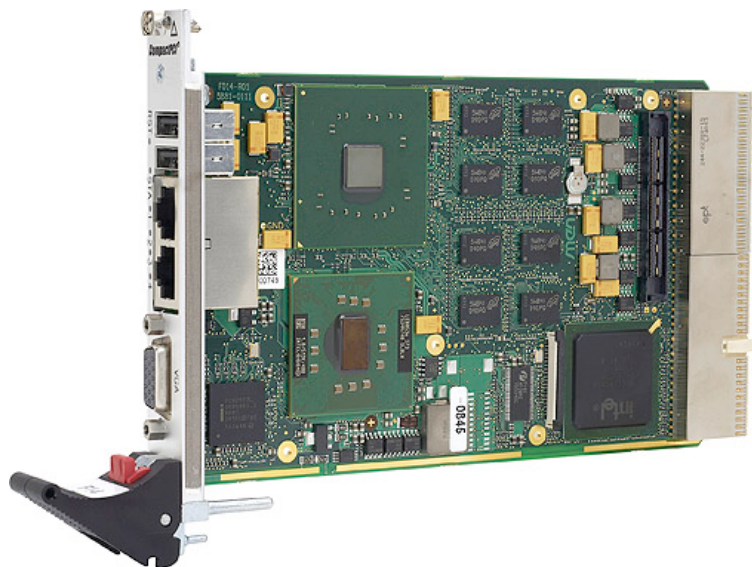


F17 – 3U CompactPCI®/Express Intel® Core™ 2 Duo CPU Board

- Intel® Core™ 2 Duo T7400 or L7400
- Dual core 64-bit processor
- PCI Express® six x1 links
- 4 HP system master or stand-alone
- 32-bit CompactPCI® or cPCI Express®
- 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



Equipped with the Intel® high-performance Core 2 Duo processor T7400 running at 2.16 GHz or the low-voltage L7400 at 1.5 GHz, the F17 is a versatile 4HP/3U (single-slot, single-size Eurocard) single-board computer based on the 64-bit multi-core processor architecture from Intel®. It is designed especially for embedded systems which require high computing and graphics performance and low power consumption. The F17 offers a 32-bit/33-MHz CompactPCI® bus interface and can 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.

A total of six PCI Express® lanes for high-speed communication (such as Gigabit Ethernet, graphics) are supported on the CPU card. 2 x1 PCIe® links are used for the two onboard Ethernet interfaces. 4 x1 or 1 x4 PCIe® links are available on a specific side card.

The DDR2 DRAM is soldered to F17 to guarantee optimum shock and vibration resistance. A robust IDE CompactFlash® device offers nearly unlimited space for user applications. In addition to parallel ATA, two serial ATA lines are available.

The standard I/O available at the front panel of F17 includes graphics on a VGA connector, two PCIe®-driven Gigabit Ethernet interfaces and two USB 2.0 ports.

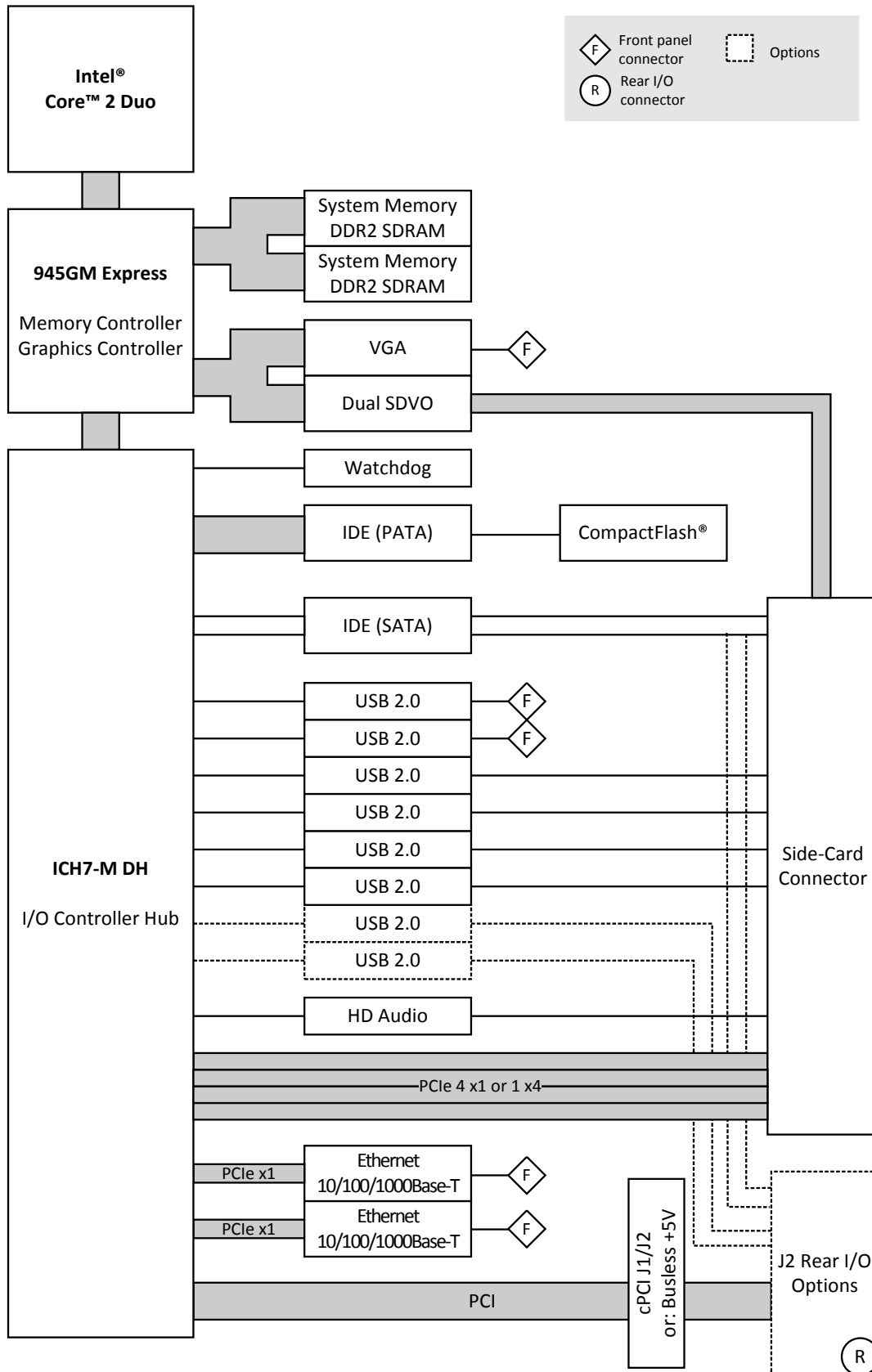
The F17 can be extended by different side cards. Additional functions include two digital video interfaces for flat panel connection via DVI, a variety of different UARTs or another four USB 2.0 ports, SATA for hard disk or RAID connection and HD audio. The F17 is also prepared for rear I/O where for 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 F17.

The F17 operates in Windows® and Linux environments as well as under real-time operating systems that support Intel®'s multi-core architecture. The Award BIOS was specially designed for embedded system applications.

Equipped with Intel® components exclusively from the Intel® Embedded Line, the F17 has a guaranteed minimum standard availability of 5 years. The F17 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 F17 comes with a tailored passive heat sink within 4 HP height. The robust design of the F17 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 F17 is also ready for coating so that it can be used in humid and dusty environments.

Diagram



Technical Data

CPU	<ul style="list-style-type: none">■ Intel® Core™ 2 Duo T7400 or L7400 (LV)<ul style="list-style-type: none">□ Dual-core 64-bit processor□ 2.16GHz or 1.5GHz processor core frequency□ Up to 667MHz front-side bus frequency■ Chipset<ul style="list-style-type: none">□ Northbridge: Intel® 945GM Express or Intel® 945GME Express□ Southbridge: Intel® ICH7-M DH
Memory	<ul style="list-style-type: none">■ 4MB L2 cache integrated in Core 2 Duo■ Up to 4GB SDRAM system memory<ul style="list-style-type: none">□ Soldered□ DDR2□ 667MHz memory bus frequency□ Dual-channel, 2x64 bits■ 8Mbits boot Flash■ Serial EEPROM 2kbits for factory settings■ CompactFlash® card interface<ul style="list-style-type: none">□ Via onboard IDE□ Type I□ True IDE□ DMA support
Mass Storage	<ul style="list-style-type: none">■ Parallel IDE (PATA)<ul style="list-style-type: none">□ One IDE port for local CompactFlash®■ Serial ATA (SATA)<ul style="list-style-type: none">□ Two channels via side-card connector□ Transfer rates up to 150MB/s□ RAID level 0/1 support
Graphics	<ul style="list-style-type: none">■ Integrated in 945GM Express chipset<ul style="list-style-type: none">□ 200/250MHz 256-bit graphics core■ VGA connector at front panel■ Two SDVO ports available via side-card connector<ul style="list-style-type: none">□ Two additional DVI connectors at front panel optional via side card□ Simultaneous connection of two monitors
I/O	<ul style="list-style-type: none">■ USB<ul style="list-style-type: none">□ 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 implementation□ Data rates up to 480Mbit/s■ Ethernet<ul style="list-style-type: none">□ Two 10/100/1000Base-T Ethernet channels□ RJ45 connectors at front panel□ Ethernet controllers are connected by two x1 PCIe® links□ Onboard LEDs to signal activity status and connection speed■ High Definition (HD) audio<ul style="list-style-type: none">□ Accessible via side-card connector
Front Connections (Standard)	<ul style="list-style-type: none">■ VGA■ Two USB 2.0 (Series A)■ Two Ethernet (RJ45)
Miscellaneous	<ul style="list-style-type: none">■ Board controller■ Real-time clock, buffered by a GoldCap or alternatively a battery■ Watchdog timer■ Temperature measurement■ One user LED■ Reset button

Technical Data

	<ul style="list-style-type: none"> ■ PCI Express® <ul style="list-style-type: none"> □ Two x1 links to connect local 1000Base-T Ethernet controllers <ul style="list-style-type: none"> □ Data rate 250MB/s in each direction (2.5 Gbit/s per lane) □ One x4 or four x1 links for extension through side-card connector <ul style="list-style-type: none"> □ Data rate up to 1GB/s in each direction (2.5 Gbit/s per lane)
<p>CompactPCI® Bus</p>	<ul style="list-style-type: none"> ■ 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)
<p>Busless Operation</p>	<ul style="list-style-type: none"> ■ Board can be supplied with +5V only, all other voltages are generated on the board ■ Backplane connectors used only for power supply
<p>Electrical Specifications</p>	<ul style="list-style-type: none"> ■ Supply voltage/power consumption: <ul style="list-style-type: none"> □ +5V (-3%/+5%), approx. 8.8A (5.4A with L7400 processor) □ +3.3V (-3%/+5%), approx. 1.1A □ +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: 434,390h @ 40°C according to IEC/TR 62380 (RDF2000)
<p>Mechanical Specifications</p>	<ul style="list-style-type: none"> ■ Dimensions: conforming to CompactPCI® specification for 3U boards ■ Front panel: 4HP with ejector ■ Weight: 427g
<p>Environmental Specifications</p>	<ul style="list-style-type: none"> ■ Temperature range (operation): <ul style="list-style-type: none"> □ 2.16GHz Core 2 Duo T7400: 0..+60°C □ Conditions: airflow 1.5m/s, typical power dissipation 33W, with Windows® XP operating system, 1 Gb Ethernet and hard disk, without CPU clock reduction □ 1.5GHz Core 2 Duo L7400: 0..+60°C □ Conditions: airflow 1.5m/s, typical power dissipation 22W, 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
<p>Safety</p>	<ul style="list-style-type: none"> ■ PCB manufactured with a flammability rating of 94V-0 by UL recognized manufacturers
<p>EMC</p>	<ul style="list-style-type: none"> ■ Tested according to EN 55022 (radio disturbance), IEC61000-4-2 (ESD) and IEC61000-4-4 (burst)
<p>BIOS</p>	<ul style="list-style-type: none"> ■ Award BIOS
<p>Software Support</p>	<ul style="list-style-type: none"> ■ Windows® ■ Linux ■ VxWorks® ■ QNX® ■ 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 Downloads.

Configuration & Options

Standard Configurations

Article No.	CPU Type	Chipset	Clock	System RAM	CFlash	RTC	Side Card Slot	Operation Temperature
02F017-00	T7400	945GM	2.16 GHz	2 GB	0 MB	GoldCap	right	0..+45°C
02F017-03	T7400	945GM	2.16 GHz	2 GB	0 MB	battery	right	0..+45°C
02F017-05	L7400	945GM	1.5 GHz	2 GB	0 MB	battery	right	0..+60°C
02F017-06	T7400	945GME	2.16 GHz	2 GB	0 MB	battery	right	0..+60°C
02F017-11	L7400	945GME	1.5 GHz	2 GB	0 MB	battery	right	0..+60°C

Options

CPU	<ul style="list-style-type: none"> ■ Core 2 Duo L7400, 1.5GHz LV ■ Core 2 Duo T7400, 2.16GHz ■ Celeron® M 530, 1.73GHz
Memory	<ul style="list-style-type: none"> ■ System RAM <ul style="list-style-type: none"> □ 256 MB, 512 MB, 1 GB, 2 GB or 4 GB ■ CompactFlash® <ul style="list-style-type: none"> □ 0 MB up to maximum available
Graphics	<ul style="list-style-type: none"> ■ One or two DVI-D connectors at front via side card <ul style="list-style-type: none"> □ Simultaneous connection of two monitors
I/O	<ul style="list-style-type: none"> ■ Ethernet <ul style="list-style-type: none"> □ 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 □ Active Management Technology for remote service
Rear I/O	<ul style="list-style-type: none"> ■ Two SATA channels (instead of the two side-card channels) ■ Two USB 2.0 ports ■ One additional Ethernet channel (via side-card connector, no side card can be used in this configuration) <ul style="list-style-type: none"> □ Via one PCI Express® link on side board connector
Real-Time Clock	<ul style="list-style-type: none"> ■ Buffered by battery instead of GoldCap <ul style="list-style-type: none"> □ 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	<ul style="list-style-type: none"> ■ Side card can be added at left or right side of CPU
Operation Temperature	<ul style="list-style-type: none"> ■ Depends on system configuration (CPU, hard disk, heat sink...) ■ Maximum: +60°C (T7400, L7400) ■ Minimum: -40°C (all processors)
Cooling Concept	<ul style="list-style-type: none"> ■ 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 F17 Models	02F017-00	Intel® Core™ 2 Duo T7400, 2.16 GHz, 2 GB DDR2 DRAM, 2 Gigabit Ethernet, 0..+45°C (945GM chipset), discontinued as of September 15, 2008
	02F017-03	Intel® Core™ 2 Duo T7400, 2.16 GHz, 2 GB DDR2 DRAM, 2 Gigabit Ethernet, battery, 0..+45°C (945GM chipset), discontinued as of September 15, 2008
	02F017-05	Intel® Core™ 2 Duo L7400, 1.5 GHz, 2 GB DDR2 DRAM, 2 Gigabit Ethernet, battery, 0..+60°C (945GM chipset), discontinued as of September 15, 2008
	02F017-06	Intel® Core™ 2 Duo T7400, 2.16 GHz, 2 GB DDR2 DRAM, 2 Gigabit Ethernet, battery, 0..+60°C (945GME chipset)
	02F017-11	Intel® Core™ 2 Duo L7400, 1.5 GHz, 2 GB DDR2 DRAM, 2 Gigabit Ethernet, battery, (945GME chipset), 0..+60°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
	02F605-00	1 XMC or PMC slot, for F14 and compatible SBCs, -40..+85°C with qualified components
	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
	0751-0053	CompactFlash® card, 2 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
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

Ordering Information

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
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 MDISS™ low-level driver sources (MEN) for LM63 on SMBus for F14, F15, F17, F18, F19P, D9, D601, A19 and A20		
13Y002-06 MDISS™ low-level driver sources (MEN) for F14, F15, F17, F18, D9, D601, A19 and A20 board monitoring		
13Y004-06 MDISS™ low-level driver sources (MEN) for generic SMBus driver for F14, F15, F17, F18, F19P, F21P, G20, D9, D601, F600 and F601, A19, A20, F217 and SC24		
13Y007-06 MDISS™ 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, SC27, DC1, DC2, RC1 and BC50M		
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		
13T003-70 Windows® chipset driver (Intel®) for F14, F15, F17, F18, F18E, F19P, F21P, G20, XM2, D9, D6, D7, D601, A19 and A20		
13T005-70 Windows® USB2UART driver (FTDI) for F14, F15, F17, F18, F19P, F21P, D9, A19, A20, XM2 and XM50 / XM51 / F50P / F50C hosts		
13T006-70 Windows® HD Audio driver (Realtek) for F14, F15, F17, F18, F19P, F21P, D9 and A19		
13T007-70 Windows® chipset graphics driver (Intel®) for F15, F17, D9, A19 and A20		
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.		
10F015-60 VxWorks® BSP (MEN) for F15, F17 and D9		
13Y001-06 MDISS™ low-level driver sources (MEN) for LM63 on SMBus for F14, F15, F17, F18, F19P, D9, D601, A19 and A20		
13Y002-06 MDISS™ 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 MDISS™ low-level driver sources (MEN) for generic SMBus driver for F14, F15, F17, F18, F19P, F21P, G20, D9, D601, F600 and F601, A19, A20, F217 and SC24		
13Y007-06 MDISS™ low-level driver sources (MEN) for F14, F15, F17, F18, D9, D601, A19 and A20 board controller		

Ordering Information

<p>Software: QNX®</p>	<p>This product is designed to work under QNX®. For details regarding supported/unsupported board functions please refer to the corresponding software data sheets.</p> <table border="1"> <tr> <td data-bbox="464 352 646 415">10F014-40</td> <td data-bbox="655 352 1508 415">QNX® 6.3.0 installation support files (QNX® and MEN) for F14, F15, F17, F18, F19P, XM1, XM2 and MM1</td> </tr> <tr> <td data-bbox="464 436 646 499">13Y001-06</td> <td data-bbox="655 436 1508 499">MDISS™ low-level driver sources (MEN) for LM63 on SMBus for F14, F15, F17, F18, F19P, D9, D601, A19 and A20</td> </tr> <tr> <td data-bbox="464 520 646 583">13Y002-06</td> <td data-bbox="655 520 1508 583">MDISS™ low-level driver sources (MEN) for F14, F15, F17, F18, D9, D601, A19 and A20 board monitoring</td> </tr> <tr> <td data-bbox="464 604 646 667">13Y004-06</td> <td data-bbox="655 604 1508 667">MDISS™ low-level driver sources (MEN) for generic SMBus driver for F14, F15, F17, F18, F19P, F21P, G20, D9, D601, F600 and F601, A19, A20, F217 and SC24</td> </tr> <tr> <td data-bbox="464 688 646 741">13Y007-06</td> <td data-bbox="655 688 1508 741">MDISS™ low-level driver sources (MEN) for F14, F15, F17, F18, D9, D601, A19 and A20 board controller</td> </tr> </table>	10F014-40	QNX® 6.3.0 installation support files (QNX® and MEN) for F14, F15, F17, F18, F19P, XM1, XM2 and MM1	13Y001-06	MDISS™ low-level driver sources (MEN) for LM63 on SMBus for F14, F15, F17, F18, F19P, D9, D601, A19 and A20	13Y002-06	MDISS™ low-level driver sources (MEN) for F14, F15, F17, F18, D9, D601, A19 and A20 board monitoring	13Y004-06	MDISS™ low-level driver sources (MEN) for generic SMBus driver for F14, F15, F17, F18, F19P, F21P, G20, D9, D601, F600 and F601, A19, A20, F217 and SC24	13Y007-06	MDISS™ low-level driver sources (MEN) for F14, F15, F17, F18, D9, D601, A19 and A20 board controller
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<p>Software: Firmware/BIOS</p>	<p>This product includes a specially adapted BIOS.</p> <table border="1"> <tr> <td data-bbox="464 804 646 835">14F015-00</td> <td data-bbox="655 804 1508 835">System BIOS for F15, F17 and D9</td> </tr> </table>	14F015-00	System BIOS for F15, F17 and D9								
14F015-00	System BIOS for F15, F17 and D9										
<p>Software: Miscellaneous</p>	<p>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.</p>										
<p>For operating systems not mentioned here contact MEN sales.</p>											
<p>Documentation</p>	<p>Compare Chart 3U CompactPCI® / PlusIO CPU cards » Download</p> <p>Compare Chart 3U CompactPCI® / PlusIO peripheral cards » Download</p> <p>Compare Chart 3U CompactPCI® / PlusIO extension cards » Download</p> <table border="1"> <tr> <td data-bbox="464 1161 646 1192">20APPN004</td> <td data-bbox="655 1161 1508 1192">Application Note: How to make a USB stick bootable</td> </tr> <tr> <td data-bbox="464 1213 646 1245">20F017-ER</td> <td data-bbox="655 1213 1508 1245">F17 Errata</td> </tr> <tr> <td data-bbox="464 1266 646 1299">20F017-00</td> <td data-bbox="655 1266 1508 1299">F17 User Manual</td> </tr> </table>	20APPN004	Application Note: How to make a USB stick bootable	20F017-ER	F17 Errata	20F017-00	F17 User Manual				
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20F017-ER	F17 Errata										
20F017-00	F17 User Manual										

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