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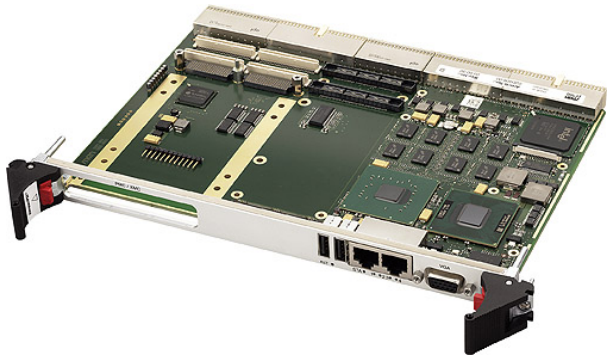
D9 - 6U CompactPCI® Core Duo / Core 2 Duo SBC



- **Intel® Core™ 2 Duo T7400 or L7400**
- **Core Duo T2500, U2500 or L2400**
- **PCI Express® five x1 links**
- **4 HP system master or stand-alone**
- **32-bit CompactPCI®**
- **PICMG 2.16 via mezzanine card**
- **Up to 4 GB DDR2 DRAM soldered**
- **2 SATA, 1 PATA interface**
- **Video via VGA and 2 SDVO, HD audio via mezzanine**
- **Up to 4 Gigabit Ethernet**
- **Up to 6 USB and 4 UARTs via mezzanine**
- **1 XMC or PMC, 1 mezzanine card slot**
- **Board controller**

The D9 6U single-slot SBC supports a variety of Intel® Core™ Duo and Core 2 Duo processors from the high-end 2.16 GHz T7400 to the low-voltage dual-core versions down to a selection of Celeron® M types. It is designed especially for embedded systems which require high computing and graphics performance and low power consumption.
The D9 offers a 32-bit/33-MHz system slot CompactPCI® bus interface or can be used without a bus system.
A total of five PCI Express® lanes for high-speed communication (such as Gb Ethernet) are supported on the D9. 2 x1 PCIe® links are used for the two onboard Ethernet interfaces, another 2 x1 links support the XMC slot and 1 x1 link is available on a specific mezzanine card.
Further serial interfaces include two SATA ports for connection of an onboard hard disk (instead of the PMC or XMC) and a second one on the transition module at the rear. Alternatively, one of the two SATA ports is available via the mezzanine card. One PATA interface supports the onboard CompactFlash® slot.
A total of six USB 2.0 are supported at the front, on the rear I/O transition module and on board the mezzanine card. Four of the onboard USBs can be used to realize two UARTs on a mezzanine card and another two UARTs on the rear I/O transition module.
The standard I/O available at the front panel of the D9 includes graphics on a VGA connector, two Gigabit Ethernet and two USB 2.0 interfaces.
The D9 can be extended by different mezzanine cards.

Additional functions may include PICMG 2.16, digital video outputs for flat panel connection via DVI, different UARTs, USB 2.0 ports, SATA for hard disk or RAID connection and HD audio.
The D9 is also prepared for rear I/O via the CT7 transition module with two USB 2.0, 2 UARTs, 2 Gigabit Ethernet, 1 SATA and 1 PIM module.
Supervision of the processor and board temperature as well as a watchdog for monitoring the operating system complete the functionality of the D9.
The D9 operates in Windows® and Linux environments and under RTOS systems that support multi-core architecture.
Equipped with Intel® components exclusively from the Intel® Embedded Line, the D9 has a guaranteed minimum standard availability of 5 years.
The D9 is suited for a wide range of industrial applications, e.g. monitoring, vision and control systems as well as test and measurement. Main target markets comprise industrial automation, multimedia, traffic and transportation, aerospace, shipbuilding, medical engineering and robotics.
For use in harsh environments the D9 is equipped with soldered DDR2 DRAM (up to 4GB) to guarantee optimum shock and vibration resistance. It comes with a tailored passive heat sink within 4 HP height. However, forced air cooling is always required inside the system. Its robust design make the D9 especially suited for rugged environments with regard to extended operation temperature, shock and vibration according to applicable DIN, EN or IEC industry standards. It is also ready for coating for use in humid and dusty environments.

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Technical Data

CPU
- Up to Intel® Core™ 2 Duo T7400
  - Dual-core 64-bit processor
  - Up to 2.16GHz processor core frequency
  - Up to 667MHz front-side bus frequency
- Chipset
  - Northbridge: Intel® 945GME Express
  - Southbridge: Intel® ICH7-M DH

Memory
- 4MB L2 cache integrated in Core 2 Duo
- Up to 4GB SDRAM system memory
  - Soldered
  - DDR2
  - 667MHz memory bus frequency
  - Dual-channel, 2x64 bits
- 8Mbits boot Flash
- Serial EEPROM 2kbits for factory settings
- CompactFlash® card interface
  - Via onboard IDE
  - Type I
  - True IDE
  - DMA support

Mass Storage
- Parallel IDE (PATA)
  - One IDE port for local CompactFlash®
- Serial ATA (SATA)
  - One channel for onboard hard disk
  - One channel via mezzanine card connector or rear I/O connector
  - Transfer rates up to 150MB/s
  - RAID level 0/1 support

Graphics
- Integrated in 945GME Express chipset
  - 200/250MHz 256-bit graphics core
- VGA connector at front panel
- Two SDVO ports available via mezzanine-card connector
  - One additional DVI connector at front panel optional via mezzanine card

I/O
- USB
  - Two USB 2.0 ports via Series A connectors at front panel
  - Four USB 2.0 ports via mezzanine-card connector (if a transition module is used two of these are converted to UARTs)
  - Two USB 2.0 ports via rear I/O (if these are used only two USB are available on the mezzanine card connector)
  - UHCI implementation
  - Data rates up to 480Mbits/s
- Ethernet
  - Two 10/100/1000Base-T Ethernet channels at front panel
  - RJ45 connectors at front panel
  - Ethernet controllers are connected by two x1 PCIe® links
  - Onboard LEDs to signal activity status and connection speed
  - Two 10/100/1000Base-T Ethernet channels via mezzanine card on backplane (PICMG 2.16 or on transition module)
  - Via one x1 PCIe® link and without LEDs
- High Definition (HD) audio
  - Accessible via mezzanine-card connector

Front Connections
- VGA
- Two USB 2.0 (Series A)
- Two Ethernet (RJ45)

Rear I/O
- USB 2.0, two ports
- UART
  - Two ports instead of two USB on mezzanine card connector
- PMC rear I/O
- Ethernet 1000Base-T via mezzanine card, two ports (only with D700)

Mezzanine Slot
- One slot usable for PMC or XMC
- XMC slot
  - Compliant with XMC standard VITA 42.3-200x
  - Two x1 PCI Express® links
- PMC slot
  - Compliant with PMC standard IEEE 1386.1
  - PCI / PCI-X 32/64 bit, 33/66/133MHz, 3.3V V(I/O)
  - One x1 PCI Express® link via PCI Express® to PCI bridge
  - PMC I/O module (PIM) support via J14

Miscellaneous
- Board controller
- Real-time clock, buffered by a GoldCap or alternatively a battery
- Watchdog timer
- Temperature measurement
- One user LED
- Reset button

PCI Express®
- Two x1 links to connect local 1000Base-T Ethernet controllers
- One x1 link for extension through mezzanine-card connector
- Two x1 links to connect XMC (or one x1 link for connection of PMC via PCI Express® to PCI bridge)
- Data rate up to 250MB/s in each direction (2.5 Gbits/s per lane)

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Technical Data

CompactPCI® Bus
- Compliance with CompactPCI® Core Specification PICMG 2.0 R3.0
- System slot
- 32-bit/33-MHz CompactPCI® bus
- V(I/O): +3.3V (+5V tolerant)
- Compliance with CompactPCI® Packet Switching Backplane PICMG 2.16 R1.0

Busless Operation
- Board can be supplied with +5V only, all other voltages are generated on the board
- Backplane connectors used only for power supply

Electrical Specifications
- Supply voltage/power consumption:
  - +5V (-3%/+5%), approx. 8.9A (9.8A with 5V only supply)
  - +3.3V (-3%/+5%), approx. 1.25A
  - +12V (-10%/+10%), approx. 10mA (without PMC or XMC module)
  - If the board is supplied with 5V only (typically without a bus connection), the 3.3V are generated on the board and fed to the backplane (3A max.)

Mechanical Specifications
- Dimensions: conforming to CompactPCI® specification for 6U boards
- Front panel: 4HP with ejector
- Weight:
  - Without XMC/PMC and mezzanine board: 400g
  - With XMC/PMC and mezzanine board: 530g

Environmental Specifications
- Temperature range (operation):
  - 0..+45°C
  - 0..+60°C (version with Celeron® M processor)
  - Airflow: min. 15m³/h (1.5m/s)
- Temperature range (storage): -40..+85°C
- Relative humidity (operation): max. 95% non-condensing
- Relative humidity (storage): max. 95% non-condensing
- Altitude: -300m to + 3,000m
- Shock: 15g/11ms (EN 60068-2-27)
- Bump: 10g/16ms (EN 60068-2-29)
- Vibration (sinusoidal): 1g/ 10..150Hz (EN 60068-2-6)
- Conformal coating on request

MTBF
- 182,199h @ 40°C according to IEC/TR 62380 (RDF2000)

Safety
- PCB manufactured with a flammability rating of 94V-0 by UL recognized manufacturers

EMC
- Tested according to EN 55022 Class A (radio disturbance), EN 61000-4-2 (ESD), EN 61000-4-4 (burst) and EN 61000-4-5 (surge)

BIOS
- Award BIOS

Software Support
- Windows®
- Linux
- VxWorks® (on request)
- QNX® (on request)
- Intel® Virtualization Technology, allows a platform to run multiple operating systems and applications in independent partitions; one computer system can function as multiple "virtual" systems
- For more information on supported operating system versions and drivers see Software.

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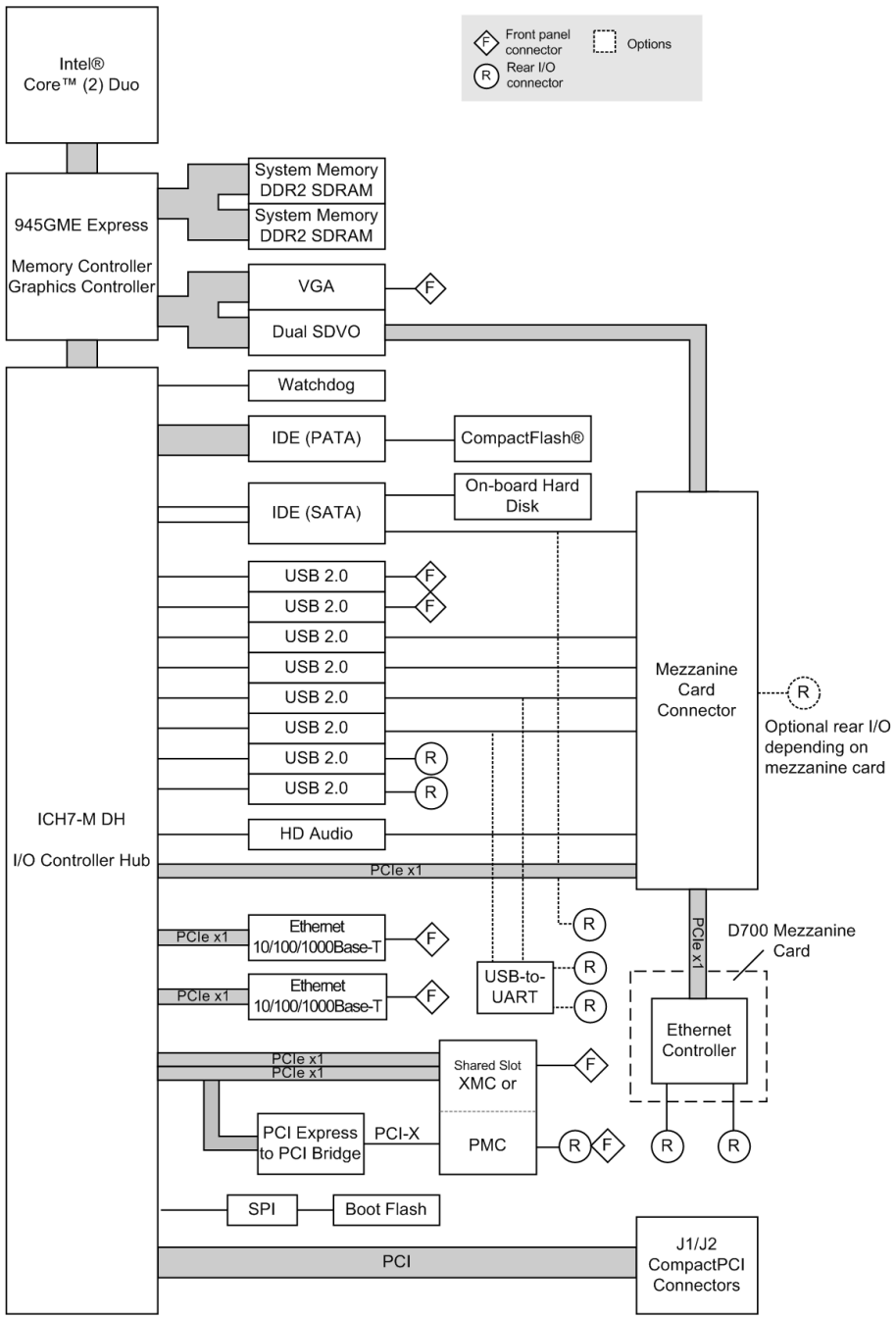
Diagram



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Configuration & Options

Standard Configurations

Article No.	CPU Type	System RAM	XMC/PMC	Operation Temp.
02D009-00	T7400	2 GB DDR2	1 slot	0..+45°C

Options

CPU

- Core 2 Duo T7400, 2.16GHz
- Core 2 Duo L7400, 1.5GHz LV
- Core Duo T2500, 2GHz
- Core Duo L2400, 1.66GHz LV
- Core Duo U2500, 1.2GHz ULV
- Celeron® M 423, 1.06 GHz

Memory

- System RAM
  - 256 MB, 512 MB, 1 GB, 2 GB or 4 GB
- CompactFlash®
  - 0 MB up to maximum available

Graphics

- One DVI-D connector at front via mezzanine card

I/O

- Ethernet
  - 9-pin D-Sub connector with one or two 10/100Base-T ports instead of two RJ45 connectors
  - Active Management Technology for remote service

I/O with mezzanine card

- One RS232 UART interface via RJ45

Rear I/O

- One SATA channel (instead of the mezzanine card channel)
- Two COM via USB-to-UART bridges (instead of two USB on the mezzanine card connector)
- Two SDVO ports via mezzanine card
- Four USB ports via mezzanine card
- Two Ethernet via mezzanine card (PICMG 2.16 or on transition module)
- HD Audio via mezzanine card
- One x1 PCIe® link via mezzanine card
- Battery on CT7 transition module

Please note that some of these options may only be available for large volumes. Please ask our sales staff for more information.

Ordering Information

Standard Hardware

02D009-00 Intel Core 2 Duo T7400, 2.16 GHz, 2 GB DDR2 DRAM, 0..+45°C

Related Hardware

02D700-00 1 DVI, 1 COM, PICMG 2.16 (2 Gb Ethernet) for D9, A19 and compatible cPCI and VME SBCs, 0..+55°C

08CT07-00 CompactPCI rear I/O transition module 6U/80mm, 2 Gb Ethernet, 2 USB 2.0, 2 COMs, 1 PIM slot, 1 CompactFlash slot, connecting to D6, D7, D9, 0..+60°C

Memory

0751-0023 CompactFlash card, 2 GB, Type I, -40..+85°C, fixed bit set

0751-0025 CompactFlash card, 512 MB, Type I, -40..+85°C, removable

0751-0026 CompactFlash card, 256 MB, Type I, -40..+85°C, removable

0751-0027 CompactFlash card, 1 GB, Type I, -40..+85°C, fixed bit set

0751-0031 CompactFlash card, 4 GB, Type I, -40..+85°C, fixed bit set

0751-0032 CompactFlash card, 8 GB, Type I, -40..+85°C, fixed bit set

Systems & Card Cages

0701-0030 CompactPCI 19" 3U/84HP rack-mount enclosure for 6U cards (horizontal), 6-slot backplane, system slot left, 250W ATX wide-range PSU, 2 fans, prepared for rear I/O

Miscellaneous

0710-0025 SATA hard disk 2.5", 80 GB, 5400 rpm, 24h/7d, -30..+85°C; N.B.: between -30°C to -20°C power-on time is 12 s typ. (incl.stand-offs and mounting screws)

Software: OS independent

13Y001-06 MDIS4/2004 low-level driver sources (MEN) for LM63 on SMBus for F14, F15, F17, F18, D9, D601, A19 and A20

13Y002-06 MDIS4/2004 low-level driver sources (MEN) for F14, F15, F17, F18, D9, D601, A19 and A20 board monitoring

13Y004-06 MDIS4/2004 low-level driver sources (MEN) for generic SMBus driver for F14, F15, F17, F18, D9, D601, F600 and F601, A19 and A20

13Y007-06 MDIS4/2004 low-level driver sources (MEN) for F14, F15, F17, F18, D9, D601, A19 and A20 board controller

Software: Windows

13F014-77 Windows driver installation package Installset (MEN) for F14, F15, F17, F18, D9, D601, A19 and A20

13T001-70 Windows network driver (Intel) for F14, F15, F17, F18, D9, D6, D7, D601, A19, A20 and P601, P602

13T003-70 Windows chipset driver (Intel) for F14, F15, F17, F18, D9, D6, D7, D601, A19 and A20

13T005-70 Windows USB2UART driver (FTDI) for F14, F15, F17, F18, D9, A19, A20 and XM50 hosts

13T006-70 Windows HD Audio driver (Realtek) for F14, F15, F17, F18, D9 and A19

13T007-70 Windows chipset graphics driver (Intel) for F15, F17, D9, A19 and A20

Software: VxWorks

10F015-60 VxWorks BSP (MEN) for F15, F17 and D9

13Y003-60 VxWorks driver (MEN) for USB-to-UART bridges on F600, F601, F602, F603, F604, F606 and D700

Software: QNX

10F014-40 QNX 6.3 installation support files (MEN) for F14, F15, F17 and D9

Software: Firmware/BIOS

14F015-00 System BIOS for F15, F17 and D9

Documentation

20APPN004 Application Note: How to make a USB stick bootable

20D009-00 D9 User Manual

For the most up-to-date ordering information and direct links to other data sheets and downloads, see the D9 online data sheet under » www.men.de.

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