

Appendix A - Ethernet Technology

This chapter will describe the features of the D-Link DGS-1100-10/ME and provide some background information about Ethernet/Fast Ethernet/Gigabit Ethernet switching technology.

Gigabit Ethernet Technology

Gigabit Ethernet is an extension of IEEE 802.3 Ethernet utilizing the same packet structure, format, and support for CSMA/CD protocol, full duplex, and management objects, but with a tenfold increase in theoretical throughput of over 100-Mbps Fast Ethernet and a hundredfold increase over 10-Mbps Ethernet. Since it is compatible with all 10-Mbps and 100-Mbps Ethernet environments, Gigabit Ethernet provides a straightforward upgrade without wasting existing investments in hardware, software, or trained personnel.

The increased speed and extra bandwidth offered by Gigabit Ethernet is essential in solving network bottlenecks, which frequently develops as more advanced computer users and newer applications continue to demand greater network resources. Upgrading key components, such as backbone connections and servers to Gigabit Ethernet technology, can greatly improve network response times as well as significantly speed up the traffic between subnets.

Gigabit Ethernet enables fast optical fiber connections to support video conferencing, complex imaging, and similar data-intensive applications. Likewise, since data transfers occur 10 times faster than Fast Ethernet, servers outfitted with Gigabit Ethernet NIC's are able to perform 10 times the number of operations in the same amount of time.

In addition, the phenomenal bandwidth delivered by Gigabit Ethernet is the most cost-effective method to take advantage of today and tomorrow's rapidly improving switching and routing internetworking technologies. With expected advances in the coming years in silicon technology and digital signal processing, which will enable Gigabit Ethernet to eventually operate over unshielded twisted-pair (UTP) cabling, a flexible foundation for the next generation of network technology products will be created. This will outfit your network with a powerful 1000-Mbps-capable backbone/server connection.

Fast Ethernet Technology

The growing importance of LANs, and the increasing complexity of desktop computing applications are fueling the need for high performance networks. A number of high-speed LAN technologies have been proposed to provide greater bandwidth and improve client/server response times. Among them, 100BASE-T (Fast Ethernet) provides a non-disruptive, smooth evolution from the current 10BASE-T technology. The non-disruptive and smooth evolution nature, and the dominating potential market base, virtually guarantees cost-effective and high performance Fast Ethernet solutions.

100Mbps Fast Ethernet is a standard specified by the IEEE 802.3 LAN committee. It is an extension of the 10Mbps Ethernet standard with the ability to transmit and receive data at 100Mbps, while maintaining the CSMA/CD Ethernet protocol. Since the 100Mbps Fast Ethernet is compatible with all other 10Mbps Ethernet environments, it provides a straightforward upgrade and utilizes existing investments in hardware, software, and personnel training.

Switching Technology

Another approach to push beyond the limits of Ethernet technology is the development of switching technology. A switch bridges Ethernet packets at the MAC address level of the Ethernet protocol transmitting among connected Ethernet or Fast Ethernet LAN segments.

Switching is a cost-effective way of increasing the total network capacity available to users on a local area network. A switch increases capacity and decreases network loading by dividing a local area network into different segments, which won't compete with each other for network transmission capacity.

The switch acts as a high-speed selective bridge between the individual segments. The switch, without interfering with any other segments, automatically forwards traffic that needs to go from one segment to another. By doing this the total network capacity is multiplied, while still maintaining the same network cabling and adapter cards.

Appendix B - Technical Specifications

Hardware Specifications

Key Components / Performance

- Switching Capacity: 20Gbps
- Max. Forwarding Rate: 14.88Mpps
- Forwarding Mode: Store and Forward
- Packet Buffer memory: 4.1M bit
- DDR for CPU: 128M Bytes
- Flash Memory: 16M Bytes

Port Functions

- 8 10/100/1000Base-TX ports compliant with the following standards:
 - IEEE 802.3
 - IEEE 802.3u
 - IEEE 802.3ab
 - IEEE 802.3az
 - Supports Half/Full-Duplex operations
 - IEEE 802.3x Flow Control support for Full-Duplex mode
 - Auto MDI/MDIX
 - Auto-negotiation
- 2 SFP port supporting SFP Transceivers
 - DEM-310GT (1000BASE-LX, 10km)
 - DEM-311GT (1000BASE-SX, 550m)
 - DEM-314GT (1000BASE-LH, 50km)
 - DEM-315GT (1000BASE-ZX, 80km)
 - DEM-312GT2 (1000BASE-SX, 2km)
 - DEM-210 (100BASE-FX, 15km)
 - DEM-211 (100BASE-FX, 2km)
 - DEM-302s-LX (1000BASE-LX, 2km)
 - DGS-712 (1000Base-T)
- 2 SFP port supporting WDM Transceivers
 - DEM-330T (1000Base-BX,TX-1550/RX-1310nm, 10km)
 - DEM-330R (1000Base-BX,TX-1310/RX-1550nm, 10km)
 - DEM-331T (1000Base-BX,TX-1550/RX-1310nm, 40km)
 - DEM-331R (1000Base-BX,TX-1310/RX-1550nm, 40km)
 - DEM-220T (100Base-BX, TX-1550/RX-1310nm, 20km)
 - DEM-220R (100Base-BX, TX-1310/RX-1550nm, 20km)
 - DEM-302S-BXD (1000BASE-BX, TX-1550/RX-1310nm, 2km)
 - DEM-302X-BXU (1000BASE-BXU, TX-1310/RX-1550nm, 2km)

Physical & Environment

- AC input, 100~240 VAC, 50/60Hz, internal universal power supply
- Acoustic Value: 0dB (Fan-less)
- Operation Temperature -5~50°C
- Storage Temperature -40~70°C
- Operation Humidity: 10%~90% RH
- Storage Humidity: 5%~90% RH

Emission (EMI) Certifications

- CE Class B

Safety Certifications

- cUL, LVD

Features

L2 Features

- Supports up to 8K MAC address
- Supports 256 static MAC
- IGMP snooping:
 - Supports 256 IGMP Snooping group (shared with MLD Snooping)
 - Supports at least 256 static multicast groups (shared with MLD Snooping)
- Limited IP Multicast:
 - Supports up to 48 profiles (32 profiles for IGMP, 32 profiles for MLD) each profile can add up to 32 multicast groups
 - Able to configure the maximum multicast group number for a port, ranging from 1-32
- MLD Snooping:
 - Supports 256 MLD snooping group (shared with IGMP Snooping)
 - Supports 256 static multicast addresses (shared with IGMP Snooping)
- Loopback Detection
- Port mirroring
- STNP
- LLDP

VLAN

- 802.1Q VLAN
- Total 32 static VLAN groups
- Management VLAN
- ISM VLAN
- Supports Port-based Q-in-Q

QoS (Quality of Service)

- Be able to classify packets according to follow contents:
 - 802.1p priority

- DSCP
- Supports Strict / WRR mode in queue handling
- Support Port based bandwidth control

AAA

- 802.1X Local/RADIUS server
- 802.1X port-based/MAC-based access control
- RADIUS Accounting
- User Account Privilege for Mgmt Access:
 - Support 3 level user account
 - Operator (Read/Write)
 - Administrator (Read/Write)
 - User (read only)

- Power Saving by LED Shut-Off: Posered LEDs can be turned on/off by port or system through schedule.

- Power Saving by Port Shut-Off: Each port on the system can be turned on/off by schedule.

- Power Saving by System Hibernation: System enters hibernation by schedule. In this mode, switches get most power-saving figures since main chipsets (both MAC and PHY) are disabled for all ports, and energy required to power the CPU is minimal.

Security

- Static MAC : Support 256 Static MAC entries
- Port Security:Support 64 MACs per port
- Traffic Segmentation
- D-Link Safeguard Engine
- Broadcast Storm Control

OAM

- Cable Diagnostics
- 802.3ah:
 - 802.3ah D-Link extension: D-Link Unidirectional Link Detection (DULD)

Management

- Web-based GUI
- D-Link proprietary CLI
- Telnet Server: Support up to 8 telnet session simultaneously
- SNMP v1/v2c/v3
- DHCP Client
- DHCP Relay: Support DHCP local relay, option 82.
- DHCPv6 Relay: Support DHCP local relay and option 37
- SNMP Trap
- RMON v1: Support 4 groups 1, 2, 3, 9
- Web-based configuration backup / restoration
- Reset, Reboot
- IPv6 Neighbor Discovery:
 - Supports Max 256 ND entries
 - Support up to 128 static ND entries

D-Link Green Technology

- Power Saving: save energy in 4 ways:
 - Power Saving by Time Profile: Ports or the system can be turned on/off by giving schedule.

Appendix C – Rack mount Instructions

Safety Instructions - Rack Mount Instructions - The following or similar rack-mount instructions are included with the installation instructions:

- A) Elevated Operating Ambient - If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient. Therefore, consideration should be given to installing the equipment in an environment compatible with the maximum ambient temperature (T_{ma}) specified by the manufacturer.

- B) Reduced Air Flow - Installation of the equipment in a rack should be such that the amount of air flow required for safe operation of the equipment is not compromised.

- C) Mechanical Loading - Mounting of the equipment in the rack should be such that a hazardous condition is not achieved due to uneven mechanical loading.

- D) Circuit Overloading - Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of the circuits might have on overcurrent protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.

- E) Reliable Earthing - Reliable earthing of rack-mounted equipment should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuit (e.g. use of power strips).

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