D-Link®

Gigabit L3 Switch

Business & Enterprise SOLUTIONS

Stacking Master & Modular Gigabit Layer 3 Switch

Stacking Up 12 DES-3226S Switches

12-Port Gigabit Switch With 4 Combo 1000BASE-T/SFP & 2 Expansion Slots, Redundant Power Support

The DGS-3312SR switch is a powerful, function-rich Layer 3 switch that gives the network administrator the flexibility to use it as a Stacking Master Switch, or as an all-Gigabit Modular Switch supporting copper and fiber connections. With 12 dedicated 2Gbps links to 12 stackable switches in the fault tolerant star architecture, redundant power backup, modular configuration, Layer 3 packet routing and extensive management capability, this highly versatile switch gives you the functions and flexibility needed to set up and run a departmental/enterprise network for mission-critical applications.

Modular Architecture

The DGS-3312SR provides 4 10/100/1000BASE-T ports, 4 combo SFP (mini GBIC) slots and 2 open expansion slots. The expansion slots allow you to flexibly deploy this switch as a Stacking Master Switch, or as a stand-alone all-Gigabit switch. The expansion slots support the following expansion modules:

- **DEM-540** 4-port stacking module. This module allows you to stack up 4 DES-3226S stackable switches. With 2 DEM-540 modules installed in the expansion slots, you can stack up to 8 stackable switches.
- **DEM-340MG** 4-port SFP (mini GBIC) module. This module provides 4 SFP slots for installation of 4 Gigabit transceivers supporting short, medium and long distance fiber cables.
- **DEM-340T** 4-port copper Gigabit module. This module provides 4 10/100/1000BASE-T ports for 4 copper Gigabit connections.

Fault Tolerant Switch Stacking

Using 2 DEM-540 stacking modules and the 4 built-in 1000BASE-T/SFP combo ports, the DGS-3312SR Stacking Master can stack up 12 D-Link stackable switches. The stacking scheme uses the star architecture, where packets are switched directly through the Stacking Master. This architecture provides for fault tolerance, as any single broken link between a switch and the Stacking Master will not affect the rest of the links of the stack. This compares favorably with the ring architecture, where a fail over link between any 2 switches can break the link of an entire stack.

Higher Performance Switch Stacking

Instead of a 2Gbps bandwidth shared by the entire stack in a ring architecture, the DGS-3312SR gives each of the switches on the stack a dedicated 2Gbps bandwidth from a Stacking Master stacking port. This brings the total bandwidth up to 24Gbps when 12 switches are stacked through the Stacking Master.

Scalable Expansion With 288 10/100BASE-TX & 12 Gigabit Ports

By stacking a DGS-3312SR with 12 DES-3226S switches, you can have as many as 288 10/100BASE-TX ports for departmental user connection, plus 12 Gigabit ports for server and backbone attachment. This architecture allows you to easily add switch units as your need grows, without making changes to your existing network hardware.

12-Port Collapsed Backbone

If you opt to use your DGS-3312SR as a stand-alone Gigabit switch, you can install up to 2 Gigabit modules in the expansion slots. This will give you 8 Gigabit ports, in addition to the 4 built-in 1000BASE-T/combo SFP ports, making it a total of 12 Gigabit ports. This type of deployment gives you a small collapsed backbone to which 12 switches and servers can be attached. All ports on the DGS-3312SR support jumbo frames to alleviate heavy network traffic. Copper and fiber cables can be deployed, depending on your selection of the port modules.

Redundant Power Support

The DGS-3312SR can be connected to an external power supply for redundant power backup purposes. In case the built-in internal power supply fails, the optional redundant power supply unit will automatically provide all the required power to ensure continuous operation.

Wire-speed IP Routing

The switch provides basic IP routing, with instant support for Windows, Unix and Internet environments. It provides wire-speed non-blocking switch fabrics with hardware-based packet filtering/forwarding. Packet routing is performed by on-board ASICs at speeds many times faster than CPU-based routers.

DGS-3312SR

Product Description

Gigabit L3 Switch

Seamless Integration

The DGS-3312SR can be instantly integrated into any existing network for seamless integration of Layer 2 and Layer 3 packet switching. With multi-layer support for every port, you can start with Layer 2 switching, then upgrade to Layer 3 routing anytime by simply re-configuring the ports. You can flexibly segment the network into domains and sub-domains, using (1) subnet IDs and user IP numbers to route traffic, and (2) custom filters based on users' physical MAC addresses to filter extraneous traffic. At Layer 2, the switch uses auto-learned and user-defined MAC addresses to discard and forward packets. At Layer 3, it looks at the user-specified routing table to route packets to their destinations.

VLANs for Enhanced Security & Performance

The DGS-3312SR supports 802.1Q and port-based VLANs to improve security and bandwidth utilization. This limits the broadcast domains and confines intra-group traffic within their segments. The switch also supports GVRP (GARP VLAN Registration Protocol) for automatic VLAN configuration distribution.

Advanced Network Access Management

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 based on TCP/UDP port number.

Advanced CoS 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 allows you to attach IP telephony devices or video servers to the switch to run delay-sensitive applications like video conference. The DGS-3312SR supports up to 8 CoS (Class of Service) queues in the stand-alone mode, and up to 4 CoS queues in the Stacking Master mode.

Flexible Transmission Scheduling

The switch supports 2 methods of packet transmission scheduling: Strict Priority Queuing and Weighted Round-Robin (WRR). You can select to use Strict Priority Queuing to strictly enforce your priority queues, or WRR to address bandwidth limitations at peak time. WRR 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 prevent too many broadcast/multicast from flooding 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.

Spanning Tree for Redundant Backup Bridge Path

For mission critical environments with multiple switches supporting STP, you can configure the stack 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. The DGS-3312SR supports 802.1D Spanning Tree compatible and 802.1w Rapid Spanning Tree.

Multiple Management Interfaces

SNMP v.1, 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 troubleshoot 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.

Features

- *4 built-in 10/100/1000BASE-T ports*
- *4 built-in combo SFP (mini GBIC) **
- *2 expansion slots for stacking or Gigabit port module installation*
- *Selection of 4-port 1000BASE-T and SFP modules for expansion slots*
- *Redundant power supply support*
- *Up to 288 10/100BASE-TX ports and 12 Gigabit ports with 24Gbps back plane when stacked with DES-3226S switches*
- *Dedicated 2Gbps bandwidth between Stacking Master and each stackable switch*
- *Jumbo frame support (up to 9,216 bytes)*
- *IP routing supporting RIP-1, RIP-2, OSPF routing protocols, DVMRP, PIM Dense mode*
- *802.1Q VLAN, GARP/GVRP support*
- *IGMP snooping, 802.1p Priority Queues, port mirroring support*
- *Multi-layer (Layer 2 to Layer 4) ACL and CoS support*
- *Broadcast storm control*
- *802.1D compatible, 802.1w Rapid Spanning Tree for redundant backup bridge paths*
- *SNMP v.1, v.3 network management, 4 groups of RMON*
- *802.1x port-based/MAC-based access control*
- *Per-port bandwidth control*
- *802.3ad LACP port trunks*
- *Command Line Interface, TFTP firmware upgrade, Web-based management, Web GUI Traffic Monitoring support*
- *SNMP management/MIB support*

** Use of the SFP will disable their corresponding built-in 10/100/1000BASE-T connections.*

DES-3312SR

Technical Specifications

Gigabit L3 Switch

Hardware

Device Ports
- 4 built-in 10/100/1000BASE-T ports
- 4 built-in combo SFP (mini GBIC) *
- RS-232 console port

** Use of the SFP will disable their corresponding built-in 10/100/1000BASE-T connections. These Gigabit ports can be configured for server/backbone attachments, or for switch stacking.*

Number of Expansion Slots
2

Port Modules (for expansion slots)
- DEM-540: 4 stacking ports
- DEM-340MG: 4 SFP slots
- DEM-340T: 4 10/100/1000BASE-T ports

Port Standard/Function Support
- IEEE 802.3 10BASE-T/802.3u 100BASE-TX/802.3ab 1000BASE-T
- ANSI/IEEE 802.3 NWay auto-negotiation
- IEEE 802.3x Flow Control
- Auto MDI/MDIX
- Port mirroring

SFP (Mini GBIC) Support
- IEEE 802.3z 1000BASE-LX (DEM-310GT transceiver)
- IEEE 802.3z 1000BASE-SX (DEM-311GT transceiver)
- IEEE 802.3z 1000BASE-LH (DEM-314GT transceiver)
- IEEE 802.3z 1000BASE-ZX (DEM-315GT transceiver)

Forwarding Rate
17.8Mpps (max.)

Switch Fabric
24Gbps

Diagnostic LEDs
Per device:
- Power
- Console
- RPS

Per RJ-45 port:
- Speed
- Link/Act

Per SFP port:
- Link/Act

Software

IP Routing
- IP v4 support
- IP Fragmentation support
- Routing protocols supported:
  Static routing
  RIP-1, RIP-2
  OSPF v.2

VLAN
- IEEE 802.1Q Tagged VLAN
- Port-based VLAN (non-overlapping)
- GARP/GVRP
- Maximum number of VLANs: 255 (Stacking Master mode), 4K (stand-alone mode)

Priority Queues (CoS)
- Standard: IEEE 802.1p
- Number of queues: 4 per port (Stacking Master mode), 8 per port (stand-alone mode)

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 Security
- 802.1x user authentication: port-based and MAC-based
- RADIUS client for 802.1x support
- SSH2 *
- SSL *
- TACACS/TACACS+/XTACACS *
- Cisco-like port security
- Multi-layer Access Control List (ACL) based on:
  MAC
  VLAN
  802.1p
  Diffserv (DSCP)
  IP address
  Protocol type
  TCP/UDP destination port number

** Functions available in next firmware upgrade*

Spanning Tree
- 802.1D compatible
- 802.1w Rapid Spanning Tree

Multicast
- IGMP v2
- IGMP Snooping
- DVMRP
- PIM-DM

Port Trunk
- Number of ports per trunk: 8 (max.)
- Number of trunk per switch: 6 (max.) (in DGS-3312SR stand-alone mode only)
- Trunking mode: static
- Operation mode: load sharing
- 802.3ad LACP support

Performance

Transmission Method
Store-and-forward

MAC Address Table
16K entries per device

Routing Table
2K entries per device

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

Layer 2 Packet Filtering/Forwarding Rates (half duplex)
1,488,100 pps per port (max.)

RAM Buffer
1MB per device

Jumbo Frame Size
Up to 9,216bytes

Broadcast Storm Control
Rate control of Broadcast, unknown Multicast and Unicast packets

Configuration & Management

Management Support
- SNMP v.1, v.3
- Web-based management
- CLI (command line interface)
- RMON monitoring
- Telnet server
- Telnet remote control console
- SYSLOG
- Web GUI traffic monitoring
- Password enable
- Web MAC address browsing
- SNMP trap on MAC notification
- SNTP
- IP filtering on management interface

MIBs
- MIB-II (RFC 1213)
- Bridge MIB (RFC 1493)
- RMON MIB (RFC 1757)
- RIP (RFC 1724)
- OSPF (RFC 1850)
- CIDR (RFC 2096)
- 802.1Q VLAN/802.1p MIB (RFC 2674)
- IGMP MIB (RFC 2933)
- IF (Interface) MIB (RFC 2233)
- Ethernet-like MIB (RFC 1643)
- D-Link enterprise MIB

DGS-3312SR

Technical Specifications

Gigabit L3 Switch

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

IP Number Self-identification
Through DHCP client, Bootp client

Firmware Upgrade
TFTP client

Console Port
DB-9 RS-232 DCE

Physical & Environmental

Power Input
100 to 120 VAC, 50/60 Hz or 200 to 240 VAC, 50/60 Hz
Internal universal power supply

Redundant Power Backup Support
Connector to connect to external redundant power supply

Power Consumption
30 watts (max.) (without expansion modules)

Ventilation
60 x 60 mm DC fans x 1

Operating Temperature
0 ˚to 40 ˚C

Storage Temperature
-25˚ to 55 ˚C

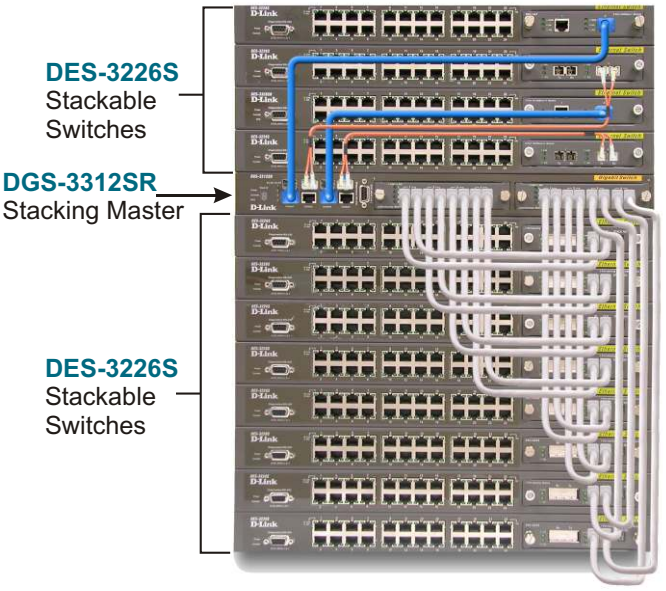
Humidity
10% to 95% non-condensing

Dimensions
440 (W) x 309 (D) x 44 mm (H) (device only)
19-inch rack-mount width, 1 U height

Weight
4.4 kg (device only, without expansion modules)

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

Safety
CSA International



Stack of 12 DES-3226S switches connected to a DGS-3312SR Stacking Master in a star stacking scheme. 8 DES-3226S are connected to the Stacking Master through their stacking ports. 4 other DES-3226S are stacked with stacking Master through the Gigabit ports.

ACN 052 202 838

Ordering Information

Stacking Master & Modular L3 Gigabit Switch

DGS-3312SR	4 10/100/1000BASE-T ports, 4 combo SFP (mini GBIC), 2 expansion slots, redundant power support

Optional Expansion Module

DEM-540	4 stacking ports
DEM-340MG	4 SFP GBIC slots
DEM-340T	4 10/100/1000BASE-T ports

Optional SFP Transceiver

DEM-310GT	SFP transceiver for 1000BASE-LX, single-mode fiber, max. distance 10km, 3.3V
DEM-311GT	SFP transceiver for 1000BASE-SX, multi-mode fiber, max. distance 550m, 3.3V
DEM-314GT	SFP transceiver for 1000BASE-LHX, single-mode fiber, max. distance 40km, 3.3V
DEM-315GT	SFP transceiver for 1000BASE-ZX, single-mode fiber, max. distance 80km, 3.3V

Optional Redundant Power Supply

DPS-200	60 watts redundant power supply
DPS-800	2-slot redundant power supply chassis
DPS-900	8-slot redundant power supply chassis

D-Link®

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Canada	TEL: 1-905-8295033	FAX: 1-905-8295095
Europe	TEL: 44-20-8731-5555	FAX: 44-20-8731-5511
Germany	TEL: 49-6196-77990	FAX: 49-6196-7799300
France	TEL: 33-1-30238688	FAX: 33-1-30238689
Benelux	TEL: 31-10-2045740	FAX: 31-10-2045880
Italy	TEL: 39-2-2900-0676	FAX: 39-2-2900-1723
Iberia	TEL: 34-93-4090770	FAX: 34-93-4910795
Sweden	TEL: 46-(0)8564-61900	FAX: 46-(0)8564-61901
Norway	TEL: 47-22-309075	FAX: 47-22-309085
Denmark	TEL: 45-43-969040	FAX: 45-43-424347
Finland	TEL: 358-9-2707-5080	FAX: 358-9-2707-5081
Singapore	TEL: 65-6774-6233	FAX: 65-6774-6322
Australia	TEL: 61-2-8899-1800	FAX: 61-2-8899-1868
Japan	TEL: 81-3-5434-9678	FAX: 81-3-5434-9868
China	TEL: 86-10-8518-2533	FAX: 86-10-8518-2250
India	TEL: 91-22-652-6696	FAX: 91-22-652-8914
Egypt	TEL: 202-62-44615	FAX: 202-62-44583
UAE	TEL: 971-4-3916480	FAX: 971-4-3908881
Turkey	TEL: 90-212-335-2525	FAX: 90-212-335-2500
Israel	TEL: 972-9-9715700	FAX: 972-9-971-5601
Chile	TEL: 56-2-232-3185	FAX: 56-2-232-0923
Brasil	TEL: 55-11-3094-2910	FAX: 55-11-3094-2921
South Africa	TEL: 27(0)1266-52165	FAX: 27(0)1266-52186
Russia	TEL: 7-095-737-3389	FAX: 7-095-737-3390
Taiwan	TEL: 886-2-2910-2626	FAX: 886-2-2910-1515
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