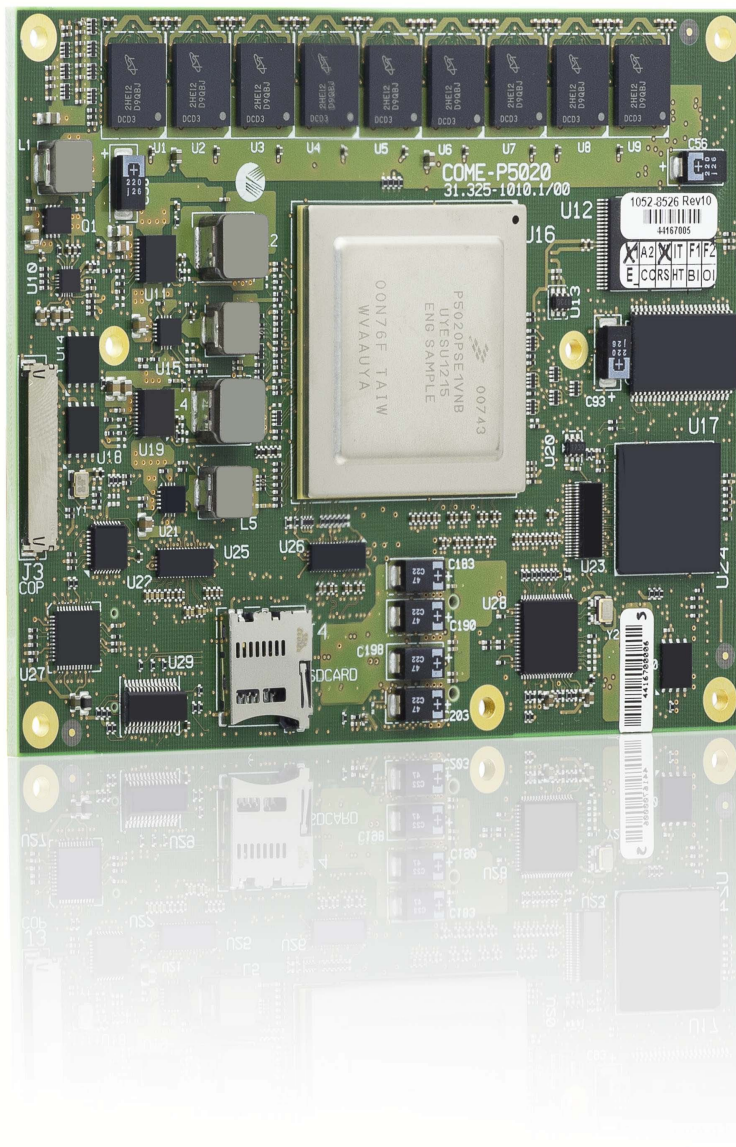


» User Guide «



COMe-bP5020

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1 Introduction

1.1 COMe-bP5020 Overview

The COMe-bP5020 is a COM Express® form factor compliant Power Architecture® processor module based on the Freescale™ QorIQ™ 64-bit P5020 processor.

Designed in the COM Express® basic (95 mm x 125 mm) form factor the module incorporates the Freescale™ QorIQ™ P5020 dual-core Power Architecture® processor operating at 2.0 GHz - other processor versions (P5010 and P3041) and operating speeds are available on request. Featuring 64-bit technology, it integrates up to 8 GByte of soldered DDR3 SDRAM at 1300 MHz and ECC support. Two additional MBytes of shared third level cache facilitate core-to-core communications to minimize accesses to main memory.

Up to 2 GB of NAND Flash as well as a socket for a MicroSD card provide flexible and reliable storage space for application data. In terms of I/Os, the module interfaces the QorIQ-specific I/Os to the carrier board. In addition to USB 2.0 ports there are also UART (TxD, RxD, RTC and CTS) and Gigabit Ethernet interfaces.

Flexible interface support is guaranteed by 18 SERDES lanes, which can be configured according to application-specific needs. A comprehensive range of different combinations, for example as PCIe x4, sRIO x4, Serial Gigabit Media Independent Interface (SGMII), XAUI and SATA interfaces is available.

The COMe-bP5020 with its innovative Data Path Acceleration Architecture (DPAA) assures that even heavy network traffic does not affect the processing performance of the cores. With DPAA the cores are relieved of the common packet-handling tasks, which leaves more headroom for the relevant processing even at full load.

The COMe-bP5020 targets high-bandwidth telecommunication and data processing applications. With its long-term availability of more than 10 years, it is also a very good choice for use in long life cycle network applications in the medical, military and transportation markets.

1.2 Board Diagrams

Figure 1: COMe-bP5020 Block Diagram

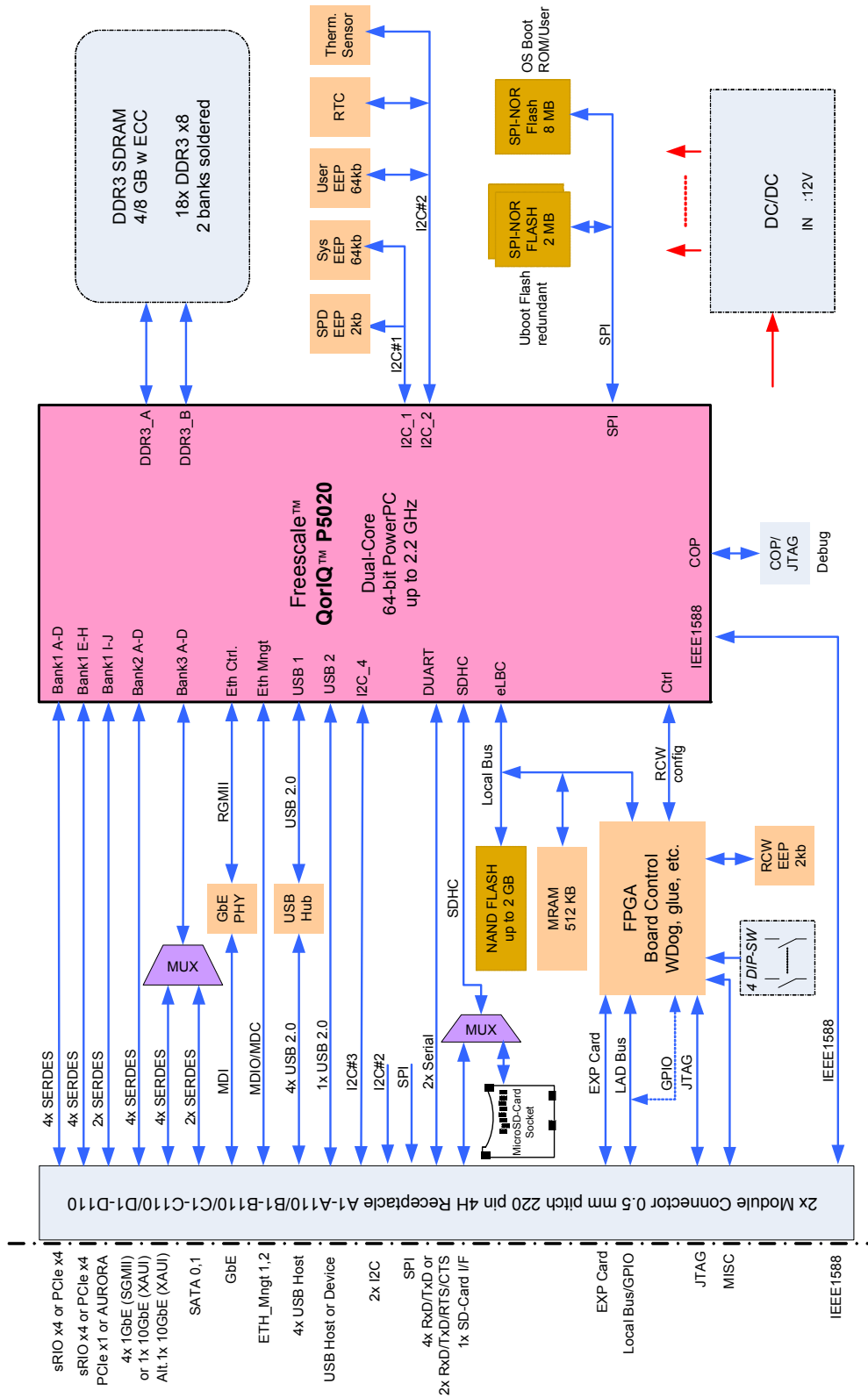


Figure 2: COMe-bP5020 Board Layout Top View

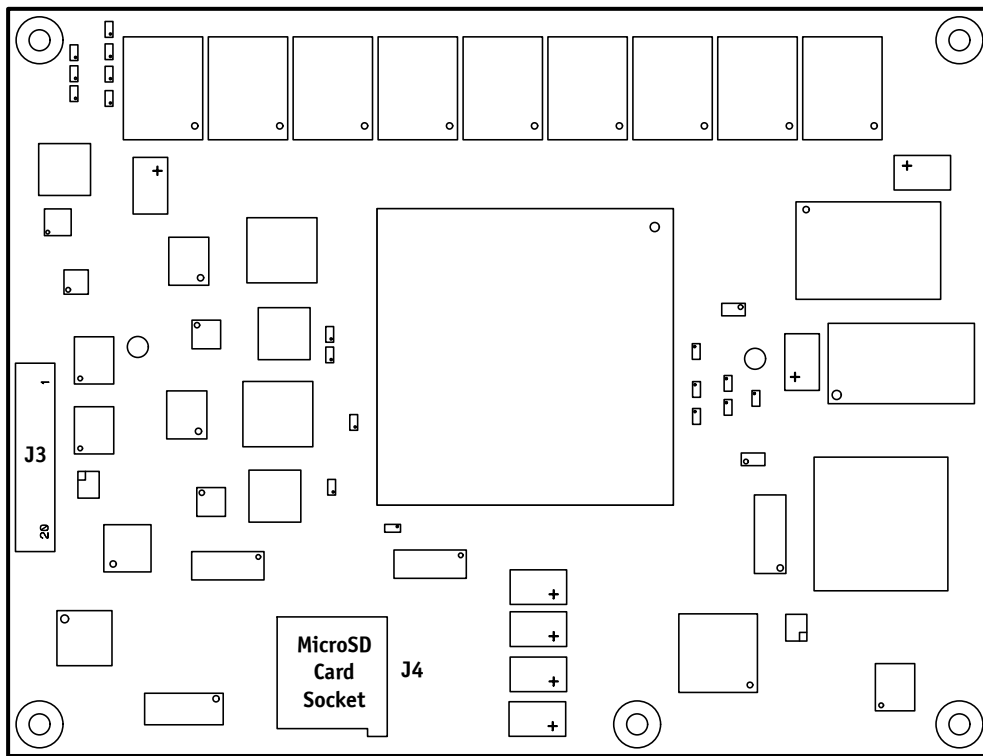
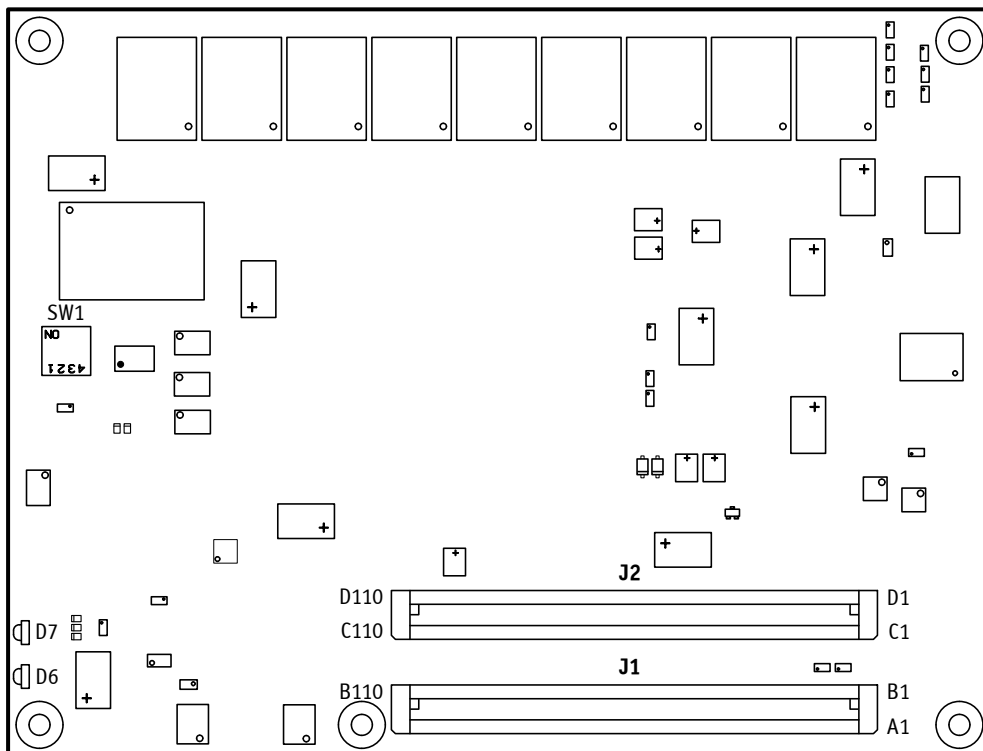


Figure 3: COMe-bP5020 Board Layout Bottom View



1.3 Technical Specifications

Table 1: COMe-bP5020 Main Specifications

COMe-bP5020		SPECIFICATIONS
PROCESSOR	CPU	<p>The COMe-bP5020 supports the following microprocessor:</p> <ul style="list-style-type: none"> » Freescale™ QorIQ™ P5020 processor, 2.0 GHz (other operating speeds and processor variants (P5010/P3041) are available on request) <p>Further processor features:</p> <ul style="list-style-type: none"> » Two 64-bit execution cores » System Memory interface with optimized support for dual-channel DDR3 SDRAM memory at 1300 MHz with ECC for the QorIQ™ P5020 processor with 2.0 GHz CPU frequency
	Integrated Controllers	<p>Controllers integrated in the CPU and utilized by the COMe-bP5020:</p> <ul style="list-style-type: none"> » eSDHC, eLBC, DUART, dTSEC, PCIe, sRIO, SPI, I2C
MEMORY	Memory	<p>Main memory:</p> <ul style="list-style-type: none"> » Up to 8 GB, dual-channel DDR3 SDRAM memory with ECC running at up to 1300 MHz <p>Cache structure:</p> <ul style="list-style-type: none"> » 64 kB L1 cache for each core <ul style="list-style-type: none"> » 32 kB instruction cache » 32 kB data cache » 512 kB backside L2 cache for each core » 2 MB shared L3 CoreNet platform cache (1 MB per memory channel) <p>Flash memory:</p> <ul style="list-style-type: none"> » Two SPI boot flashes (2 x 2 MB) for U-Boot selectable via the DIP switch » One 8 MB SPI flash for operating system or application <p>Mass storage device:</p> <ul style="list-style-type: none"> » Up to 2 GB NAND flash via an integrated/embedded NAND flash controller » Up to 32 GB microSDHC flash via an integrated SDHC controller <p>MRAM memory:</p> <ul style="list-style-type: none"> » 512 kB of non-volatile memory <p>Two serial EEPROMs with 64 kbit:</p> <ul style="list-style-type: none"> » One for system data storage » One free for user data storage

Table 1: COMe-bP5020 Main Specifications (cont'd)

COMe-bP5020		SPECIFICATIONS
INTERCONNECTION	Gigabit Ethernet	Up to five Gigabit Ethernet ports: » One Gigabit Ethernet port through COMe MDI interface » Up to four Gigabit Ethernet ports through SGMII interface
	SATA	Two SATA ports
	SRIO	Up to two x4 Serial RapidIO interfaces operating in host or agent configuration, depending on configuration
	PCI Express	Up to two x4 PCI Express interface operating in root complex configuration If interface is configured for PCI Express, SRIO is not possible
	Debug Interface	One debug port
	Serial Interface	Up to four serial ports: » 2x 4-wire UART interfaces (RxD, TxD, RTS, CTS), or » 4x 2-wire UART interfaces (RxD, TxD)
	GPIO	Up to 12 GPIOs
Connectors	Onboard Connectors	Two 220-pin connectors for interfacing with a carrier board One JTAG/COP connector, J3, for debugging
	microSD card Socket	Standard microSD socket, J9, accepts microSD and microSDHC cards
Switch	DIP Switch	One DIP switch for board configuration, SW1, consisting of four switches
LEDs	Module Health Monitor LEDs	LED7: indicates Reset Status LED9: indicates "Power Good" status
TIMER	Watchdog Timer	Software-configurable, two-stage Watchdog with programmable timeout ranging from 125 ms to 4096 s in 16 steps Serves for generating IRQ or hardware reset
	System Timer	There are several timers implemented in the CPU. For further information regarding these timers, refer to the CPU reference manual from Freescale™.
THERMAL	Thermal Monitoring	One onboard temperature sensor for monitoring the board temperature
GENERAL	Power Consumption	Refer to Chapter 4, "Power Considerations" for information related to the power consumption of the COMe-bP5020.
	Temperature Range	Operational: Refer to Chapter 5, "Thermal" for further information Storage: -40°C to +70°C
	Mechanical	COM Express® basic
	Dimensions	125 mm x 95 mm
	Board Weight	99 grams (without heat spreader) 220 grams (with heat spreader)

Table 1: COMe-bP5020 Main Specifications (cont'd)

COMe-bP5020		SPECIFICATIONS
SOFTWARE	Bootloader	DENX U-Boot (Universal Boot Loader) with Kontron-specific modifications to support the COMe-bP5020 requirements
	Operating Systems	The board is offered with various Board Support Packages including VxWorks and Linux operating systems. For further information concerning the operating systems available for the COMe-bP5020, please contact Kontron.

1.4 Standards

The COMe-bP5020 complies with the requirements of the following standards.

Table 2: Standards

COMPLIANCE	TYPE	STANDARD	TEST LEVEL
CE	Emission	EN55022 EN61000-6-3	--
	Immission	EN55024 EN61000-6-2	--
	Electrical Safety	EN60950-1	--
Mechanical	Mechanical Dimensions	COM Express® basic	--
Environmental and Health Aspects	Vibration (sinusoidal, operating)	tbs	tbs
	Shock (operating)	tbs	tbs
	Climatic Humidity	IEC60068-2-78	93% RH at 40°C, non-condensing (see notice below)
	WEEE	Directive 2002/96/EC	Waste electrical and electronic equipment
	RoHS-II	Directive 2011/65/EC	Restriction of the use of certain hazardous substances in electrical and electronic equipment

NOTICE

Kontron performs comprehensive environmental testing of its products in accordance with applicable standards.

Customers desiring to perform further environmental testing of Kontron products must contact Kontron for assistance prior to performing any such testing. This is necessary, as it is possible that environmental testing can be destructive when not performed in accordance with the applicable specifications.

In particular, for example, boards without conformal coating must not be exposed to a change of temperature exceeding 1K/minute, averaged over a period of not more than five minutes. Otherwise, condensation may cause irreversible damage, especially when the board is powered up again.

Kontron does not accept any responsibility for damage to products resulting from destructive environmental testing.

1.5 Related Publications**Table 3: Related Publications**

SPECIFICATION / ORGANIZATION	PUBLICATION
COM Express®	PICMG® COM.0, COM Express® Module Base Specification, Revision 2.0, August 8, 2010 Freescale™, Kontron and Emerson Common Pinout Definition
PCI Express	PCI Express Base Specification Revision 2.0, Dec. 20, 2006
Serial RapidIO	RapidIO™ Interconnect Specification Part 6: LP-Serial Physical Layer Specification, Rev. 2.0.1, March 2008
Serial ATA	Serial ATA International Organization: Serial ATA Revision 2.6, 15th February 2007
Ethernet	IEEE802.3: Part 3: Carrier Sense Multiple Access with Collision Detection (CSMA/CD) Access Method and Physical Layer Specification, Clause 22 and Clause 45
Platform Firmware	DENX "U-Boot" (Universal Boot Loader) online documentation at www.denx.de
Kontron	Kontron's Product Safety and Implementation Guide, ID 1021-9142

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