, let's sleep for some time to allow DHCP to re-configure"
sleep 3
echo "New IP configuration is:"
ifconfig
cat /etc/resolv.conf
/opt/DIS/sbin/ixsctl info
```

tsusb script setting static configuration

```
#!/bin/sh

echo "Sets a static network configuration on the IXS600 switch"
echo "-----"

# Adjust these values accordingly to your network setup
ADDR=192.168.0.50
MASK=255.255.255.0
GATEWAY=192.168.0.1
DNS_SERVER=192.168.0.1
DNS_DOMAIN=localdomain

if [ ! -e /opt/DIS/sbin/ixsctl ]; then
    echo "ERROR: ixsctl is not present on this device."
    exit 1
fi

killall ixsctl

echo "Disabling DHCP"
/opt/DIS/sbin/ixsctl config CONF_NET_DHCP 0

echo "Setting the static configuration"
/opt/DIS/sbin/ixsctl config CONF_NET_ADDR $ADDR
/opt/DIS/sbin/ixsctl config CONF_NET_MASK $MASK
/opt/DIS/sbin/ixsctl config CONF_NET_GW $GATEWAY
/opt/DIS/sbin/ixsctl config CONF_NET_DNS_SERVER $DNS_SERVER
/opt/DIS/sbin/ixsctl config CONF_NET_DNS_DOMAIN $DNS_DOMAIN

echo "Done, let's sleep to re-configure the network"
sleep 3

echo "New IP configuration is:"

ifconfig
cat /etc/resolv.conf
/opt/DIS/sbin/ixsctl info
sync
```

Switch Monitoring



Picture 7: Switch monitoring page

The /Monitoring.shtml -page shows the switch uptime, currently operational mode and firmware, readings from fan- and temperature-sensors and port status. Ports arbitrated to Gen2 x8 will show black text on green, while disconnected ports show a red NC on yellow. Gen1 speed and x4 or narrower links are reported with an updated red status text. The various information is automatically updated and there should be no need to refresh the page.

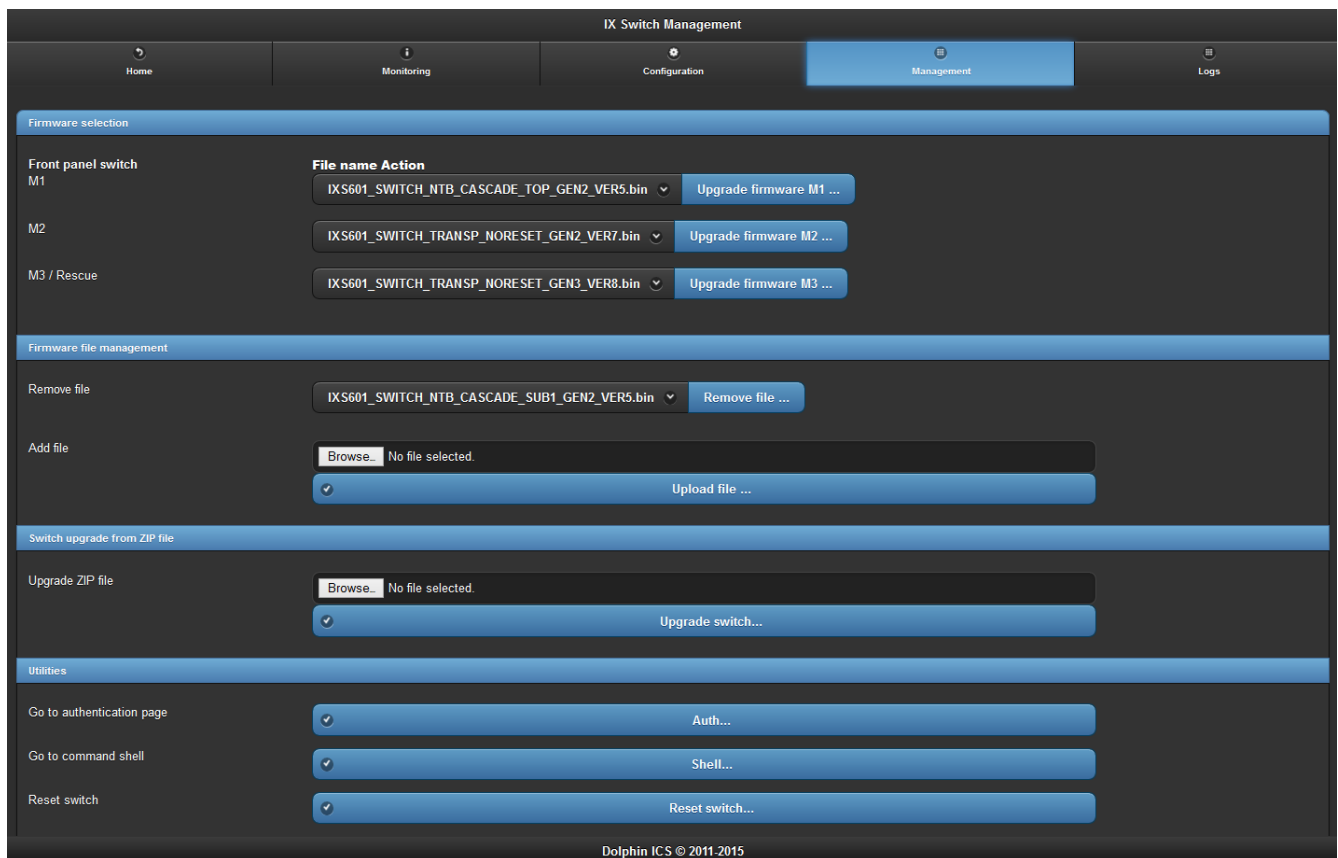
Firmware management & upgrade

Dolphin's IXS600 switch is pre-configured during manufacturing and a firmware upgrade is normally not required for default operations. Please contact Dolphin support before trying to upgrade any firmware not included in the switch. This process may render your device useless or inaccessible if the process is interrupted or corrupted firmware is uploaded to the switch.

Web GUI

The recommended way of managing switch firmware is to use the web GUI to select the image you want to use, and then write that image to the currently selected EEPROM.

If a new image has been published, you can upload the image using the 'Add file' –interface. Upload this image and then choose 'Upgrade firmware' for the correct (M1, M2 or M3) EEPROM position. The upgrade procedure takes some time so please be patient and allow the procedure to complete. You must reset the switch after an EEPROM upgrade for the new EEPROM to be loaded. Use the *Reset switch...* button on the management page or reboot it manually.



Picture 8: Switch management page

The /Management.shtml –page configures which EEPROM-image (function) is accessed with which front-panel switch-setting. Note that changing function will change the behavior of the switch, and may cause running applications to fail.

Please note that if the upgrade-process shows a failure, you will have to retry the upgrade.

USB flash drive

As an option, the firmware image can also be updated via a USB flash drive. This does not require the switch to be Ethernet configured or connected.

The IXS600-switches support firmware-upgrades from a normal USB flash drive (not supplied with the product).

Please download the firmware distributable (a .zip –file), and unzip the contents onto the root of the USB device. All USB flash-devices are expected to work, and at least the FAT32 filesystem is supported.

We recommend using a high quality and stable USB drive for this procedure or you may end up corrupting the switch. Cheaper USB drives typically used for marketing purposes tend to be unstable

The USB upgrade procedure

Once started, do not interrupt the upgrade process. Interrupting the process may leave the device in an undetermined state, and retrying the upgrade may fail.

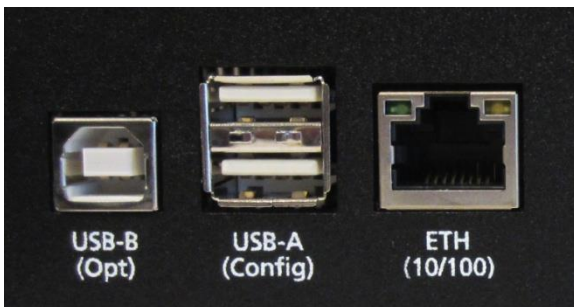
Please identify the USB-A (Config) ports on the front of the switch, and the 'Power' and 'System' LEDs.

1. Power off the switch.
2. Insert the USB drive into one of the USB-A ports and power-cycle the switch.
Please note that after a few seconds, the 'System'-LED should light up red, and then start flashing. The power-LED should turn dark.

The 'System'-LED should flash and stay lit intermittently for about two to six minutes, and then turn dark, with the 'Power'-LED lighting up again, first flashing a number of times (actually, the flashes should resemble the version-code of the firmware package – e.g. 1.3.5.4 or similar), and then remaining solidly lit.

3. Wait for the 'System'- LED to be solid lit green for at least 15 seconds.
4. Remove the USB drive (to prevent restarting the upgrade the next time the switch is power-cycled).
5. Power the switch off and on again - it should again flash the version-sequence with the power-LED.

The picture below shows the IXS600 Ethernet and USB connectors.



Picture 9: IXS600 USB and Ethernet connectors

Link Watchdog

The screenshot displays the 'IX Switch Watchdog' interface. At the top, there is a navigation bar with icons for Home, Monitoring, Configuration, Management, and Logs. Below this, the 'Watchdog Status' section shows the status as 'Running'. There is a 'Toggle watchdog' section with a 'Stop watchdog...' button. The 'Top-Switch Port' is listed as 'Not applicable. This is a top switch.' The 'Watchdog interval' is set to '10s'. The 'Minimum Required Port Configuration' section shows eight ports (1-8) with 'Speed' and 'Width' dropdowns set to 'Off' and 'Current state: G3 x8'. The footer reads 'Dolphin ICS © 2011-2016'.

Picture 10: Link Watchdog monitoring and configuration

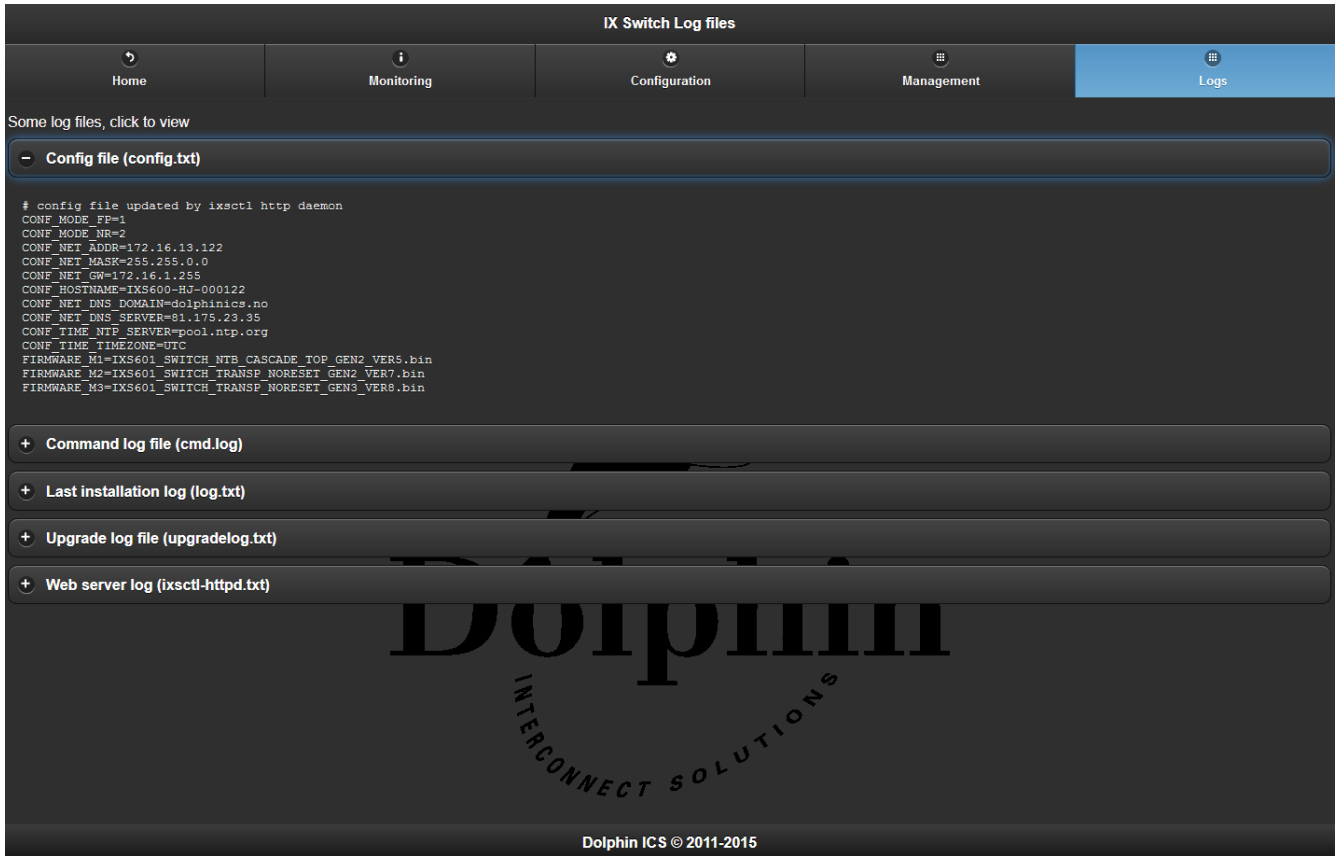
The /watchdog.shtml page allows you to monitor and configure the link watchdog implemented in the 1.3.9 management software release. There's a button leading to this page at the bottom of the Management page.

The link/port watchdog is an individual process running on the management processor that constantly checks and verifies the status of the various links. The watchdog process is running by default, but does not have any default minimum required port configuration.

The settings configured in "Minimum required port configuration" is used by the watchdog to perform a link reset if a violation is detected on one of the ports. Example: You have configured port 7 to have a minimum of Gen2 x8, and something has gone wrong so that it is G1 x8. The watchdog will then perform a reset on the link in an attempt to correct the situation. The same goes for un-detected connection. I.e.: you can enable the minimum requirements for a port that yields NC (not connected).

Please note that you should only enable the minimum configuration on ports in-between switches, and only on one of the switches. Switches configured as sub-switch will automatically recommend which port you should configure on the watchdog page. The adapters already have an active link watchdog integrated into the driver.

Management processor logs



The screenshot displays the 'IX Switch Log files' management interface. At the top, there is a navigation bar with tabs for 'Home', 'Monitoring', 'Configuration', 'Management', and 'Logs'. The 'Logs' tab is currently selected and highlighted in blue. Below the navigation bar, a message reads 'Some log files, click to view'. A list of log files is presented, each with a plus sign icon to its left, indicating it is expandable. The first log file, 'Config file (config.txt)', is expanded, showing its contents in a monospaced font. The other log files listed are 'Command log file (cmd.log)', 'Last installation log (log.txt)', 'Upgrade log file (upgradelog.txt)', and 'Web server log (ixsctl-httpd.txt)'. At the bottom of the interface, the 'Dolphin' logo is visible, along with the text 'INTERCONNECT SOLUTIONS' and 'Dolphin ICS © 2011-2015'.

```
# config file updated by ixsectl http daemon
CONF_MODE_FF=1
CONF_MODE_NR=2
CONF_NET_ADDR=172.16.13.122
CONF_NET_MASK=255.255.0.0
CONF_NET_GW=172.16.1.255
CONF_HOSTNAME=IXS600-HJ-000122
CONF_NET_DNS_DOMAIN=dolphinics.no
CONF_NET_DNS_SERVER=81.175.23.35
CONF_TIME_NTP_SERVER=pool.ntp.org
CONF_TIME_TIMEZONE=UTC
FIRMWARE_M1=IXS601_SWITCH_NTP_CASCADE_TOP_GEN2_VER5.bin
FIRMWARE_M2=IXS601_SWITCH_TRANSP_NORESET_GEN2_VER7.bin
FIRMWARE_M3=IXS601_SWITCH_TRANSP_NORESET_GEN3_VER8.bin
```

Picture 11: Logs page

The GUI allows access to the log-information the management processor has collected in the /Logs.shtml. Use the expandable entries to show log contents from the config-log, command-log, installation log, upgrade log and web-server log.

Software installation

No special software is required for the switch but Dolphin Express IX adapters need to install DIS 4.2.4 or newer software releases to enable seamless integration with the IXS600 switch. More information on installing Dolphins SuperSockets, SISCI or TCP/IP driver software can be found at <http://www.dolphinics.com/support/installation-ix.html>

Support

More information about the product, support and software download can be found at <http://www.dolphinics.com>.

For general support questions, please contact Dolphin via the Jira Service Management portal:
<https://www.dolphinics.com/csp>.

Compliance



EMC compliance

The Dolphin PCI Express IXS600 switch has been tested and found to comply with the following relevant test standards for PCI Express equipment, Telecommunication and Industry equipment:

- EN 55022 (2010)
- EN 55024 (1998) + A1 (2001) + A2 (2003)
- EN 61000-6-2 (2005)

This does not ensure that it will comply with these standards in any random configuration or setup. It is the responsibility of the integrator to ensure that their products are compliant with all regulations where their product will be used.

Safety compliance

The IXS600 PCI Express switch is tested and found to comply with the following safety standards:

- IEC 60950-1:2005 (Second Edition), Am 1: 2009
- EN 60950-1:2006 + A11:2009 + A1:2010 + A12:2011

A CB test certificate is available upon request.

RoHS compliance

The Dolphin IXS600 is RoHS compliant. A compliance certificate issued by the Manufacturer is available upon request.



Flammability standard

The Dolphin IXS600 PWB is UL94V-0 compliant. The board has the 94V-0 mark in its silk screen.

WEEE Notice

This IXS600 is labelled in accordance with European Directive 2002/96/EC concerning waste electrical and electronic equipment (WEEE). The Directive determines the framework for the return and recycling of used appliances as applicable throughout the European Union. This label is applied to various products to indicate that the product is not to be thrown away but returned to your local approved WEEE waste collector.



Limited warranty

Dolphin Interconnect Solutions warrants this Product to be free from manufacturing defects under the following terms:

Warranty Period

The warranty applies for one (1) year from the date of purchase. Extended warranty is available.

Coverage

To the extent permitted by applicable law, this warranty does not apply to:

- Damage caused by operator error or non-compliance with instructions available for the product.
- Use or attempt to use or program firmware not approved by Dolphin.
- Damage due to accidents, abuse, misuse, improper handling or installation, moisture, corrosive environments, high voltage surges, shipping, or abnormal working conditions.
- Damage caused by acts of nature, e.g. floods, storms, fire, or earthquakes.
- Damage caused by any power source out of range or not provided with the product.
- Normal wear and tear.
- Attempts to repair, modify, open, or upgrade the product by personnel or agents not authorized by Dolphin.
- Products for which the serial number label has been tampered with or removed.
- Damage to the product caused by products not supplied by Dolphin.

Service procedure

In the event that the product proves defective during the Warranty Period, you should contact the seller that supplied you with the product, or if you purchased it directly from Dolphin, email returnrequests@dolphinics.com to obtain a valid RMA number and instructions. Products returned to Dolphin without a proper RMA number will not be serviced under this warranty.

Limitations

TO THE FULLEST EXTENT PERMITTED BY LAW, DOLPHIN WILL NOT BE LIABLE FOR ANY INDIRECT, INCIDENTAL, SPECIAL OR CONSEQUENTIAL DAMAGES (INCLUDING LOST PROFITS, LOST DATA, OR LOSS OF USE) ARISING OUT OF ANY USE DOLPHIN'S PRODUCTS, SOFTWARE OR SERVICE PROVIDED. DOLPHIN'S MAXIMUM LIABILITY WILL NOT EXCEED THE TOTAL AMOUNT PAID FOR THE PRODUCT BY PURCHASER.