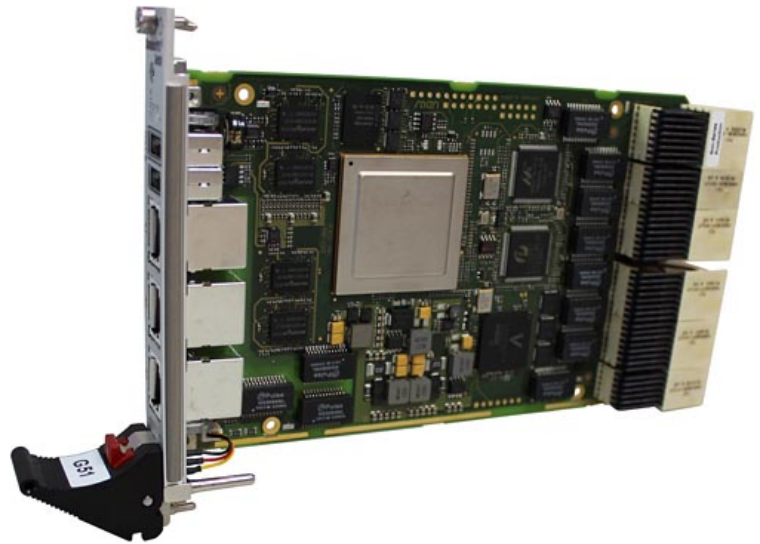


G51 – 3U CompactPCI® Serial QorIQ™ Communications CPU Board

- **Single-board computer with up to 8 Gb Ethernet**
- **P3041 Freescale™ QorIQ™ quad-core PowerPC® processor**
- **4 HP system master and peripheral slot**
- **PICMG CPCI-S.0 CompactPCI® Serial**
- **Up to 8 GB DDR3 SDRAM soldered, ECC**
- **Standard front I/O: 3 Gb Ethernet, 2 USB 2.0**
- **Standard rear I/O: 4 PCIe®, 8 Gb Ethernet, 6 USB 2.0, 2 SATA (3 Gb)**
- **-40 to +85°C with qualified components**
- **Compliant to EN 50155 (railways)**
- **Prepared for ISO 7637-2 compliance (E-mark for automotive)**



The G51 unites the benefits of CompactPCI® Serial and the interface capabilities and calculation power of a QorIQ™ CPU. Being based on a Freescale™ quad-core QorIQ™ P3041 processor, the 3U, 4 HP card provides a large number of high-speed serial interfaces both at the front and at the CPCI-S.0 rear connectors.

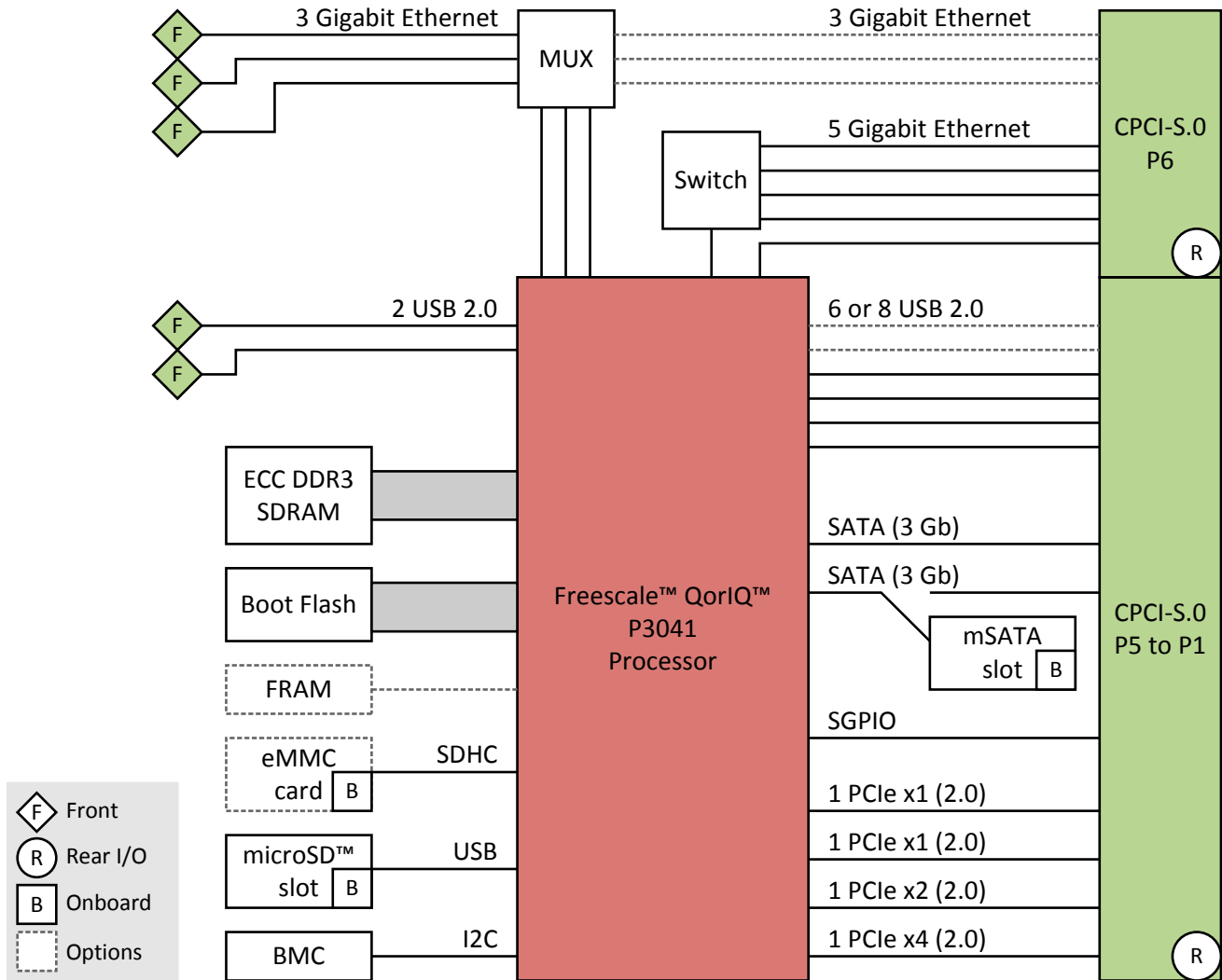
Three Gigabit Ethernet channels at the front and a standard five ports at the rear provide solid connectivity. The three front ports can also be routed to the rear, so that the maximum of eight Ethernet channels defined by CPCI-S.0 are available on the backplane. This routing option is a standard feature, and can be set in the U-Boot boot loader. In a similar way, the G51 comes with two SATA 2.x channels, where one can either be used for an onboard mSATA disk, or as a second port at the rear - also switchable via U-Boot. SGPIO is available, too. The G51 comes with six standard rear USB 2.0 ports, and the two standard front interfaces can be led to the rear as a hardware option, for a total of eight backplane channels. Four PCI Express® links (two x1, one x2 and

one x4) add another important column of CompactPCI® Serial features to the G51's rear I/O.

Its abundant connectivity, flexible configuration options and multi-core computing performance make the G51 a universal off-the-shelf platform for all kinds of communication and processing tasks. Data acquisition, data encryption, simulation and process control systems are only a few examples. Suitable CompactPCI® Serial peripheral cards are available to add specialized functions in a modular system where necessary.

Apart from its connectivity, the card comes with fast DDR3 RAM, a microSD™ card slot, a number of board management functions and Linux BSP support. All components are soldered for protection against shock and vibration and withstand an extended operating temperature of -40°C to +85°C. As an option, the board can be equipped with M12 Ethernet front connectors. The G51 is also ready for coating so that it can be used in humid and dusty environments. All this makes the G51 a perfect choice for railway, avionics or marine applications, but also for fields like automation or power & energy, where computers face harsh environments.

Diagram



Technical Data

CPU	<ul style="list-style-type: none"> ■ Freescale™ QorIQ™ P3041 <ul style="list-style-type: none"> □ 1.2 GHz (no encryption) □ Four high-performance Power Architecture e500mc cores ■ Please see Standard Configurations and Options below for options and available standard versions.
Memory	<ul style="list-style-type: none"> ■ 1 MB L3 cache integrated in QorIQ™ P3041 ■ Up to 8 GB SDRAM system memory <ul style="list-style-type: none"> □ Soldered □ DDR3 with ECC support □ 600 MHz memory bus frequency ■ 64 MB boot Flash ■ Please see Standard Configurations and Options for options and available standard versions.
Mass Storage	<ul style="list-style-type: none"> ■ Serial ATA (SATA) <ul style="list-style-type: none"> □ One port for onboard mSATA disk slot □ One port via CPCI-S.0 rear connector (two ports if the link to the mSATA disk is not required, can be switched in U-Boot) □ SATA Revision 2.x support □ Transfer rates up to 300 MB/s (3 Gbit/s) ■ mSATA disk slot <ul style="list-style-type: none"> □ Connected via one SATA channel ■ Serial GPIO (SGPIO) <ul style="list-style-type: none"> □ One interface via CPCI-S.0 rear connector □ Compliant with SFF 8485 specification ■ microSD™ card slot <ul style="list-style-type: none"> □ Via USB
I/O	<ul style="list-style-type: none"> ■ USB <ul style="list-style-type: none"> □ Two USB 2.0 host/client ports via Series A connector at front panel □ Six USB 2.0 host ports via CPCI-S.0 rear connector □ OHCI/EHCI implementation □ Data rates up to 480 Mbit/s ■ Ethernet <ul style="list-style-type: none"> □ Three 10/100/1000Base-T Ethernet channels at the front □ RJ45 or M12 connectors at front panel □ Two front LEDs per front channel to signal LAN link and activity status □ Up to eight 10/100/1000Base-T Ethernet channels via CPCI-S.0 rear connector □ All front ports can be switched to the rear using U-Boot □ IEEE 1588 support (PTP, Precision Time Protocol) for 3 front/rear ports and 1 additional rear port ■ PCI Express® <ul style="list-style-type: none"> □ Two x1 links, data rate up to 500 MB/s in each direction (5 Gbit/s per lane) □ One x2 link, data rate 1000 MB/s in each direction (5 Gbit/s per lane) □ One x4 link, data rate 2 GB/s in each direction (5 Gbit/s per lane) □ PCIe® 2.x support □ Accessible via CPCI-S.0 rear connector
Front Connections (Standard)	<ul style="list-style-type: none"> ■ Two USB 2.0 (Series A) ■ Three Ethernet (RJ45 or M12)
Rear I/O	<ul style="list-style-type: none"> ■ One or two SATA, configurable in U-Boot ■ SGPIO ■ Six USB 2.0 ■ Five or eight Gigabit Ethernet, configurable in U-Boot ■ Two PCI Express® x1, one PCI Express® x2, one PCI Express® x4

Technical Data

Miscellaneous	<ul style="list-style-type: none">■ Real-time clock with supercapacitor or onboard battery backup<ul style="list-style-type: none">□ Data retention of supercapacitor: 72 hours■ Power supervision and watchdog■ Temperature measurement■ Hot-plug capability<ul style="list-style-type: none">□ Hot-pluggable when used as a peripheral board□ Blue front LED for hot plug■ One front LED for board status, two onboard user LEDs■ Reset button
CompactPCI® Serial	<ul style="list-style-type: none">■ Compliance with CompactPCI® Serial PICMG CPCI-S.0 Specification■ System or peripheral slot
Electrical Specifications	<ul style="list-style-type: none">■ Supply voltage/power consumption:<ul style="list-style-type: none">□ +12 V (-5%/+5%), tbd. A typ/max.
Mechanical Specifications	<ul style="list-style-type: none">■ Dimensions: conforming to CompactPCI® Serial specification for 3U boards■ Front panel: 4 HP with ejector■ Weight: tbd. g
Environmental Specifications	<ul style="list-style-type: none">■ Temperature range (operation):<ul style="list-style-type: none">□ -40..+85°C (qualified components)□ Airflow: min. 1.5 m/s■ Temperature range (storage): -40..+85°C■ Relative humidity (operation): max. 95% non-condensing■ Relative humidity (storage): max. 95% non-condensing■ Altitude: -300 m to +3000 m■ Shock: 50 m/s², 30 ms (EN 61373)■ Vibration (function): 1 m/s², 5 Hz - 150 Hz (EN 61373)■ Vibration (lifetime): 5.72 m/s², 5 Hz - 150 Hz (EN 61373)■ Conformal coating on request
MTBF	<ul style="list-style-type: none">■ 361 403 h @ 40°C according to IEC/TR 62380 (RDF 2000)
Safety	<ul style="list-style-type: none">■ Flammability<ul style="list-style-type: none">□ PCB manufactured with a flammability rating of 94V-0 by UL recognized manufacturers■ Electrical Safety<ul style="list-style-type: none">□ Insulation measurement test according to EN 50155 (12.2.9.1)□ Voltage withstand test according to EN 50155 (12.2.9.2)□ Information technology equipment test according to EN 60950
EMC Conformity	<ul style="list-style-type: none">■ EN 55022, IEC 61000-6-4 (radio disturbance)■ IEC 61000-4-2 (ESD)■ IEC 61000-4-3 (electromagnetic field immunity)■ IEC 61000-4-4 (burst)■ IEC 61000-4-5 (surge)■ IEC 61000-4-6 (conducted disturbances)■ Prepared for compliance according to ISO 7637-2 requirements (E-mark for automotive)
BIOS	<ul style="list-style-type: none">■ U-Boot Universal Boot Loader
Software Support	<ul style="list-style-type: none">■ Linux (in preparation)■ For more information on supported operating system versions and drivers see Downloads.

Configuration & Options

Standard Configurations

Article No.	CPU Type / Clock	Encryption	System RAM	FRAM	eMMC	USB	Ethernet Conn.	Operating Temperature
02G051-00	P3041, 1.2 GHz	No	2 GB	0 KB	0 GB	2 front, 6 rear	RJ45	-40..+85°C

Options

CPU	<ul style="list-style-type: none"> ■ QorIQ™ P3041 available with <ul style="list-style-type: none"> □ 1.2 GHz, 600 MHz memory bus frequency □ 1.33 GHz, 667 MHz memory bus frequency □ 1.5 GHz, 667 MHz memory bus frequency ■ With or without encryption
Memory	<ul style="list-style-type: none"> ■ System RAM <ul style="list-style-type: none"> □ 2 GB, 4 GB or 8 GB □ With or without ECC ■ FRAM, non-volatile <ul style="list-style-type: none"> □ 0 KB or 8 KB ■ Boot Flash <ul style="list-style-type: none"> □ 64 MB, 128 MB or 256 MB
Mass Storage	<ul style="list-style-type: none"> ■ eMMC card up to 64 GB and more possible, depending on available components <ul style="list-style-type: none"> □ Soldered on the board □ Connected via one SDHC channel
I/O	<ul style="list-style-type: none"> ■ USB <ul style="list-style-type: none"> □ Two additional host ports via CPCI-S.0 rear connector instead of front connections, one of them also usable as a client port ■ Ethernet <ul style="list-style-type: none"> □ RJ45 or M12 connectors
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 G51 Models	02G051-00	3U CompactPCI® Serial communications SBC, Freescale™ QorIQ™ P3041, 1.2 GHz, 2 GB RAM with ECC, RJ45 Ethernet at front, -40..+85°C
Memory	0751-0046	MicroSD card, 2 GB, -40..+85°C
	0751-0051	SSD mSATA, 8 GB, -40..+85°C
	0751-0052	MicroSD card, 4 GB, -40..+85°C
Systems & Card Cages	0701-0058	CompactPCI® Serial 19" 4U/84 HP rack-mount enclosure for 3U cards (vertical), 9-slot backplane, system slot left, full mesh, 460 W ATX PSU 90..264VAC, 1U fan tray with 2x 12 VDC fans, 0..+45°C 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.
Documentation	Compare Chart 3U CompactPCI® Serial CPU and I/O cards » Download	

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