



## **VPX Power: Present & Future Embedded Tech Trends**

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- Released & available in fourth quarter 2022
- Defines new 12V centric configurations for 3U and 6U
- Adds definition for commonly used alternate configurations
- Recommends pin assignments for user defined pins to promote interchangeability
- Expands Geographic addressing for 3U configurations
- Assigns pins for required functions such as NVRMO, not previously defined
- Better defines the performance of the 3.3\_VAUX output for system management
- Updates connector part numbers to reflect the addition of new more rugged parts

<b>VITA 62-2012</b>	3U	300W - 500W	Mostly Dumb
	6U	700W - 1000W	
<b>VITA 62-2016</b>	3U	700W – 800W+	Proprietary System Management
	6U	800W – 1200W	
<b>VITA 62-2022</b>	3U	800W+	VITA 46.11 Tier 1 - 2 - 3
	6U	1500W+	
<b>Future</b>	3U	3U-S, 4U?, 6U	6U
	Power TBD		



## Controlled by VITA 62

- Input Voltage
- Output Voltages
- Regulation
- Noise and Ripple
- Basic Controls Inhibit/Enable
- Mechanical Interface

## Uncontrolled – Manufacturer Must Provide Data

- Output Power
- EMI/EMC Performance
- Environmental Performance
  - Shock
  - Vibration
  - Operating Temperature
  - Storage Temperature
  - Derating
  - Humidity Performance
  - Isolation



- Not required by VITA 62
- ANSI/VITA 46.11-2022 released
- Defines Optional and Mandatory commands for power supplies
- Optional commands allow each manufacturer to offer their own special performance features
- Various manufacturers working to demonstrate compliance
- The government has been holding various TIM's, Expos and Plug-Fests to allow companies to demonstrate their products and compatibility with other systems



## 3U-S SHORT VPX

- Now Defined in VITA 48.2
- Needs to be addressed in VITA 62.0 due to unique power supply connector and mechanical configuration
- Pitch, cooling and interface should be addressed
- Useful for larger higher power, small form factor systems with diameters too small for VPX

## 4U or “Other” NEW FORM Factor

- New mechanical form factor
- Apparent need to accommodate new system components
- Various studies underway to consider future needs
- VITA 85.104 common plug-in-module form factor study group
- VITA 85.106 VPX-expanded study group

VITA 48 Standard	Cooling Method	Current Wattage		Future Needs	
		Capability MAX.		2 – 5 Years	
		3U	6U	3U	6U
VITA 48.1	Air Cooled	50W	75W	75W	100W
VITA 48.2	Conduction Cooled	100W	200W	270W	450W
VITA 48.4	Liquid Flow Through	N/A	200W+	270W	450W
VITA 48.5	Air Flow Through	100W	200W	270W	450W
VITA 48.7	Air Flow-By	100W	200W	270W	450W
VITA 48.8	Air Flow Through	100W	200W	270W	450W
VITA 48.9	VPX AFT Cooling	TBD	TBD	270W	450W

	<b>2012 &amp; Earlier</b>	<b>2016</b>	<b>2022</b>	<b>Future</b>
	<b>3U</b>	<b>3U</b>	<b>3U</b>	<b>3U</b>
Power Out	500W	700W	800W	1000W
Efficiency	85%	87%	89%	90%+
Dissipation	88W	104W	99W+	111W
	<b>6U</b>	<b>6U</b>	<b>6U</b>	<b>6U</b>
Power Out	700W	1000W	1500W	2000W+
Efficiency	84%	88%	90%	93%
Dissipation	130W	136W	166W	150W



- 3U power to approach 1000W
  - Limited by low line input current 40A-50A @ 28VDC
  - Chassis cooling limits
  - Output mostly 12V (12V centric) for maximum power
- 6U power to approach 2000W
  - Connector current rating on output pins – 160A
  - Chassis cooling limits
  - Input pin current limits @ 28VDC especially low line



- 2012
  - 9 types
  - 30 μinch gold
- 2016
  - Added 9 more types
  - 50 μinch gold plating
  - VITA 62.1 adds 5 types
- 2020
  - VITA 62.2 published 2020
  - Adds 5 HV parts
  - Adds 2 separating fins for HV pins

## Future

- Power now limited on both 3U and 6U due to connector limitations on input or output pins
- New Multi-Beam+ being studied as an upgrade
- Almost doubles power pin currents from ~40A to over 80A
- This would significantly increase output power potential



- 6U Power over 2000W
- 3 Phase PFC AC input
- .98 PF min.
- 270VDC input
- Efficiencies 93%+
- 12V Output currents 160A+
- VITA 46.11 System Management
  - Tier 1; Tier 2; Tier 3

- VITA 48.2;4;7;8 cooling
- Isolation 2100VDC
  - Input-Output; Input Case
- Operating Temp: +85°C--40°C
- Shock VITA 47 OS2
- Vibration VITA 47 V3



**Thank You!**