



**Network World  
Editor's Choice**



## 24-Port Fast Ethernet Stackable Switch

*The DES-3226S is a versatile 10/100Mbps stackable Layer 2 switch designed for cost-effective departmental connections. With 24 10/100BASE-TX ports and Gigabit support, this switch blends many features typically found in more expensive chassis-based solutions, including advanced management functions and reliable star stacking, with the price and flexibility of a stackable.*

### 24 10/100Mbps Ports for Workstation Connection

The switch provides 24 10/100Mbps ports supporting auto-sensing and auto-negotiation of network speeds and full/half duplex. These ports can connect to workstations and print servers, giving each a dedicated bandwidth. All ports support plug-and-play auto MDI/MDIX, allowing you to connect to any node device without the need to change your usual straight-through twisted-pair cables.

### Switch Stacking & GBIC Port

The switch provides an open slot for installation of a stack module, which is equipped with a stacking port and a GBIC port. The stacking port is for switch stacking. The GBIC port provides for flexible deployment of multi-mode or extended cable-length single-mode fiber. At 2000Mbps full duplex, this port provides for Gigabit server or fiber backbone attachment.

### Scalable Expansion

Up to 13 DES-3226S can be stacked together in a ring architecture. You can add units to reach maximum 312 10/100Mbps ports and 13 GBIC ports per stack. The switches are stacked together through high-speed stack cables, allowing the entire stack to perform as a single entity.

### Fault Tolerant Star Stacking

Alternately, you can stack a DGS-3212SR(L2 switch) or DGS-3312SR (L3 switch) Stacking Master with 12 DES-3226S, to get 288 10/100BASE-TX ports, plus 12 Gigabit ports for server and backbone attachment. This star stacking scheme allows packets to be switched directly through the Stacking Master. Fault tolerance is provided, as any single broken link between a switch and the Stacking Master will not affect the rest of the links of the stack.

### Flow Control to Prevent Packet Loss

The switch supports standard IEEE 802.3x Flow Control. Working in conjunction with buffer overrun auto-detection, this full-duplex data transfer mode provides protection against possible data loss for 802.3x supported servers directly connected to the switch.

### Port Trunks for Aggregated Bandwidths

With low cost per port, port trunking provides an easy and economical alternative solution for server connection to attain Gigabit bandwidth. Up to 8 10/100Mbps ports or 8 Gigabit ports can be combined together to create a multi-link load-sharing aggregated bandwidth to a server. Trunked ports can span multiple units of the stack for fail-safe connectivity to mission-critical servers and the network center.

### VLANs for Enhanced Security & Performance

VLANs improve security and bandwidth utilization by limiting the broadcast domains and confining intra-group traffic within their segments. To segment up the network, workstations supporting VLAN can be grouped into different Virtual LANs (VLANs). The switch also supports asymmetric VLAN and GVRP (GARP VLAN Registration Protocol) for automatic VLAN configuration distribution.

### Advanced Network Access Management

Port-based and MAC-based 802.1x features enable user authentication for each network access attempt. Port Security features allow you to limit the number of MAC addresses per port in order to control the number of stations for each port. Static MAC addresses can be defined for each port to ensure only registered machines are allowed to access. By enabling both of these features, you can establish an access mechanism based on user and machine identities, as well as control the number of access stations.

### Multi-layer Access Control List (ACL)

Access Control Lists (ACL) allow the network administrator to define policies on network traffic control. The switch supports comprehensive and multi-layer ACLs, providing a powerful tool for network management. For example, the switch can be set to block malicious bulk traffic from specific clients (based either on MAC or IP addresses). Or during a virus attack, the switch can be set to restrict its flooding based on a virus's unique pattern (TCP/UDP port number).

### Advanced QoS Support

The switch supports not only Layer 2 802.1p Priority Queue control, but also a variety of ways to prioritize network packets. Multi-layer information from L2 to L4 can be used to classify packet priorities. This function support allows you to attach IP telephony devices or video servers to the switch to run delay-sensitive applications like video conference.

### Flexible Transmission Scheduling

The switch supports 2 methods of packet transmission scheduling: Strict Scheduling and Round-Robin. You can select to use Strict Scheduling to strictly enforce your priority queues, or Round-Robin to address bandwidth limitations at peak time. Round-Robin allows each queue to be assigned a different percentage of the output port's bandwidth, so that lower-priority queues are not denied access to buffer space and port bandwidth.

### IGMP Snooping for Broadcast Control

The switch listens to IGMP (Internet Group Management Protocol) messages to build mapping table and associate forwarding filters. It dynamically configures the switch ports to forward IP multicast traffic only to those ports associated with multicast hosts.

### Broadcast Storm Control

To limit too many broadcast/multicast flooding in the network, broadcast/multicast storm control is configured to screen excessive traffic. Threshold values are available to control the rate limit for each port. Packets are discarded if the respective count exceeds the configured upper threshold in a given time interval. The possible range of upper threshold is from 0 to 255k packets per second.

### Port Mirroring

This function allows you to mirror adjacent ports for the purpose of analyzing incoming and outgoing packets where packet patterns can be studied.

### 802.1D Compatible & 802.1w Rapid Spanning Tree

For mission critical environments with multiple switches supporting STP, you can configure the stack of switches with a redundant backup bridge path, so transmission and reception of packets can be guaranteed in event of any fail-over switch on the network.

### Multiple Management Interfaces

SNMP v.1, v.2c, v.3 network management is supported, using the built-in MIBs. RMON monitoring and SYSLOG are provided for effective central management. The switch also provides a Command Line Interface (CLI) and a Web-based GUI. CLI enables quick system configuration for administrators familiar with command line operation. The embedded Web-based interface allows you to easily access the switch from anywhere on the network and trouble shoot it in real-time. You can, for example, browse the MAC address table via the Web browser and perform searching to identify the location of any workstation. Port utilization graphs provide real-time traffic monitoring and diagnostic information.

### Optional Ports (Stand-alone Configuration)

If you configure the DES-3226S as a stand-alone switch, you can install the following modules in the open slot:

- 2-port Fast Ethernet module (10/100BASE-TX)
- 1 or 2-port Fast Ethernet multi-mode fiber module (100BASE-FX)
- 1 or 2-port Fast Ethernet single-mode Fiber module (100BASE-FX)
- 2-port Gigabit fiber module (1000BASE-SX)
- 2-port Gigabit fiber module (1000BASE-LX)
- 2-port Gigabit copper module (1000BASE-T)
- 2-port GBIC module

## Features

- 24 built-in 10/100BASE-TX ports
- Ring topology switch stacking: 13 units per stack + 13 GBIC ports
- Fault tolerant star topology switch stacking: 13 units per stack (including DGS-3212SR or DGS-3312SR Stacking Master) + 12 Gigabit ports
- 1 open slot for 2 10/100BASE-TX ports, 1 or 2 optional Fast Ethernet fiber or 2 Gigabit ports (stand-alone configuration)
- 8.8Gbps switching fabric
- Auto MDI/MDIX uplink for all twisted-pair ports
- 802.1Q and asymmetric VLAN
- Per-port multicast filtering
- IGMP snooping, 802.1p Priority Queues, port mirroring
- Multi-layer ACL and QoS support
- Administrator-definable port security (permanent port security supported)
- Port trunks (up to 8 Fast Ethernet ports per trunk), 802.3ad LACP support
- Broadcast storm control
- 802.3x Flow Control
- 802.1D and 802.1w Rapid Spanning Tree for redundant backup bridge paths
- SNMP v.1, v.2c, v.3 network management, RMON support
- 802.1x port-based/MAC-based authentication
- Per-port bandwidth control
- Network Time Protocol support

### General

#### Protocol

CSMA/CD

#### Data Transfer Rates

- Ethernet:
  - 10Mbps (half duplex)
  - 20Mbps (full duplex)
- Fast Ethernet:
  - 100Mbps (half duplex)
  - 200Mbps (full duplex)
- Gigabit Ethernet:
  - 2000Mbps (full duplex)

### Hardware

#### Basic Configuration

- 24 auto-sensing 10/100Mbps ports (built-in)
- 1 open slot

#### Switch Fabric

8.8 Gbps

#### LED (per device)

- Power
- Console

#### Built-in Ports Supported Functions

- IEEE 802.3 10BASE-T/802.3u 100BASE-TX standards
- Full/half duplex support with ANSI/IEEE 802.3 NWay auto-negotiation
- IEEE 802.3x Flow Control in full-duplex, back pressure in half-duplex
- MDI-II/MDI-X auto-sensing for all twisted-pair ports
- Auto-correction of twisted-pair Rx reverse polarity
- Port trunking: up to 8 ports per trunk, up to 6 trunks per switch
- 10BASE-T cables:
  - UTP Cat. 3, 4, 5 (100 m max.)
- 100BASE-TX cables:
  - UTP Cat. 5 (100 m max.)
- LED report (per port):
  - 10/100Mbps speed
  - Link/Act

### Optional Modules

#### DES-332GS Stack + GBIC Module

- 1 stacking port
- 1 GBIC port (IEEE 802.3z/802.3ab standards)
- Stackable units: 13 DES-3226S switches per stack (Ring), 12 units (star)
- Stacking method: ring or star (DGS-3212SR or DGS-3312SR Stacking Master needed for star stacking)
- Full duplex support for GBIC port
- IEEE 802.3x Flow Control (GBIC port)
- Stacking cable: proprietary IEEE 1394 cable (provided)
- Network cables (GBIC port): single-mode and multi-mode fiber
- LED report (per port): Link/Act (GBIC port)

#### DES-131F/132F Fast Ethernet Fiber Modules

- IEEE 802.3u 100BASE-FX standard
- 1 or 2 100Mbps fiber ports (SC connectors)
- Full duplex support
- IEEE 802.3x Flow Control
- Cables: 50, 62.5/125-micron multi-mode fiber (2 km max.)
- LED report (per port): Link/Act

#### DES-131FL/132FL Fast Ethernet Fiber Modules

- IEEE 802.3u 100BASE-FX standard
- 1 or 2 100Mbps fiber ports (SC connectors)
- Full duplex support
- IEEE 802.3x Flow Control
- Cables: 9-micron single-mode fiber (15 km max.)
- LED report (per port): Link/Act

#### DES-132G Gigabit Fiber Module

- IEEE 802.3z 1000BASE-SX standard
- 2 Gigabit fiber ports (SC connectors)
- Full duplex support
- IEEE 802.3x Flow Control
- Cables: 50/125 micron multi-mode fiber (525 m max.), 62.5/125 micron multi-mode fiber (275 m max.)
- LED report (per port): Link/Act

#### DES-132GL Gigabit Fiber Module

- IEEE 802.3z 1000BASE-LX standard

- 2 Gigabit fiber ports (SC connectors)
- Full duplex support
- IEEE 802.3x Flow Control
- Cables: single-mode fiber (5 km max.)
- LED report (per port): Link/Act

#### DES-132T Gigabit Copper Module

- IEEE 802.3 10BASE-T/802.3u 100BASE-TX/IEEE 802.3ab 1000BASE-T standards
- 2 auto-sensing 10/100/1000Mbps ports
- Full/half duplex support with ANSI/IEEE 802.3 NWay auto-negotiation
- IEEE 802.3x Flow Control in full-duplex, back pressure in half-duplex
- 10BASE-T/100BASE-TX: full/half duplex
- 1000BASE-T: full duplex
- MDI-II/MDI-X auto-sensing for all twisted-pair ports
- Auto-correction of twisted-pair Rx reverse polarity
- 10BASE-T cables:
  - UTP Cat. 3, 4, 5 (100 m max.)
- 100BASE-TX/1000BASE-T cables:
  - UTP Cat. 5/Cat. 5e (100 m max.)
- LED report (per port):
  - 100/1000Mbps speed
  - Link/Act

#### DES-132 10/100Mbps Fast Ethernet Module

- IEEE 802.3 10BASE-T/802.3u 100BASE-TX standards
- 2 10/100Mbps ports
- IEEE 802.3x Flow Control in full-duplex, back pressure in half-duplex
- Auto MDI/MDIX for each port

#### DES-132GB GBIC Module

- IEEE 802.3z standard
- 2 GBIC-based ports for installation of 1000BASE-SX and 1000BASE-LX PHY modules
- Full duplex support
- IEEE 802.3x Flow Control
- Cables: single-mode and multi-mode fiber
- LED report (per port): Link/Act

### Software

#### VLAN

- IEEE 802.1Q Tagged VLAN
- Port-based VLAN
- Number of VLANs: 255 per device (max.)

#### Priority Queues

- Standard: IEEE 802.1p
- Number of queues: 4

#### Traffic Classification (CoS)

Can be based on user-definable application types:

- TOS
- Diffserv (DSCP)
- Port-based
- MAC address
- IP address
- TCP/UDP port number

#### Network Access Management

- Port security features
- 802.1x user authentication
- RADIUS client (for 802.1x authentication)
- Multi-layer ACL based on:
  - TOS
  - Diffserv (DSCP)
  - MAC address
  - IP address
  - User-definable applications

#### Spanning Tree

- IEEE 802.1D compatible
- IEEE 802.1W Rapid Spanning Tree

#### Multicast

- IGMP Snooping

#### Port Trunks

- Number of ports per trunk: 8 (max.)
- Number of trunks: 6 (max.)
- Operation mode: load sharing

# DES-3226S

## Technical Specifications

## 10/100Mbps L2 Stackable Switch

### Performance

**Transmission Method**  
Store-and-forward

**MAC Address Table**  
8K entries per device

**MAC Address Learning**  
- Dynamic entries: automatic update  
- Static entries: user-defined

**Packet Filtering/Forwarding Rates (half duplex)**  
- Ethernet: 14,880 pps per port  
- Fast Ethernet: 148,810 pps per port  
- Gigabit Ethernet: 1,488,100 pps per port

**RAM Buffer**  
- v.B1: 8MB per device (excluding optional modules)  
- v.C1: 16MB per device (excluding optional modules)

### Configuration & Management

**Management Support**  
- SNMP-based management v.1, v.2c, v.3  
- Web-based management  
- CLI (command line interface)  
- RMON monitoring  
- Telnet (up to 8 sessions)  
- Bandwidth control

**MIBs**  
- MIB-II (RFC 1213)  
- Bridge MIB (RFC 1493)  
- RMON MIB (RFC 1757)  
- 802.1Q VLAN MIB (RFC 2674)  
- IGMP MIB (RFC 2833)  
- If MIB (RFC 2233)  
- Ethernet-like MIB (RFC 2358) - dot3statsTable  
- D-Link enterprise MIB

**RMON Groups**  
1, 2, 3, 9 (Alarm, Statistics, History, Event)

**IP Number Self-identification**  
Through DHCP client, Bootp client

**Firmware Upgrade**  
TFTP

**Console Port**  
DB-9 RS-232 DCE

### Physical & Environmental

**Power Input**  
100 - 240 VAC, 50/60 Hz

**Internal universal power supply**

**Power Consumption**  
29 Watts (max.)

**Ventilation**  
40 x 40 mm DC fan

**Operating Temperature**  
0 ° - 50 °C (32 ° - 122 °F)

**Storage Temperature**  
-25° - 55 °C (13° - 131 °F)

**Humidity**  
5% - 95% non-condensing

**Dimensions**  
441 x 210 x 43 mm (17.36 x 8.27 x 1.69 inches)  
19-inch rack-mount width, 1 U height

**Weight**  
2.5 kg (5.51 lb.) (without module installed)

**Emission (EMI)**  
- FCC Class A  
- CE Class A  
- C-Tick Class A

**Safety**  
CSA International



### Ordering Information

#### 10/100Mbps Layer 2 Stackable Switch

**DES-3226S** 24 10/100Mbps ports + 1 open slot

#### Optional Modules

<b>DES-332GS</b>	1 stacking port + 1 GBIC port
<b>DES-132</b>	2 10/100Mbps ports
<b>DES-131F</b>	1 100BASE-FX multi-mode fiber port (SC connector)
<b>DES-132F</b>	2 100BASE-FX multi-mode fiber ports (SC connectors)
<b>DES-131FL</b>	1 100BASE-FX single-mode fiber port (SC connector)
<b>DES-132FL</b>	2 100BASE-FX single-mode fiber ports (SC connectors)
<b>DES-132G</b>	2 1000BASE-SX Gigabit fiber ports (SC type connectors)
<b>DES-132GL</b>	2 1000BASE-LX Gigabit fiber ports (SC type connectors)
<b>DES-132T</b>	2 10BASE-T/100BASE-TX/1000BASE-T Gigabit copper ports
<b>DES-132GB</b>	2 GBIC-based ports

#### Optional GBIC Transceivers

<b>DGS-701</b>	For 1000BASE-SX, multi-mode fiber, 550 m max.
<b>DGS-702</b>	For 1000BASE-LX, single-mode fiber, 5 km max.
<b>DGS-703</b>	For 1000BASE-LX, single-mode fiber, 10 km max.
<b>DGS-704</b>	For 1000BASE-LX, single-mode fiber, 30 km max.
<b>DGS-708</b>	For 1000BASE-LX, single-mode fiber, 70 km max.
<b>DGS-711</b>	For 1000BASE-T, Cat. 5 cable, 100 m max.
<b>DGS-707</b>	For 1000BASE-SX, multi-mode fiber, 550 m max.

#### Optional Stacking Master Switch

<b>DGS-3212SR</b>	L2 switch with 4 10/100/1000BASE-T ports, 4 combo SFP (mini GBIC), 2 expansion slots, redundant power support
<b>DGS-3312SR</b>	L3 switch with 4 10/100/1000BASE-T ports, 4 combo SFP (mini GBIC), 2 expansion slots, redundant power support
<b>DEM-540</b>	4 stacking ports (for use with DGS-3212SR, DGS-3312SR)
<b>DPS-200</b>	Redundant power supply (for use with DGS-3212SR, DGS-3312SR)



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