Foreword:

The market leading manufacturer of semi-conductors presented new Desktop motherboards on the Intel Solution Summit 2008 in Rome. There under was a motherboard declared by Intel as "Nettop", the "D945GCLF". Here an relative low-priced solution for desktop computers was emphasized, without changing the efficient too much.

The Atom-CPU builds the base of a low costs system, which works very energy efficient in addition and can be used therefore optimal for the mobile section, but also for servers, carPCs and multimedia solutions.

Generally the Atom-CPU was developed for "Mobile Internet Devices" (MID), which are settled in the sector between notebooks and mobile phones. "The processors were furnished in 45mm process with the world-smallest transistors", Intel Vice president Sean Maloney mentioned.

Because the IT world is screaming for "Green-IT" honestly, such a motherboard is ideal. For example Intel could reduce the power consumption of 20W to 2.05W, which is an incredible value. At the moment other industrial motherboards aren't able to keep up with that.

Specifications

| Model	D945GCLF
Type	Mini-ITX motherboard
CPU	Intel Atom 230 @ 1x 1.60GHz (Silverthorne 45nm), passive cooled
Chipset	
GPU	Intel 82945G (ICH7) Chipset L2 Cache 512kb
	Intel 82945G Express Chipset (Intel GMA 950)
IDE	1x DDR2 533/667
SATA	VGA
Audio	1x PCI
LAN	2x SATA II
USB 2.0	Realtek High Definition Audio
I/O extern	1x 100Mbit
	4x USB 2.0
I/O intern	PS2 keyboard/mouse, Parallel-port, COM Port, Line Out, Line In, Microphone
Power Supply	
Scope of Supply	PCI, USB 2.0 5/6, Audio
Software	20 Pin ATX, P4-connector
	I/O Backpanel, SATA cable, IDE ribbon cable, quick guide
	CD with drivers

Motherboard and connectors

The layout of the motherboard has kept quite simple and build up logical. The heat sink for the chipset is placed centrically, on which is installed a 40x40 mm speed-controlled fan. Beside that a passive cooler is installed under which the Atom-CPU can be found. This was very interesting for me, because the CPU can get along with such a small, passive cooler and which gets warm to the touch, while the chipset needs an obvious bigger block, which has to be cooled active.
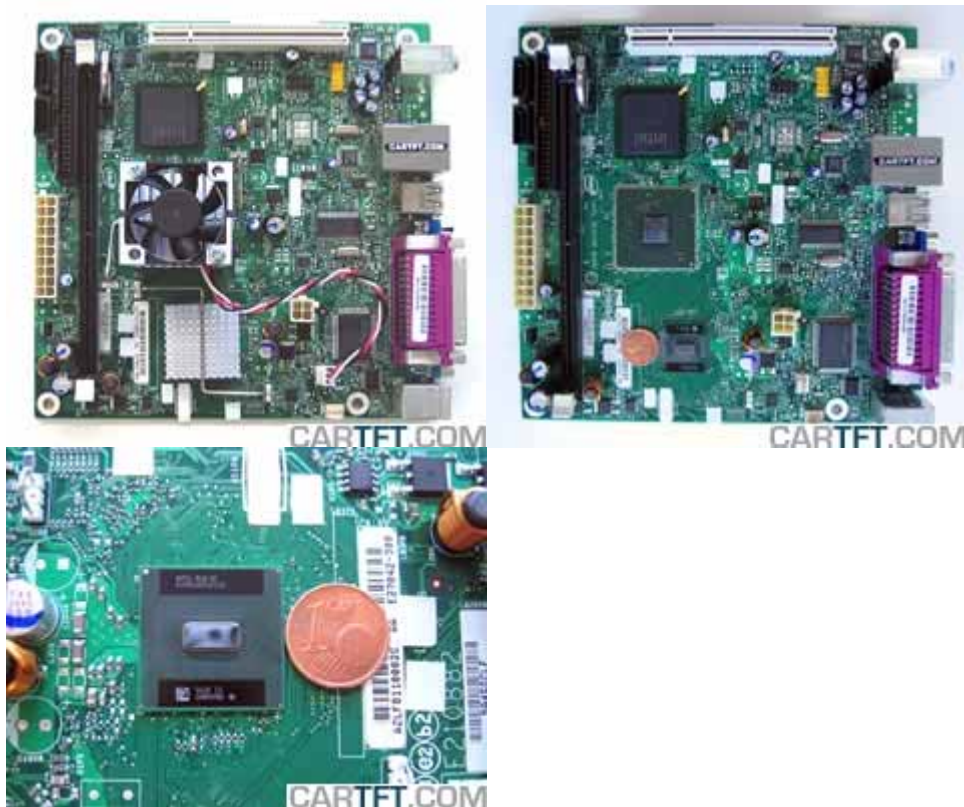
All in all one DDR2 RAM can be installed onto the motherboard only. The 2 SATA ports, one IDE cable and the cable connector are placed at the outside of the motherboard. In contrast with to the older GLY series, you now have the possibility to use the complete picoPSU series, for example to install the picoPSU120WI, which is a little thicker.

Practically for Mini-ITX enclosures: SATA, IDE and ATX power supply, all of them can be found directly next to each other on the opposite of the I/O, in front of the RAM. This makes it easy for installing power cables in narrow environment.

The connectivity was limited needful, which affects very positive to the price. You do not find a so low-priced motherboard including a CPU in this domain, whereby there is to mention, that the performance mustn't be classified as "Low Cost", when you take into consideration the business competition, their performance and corresponding prices.

Installation and usage of operating systems

The following hardware was used in this test-system:

- Intel G945GCLF motherboard with Intel Atom processor
- 2GiB DDR2 RAM by Aenon
- 80 GB SATA HDD with 5400U/rps by Samsung
- DVD R/RW ROM by Pioneer
- picoPSU 90W supplied by one 84W AC Adapter

Windows XP Professional and Windows Vista Ultimate 32bit were installed. Both systems got installed without problems with the drivers on the CD included. No errors occurred.

Only the size of the virtual RAM of both operating systems was changed, no other change was made, to allow a preferably presentable test for the masses.

Both operating systems and also every application were running very stable and they never crashed while the test stage, which is very considerable in this stage the test board fares.

The transparent Aero surface and the windows-animations of Windows Vista were displayed without jerking.

The S3 mode showed an uncomfortable error though. As soon as the system was set into power save mode and you want to wake up the system again, the display gets no signal and stays off.

In S1 mode, no errors occurred and the PC-system could wake up by pressing one key of the keyboard.

Performance, Power consumption

Also with the predecessors, Intel is ahead opposite VIA. For usual applications, office, internet, DVD playback, GPS navigation etc. the performance is almost sufficient and it's fun to work with the system. The integrated GPU is too weak for games as expected. This is mirrored also in the performance index of Windows Vista and benchmark results.

Vista Performance Index

Processor	3.0
RAM	4.4
Graphics	4.2
Graphics (Games)	2.8
Prim. HDD	4.8
Total	2.8

3DMark 2005

Windows XP	Windows Vista
435	656

PCMark 2005

Windows XP	Windows Vista
1635	1421

Cinebench R10

	Windows XP	Windows Vista
Rendering CPU1	555	522
OpenGL	277	240

Stromverbrauch

Boot-Up	33W
Idle	26W
Load	36W
CD/DVD Load	31W
DVD	31W

Temperatures, noise level

The temperatures proved to be unproblematic. The CPU cooler works a bit louder than an 80mm fan for example, because of its minor size. But it is hardly noticeable in a closed PC-case.

Conclusion

The G945GCLF shows the way: „Green IT" is the motto and preferably without loosing performance. Intel can show a very power saving and yet a powerful system with this motherboard.

The connectivity could have some more options. For example a TV out would have been nice to have. Also an internal COM port is missing, which is used nowadays in the car-PC section to program timings of power supplies.

There was no critique on the stability of the hardware-drivers on the tested operating systems Windows XP Professional and Windows Vista Ultimate. No problem was discovered while the stages test.

All in all the G945GCLF is a solid foundation for different range of applications. It be now in the industrial area or as private user in form of a CarPC, Server or multimedia station in the living room.

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