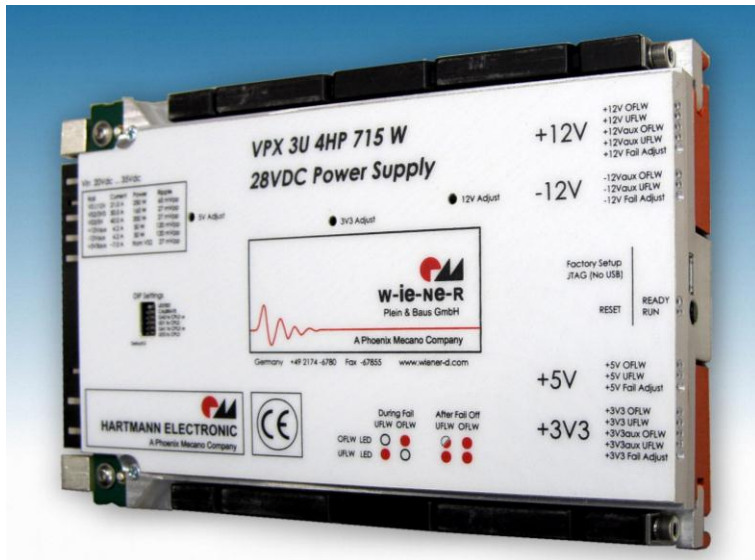




Power Supplies 3U and 6U





1 Power Supply 3U 4TE 715W, DC/DC, conduction cooled

1.1 Key Features

- Compliant to VITA 62 baseline specification
- Up to 715 Wmax. Power *
- 600 W over all
- up to 21A for +12V :VS1
- up to 50A for +3.3V :VS2
- up to 40A for +5V :VS3
- +12V / -12V AUX 4.2A
- +3V3 AUX 7A
- up to 92% efficiency
- -40 to +85°C Operating Temperature **
- Voltage sense controlled ***
- 18 – 35 V DC INPUT



* Derating: ~2% Wattage per Kelvin from 40°C on **

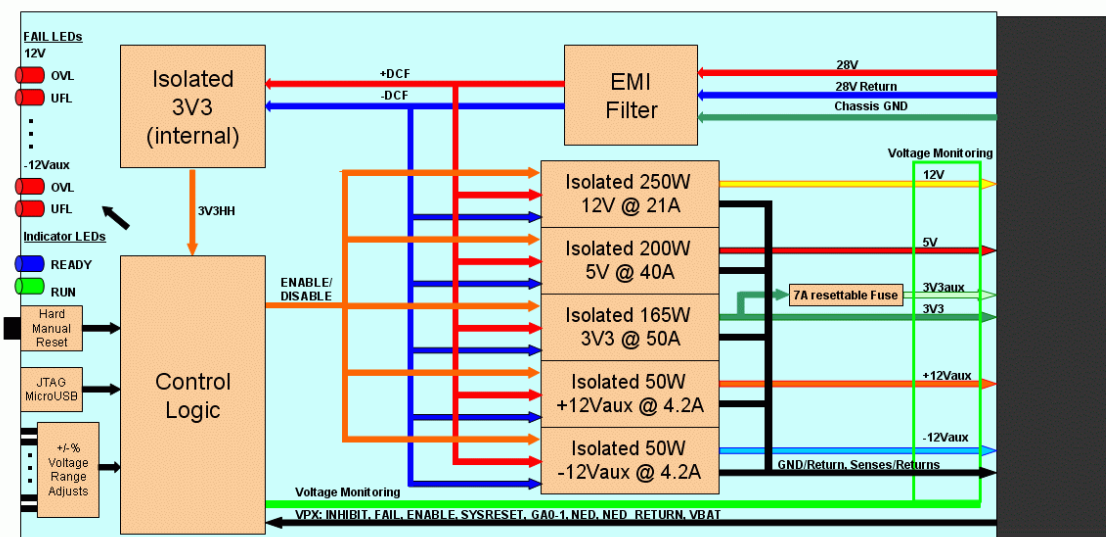
** At hottest outer case temperature / wedge lock edge temp. values in work

*** Over Voltage, Under Voltage, Over Current, Over Temperature
Shutdown control over each power rail, common control via VITA62 control bus

- Storage Temperature: -40°C to +100°C
- Weight: 0.6kg/1.23 Lbs
- Isolation Voltage: 500V

Order Number: D575.00700

1.1.1 Block diagram





VPX Power 3U / 6U



Figure 1 Block diagram 3U

All voltage ZVS converters are isolated (1500V isolation voltage) and fed via a common Filter Network from the same 28V main supply (18V – 35V, shortly 36V). 3V3aux is not independent but protected by a resettable fuse (PTC). All individual output voltages (6x) are sensed by window comparators for over- and under voltages which are monitored from a central control logic device (CPLD). Any failure on the output voltages are signaled on the front panel by corresponding FAIL LEDs and lead to a switch off of all voltages (by default). If all internals are normal the blue READY LED is working. Figure 1 show gives an overview over the front panel elements.

1.1.2 Front panel

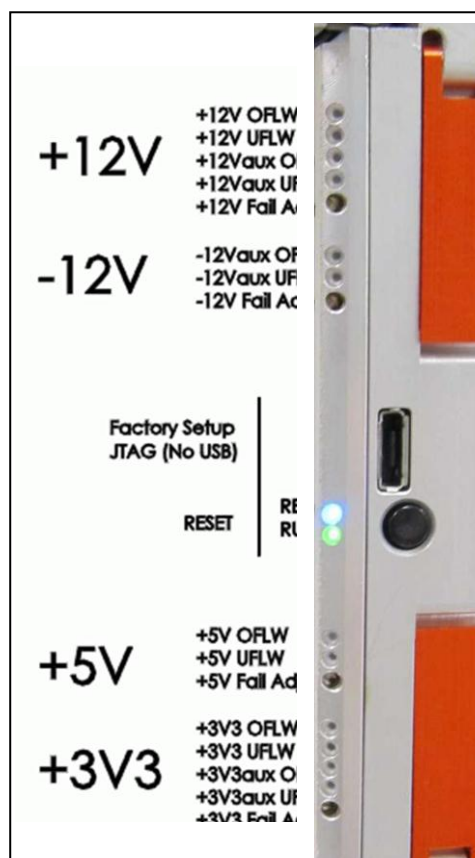


Figure 2 Front panel functional elements of the VPX3C Power Supply

1.1.3 Control Logic:

Depending on the main bus signals also the green RUN LED goes on and the power supply tries to start working. According to VITA 62 and VITA 46 the logic *run line condition* is – when “#” is nomenclature for the negative logic main bus signals, logic negation is signaled by the “-” sign, and a positive logic transition by “↑”:

$$\text{RUN} = (\neg \# \text{ENABLE AND } \# \text{INHIBIT AND } \# \text{FAIL AND } \neg \text{INTERNAL_FAIL})$$

“REFRESHED AFTER FAIL WHEN”

$$\uparrow (\neg \# \text{SYSRESET OR } \neg \# \text{RESET_BUTTON OR POWER_ON})$$

This means that if the global inhibit is not set (= released to H), whether no internal or external failure occurs (both are released to H) the power supply starts. After some kind of failure (internal or external) the power supply restarts by one of the following three conditions: A power cycle, a push onto the front panel button or a remote reset via the main bus system reset (#SYSRESET).



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By default all voltages go down promptly if one of the run line conditions is not met. When an internal failure occurs the delay or failure hold time to a complete switch off of the power supply is a half second to a second. This logic prevents any hardware from defects caused by unsymmetrical power faults (analogue operational circuits) or partial power faults (CPUs).

1.1.4 Failure LEDs:

To know exactly the reason of the last failure two fail LEDs on the front panel for every voltage will indicate the origin. Window discriminators directly steer the upper or lower LEDs if over- or under voltage actually takes place (OFLW, UFLW). This actual state can be watched shortly before the failure hold time is reached and/or by flickers of the corresponding LEDs. If the failure origin lasts longer than the hold time the power supply shuts down.

After a shutdown all under voltage LEDs must go on showing that no power is online. Now it is easily possible to distinguish where an over- or under voltage failure occurred: A steady overvoltage LED at the corresponding power rail shows an over voltage problem, a blinking overvoltage LED an under-voltage problem. Largely under-voltage is caused by over current or over heat of the corresponding power rail. Figure 2 gives the list of failure interpretations.

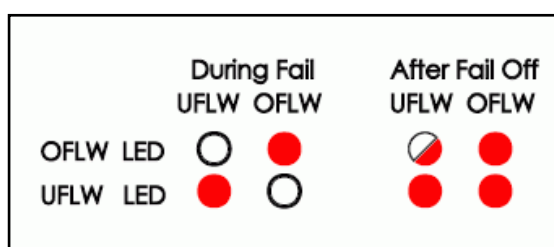


Figure 3 Failure LED failure origin interpretation

The +/- window range of the power rail is adjusted by factory to +/- 5..7 % and may be carefully readjusted by the named front panel trimmer elements (+/- 0%..50%).

After origin of failure has removed a reset restarts the module.

1.1.5 Technical Specification

Form Factor	3U VPX CC
Pitch	4HP / 0.8 inch
Weight	0.6 kg / 1.23 Lbs / 21.2 oz.
Storage Temperature	-55°C to 105°C
Operating Temperature	-40°C to 85°C
Input to Output Insulation	1500V
Input to Output Isolation with Case	550V
Input to Case Ground Isolation	500V
Output to Case Ground Isolation	50V
Case Ground to Safety Ground Resistance	< 10 mΩ
Main Power	
Maximum Output Power	715W
Maximum Input Power	~760W
Maximum Dissipated Power @ max. Power	~45W
Minimum Turn ON Voltage	20 V
Minimum Turn OFF Voltage	19 V



VPX Power 3U / 6U



Hysteresis	1 V
Maximum Continuous Input Voltage	35 V
Maximum Short Time Input Voltage	(15 s) 36 V
Maximum Currents 12V / 3V3 / 5V	21 A / 50 A / 40 A
Fixed Switching Frequencies 12V / 3V3 / 5V	120 kHz / 125 kHz / 130 kHz
Peak Efficiencies 12V / 3V3 / 5V	94% / 92% / 92%
Max. Output Ripple and Noise: 12V / 3V3 / 5V (0-20 MHz Bandwidth)	15 mVrms / 4 mVrms / 4 mVrms 65 mVpp / 27 mVrms / 27 mVpp
Line Regulation: 12V / 3V3 / 5V.	40 mV / 2 mV / 4 mV
Vin=Vin,min to Vin,max, Io and Tc fixed	< 0.1%
Load Regulation: 12V / 3V3 / 5V	70 mV / 2 mV / 4 mV
Vin=Vin,nom, Io=Io,min to Io,max, Tc fixed	< 0.1%
Controlled Overvoltage Protection: +/-12V / 3V3 / 5V	+ 0 %..+ 50 % variable by trimmer. + 5..7 % per factory setup
Uncontrolled	14.4 V / 4.1 V / 6.1 V (hardware)
Controlled Undervoltage Protection: +/-12V / 3V3 / 5V	- 0 %.- 50 % variable by trimmer - 5..7% per factory setup
Temperature Protection Sensing Point (identical to case)	85°C (Latching)
Maximum Internal Working Temperatures	125°C
Auxiliary +/-12V Power	
Maximum Current	4.2 A
Fixed Switching Frequency	900 kHz
Peak Efficiency	88%
Max. Output Ripple and Noise (0-20 MHz Bandwidth)	120 mVpp / 30 mVrms
Load Transient Recovery Time	100 μs
Control Logic	
Failure hold time	0.5..1 s*
Full* Shutdown	OVC, OVT, OFLW, UFLW
Timing	
Minimum Hold up Time (at max. Power)	~ 1 ms
Minimum input voltage start up rise time	> 50 V/s
Output voltage rise time: 12 V / 3V3 / 5V / 12Vaux	38 V/s, 30 V/s, 27 V/s, 30 V/s (exponential)
Startup Delay time: 12 V / 3V3 / 5V / +/- 12Vaux	30 ms, 28 ms, 30 ms, 80 ms
*by default firmware	

1.1.6 Compatibility

UL 60950 (US and Canada)

VDE 0805

IEC 950

CE Mark (EN60950)

Altitude: MIL-STD-810F, Methode 500.4, Procedure II

Vibration: MIL-STD-810G, Methode 514.6 D-1, Category 12

Shock: MIL-STD-810F, Methode 516.6, Procedure I



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1.1.7 Switch-On Behavior

All voltage outputs are switched on exponentially with relatively slow rise times of 30-80 ms and do settle smooth to the final voltage without any overshoot or glitch.

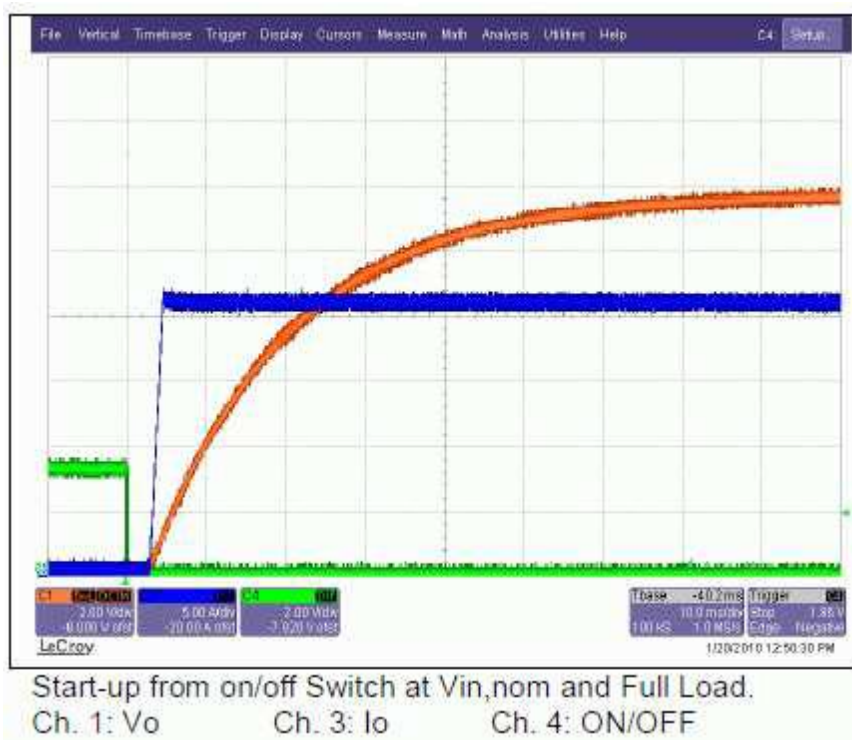


Figure 4 Startup Delay and Exponential Rise (orange) of $V_{S1} = 12V$ Output Voltage



VPX Power 3U / 6U



2 Power Supply 3U 10HP 600W, AC/DC, air cooled

2.1 Key Features

- Form factor: 3 U/10HP
- Efficiency: up to 89%
- Input Frequency: 47-63Hz
- Input Voltage: 85 – 264Vac
- Input Current: 6A (600W output at 120Vrms input)
- Inrush Current: 20A (at 265Vrms)
- Output Voltage: 12V/28A: VS1
3.3V/19A: VS2
5V/25A: VS3
±12VAUX/1A
3V3AUX/6A
- Isolation Voltage: Input to Output:4000Vac
Input to Chassis: 1500Vac
Output to Chassis 250Vdc
Output to Output 250Vdc
- Cooling with low noise Fan installed

Order Number: D575.00641





VPX Power 3U / 6U



2.1.1 LED Status:

RUN

READY

ENABLE

INHIBIT (LED green / red)

12V (LED green / red)

3,3V (LED green / red)

5V (LED green / red)

12V AUX (LED green / red)

+3,3V AUX (LED green / red)

-12V AUX (LED green / red)

Indicates the output power:

Power is present (inside of the specified range) = LED
GREEN

Power is not present (not inside of the specified range) = LED
RED



VPX Power 3U / 6U



2.1.2 Technical Specification

Form Factor	3U
Pitch	10HP
Weight	650g
Storage Temperature	-40°C to +85°C
Operating Temperature	-20°C to +70°C
Input to Output Insulation	4000Vac
Input	
Input Voltage	85 – 264Vac
Input Current:	6A (600W output at 120Vac input)
Inrush Current:	20A (at 265Vac)
Output	
Maximum Output Power (85 – 264Vac)	600W
Max. Currents 3.3V / 12V / 5V	19A / 28A / 25A
Over Current Protection (% of rated current)	105% - 125%
Ripple and Noise (20MHz BW, pk – pk)	1%Vnom
Holdup Time (600W output at 120Vrms input)	min. 17ms, typ 20ms, max 21
Turn ON Rise Time 3.3V / 12V / 5V	1,5-3,5ms
Turn ON Delay (AC to PG) 3.3V / 12V / 5V	750ms
Line Regulation: 3.3V / 12V / 5V	±1%Vnom / ±1%Vnom / ±1%Vnom
Load Regulation: 3.3V / 12V / 5V	±50 mV / ±100 mV / ±50 mV
Overvoltage Protection: 3.3V / 12V / 5V /	9,5V / 18V / 9,5V
Over Temperature Protection (internal monitored.)	+115C° - 125°C (Latching)
Efficiency	86% - 89%
Auxiliary ±12VAUX / 3V3AUX Power	
Input +12V / 3,3V	
Maximum Current ±12VAUX / 3V3AUX	1 A / 6A
Current Protection (Fuse) ±12VAUX / 3V3AUX	1,5A / 6A
Connector	
Vita 62, Tyco 6450849-7	



VPX Power 3U / 6U



2.1.3 P0 Connector Pin Out

PART NUMBER	ROWS	POWER			SIGNAL								POWER						
		P1	P2	LPI	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
6450849-7	D				Z5	Z5	Z5	Z5	Z5	Z5	Z5	Z5	Z5	Z5					
	C	TT	TT	LT	Y5	Y5	Y5	Y5	Y5	Y5	Y5	Y5	Y5	Y5					
	B				R5	R5	R5	R5	R5	R5	R5	R5	R5	R5	TT	TT	TT	LT	TT
	A				O5	O5	O5	O5	O5	O5	O5	O5	O5	O5					
2ACP+1LP+32S+3HDP+1LP+1HDP																			

Pin Number	Voltage	Current	Assignment
P6	+12V	28A	VS1
LP2	+3,3V	6A	VS2
P4, P5	Return of all output		PWR_RET
P3	+5V	25A	VS3
D8	GND_SENSE		SENSE_RET
C8	+5V_SENSE		VS3_SENSE
B8	+3,3V_SENSE		VS2_SENSE
A8	+12V_SENSE		VS1_SENSE
D7			SIG_RET
C7	+5V_SHARE		VS3_SHARE
B7	+3,3V_SHARE		VS2_SHARE
A7	+12V_SHARE		VS1_SHARE
D6			SYS_RESET /ACOK
C6	-12V AUX	1A	
B6	n/a		SM3
A6	n/a		SM2
D5	n/a		SM1
C5	n/a		SM0
B5	n/a		GA1
A5	n/a		GA0
D4	+3,3V AUX	6A	
C4	+3,3V AUX		
B4	+3,3V AUX		
A4	+3,3V AUX		
D3	n/a		NED_RET
C3	n/a		NED
B3	+12V AUX	1A	
A3	n/a		UD0
D2			ENABLE
C2			INHIBIT
B2	PG		FAIL
A2	n/a		VBAT
D1	n/a		UD4
C1	n/a		UD3
B1	n/a		UD2
A1	n/a		UD1
LP1			CHA_GND
P2	85 – 264Vac	6A max.	Line
P1			Neutral