



24 Port Stackable Managed Switch With Dual Port Expansion Slot

Product User Guide

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Features

- Conforms to IEEE802.3, 802.3u, 802.3z, 802.3ab, 802.3ad, 802.3x, 802.1p, 802.1d, 802.1w and 802.1q. 802.1x
- Single IP stack management
- 24 auto-sensing 10/100Mbps Ethernet RJ-45 ports
- 1 Expansion slot for optional modules:
 - 100Fx SC Multimode Fibre
 - 100Fx ST Multimode Fibre
 - 100Fx SC Singlemode Fibre
 - Dual Gigabit Multimode Sx
 - Dual Gigabit Singlemode Lx
 - Dual Gigabit Copper 1000BaseT
- Store - And - Forward switch architecture
- 8K-entry MAC address table
- Up to 256 Static and 2048 dynamic VLAN groups.
- IGMP snooping supporting 256 groups.
- 8 MB system memory
- 8.8 Gbps Backplane Bandwidth
- Full wire speed forwarding rate
- LED-indicators for Power, Link/Activity, FDX/COL
- 10/100/1000M Gigabit Module LNK/ACT, FDX/ COL status

Intelligent Management Features

- Console and Telnet Configuration
- Web based management
- SNMP network management
- Asymmetrical bandwidth limiting and control on each port
- Port based VLANS
- Protocol VLANS
- Tagged VLANS using IEEE802.1Q
- Programmable QoS
- Port Trunking
- Spanning Tree Protocol (802.1d and 802.1w)
- GVRP/IGMP protocol
- Port mirroring
- Radius Authentication
- TFTP support for firmware downloads, configuration backup and restore

Technical Support and Service

If you require technical advice for these products, please see the FAQ pages on the web address: -

<http://www.tycoelectronics.com/products/lanelectronics>

If you still have problems, please contact us using the support form located on the above web site.

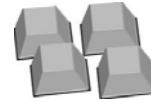
If you have a faulty unit then please contact us through the web site to arrange for a replacement unit. The faulty unit must be returned to us as part of the replacement agreement.

Package Contents

Unpack the contents of the 24 Stackable Managed Switch and verify them against the checklist below.



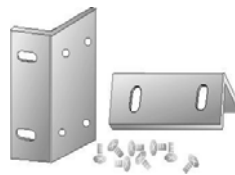
24 Port Stackable Managed Switch



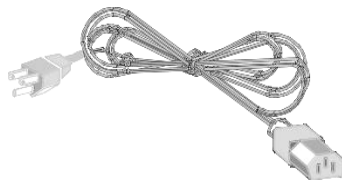
Four Rubber Feet



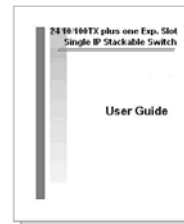
RS-232 Cable



Rack-mounted Kit



Power Cord



User Guide

Figure 1. Package Contents

Compare the contents of the 24 Port Stackable Managed Switch with the standard checklist above. If any item is missing or damaged, please contact your local dealer for service.

The 24 Port Stackable Managed Switch supports the following management methods:

- Console and Telnet Management
- Web-based Management
- SNMP Network Management

Console and Telnet Management

Console Management is performed through the RS-232 Console Port. Managing the 24 Stackable Managed Switch using this method requires a direct connection between a PC and the 24 Port Stackable Managed Switch. Telnet allows remote management of the Switch across the network. Once the 24 Port Stackable Managed Switch is on the network with an assigned IP address, it is possible to use Telnet to log in and change the configuration.

Web Based Management

The Switch can be managed using a standard web browser that supports Java applets. This interface has the same functionality as the console/Telnet interfaces but is more user-friendly. See page 42 for details.

SNMP Network Management

SNMP (Simple Network Management Protocol) provides a means to monitor and control the Switch. Agents, which reside in the Switch, respond to requests from the NMS (Network Management Station). The agent returns information contained in a MIB (Management Information Base), which is a data structure that defines what is obtainable from the Switch and what can be controlled.

Hardware Description

The 24 Stackable Managed Switch has fixed 24-port auto-sensing Ethernet RJ-45 connectors, and one expansion slot that can support a range of optional modules. These optional modules enable the Switch to support Gigabit copper and fibre optic circuits.

Front Panel

The Front Panel of the Switch consists of 24 auto-sensing 10/100Mbps Ethernet ports, one optional expansion slot and a console port. The LED Indicators are also located on the front panel of the Switch.

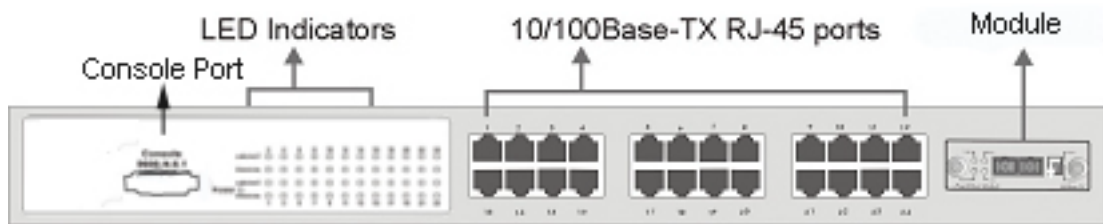


Figure2. The Front panel of 24 Port Stackable Managed Switch

10/100Base-TX Auto MDI/MDIX RJ-45 Ports

The 24 10/100Mbps auto-sensing ports can support 10Base-T or 100Base-TX device connection. The auto-MDI/MDIX function enables the direct connection to another Switch or workstation without the need to select either a straight or cross-over cable.

Expansion Slot

The Switch can support one of the following expansion modules:

- Single 100Fx SC Multimode Fibre
- Single 100Fx ST Multimode Fibre
- Single 100Fx SC Singlemode Fibre
- Dual Gigabit Multimode Sx
- Dual Gigabit Singlemode Lx
- Dual Gigabit Copper 1000BaseT

Console Port

The Switch can be fully managed using the console port connected to a PC using the supplied RS-232 cable.

LED Indicators

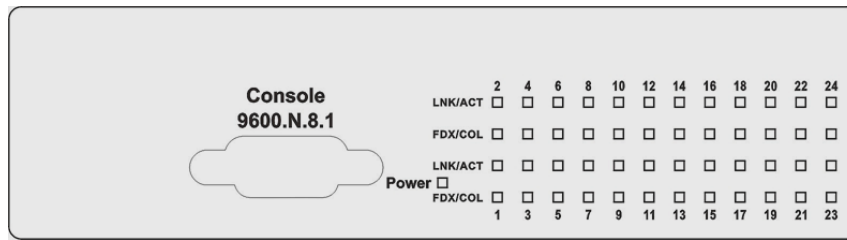


Figure3. LED indicators

All LED indicators are located on the front panel of the 24 Port Stackable Managed Switch and provide a real-time indication of Switch condition and operational status. The following table details the LED states:

LED	Status	Description
Power	Green	Power On
	Off	Power is Off.
LNK/ACT	Green	The port is connected to an Ethernet device.
	Blinks	The port is receiving or transmitting data
	Off	No device is attached
FDX/COL	Orange	The port is operating in Full-duplex mode
	Blinks	Collisions are occurring on the port (Half-duplex only)

Table 1. Descriptions of LED Indicators

Rear Panel

The 3-pronged power socket is located at the rear panel of the Switch. The Switch operates in a range between 100-240V AC, 50-60Hz without adjustment.



Figure 4. The Rear Panel of the 24 Port Stackable Managed Switch

Installation

Pre-Installation Requirements

Before starting the hardware installation, make sure the installation environment has the below items:

- PC with 10/100Mbps RJ-45 Network Interface Card to connect the Switch's copper port.
- UTP/STP cable with RJ45 connectors. Ensure that the cable has been tested
- AC Power: 100 to 240V AC at 50/60 Hz: Make sure that the power is accessible and the AC power can be connected easily.
- Dedicated power supply: Use a dedicated AC supply to power the Switch.
- A dry cool place: Keep the Switch away from moisture. Avoid direct sunlight, sources of heat, and a high amount of electromagnetic interference.
- Mounting tools: If you intend to mount the Switch in a rack, make sure you have all the tools, mounting brackets, screws etc

Caution:

Cabling must be away from sources of electrical noise such as radio, computers, transmitters, broadband amplifiers, power lines etc.

Mounting the Switch

The 24 Port Stackable Managed Switch is suitable for use in an office environment where it can be rack-mounted in standard EIA 19-inch racks or Desktop.

Desktop Mounting

Set the Switch on a sufficiently large flat space with a power outlet nearby, and near the center of all networked devices. Make sure mounting surface on the bottom of the Switch is grease and dust free. Remove adhesive backing from the Rubber Feet.

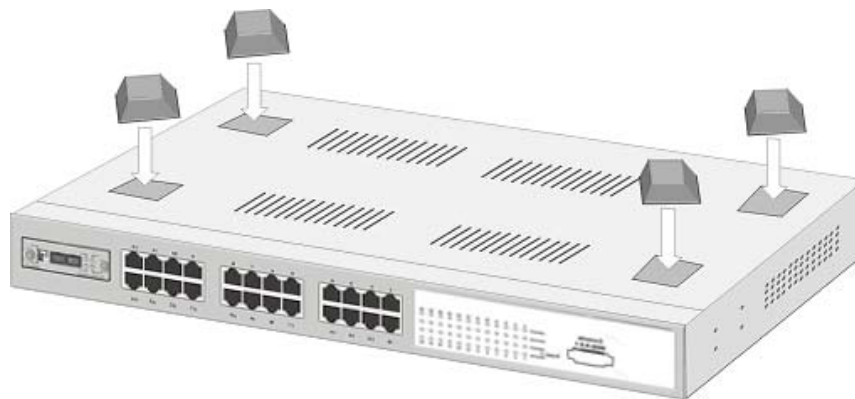


Figure 5. Attach Rubber Feet to each corner on the bottom of the Switch

Apply the Rubber Feet to each corner, on the bottom, of the Switch. These footpads can prevent the Switch from shock/vibrations.

Caution: Do not place objects on top of the Switch

Rack-mounted Installation

The 24 Port Stackable Managed Switch is supplied with a rack-mounted kit and can be mounted in an EIA standard size, 19-inch rack. The Switch can be placed in a wiring closet with other equipment.

Perform the following steps to rack mount the Switch:

Position one bracket to align with the holes on one side of the Switch and secure it with the smaller bracket screws. Then attach the remaining bracket to the other side of the Switch.



Figure 6. Attach mounting brackets with screws

After attaching both mounting brackets, position the Switch in the rack by lining up the holes in the brackets with the appropriate holes on the rack. Secure the Switch to the rack with the rack-mounting screws.



Figure 7. Mount the Switch in an EIA standard 19-inch Rack

NOTE: For ventilation allow at least 4 inches (10 cm) of clearance on the front and 3.4 inches (8 cm) on the back of the Switch. This is especially important for enclosed rack installation.

Connecting to the Switch

The Console port is a male DB-9 connector located on the front panel of the Switch that enables a connection to a PC or terminal for monitoring and configuration. Use the supplied RS-232 cable with a female DB-9 connector to connect a terminal or PC to the Console port.

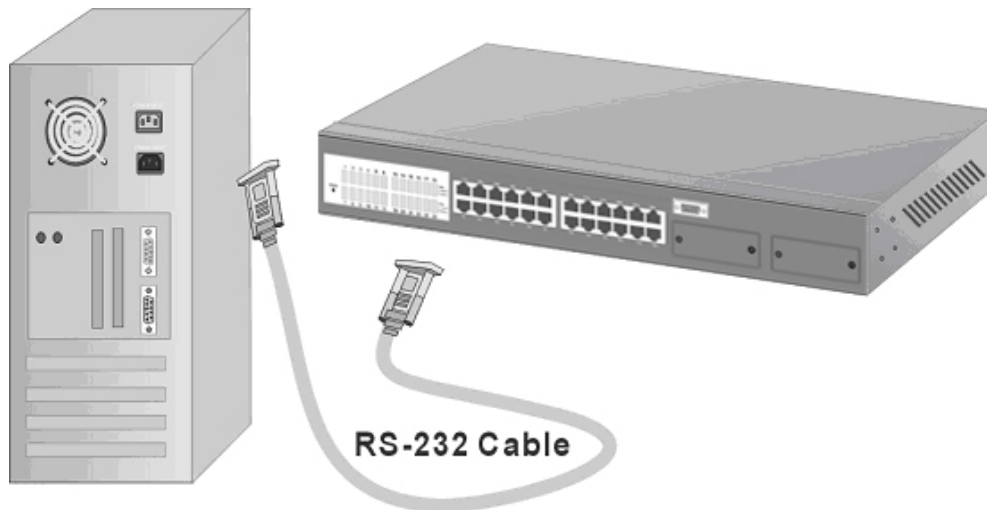


Figure 8. Connecting the 24 Port Stackable Managed Switch to a terminal via RS-232 cable

Quick Start Guide

If you do not need to apply VLANs, Quality of Service, Stacking functionality, adjust any settings or manage the Switch via the network, then the Switch can be used “straight-from-the-box” to carry network traffic. In that case, no further action is needed. If you want to use the management settings or controls, then a little work is needed to configure the Switch.

1. After the installation is complete and AC power is applied, the Switch loads its operating code from memory and performs a full power-on self test that takes about 30 seconds to complete.
2. Configure the PC terminal emulation program, such as HyperTerminal, to allow it to communicate with the Switch via the supplied serial cable connected to the front panel Console port. See page 11 for details.
3. After configuring the emulation program press **<enter>** and input **root** in lower case letters for both the User Name and Password. The main menu screen will be displayed. Use either **<tab>** or cursor keys to navigate up and down the menu. Select the item using the **<enter>** key. The **<esc>** key will return to the previous menu level.
4. If the Switch is to be managed over the network using Telnet, SNMP or the web browser, then an IP address needs to be assigned to the Switch. See page 18 for details.
5. Once an IP address has been assigned to the Switch, it should be possible to PING the Switch over the network. This will prove that the Switch is present and responding correctly to network requests.
6. Now that the Switch can be accessed over the network, use a web browser application to open up the configuration screens. Enter the Switch's IP address into the web browser URL field and use the same user name and password set as in 3 above.
7. Using the preferred method (console, Telnet or web browser), configure the Switch to meet the requirements. Always save the configuration at the end of each action.
8. If you need to revert the Switch back to the factory default configuration, then see page 41.

Management Using The Console

Configuring the Console Interface

When the connection between Switch and PC is complete, turn on the PC and run a terminal emulation program such as Hyper Terminal and configure its communication parameters to match the following default characteristics of the console port:

Baud Rate: **9600 bps**
Data Bits: **8**
Parity: **none**
Stop Bit: **1**
Control flow: **None**

Figure 9. Communication parameters settings

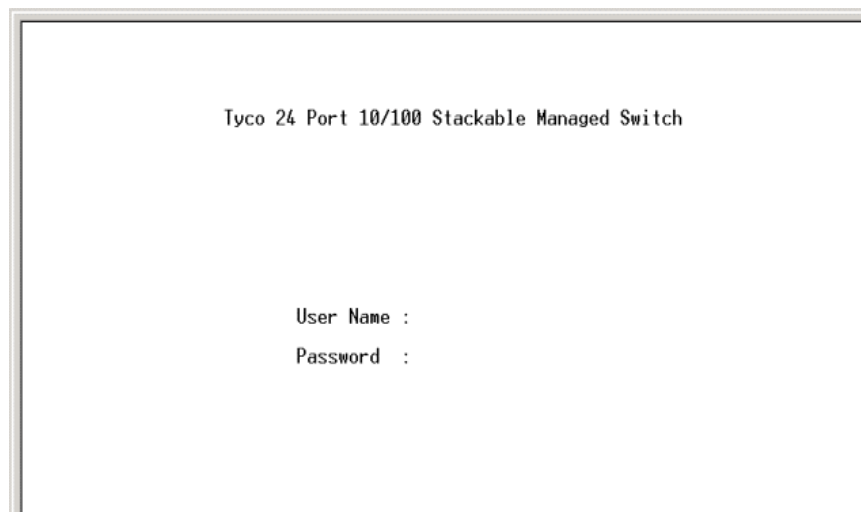
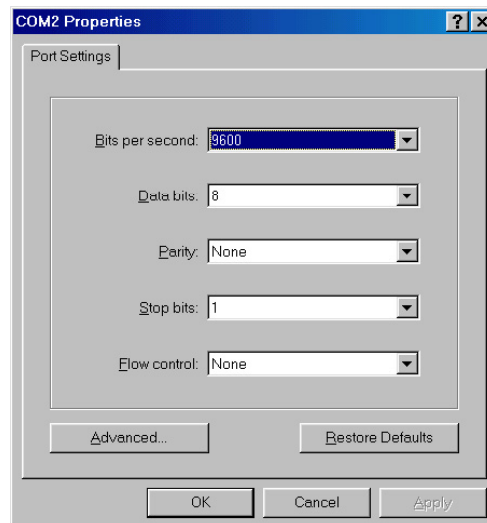


Figure 10. Initial login screen

After setting the communication parameters, click “OK“ on the PC. Press **<enter>** and when the screen displays the initial login screen as above, enter **root** in lower case letters for both the User Name and Password. The Main Menu Screen of console management appears.

NOTE: If an IP address has been assigned to the Switch then it also possible to manage the Switch remotely using Telnet. The management menu structure is exactly the same as from console.

Menu Navigation

To navigate all these menus, use the following keys:

- **Tab:** Move the cursor to next item or right arrow key
- **Backspace:** Move the cursor to previous item or left arrow key
- **Enter:** Select the item.
- **Spacebar:** Toggle selected item to next value in sequence
- **Esc:** Go back to the action list or the previous menu

Note: Most menus have an action line at the bottom of the screen. This provides basic context instructions such as **Edit**, **Apply** and **Quit**

Main Menu Screen

After login the screen below is displayed. Use the **<tab>** or cursor keys to step through the sub-menus. Select the required sub-menu using the **<enter>** key.

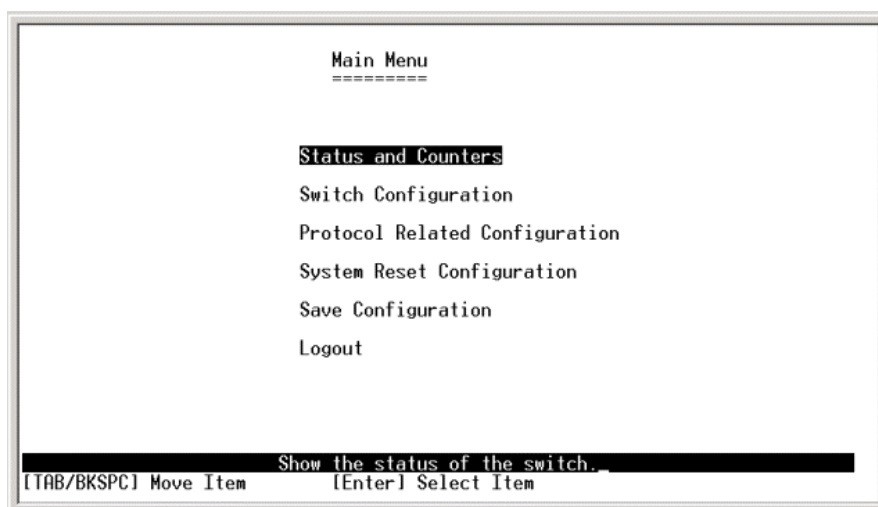


Figure 11. Main Menu Screen

The sub-menus are:

- **Status and Counters:** Displays Port Status, Port Counters and System Information
- **Switch Configuration:** This large menu enables the configuration of key functions such as IP address, Ports, Trunking, Mirroring, VLANs, QoS, Security, Broadcast filtering etc.
- **Protocol Related Configuration:** Enables the configuration of Spanning Tree, SNMP, GVRP and LACP.
- **System Reset Configuration:** Restores factory default values, restarts the Switch and TFTP functions such as update firmware, Restore/Backup configuration.
- **Save Configuration:** Saves the current configuration to the switches permanent memory.

Status and Counters

In Status and Counters, you can view port status, counters, and system information. Press the **<tab>** to choose item, and press **<enter>** key to select item.

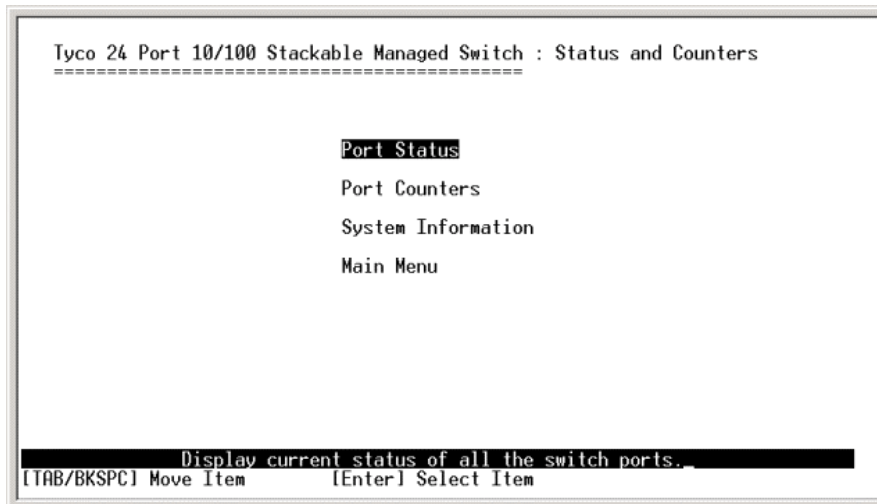


Figure 12. Status and Counters main configuration screen

Port Status

This read-only screen lists the status of every port. Select the **<previous page>** and **<next page>** to scroll through the full port list.

- **Type:** Displays the port type.
- **Link:** Displays link status. **UP** is a valid working link, and **Down** is no link.
- **State:** Displays if port is Enabled or Disabled by management
- **Negotiation:** Displays the auto negotiation status.
- **Speed Duplex:** Displays port speed and duplex mode.
- **FC:** Displays the flow control status – On or Off
- **BP:** Displays backpressure status – On or Off
- **Bandwidth In/Out:** Displays bandwidth In/out control status.
- **Priority:** Displays the port priority status. Enabled or Disabled.
- **Security:** Displays the port security status. On or Off.

```

Tyco 24 Port 10/100 Stackable Managed Switch : Port Status
=====
Port   Type   Link  State  Negotiation  Speed  Duplex  FC  BP  Band  Width  In  Out  Priority  Security
-----
Port.01 100TX Down Enable Auto    100 Full ON  OFF OFF OFF OFF  Disable OFF
Port.02 100TX Down Enable Auto    100 Full ON  OFF OFF OFF OFF  Disable OFF
Port.03 100TX Down Enable Auto    100 Full ON  OFF OFF OFF OFF  Disable OFF
Port.04 100TX Up   Enable Auto    100 Full ON  OFF OFF OFF OFF  Disable OFF
Port.05 100TX Down Enable Auto    100 Full ON  OFF OFF OFF OFF  Disable OFF
Port.06 100TX Down Enable Auto    100 Full ON  OFF OFF OFF OFF  Disable OFF
Port.07 100TX Down Enable Auto    100 Full ON  OFF OFF OFF OFF  Disable OFF
Port.08 100TX Up   Enable Auto    100 Full ON  OFF OFF OFF OFF  Disable OFF

Actions-> <Previous Page> <Next Page> <Quit>
Select the action menu.
[TAB/BKSPC] Move Item          [Enter] Select Item          [Esc] Previous Menu
  
```

Figure 13. Port status Screen

Port Counters

Displays real-time counter values for each port. This information can be especially useful when troubleshooting link and port problems.

Tyco 24 Port 10/100 Stackable Managed Switch : Port Counters							
Port	Type	Tx Good Packet	Tx Bad Packet	Rx Good Packet	Rx Bad Packet	Tx Abort Packet	Packet Collision
Port.01	100TX	0	0	0	0	0	0
Port.02	100TX	0	0	0	0	0	0
Port.03	100TX	0	0	0	0	0	0
Port.04	100TX	48	0	27	0	0	0
Port.05	100TX	0	0	0	0	0	0
Port.06	100TX	0	0	0	0	0	0
Port.07	100TX	0	0	0	0	0	0
Port.08	100TX	11	0	55	0	0	0

Actions-> <Refresh> <Clear> <Previous Page> <Next Page> <Quit>
 Configure the action menu.
 [TAB/BKSPC] Move Item [Enter] Select Item [Esc] Previous Menu

Figure 14. Port counter Screen

These counters display both transmitted and received packet counts, together with the number of good and bad packets, including the number of collisions (half-duplex mode only). Select **<refresh>** to get newest port counter information and **<clear>** to reset the counters from the action line.

System Information

This screen displays useful information such as system name, location, firmware version, MAC address and expansion module type if applicable. Note this is a read-only menu.

```
Tyco 24 Port 10/100 Stackable Managed Switch : System Information
=====
System Name      : Master
System Location  :
System Description : Tyco 24 Port 10/100 Stackable Managed Switch

Firmware Version : v2.05
Kernel Version   : v9.21
Hardware Version  : A7.00
MAC Address      : 000F386A99F2

Module   Type   Description
-----
Port 25  N/A    N/A
Port 26  N/A    N/A

Actions->  <Quit>
            Display the switch system information.
[Tab/BKSPC] Move Item      [Enter] Select Item      [Esc] Previous Menu
```

Figure 15. System Information Screen

Switch Configuration

This menu, selected from the main menu, provides the primary method of configuring the Switch and its associated values.



Figure 16. Switch Configuration Screen

The Switch configuration screens has the following sub-menus:

- **Administration Configuration** – used to configure device description information, IP address configuration, User Name and Password configuration.
- **Port Configuration** – enable port attributes such as speed, duplex, state and security to be configured.
- **Trunk Configuration** – allows configuration of LACP and Static port trunk groups.
- **Port Mirroring Configuration** – used to configure a port(s) to be mirrored
- **VLAN Configuration** – enables VLANS to be configured.
- **Priority Configuration** – controls the QoS settings on the Switch.
- **MAC Address Configuration** – Sets the MAC address security and filtering attributes
- **Misc. Configuration** – Controls various settings including Stacking mode, Broadcast Filtering, and MAC Ageing Timer

Administration Configuration

The Administration Configuration screen, selected from the Switch Configuration menu, allows the configuration of device information, IP address, login username and password.

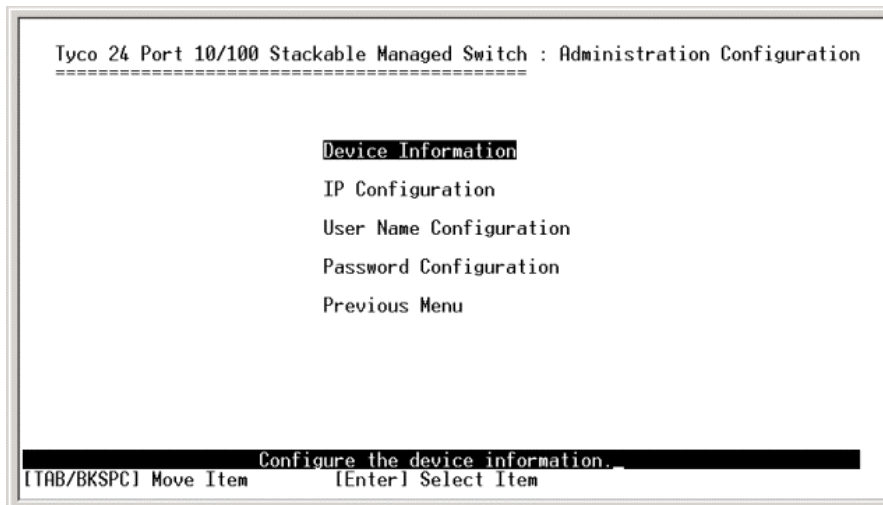


Figure 17. Administration Configuration Screen

Device Information

In this menu you can change device name, description, location and contact details. Select the **<edit>** mode from the action line and edit the required fields, use the **<tab>** key to move to the next field. When configuration is complete use the **<esc>** key to move back to the action line and **<apply>** the changes.

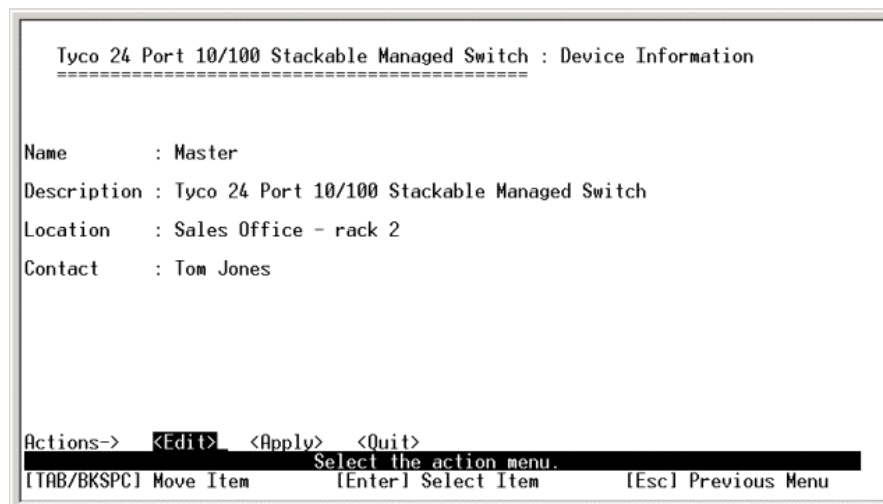


Figure 18. Device Information Screen

IP Configuration

This screen is used to set the IP address, Sub-Net Mask and Default Gateway, DHCP client functionality for the Switch. These settings are only required if the Switch is to be managed over the network using Telnet, a web browser or SNMP.

```

Tyco 24 Port 10/100 Stackable Managed Switch : IP Configuration
=====
DHCP Client : Disable
IP Address  : 162.109.37.2
Subnet Mask : 255.255.255.0
Gateway     : 10.10.10.254

Actions->  <Edit>  <Apply>  <Quit>
          Select the action menu.
[TAB/BKSPC] Move Item      [Enter] Select Item      [Esc] Previous Menu

```

Figure 19. IP Configuration Screen

This menu enables the IP address of the Switch to be configured. To change the IP Switch setting:

1. Use the **<tab>** to highlight the **<edit>** field in the action line and press **<enter>**
2. The cursor will highlight the DHCP client field.
3. Use **<tab>** key to highlight the IP address field.
4. Enter the new IP Address as required.
5. Use **<tab>** key to highlight the Subnet Mask field.
6. Enter the Subnet mask address as required.
7. Use **<tab>** keys to highlight the default gateway field.
8. Enter the IP address of the default gateway as required.
9. Use the **<esc>** key return to the action line and then tab to the **<apply>** field and then select the **<apply>** using the **<enter>** key to save the IP address changes.
10. Navigate up to the **Main Menu** using the **<esc>** key and then select the **Save Configuration**. This will save the IP address configuration to Flash Rom.
11. After saving the configuration reboot the Switch for IP address configuration to take affect.
12. After rebooting the Switch it is advisable to check that IP changes have been made current by checking the **Administration Configuration>IP Configuration** menu again.

NOTE: The Switch can also acquire its IP configuration automatically via DHCP by enabling DHCP client from the IP configuration screen.

Change User Name and Password

The Administration Configuration screen has separate options for changing the User Name and the Password for the Switch. The default values are:

- User Name = **root**
- Password = **root**

NOTE: User Name and Password are case-sensitive.

To change either value, select the required option in the Administration Configuration screen and then select the **<edit>** mode from the action line. Make the change and then quit from the edit mode using **<esc>** key. Ensure that the new User Name and Password is saved by selecting the **<apply>** option in the action line.

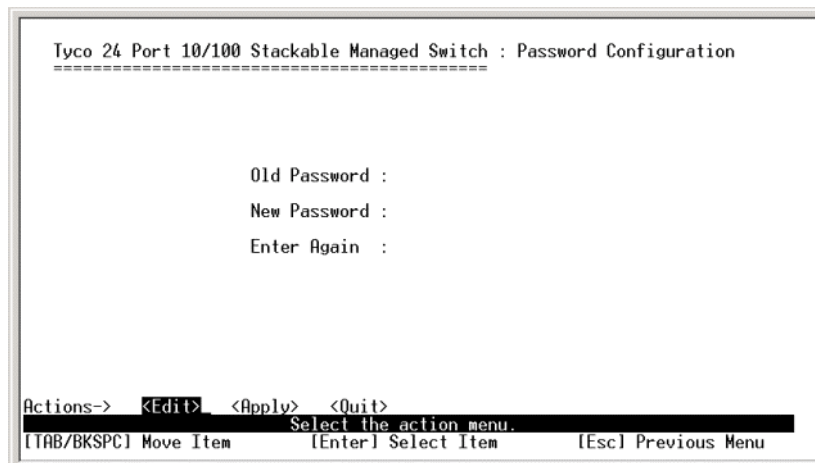


Figure 20. Password Configuration Screen

Port Configuration

This menu section controls the port configuration of the Switch and is selected from the Switch Configuration menu screen. The following port attributes can be configured from this menu:

- Port State
- Auto-Negotiation Mode
- Port Speed and Duplex Mode
- Port Flow Control
- Port Back Pressure
- Bandwidth In/Out
- Priority
- Security

Port	Type	Negotiation State	Speed Duplex	FC	BP	Band In	Width Out	Security Priority
Port.01	100TX	Enable	Auto 100 Full	ON	OFF	0	0	Disable OFF
Port.02	100TX	Enable	Auto 100 Full	ON	OFF	0	0	Disable OFF
Port.03	100TX	Enable	Auto 100 Full	ON	OFF	0	0	Disable OFF
Port.04	100TX	Enable	Auto 100 Full	ON	OFF	0	0	Disable OFF
Port.05	100TX	Enable	Auto 100 Full	ON	OFF	0	0	Disable OFF
Port.06	100TX	Enable	Auto 100 Full	ON	OFF	0	0	Disable OFF
Port.07	100TX	Enable	Auto 100 Full	ON	OFF	0	0	Disable OFF
Port.08	100TX	Enable	Auto 100 Full	ON	OFF	0	0	Disable OFF

Actions-> <Edit> <Apply> <Previous Page> <Next Page> <Quit>
 Select the Action menu.
 [TAB/BKSPC] Move Item [Enter] Select Item [Esc] Previous Menu

Figure 21. Port Configuration Screen

Selecting the required Port Attribute

To edit the attribute of a selected port, use the **<tab>** key to move the cursor in the action line to the **<edit>** mode. Then press the **<enter>** key and the cursor will highlight the Enable status of Port 1. Use the **<tab>** key to navigate to the required port attribute and then use the **<spacebar>** key to toggle the values of that attribute. Use the **<backspace>** key to move to the previous port attributes. Ensure that port configurations are saved by selecting the **<apply>** in the action line.

Port State

This allows the port to be enabled or disabled by management. The default is enabled allowing packets to be transmitted and received.

Port Negotiation

This allows the ports to be configured for Auto or Force. If configured for 'Auto' the port will auto-negotiate speed and duplex with the its connected neighbour's port. If configured for 'Force' then the port is set to speed and duplex as defined in the speed/duplex attribute. The default is Auto.

Port Speed/Duplex

This controls the speed and duplex capability of a port. If negotiation is 'Auto' then the port will advertise to the neighbour port its capability and will try and negotiate this capability. If negotiation is set to 'Force' the speed and duplex are fixed.

Port Flow Control (FC)

This allows a **full-duplex port** to negotiate with connected equipment to implement a flow control process using embedded Pause frames. The default setting is ON.

Back Pressure (BP)

This allows a **half-duplex port** to use back pressure as a method of flow control. The default is OFF.

Bandwidth In/Out

Limits a port transmit and receive bandwidth. The bandwidth limiting can be configured between 0 - 999 in 100Kbps increments. The default is 0, which is no rate limiting.

Priority

Configures a port to be high or low priority. Packets entering this port will be assigned a priority and will follow the rule as defined in the **Priority Configuration** menu. The default is Disable.

Security

Stops a port from learning new MAC addresses, which is useful when security is needed to disallow an unauthorized connection to the port. This can be used in conjunction with Static MAC Address Configuration to allow only a known and authorized MAC address to use this port. The default is OFF.

Trunk Configuration

The Switch supports trunk groups between Switches. This scheme combines ports to become an aggregate link to increase the bandwidth available between Switches using the standard IEEE802.1ad (LACP) or Static Trunks. Up to 4 ports can be assigned to a trunk and the Switch supports up to 7 trunks.

NOTE: LACP trunk ports must be full duplex and same speed.

```

Tyco 24 Port 10/100 Stackable Managed Switch : Trunk Configuration
=====
 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26
T1 * * . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
T2 . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
T3 . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
T4 . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
T5 . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
T6 . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
T7 . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

Trunk 1: LACP
Trunk 2: Disable
Trunk 3: Disable
Trunk 4: Disable
Trunk 5: Disable
Trunk 6: Disable
Trunk 7: Disable

Actions->  <Edit>  <Apply>  <Quit>
                Select the action menu.
[Tab/BKSPC] Move Item      [Enter] Select Item      [Esc] Previous Menu

```

Figure 22. Trunk Configuration Screen

Select Trunk Configuration from Switch Configuration menu and use the **<tab>** key to move the cursor in the action line and select **<edit>** mode. It is now possible to use the **<tab>** and **<backspace>** keys to navigate through the ports and add ports using the **<spacebar>** into a trunk group (T1 to T7). Ports that are members of trunk are indicated by '*'. Having chosen which ports to add into the Trunk Group navigate to the appropriate group and use the **<spacebar>** to enable LACP or Static groups. Ensure that the Trunk Group configuration is saved by selecting the **<apply>** in the action line. For further configuration details of LACP trunk group, please refer to '**LACP Configuration**' on page 36 in this manual.

Port Mirroring Configuration

Port mirroring is a method of duplicating traffic seen on a particular port and sending it to another port. This is used for analyzing traffic using a network sniffer. The port being monitored is called the Mirrored port and the port used to analyze the traffic is called the Analysis port.

```

Tyco 24 Port 10/100 Stackable Managed Switch : Port Mirroring
=====
Mirroring State : Both
Analysis Port : Port.08

Port State      Port State      Port State      Port State
-----
Port.01 -      Port.09 -      Port.17 -
Port.02 -      Port.10 -      Port.18 -
Port.03 -      Port.11 -      Port.19 -
Port.04 -      Port.12 *      Port.20 -
Port.05 -      Port.13 -      Port.21 -
Port.06 -      Port.14 -      Port.22 -
Port.07 -      Port.15 -      Port.23 -
Port.08 -      Port.16 -      Port.24 -

Actions->  <Edit>  <Apply>  <Quit>
Select the action menu.
[Tab/BKSPC] Move Item      [Enter] Select Item      [Esc] Previous Menu

```

Figure 23. Port Mirroring Screen

Select Port Mirroring from the Switch Configuration menu and then from the action line select **<edit>**. By default port mirroring is disabled. Use the **<spacebar>** to enable port mirroring. The screen above will now be displayed. Again using the **<spacebar>** select the Mirroring State. There are three options:

- **RX:** Received packets are only sent to the Analysis port
- **TX:** Transmitted packets are only sent to the Analysis port
- **Both:** Received and Transmitted packets are sent to the Analysis port.

Next using the **<tab>** key navigate to the Analysis port and select which port, using the **<spacebar>**, is to be the Analysis Port. Again using the **<tab>** key scroll down through the port list to select which port(s) is to be mirrored. Make the selection using the **<spacebar>** which is indicated by a '*'. Ensure that the Port Mirroring Configuration is saved by selecting **<apply>** in the action line. Please disable Mirroring State when finished, as Mirroring is very CPU intensive.

VLAN Configuration

This menu section controls the VLAN configuration of the Switch and is selected from the Switch Configuration menu screen. The Switch supports the following VLAN modes:

**Port Based,
802.1Q**

The default configuration is **Disabled**.

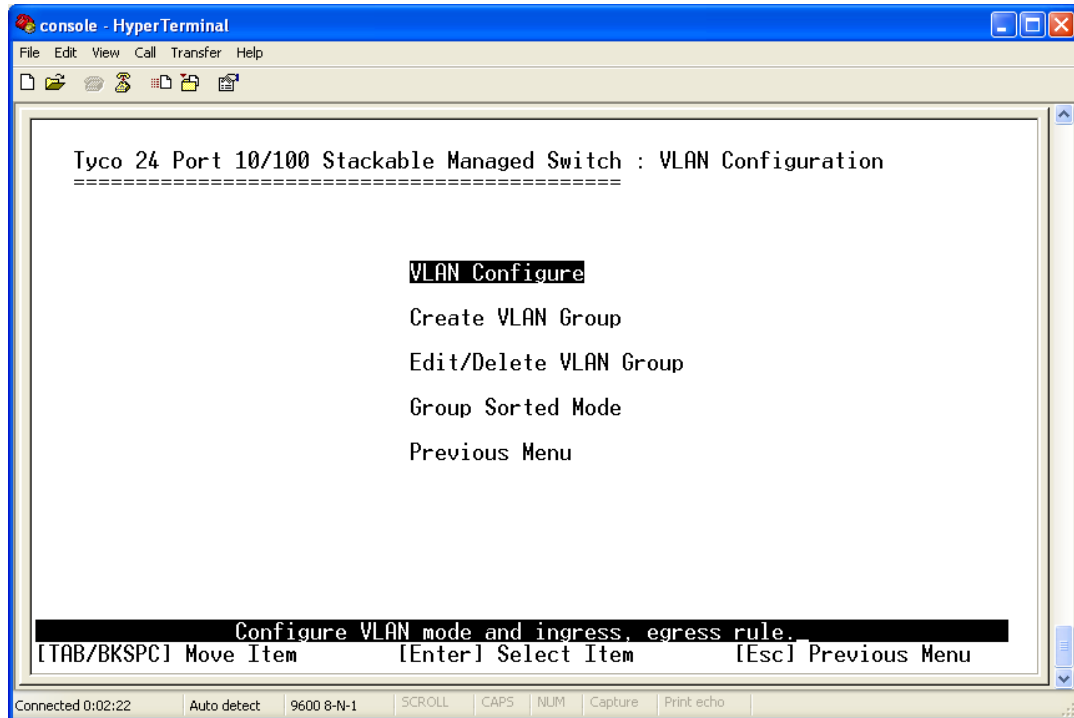


Figure 24. VLAN Configuration Main Screen

This menu allows basic control of the VLAN and its membership. Select the **VLAN Configure** menu option and a new screen is displayed. If the Switch is in the default setting of Disabled, then this will need to be changed to the required VLAN type listed above. Use the **<edit>** key in the action line to move into the options area of the screen. Then use the **<spacebar>** to toggle through the VLAN options. Having selected the required VLAN type use **<esc>** to return to action line and **<apply>** changes.

Port Based VLAN

Having selected Port Based VLAN in the VLAN Configure menu, the next task is to create and assign ports into the VLAN. This is achieved by selecting 'Create VLAN Group' from the main VLAN Configuration menu. The following information is required:

- VLAN Name
- VLAN Group ID
- VLAN Port Membership

VLAN Name

This is a local value intended to provide a simple description of the VLAN, such as Sales, Accounts etc.

VLAN Group ID

This is used to provide a number identifier for the specific VLAN. The legal range is 1 to 4094, with 1 being the default value. The VLAN Group ID must be a unique number for each VLAN.

VLAN Port Membership

To assign ports to a VLAN use the **<tab>** key to scroll through the port list and then the **<spacebar>** to toggle the membership status between No and Member. Select **<previous page>** and **<next page>** from the action line to see further ports in the list. Select the required ports to be members of this VLAN and then use **<esc>** to move to the action line and then **<apply>** the settings.

IEEE802.1Q VLANS

This is a more complex form of VLAN that reacts to the tagging field in the Ethernet packets. Unlike Port Based VLANS, where VLANS created are only significant to the local Switch, 802.1Q VLANS can exist across multiple Switches. The connection between these Switches is called an 802.1Q trunk.

```

Tyco 24 Port 10/100 Stackable Managed Switch : VLAN Configure
=====
VLAN Mode : 802.1Q
VLAN ID Range : 1-255

Port      VLAN ID  Ingress  Acceptable
          Filter  Filter   Frame Type
-----
Port.01   1        Enable   All
Port.02   1        Enable   All
Port.03   1        Enable   All
Port.04   1        Enable   All
Port.05   1        Enable   All
Port.06   1        Enable   All
Port.07   1        Enable   All
Port.08   1        Enable   All

Actions->  [Edit]  <Apply>  <Previous Page>  <Next Page>  <Quit>
          Select the Action menu.
[Tab/BKSPC] Move Item      [Enter] Select Item      [Esc] Previous Menu
  
```

Figure 25. 802.1Q VLAN Configure Screen

1. Having selected **802.1Q** in the VLAN Configure Menu the above is displayed.
2. Use the **<tab>** to move into the VLAN ID Range and select required VLAN ID range by pressing **<space>**. Again using the **<tab>** key to move into the port field of the menu. Enter the number of the tagged VLAN ID directly into the **VLAN ID** field. If the device connected to this port does not support tagged VLANS, the ingress traffic will have the specified default tag number added to each packet. This allows legacy devices that do not support tagging to interoperate with tagged VLAN systems.
3. Use the **<tab>** key to move into the **Ingress Filter** field of the menu. Use the **<spacebar>** to toggle between Disable and Enable. When this filter is **Enable** (default), then only ingress packets with an identical VLAN tag to the port VLAN ID will be forwarded. If **Disable**, all tagged packets will be forwarded.
4. Use the **<tab>** key to move into the **Acceptable Frame Type** field of the menu. Use the **<spacebar>** key to toggle between **All** and **Tag Only**. If **All** then all tagged and non-tagged packets will be forwarded. If **Tag Only** then only ingress packets with a tag will be forwarded.

Create VLAN Group

This menu section controls the VLAN Group Membership of the Switch and is selected from the VLAN Configuration menu. This allows specified ports to be made members of specific VLAN groups. It is also possible to create a Security VLAN from this menu. A Security VLAN allows only members of this VLAN to manage the Switch using Web, Telnet, or SNMP. There can be only one Security VLAN. Having selected **Create VLAN Group** from the VLAN Configuration Menu and chosen if a Security VLAN is needed the following screen is displayed:

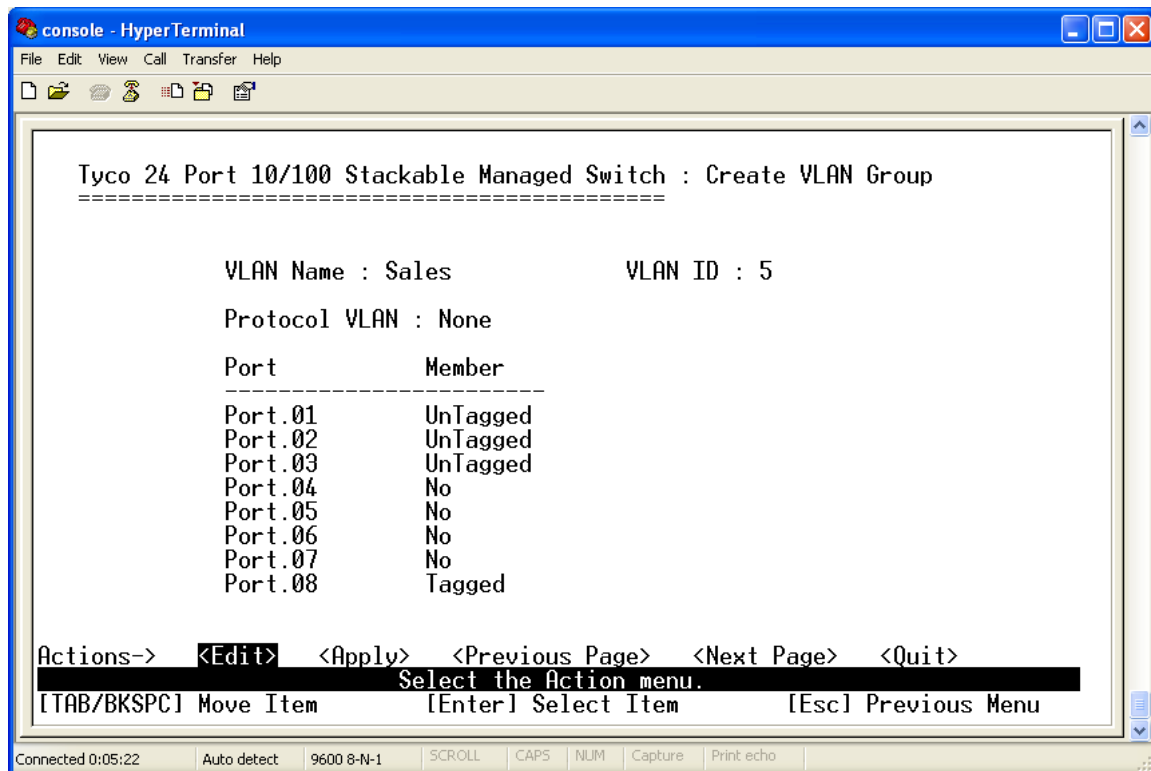


Figure 26. Create VLAN Group: 802.1Q Screen

VLAN Name

This is a local value intended to provide a simple description of the VLAN, such as Sales, Accounts etc. If a Security VLAN has been selected this field will display 'Security_VLAN' and cannot be changed.

VLAN ID

The VLAN ID is used to provide a number for the specific VLAN. The legal range is 1 to 4094, with 1 being the default value. The VLAN ID must be a unique number

Protocol VLAN

It is possible to assign ports to a VLAN based on protocol. The default is None.

Member

Ports that are to be members of this VLAN are specified in the table by using **<tab>** key to move to the Port area and then the **<spacebar>** key to toggle the membership status between **No**, **Untagged**, and **Tagged**. Select the required ports to be members of this VLAN and then use **<esc>** to move to the action line and then **<apply>** the settings changes.

Edit/Delete VLAN Group

This menu section is selected from the VLAN Configuration menu and allows an existing VLAN group to be edited or even deleted. When this option is selected, all existing VLAN groups on the Switch are displayed. Use the **<tab>** key to navigate to the **<edit>** field or **<delete>** field in the action line and then use the **<enter>** key to select the option.

If **<edit>** was selected, the cursor now moves to the VLAN group are. Use the **<tab>** key to select the required group to edit and make the required changes. Use the **<esc>** key to return to the action line and then **<apply>** the changes.

If **<delete>** was selected, the cursor now moves to the VLAN group. Select the required group using the **<tab>** and then **<enter>** to delete the VLAN group. Use the **<esc>** key to return to the action line and then **<apply>** the changes.

NOTE: The Default VLAN cannot be deleted.

Group Sorted Mode

This menu controls the order VLANS are listed in the 'Edit/Delete VLAN Group'. The VLANS can either be sorted using VLAN ID (Numerically) or by VLAN Name (Alphabetically). Select **<edit>** from the action line and use the **<spacebar>** to toggle between VLAN ID and Name. Having selected the required order method, use the **<esc>** key to return to action line and then **<apply>** the changes.

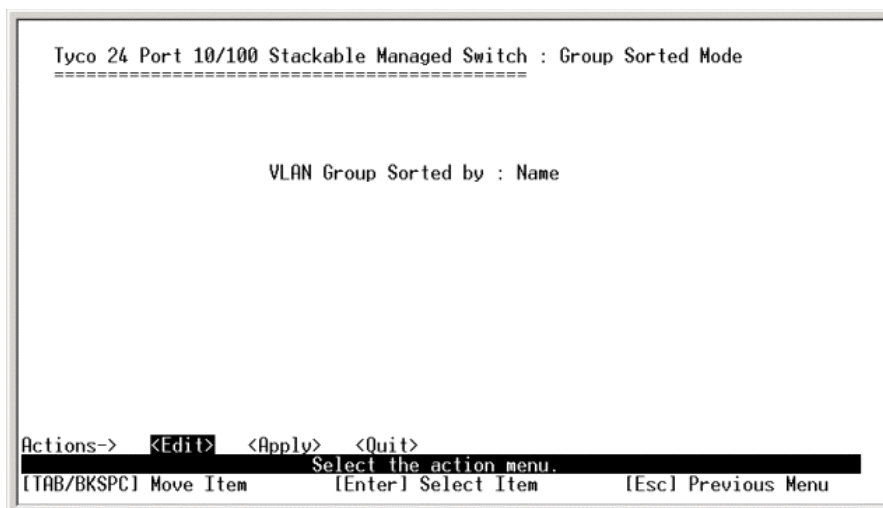


Figure 27. Group Sorted Mode Screen

Priority Configuration

The Switch supports basic QoS operation with the ability to map the 0-7 priority levels in IEEE802.1p to either the low or high priority egress queue buffers. In addition the relative weighting of high to low packets egressing from the Switch can also be programmed. This menu section is selected from the Switch Configuration menu screen.

```

Tyco 24 Port 10/100 Stackable Managed Switch : Priority Configuration
=====
Level 0 : Low
Level 1 : Low
Level 2 : Low
Level 3 : Low
Level 4 : High
Level 5 : High
Level 6 : High
Level 7 : High

QoS Mode : All High Before Low

Actions->  <Edit>  <Apply>  <Quit>
                Select the action menu.
[TAB/BKSPC] Move Item      [Enter] Select Item      [Esc] Previous Menu

```

Figure 28. Priority Configuration Screen

Modify the Egress Mapping

After the Priority Configuration menu has been selected, the priority screen is displayed and this enables the control of the QoS egress mapping. To adjust the mapping, select **<edit>** from the action line and the cursor moves to the first map level. Use the **<spacebar>** key to toggle between **<low>** and **<high>** settings. The default mapping is Levels 0-3 are Low priority and Levels 4-7 are High priority.

Modify the Egress Weighting

The Switch can be programmed to control the relative flow of high and low priority packets from the egress port. Note that this weighting algorithm is applied to the whole Switch and not specific ports. To adjust the weighting algorithm, select **<edit>** from the action line and the cursor moves to the first map level. Use the **<tab>** key to move through the mapping options to the **QoS Mode** field. Then select the required algorithm using the **<spacebar>**. The weighting options are:

All High Before Low – All high priority packets are sent before low priority (default)

Weight Round Ratio x:1 – The Switch will send x high priority packets followed by a low priority packet (x can be between 2 to 7)

First Come First Serve – The first packet to arrive is sent out first (no actual priority is applied).

Use the **<esc>** key to return to the action line and ensure that the settings are saved by selecting the **<apply>** field.

MAC Address Configuration

This menu section is selected from the Switch Configuration menu screen and enables configuration of the static or filtered MAC addresses. These settings are only needed for certain security operations and are not generally used. It is also possible from this option to view MAC addresses that have been learnt by the Switch.

In some instances, it is necessary to manually apply a fixed or static address into the tables of the Switch. When you add a static MAC address, it remains in the Switch's address table, regardless of whether the device is physically connected to the Switch. This saves the Switch from having to learn a device's MAC address.

Static MAC Address

From the MAC Address Configuration menu select the option Static MAC Address. A new menu is displayed listing the existing static MAC addresses. Select **<add>** from the action line. A new menu is displayed that requests the MAC address value and the physical port that is associated with the static address value. If VLANS are configured it will also request a VLAN ID. When these values have been entered, use the **<esc>** key to return to the action line and then select the **<apply>** to ensure that the MAC values are stored. The menu will display each static MAC address configured, the associated port and VLAN ID.

Filtering MAC Address

There may be times when filtering packets based on the destination MAC address is needed. This is achieved using Filtering MAC Address menu, selected from the MAC Address Configuration menu. After selecting this option a new menu is displayed listing the current MAC addresses that are being filtered and their associated VLAN ID. Select **<add>** from the action line. A new menu is displayed that requests the MAC address value to be filtered and if VLANS are configured, the VLAN ID value. When these values have been entered, use the **<esc>** key to return to the action line and then select **<apply>** to ensure the configuration is saved.

All MAC Addresses

There can be occasions when it is useful to determine what MAC addresses have been learnt on a port for troubleshooting reasons. Select **All MAC Addresses** from the MAC Configuration Menu. Now choose **<select>** from the action line and use the **<spacebar>** to list port number options. Select the port to be viewed by pressing **<enter>**. A new screen is now displayed showing a list of MAC addresses that have been learnt on this port, and their associated VLANID. The Status field shows if the MAC address is Dynamic (learnt) or Static.

NOTE: This option currently only works on a Standalone or Master Switch

Misc Configuration

This menu is selected from the Switch Configuration menu screen and enables configuration of the remaining Switch-specific variables such as MAC Ageing time, Broadcast Storm, Stacking mode etc.

```

Tyco 24 Port 10/100 Stackable Managed Switch : Misc Configuration
=====
MAC Address Ageing Time (0, 300..765) : 300
Broadcast Storm Filter Mode           : 5%
Max Bridge Transmit Delay Bound      : OFF
Low Queue Delay Bound                 : Disable
Low Queue Max Delay Time (1..255)    : 255
Collisions Retry Forever              : Enable
Hash Algorithm                        : CRC Hash
IFG Compensation                      : Enable
IP Stacking Group ID (0..65535)      : 0
IP Stacking Mode                      : Master
IP Stacking System Information        : Master
Actions-> <Edit> <Apply> <Quit>
Select the action menu.
[Tab/BKSPC] Move Item      [Enter] Select Item      [Esc] Previous Menu

```

Figure 29. Misc Configuration Screen

MAC Address Aging Time

This setting specifies the time that a dynamic MAC address can remain in the Switch tables before the value is “aged out”. The valid range is 300 to 765 seconds. The default value is 300 seconds, which is the industry standard duration. This value rarely needs to be modified.

Broadcast Storm Filter

This is used to limit the number of packets flowing through the Switch that do not have associated entries in the Switch tables (Destination Look-Up Failures) or excessive broadcast transmissions. In some instances, this high level of DLF/broadcast traffic can degrade network performance. To minimize this problem, the Switch can be programmed to limit the amount of broadcast traffic that can flow through the Switch. In normal networks, only a few percent of traffic would normally be broadcasts.

This mode is accessed from the Misc. Configuration screen and is changed by selecting **<edit>** from the action line and then using **<tab>** key for navigation to Broadcast Storm field. Use the **<spacebar>** to step through the valid thresholds:

- N/A (Disabled)
- 5%
- 10%
- 15%
- 20%
- 25%

The default value is 5%. After the required threshold value has been selected, use the **<esc>** key to return to the action line and then select **<apply>** to store the value.

Max Bridge Transmit Delay Bound

This control is used in association with QoS Configuration to control the time that packets may be queued in the Switch. If the packet is stored in the Switch for a time exceeding the specified amount, then it is dropped. These settings do not need to be changed except for networks where time-sensitive prioritized traffic is used. The default is OFF.

Low Queue Delay Bound

If low priority packets are queued in the Switch for longer than the 'Low Queue Max Delay Time', then the Switch will forward the packet immediately. Default is Disable.

NOTE: Ensure that 'Max Bridge Transmit Delay Bound' is ON before enabling 'Low Queue Delay Bound'.

Low Queue Max Delay Time

Defines the maximum time a low priority packet will be queued before being sent. The valid range is 1 to 255ms. The default max delay time is 255ms.

Collisions Retry Forever

In the default enable state the Switch will attempt to send a packet forever in the event of collisions. If disabled the Switch will re-transmit the packet up to 48 times in the event of collisions and after this the packet will be dropped.

Hash Algorithm

This controls the method used to maintain the MAC table. Either CRC Hash or Direct Hash. The default is CRC Hash.

IFG Compensation

When enabled Inter-Frame Gap is forced to 0.96 microseconds. This maintains compatibility with LAN cards and other network equipment. If disabled then the IFG remains unchanged. The default is enabled.

IP Stacking Group ID

Assigns the stacking group ID, which is used to control stack membership. Switches belonging to the same stack must be assigned the same stacking group ID. The valid range is 0 to 65535).

IP Stacking Mode

There are three stacking modes that can be configured on the Switch:

- **Disable** – The Switch is not participating in a stack and is standalone (default)
- **Master** – The Switch is the main controller Switch in the stack. There can be only one configured Master in the stack.
- **Slave** – All other Switches in the stack are configured as Slaves. Web management of these Slave Switches is preformed via the Master Switch.

IP Stacking System Information

This is a meaningful name that can be given to the Switch e.g. Sales Switch – rack 4, that is displayed when using a web browser to manage the Switch.

Please refer to page 42 for further details about Stacking.

Protocol Related Configuration

This menu option enables the following protocols to be configured:

- STP/RSTP Spanning Tree Protocol
- SNMP Simple Network Management Protocol
- LACP Link Aggregation Control Protocol
- IGMP/GVRP (Internet Group Management Protocol/Generic Attribute Registration Protocol)
- RADIUS Remote Authentication Dial-in User Service (802.1x)

RSTP Configuration

Spanning-Tree Protocol is a link management protocol that provides path redundancy while preventing undesirable loops in the network. For an Ethernet network to function properly, only one active path can exist between two stations. The Switch supports two versions of this protocol:

- RSTP Rapid Spanning Tree Protocol (802.1w)
- STP Spanning Tree Protocol (802.1d)

NOTE: In this current version of firmware Spanning Tree will not work across trunk links.

Having selected RSTP Configuration from the Protocol Related Configuration screen the following menu is displayed:

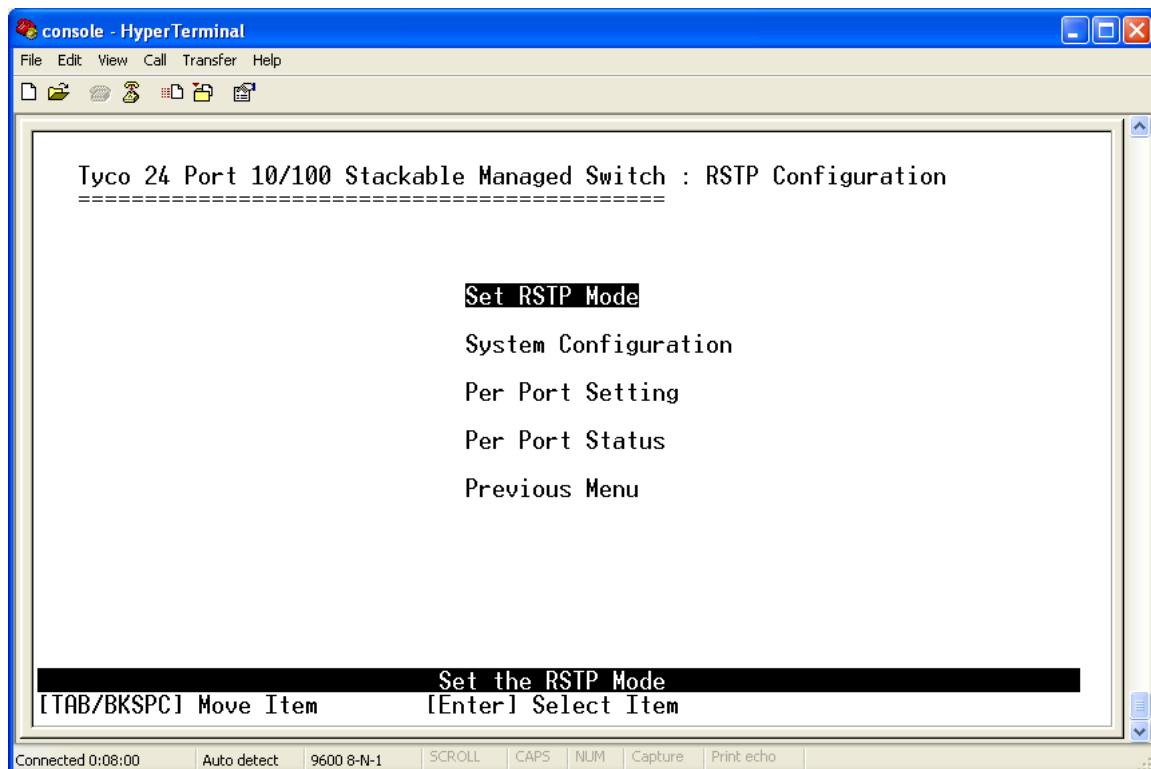


Figure 30. RSTP Configuration Screen

RSTP Setup

To enable Spanning Tree highlight 'Set RSTP Mode' using the <tab> key and press <enter>. The RSTP Setup screen will now appear. Select <edit> mode from the action line and use the <spacebar> to toggle between STP modes. Choose either 802.1w (RSTP) or 802.1d (Traditional Spanning Tree) depending what type of spanning tree protocol is required. Now use the <esc> key to return to the action line and then <apply> the changes. Spanning Tree is now enabled on the Switch.

System Configuration

This screen provides both information and configuration of the spanning tree protocol. Useful information such as Root Bridge, Root Port and cost to root can be gathered from here. The following parameters can also be changed from this menu:

- **Priority** – This parameter allows the control of Root Bridge in the STP network. The lower the priority, the more likely this Switch will be elected as root. The valid range is 1 - 65535.
- **Max Age** - The number of seconds the Switch waits for hello messages from root bridge before deciding the root is unavailable and performing a reconfiguration. The valid range is 6 - 40.
- **Hello Time** – This is the interval in time (seconds) that a root bridge sends BPDU configuration messages. The valid range is 1 - 10.
- **Forward Delay Time** – The period in time (seconds) a Switch will wait (the listen and learn period) before forwarding frames. The valid range is 4 - 30.

Per Port Setting

This screen allows the individual RSTP/STP values to be set on the required ports. . A port with higher priority, lower path cost is less likely to be blocked if Spanning Tree Protocol detects a network loop. The following can be configured:

- **Path Cost** – This parameter can be used to assign a higher or lower path cost to a port. A port with a high path cost is more likely to be blocked. The valid range is 1 - 200000000.
- **Priority** – If path cost to root is equal then a port with a higher priority (lower numerical value) is more likely to forward traffic. The valid range is 1 - 240.
- **P2P** – This parameter is used by RSTP to determine if the port is connected to a shared or full-duplex link, which will affect RSTP state transaction. It is recommended to keep this parameter with the default of Auto.
- **Edge** – This is a RSTP value. A port directly connected to end stations cannot create a bridging loop. The default is true.
- **Non STP** – The status shown here indicates if the port is participating in STP.

Per Port Status

This is informational screen only and parameters cannot be changed. The STP status of each port can be viewed. The following STP port statuses are:

- **Role** – indicates the STP role of the port
- **State** – determines the STP state of the port
- **Path Cost** – The port cost.
- **P2P** – The current P2P status of the port
- **Edge** – The current Edge status of the port
- **STP Neighbor** – shows if the port has a STP neighbor or not.

SNMP Configuration

This set of screens configures the Switch to become an active SNMP agent. There are several sub-menus available:

- System Options
- Community Strings
- Trap Managers

System Options

This sub-menu is used to specify the System Name, Contact and Location. This information can be useful when querying a Switch from a network management station.

Community Strings

In the SNMP Community Menu, it is possible to create or edit communities and customize their access rights.

When the rights value is **Read Only**, this enables SNMP requests accompanied by this community string to display MIB variable information.

When the rights value is **Read/Write** this enables SNMP requests accompanied by this community string to display and set MIB variable information.

Trap Managers

A trap manager is a network management station (NMS) that receives traps from distributed SNMP devices. The Switch will generate trap messages when a fault condition is detected. Create a trap manager by entering the IP address of the NMS and a community string.

LACP Configuration

The Link Aggregation Control Protocol (LACP) provides a standardized means for grouping up to four consecutive ports into a single dedicated connection. This feature can expand bandwidth to a device on the network. **LACP operation requires full-duplex mode.**

NOTE: Before configuring LACP set a trunk group(s) from the Trunk Configuration menu.

Having selected LACP Configuration from the Protocol Related Configuration screen the following menu is displayed:

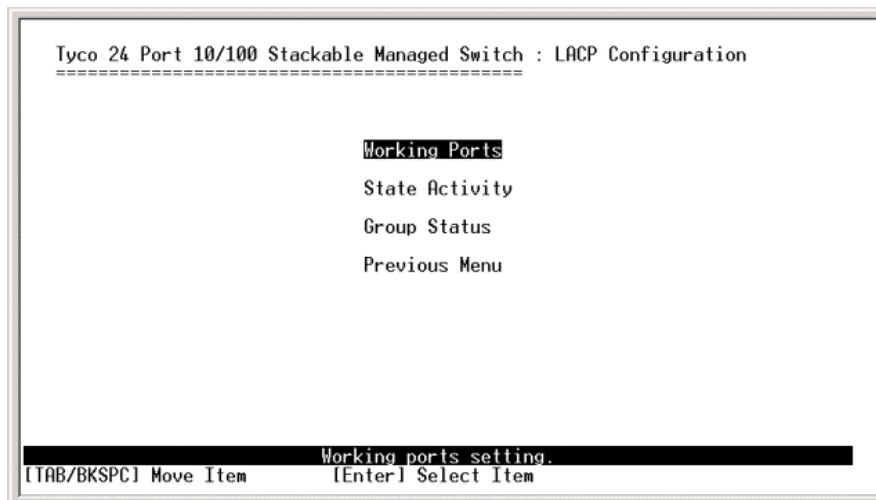


Figure 31. LACP Configuration screen

Working Ports

This menu allows the control of how many active LACP ports will participate in the trunk. If an active port fails then a standby port will join the LACP trunk.

E.g. If 4 ports have been configured to be in an LACP trunk and work ports is 3. Then 3 ports will be active and 1 port will be in standby.

Note: It is not possible to create standby trunk ports if Static Trunks have been configured.

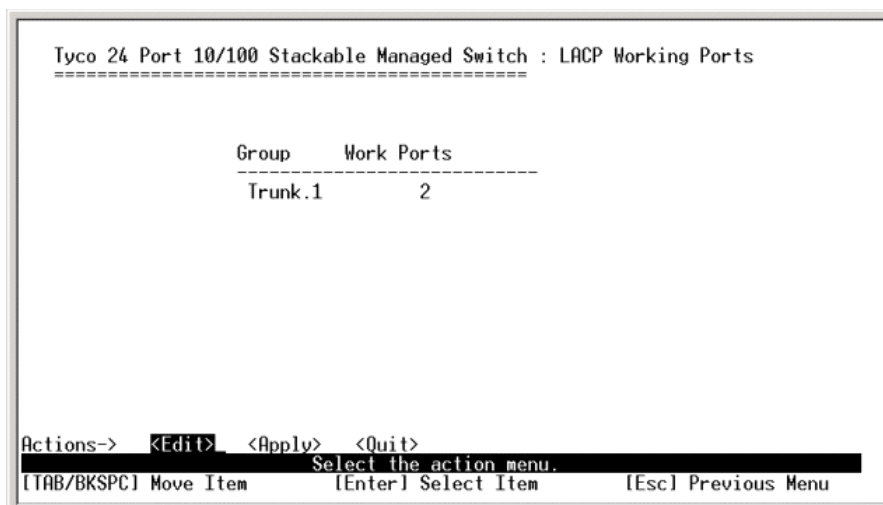


Figure 32. LACP Working Ports Screen

Having selected working ports from the LACP Configuration screen the above is displayed. Select **<edit>** from the action line and enter the number of ports to be working port. Press **<esc>** to return to the action line and **<apply>** to save the configuration.

State Activity

If a LACP trunk has been configured it is possible to set the port to the following modes:

- **Active** (default) – The port automatically sends LACP packet to the neighbor device to establish a trunk connection
- **Passive** – The port waits for a LACP packet from the neighbor device before establishing a LACP trunk connection.

NOTE: One or both ends of the trunk link must be set to 'Active'.

```

Tyco 24 Port 10/100 Stackable Managed Switch : LACP State Activity
=====
Port          State Activity          Port          State Activity
-----
3             Active
4             Active

Actions->  <Edit>  <Apply>  <Quit>
                Select the action menu.
[TAB/BKSPC] Move Item      [Enter] Select Item      [Esc] Previous Menu

```

Figure 33. LACP State Activity Screen

After selecting this option from the LACP configuration the screen above will appear. Now select **<edit>** from the action line. Use the **<tab>** key to highlight the port to be modified and press the **<spacebar>** to toggle between Active and Passive modes. Having made the selection press **<esc>** to return to the action line and **<apply>** to save the configuration.

Group Status

This is an informational screen only and provides the status of both LACP and Static trunk groups. This option can be selected from the LACP Configuration screen.

```

Tyco 24 Port 10/100 Stackable Managed Switch : LACP Group Status
=====
                [Actor]          Group          [Partner]
Priority:      1                      1
MAC   :      000F386A99F2          000F386A9A0C
Port MembeKey Priority Active   Port MembeKey Priority
 3         513   1   selected 15         513   1
 4         513   1   selected 16         513   1

Actions->  <Previous Page>  <Next Page>  <Quit>
                                     Select the action menu.
[TAB/BKSPC] Move Item          [Enter] Select Item          [Esc] Previous Menu

```

Figure 34. LACP Group Status Screen

IGMP/GVRP Configuration

This screen, selected from the Protocol Configuration screen is used to enable or disable the IGMP and GVRP, and to configure the IGMP mode. The Internet Group Management Protocol (IGMP) is a protocol that manages IP multicast traffic.

The Generic VLAN Registration Protocol allows automatic VLAN configuration between Switches and its nodes. A node that that supports GVRP can send a request to the Switch to join a specific VLAN.

```

Tyco 24 Port 10/100 Stackable Managed Switch : IGMP/GVRP Configuration
=====

IGMP      : Disable
Query Mode : Disable
GVRP      : Disable

Actions->  <Edit>  <Apply>  <Quit>
                                     Select the action menu.
[TAB/BKSPC] Move Item          [Enter] Select Item          [Esc] Previous Menu

```

Figure 35. IGMP/GVRP Configuration Screen

Select **<edit>** from the action line and highlight the required field to modify using the **<tab>** key. Use the **<spacebar>** to toggle through the settings. IGMP and GVRP can be set to either Enable or Disable. Query Mode can be set to enable, disabled or auto. Having made the selection use **<esc>** key to return to the action line and **<apply>** to save the configuration.

802.1x Configuration

The 802.1x is a security protocol that provides a means of authenticating and authorizing devices attached to a LAN port on the Switch, and preventing access to that port when authentication and authorization fails. Having selected 802.1x Configuration from the Protocol Configuration screen the following is displayed:

```
Tyco 24 Port 10/100 Stackable Managed Switch : 802.1x Configuration
=====
                                802.1x Setup
                                System Configuration
                                Per Port Setting
                                Misc Configuration
                                Previous Menu

                                Enable or disable 802.1x Protocol function.
[TAB/BKSPC] Move Item          [Enter] Select Item
```

Figure 36. 802.1x Configuration Screen

802.1x Setup

This menu is used to enable to the 802.1x protocol. By default the protocol is disabled. To enable the protocol select 802.1x Setup from the 802.1x Configuration menu. Using the **<tab>** key select **<edit>** from the action line and use the **<spacebar>** to toggle to Enable. Now press **<esc>** key to return to the action line and **<apply>** to save changes. The 802.1x protocol is now running on the Switch.

System Configuration

This is the main configuration screen for the 802.1x protocol and is selected from the 802.1x Configuration screen. Having selected this menu option the following screen is displayed:

```
Tyco 24 Port 10/100 Stackable Managed Switch : 802.1x System Configuration
=====

                                Radius Server IP : 192.168.16.3
                                Shared Key       : 12345678
                                NAs, Identifier  : NAS_L2_SWITCH
                                Server Port      : 1812
                                Accounting Port   : 1813

Actions->  <Edit>  <Apply>  <Quit>
                                Select the action menu.
[TAB/BKSPC] Move Item          [Enter] Select Item          [Esc] Previous Menu
```

Figure 37. 802.1x System Configuration Screen

The following parameters can be configured:

- **Radius Server IP address** – This is the IP address of the authentication server that the Switch will use to authenticate and authorize.
- **Shared Key** - set an encryption key for use during authentication process with the specified radius server. This key must match the encryption key used on the Radius Server
- **NAS, Identifier** – A meaningful name used in authentication and accounting.
- **Server Port** - The UDP destination port number used to send authentication requests to the Radius server.
- **Accounting Port** – The UDP destination port number used to send accounting requests to the Radius server.

Per Port Setting

Using this menu option it is possible to configure the 802.1x authentication state of each port. Having selected this menu option from the 802.1x Configuration it is possible to set specific ports to the following authentication states:

- **Disable** (default) – Authentication is disabled on this port
- **Reject** – The port is held in an unauthorized state
- **Accept** – The port is held in an authorized state
- **Authorize** – The port will participate in the authentication process and the authentication state will depend on the outcome of the authentication process between the supplicant and the Radius server.

From the action line select **<edit>** and use the **<esc>** key to highlight the port that needs changing. Use the **<spacebar>** to toggle between the required authentication states. Having made the selection press the **<esc>** to return to the action line and **<apply>** to save the changes.

Misc Configuration

Use this option to change the following 802.1x attributes. It is recommended to leave as defaults unless certain of the consequences:

- **Quiet Period** - The number of seconds that the Switch remains in the quiet state following a failed authentication exchange with the client (default 60 seconds)
- **Tx Period** – The number of seconds the Switch should wait for a response to an EAP request/identity frame from the client before retransmitting the request (default 30 seconds)
- **Supplicant Timeout** - The number of seconds the Switch waits for a supplicant response to an EAP request (default 30 seconds)
- **Server Timeout** – The number of seconds the Switch waits for a server response to an authentication request. (default 30 seconds)
- **Reauthorize Maximum** –The number of times that the Switch will send an EAP-request/identity frame before restarting the authentication process (default 2)
- **Reauth Period** – The number of seconds the authorized clients must be re-authenticated (default 3600 seconds).

System Reset Configuration

The following options can be selected from this menu:

- Factory Default
- System Reboot
- TFTP Configuration

Factory Default

This menu restores the Switch back to its original defaults. Select this option from the System Reset Configuration. When prompted choose if current IP address and username/password are to be kept after the factory default. After confirming the intention of restoring to factory defaults, it is recommend that a system reboot is performed.

System Reboot

This option reboots the entire Switch as soon as it is selected. There is no confirmation step. Only select this mode if you are sure that you want to reset the Switch

TFTP Configuration

From this menu option, selected from System Reset Configuration, it is possible to perform the following:

- Update Firmware
- Restore Configuration
- Backup Configuration

Update Firmware

This option updates firmware running on the Switch from the TFTP server. Having selected this option from the TFTP Configuration menu select **<edit>** from the action line. Enter the IP address of the TFTP server and the file name to download. Use the **<esc>** to return to action line and **<apply>** to start the download. When the file has downloaded choose to reboot the Switch when prompted. The firmware is now updated.

NOTE: Check the version is updated from the System Information menu. If it remains unchanged a factory default maybe needed.

Restore Configuration

This selection allows a saved Switch configuration file to be downloaded to the Switch. After choosing this option from the TFTP Configuration menu select **<edit>** from the action line. Now enter the IP address of the TFTP server and the file name of the configuration file to download. Press **<esc>** to return to the action line and **<apply>** to start the download. If successful a prompt will appear to confirm if a system reset is required. It is recommended that a reset be performed. The Switch is now restored.

Backup Configuration

Use this option to upload and save a backup Switch configuration file to a TFTP server. After choosing this option from the TFTP Configuration menu select **<edit>** from the action line. Now enter the IP address of the TFTP server and the file name of the configuration file to upload. Press **<esc>** to return to the action line and **<apply>** to start the upload. Check on the TFTP server that the file has been saved.

Save Configuration

Any changes made to the configuration of the Switch needs to be saved. Otherwise after a reboot of the Switch any configuration changes will be lost. Select this option from the Main Menu and confirm the save.

IP Stacking

The Switch can be web managed in either a standalone or stacking mode. In stacking mode a group of Switches (8 maximum) can be managed using a single IP address from a web browser, which simplifies the management task. One Switch in the Stack is configured as the 'Master' Switch and all other Switches are configured as a 'Slave'. Switches belonging to the same Stacking group must have the same IP Stacking Group ID.

Note: After configuring an IP Stacking Group. Slave Switches can only be managed through the Master Switch. It is not possible to Web/Telnet/SNMP Manage a Slave Switch directly.

IP Stacking Configuration

1. Select the IP Configuration menu on each Switch and assign a unique IP address to all Switches that are to be stacked (**NOTE:** Only the Master Switch's IP address is used on the LAN. All other IP addresses assigned to Slave Switches can be reused for other devices on the LAN. Ensure that assigned IP addresses are in the same subnet.
2. To enable one Switch as Master, select Misc Configuration from Switch Configuration menu and modify:

IP Stacking Group ID – Choose a unique ID, between 0 - 65535, to identify the stacking group

IP Stacking Mode – Select this Switch to be Master

IP Stacking System Information – Give the Switch a meaningful name that will be displayed when web managed.

Save the configuration

3. The next task is to configure all other Switches as Slaves. Select Misc Configuration on each Switch and modify:

IP Stacking Group ID – Configure each Switch with the same ID as the Master.

IP Stacking Mode – Select each Switch to be 'Slave'

IP Stacking System Information – Give each Switch a meaningful name that will be displayed when web managed.

Save the configuration

4. Now ensure all Switches are connected to the LAN and are in the same broadcast domain (subnet). It is recommended that the Switches be directly connected to each other.

The Stack is now configured. It should now be possible to manage the stack of Switches from a web browser. In the URL field of the web browser enter the IP address of the **Master Switch**. A similar window as below should appear:



Figure 38. Web Login Screen

Enter the Username and Password and click OK. The defaults are:

Username: **root**

Password: **root**

If username and password are correct the browser will display the stacked Switch group homepage, which will look similar to:

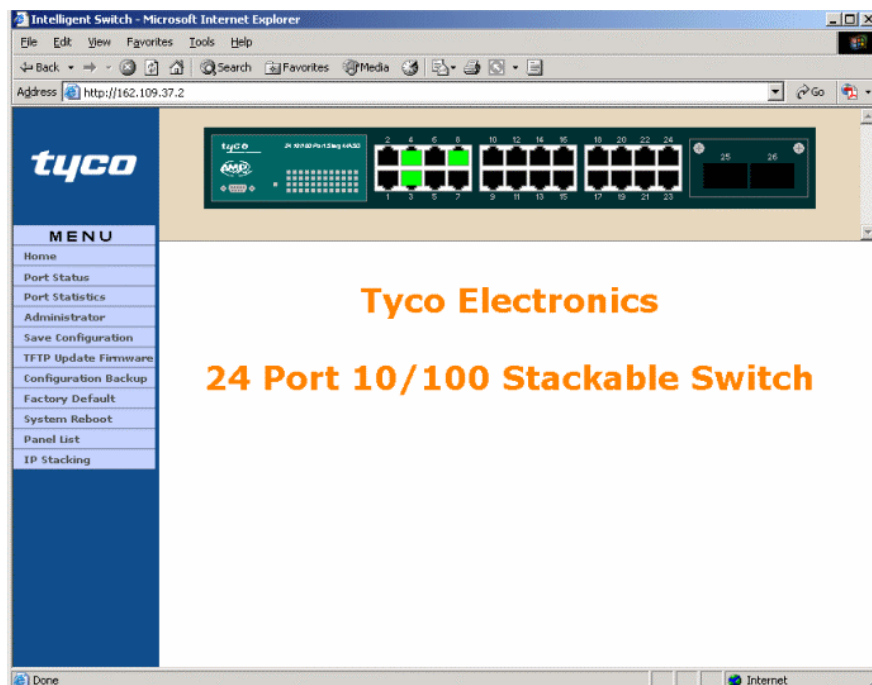


Figure 39. Switch Homepage Screen

To ensure that the stack has been properly configured click on the **'IP Stacking'** in the side menu and a window similar to below will appear:

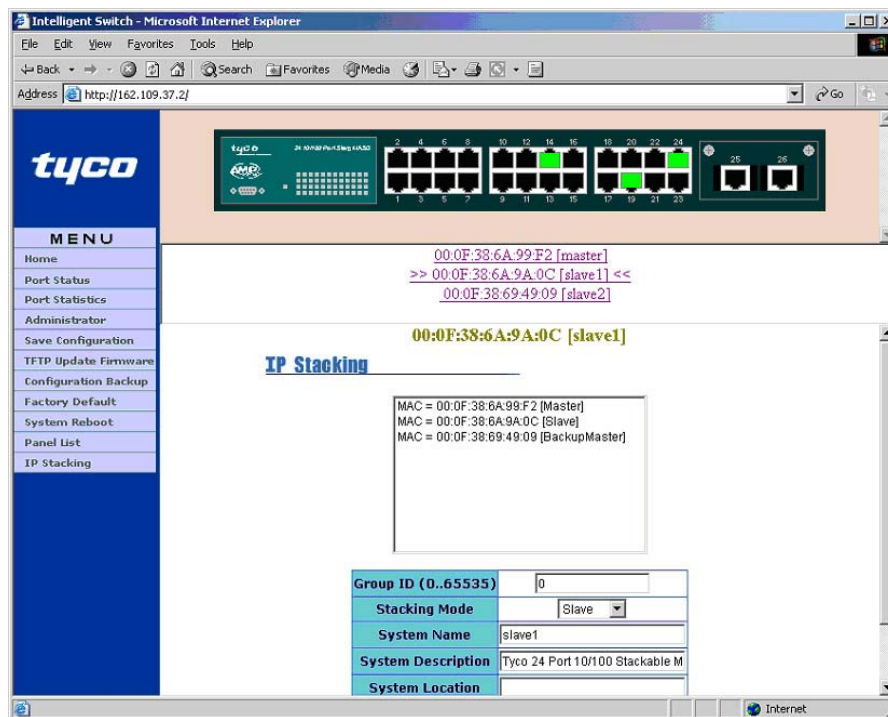


Figure 40. IP Stacking Screen

If the Stacking Configuration has been successful, then the IP Stacking screen will show a list of MAC addresses and System names, which are Hyperlinks. It is now possible to manage any member Switch in the stacking group by clicking on the Switch Hyperlink. The Switch that is currently being managed is indicated by >> and <<. Having selected a Switch to manage, any actions performed using this web interface will affect the selected Switch only.

NOTE: If a Stack of Switches needs to be disbanded using Web Based Management, then Disable Stacking mode on the Slaves first, and lastly Disable Stacking mode on the Master Switch.

Backup Master

The Stack will remain manageable if the Master Switch fails or loses network connectivity. If this should happen then the BackupMaster will go active and maintain the manageability of the Stack. The BackupMaster is elected by the lowest MAC address in the Stack and no user configuration is needed. The IP Stacking screen (Figure 40.) is used to determine the current Master and BackupMaster Switch.

NOTE: The IP address used to manage the Stack, after the Master Switch fails, remains unchanged.

Web Based Management

Inside the Switch exists an embedded web server that allows administrators to manage the Switch remotely. The Web Based management is a graphical interface, which some users may find easier and more intuitive than other management methods.

The Web-Based Management supports Microsoft Internet Explorer 5.0 and above (plus other web browsers). It is based on Java Applets with an aim to reduce network bandwidth consumption, enhance access speed and present an easy viewing screen.

Configuring The Switch for Web Based Management

The Switch has the following default values – User that need to be adjusted to suit your network:

IP Address:	10.10.10.10
Subnet Mask:	255.255.255.0
Default Gateway:	10.10.10.254
User Name:	root
Password:	root

1. Obtain the correct local IP addresses from your network administrator and enter the values from the console menu as detailed on page 17. This IP information has to be entered via the console, as the web interface will not be accessible until the local IP address values have been entered, saved and the Switch restarted.
2. After the Switch has been restarted with the new IP address, check that the Switch is visible on the network by 'pinging' the address. If the Switch is present and correctly configured, then the 'ping' will echo back a response message otherwise the message "Request Timeout" will be displayed. Ensure that the Switch can be 'pinged' before proceeding. Consult your system administrator for details of 'pinging'. The syntax from your PC is:

Start >Run> ping 162.109.37.13 -t

Where the **162.109.37.13** is the example IP address allocated to the Switch
The **-t** causes the ping test to run continuously.

3. After the 'ping' test has passed, open a web browser window (such as Microsoft Internet Explorer) and enter the allocated IP address of the Switch into the URL field. For example:

http://162.109.37.13

If all the settings are correct, then the browser will display a user name and password box similar to the one below:



Figure 41. Web Login Screen

4. to the password box and enter the default password **root**. If the settings are correct, then the browser will begin to render a new page showing the image of the Switch. This is the home page of the Switch web management screen.

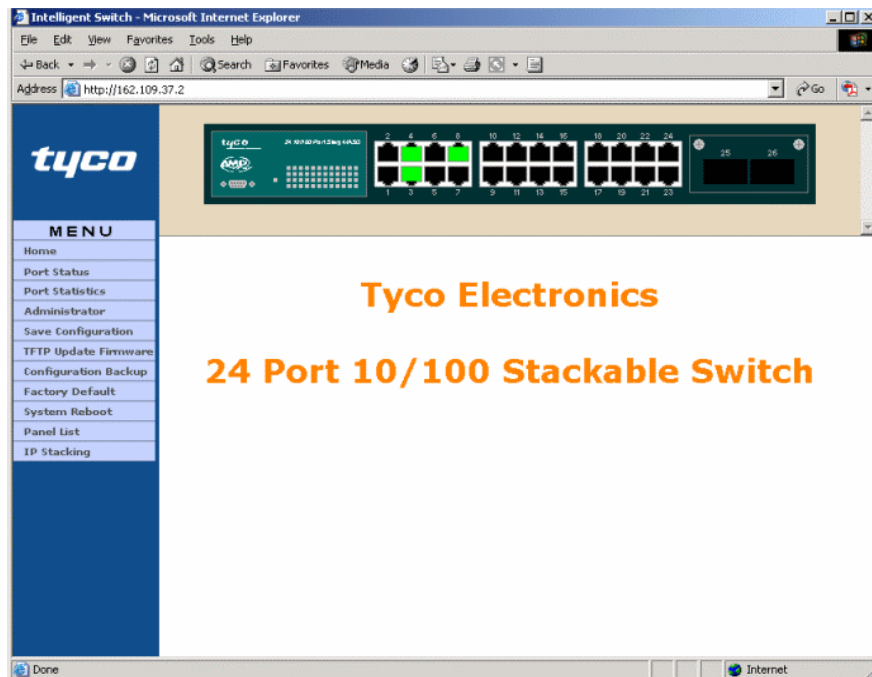


Figure 42. Web Browser Home Page Screen

It is recommended that you explore the menu bar in the left hand side of the screen. This menu area controls the configuration, control and statistics elements of the Switch.

Port Status Screen

The most basic and useful menu is the read-only Port Status screen, which provides the current status of each port.

The screenshot shows the 'Port Status' screen in a web browser. At the top, there is a graphical representation of the switch with 24 ports, where ports 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, and 24 are shown as green, indicating they are up. Below this is a table with the following data:

Port	Type	Link	State	Negotiation		Speed Duplex		Flow Control		Back Pressure		Band Width		Priority	Security
				Config	Actual	Config	Actual	Config	Actual	Config	Actual	In	Out		
Port.01	100TX	Down	Enable	Auto	N/A	100 Full	N/A	ON	N/A	ON	N/A	OFF	OFF	Disable	OFF
Port.02	100TX	Down	Enable	Auto	N/A	100 Full	N/A	ON	N/A	ON	N/A	OFF	OFF	Disable	OFF
Port.03	100TX	Up	Enable	Auto	Auto	100 Full	10 Half	ON	OFF	ON	ON	OFF	OFF	Disable	OFF
Port.04	100TX	Up	Enable	Auto	Auto	100 Full	100 Full	ON	ON	ON	OFF	OFF	OFF	Disable	OFF
Port.05	100TX	Down	Enable	Auto	N/A	100 Full	N/A	ON	N/A	ON	N/A	OFF	OFF	Disable	OFF
Port.06	100TX	Down	Enable	Auto	N/A	100 Full	N/A	ON	N/A	ON	N/A	OFF	OFF	Disable	OFF
Port.07	100TX	Down	Enable	Auto	N/A	100 Full	N/A	ON	N/A	ON	N/A	OFF	OFF	Disable	OFF
Port.08	100TX	Down	Enable	Auto	N/A	100 Full	N/A	ON	N/A	ON	N/A	OFF	OFF	Disable	OFF
Port.09	100TX	Down	Enable	Auto	N/A	100 Full	N/A	ON	N/A	ON	N/A	OFF	OFF	Disable	OFF
Port.10	100TX	Down	Enable	Auto	N/A	100 Full	N/A	ON	N/A	ON	N/A	OFF	OFF	Disable	OFF

Figure 43. Port Status Screen

This menu screen displays the read-only link status (Up/Down) of all ports together with the Auto-negotiation mode, duplex mode and flow control settings. A 'green' port on the graphical representation of the Switch also indicates the link status of a port that is UP. The programmable port values can be changed in the **Administrator > Port Controls** Screen.

Port Statistics Screen

The port statistics screen enables the network administrator to diagnose certain fault conditions. The screen is accessed by selecting Port Statistics from the left hand menu bar.

The screenshot shows the 'Port Statistics' screen in a web browser. The browser title is 'Intelligent Switch - Microsoft Internet Explorer' and the address is 'http://162.109.37.4'. The page features a 'tyco' logo and a 'MENU' on the left. The main content area displays a 'Port Statistics' table with the following data:

Port	Type	Link	State	Tx Good Packet	Tx Bad Packet	Rx Good Packet	Rx Bad Packet	Tx Abort Packet	Packet Collision
Port.01	100TX	Down	Enable	0	0	0	0	0	0
Port.02	100TX	Down	Enable	0	0	0	0	0	0
Port.03	100TX	Up	Enable	3457	0	4181	0	0	0
Port.04	100TX	Up	Enable	0	0	0	0	0	0
Port.05	100TX	Down	Enable	0	0	0	0	0	0
Port.06	100TX	Down	Enable	0	0	0	0	0	0
Port.07	100TX	Down	Enable	0	0	0	0	0	0
Port.08	100TX	Down	Enable	0	0	0	0	0	0
Port.09	100TX	Down	Enable	0	0	0	0	0	0
Port.10	100TX	Down	Enable	0	0	0	0	0	0
Port.11	100TX	Down	Enable	0	0	0	0	0	0
Port.12	100TX	Down	Enable	0	0	0	0	0	0
Port.13	100TX	Down	Enable	0	0	0	0	0	0
Port.14	100TX	Down	Enable	0	0	0	0	0	0
Port.15	100TX	Down	Enable	0	0	0	0	0	0
Port.16	100TX	Down	Enable	0	0	0	0	0	0

A 'Clear' button is located below the table. The browser status bar shows 'Done' and 'Internet'.

Figure 44. Port Statistics Screen

Administrator Screen

This set of screens is used to deliver the advanced configuration and control functions of the Switch. These settings are potentially network affecting so it is important that the consequences of these changes are clearly understood. Select the Administrator option in the left hand menu bar and an extended drop down menu is displayed offering the following functions:

Option	Function
IP Configuration	Displays the current IP addresses.
Switch Configuration	Controls the Broadcast Storm, QoS, enable 802.1x etc
Console Port Information	Displays the console port setup (read-only – configuration cannot be changed)
Port Controls	Allows detailed port configuration
Trunking	LACP/Static Trunk configuration
Forwarding and Filtering	IGMP Multicast group, Static MAC, MAC Filtering and Display MAC addresses learnt on a port
VLAN Configuration	Configure Port based, 802.1Q VLANS
Spanning Tree	Configure STP (802.1d and 802.1w)
Port Mirroring	Set up Analysis port and Monitor port
SNMP Management	Set up the trap addresses, strings and access information
Security Manager	Set the password and user names.
802.1x Configuration	Configure 802.1x parameters

Table 2. Web Administrator Options

All the above items are identical in structure to the console controls described in the first part of the manual. Refer to these sections for guidance.

To close the administrator menu, click on the red arrow in the lower part of the expanded administrator menu. The menu will roll-up.

Future manuals will describe the web-based interface in more detail.

Save Configuration

After configuring the Switch it is important to save the configuration, otherwise the changes made will be lost after the Switch is rebooted. This option can be selected from the left hand menu bar.

TFTP Update Firmware

This menu allows the download of new firmware images to the Switch, so that bugs can be fixed and enhancements added in the future. This option can be selected from the left hand menu bar. This option can be selected from the left hand menu bar

Configuration Backup

The screen is used to backup and restore a configuration. This is useful when Switches need to be replaced or the configuration has been accidentally lost.

Factory Default

It maybe necessary on occasions to reset all Switch attributes back to default. Having selected this option from the left hand menu bar a new screen will appear. If it is preferred to keep the current IP address and Username/Password after the factory reset then 'check' the appropriate boxes.

System Reboot

To reboot the Switch select this option from the left hand menu bar. Please ensure that it is safe to do so before performing this operation.

Panel List

This screen is used to refresh the most current view of the Switch that is being managed. The current view can be seen in the lower panel. This option is selected from the left hand menu bar.

IP Stacking

It is possible to configure IP Stacking using Web Based Management. Configure a Master Switch first, and next configure the Slave Switches.

NOTE: If a Stack of Switches needs to be disbanded using Web Based Management, then Disable Stacking mode on the Slaves first, and lastly Disable Stacking mode on the Master Switch.

Product Specifications

Standard	<p>IEEE802.3 10BASE-T IEEE802.3u 100BASE-TX/100BASE-FX IEEE802.3z Gigabit SX/LX IEEE802.3ab Gigabit 1000T IEEE802.3x Flow Control and Back pressure IEEE802.3ad Port trunk with LACP IEEE802.1d Spanning tree protocol IEEE802.1p Class of service IEEE802.1Q VLAN Tagging IEEE 802.1x user authentication</p>
Switch architecture	Store and forward switch architecture.
Back plane	8.8Gbps
LED Indicators	<p>System Power 10/100TX RJ-45 Port: 100Mbps,Link/Active, Full-duplex/Collision Gigabit Fiber: Link/ Activity Gigabit Copper: Link/Activity, Full duplex/collision, 1000Mbps, 100Mbps 100FX module: Link/Activity, Full duplex</p>
Connector	<p>10/100TX: RJ-45 100FX(Multimode) module: SC/ST 100FX (Singlemode) module: SC Gigabit SX/LX module: SC Gigabit 1000T module: RJ-45</p>
MAC address	8K MAC address table
Memory	3Mbits for packet buffer
CPU	ARM-7
Flash ROM	1 Mbytes
System memory	8Mbytes
Power Consumption	34Watts(Maximum)
Dimensions	440mm(W) x 161mm(D) x 44mm(H)
Power Supply	100-240V AC, 50-60Hz, 0.8A(maximum)
EMI	FCC Class A, CE

Safety	UL, cUL, CE/EN60950
--------	---------------------

Order Codes

24 Port Stackable Managed Switch	0-1591100-x
Plug-In Option Modules	
100Fx SC Multimode Fibre Plug-In Option Module	0-1591094-0
100Fx ST Multimode Fibre Plug-In Option Module	0-1591095-0
100Fx SC Singlemode Fibre Plug-In Option Module	0-1591096-0
Dual Gigabit Multimode Sx Plug-In Option Module	0-1591097-0
Dual Gigabit Singlemode Lx Plug-In Option Module	0-1591098-0
Dual Gigabit Copper 1000BaseT Plug-In Option Module	2-1591019-0
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