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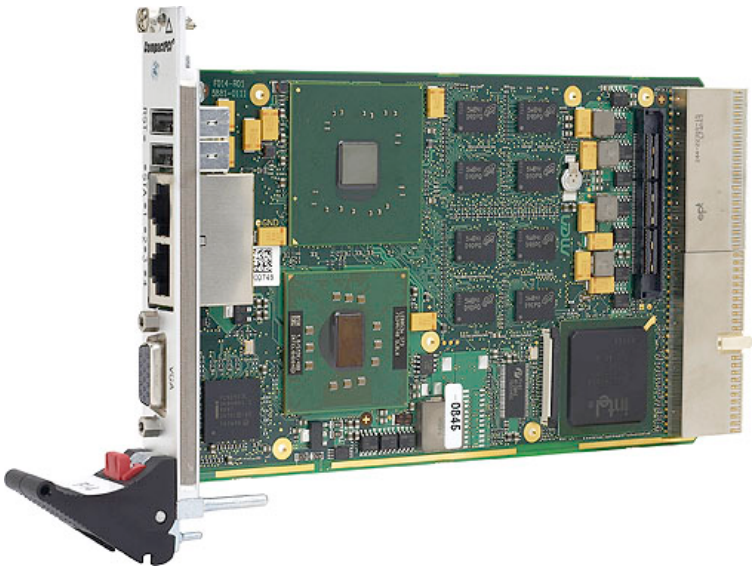
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F14 – 3U CompactPCI®/Express Intel® Pentium® M CPU Board

- **ULV Celeron® M 373, 1 GHz**
- **Up to Pentium® M 760, 2 GHz**
- **PCI Express® four x1 links**
- **4 HP system master or stand-alone**
- **32-bit CompactPCI® or cPCIe®**
- **Up to 2 GB DDR2 DRAM soldered**
- **CompactFlash® slot**
- **2 SATA interfaces**
- **Video via VGA and 2 SDVO**
- **2 Gigabit Ethernet (PCIe®)**
- **Up to 8 USB 2.0**
- **High Definition audio**
- **Board controller**
- **-40 to +85°C screened versions**



Equipped with the high-performance Intel® 2-GHz Pentium® M down to the 1-GHz ultra low voltage Celeron® M processor, the single-board computer F14 is a versatile 4 HP / 3U (single-slot, single-size Eurocard) CompactPCI® board, designed especially for embedded systems which require high computing and graphics performance and low power consumption. All versions of the CPU card come with tailored passive heat sinks within 4 HP height. Depending on the processor version forced air cooling is required inside the CompactPCI® system.

The F14 is suited for a wide range of industrial applications, for example for monitoring, vision and control systems as well as test and measurement. Main target markets comprise industrial automation, multimedia, transportation (railways, commercial vehicles), aerospace, shipbuilding, medical engineering and robotics. The robust design of the F14 together with the low-power Pentium® M processors make the board especially suited for use in rugged environments in mobile applications with regard to temperature, shock, vibration, humidity or dust according to the applicable DIN, EN or IEC industry standards. The F14 is also ready for coating so that it can be used in humid and dusty environments.

The F14 offers a 32-bit/33-MHz interface to the CompactPCI® bus and can alternatively also be used without a bus system. In combination with a specific side card it can also perform system-slot functionality in a CompactPCI® Express system. Four PCI Express® links for high-speed communication requirements (such as Gigabit Ethernet, graphics) are supported on the board.

The DDR2 DRAM is soldered to F14 to guarantee optimum shock and vibration resistance. An IDE-driven robust CompactFlash® device offers nearly unlimited space for user applications. Apart from parallel ATA support, two serial ATA lines are also available.

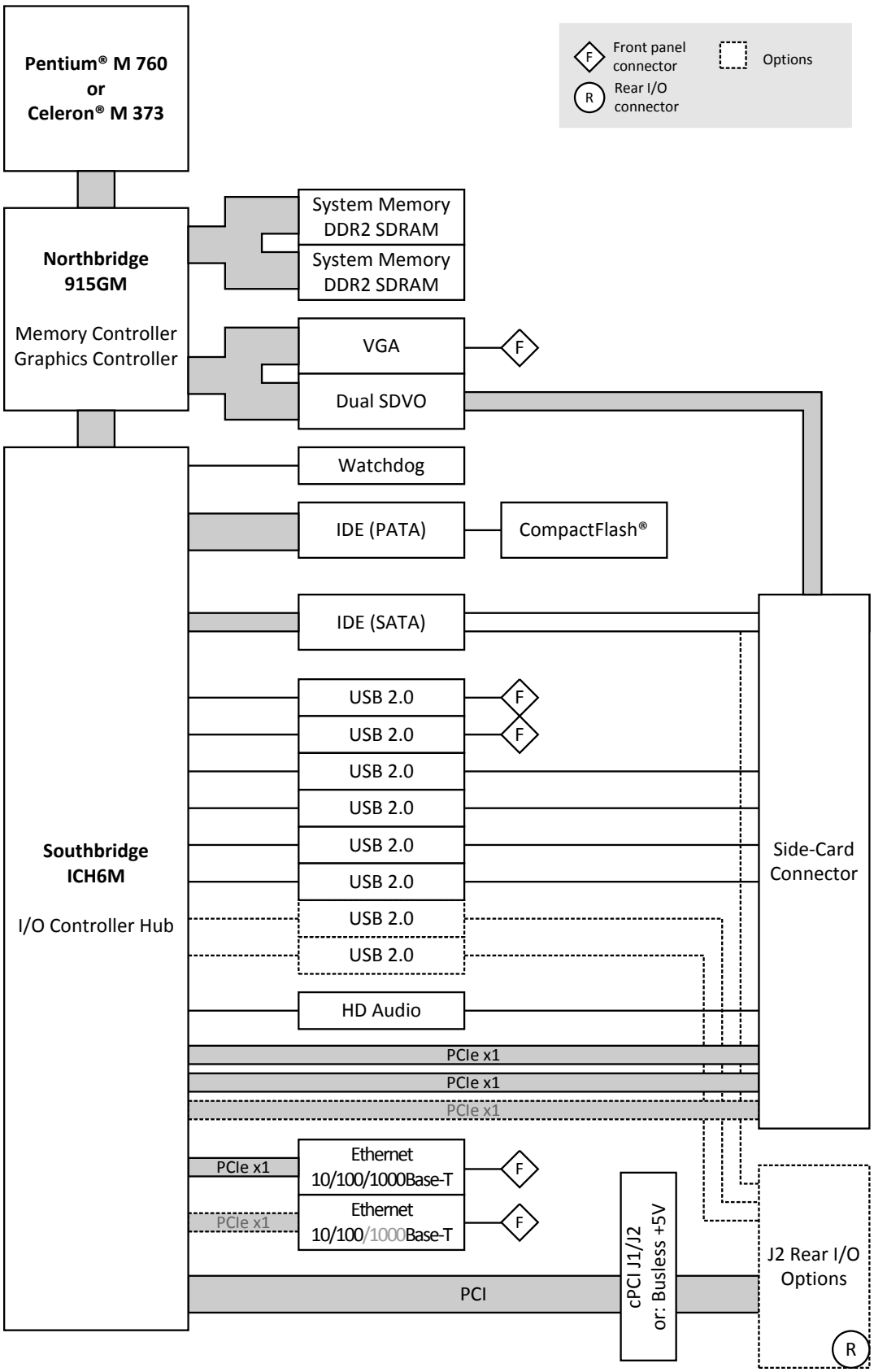
The standard I/O available at the front panel of F14 includes graphics on VGA connector, two PCIe®-driven Gigabit Ethernet interfaces (alternatively 1 Gigabit / 1 Fast Ethernet) as well as two USB 2.0 ports. The F14 can be extended by a side card to 8 HP. I/O functions realized on the side card include two digital video outputs for flat panel connection via DVI, another four USB 2.0 ports and HD Audio. The F14 is also prepared for rear I/O where for example another two USB 2.0 ports can be connected.

Two watchdogs for thermal supervision of the processor and board temperature as well as for monitoring the operating system complete the functionality of the F14.

The F14 operates in Windows® and Linux environments as well as under major real-time operating systems like VxWorks® or QNX®. The Award BIOS was especially designed for embedded system applications.

Equipped with Intel® components that come exclusively from the Intel® Embedded Line, the F14 has a guaranteed minimum standard availability of 5 years.

Diagram


Pentium® M 760
or
Celeron® M 373
F Front panel connector
R Rear I/O connector
Options
Northbridge
915GM
Memory Controller
Graphics Controller
System Memory
DDR2 SDRAM
System Memory
DDR2 SDRAM
VGA
Dual SDVO
Watchdog
IDE (PATA)
CompactFlash®
IDE (SATA)
USB 2.0
USB 2.0
USB 2.0
USB 2.0
USB 2.0
USB 2.0
USB 2.0
USB 2.0
Southbridge
ICH6M
I/O Controller Hub
HD Audio
PCIe x1
PCIe x1
PCIe x1
PCIe x1
Ethernet
10/100/1000Base-T
PCIe x1
Ethernet
10/100/1000Base-T
PCI
cPCI J1/J2
or: Busless +5V
Side-Card
Connector
J2 Rear I/O
Options
R

Technical Data

CPU	■ ULV Celeron® M 373 up to Pentium® M 760 □ 1.0 to 2.0GHz processor core frequency □ 400MHz or 533MHz front-side bus frequency ■ Chipset □ Northbridge: Intel® 915GM □ Southbridge: Intel® ICH6M
Memory	■ Up to 1MB L2 cache integrated in Celeron® M or 2MB L2 cache integrated in Pentium® M ■ Up to 2GB SDRAM system memory □ Soldered □ DDR2 □ 400MHz or 533MHz memory bus frequency □ Dual-channel, 2x64 bits ■ 4Mbits 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) □ Two channels via side-card connector, or: one channel via side card and one channel via rear I/O □ Transfer rates up to 150MB/s
Graphics	■ Integrated in 915GM chipset □ Analog CRT DAC interface support □ Supports max. DAC frequency up to 400 MHz □ 24-bit RAMDAC support □ Maximum resolutions: 2048 x 1536 pixels 16M colors @ 75Hz refresh rate (analog); 1600 x 1200 pixels 16M colors @ 60Hz (digital) □ Incorporates PanelLink Digital technology (Silicon Image) ■ 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 □ Two USB 2.0 ports via rear I/O on request □ UHCI and EHCI implementation □ Data rates up to 480Mbit/s ■ Ethernet □ Two 10/100/1000Base-T Ethernet channels, or: one 10/100/1000Base-T and one 10/100Base-T channel □ RJ45 connectors at front panel □ Gigabit Ethernet connected by two x1 PCIe® links □ Onboard LEDs to signal activity status and connection speed ■ High Definition (HD) audio □ Accessible via side-card connector
Front Connections (Standard)	■ VGA ■ Two USB 2.0 (Series A) ■ Two Ethernet (RJ45)

Technical Data

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 ■ Two x1 links for extension through side-card connector, or: ■ Three x1 links if one Gigabit Ethernet channel is replaced by Fast Ethernet ■ Data rate 250MB/s in each direction (2.5 Gbit/s per lane)
CompactPCI® Bus	■ Compliance with CompactPCI® Core Specification PICMG 2.0 R3.0 ■ CompactPCI® Express support (EXP.0 R1.0) ■ System slot ■ 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: □ +5V (-3%/+5%), approx. 2.5A (ULV Celeron® M 373), approx. 7.5A (Pentium® M 760) □ +3.3V (-3%/+5%), approx. 1A □ +12V (-10%/+10%), approx. 10mA □ 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.) No external 3.3 V voltage may be applied in that case! ■ MTBF: 86,600h @ 40°C (derived from MIL-HDBK-217F)
Mechanical Specifications	■ Dimensions: conforming to CompactPCI® specification for 3U boards ■ Weight: 370g
Environmental Specifications	■ Temperature range (operation): □ 2GHz Pentium® M760: 0..+60°C □ Conditions: airflow 1.5m/s, typical power dissipation 32W, with Windows® XP operating system, 1 Gb Ethernet and hard disk, without CPU clock reduction □ 1GHz Celeron® M373: -40..+85°C □ Conditions: airflow 1.5m/s, typical power dissipation 16W, with Windows® XP operating system, 1 Gb Ethernet and hard disk, without CPU clock reduction ■ 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 ■ Bump: 10g/16ms ■ Vibration (sinusoidal): 2g/10..150Hz ■ Conformal coating on request
Safety	■ PCB manufactured with a flammability rating of 94V-0 by UL recognized manufacturers
EMC	■ Tested according to EN 55022 (radio disturbance), IEC61000-4-2 (ESD) and IEC 61000-4-4 (burst)
BIOS	■ Award BIOS
Software Support	■ Windows® ■ Linux ■ VxWorks® ■ QNX® ■ For more information on supported operating system versions and drivers see Downloads.

Configuration & Options

Standard Configurations

Article No.	CPU Type	Clock	System RAM	CFlash	Ethernet	RTC	Side Card Slot	Operation Temperature
02F014-00	Celeron M 373	1 GHz	512 MB	0 MB	1Gb, 1 Fast Ethernet	GoldCap	right	0..+60°C
02F014-01	Pentium M 760	2 GHz	1 GB	0 MB	2 Gb Ethernet	GoldCap	right	0..+60°C
02F014-02	Celeron M 373	1 GHz	512 MB	0 MB	1Gb, 1 Fast Ethernet	GoldCap	right	-40..+85°C
02F014-13	Pentium M 760	2 GHz	1 GB	0 MB	2 Gb Ethernet	battery	right	0..+60°C

Options

CPU	■ Celeron® M 373 ULV, 1.0GHz ■ Celeron® M 370, 1.5GHz ■ Pentium® M 738 LV, 1.4GHz ■ Pentium® M 745 LV, 1.8GHz ■ Pentium® M 760, 2.0GHz
Memory	■ System RAM □ 256 MB, 512 MB, 1 GB or 2 GB ■ CompactFlash® □ 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 □ Two M12 connectors with two 10/100/1000Base-T ports instead of two RJ45 connectors on 8HP
Rear I/O	■ One SATA channel (instead of one side-card channel) ■ Two USB 2.0 ports
Real-Time Clock	■ Buffered by battery instead of GoldCap □ For retention of time/date data after a power off of more than 8-10 hours. When a 1.8" PATA hard disk is used, no battery can be used on the CPU board
Mechanical	■ Side card can be added at left or right side of CPU
Operation Temperature	■ Depends on system configuration (CPU, hard disk, heat sink...) ■ Minimum: -40°C (all processors) ■ Maximum: □ +60°C (Pentium® M 760) □ +85°C (Celeron® M 373)
Cooling Concept	■ Also available with conduction cooling in MEN CCA frame

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 F14 Models	**02F014-01**	Pentium® M 760, 2GHz, 1GB DDR2 DRAM, 2 Gigabit Ethernet, 0..+60°C
	02F014-13	Pentium® M 760, 2GHz, 1GB DDR2 DRAM, 2 Gigabit Ethernet, battery, 0..+60°C
	02F014-30	Celeron® M 373, 1GHz, 1GB DDR2 DRAM, 2 Gigabit Ethernet, 0..+60°C
	02F014-31	Celeron® M 373 1GHz, 1GB DDR2 DRAM, 2 Gigabit Ethernet, -40..+85°C
Related Hardware	**02F600-00**	2 COM extensions and SATA hard disk slot, for F14 and compatible SBCs, -40..+85°C screened
	02F601-00	1 DVI-D and 1 audio at front, SATA hard disk slot, for F14 and compatible SBCs, 4HP, 0..+60°C
	02F601-02	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
	02F602-00	3U CompactPCI® to CompactPCI® Express side card with 1 USB, 1 COM, 1 DVI, SATA hard disk slot, for F14 and compatible SBCs, 0..+60°C
	02F603-00	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
	02F604-00	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
	02F606-00	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
	02F608-00	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
Memory	**0751-0042**	CompactFlash® card, 4 GB, Type I, fixed bit set, -40..+85°C
	0751-0055	CompactFlash® card, 8 GB, Type I, fixed bit set, -40..+85°C
	0751-0058	CompactFlash® card, 16 GB, Type I, fixed bit set, -40..+85°C
	0751-0061	CompactFlash® card, 2 GB, Type I, fixed bit set, -40 to +85°C
Systems & Card Cages	MEN delivers turn-key systems completely installed (hardware, operating system, accessories), wired and tested. Different rack sizes, power supplies and backplanes on request. For details please contact your local sales representative.	
	0701-0046	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
	0701-0056	CompactPCI® 19" 4U/84HP rack-mount enclosure for 3U cards (vertical), 4+4-slot 3U CompactPCI® / CompactPCI® 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 Accessories	**0713-0003**	CompactPCI® 3U 1-slot backplane for stand-alone operation of F14, F15, F17, F18, F19P, F21P: 32-bit/33-MHz with rear I/O, 3.3V supply, ATX-power, power, JTAG, IPMB and utility connection, 6x screw connection M3

Ordering Information

Software: Linux

This product is designed to work under Linux. See below for potentially available separate software packages from MEN.

This product is designed to work under ELinOS Embedded Linux by Sysgo. For more information and product support please contact www.sysgo.com.

13Y001-06	MDIS5™ low-level driver sources (MEN) for LM63 on SMBus for F14, F15, F17, F18, F19P, D9, D601, A19 and A20
13Y002-06	MDIS5™ low-level driver sources (MEN) for F14, F15, F17, F18, D9, D601, A19 and A20 board monitoring
13Y004-06	MDIS5™ low-level driver sources (MEN) for generic SMBus driver for F14, F15, F17, F18, F19P, F21P, F22P, G20, G22, D9, D601, F600 and F601, A19, A20, F217, SC24, BC50M, BC50I and BL50W
13Y007-06	MDIS5™ low-level driver sources (MEN) for F14, F15, F17, F18, D9, D601, A19 and A20 board controller

Software: Windows®

This product is designed to work under Windows®. See below for potentially available separate software packages from MEN.

10F014-78	Windows® XP Embedded BSP (MEN) for F11S, F14, F15, F17, F18, F19P, F21P, G20, XM1, XM1L, XM2, MM1, MM2, SC21, SC24, DC1, DC2, RC1, BC50I, BC50M and BL50W
13F014-77	Windows® Installset (MEN) for F14, F15, F17, F18, D9, D601, A19 and A20 (Includes all free drivers developed by MEN for the supported hardware.)
13T001-70	Windows® network driver (Intel®) for F14, F15, F17, F18, D9, D6, D7, D601, A19, A20 and P601, P602
13T002-70	Windows® chipset graphics driver (Intel®) for F14 and D601
13T003-70	Windows® chipset driver (Intel®) for F14, F15, F17, F18, F18E, F19P, F21P, F22P, G20, G22, XM2, D9, D6, D7, D601, A19 and A20
13T005-70	Windows® USB2UART driver (FTDI) for F14, F15, F17, F18, F19P, F21P, F22P, D9, A19, A20, XM2 and XM50 / XM51 / F50P / F50C hosts
13T006-70	Windows® HD Audio driver (Realtek) for F14, F15, F17, F18, F19P, F21P, F22P, D9 and A19

Software: VxWorks®

This product is designed to work under VxWorks®. For details regarding supported/unsupported board functions please refer to the corresponding software data sheets.

10F014-60	VxWorks® BSP (MEN) for F14 and D601
13Y001-06	MDIS5™ low-level driver sources (MEN) for LM63 on SMBus for F14, F15, F17, F18, F19P, D9, D601, A19 and A20
13Y002-06	MDIS5™ low-level driver sources (MEN) for F14, F15, F17, F18, D9, D601, A19 and A20 board monitoring
13Y003-60	VxWorks® driver (MEN) for USB-to-UART bridges on F600, F601, F602, F603, F604 and F606
13Y004-06	MDIS5™ low-level driver sources (MEN) for generic SMBus driver for F14, F15, F17, F18, F19P, F21P, F22P, G20, G22, D9, D601, F600 and F601, A19, A20, F217, SC24, BC50M, BC50I and BL50W
13Y007-06	MDIS5™ low-level driver sources (MEN) for F14, F15, F17, F18, D9, D601, A19 and A20 board controller

Ordering Information

Software: QNX®	This product is designed to work under QNX®. For details regarding supported/unsupported board functions please refer to the corresponding software data sheets.	
	10F014-40	QNX® 6.3.0 installation support files (QNX® and MEN) for F14, F15, F17, F18, F19P, XM1, XM2 and MM1
	13Y001-06	MDIS5™ low-level driver sources (MEN) for LM63 on SMBus for F14, F15, F17, F18, F19P, D9, D601, A19 and A20
	13Y002-06	MDIS5™ low-level driver sources (MEN) for F14, F15, F17, F18, D9, D601, A19 and A20 board monitoring
	13Y004-06	MDIS5™ low-level driver sources (MEN) for generic SMBus driver for F14, F15, F17, F18, F19P, F21P, F22P, G20, G22, D9, D601, F600 and F601, A19, A20, F217, SC24, BC50M, BC50I and BL50W
	13Y007-06	MDIS5™ low-level driver sources (MEN) for F14, F15, F17, F18, D9, D601, A19 and A20 board controller
Software: Firmware/BIOS	This product includes a specially adapted BIOS.	
	14F014-01	System BIOS for F14 and D601
Software: Miscellaneous	Intel® software development products such as analyzers, compilers, threading tools etc. can be downloaded under www.intel.com/cd/software/products/asmo-na/eng/index.htm. IA-32 Intel® Architecture Software Developer's Manuals are available under www.intel.com/products/processor/manuals/index.htm.	

For operating systems not mentioned here contact MEN sales.

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	20APPN004	Application Note: How to make a USB stick bootable
	20F014-ER	F14 Errata
	20F014-00	F14 User Manual

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