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** halfduplex, others are point to point fullduplex*

AMD 990FX

chipset provides a total of **38x PCIe 2.0** lanes and 4x PCIe 2.0 for A-Link Express III

AMD 990X / 980G / 970

chipset provides a total of **22x PCIe 2.0** lanes and 4x PCIe 2.0 for A-Link Express III

- VIA VL805 4x USB3.0 connected to PCIe 2.0 x1 (500MB/s) Real measured: 358MB/s
- ASMedia ASM1142 2x USB3.1 connected to PCIe 2.0 x2 (1GB/s) Real measured: 733MB/s
- M.2 connected to PCIe 2.0 x4 (2GB/s)
- Intel Network PCIe 1.1 x1 (250MB/s)

* my note - real connection

nvidia nForce4 / GeForce8200

chipset provides a total of **20x PCIe 2.0** lanes

Intel Z97

chipset provides a total of **24x PCIe 3.0** lanes

Intel X99

chipset provides a total of **40x PCIe 3.0** lanes

SATA / USB Speed

Interface	RAW Speed	Bandwidth
SATA 1.5G	1.5 Gbit/s	143 MB/s *
SATA 3G	3 Gbit/s	286 MB/s *
SATA 6G	6 Gbit/s	572 MB/s *
USB 4.0	20 Gbit/s	1800 MB/s
USB 3.1 (USB 3.2 Gen 2)	10 Gbit/s	900 MB/s
USB 3.0 (USB 3.2 Gen 1)	5 Gbit/s	400 MB/s
USB 2.0	480 Mbit/s	26 MB/s *

* half duplex

USB 3.0 to SATA 6G

UGREEN 20231 → Chipset: VIA VL711 → https://www.via-labs.com/product_show.php?id=44
Real speed aprox: 380 MB/s (3 Gbit/s)

Marvell 88SE9230 SATA Controller

PCIe v2.0 x2 = max. 1GB/s
Max utilization → 4x SATA 3G or 2x SATA 6G

PCIe / Bus Speed

Slot	Clock	# Bits	Data per Clock	Bandwidth
PCI	33 MHz	32	1	133 MB/s *
PCI-X 66	66 MHz	64	1	533 MB/s *
PCI-X 133	133 MHz	64	1	1,066 MB/s *
PCI-X 266	133 MHz	64	2	2,132 MB/s *
PCI-X 533	133 MHz	64	4	4,266 MB/s *
AGP x1	66 MHz	32	1	266 MB/s
AGP x8	66 MHz	32	8	2,133 MB/s
PCIe 1.0 x1	2.5 GHz	1	1	250 MB/s
PCIe 1.0 x4	2.5 GHz	4	1	1,000 MB/s

Slot	Clock	# Bits	Data per Clock	Bandwidth
PCIe 1.0 x8	2.5 GHz	8	1	2,000 MB/s
PCIe 1.0 x16	2.5 GHz	16	1	4,000 MB/s
PCIe 2.0 x1	5 GHz	1	1	500 MB/s
PCIe 2.0 x2	5 GHz	2	1	1,000 MB/s
PCIe 2.0 x4	5 GHz	4	1	2,000 MB/s
PCIe 2.0 x8	5 GHz	8	1	4,000 MB/s
PCIe 2.0 x16	5 GHz	16	1	8,000 MB/s
PCIe 3.0 x1	8 GHz	1	1	1,000 MB/s
PCIe 3.0 x2	8 GHz	2	1	2,000 MB/s
PCIe 3.0 x4	8 GHz	4	1	4,000 MB/s
PCIe 3.0 x8	8 GHz	8	1	8,000 MB/s
PCIe 3.0 x16	8 GHz	16	1	16,000 MB/s
PCIe 4.0 x1	GHz	1	1	2,000 MB/s
PCIe 4.0 x4	GHz	4	1	8,000 MB/s
PCIe 4.0 x8	GHz	8	1	16,000 MB/s
PCIe 4.0 x16	GHz	16	1	32,000 MB/s
HyperTransport 2	2 GHz	16	1	4,000 MB/s * *
HyperTransport 3	2 GHz	16	1	7,200 MB/s
Intel QuickPath	3.2 GHz	16	8	12,800 MB/s
FSB	200 MHz	64	4	6,400 MB/s *

* Bus - Shared topology

* * AMD uses HyperTransport 2.0 on all CPUs based on sockets 939 and AM2, however, supporting only the lower HT2 speed. In fact, AMD was more interested in the PCI Express mapping feature than a higher transfer speed. So even though these processors are based on HT2, the maximum transfer rate of their HT links is 4,000 MB/s.

Storage

Name	Read	Write	Interface	Cache	IOPs 4k	NAND	Note
Patriot Zephyr 256GB	214 MB/s	157 MB/s	SATA 3G / JMf612	64MB DDR2	4800/4400	MLC 34nm / Intel	* bad trim
OCZ Colossus 256GB	233 MB/s	217 MB/s	SATA 3G / Indilinx		4300/5440	MLC / Toshiba	int RAID0
Vibe Z2 Pro	205 MB/s	69 MB/s	eMMC	n/a	3300/2348	32GB	MBG4GC
ST3500630NS	59 MB/s	52 MB/s	SATA 3G	16MB		n/a	* slow
Corsair Survivor3 64GB	122 MB/s	40 MB/s	USB 3.0	n/a	1500/211	?	USB Flash
TDK TransIT Drive 32GB	16 MB/s	7.8 MB/s	USB 2.0	n/a	5/2	?	USB Flash
SDHC Transcend 32GB U1/600x	87 MB/s	37 MB/s	SDHC	n/a	n/a	MLC	SD Card
SDHC Kingston 16GB/C4	22 MB/s	12 MB/s	SDHC	n/a	n/a	?	SD Card
uSDHC SanDisk 64GB/U3	68 MB/s	51 MB/s	SDHC	n/a	1470/499	?	microSD
uSDHC Samsung EVO 128GB	84 MB/s	77 MB/s	SDHC	n/a	1265/438	?	microSD

RAM

Type	# Bits	Frequency	Bandwidth
GDDR5	128bit	6400 MHz (1600)	100 GB/s
DDR2	128bit	1056 MHz (528)	17 GB/s

NAS / SAN

CIFS / Samba Performance

HW	Name	CPU	RAM	FS	HDD	Network	Read	Write
Netgear	ReadyNAS Duo v2	ARM 1x 1.6 GHz	256 MB	ext3/lvm-sata	WD Green 2TB	1 GBit/s	91 MB/s	44 MB/s

HW	Name	CPU	RAM	FS	HDD	Network	Read	Write
Synology*	RS812+ DSM 6	Atom 2x 2.1 GHz	1024 MB	raid5/ext4-sata	4x WD RED 2TB	1 GBit/s	112 MB/s	77 MB/s
Noname-MSI	Synology DSM 5.2	Athlon64 1x 2 GHz	3096 MB	raid5/ext4-sata	4x Seagate 500GB	1 GBit/s	95 MB/s	69 MB/s
Raspberry PI 4	Raspbian 10	ARM 4x 2.0 Ghz	4096 MB	ext4/usb3	SanDisk SSD	1 Gbit/s	114 MB/s	114 MB/s
AMD Athlon 64 X2 5050e, nForce4, SATA 3G, WD Green 750GB, 1 Gbit/s nVidia, LVM-Thin								
KVM	OpenMediaVault	5050e 2x 2.6 GHz	512 MB	ext4/lvm-sata	WD Green 750GB	1 GBit/s	42 MB/s	66 MB/s
KVM	NAS4Free	5050e 2x 2.6 GHz	512 MB	ufs/lvm-sata	WD Green 750GB	1 GBit/s	42 MB/s	32 MB/s
KVM	Synology DSM 5	5050e 2x 2.6 GHz	512 MB	ext4/lvm-sata	WD Green 750GB	1 GBit/s	70 MB/s	68 MB/s
KVM	RockStor 3	5050e 2x 2.6 GHz	512 MB	ext4/lvm-sata	WD Green 750GB	1 GBit/s	60 MB/s	50 MB/s
LXC	Samba 4	5050e 2x 2.6 GHz	512 MB	ext4/lvm-sata	WD Green 750GB	1 GBit/s	70 MB/s	68 MB/s
RPi4B	Samba 4	ARM 4x 2.0 GHz	4096 MB	f2fs	Seagate 8TB SMR	1 GBit/s	114 MB/s	114 MB/s

* reach networking limit
KVM virtio drivers used (block or scsi)

CPU AES

AMD FX-8300 3.6GHz	26.4 Gbit/s
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