



DES-3326S

DES-3326S with 24 10/100Mbps ports. A DES-332GS stack module installed in the open slot provides a GBIC port and switch stacking capability.

## 24-Port Layer 3 Fast Ethernet Stackable Switch

The DES-3326S is a Stackable Multi-layer Routing Switch that combines wire-speed Layer 2 switching with basic Layer 3 IP packet routing and quality of service (QoS), all in one single box. It provides 24 10/100Mbps ports, 1 GBIC port for server or fiber backbone connection, and scalable expansion of up to 6 units per stack. Designed to give everything a business needs for today's switched networks, this switch gives you the edge device simplicity and the price/performance ratio ideal for departmental connection.

### 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 auto MDI-II/MDI-X uplink, allowing you to connect to workstations, servers, or other switches from any port 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 DES-332GS 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 gives you Gigabit server connection or attachment to a fiber backbone.

### Scalable Expansion

Up to 6 DES-3326S can be stacked together. You can add units to reach maximum 144 10/100Mbps ports and 6 GBIC-based ports per stack. The switches are stacked together through high-speed stack cables that provide multi-gigabit per second backplane, allowing the entire stack to perform as a single entity.

### Wire-speed IP Routing

The DES-3326S is designed for 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.

### Seamless Integration

The DES-3326S 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.

### Ready for Voice, Video Applications

With Priority Queues and IP multicast (IGMP snooping) support, Quality of Services (QoS) can be guaranteed for successful execution of delay-sensitive applications like video conference and IP telephony.

### 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 6 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. Up to 6 multi-link trunks can be configured for a stack.

### 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 IEEE 802.1Q VLAN Tagging connected to the switch can be grouped into different Virtual LANs (VLANs). The switch also supports GVRP (GARP VLAN Registration Protocol) for automatic VLAN configuration distribution.

### Quality of Service (QoS)

The DES-3326S provides for classification and prioritization of packets using 802.1p Priority Queue control (Layer 2), IP TOS, DSCP bits and IP source/destination addresses (Layer 3), and TCP/UDP port number (Layer 4). With QoS based on multi-layer information, your workstations and server can be attached to the switch and run delay-sensitive applications like video-conference and IP telephony.

### Flexible Transmission Scheduling

The switch supports 2 methods of packet transmission scheduling: Strict Round-Robin (SRR) and Weighted Round-Robin (WRR). You can select to use SRR 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 limit too many broadcast/multicast flooding in the network, broadcast/multicast storm control is configured to screen excessive traffic. 5 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 Protocol

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.

### SNMP & Web-based Management

The switch stack can be managed from within the LAN from an SNMP management station, and via an Internet from any workstation. Standard-based MIBs are built-in, allowing for monitoring and management from third-party management platforms. Web-based management program is built into the switch. RMON monitoring is through built-in RMON MIBs.

### Optional Ports (Stand-alone Configuration)

If you configure the DES-3326S as a stand-alone switch, you can install the following modules in the open slot:

- 2-port Fast Ethernet multi-mode fiber module (100BASE-FX)
- 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)
- GBIC module (2 ports)

### Gigabit Over Copper Twisted-pair

The optional Gigabit copper ports provide an inexpensive alternative solution to the fiber. Using your existing low-cost Cat. 5 twisted-pair wires as the transmission media, these ports allow you to instantly upgrade your servers to Gigabit capability without requiring you to install new, expensive fiber cables.

## Features

- 24 built-in 10/100Mbps ports
- Switch stacking configuration: 6 units per stack + 6 GBIC ports
- 1 open slot for 2 optional Fast Ethernet fiber or 2 Gigabit ports (stand-alone configuration)
- 8.8Gbps switching fabric
- IP routing supporting RIP-1, RIP-2, OSPF routing protocols
- Multi-layer QoS
- Support Multi-Link Trunking
- Supports 802.1Q VLAN, GMRP multicast, IGMP snooping, 802.1p Priority Queues, port mirroring
- Port trunking of up to 8 Fast Ethernet ports
- Broadcast storm control
- 802.3x Flow Control
- 802.1D Spanning Tree for redundant backup bridge paths
- SNMP & web-based management, RMON monitoring
- Single IP Address management for a virtual stack of up to 6 switches

### 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)

#### Topology

Star

### 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
- 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 standard)
- Stackable units: 6 DES-3326S switches per stack
- Stacking method: ring
- 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-132F Fast Ethernet Fiber Module

- IEEE 802.3u 100BASE-FX standard
- 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-132FL Fast Ethernet Fiber Module

- IEEE 802.3u 100BASE-FX standard
- 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 100BASE-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
- 100BASE-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-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

#### Quality of Service (QoS)

(Classification & Prioritization)

- Layer 2:
  - Priority bits (IEEE 802.1p standard)
  - 4 priority queues
- Layer 3:
  - IP TOS and DSCP bits
  - IP destination & source addresses
- Layer 4:
  - TCP/UDP port number

#### IP Routing

- IP v4 support
- IP multi-netting
- Path MTU discovery
- IP Fragmentation support
- Routing protocols supported:

#### Static routing

RIP-1, RIP-2

#### OSPF v.2

#### VLAN

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

#### Spanning Tree

Standard: IEEE 802.1D

#### Multicast

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

#### Access Security (Layer 2 Filters)

- MAC based: user-specified MAC addresses
- VLAN based: ingress checking enable/disable
- Port based: MAC address learning per port enable/disable
- IEEE 802.1x Port-based Network Access Control \*

**Access Security (Layer 3 Access Control List) \***

IP address based

**MultiLink Trunking (MLT)**

Enables grouping of links between the switch and another switch or a server to provide higher bandwidth of up to 8 10/100 ports or up to 6 GBIC ports with active redundant links. A multi-link is defined as trunked ports spanning multiple units of the stack for fail-safe connectivity to mission-critical servers and the network center.

- Number of Fast Ethernet ports per trunk: 8 (max.)
- Number of Fast Ethernet ports per multi-link trunk: 8 (max.)
- Number of Gigabit ports per multi-link trunk: 6 (max.)
- Number of trunks per switch: 6 (max.)
- Number of trunks per stack: 36 (max.)
- Number of multi-link trunks per stack: 6 (max.)
- Operation mode: load sharing

**Performance****Transmission Method**

Store-and-forward

**MAC Address Table**

8K entries per device

**MAC Address Learning**

- Dynamic entries: automatic update
- Static entries: user-defined

**Routing Table**

2K entries per device

**Layer 2 Packet 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

**Layer 3 Packet Forwarding Rate (half duplex)**

6.6Mpps

**RAM Buffer**

8MB per device (excluding optional modules)

**Configuration & Management****Management Methods & Standards**

- SNMP v.1 & v.3
- Web-based (via web browser)
- RMON monitoring
- Telnet (up to 8 sessions)
- CLI (command line interface)

**Management Security**

Password enabled

**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 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**

- 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 fans x 2

**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
- VCCI Class A
- BSMI Class A

**Safety**

CSA International

\* Available in future release



ACN 052 202 838

**Ordering Information****10/100Mbps Stackable Layer 3 Switch**

DES-3326S 24 10/100Mbps ports + 1 open slot

**Optional Modules**

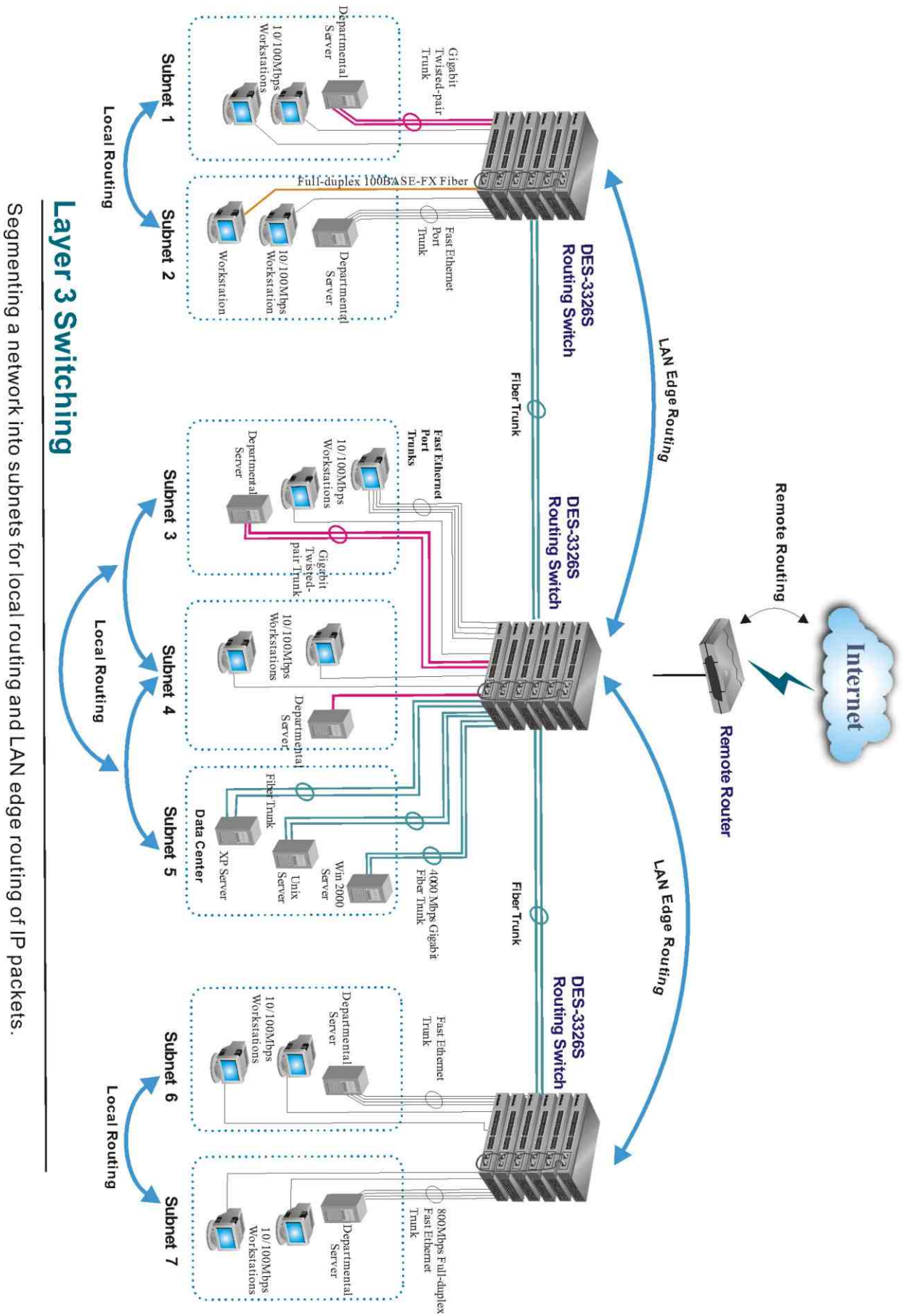
|           |  |
|-----------|--|
| DES-332GS | 1 stacking port + 1 GBIC port                          |
| DES-132F  | 2 100BASE-FX multi-mode fiber ports (SC connectors)    |
| DES-132FL | 2 100BASE-FX single-mode fiber ports (SC connectors)   |
| DES-132G  | 2 1000BASE-SX Gigabit fiber ports (SC type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

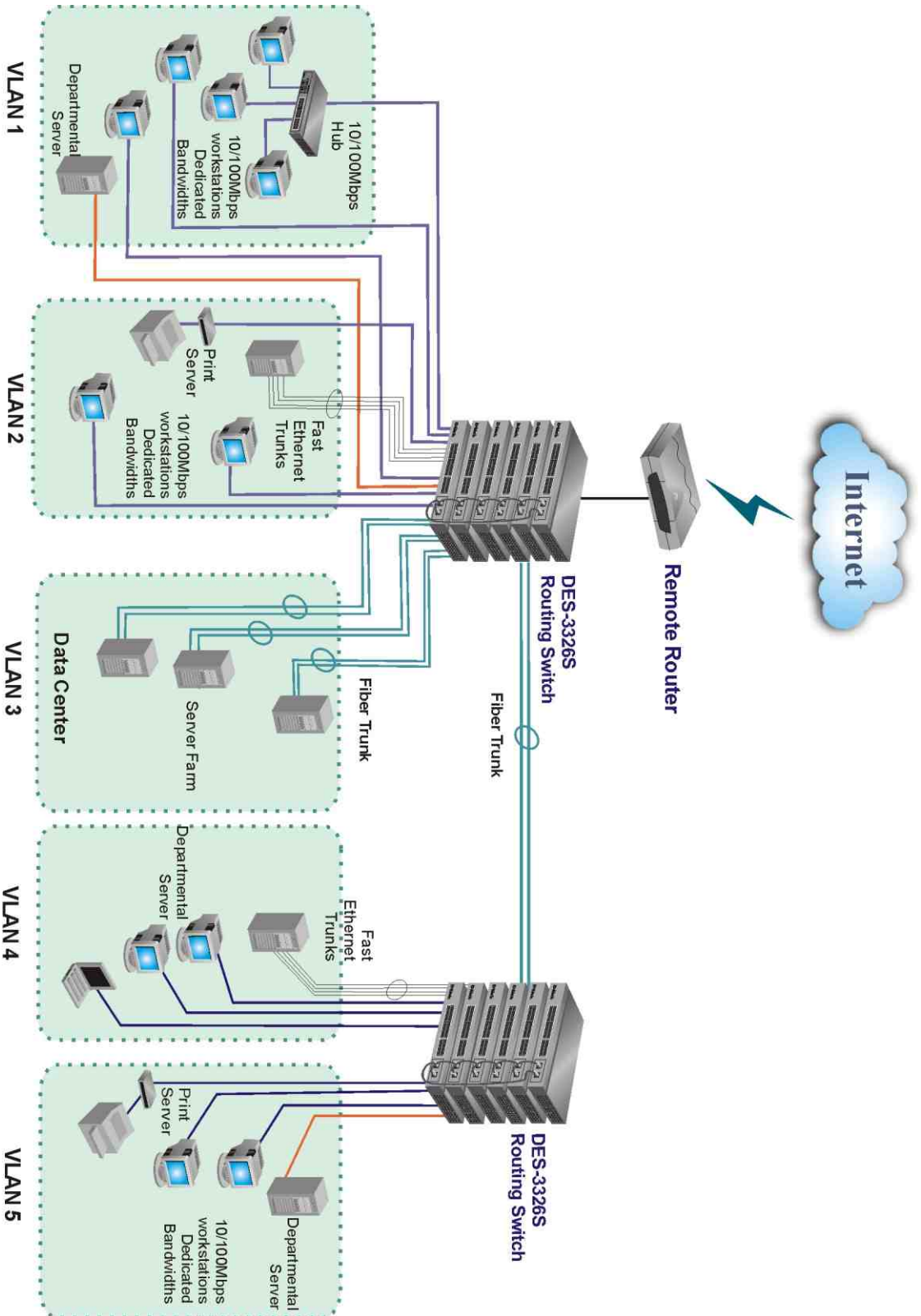
Specifications subject to change without prior notice.  
D-Link is a registered trademark of D-Link Corporation/D-Link System Inc. All other trademarks belong to their proprietors.

|                      |                       |                       |                      |
|----------------------|-----------------------|-----------------------|----------------------|
| <b>U.S.A.</b>        | TEL: 1-949-788-0805   | FAX: 1-949-753-7033   | www.dlink.com        |
| <b>Canada</b>        | TEL: 1-905-8295033    | FAX: 1-905-8295095    | www.dlink.ca         |
| <b>Europe</b>        | TEL: 44-20-8731-5555  | FAX: 44-20-8731-5511  | www.dlink.co.uk      |
| <b>U.K.</b>          | TEL: 44-20-8731-5555  | FAX: 44-20-8731-5511  | www.dlink.co.uk      |
| <b>Germany</b>       | TEL: 49-6196-77990    | FAX: 49-6196-7799030  | www.dlink.de         |
| <b>France</b>        | TEL: 33-1-30238688    | FAX: 33-1-30238689    | www.dlink-france.fr  |
| <b>Benelux</b>       | TEL: 31-40-2668713    | FAX: 31-40-2668666    | www.dlink-benelux.nl |
| <b>Italy</b>         | TEL: 39-02-2900-0676  | FAX: 39-02-2900-1723  | www.dlink.it         |
| <b>Iberia</b>        | TEL: 34-93-4090770    | FAX: 34-93-4910795    | www.dlinkiberia.es   |
| <b>Sweden</b>        | TEL: 46-(0)8564-61900 | FAX: 46-(0)8564-61901 | www.dlink.se         |
| <b>Norway</b>        | TEL: 47-22-991890     | FAX: 47-22-207039     | www.dlink.no         |
| <b>Denmark</b>       | TEL: 45-43-969040     | FAX: 45-43-424347     | www.dlink.dk         |
| <b>Finland</b>       | TEL: 358-9-622-91660  | FAX: 358-9-622-91661  | www.dlink-fi.com     |
| <b>Singapore</b>     | TEL: 65-774-6233      | FAX: 65-774-6322      | www.dlink-intl.com   |
| <b>Australia</b>     | TEL: 61-2-94177100    | FAX: 61-2-94171077    | www.dlink.com.au     |
| <b>Japan</b>         | TEL: 81-3-5434-9678   | FAX: 81-3-5434-9868   | www.dlink.co.jp      |
| <b>China</b>         | TEL: 86-10-8809-7777  | FAX: 86-10-8809-6789  | www.dlink.cn         |
| <b>India</b>         | TEL: 91-22-652-6696   | FAX: 91-22-652-8914   | www.dlink-india.com  |
| <b>Middle East</b>   | TEL: 202-6356176      | FAX: 202-6356192      | www.dlink-me.com     |
| <b>South America</b> | TEL: 56-2-232-3185    | FAX: 56-2-232-0923    | www.dlink.cl         |
| <b>South Africa</b>  | TEL: 27(0)126652165   | FAX: 27(0)126652186   | www.dlink.co.za      |
| <b>Russia</b>        | TEL: 7-095-737-3389   | FAX: 7-095-737-3390   | www.dlink.ru         |
| <b>Taiwan</b>        | TEL: 886-2-2910-2626  | FAX: 886-2-2910-1515  | www.dlinktw.com.tw   |
| <b>D-Link Corp.</b>  | TEL: 886-2-2916-1600  | FAX: 886-2-2914-6299  | www.dlink.com.tw     |



RECYCLABLE  
Rev. 01 (July 2002)  
Printed in Taiwan





**Layer2 Switching**

Segmenting a network into VLANs to enhance performance and security.