

Product Specification

NIC-1G-2ET

A-GEAR PRO Gigabit ET Dual Port Server Adapter



Apply Dual-port Gigabit Ethernet copper server connections, design for multi- core processors and optimized for visualization.

1. Features

- Build on scalable PCI Express interface which provides dedicated I/O bandwidth for I/O intensive networking applications.
- Based on gigabit Ethernet copper connection
- Based on Intel original gigabit controller technology.
- Multi-Gigabit scalability and increased uptime through advanced server features.
- Optimized for virtualized environments
- High-performing, Reliable and proven Gigabit Ethernet technology from Intel Corporation.
- Flexibility with iSCSI Boot and choice of dual- port adapters in copper.

2. Product Description

2.1. Reliable connectivity you can count on

The A-GEAR PRO Gigabit ET Dual Port Server Adapters are A-GEAR's third generation of PCIe GbE network adapters. Built with the Intel 82576EB Gigabit Ethernet Controller, PCI Express bus interface, RJ-45 slots and UTP-5 cable copper connectivity, they can added multi-port or UTP-5 connectivity in a single PCI-E bus within one server adapter, to enhance network performance and also saving valuable PCI Express (PCIe *) server slots.

These new adapters showcase the next evolution in GbE networking features for the

enterprise network and data center. These features include support for multi-core processors and optimization for server virtualization.

2.2. Designed for Multi-Core Processors

These new dual-port adapters provide high-performing, dual-port Gigabit connectivity in a multi-core platform as well as in a virtualized environment. In a multi-core platform, the adapters support different technologies such as Intel QuickData Technology, MSI-X, and Low Latency Interrupts, that help in accelerating the data across the platform, thereby improving application response times.

The I/O technologies on a multi-core platform make use of the multiple queues and multiple interrupt vectors available on the network controller. These queues and interrupt vectors help in load balancing the data and interrupts amongst themselves in order to lower the load on the processors and improve overall system performance. For example, depending upon the latency sensitivity of the data, the low level latency interrupts feature can bypass the time interval for specific TCP ports or for flagged packets to give certain types of data streams the least amount of latency to the application.

2.3. Optimized for Virtualization

The A-GEAR PRO Gigabit ET Dual Port Server Adapters showcase the latest virtualization technology called Virtualization Technology for Connectivity (VT for Connectivity).

VT for connectivity is a suite of hardware assists that improve overall system performance by lowering the I/O overhead in a virtualized environment. This optimizes CPU usage, reduces system latency, and improves I/O throughput. Intel VT for Connectivity includes:

2.4. Virtual Machine Device Queues (VMDq) I/O Acceleration Technology 1 (Intel I/OAT)

Use of dual-port adapters in a virtualized environment is very important because of the need to provide redundancy and data connectivity for the applications/workloads in the virtual machines. Due to slot limitations and the need for redundancy and data connectivity, it is recommended that a virtualized physical server needs at least six GbE ports to satisfy the I/O requirement demands.

2.5. Virtual Machine Device queues (VMDq)

VMDq reduces I/O overhead created by the hypervisor in a virtualized server by performing data sorting and coalescing in the network silicon. VMDq technology makes use of multiple queues in the network controller. As data packets enter the network adapter, they are sorted, and packets traveling to the same destination (or virtual machine) get grouped together in a single queue. The packets are then sent to the hypervisor, which directs them to their respective virtual machines. Relieving the hypervisor of packet filtering and sorting improves overall CPU usage and throughput levels.

This new generation of PCIe A-GEAR Gigabit adapters provides improved performance with the next-generation VMDq technology, which includes features such as loop back functionality for inter-VM communication, priority-weighted bandwidth management, and

doubling the number of data queues per port from 4 to 8. It now also supports multicast and broadcast data on a virtualized server.

2.6. Intel I/O Acceleration Technology

Intel I/O Acceleration Technology (Intel I/OAT) is a suite of features that improves data acceleration across the platform, from networking devices to the chipset and processors, which help to improve system performance and application response times. The different features include Intel QuickData Technology, Direct Cache Access (DCA), MSI-X, Low-Latency Interrupts, Receive Side Scaling (RSS), and others. Intel QuickData Technology, a DMA engine, moves data using the chipset instead of the CPU. DCA enables the adapter to pre-fetch data from the memory cache, thereby avoiding cache misses and improving application response times. MSI-X helps in load-balancing I/O interrupts across multiple processor cores, and Low Latency Interrupts can provide certain data streams a non-modulated path directly to the application. RSS directs the interrupts to a specific processor core based on the application's address.

2.7. End-to-end Wired Security

The A-GEAR PRO Gigabit ET Dual Port Server Adapters are A-GEAR's first PCIe adapters to provide authentication and encryption for IPsec and LinkSec. LinkSec is already designed into the network adapter hardware. These adapters are future proof and prepared to provide LinkSec functionality when the ecosystem supports this new technology. IPsec provides data protection between the end-point devices of a network communication session. The IPsec offload feature is designed to offload authentication and encryption of some types of IPsec traffic and still delivers near line-rate throughput and reduced CPU utilization. LinkSec is a new IEEE industry-standard feature that provides data protection in the network. The IEEE 802.3ae and IEEE 802.3af protocols provide hop-to-hop data protection between two network devices in the transaction line between the host and destination. The two network devices must support the LinkSec technology. The network devices could be servers, switches, and routers.

2.8. On-Board Management Features

The A-GEAR PRO Gigabit ET Dual Port Server Adapters enable network manageability implementations required by IT personnel for remote control and alerting (IPMI, KVM Redirection, Media Redirection) by sharing the LAN port and providing standard interfaces to a Board Management Controller (BMC). The communication to the BMC is available through an on-board System Management Bus (SMBus) port. The adapter provides filtering capabilities to determine which traffic is forwarded to the host.

3. Product Specifications

3.1. General and Technical Features

Manufacturer Product Name	A-GEAR PRO Gigabit ET Dual Port Server Adapter
Product Code	NIC-1G-2ET
Form Factor	Internal-connected with servers .Workstations and Others
Controller-Processor	Intel 82576EB *1
Bus Type	PCI Express 2.0 (2.5GT/s)
Bus Width	x4 lane PCI Express operable in x4, x8, x16 slots
Network Interface Type	Dual-Port ,RJ-45 Slots *2
Data Rate(s) Supported	10, 100, and 1000 Mbps per port
Connection Parts	RJ-45 *2, UTP-5 cables which is required for EMI compliance
IEEE Network Standards	IEEE 802.3(10BASE-T, 100BASE-TX,1000BASE-T)
Typical Power Consumption	2.9 W (3.3 V & 0.88A)
Hardware Certifications	FCC B, UL, CE, VCI, BSMI, CTICK, MIC
LEDs	4 (2/port,) solid and blinking
Brackets *2	Includes a full-height bracket and a low profile bracket.

3.2. Environment Standard

Operating Temperature	0°C ~ 55°C
Operating Humidity	90%
Stoke Temperature	-40°C ~ 70°C
Stoke Humidity	90%

3.3. Physical Dimensions

Length	13.2 cm (5.20 in)
Width	6.8 cm (2.68 in)
Height of Brackets	12.0cm/8 cm (4.72 in/3.15 in)
Packing Standard Size (Unit)	20 x 15 x 4.5 (cm) (7.87 x 5.91 x 1.77 (in))

3.4. Manageability Features

On-board microcontroller	Implements pass through manageability via a sideband interface to a Board Management Controller (BMC) via SMBus Supports extended L2, L3, and L4 filtering for traffic routing to BMC
Advanced filtering capabilities	Supports MAC address, VLAN, ARP, IPv4, IPv6, RMCP UDP ports, and UDP/TCP ports filtering Supports flexible header filtering Enables the BMC to share the MAC address with the host OS
Preboot eXecution Environment (PXE) Support	Enables system boot up via the LAN (32-bit and 64-bit) Flash interface for PXE image
SNMP and RMON Statistic Counters	Easy system monitoring with industry-standard consoles Simple Network Management Protocol (SNMP), Remote Network Monitoring (RMON)
Wake-on-LAN support	Packet recognition and wake-up for LAN on motherboard applications without software configuration
iSCSI boot	Enables system boot up via iSCSI Provides additional network management capability
Watchdog timer	Used to give an indication to the manageability firmware or external devices that the chip or the driver is not functioning

4. Features and Benefits

Features	Benefits
Two Gigabit Ethernet SFP Ports	Apply two Gigabit Fiber SFP connections in a single PCI Express * slot, you can apply two high-performance PCI Express * 1000BASE-SX, 1000BASE-LX and 1000BASE-ZX adapters in limited server slot .and with the advanced server features to achieve multi-gigabit scalability and uptime.
Apply with SFP Slots, install the fiber optic module according to demand	Compatible with all single-mode or multimode Gigabit SFP optical modules, You can configure the module based on your operating requirements, to achieve meeting your needs and the optimal allocation of resources.
Apply Intel 82576 EB Gigabit Controller	Enables two Gigabit connections in a single adapter, industry-leading, energy-efficient design for next-generation Gigabit performance and multi-core processors.
iSCSI remote boot support	Provides centralized storage area network (SAN) management at a lower cost than competing iSCSI solutions.

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Features	Benefits
Load balancing on multiple CPUs	Increases performance on multi-processor systems by efficiently balancing network loads across CPU cores when used with Receive-Side Scaling from Microsoft or Scalable I/O on Linux*
Interrupt moderation	Delivers increased performance while significantly reducing CPU utilization
Compatible with x4, x8, and x16 full-height 2 PCI Express* slots	Allows dual-port operation in almost any PCI Express server slot, except x1 slots, and allows each port to operate without interfering with the other
Support for most network operating systems (NOS)	Enables widespread deployment
Remote management support	Reduces support costs with remote management based on industry-wide standards
PROSet Utility for Microsoft* Device Manager	Provides point-and-click power over individual adapters, advanced adapter features, connection teaming, and virtual local area network (VLAN) configuration
LC connectors	Small connector design is compatible with the latest fiber-optic cabling standard 1000BASE-SX, 1000BASE-LX or 1000BASE-ZX, multi-mode or single-mode cables which lengths up to 120km meters distance.
RoHS compliant ³ , Lead-free ¹ technology	Compliant with the new European Union directive 2002/95/EC to reduce the use of hazardous materials
Product backing	Backed by A-GEAR limited lifetime warranty, 3-months replacement guarantee, and 3-years global services warranty , and worldwide support.

5. I/O Features for Multi-Core Processor Servers

QuickData Technology	DMA Engine: enhances data acceleration across the platform (network, chipset, processor), thereby lowering CPU usage Direct Cache Access : enables the adapter to pre-fetch the data from memory, thereby avoiding cache misses and improving application response time
MSI-X support	Minimizes the overhead of interrupts Allows load balancing of interrupt handling between multiple cores/CPU's

Low Latency Interrupts	Based on the sensitivity of the incoming data it can bypass the automatic moderation of time intervals between the interrupts
Header splits and replication in receive	Helps the driver to focus on the relevant part of the packet without the need to parse it
Multiple queues: 8 queues per port	Network packet handling without waiting or buffer overflow providing efficient packet prioritization
Tx/Rx IP, SCTP, TCP, and UDP checksum offloading (IPv4, IPv6) capabilities	Lower processor usage , Checksum and segmentation capability extended to new standard packet type
Tx TCP segmentation offload (IPv4, IPv6)	Increased throughput and lower processor usage Compatible with large send offload feature
Receive and Transmit Side Scaling for Windows* and Scalable I/O for Linux*	This technology enables the direction of the interrupts to the processor cores in order to improve the CPU utilization rate
IPsec Offload	Offloads IPsec capability onto the adapter instead of the software to significantly improve I/O throughput and CPU utilization (for Windows* 2008 Server and Vista*)
LinkSec	A Layer 2 data protection solution that provides encryption and authentication ability between two individual devices (routers, switches, etc.) These adapters are prepared to provide LinkSec functionality when the ecosystem supports this new technology

6. Visualization Features

Virtual Machine Device queues 2 (VMDq)	Offloads the data sorting functionality from the Hypervisor to the network silicon, thereby improving data throughput and CPU usage Provides QoS feature on the Tx data by providing round robin servicing and preventing head-of-line blocking Sorting based on MAC addresses and VLAN tags
Next-generation VMDq	Enhanced QoS feature by providing weighted round robin servicing for the Tx data Provides loopback functionality, where data transfer between the virtual machines within the same physical server need not go out to the wire and come back in. This improves throughput and CPU usage. Supports replication of multicast and broadcast data

IPv6 offloading	Checksum and segmentation capability extended to the new standard packet type
Advanced packet filtering	24 exact-matched packets (unicast or multicast) 4096-bit hash filter for unicast and multicast frames Lower processor usage Promiscuous (unicast and multicast) transfer mode support Optional filtering of invalid frames
VLAN support with VLAN taginsertion	Ability to create multiple VLAN segments Stripping Packet filtering for up to 4096 VLAN tags

7. Network Operating Systems (NOS) Software Support

Operating System	IA32	x64	IPF
Windows* Vista* SP1	-	-	N/A
Windows Server* 2003 SP2	-	-	-
Windows* Unified Storage Solution 2003	-	-	-
Windows Server* 2008	-	-	-
Linux* Stable Kernel version 2.6	-	-	-
Linux* RHEL 4	-	-	-
Linux* RHEL 5	-	-	-
Linux* SLES 9	-	-	-
Linux* SLES 10	-	-	-
FreeBSD* 7.0	-	-	-
UEFI* 1.1	-	-	-
VMware ESX* 3.x	-	-	-

8. Advanced Software Features

Adapter fault tolerance (AFT)	Adaptive load balancing (ALB)
Switch fault tolerance (SFT)	Teaming support
Test switch configuration	PCIe Hot Plug*/Active peripheral component interconnect
IEEE 802.1Q* VLANs	IEEE 802.3ad (link aggregation control protocol)
IEEE 802.3 2005* flow control support	IEEE 1588 Precision Time Control Protocol
IEEE 802.1p*	Tx/Rx IP, TCP, and UDP checksum offloading (IPv4, IPv6) capabilities (Transmission control protocol (TCP), user datagram protocol (UDP), Internet protocol (IP))



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TCP segmentation/large
send offload

MSI-X supports Multiple Independent Queues

Interrupt moderation

IPv6 offloading--Checksum and segmentation capability
extended to new standard packet type

9. Companion Products

A-GEAR Ethernet server adapter has been tested for compatibility, available from 10/100 Mbps to 1000Mbps and 10 Gbps, optical fiber or copper, gigabit SFP transceivers SM or MM, 10 gigabit Ethernet SFP+ transceivers, can be adaptive plug replacement, extensive using PCI Express * and single to dual to quad ports configurations.



10. Customer Support

A-GEAR Customer Support Services offers a broad selection of programs including phone support, online service and warranty service. We offer you good service including 3-months replacement guarantee, and 3 years global warranty services and worldwide support.