

SynQor®

VPX-6U-AC
VPX-6U-ACUNV-1-C-001

MILITARY COTS VITA 62 COMPLIANT POWER SUPPLY

85 - 264Vrms Continuous Input Voltage	Input EMI Filtering	5 Outputs	630W Maximum Output Power	84% Typical Efficiency
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Operation: -40 °C to 85 °C (at Card Edge)



VPX Features

▶ Outputs:

VS1:	} +12V	@ 52.5A = 630W
VS2:		
VS3:	+5.0V	@ 40A = 200W
(AUX)	+3.3V _{AUX}	@ 20A = 66W
(AUX)	+12V _{AUX}	@ 1A = 12W
(AUX)	-12V _{AUX}	@ 1A = 12W

- ▶ Maximum Total Output Power: 630W
- ▶ Input EMI Filtering
- ▶ -40 °C to 85 °C Operating Temperature
- ▶ Over-current, Over-voltage and Over-temperature Protection
- ▶ ≥0.99 Power Factor
- ▶ Frequency Range: 47-63Hz / 360-800Hz
- ▶ Current Sharing on +12V, 5V & +3.3V_{AUX}
- ▶ Multiple VPX's Can Be Connected In a 3-Phase Configuration
- ▶ Optional I²C Function
 - Supports IPMI/PMBus/VITA 46.11

▶ Compliance:

- VITA 62
- MIL-STD-461F
 - CE101 ▪ CE102 ▪ CS101 ▪ CS106
 - CS114 ▪ CS115 ▪ CS116
- VITA 47 / MIL-STD-810G
 - ESD Protection
 - Shock
 - Vibration
 - Rapid Decompression
 - Corrosion Resistance
 - Fungus Resistance
 - Altitude
 - Humidity

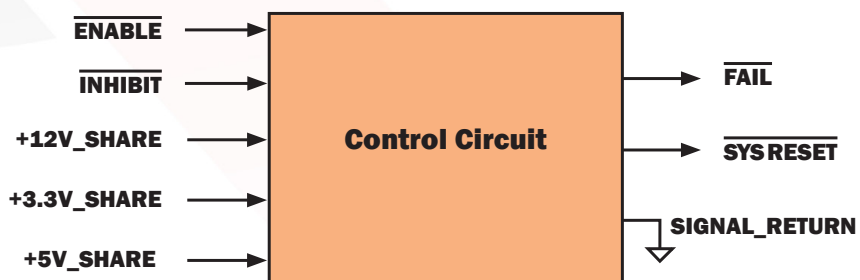
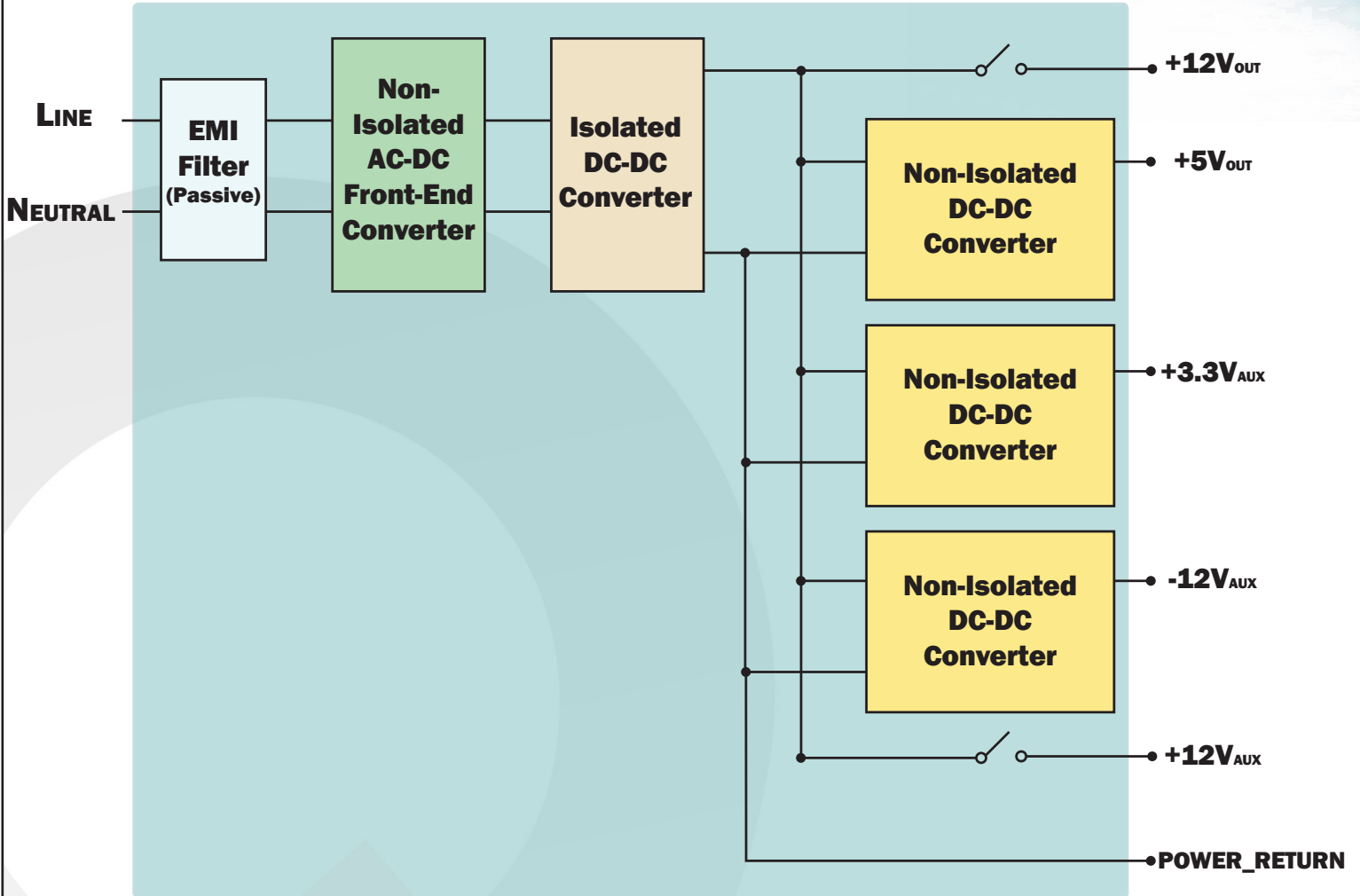
- ▶ Designed to be compliant with:
 - MIL-STD-704 (B-F)



Made in USA



Block Diagram for VPX-6U-ACUNV-1-C-001



VPX-6U-ACUNV-1-C-001 Input Characteristics

Operating condition at 25°C unless otherwise noted. Specifications subject to change without notice.

Parameter	Min.	Typ.	Max.	Units	Notes & Conditions
ABSOLUTE MAXIMUM RATINGS					
Input Voltage			575	Vpk	
Isolation Voltage			1500	Vdc	Input to Output and Input/Output to Case
Operating Temperature	-40		85	°C	Card edge temperature
Storage Temperature	-40		105	°C	
ELECTRICAL CHARACTERISTICS					
Operating Input Voltage Range					
AC Input Continuous	85		264	Vrms	
AC Input 100ms Transient	40		290	Vrms	Available output power reduced when <85 Vrms
Input Under-Voltage Lockout		30		Vrms	> 1s duration
Operating Input Frequency	47		63	Hz	50/60Hz range, for startup
	360		800	Hz	400Hz range, for startup
	45		800	Hz	After startup, module operates over wide frequencies
Power Factor of AC Input Current		0.99			50/60Hz, min 400W output
		0.97			400Hz, min 400W output
THD of AC Input Current		3		%	min 400W output
Inrush of AC Input Current					
50/60Hz			10	Apk	
400Hz			20	Apk	
FAIL*/SYSRESET* Signal					
Pull-up resistance	100			Ω	Pull-up to 3.3V on backplane, compliant to VITA 46.0
Sinking current			40	mA	Pull-up to 3.3V on backplane, compliant to VITA 46.0
FEATURE CHARACTERISTICS					
VITA 62 ON/OFF Control					
ENABLE* high-state Voltage	2		3.6	V	ENABLE* regards a no-connect as a high
ENABLE* low-state Voltage			0.8	V	
INHIBIT* high-state Voltage	2		3.6	V	INHIBIT* regards a no-connect as a high
INHIBIT* low-state Voltage			0.8	V	
HOLDUP CHARACTERISTICS					
Holdup Time at 25°C					
630W Output Power		35		ms	All loading is on the +12V_MAIN output
500W Output Power		50		ms	
350W Output Power		70		ms	
Holdup Time at -40°C					
630W Output Power		30		ms	All loading is on the +12V_MAIN output
420W Output Power		50		ms	
300W Output Power		70		ms	
RELIABILITY CHARACTERISTICS					
Calculated MTBF (MIL-217) MIL-HDBK-217F		1700		kHrs	Ground Benign, T _A = 25°C
Calculated MTBF (MIL-217) MIL-HDBK-217F		159		kHrs	Ground Mobile, T _A = 25°C

VPX-6U-ACUNV-1-C-001 Output Characteristics

Operating condition at 25°C unless otherwise noted. Specifications subject to change without notice.

Parameter	+12V	+5V	+3.3V _{AUX}	+12V _{AUX}	-12V _{AUX}
OUTPUT CHARACTERISTICS					
Output Voltage Set Point See Note 1	12V (+/-1.5%)	5V (+/-1.5%)	3.3V (+/-1.5%)	12V (+/-1.5%)	-12V (+/-1.5%)
Total Output Voltage Range See Note 2	12V (+/-4%)	5V (+/-3%)	3.3V (+/-3%)	12V (+/-4%)	-12V (+/-3%)
Output Voltage Ripple (pk-pk) See Note 3	120mV	80mV	50mV	120mV	120mV
Operating Current Range Maximum Total Output Power = 630W	0-52.5A	0-40A	0-20A	0-1A	0-1A
Over-Voltage Protection	15.0V	6.0V	6.0V	15.0V	NA
Current-Limit Inception	58A	70A	40A	2A	1.8A
Maximum Output Capacitance	10mF	10mF	10mF	1mF	10mF
MAXIMUM TOTAL OUTPUT POWER			630 W		

Note 1: 115Vrms, 50% load

Note 2: Over line, load, temperature

Note 3: Full Load, measured with 1µF capacitor and 10uF tantalum capacitor

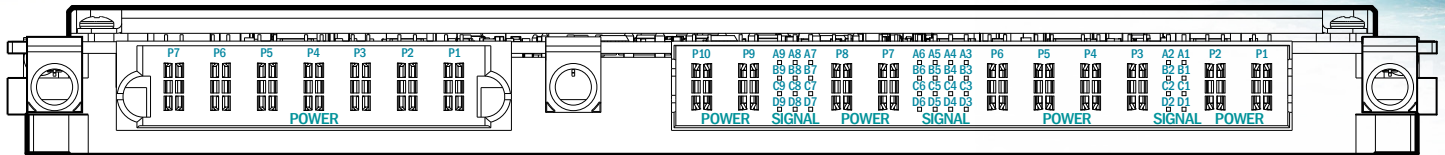
Full output power (630W) available up to 70°C card edge temperature.

From 70°C to 85°C, derate total output power linearly according to the table below:

5V and 3.3V _{AUX} Load Condition	Total output power at 85°C
No Load - 5V at 0A, 3.3V _{AUX} at 0A	570 W
Half Load - 5V at 20A, 3.3V _{AUX} at 10A	500 W
Full Load - 5V at 40A, 3.3V _{AUX} at 20A	350 W

Temperature specifications are relative to the temperature at the thermal interface, on the flange opposite the wedge locks.

PIN DESCRIPTIONS



6U P0 Connector

6U P1 Connector

PIN	Function	DESCRIPTION
P7	AC_Line	Line
P6	No Connection	
P5	No Connection	
P4	AC_Neutral	Neutral
P3	No Connection	
P2	No Connection	
P1	CHASSIS	Chassis

PIN	Function	DESCRIPTION
P10	+12V_MAIN	+12V main output voltage, 52.5A rated
P9	+12V_MAIN	
A9	+12V_SENSE(+)	Should be connected to +12V_MAIN either remotely or at the connector
B9	+12V_SENSE(+)	
C9	+5V_SENSE(+)	Should be connected to +5V_MAIN either remotely or at the connector
D9	No Connection	
A8	+12V_SENSE(-)	Should be connected to POWER_RETURN either remotely or at the connector
B8	+12V_SENSE(-)	
C8	+5V_SENSE(-)	Should be connected to POWER_RETURN either remotely or at the connector
D8	MAIN_SYNC	Startup synchronization for +12V_MAIN and +5V_MAIN
A7	+12V_SHARE	Active current share for +12V_MAIN
B7	+5V_SHARE	Active current share for +5V_MAIN
C7	+3.3V_SHARE	Active current share for +3.3V_AUX
D7	SIGNAL_RETURN	Ground pin for control signals
P8	POWER_RETURN	Common output voltage return pin, 40A rated per pin
P7	POWER_RETURN	
A6	SM2	Redundant I ² C Clock Line, See Note 1
B6	SM3	Redundant I ² C Data Line, See Note 1
C6	-12V_AUX	-12V auxiliary output voltage, 1A rated
D6	SYSRESET*	System Reset is actively low. It will float when all outputs are within specification
A5	GAP*	Geographical Address, See Note 1
B5	GA4*	Geographical Address, See Note 1
C5	SM0	Primary I ² C Clock Line, See Note 1
D5	SM1	Primary I ² C Data Line, See Note 1
A4	GA3*	Geographical Address, See Note 1
B4	GA2*	Geographical Address, See Note 1
C4	GA1*	Geographical Address, See Note 1
D4	GA0*	Geographical Address, See Note 1
A3	+3.3V_SYNC	Startup synchronization for +3.3V_AUX
B3	+12V_AUX	+12V auxiliary output voltage, 1A rated
C3	No Connection	
D3	No Connection	
P6	+5V_MAIN	+5V main output voltage, 40A rated
P5	+5V_MAIN	
P4	POWER_RETURN	Common output voltage return pin, 40A rated per pin
P3	POWER_RETURN	
A2	No Connection	
B2	FAIL*	When any of the output is not within specification, FAIL* signal will be driven low
C2	INHIBIT*	Input control signal as defined in VITA 62, referenced to SIGNAL_RETURN
D2	ENABLE*	Input control signal as defined in VITA 62, referenced to SIGNAL_RETURN
A1	No Connection	
B1	No Connection	
C1	No Connection	
D1	No Connection	
P2	+3.3V_AUX	+3.3V auxiliary output voltage, 20A rated
P1	POWER_RETURN	Common output voltage return pin, 40A rated per pin

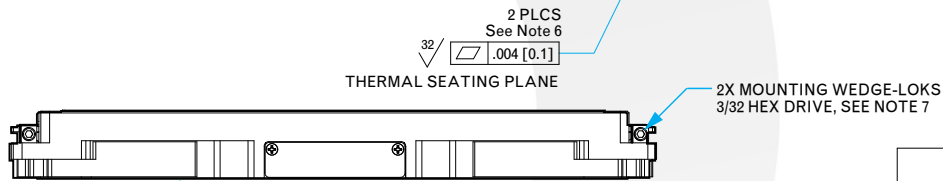
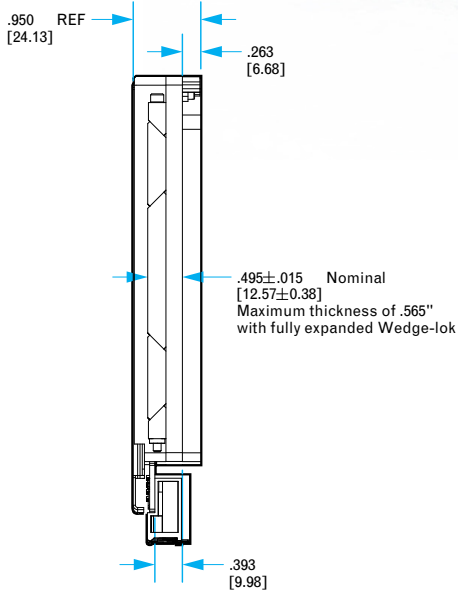
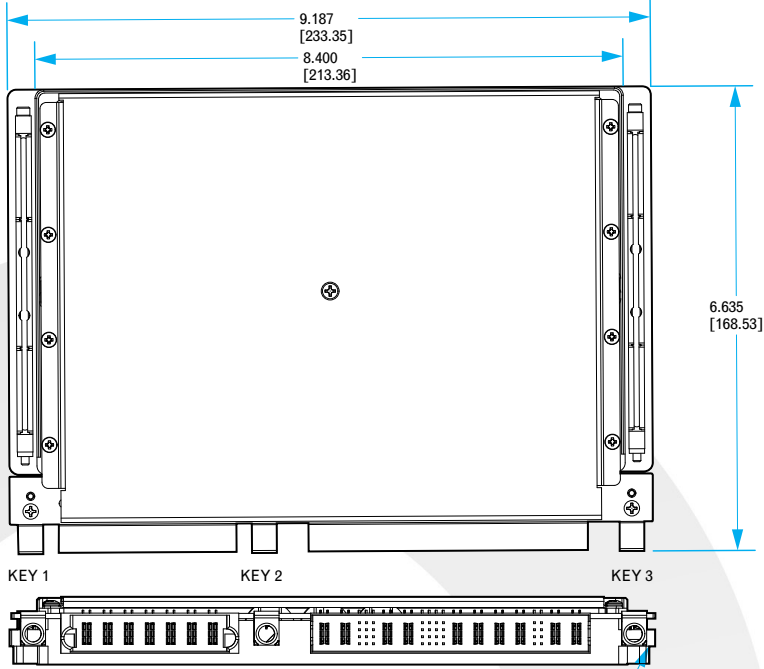
Note 1: Refer to SynQor "VPX 6U I²C Operator's Guide" for details regarding the I²C interface.



VPX-6U-AC

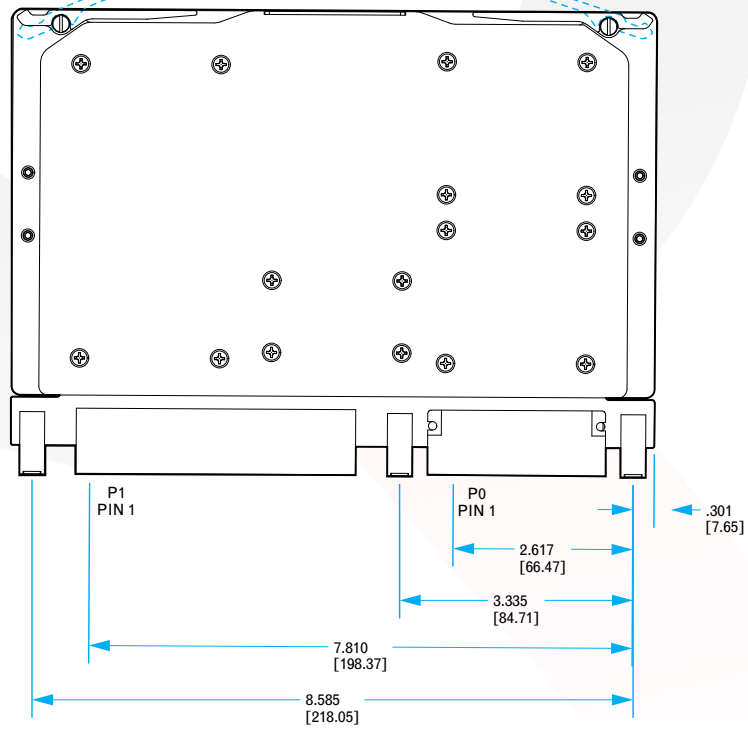
VPX-6U-ACUNV-1-C-001

Mech1 Diagram



VPX-6U-ACUNV-1-C-001		
Weight	3.6lbs (1.6kg)	
Key Position	Alignment Angle	TE Connectivity Part Number
1	270°	1-1469492-7
2	45°	1-1469492-2
3	0°	1-1469492-1

- NOTES:
1. ALL DIMENSIONS IN INCHES
2. TOLERANCES: X.XX ±0.02in [0,5mm]
X.XXX ±.010in [0,25mm]
3. CONNECTOR PART NUMBERS:
P0 - TE CONNECTIVITY 6450843-6
P0 - FOXCONN HM811J3-B84F
P1 - TE CONNECTIVITY 6450849-6
P1 - FOXCONN HM811L3-B84F
4. WEIGHT: SEE TABLE
5. SEE TABLE FOR KEYWAY POSITION AND ANGLE.
6. FLATNESS AND SURFACE FINISH REQUIREMENT APPLIES TO BOTH RAILS
7. RECOMMENDED TORQUE PER EACH MOUNTING WEDGE-LOK: 7 IN-LBS [80 N-CM].



Application Notes

Control Features

ENABLE*	Standard VITA 62 control signal. It is used to turn off all of the output voltages when it is high, including +3.3V_AUX. When it is pulled low to SIGNAL_RETURN, +3.3V_AUX will be turned on and the status of the other outputs will be dependent on the state of INHIBIT*. ENABLE* signal regards a no-connect as a high.
INHIBIT*	Standard VITA 62 control signal. It is used to turn off all the output voltages except +3.3V_AUX. When it is pulled low to SIGNAL_RETURN, VS1, VS2, VS3, +12V_AUX and -12V_AUX will be turned off. INHIBIT* signal regards a no-connect as a high. At power-on, if ENABLE* and INHIBIT* are configured to turn all outputs on, +3.3V_AUX will be powered up 100ms prior to when the other outputs are powered up.
FAIL*	FAIL* signal is used to indicate a failure has occurred. It will be pulled low when any of the outputs are outside the voltage specification. FAIL* is an active low open-drain signal. It is expected there will be a pull-up resistor on the backplane to 3.3V. A typical resistor value is 4.7kΩ.
SYSRESET*	SYSRESET* signal is an output generated from the module. It is used to indicate that startup has completed. At power-on, SYSRESET* is pulled low. It will be high impedance when all outputs are within voltage specification. It will be pulled low if any failure has occurred or if the outputs are disabled by the user during operation. SYSRESET* signal is an active low open-drain signal. It is expected there will be a pull-up resistor on the backplane to 3.3V. A typical resistor value is 4.7kΩ.

VITA 62 Control States

ENABLE*	INHIBIT*	+3.3V_AUX	VS1, VS2, VS3, +12V_AUX, -12V_AUX
HIGH	HIGH	OFF	OFF
LOW	HIGH	ON	ON
HIGH	LOW	OFF	OFF
LOW	LOW	ON	OFF

Parallel Operation

+12V_MAIN, +5V_MAIN & +3.3V_AUX	Active current sharing on +12V_MAIN, +5V_MAIN and +3.3V_AUX are supported with analog sharing schemes. To implement the current sharing function, SHARE pins, ENABLE*, INHIBIT* and SYNC pins should be connected together between all paralleled modules. These SHARE pins are referenced to POWER_RETURN. A clean ground plane is important, and ground drop between each module should be minimized.
+12V_AUX & -12V_AUX	Active current sharing is not supported on auxiliary outputs. However, all these auxiliary rails have OR'ing MOSFETs or OR'ing diodes implemented, so that they can still be operated in parallel. Total output current on these rails should not exceed the current rating of a single module.



VPX-6U-AC
VPX-6U-ACUNV-1-C-001

VPX Module Qualification (VITA 47 Compliant)

Test Name	Method
Random Vibration	MIL-STD-810, 514.6 - Procedure I, Class V3
Shock	MIL-STD-810, 516.6 - Procedure I, VI, Class OS2
Altitude	MIL-STD-810, 500.5 - Procedure I, II, III
Fungus Resistance	MIL-STD-810, 508.6
Corrosion Resistance	ASTM G85, Annex A4
Humidity	MIL-STD-810, 507.5 - Procedure II
High Temperature	MIL-STD-810, 501.5 - Procedure I, II
Low Temperature	MIL-STD-810, 502.5 - Procedure I, II
Temperature Cycling	MIL-STD-202, 107 - Class C4
ESD	EN61000-4-2, Level 4; 15kV Air Discharge

Internal Mil-COTS Converter and Filter Module Screening

Screening	Process Description	S-Grade	M-Grade
Baseplate Operating Temperature		-55 °C to +100 °C	-55 °C to +100 °C
Storage Temperature		-65 °C to +135 °C	-65 °C to +135 °C
Pre-Cap Inspection	IPC-A-610, Class III	•	•
Temperature Cycling	MIL-STD-883F, Method 1010, Condition B, 10 Cycles		•
Burn-In	100 °C Baseplate	12 Hours	96 Hours
Final Electrical Test	100%	25 °C	-55 °C, +25 °C, +100 °C
Final Visual Inspection	MIL-STD-883F, Method 2009	•	•



VPX-6U-AC
VPX-6U-ACUNV-1-C-001

Ordering Information / Part Numbering

Series	Package Size (U)	Input Range	Number of Phases	Mil Std Filtering	Output Voltage Combination Code	Packaging Options
VPX	6U	ACUNV	1	C	001	Y1Y2Y3
VPX	6U	ACUNV:AC Universal Input	1: Single Phase	C: Clamped Passive Filter	001: 001	Y1: Internal Module Screening S - S-Grade (MCOTS) M - M-Grade (MCOTS) Y2: Conformal Coating N - No Conformal Coating C - Conformal Coating Y3: I ² C Function [] - No I ² C 2 - I ² C

Examples: VPX-6U-ACUNV-1-C-001-SN

Not all combinations make valid part numbers, please contact SynQor for availability.

Contact SynQor for further information and to order:

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PATENTS

SynQor holds numerous U.S. patents, one or more of which apply to most of its power conversion products. Any that apply to the product(s) listed in this document are identified by markings on the product(s) or on internal components of the product(s) in accordance with U.S. patent laws. SynQor's patents include the following:

7,050,309 7,765,687 7,787,261
 8,149,597 8,644,027

WARRANTY

SynQor offers a one (1) year limited warranty. Complete warranty information is listed on our website or is available upon request from SynQor.