



VPX-3U-AC
 VPX-3U-ACUNV-1-C-N01

MILITARY COTS

VITA 62 COMPLIANT POWER SUPPLY

| | | | | |
|---|----------------------------|---------------------|-------------------------------------|----------------------------------|
| 85 - 264Vrms Continuous Input Voltage | Input EMI Filtering | 6 Outputs | 300W Maximum Output Power | 84% Typical Efficiency |
|---|----------------------------|---------------------|-------------------------------------|----------------------------------|

Operation: -40 °C to 85 °C (at Card Edge)



VPX Features

▶ **Outputs:**

- VS1: +12V @ 25A = 300W
- VS2: +3.3V @ 20A = 66W
- VS3: +5.0V @ 30A = 150W
- (AUX) +3.3V_{AUX} @ 6A = 20W
- (AUX) +12V_{AUX} @ 1A = 12W
- (AUX) -12V_{AUX} @ 1A = 12W

- ▶ Maximum Total Output Power: 300W
- ▶ Input EMI Filtering
- ▶ -40 °C to 85 °C Operating Temperature (at Card Edge)
- ▶ Over-current, Over-voltage and Over-temperature Protection
- ▶ ≥0.99 Power Factor
- ▶ Input Voltage Range: 85 - 264Vrms
- ▶ Frequency Range: 47-63Hz / 360-800Hz
- ▶ Standard VITA 62 Controls
- ▶ Optional I²C Function
 - Supports IPMI/PMBus/VITA 46.11

▶ **Compliance:**

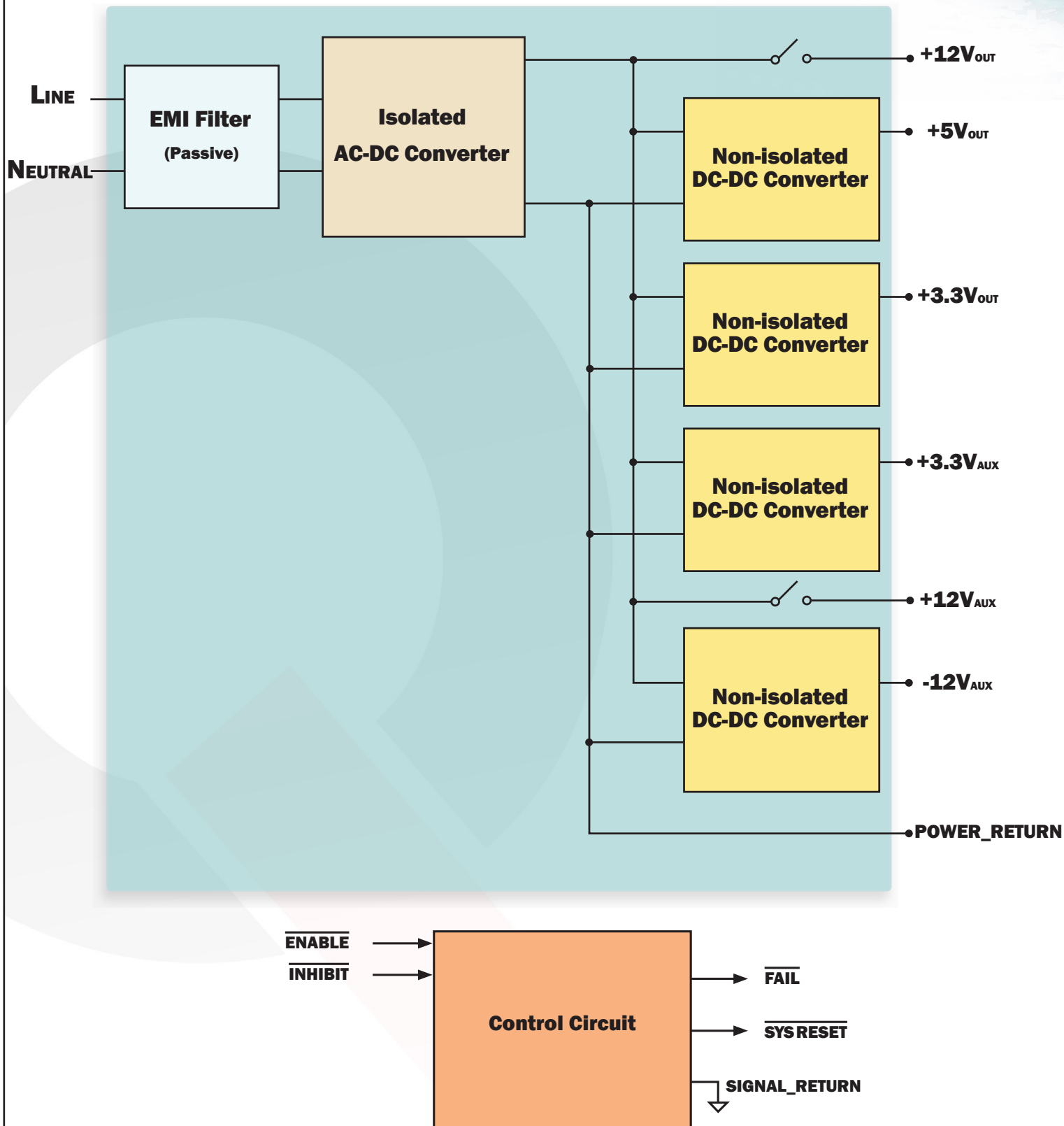
- VITA 62
- MIL-STD-461
 - CE101 ▪ CE102 ▪ CS101 ▪ CS106
 - CS114 ▪ CS115 ▪ CS116
- VITA 47 / MIL-STD-810G
 - ESD Protection
 - Shock
 - Vibration
 - Rapid Decompression
 - Corrosion Resistance
 - Fungus Resistance
 - Altitude
 - Humidity

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



Made in USA

Block Diagram for VPX-3U-ACUNV-1-C-N01



VPX-3U-ACUNV-1-C-N01 Input Characteristics

| 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 | Available output power reduced when <95 Vrms |
| AC Input 100ms Transient | 40 | | 290 | Vrms | |
| Input Under-Voltage Lockout | | 30 | | Vrms | > 1s duration |
| Input Over-Voltage Shutdown | | 440 | | Vpk | |
| Disabled AC Input Current | | 180 | 240 | mArms | 115 Vrms input |
| 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 200W output |
| | | 0.97 | | | 400Hz, min 200W output |
| THD of AC Input Current | | 3 | | % | min 200W 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 | |
| HOLD-UP CHARACTERISTICS | | | | | |
| Hold-up Time | | | | | |
| At 100W Output Power | | 50 | | ms | To -40% on +12V, see Note 1 |
| At 300W Output Power | | 17 | | ms | |
| RELIABILITY CHARACTERISTICS | | | | | |
| Calculated MTBF (MIL-217) MIL-HDBK-217F | | 1655 | | kHrs | Ground Benign, T _a = 25°C |
| Calculated MTBF (MIL-217) MIL-HDBK-217F | | 153 | | kHrs | Ground Mobile, T _a = 25°C |

Note 1: During a dropout of the AC input, +12V_MAIN and +12V_AUX output voltages will droop while other output voltages will remain in regulation. Hold-up time is defined as +12V output voltages drop 40% of their steady state value.

VPX-3U-ACUNV-1-C-N01 Output Characteristics

| Parameter | +12V | +5V | +3.3V | +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%) | 3.3V (+/-1.5%) | 12V (+/-1.5%) | -12V (+/-1.5%) |
| Total Output Voltage Range See Note 2 | 12V (+/-4%) | 5V (+/-3%) | 3.3V (+/-3%) | 3.3V (+/-2%) | 12V (+/-4%) | -12V (+/-3%) |
| Output Voltage Ripple (pk-pk) See Note 3 | 300mV | 50mV | 40mV | 40mV | 80mV | 200mV |
| Operating Current Range Maximum Total Output Power = 500W | 0-25A | 0-30A | 0-20A | 0-6A | 0-1A | 0-1A |
| Over-Voltage Protection | 13.0V | 6.0V | 6.0V | 6.0V | 14.8V | NA |
| Current-Limit Inception | 30A | 40A | 30A | 10A | 2A | 1.8A |
| Maximum Output Capacitance | 4mF | 10mF | 10mF | 10mF | 1mF | 10mF |
| MAXIMUM TOTAL OUTPUT POWER | | | | 300W | | |

Note 1: 115Vrms, 50% load

Note 2: Over line, load, temperature at steady state

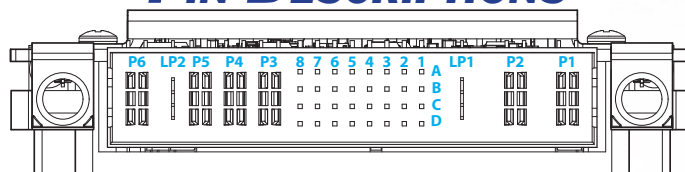
Note 3: Full Load, measured with 1 μ F capacitor and 10 μ F tantalum capacitor

Maximum Total Output Power = 300W (Vin > 95 Vrms, Full Temperature Range)

Maximum Total Output Power derates to 230W at 85 Vrms.

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

PIN DESCRIPTIONS



3U P0 Connector

| PIN | Function | DESCRIPTION |
|-----|----------------|---|
| P1 | AC_Neutral | Neutral |
| P2 | AC_Line | Line |
| LP1 | CHASSIS | Chassis |
| A1 | No Connection | |
| B1 | No Connection | |
| C1 | No Connection | |
| D1 | No Connection | |
| A2 | No Connection | |
| B2 | FAIL* | When any of the output is not within specification, FAIL* signal will be driven low to indicate a failure |
| 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 |
| A3 | No Connection | |
| B3 | +12V_AUX | +12V auxiliary output voltage, 1A rated |
| C3 | No Connection | |
| D3 | No Connection | |
| A4 | +3.3V_AUX | +3.3V auxiliary output voltage, 6A rated (1.5A per pin) |
| B4 | | |
| C4 | | |
| D4 | | |
| A5 | GA0* | Geographical Address, See Note 1 |
| B5 | GA1* | 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 |
| 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 |
| A7 | No Connection | |
| B7 | No Connection | |
| C7 | No Connection | |
| D7 | SIGNAL_RETURN | Ground pin for control signals |
| A8 | +12V_SENSE(+) | Should be connected to +12V_MAIN either remotely or at the connector |
| B8 | +3.3V_SENSE(+) | Should be connected to +3.3V_MAIN either remotely or at the connector |
| C8 | +5V_SENSE(+) | Should be connected to +5V_MAIN either remotely or at the connector |
| D8 | SENSE_RETURN | Should be connected to POWER_RETURN either remotely or at the connector |
| P3 | +5V_MAIN | +5V main output voltage, 30A rated |
| P4 | POWER_RETURN | Common output voltage return pin, 40A rated per pin |
| P5 | POWER_RETURN | |
| LP2 | +3.3V_MAIN | +3.3V main output voltage, 20A rated |
| P6 | +12V_MAIN | +12V main output voltage, 25A rated |

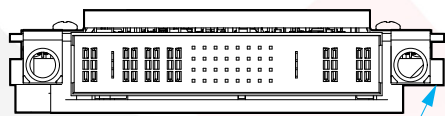
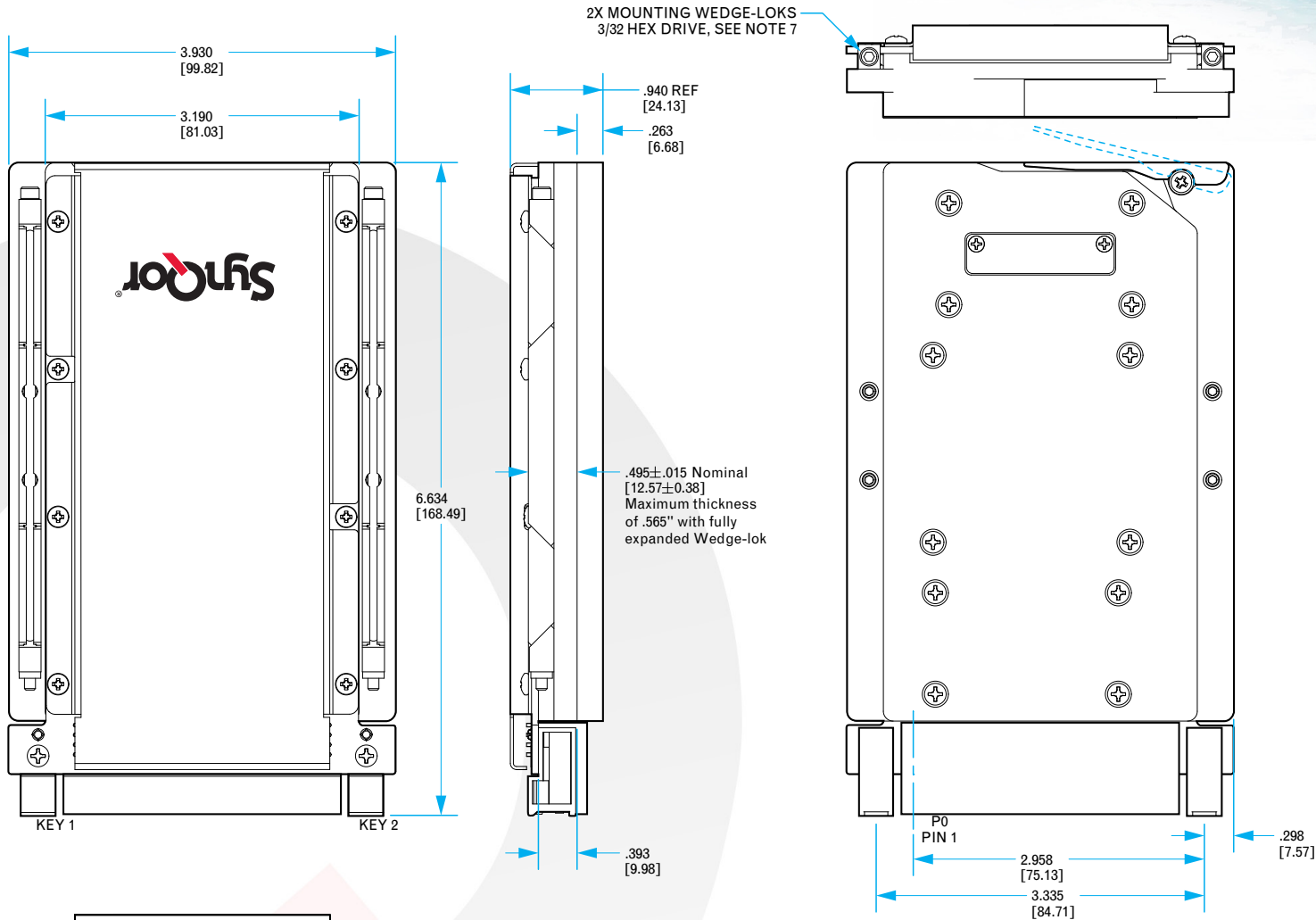
Note 1: Refer to SynQor "VPX 3U I²C Operator's Guide" for details regarding the I²C interface.



VPX-3U-AC

VPX-3U-ACUNV-1-C-N01

Mechanical Diagram



2 PLCS
See Note 6
32
THERMAL SEATING PLANE
0.004 [0.1]

| VPX-3U-ACUNV-1-C-N01 | | |
|----------------------|-----------------|-----------------------------|
| Weight | 1.7lbs (.77kg) | |
| Key Position | Alignment Angle | TE Connectivity Part Number |
| 1 | 270° | 1-1469492-7 |
| 2 | 45° | 1-1469492-2 |

- NOTES:
- ALL DIMENSIONS IN INCHES
 - TOLERANCES: X.XX ±0.02in [0,5mm]
X.XXX ±.010in [0,25mm]
 - CONNECTOR PART NUMBERS:
P0 - TE CONNECTIVITY 6450849-7
P0 - FOXCONN HM811C3-B84F
 - WEIGHT: SEE TABLE
 - SEE TABLE FOR KEYWAY POSITION AND ANGLE.
 - FLATNESS AND SURFACE FINISH REQUIREMENT APPLIES TO BOTH RAILS
 - RECOMMENDED TORQUE PER EACH MOUNTING WEDGE-LOK: 7 IN-LBS [80 N-CM].



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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 |



VPX-3U-AC
VPX-3U-ACUNV-1-C-N01

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 3; 8kV 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-3U-AC
VPX-3U-ACUNV-1-C-N01

Ordering Information / Part Numbering

| Series | Package Size (U) | Input Range | Number of Phases | Mil Std Filtering | Output Voltage Combination Code | Packaging Options |
|------------|------------------|--------------------------|------------------|---------------------------|---------------------------------|---|
| VPX | 3U | ACUNV | 1 | C | N01 | Y1Y2Y3 |
| VPX | 3U 6U | ACUNV:AC Universal Input | 1: Single Phase | C: Clamped Passive Filter | N01: N01 No Current Share | 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-3U-ACUNV-1-C-N01-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.