VPX68-3 3U VPX DC/DC Converter

400-Watt Ruggedized Converter
Plug-in Module, Conduction-Cooled, Six Outputs, With Holdup Time

Made in the USA
Certified Small Business

Description

NAI's VPX68-3 is a 400 Watt DC/DC Converter that plugs directly into a standard 3U VPX chassis with a VITA 62, 1.0" pitch power supply slot. This off-the-shelf solution for VITA 46.0 and VITA 65 systems is compatible with VPX specifications; supports all VITA standard I/O, signals, and features; and conforms to the VITA 62 mechanical and electrical requirements for modular power supplies.

The VPX68-3 switching power supply is conduction-cooled through the card edge/wedgelock. It accepts +28 VDC input voltage and provides six outputs at 400 Watts and has optiponal, integrated Holdup Time.

The VPX68-3 can be used either as a single-stage module or a back-end module in a multiple power supply configuration. It supports a variety of standard features, including continuous Background Built-in-Test (BIT); remote error sensing; and protection against transients, over-voltage, over-current, and short-circuits. With its intelligent design, the VPX68-3 also has the flexibility to address special needs. This COTS converter is specifically designed with component derating for rugged defense and industrial applications. It is also designed to meet the many harsh environmental requirements of military applications.

Features

- Ideal for rugged 3U VPX power applications
- Standard VPX-compatible connectors and I/O per VITA 62
- IPMI Dual PM Bus compliant
- Supports all VITA standard I/O, signals, and features
- Accepts +28 VDC input
- Provides six outputs and I/O at 400 Watts
- High Efficiency
- Continuous Background Built-in-Test (BIT)
- Holdup Time
- Input transient protection per MIL-STD-704A-F
- Input Protection per MIL-STD-1275E
- Integrated EMI filtering per MIL-STD-461F; CE102 standalone compliant
- Environmentals per MIL-STD-810G and VITA 47
- Operates at full load through the entire -40°C to +85°C temperature range
- +/-12V aux outputs independently adjustable from 8 to 15V

110 Wilbur Place, Bohemia, NY 11716 Tel: 631.567.1100 www.naii.com

Electrical Specifications

DC Input Characteristics	
Input	+28 VDC (+16 VDC to +60 VDC range, continuous)
EMI/RFI	Designed to meet the requirements of MIL-STD-461F; CE102 standalone compliant (**without** additional filtering)
Input Transient Protection	Per MIL-STD-704A-F
	Per Mil-Std-1275E
Output Power	400 Watts max (see Output Power Table)
Output Voltage	VPX outputs standard (see Output Power Table)
Efficiency	92% typical
Switching Frequency	250KHz
Line Regulation	Within 0.5% or 20 mV (whichever is greater) for low to high line changes at constant load. For current share units: 1.5% for VS1, VS2, VS3; 2% for +3.3 VDC_Aux, +12 VDC_Aux, -12 VDC_Aux
Load Regulation	0.5% or 20 mV (whichever is greater) for 0 to 100% of rated load at nominal input line with remote sense. 1% for -12 VDC_Aux , +12 VDC_Aux, +3.3 VDC_Aux; For current share units: 1.5% for VS1, VS2, VS3, +3.3 VDC_Aux; 2% for +12 VDC_Aux, -12 VDC_Aux
PARD (Noise and Ripple)	1% or 50 mV p-p max per VITA 62; measurements are made with a 20 MHz bandwidth instrument connected on load wires < 5 inches from power supply and terminated with 1uF capacitors across load lines
Load Transient Recovery	Output voltage returns to regulation limits within 0.5 msec, half to full load
Load Transient Under/Overshoot	5% of nominal output voltage set point (1.4 V max); 2.5% for VS3
Holdup Time (optional)	Provides 50 milliseconds of Holdup Time at 400 Watts
Short Circuit Protection	Protected for continuous short circuit with automatic recovery
Current Limiting	User Adjustable Current limits (adjustable from 25% to 100% of full load); will periodically retry until condition is removed
Over Voltage Protection	Automatic electronic shutdown if outputs exceed 125% ±10%
Remote Error Sensing	Sensing pins compensate for up to 0.5 V drop on VS1 to VS3 outputs
Isolation Voltage	250 VDC input to output and input to case; 100 VDC output to case
Insulation Resistance	50 Mega Ohm at 250 VDC

All specifications are subject to change without notice.

110 Wilbur Place, Bohemia, NY 11716 *Tel: 631.567.1100* *www.naii.com*

Additional Specifications

Physical/Environmental	
Temperature Range	Operating: -40°C to +85°C at 100% load (temperature measured at card edge, conduction via card edge); Storage: -55°C to +105°C per VITA 47 CC4)
Temperature Coefficient	0.01% per °C
Shock	30 G's each axis per MIL-STD-810G, Method 516.6, Procedure 1; Hammer shock per MIL-S 901, ½ sine wave per VITA 47 OS2
Acceleration	6 G's per MIL-STD-810G, Method 513.6, Procedure II
Vibration	Per MIL-STD-810G, Method 514, Procedure 1
Humidity	95% at 71°C per MIL-STD-810G, Method 507.5 (non-condensing)
Altitude	1,250 feet to +60,000 feet per VITA 47
Salt & Fog	Per MIL-STD-810G, Method 509.5
Sand/Dust	Per MIL-STD-810G, Method 510.5
Fungus	Per MIL-STD-810G, Method 508.6
ESD	15 kV EN61000-4-2 per VITA 47
Enclosure	Aluminum housing to aluminum baseplate
Dimensions	See Mechanical Layout
Finish	Chemical film IAW MIL-DTL-5541, Type II, Class 3
Interface	50 Micro-Inch Gold on contacts; plated tails for tin whisker mitigation; See Connector Part Numbers below
Weight	2lbs,Typical

All specifications are subject to change without notice.

Connectors

Unit	Backplane
P0: TE Connectivity p/n 2314578-2	**J0:** 2 TE Connectivity p/n 309390-1

110 Wilbur Place, Bohemia, NY 11716 Tel: 631.567.1100 www.naii.com

Signal Types

Signal	Description
ENABLE*	Turns off all of the output voltages, including 3.3 V_AUX, when signal is High. ENABLE* is pulled Low by using a mechanical switch which connects it to SIGNAL_RETURN. A Logic output can also be used to drive the ENABLE*. Opening the switch would turn off all the outputs; closing the switch or applying the Logic output would enable the outputs to come on depending on the state of INHIBIT*. An input of <0.8 VDC is regarded as a Low and an input of >2.0 VDC is regarded as a High. A no-connect is also regarded as a High. Along with INHIBIT*, this signal determines the output power status of the VPX68-3 (see Power Status Table below).
INHIBIT*	Turns off all the output voltages. In most implementations, the signal is expected to leave 3.3 V_AUX on. Pulling INHIBIT* Low turns off VS1, VS2, VS3, and ±12 VDC_Aux outputs. An input of <0.8 VDC is regarded as a Low and an input of >2.0 VDC is regarded as a High. A no-connect is also regarded as a High. Along with ENABLE*, this signal determines the output power status of the VPX68-3 (see Power Status Table below).
SYSRESET*	An active low open-collector line driven by the Power Monitor module. Signal ensures a clean, stabilized startup based on monitoring the output voltage levels in accordance with VITA 46.0, paragraph 4.8.11. Timing can be factory customized.
FAIL*	Indicates failure when any of the outputs are not within specification. Signal complies with VITA 65 for active Low. FAIL* signal is Open Drain. It is expected that there will be a pull-up resistor on the backplane.
VBAT (Optional)	Provides a low-power +3.3 VDC @ 1A output to other plug-in modules. Intent is to supply power to low current devices, such as Real Time Clocks, when other outputs are off. While connected internally to the +3.3 VDC_Aux output, the signal provides a separate line dedicated to low power needs and has its own overcurrent protection. The signal is controlled thru power status, along with the +3.3 VDC_Aux output (see Power Status Table below).
Geographical Addressing	As defined in VITA 46
Protocol	IPMI Dual PMBus.
Status LED	5 State LED as shown below in LED Status Table

LED Status

LED State	Meaning
Off	Input Low
Green (Steady)	Vout OK; All outputs are good
Red (Steady)	Fail; Follows same logic as FAIL* signal
Blinking Green	Unit disabled
Blinking Red	Over Voltage or Over Temperature (all outputs are off)

Power Status

Control Input States		Power Output States	
ENABLE*	INHIBIT*	+3.3V_AUX	VS1, VS2, VS3, +12V_AUX & -12V_AUX
High	High	Off	Off
High	Low	Off	Off
Low	High	On	On
Low	Low	On	Off

110 Wilbur Place, Bohemia, NY 11716 Tel: 631.567.1100 www.naii.com

Output Power

400-Watt Power*		
Designation	**Volts**	**Amps**
VS1	+12	15
VS2	+3.3	15
VS3	+5.0	30
+12_Aux	+12 **	5
-12_Aux	-12 **	5
+3.3_Aux	+3.3	4

***Total output power limited to 400 Watts**

Max current from each supply. Each supply has a programmable current limit, to limit total power to 400 Watts.

**** +12_Aux and -12_Aux supplies user programmable from 8vdc +/- 15 Volts.**

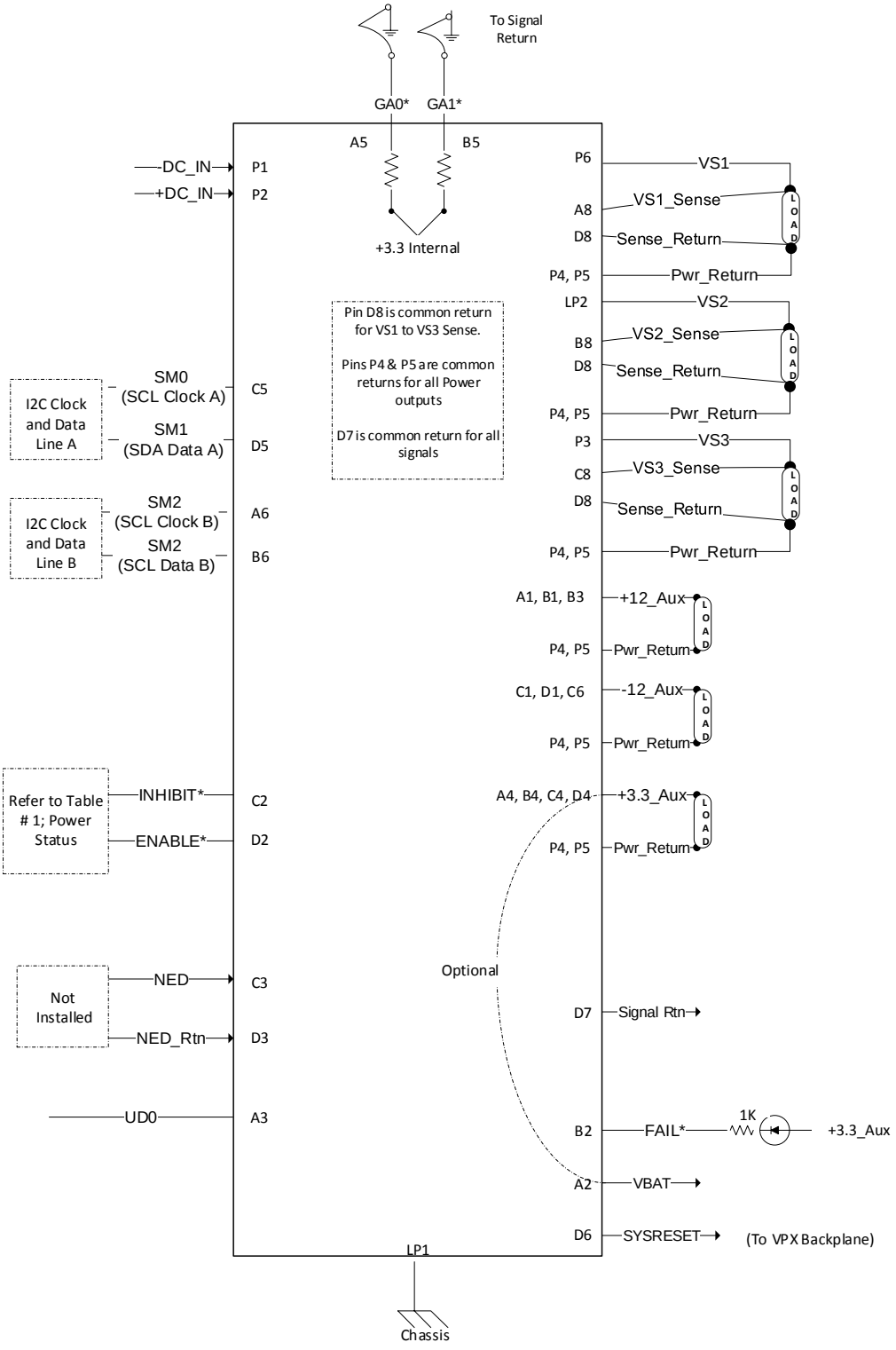
110 Wilbur Place, Bohemia, NY 11716 *Tel: 631.567.1100* *www.naii.com*

Pinout Designations (P0)

Pin #	Rated Current (A)	Pin Name	Description	Pin #	Rated Current (A)	Pin Name	Description
P1	40A	-DC_IN/ACN	28Vdc Input Rtn	B5	<1A	GA1*	Geographical Address
P2	40A	+DC_IN/ACL	+28Vdc Input	C5	<1A	SM0	System Mgmt. Bus (I^2C Clock) line A
LP1	20A	CHASSIS	Chassis Ground	D5	<1A	SM1	System Mgmt. Bus (I^2C Data) line A
A1	<1A	+12 V_AUX	+12Vdc_Aux Output / User Defined 1	A6	<1A	SM2	System Mgmt. Bus (I^2C Clock) line B
B1	<1A	+12 V_AUX	+12Vdc_Aux Output / User Defined 2	B6	<1A	SM3	System Mgmt. Bus (I^2C Data) line B
C1	<1A	-12 V_AUX	-12Vdc_Aux Output / User Defined 3	C6	<1.5A	-12 V_AUX	-12Vdc_Aux Output
D1	<1A	-12 V_AUX	-12Vdc_Aux Output / User Defined 4	D6	<1A	SYS_RESET*	Active Low Open Collector
A2	<1A	VBAT (optional)	Connected internally to +3.3Vdc_Aux	A7	<1A	N/C	Not Used
B2	<1A	FAIL*	Active Low Open Collector	B7	<1A	N/C	Not Used
C2	<1A	INHIBIT*	Used with ENABLE* See power status table	C7	<1A	N/C	Not Used
D2	<1A	ENABLE*	Used with INHIBIT* See power status table	D7	<1A	SIGNAL_RETURN	Common Signal Return
A3	<1A	UD0	User Defined 0	A8	<1A	VS1_SENSE	Remote Sense VS1
B3	<1.5A	+12 V_AUX	+12Vdc_Aux Output	B8	<1A	VS2_SENSE	Remote Sense VS2
C3	<1A	NED	Not Installed	C8	<1A	VS3_SENSE	Remote Sense VS3
D3	<1A	NED_RETURN	Not Installed	D8	<1A	SENSE_RETURN	Common Remote Sense Return
A4	<1.5A	+3.3 V_AUX	+3.3Vdc Aux Output	P3	40A	VS3	VS3 Output
B4	<1.5A	+3.3 V_AUX	+3.3Vdc Aux Output	P4	40A	POWER_RETURN	Common Output Return
C4	<1.5A	+3.3 V_AUX	+3.3Vdc Aux Output	P5	40A	POWER_RETURN	Common Output Return
D4	<1.5A	+3.3 V_AUX	+3.3Vdc Aux Output	LP2	20A	VS2	VS2 Output
A5	<1A	GA0*	Geographical Address	P6	40A	VS1	VS1 Output

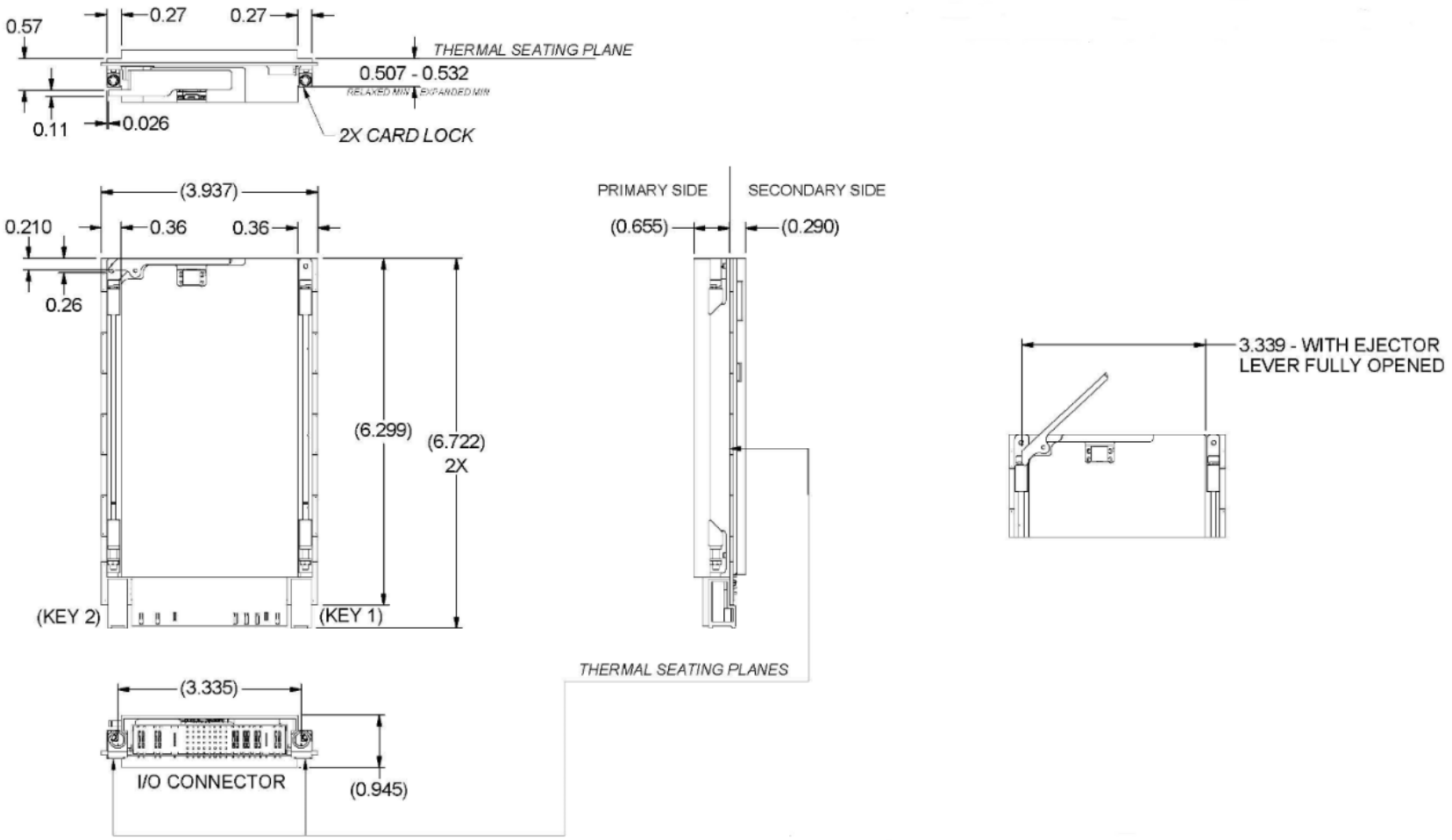
110 Wilbur Place, Bohemia, NY 11716 Tel: 631.567.1100 www.naii.com

VPX68-3 Connections



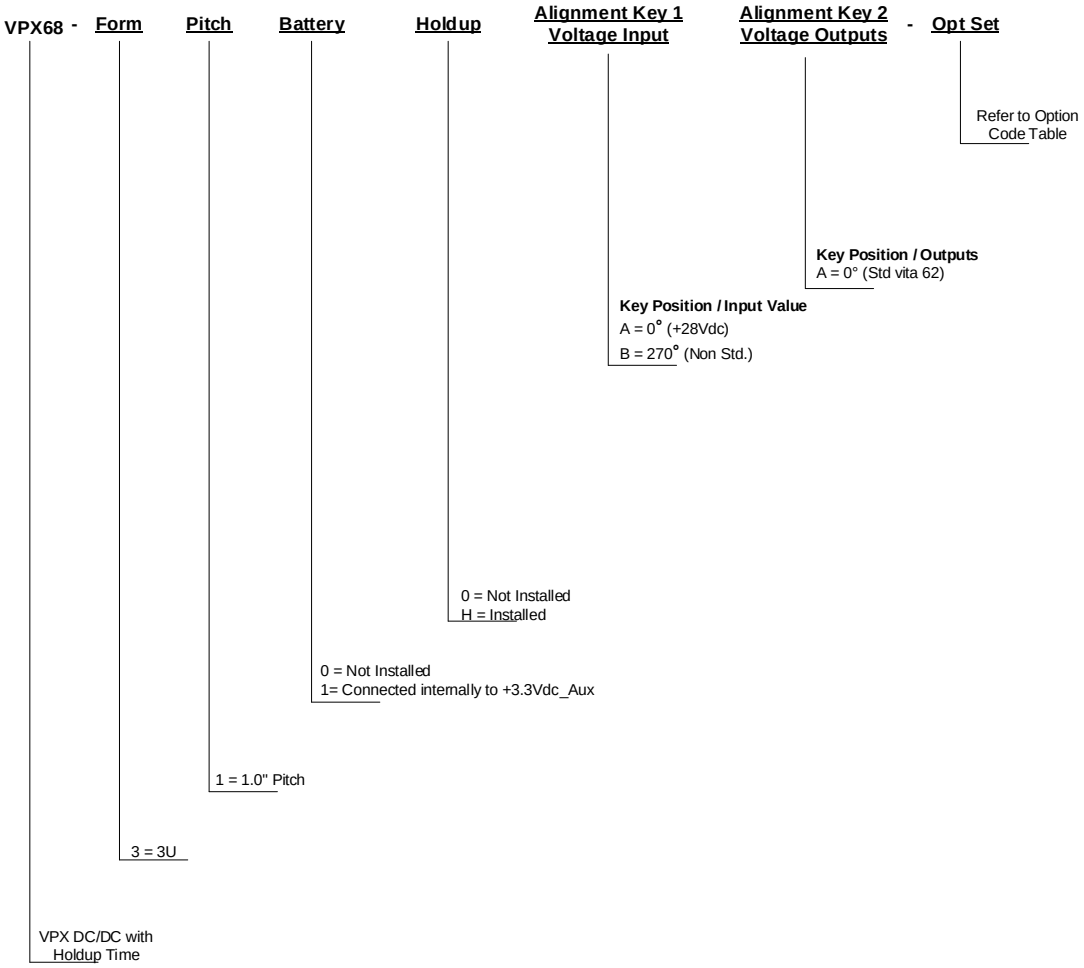
110 Wilbur Place, Bohemia, NY 11716 Tel: 631.567.1100 www.naii.com

Mechanical Layout



110 Wilbur Place, Bohemia, NY 11716 Tel: 631.567.1100 www.naii.com

Ordering Information



Example Part Number:VPX68-310HAA-00
Description: 3U VPX 1.0" pitch, 400 Watts, Holdup Time installed, +28Vdc input with Standard VITA 62 Outputs, No Additional Options.

Refer to option code table for description of option codes

Option Code Table

Code	Description
00	Standard Unit, with Holdup Time no additional options
01	Optimized for MIL-STD-1275E, No Holdup Time • Normal Operation during IES (+12Vdc for up to 1 second) • Normal Operation during Cranking (+16Vdc) • Compliance to 100Vdc and 250Vdc Spikes/Surges

110 Wilbur Place, Bohemia, NY 11716 Tel: 631.567.1100 www.naii.com