



PANTHER™ 760 & 380 MICROTCA™ POWER MODULE



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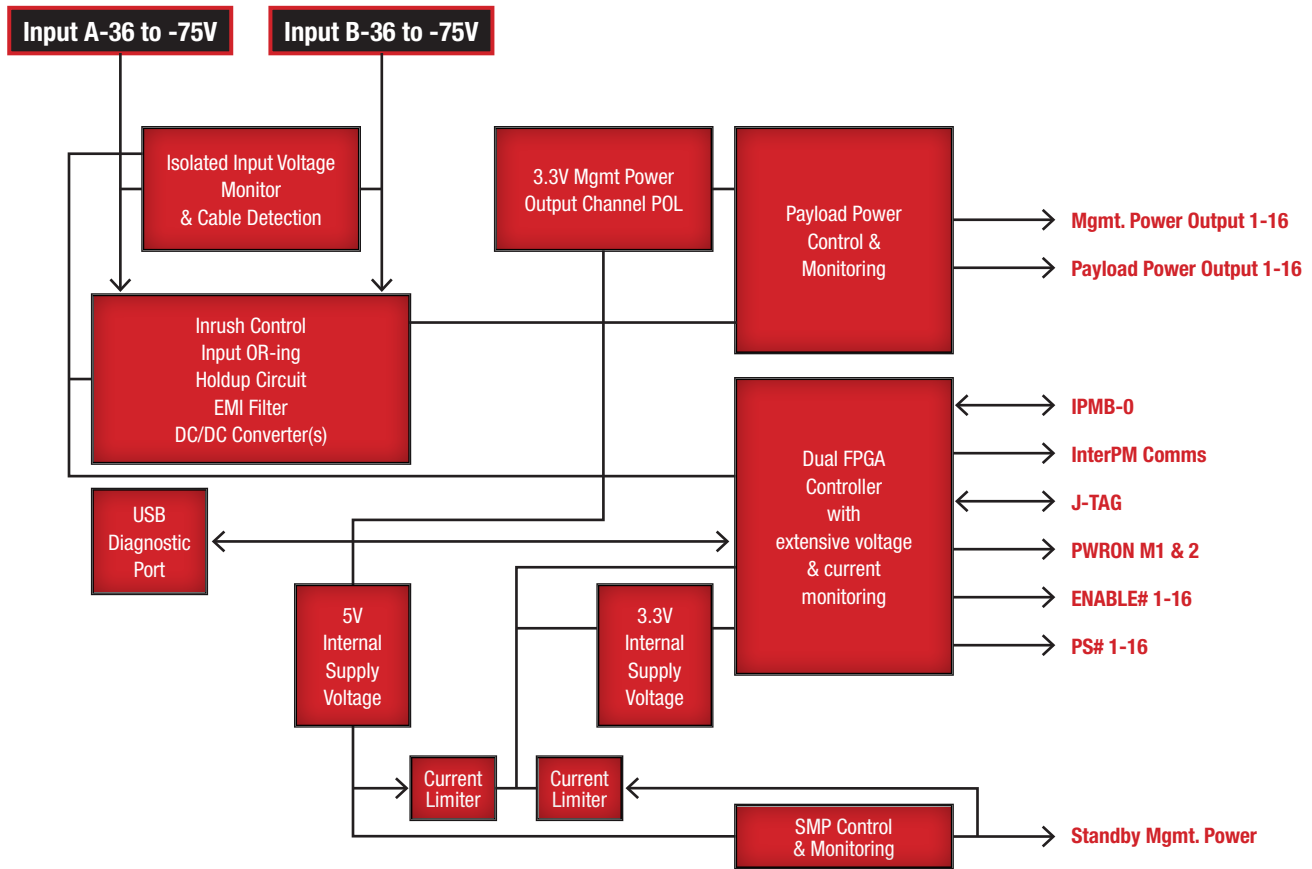
The Panther 760 and 380 power modules, compliant with the MicroTCA spec, are Full-Size/Single-Width form factor and fully enclosed for electrical protection. The design is based on state of the art FPGA and advanced technologies for energy management and remote monitoring, diagnostics, software updating and reconfiguration.

Panther power modules provide full **monitoring capability with only SMP** (Standby Mgmt Power) so input cable detection and input and output voltage monitoring is possible without input power.

Each unit provides 16 pairs of management power and payload power outputs that are digitally monitored for over or under voltage and over current. Each output channel is individually configurable as primary, backup or disabled. This provides the μ TCA form of **shared power**, i.e. redundant power modules can be configured so that they each power about the half the load on a per channel basis.

Payload power channels can be individually **programmed current limits** with load specific values. This enables improved MTBFs of the power system, more tightly managed power budgeting and the ability to determine an accurate history power consumption of each component of the system.

Hot swappable and fully redundant operation coupled with extremely high efficiency and wide temperature range operation make Panther power modules ideally suited for all air cooled MicroTCA™ applications.



The Panther μ TCA power module provides two power inputs with a common VRTN. These power inputs include all of the typical features: input protection, input isolation, inrush current control, input OR-ing, EMI filtering, holdup circuit and high efficiency power conversion. The input voltage is continuously digitized and monitored.

The power module provides up to 12 Watts of management power so that if all 16 management power channels are running at the maximum current there is no possible interaction due to current limiting of the 3.3V Mgmt Power Output Channel POL. Each management channel is individually digitized and monitored for under or over voltage. Each MP output has over current monitoring with individual channel indicators.

Each payload channel voltage and current is digitized and monitored. The readings are compared to digital references to detect under-voltage, over-voltage, transient over-current and average over-current. Detection of any of these conditions results in disabling of that specific primary channel.

For redundancy purposes all payload and management power outputs are designed for parallel connections to other power modules. Inflow currents are not permitted for these outputs. However the SMP channel does permit inflow current up to 150ma.

A standard USB port is provided for system development, monitoring and integration purposes. Mounted on the face

plate is a bicolor LED labeled HSMA (Hardware System Management Activity) this LED flashes yellow with each IPMB-A message and green with each IPMB-B message. If it appears yellow or green rather than amber it indicates that one of the channels is inactive. The μ TCA spec indicators are present, green for ready, red for out of service and blue for hot swap.

The Panther utilizes a microprocessor which provides an EMMC (Enhanced Module Management Controller), per the μ TCA spec, for hardware platform management interface to MCH and for control of the power module. An important Panther feature is that the power module does not rely on the microprocessor for any system critical functions such as current limiting or channel failover control. All such functions are designed into the FPGA gates and will fully function with the microprocessor halted.

REDUNDANCY

Power modules should be installed and removed with the input power disconnected. However the Panther is hot swappable with or without input power connected. As already mentioned the power module will power the control circuitry from the SMP input if it is active, otherwise the power module remains in a quiescence state (check for IPMB-0 short circuit) until input power is connected. When the control circuitry does power up it recognizes that it is not the "startup PM" and waits for MCH control messaging before enabling any outputs.

INPUT

The power module is designed for use in -48V or -60V DC systems and uses μ TCA spec power input connector and pin-out.

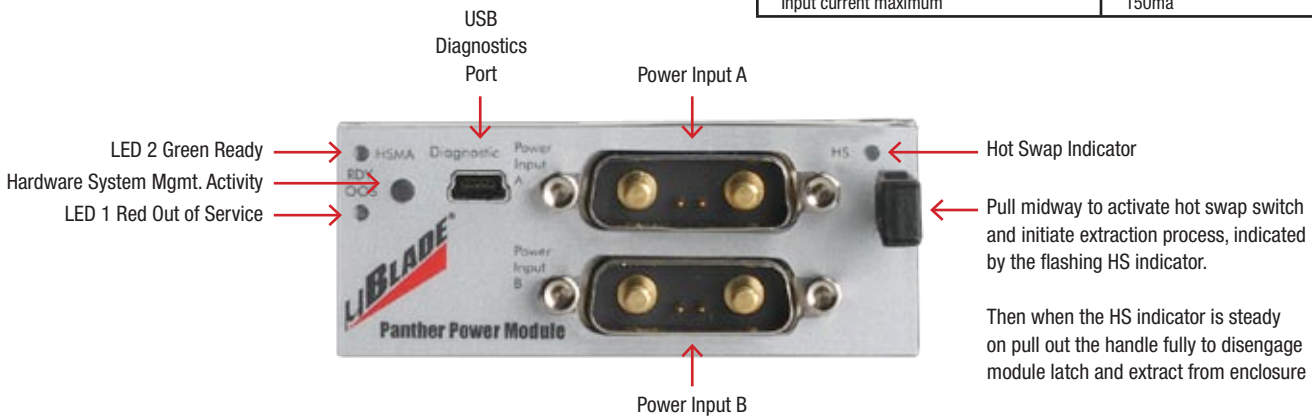
The face plate supports the PCB, power input connectors, EMC gaskets, and the power module latch /retention mechanism.

The input OR-ing circuit will automatically select either input, whichever has the more negative voltage.

INPUT POWER	
Max input power Panther 380	395W @ 370W Output Power
Max input power Panther 760	790W @ 735W Output Power
Nominal voltage	-48V or -60V
Normal voltage (full performance)	-36V to -75V
Abnormal voltage (non-destruction)	0V to -36V; -75V to -80V
Conducted emission	Class A
* Hold-up, VIN = 50V, 100% load	8.40ms Panther 380 4.25ms Panther 760
Burst	4kV

* The μ TCA spec requirement is expected to be revised to 5ms, as 10ms is under a double fault condition.

SMP (STANDBY POWER MODE) INPUT	
Input voltage	5V \pm 0.5V
Input current typical	100ma
Input current maximum	150ma



OUTPUT

OUTPUT SPECIFICATIONS			
	PANTHER 760 PAYLOAD POWER	PANTHER 380 PAYLOAD POWER	PANTHER 380 & 760 MGMT POWER
Output Power	740 Watts Typical	365 Watts Typical	12W
Output Voltage	11.9V (12.0V to 10.75V)		3.3V (3.43V to 3.17V)
Under Voltage Lockout	10.4V \pm 125mv programmable		3.15V \pm 32mv programmable
Output current limit 25 μ s average Transient \leq 100 μ s	Average 0 to 10.2A programmable 7.6A default configuration Transient 0 to 10.2A programmable 9.4A default configuration		Minimum 100ma Maximum 225ma
Output current limit accuracy	\pm 40ma or \pm LSB		na
Current limit response time	\leq 100 μ s		2 μ s
Outrush current control	1600 μ F in 25ms		150 μ F in 25ms
Output channel resistance	14.6m Ω typical		145m Ω maximum
Output ripple 5Hz to 20MHz	<200mv		<100mv
Efficiency @20°C, 72V Input	94%		na
Operation temperature	-5 to 55°C with 2m/s	-5 to 55°C with 2m/s	na

SMP (STANDBY POWER MANAGEMENT) OUTPUT MODE			
Output voltage	5V \pm 5%		
Output current limit	500ma min to 750ma max		

OTHER I/O

JTAG

The Panther power module supports JTAG diagnostics and be software or firmware (VHDL) upgraded from the JTAG port. The JTAG signals are buffered to insure good signal integrity and fault free operation.

USB DIAGNOSTIC PORT

This is a true USB port which is powered only by the terminal device. This port can be used to monitor power module boot sequencing and IPMI messaging or used to interface to the μ Blade Dashboard (an MS Excel application) which will show the detailed operating status of the Panther power module.

