



The DPD3 is a form/fit/function upgrade to the DPD shown above with XPDPTB

## DPD3

The DPD3 is a VMEbus (and VME64) compatible platform based on either the Intel® low-power Core-Duo (Yonah) processor or the Intel® Core™2 Duo Mobile Processor L7400. The DPD3 takes advantage of the Core-Duo's low 15 W power consumption (Core 2 Duo at 17W) as a rugged Single Board Computer (SBC). It is optionally available as an IEEE 1101.2-compliant, conduction-cooled VMEbus module with wedge-loks and a full-board heat sink for high shock/vibration environments and temperature extremes.

The E7520 Memory Controller Hub (MCH) and 6300ESB I/O Controller Hub (ICH) chipset support PCI-X and PCIe expansion, USB 2.0, ATA/100, and Serial ATA (SATA). Two Gb Ethernet ports and two USB 2.0 ports are accessible from the front panel in addition to two PMC bezels. On-board Flash permits single-slot booting. Two VITA 31.1-compliant, 10/100/1000BaseTX ports are routed to the backplane. Two SATA ports, VGA video, two Gb Ethernet ports, four RS232 ports, an IDE interface, PS/2 mouse & keyboard, and two more USB 2.0 ports are routed to the backplane. Two PMC-X site is provided for additional I/O expansion. Conventional PC I/O is accessible with industry-standard connectors on optional rear I/O modules.

For rugged conduction-cooled version, see RPD3

### Changes from the DPD

The DPD3 is a form/fit/function replacement to the DPD. While all I/O interfaces are unchanged, the redesign addressed a few key issues to improve performance of the DPD as follows:

Each PMC module now interfaces directly to the E7520 MCH via a Tsi384 PCIe to PCI-X bridge. By converting x4 PCI Express to PCI-X at 64-bit and 133MHz, each PMC can now realize a bandwidth of 1 GB/sec. The DPD had both PMC cards routed from the 6300 I/O controller hub. By routing PMC modules directly to the E7520, the CPD2 offers much greater bandwidth between PMC and processor and PMC and memory. This change allows the use of higher performance PMC modules. The XMC interface continues to be x8 PCI Express direct from the E7520. These changes will have no impact on application software already developed for the DPD.

A second change from the DPD is the optional support for 3.3 V from the backplane in case more power is needed for mezzanine cards. This provides compatibility with either 5V only backplanes or VME64x backplanes.

A third change from the DPD is the elimination of CompactFlash and its replacement with 16 GB of soldered NAND Flash. This makes the CPD2 more rugged, and provides higher performance Flash at less cost. It also standardizes the Flash to ensure consistent compatibility.

A fourth change from the DPD is the replacement of the AMD Rage Mobility VGA controller with the Silicon Motion SM712

### **Core™2 Duo Mobile Processor L7400**

Delivering breakthrough energy efficient performance for embedded platforms, 65 nm process technology makes it possible to integrate two complete execution cores in one physical package, providing advancements in simultaneous computing for multi-threaded applications and multitasking environments. While incorporating advanced technology the L7400 remains software compatible with previous IA-32 processors. Executes four instructions per cycle to improve execution speed and efficiency using 14-stage pipeline. Supports 64-bit instructions, providing flexibility for 64-bit and 32-bit applications and operating systems.

### **E7520 Memory Controller Hub**

The Intel E7520 chipset acts as the central hub for all data passing between the core system elements including processor, memory, PCI Express I/O, and legacy I/O subsystems. The Intel® E7520 chipset enables a variety of high-performance, low-power designs with improved platform reliability and system manageability. This chipset utilizes PCI Express serial I/O technology and next-generation DDR2 memory technology to help increase I/O bandwidth and reduce system latency for data-intensive applications.

### **Core Duo Processor**

1.66 GHz, 479-pin uFC-BGA Core-Duo manufactured with low-power 65 nm process  
2 MB L2 Cache  
667 MHz front side bus

### **Core™2 Duo Mobile Processor L7400**

1.5 GHz, 479-pin uFC-BGA Core 2 Duo manufactured with low-power 65 nm process  
4 MB L2 Cache  
667 MHz front side bus  
64-bit OS and application support

### **E7520 & 6300ESB Chipset**

Two x4 PCI Express interfaces are routed to two dual Gb Ethernet controllers  
Two x4 PCI Express interfaces are routed to the two PMC sites via two Tsi384 PCIe to PCI-X bridges. These provide each PMC site with a dedicated 64-bit 133 MHz PCI-X bus with a 1 GB bandwidth. One x8 PCI Express interface is routed directly to an XMC connector.  
DDR2-400 DRAM interface with a max memory bandwidth of 6.4 GB/second  
Four USB 2.0 Ports  
PATA/100 and SATA/150 support  
PCI 32/33 for the Universe IID VMEbus bridge and the SM712 VGA controller

### **DRAM**

2 or 4 GBytes of DDR2-400 memory  
Two banks that are each 64 bits wide with 8 bits for ECC

### **VMEbus**

Tundra Universe IID PCI-VMEbus interface provides 64-bit VMEbus transfer rates over 30 MB/sec  
Full range of software drivers is available for different operating systems  
Full Slot 1 (system controller) functions provided  
Lower cost versions available without VMEbus

### **PMC Expansion**

Two PMC sites each with a dedicated 64-bit 133 MHz PCI-X bus interfaced to the E7520 via two separate Tsi384 PCIe to PCI-X bridges. This architecture eliminates potential bottlenecks and provides 1 GB access to E7520.

One of PMC sites also supports XMC modules with x8 PCIe

### **Ethernet**

4 10/100/1000 BaseTX  
2 Gb Ethernet ports are available from front panel (only available on convection cooled versions)  
2 Gb Ethernet ports are routed to P0

### **Graphics**

The Silicon Motion SM712 ultra low-power display controller with 4 MB on-chip memory  
SVGA interface routed to P0

### **IDE**

Primary ATA/100 DMA IDE interface is accessible through the backplane  
P2 connector PIO and bus master support

Secondary IDE port is routed to a Silicon Motion SM2231 NAND Flash controller. 16 GB of NAND Flash is installed.

### **BIOS**

Phoenix Technologie's flash-based system BIOS with a variety of boot options, including CD-ROM and PXE over Ethernet  
Customized versions available upon request

### **Operating Systems**

BSP support for Windows, Linux, Solaris, QNX, LynxOS, VxWorks

### **Watchdog**

Programmable watchdog timer for system recovery



DPD3 I/O Routing			
I/O	Front Panel	P0	P2
SVGA		1	
Serial ATA		2	
10/100/1000BaseTX	2	2	
Full Driven RS-232 Port			2
Two-wire Driven RS-232			2
USB 2.0	2		2
PMC/XMC site #1 I/O			1
PMC site #2 I/O	1	1	
Primary IDE Interface	1		1

#### Environmental Specification

Temperature			
	Operating	0°/71°C Special versions available for extended temperature operation	Clock throttling can be implemented for wider temperature ranges
	Storage	-55°C to 125°C	
Humidity			
	Operating	0 to 95% non-condensing	± 4% relative humidity, per MIL-STD-810F
	Storage	0 to 100% non-condensing	
Altitude			
		Unlimited	Air cooled cards must have adequate cooling
Vibration			
	Sine	10 g peak 15-2 kHz	All levels based on a sweep duration of ten minutes per axis, each of three mutually perpendicular axes. Qualification testing is displacement limited below 44 Hz.
	Random	0.1 g <sup>2</sup> /Hz 15-2 kHz (14.1 grms)	60 minutes per axis each of three mutually perpendicular axes.
	Shock	40 g peak	Three hits per direction per axis, ½ sine + terminal peak sawtooth, 11 ms (total 36 hits).

