



Integrated Device Technology

Switching and Bridging Solutions

IDT RapidIO Switches, VME Interconnect, and Host Bridges

ANALOG AND RF | INTERFACE AND CONNECTIVITY | MEMORY AND LOGIC | POWER MANAGEMENT | TIMING AND SYNCHRONIZATION

COMMUNICATIONS

DEFENSE
INDUSTRIAL AUTOMATION
MEDICAL IMAGING

Typical Application

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    graph TD
      VXS[VXS Connector] -- "4x SRIO Gen2" --> RS[RapidIO Switch]
      RS -- "4x SRIO Gen2" --> RS
      RS -- "4x SRIO Gen2" --> P2R[PCIe to RapidIO Bridge]
      P2R -- "4x PCIe Gen2" --> PC[Processor Chip Set]
      PC -- "PCIe Gen3" --> P2R
      VME[VME64 Connector] --> P2V[PCI-X to VME Bridge]
      P2V -- "PCI 66MHz or PCI-X 133MHz" --> P2R
      P2V -- "PCI 66MHz or PCI-X 133MHz" --> P2X[PCIe to PCI-X Bridge]
      P2X -- "x4 PCIe Gen1" --> PC
      PC --> X86[x86 Processor]
      PC --> MEM[DDR3L-1600 2GB(4GB) with ECC]
      PC --> MEM2[DDR3L-1600 2GB(4GB) with ECC]
      PC --> I/O[ON BOARD I/Os: DisplayPort, USB 3.0, USB 2.0, VGA, GbE]
      PC --> STORAGE[mSATA, eUSB, BIOS, Thermal DSW]
  
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IDT is the industry leader in SRIO, VME, and EHB switching and bridging technology. Our chips set the standard in Military, Aerospace, Communication, and Industrial segments for each of these product lines. With strong technical support, established products and long term proven technology, IDT is the pre-eminent company in SRIO, VME and EHB switching and bridging.

RAPIDIO SWITCHES AND BRIDGES – With performance up to 20Gbps per-port throughput and the ability to scale to thousands of processors over any topology, open-standard RapidIO is the embedded fabric of choice. IDT offers RapidIO Gen1 and Gen2 switch families. This sub-microsecond interconnect (100ns switch latency), with its specification-standard backplane support, enables high performance computing and carrier-class wireless infrastructure. Military, aerospace, and industrial control systems benefit from RapidIO’s hot-swap support and fault tolerance in these mission critical systems. Green microserver and storage systems leverage RapidIO’s best power efficiency (as low as 300mW / 10Gbps) and hardware-based RDMA and Messaging. In datacenter-class systems, any processor can be supported. Even x86 can take advantage of the RapidIO network when connected via IDT’s PCIe-to-SRIO bridge devices.

VME INTERCONNECT – IDT is the market leader in VME Interconnect technology with more than twenty years experience in providing VME solutions and technical support to the embedded systems industry. The VME System Interconnect products, such as IDT TSI148, dominate the VME market and enhance the performance of traditional VME-based applications for military, communications, industrial automation, and medical imaging. IDT’s VME bridges provide a high performance, direct connect interface between the VMEbus backplane and the local PCI bus. The VME bridges are ideally suited for processor and peripheral I/O boards that function as both a master and slave in the VMEbus system.

EHB – Embedded Host Bridges (EHB) by IDT play a critical system role acting as a hub between the host processor, the system memory, and the system input/output (I/O). Through the host bridge, the host processor is able to configure and effectively manage the system I/O resources. The host processor and the system I/O peripherals both use the host bridge to access common system memory.



HOST BRIDGES (EHB) – The IDT Host Bridge product family support the PowerQUICC and PowerPC processor families. The host bridge is the central component that interconnects the processor with the system memory (DRAM and FLASH) and a wide range of I/O peripheral devices that reside on the PCI/X Bus. They also contain integrated DMA controllers so the task of moving data within the system can be offloaded from the processor.

VME INTERCONNECT – The Universe II (CA91C142D) is fully compliant with the VME64 bus standard, and is tailored to support advanced PCI processors and peripherals. With a zero-wait state implementation for write transactions, and the capability to support prefetch reads and multi-beat transactions, the Universe II provides high performance on the PCI bus and eases development of VMEbus systems by providing direct connection to a local PCI bus. The device is ideally suited for CPU or peripheral boards functioning as both master and slave in the VMEbus system. Bridging is accomplished through a decoupled architecture with independent FIFOs for inbound, outbound, and DMA traffic. System performance is enhanced by our efficient architecture, and throughput is maximized

The IDT Tsi148 device is the next-generation component in our industry leading, high performance VMEbus system interconnect product family and is fully compliant with the 2eSST and VME64 Extension standards. This enables you to take advantage of the higher performance VME protocols, while preserving your existing investment in VME boards that implement legacy protocols.

The Tsi148 increases a system's usable bus bandwidth because its local bus interface is designed for the next generation PCI/X processors and peripherals that support either a 66 MHz PCI bus or a 133 MHz PCI-X bus interface. It also eases design constraints of VME Single Board Computers (SBCs) by requiring less board real estate and power than the previous generation of VME-to-PCI bridge components.

VME FEATURES AND BENEFITS

- VMEbus bridge products support the VME64, VME64 Extension, and 2eSST standards, enabling data transfer rates up to 320Mbytes/s.
- Local bus, support exists for a 33MHz, 32-bit PCI bus up to a 133MHz, 64-bit PCI-X bus.
- Use of a companion bridge such as IDT's TS1384 alongside the TS148 provides an easy and straightforward solution to bridge the latest generation of PCI Express enabled processors to the VME bus.
- Three independent data paths (PCI to VMEbus, VMEbus to PCI, and DMA) exist in each bridging solution to enable effective, high-performance data transfers to occur within the VME bus system.
- The VME bridges also contain complete VMEbus system controller functionality enabling single board computers to be used within any slot in the VME system.
- Architecture allows customer flexibility implementing system level software to ensure the optimal VME bus performance.

HOST BRIDGES (EHB)

Part Number	Processor Bus	Memory Interface	PCI Bus	Temp. Range	Power Max (W)	Pkg. Code	Package
CA91L750	PowerPC (MPC7xx) 100MHz	SDRAM - 100MHz	—	-40 to 85°C	1.5	AMG376	23.0 x 23.0 x 2.03
CA91L8200B	PowerQUICC II (MPC82xx) 100MHz	NA	66MHz/64 bit PCI; 66MHz/32-bit PCI	0 to 70°C	3	AE480, AER480	37.5 x 37.5 x 2.33
CA91L8260B	PowerQUICC II (MPC82xx) 100MHz	NA	66MHz/64 bit PCI	0 to 70°C	1.9	AE420, AEG420	35.0 x 35.0 x 2.33
CA91L862A	PowerQUICC (MPC8xx) 50MHz	NA	33MHz/32-bit PCI	-40 to 85°C	0.9	AM256, AMG256, BG256, BGG256	17.0 x 17.0 x 1.61, 27.0 x 27.0 x 2.0
TS1108	PowerPC 7xx/7448 200MHz	DDR2 - 400 MHz	133MHz/64-bit PCI-X	0 to 70°C	3.7	HM1023, RM1023	33.0 x 33.0 x 2.0
TS1109	PowerPC 7xx/7448 200MHz	DDR2 - 400 MHz	133MHz/64-bit PCI-X	-40 to 85°C, 0 to 70°C	3.7	HM1023, RM1023	33.0 x 33.0 x 2.0
TS1110	PowerPC 7xx/7448 167MHz	DDR2 - 333 MHz	133MHz/64-bit PCI-X	0 to 70°C	2.27	HM1023, RM1023	33.0 x 33.0 x 2.0

VME INTERCONNECT

Part Number	VME Bus	PCI Bus	Temp. Range	Power Max (W)	Pkg. Code	Pkg. Dimensions
CA91C142D	VME64	33MHz/64-bit PCI (5.0V)	-55 to 125°C, -40 to 85°C, 0 to 70°C	3.2	BG313, BGG313	35.0 x 35.0 x 2.3
TS1148	VME64, 2eVME, 2eSST	133MHz/64-bit PCI-X 66MHz/64-bit PCI	-40 to 85°C, 0 to 70°C	1.8	BB456, BBR456	27.0 x 27.0 x 2.65

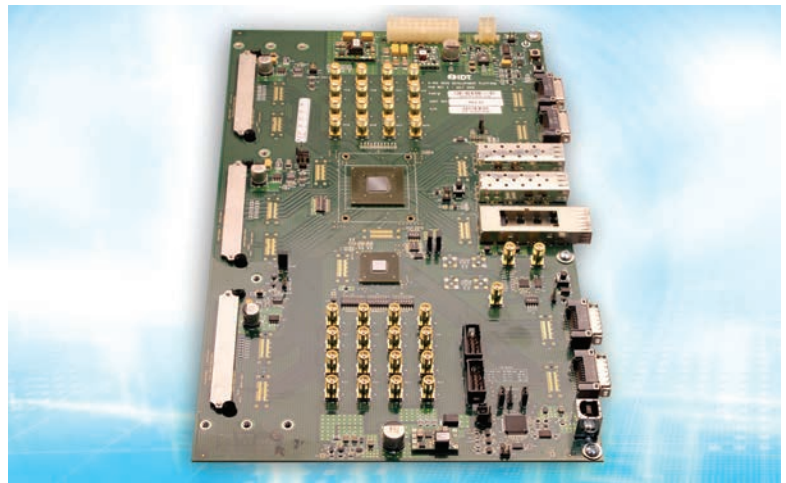
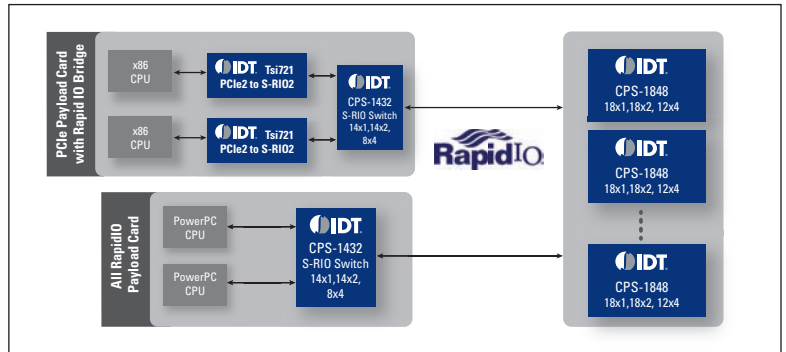
PACKAGE KEY

Package Code Use for Package Search	Package Description	Pin Count	Description	Pb/RoHS/ Green	Top Mark	Dimensions				Devices Per Tray / Tube	JEDEC ID	Class
						Pitch (mm)	Length (mm)	Width (mm)	Thickness (mm)			
AE420	TEPBGA	420	Thermal 35mm x 35mm 1.27mm Pitch	Pb	E	1.27	35.00	35.00	2.33	24	M-034	Plastic
AE480	TEPBGA	480	Thermal 37.5mm x 37.5mm 1.27mm Pitch	Pb	E	1.27	37.50	37.50	2.33	21	MO-151	Plastic
AEG420	TEPBGA	420	Thermal 35mm x 35mm 1.27mm Pitch	Green	EV	1.27	35.00	35.00	2.33	24	M-034	Plastic
AER480	TEPBGA	480	Thermal 37.5mm x 37.5mm 1.27mm Pitch	RoHS	EY	1.27	37.50	37.50	2.33	21	MO-151	Plastic
AM256	PBGA	256	PBGA 17mm x 17mm 1.0mm Pitch	Pb	L	1.00	17.00	17.00	1.61	90	MO-151	Plastic
AMG256	PBGA	256	PBGA 17mm x 17mm 1.0mm Pitch	Green	LV	1.00	17.00	17.00	1.61	90	MO-151	Plastic
AMG376	PBGA	376	PBGA 23.0 X 23.0 MM 1.0 MM Pitch	Green	LV	1.00	23.00	23.00	2.03	60	MS-034	Plastic
BB456	PBGA	456	PBGA 27mm x 27mm 1.0mm Pitch	Pb	L	1.00	27.00	27.00	2.65	40	MS-034	Plastic
BBR456	PBGA	456	PBGA 27mm x 27mm 1.0mm Pitch	RoHS	LY	1.00	27.00	27.00	2.65	40	MS-034	Plastic
BG256	PBGA	256	PBGA 27mm x 27mm 1.27mm Pitch	Pb	E	1.27	27.00	27.00	2.00	40	MO-151	Plastic
BG313	PBGA	313	PBGA 35mm x 35mm 1.27mm Pitch	Pb	E	1.27	35.00	35.00	2.30	24	MS-034	Plastic
BGG256	PBGA	256	PBGA 27mm x 27mm 1.27mm Pitch	Green	EV	1.27	27.00	27.00	2.00	40	MO-151	Plastic
BGG313	PBGA	313	PBGA 35mm x 35mm 1.27mm Pitch	Green	EV	1.27	35.00	35.00	2.30	24	MS-034	Plastic
HC503	FCBGA	503	Flip Chip BGA 33mm x 33mm	Pb	E	1.27	33.00	33.00	2.75	24	—	Plastic
HM1023	FCBGA	1023	Flip Chip BGA 33mm x 33mm 1.0mm Pitch	Pb	L	1.00	33.00	33.00	2.00	24	—	Plastic
RC503	FCBGA	503	Flip Chip BGA 33mm x 33mm	RoHS	EY	1.27	33.00	33.00	2.75	24	—	Plastic
RM1023	FCBGA	1023	Flip Chip BGA 33mm x 33mm 1.0mm Pitch	RoHS	LY	1.00	33.00	33.00	2.00	24	—	Plastic

Pb - RoHS 5, may contain Lead > 1000 PPM | **RoHS** - RoHS 6, Flip Chip may have Lead (Pb) Solder Bumps | **Green** - RoHS 6, Lead (Pb) < 100PPM

RapidIO® Switches and Bridges

- Serial RapidIO Error Management Extension support including Time-to-Live enables fault-tolerant systems
- VITA 41, OpenVPX, and ATCA fabric mappings enable rapid development of modular, standards-based systems
- True peer-to-peer networking allows scaling of arbitrary topology and simplifies hot swap software implementation
- Per-port filter feature allows blocking errant packets or malicious attack (for example, denial of service, system memory reads and writes)



ECOSYSTEM AND TOOLS

A variety of software tools, and hardware platforms are available from third party companies which support IDT RapidIO Switches.

SOFTWARE AND HARDWARE ECOSYSTEM

- Serial RapidIO Development Platform Gen2 (SRDP2)
- RapidFET JTAG edition software support
- Serial RapidIO Gen2 Endpoint Intellectual Property for ASIC, CPU, DSP, and FPGAs
- RapidIO Linux support
- Power Calculator tool
- IBIS-AMI and IBIS models
- System Modeling Tool

RapidIO Generations	Part Numbers	Ports	Bandwidth	Features
S-RIO 1.3	TSI578	8x4/16x1	80 Gbps	10 Gbps per port, 110 ns cut through latency, <500mW per 10 Gbps, 27x27 FCBGA
	TSI577	4x4/16x1	40 Gbps	10 Gbps per port, 110 ns cut through latency, <500mW per 10 Gbps, 21x21 FCBGA
	TSI574	4x4/8x1	40 Gbps	10 Gbps per port, 110 ns cut through latency, <500mW per 10 Gbps, 21x21 FCBGA
	TSI572	4x2/8x1	30 Gbps	10 Gbps per port, 110 ns cut through latency, <500mW per 10 Gbps, 21x21 FCBGA
S-RIO 2.1	CPS-1848	12x4/18x2/18x1	240 Gbps	20 Gbps per port, 100 ns cut through latency, <300mW per 10 Gbps, 29x29 FCBGA
	CPS-1432	8x4/14x2/14x1	160 Gbps	20 Gbps per port, 100 ns cut through latency, <385mW per 10 Gbps, 25x25 FCBGA
	CPS-1616	4x4/8x2/16x1	80 Gbps	20 Gbps per port, 100 ns cut through latency, <440mW per 10 Gbps, 21x21 FCBGA
	SPS-1616	4x4/8x2/16x1	80 Gbps	20 Gbps per port, 100 ns cut through latency, <440mW per 10 Gbps, 21x21 FCBGA, Security
	TSI721	2x4/2x2/2x1	16 Gbps	PCIe Gen2 to S-RIO Gen2 Bridge, 8 DMA and Messaging Channels, 2W 300ns store and forward latency, 13x13 FCBGA

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