

# F19P - 3U CompactPCI® PlusIO Intel® Core™ 2 Duo SBC



- Intel® Core™ 2 Duo SP9300, 2.26 GHz
- Dual-core 64-bit processor
- 4 HP system master or stand-alone
- 32-bit CompactPCI® and PICMG 2.30 PlusIO
- Up to 4 (8) GB DDR3 DRAM soldered
- CompactFlash® and microSD™ card slots
- Standard front I/O: VGA, 2 Gb Ethernet, 2 USB
- Standard rear I/O: 4 PCIe®, 4 USB, 4 SATA, 1 Gb Ethernet
- Other I/O (onboard, side card): SATA, SDVO, HD audio, USB, UART etc.
- Board controller
- -40 to +85°C screened version

The F19P versatile 4HP/3U single-board computer is a continuation of MEN's proven range of Intel® CPU boards.

It is equipped with the Intel® high-performance Core 2 Duo processor SP9300 running at 2.26 GHz and offering the latest multi-core processor architecture from Intel® with full 64-bit support. The board delivers an excellent graphics performance and is designed especially for embedded systems which require high computing performance with low power consumption. The F19P offers a 32-bit/33-MHz CompactPCI® bus interface and can also be used without a bus system. It offers 4 USB 2.0 and 4 fast (3Gb/s) SATA interfaces as well as 4 PCI Express® x1 links and one Gigabit Ethernet on the J2 rear I/O connector which is compatible with the PICMG 2.30 CompactPCI® PlusIO specification.

A total of seven PCI Express® lanes for high-speed communication (such as Gigabit Ethernet) are supported on the F19P. 3 x1 PCIe® links are used for the three onboard Ethernet interfaces. 4 x1 or 1 x4 PCIe® links are available via rear I/O or on a specific side card. The F19P is equipped with a state-of-the-art fast DDR3 DRAM which is soldered to the F19P to guarantee optimum shock and vibration resistance. A robust CompactFlash® and microSD™ card device which are connected via a USB interface offer nearly unlimited space for user applications.

The standard I/O available at the front panel of F19P includes graphics on a VGA connector, two PCIe®-driven

Gigabit Ethernet as well as two USB 2.0 ports.

The F19P can be extended by different side cards. Additional functions include two digital video inputs for flat panel connection via DVI (multimedia), a variety of different UARTs or another four USBs, SATA for hard disk connection and HD audio.

Thermal supervision of the processor and a watchdog for the operating system complete the functionality of the F19P.

The F19P operates in Windows® and Linux environments as well as under real-time operating systems that support Intel®'s multi-core architecture. The InsydeH2O™ EFI BIOS was specially designed for embedded system applications.

Equipped with Intel® components exclusively from the Intel® Embedded Line, the F19P has a guaranteed minimum standard availability of 7 years.

The F19P is suited for a wide range of industrial applications, e.g. for 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.

The F19P comes with a tailored passive heat sink within 4 HP height. Regardless, forced air cooling is always required inside the system. The robust design of the F19P make the board especially suited for use in rugged environments with regard to shock and vibration according to applicable DIN, EN or IEC industry standards. The F19P is also ready for coating so that it can be used in humid and dusty environments.

## Technical Data

### CPU

- Intel® Core™ 2 Duo SP9300
  - Up to 2.26GHz processor core frequency
  - 1066MHz system bus frequency
- Chipset
  - Northbridge: Intel® GS45
  - Southbridge: Intel® ICH9M-SFF

### Memory

- Up to 6MB L2 cache integrated in Core 2 Duo
- Up to 4GB DDR3 SDRAM system memory (8GB when components available)
  - Soldered
  - 800/1067MHz memory bus frequency locked to the FSB frequency
- 16Mbits boot Flash
- Serial EEPROM 2kbits for factory settings
- CompactFlash® card interface
  - Via USB
  - Type I
  - True IDE
  - DMA support
- MicroSD card interface
  - Via USB

### Mass Storage

- CompactFlash®
  - Connected via USB
- MicroSD card
  - Connected via USB
- Serial ATA (SATA)
  - Four channels via rear I/O, one channel via side-card connector (switchable)
  - Transfer rates up to 3Gbit/s
  - RAID level 0/1/5/10 support

### Graphics

- Integrated in GS45 chipset
  - Up to 533 MHz graphics core
  - Maximum resolution: 2048 x 1536 pixels
- VGA connector at front panel
- Two SDVO ports available via side-card connector
  - Two additional DVI connectors at front panel optional via side card
  - Simultaneous connection of two monitors

### I/O

- USB
  - Two USB 2.0 ports via Series A connectors at front panel
  - Four USB 2.0 ports via side-card connector
  - Four USB 2.0 ports via rear I/O

- One USB for connection of CompactFlash®/MicroSD or USB NAND Flash
- UHCI implementation
- Data rates up to 480Mbits/s
- Ethernet
  - Two 10/100/1000Base-T Ethernet channels at the front
  - RJ45 connectors at front panel
  - Ethernet controllers are connected by two x1 PCIe® links from ICH9M
  - Onboard LEDs to signal activity status and connection speed
  - One 10/100/1000Base-T Ethernet channel via rear I/O
  - Ethernet controller is connected by one x1 PCIe® link from GS45
- High Definition (HD) audio
  - Accessible via side-card connector

### Front Connections (Standard)

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

### Rear I/O

- Four SATA
- Four USB
- One Gigabit Ethernet
- Four PCI Express® x1 links
- Compatible with PICMG 2.30 CompactPCI® PlusIO

### Miscellaneous

- Board controller
- Real-time clock, buffered by a GoldCap or alternatively a battery (5 years life cycle)
- Watchdog timer
- Temperature measurement
- One user LED
- Reset button

### PCI Express®

- Three x1 links to connect local 1000Base-T Ethernet controllers
  - Data rate 250MB/s in each direction (2.5 Gbits/s per lane)
- One x4 or four x1 links for extension through side-card connector or rear I/O
  - Data rate up to 1GB/s in each direction (2.5 Gbits/s per lane)

### CompactPCI® Bus

- Compliance with CompactPCI® Core Specification PICMG 2.0 R3.0
- System slot

## Technical Data

- 32-bit/33-MHz CompactPCI® bus
- V(I/O): +3.3V (+5V tolerant)

### 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 with Celeron® M722 processor:
  - +5V (-3%/+5%), 2.2A typ., 2.7A max., if the F19P is operated with 5V only, the 3.3V voltage can be used to supply other CompactPCI® boards in the system, maximum load: 10W
  - +3.3V (-3%/+5%), 1.4A (2 Gb Ethernet), 1A (1 Gb Ethernet)
  - +12V (-10%/+10%), approx. 10mA
- Supply voltage/power consumption with SP9300 processor:
  - +5V (-3%/+5%), 4.9A typ., 6.4A max., if the F19P is operated with 5V only, the 3.3V voltage can be used to supply other CompactPCI® boards in the system, maximum load: 10W
  - +3.3V (-3%/+5%), 1.4A (2 Gb Ethernet), 1A (1 Gb Ethernet)
  - +12V (-10%/+10%), approx. 10mA

### Mechanical Specifications

- Dimensions: conforming to CompactPCI® specification for 3U boards
- Front panel: 4HP with ejector
- Weight: 430g

### Environmental Specifications

- Temperature range (operation):
  - Depends on system configuration (CPU, hard disk, heat sink...)
  - Maximum: +85°C
  - Minimum: -40°C (all processors)
  - Conditions: airflow 1.5m/s, typical power dissipation tbd
- Temperature range (storage): -40..+85°C
- Relative humidity (operation): max. 95% non-condensing
- Relative humidity (storage): max. 95% non-condensing
- Altitude: -300m to + 2,000m
- Shock: 15g/11ms
- Bump: 10g/16ms
- Vibration (sinusoidal): 1g/10..150Hz
- Conformal coating on request

### MTBF

- tbd @ 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 (radio disturbance), IEC1000-4-2 (ESD) and IEC1000-4-4 (burst)

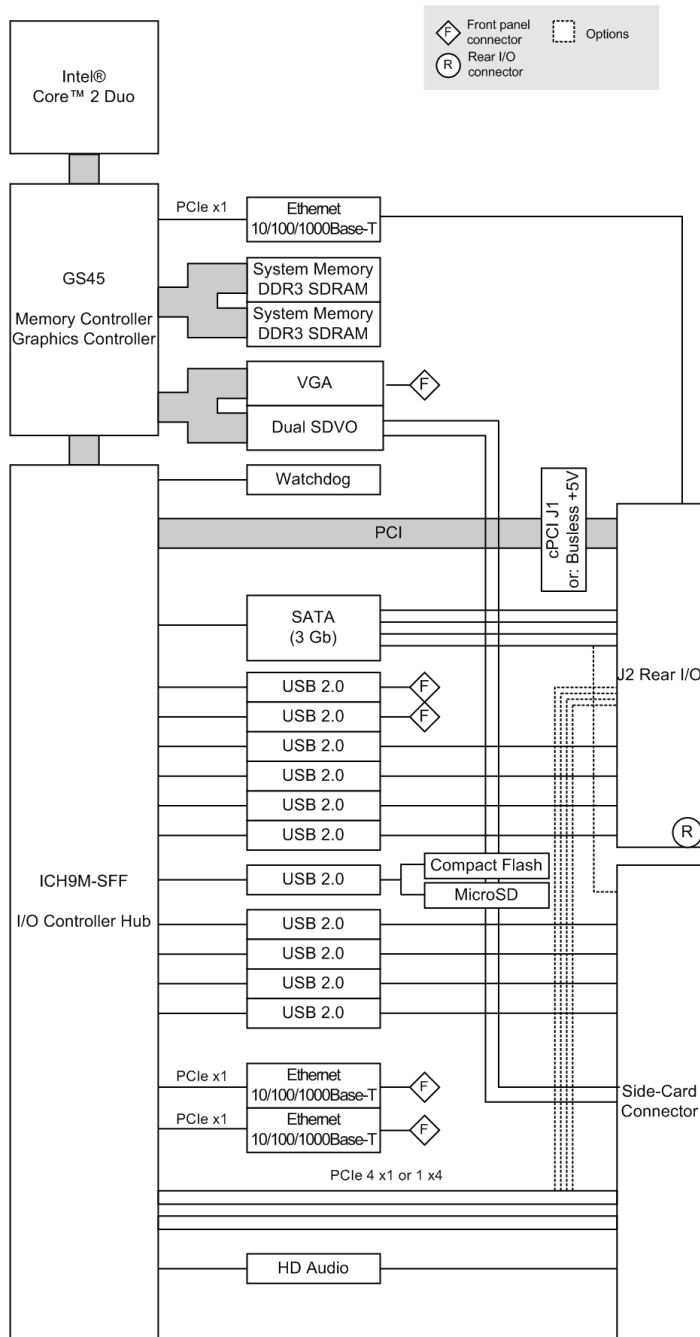
### BIOS

- InsydeH2O™ UEFI Framework

### Software Support

- Note that 64-bit hardware technology requires 64-bit operating system support
- Windows® (including Vista)
- Linux
- VxWorks® (in preparation)
- 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.

# Diagram



## Configuration & Options

### Standard Configurations

Article No.	CPU Type	Clock	System RAM	Cflash/microSD™	Side Card Slot	Operation Temperature
02F019P00	Celeron® M 722	1.2 GHz	2 GB	0 MB	right	-40..+85°C
02F019P01	SP9300	2.26 GHz	4 GB	0 MB	right	0..+60°C

### Options

#### CPU

- Intel® SP9300, 2.26GHz, 1066MHz FSB, 6MB cache, 25W
- Intel® SL9400, 1.86GHz, 1066MHz FSB, 6MB cache, 17W
- Intel® SU9300, 1.2GHz, 800MHz FSB, 3MB cache, 10W
- Intel® Celeron® M722, 1.2GHz, 800MHz FSB, 1MB cache, 5.5W
- Intel® Celeron® M723, 1.2GHz, 800MHz FSB, 1MB cache, 10W

#### Memory

- System RAM
  - 2GB or 4GB (8GB when components available)
- CompactFlash®
  - 0 MB up to maximum available
- MicroSD card
  - 0 MB up to maximum available
- NAND Flash instead of CompactFlash®, microSD™ card and battery
  - 0 MB up to maximum available

#### Graphics

- One or two DVI-D connectors at front via side card
  - Simultaneous connection of two monitors

#### I/O

- Ethernet
  - 9-pin D-Sub connector with one or two 10/100Base-T ports instead of two RJ45 connectors

#### Mechanical

- Side card can be added at left or right side of CPU

#### Operation Temperature

- Depends on system configuration (CPU, hard disk, heat sink...)
- Maximum: +85°C
- Minimum: -40°C (all processors)

**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

<b>02F019P00</b>	Intel Celeron M 722, 1.2 GHz, 2 GB DDR3 DRAM, -40..+85°C
<b>02F019P01</b>	Intel Core 2 Duo SP9300, 2.26 GHz, 4 GB DDR3 DRAM, 0..+60°C

### Related Hardware

<b>02F600-00</b>	2 COM extensions and SATA hard disk slot, for F14 and compatible SBCs, -40..+85°C screened
<b>02F601-00</b>	1 DVI-D and 1 audio at front, SATA hard disk slot, for F14 and compatible SBCs, 4HP, 0..+60°C
<b>02F601-02</b>	2 DVI-D, 1 audio, 1 COM (via SA-Adapter) at front, SATA hard disk slot, for F14 and compatible SBCs, 8HP, 0..+60°C
<b>02F603-00</b>	3U CompactPCI side card with 2 USB and 1 COM extension, SATA hard disk and CompactFlash slot, for F14 and compatible SBCs, mounted to the right of the SBC, 0..+60°C
<b>02F604-00</b>	3U CompactPCI side card with 1 IEEE 1394 FireWire, 1 DVI, 1 HD audio and 1 COM extension, SATA hard disk slot, for F14 and compatible SBCs, mounted to the right of the SBC, 0..+60°C
<b>02F605-00</b>	1 XMC or PMC slot, for F14 and compatible SBCs, -40..+85°C with qualified components
<b>02F606-00</b>	2 Gigabit Ethernet on Lemo railway compliant connectors, 1 COM extension (SA-Adapter not included), SATA hard disk slot, for F14 and compatible SBCs, conformally coated, -40...+85°C screened
<b>02F608-00</b>	4 SATA and 2 COM ports, additional SATA hard disk slot on-board, for F14 and compatible SBCs, mounted to the right of the SBC, 0..+60°C
<b>08CT12-00</b>	CompactPCI PlusIO rear transition module 3U/80mm, 2 Ethernet, 4 USB, 4 SATA, 4 PCIe x1, -40°C..+85°C qualified

### Memory

<b>0751-0032</b>	CompactFlash card, 8 GB, Type I, -40..+85°C, fixed bit set
<b>0751-0038</b>	CompactFlash card, 256 MB, Type I, removable, -40..+85°C
<b>0751-0039</b>	CompactFlash card, 512 MB, Type I, removable, -40..+85°C

<b>0751-0040</b>	CompactFlash card, 1 GB, Type I, fixed bit set, -40..+85°C
<b>0751-0041</b>	CompactFlash card, 2 GB, Type I, fixed bit set, -40..+85°C
<b>0751-0042</b>	CompactFlash card, 4 GB, Type I, fixed bit set, -40..+85°C

### Systems & Card Cages

<b>0701-0046</b>	CompactPCI 19" 4U/24HP desktop system for 3U cards, 3-slot 3U CompactPCI backplane, system slot right, 1U fan tray with 1 fan, 8 HP space for 1 pluggable PSU
<b>0701-0056</b>	CompactPCI 19" 4U/84HP rack-mount enclosure for 3U cards (vertical), 4+4-slot 3U CompactPCI / cPCI Serial hybrid backplane, prepared for rear I/O, 250W power supply wide range 90..264VAC on rear, 1U fan tray with 2 fans included, 0..+60°C

### Miscellaneous

<b>0713-0003</b>	CompactPCI 3U 1-slot backplane for stand-alone operation of F14, F15, F17, F18, F19P: 32-bit/33-MHz with rear I/O, 3.3V supply, ATX-power, power, JTAG, IPMB and utility connection, 6x screw connection M3
<b>08CT12-00</b>	CompactPCI PlusIO rear transition module 3U/80mm, 2 Ethernet, 4 USB, 4 SATA, 4 PCIe x1, -40°C..+85°C qualified

### Software: OS independent

<b>13XM01-06</b>	MDISS low-level driver sources (MEN) for XM1, XM1L, MM1, XM2, F11S and F19P board controller
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### Software: Windows

<b>10F014-78</b>	Windows Embedded Standard BSP (MEN) for F14, F15, F17, F18, F19P, G20, XM1, XM1L, XM2, MM1, SC21, DC1 and RC1
<b>13T003-70</b>	Windows chipset driver (Intel) for F14, F15, F17, F18, F18E, F19P, D9, D6, D7, D601, A19 and A20
<b>13T005-70</b>	Windows USB2UART driver (FTDI) for F14, F15, F17, F18, F19P, D9, A19, A20, XM2 and XM50 hosts

## Ordering Information

- 13T010-70** Windows network driver (Intel) for XM1, XM1L, XM2, F11S and F19P
- 13T019-70** Windows graphics driver (Intel) for XM2 and F19P
- 13XM02-77** Windows Installset (MEN) for XM2 and F19P

### Software: VxWorks

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

### Software: Firmware/BIOS

- 14F019P01** System BIOS for F19P

### Documentation

- 20APPN004** Application Note: How to make a USB stick bootable
- 20F019P00** F19P User Manual
- 20F019PER** F19P Errata

For the most up-to-date ordering information and direct links to other data sheets and downloads, see the F19P online data sheet under » [www.men.de](http://www.men.de).

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