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THEME /
THEMA: **Power Requirements for CP 306**
Rise time, Power Sequencing, Tolerance and Regulation of cPCI
PSU

Report by/
Bericht von: Technical Support Kaufbeuren/Germany

1. Requirement of Start up, Power Sequencing, Tolerance and Regulation for CP306

The start up behavior of cPCI and PCI PSU is basically for all new CPU boards critically. There need a definition power on sequencing and start up behavior of the power supply. The behavior is described in the ATX and the cPCI (PICMG) specification.

Start up, rise time

The Rise time must be:

- The output voltages shall rise from 10% of nominal to within the regulation ranges specified in within > 0.1 ms to < 20 ms (typically > 5 ms to < 15 ms)
- There must be a smooth and continuous ramp of each DC output voltage from 10% to 90% of the regulation band.
- The slope of the turn-on waveform shall be a positive and almost linear voltage increase and have a value of between 0 V and nominal Vout.

Power Sequencing

- The +5 VDC output level shall be equal or higher than the +3.3 VDC output at any time during power-up and normal operation.
- The time between the +5 VDC output reaching its minimum in-regulation level and +3.3 VDC reaching its minimum in-regulation level must be ≤ 20 ms.

Tolerance:

The tolerance of the voltage lines is described in the cPCI specification (PICMG 2.0 R3.0). The recommended measurement point for the voltage is the cPCI connector on the CPU board.

Description	Nominal Value	Tolerance	Max. Rippel (p-p)	Info
5V	+5,0 VDC	+5% / -3%	50 mV	Main voltage
3,3V	+3,3 VDC	+5% / -3%	50 mV	
+12V	+12 VDC	+5% / -5%	240 mV	Not required
-12V	-12 VDC	+5% / -5%	240 mV	Not required
V (I/O) PCI I/O voltage	+3,3 or +5 VDC	+5% / -3%	50 mV	Standard Version +5,0V
GND	Ground, not directly connected to potential earth (PE)			

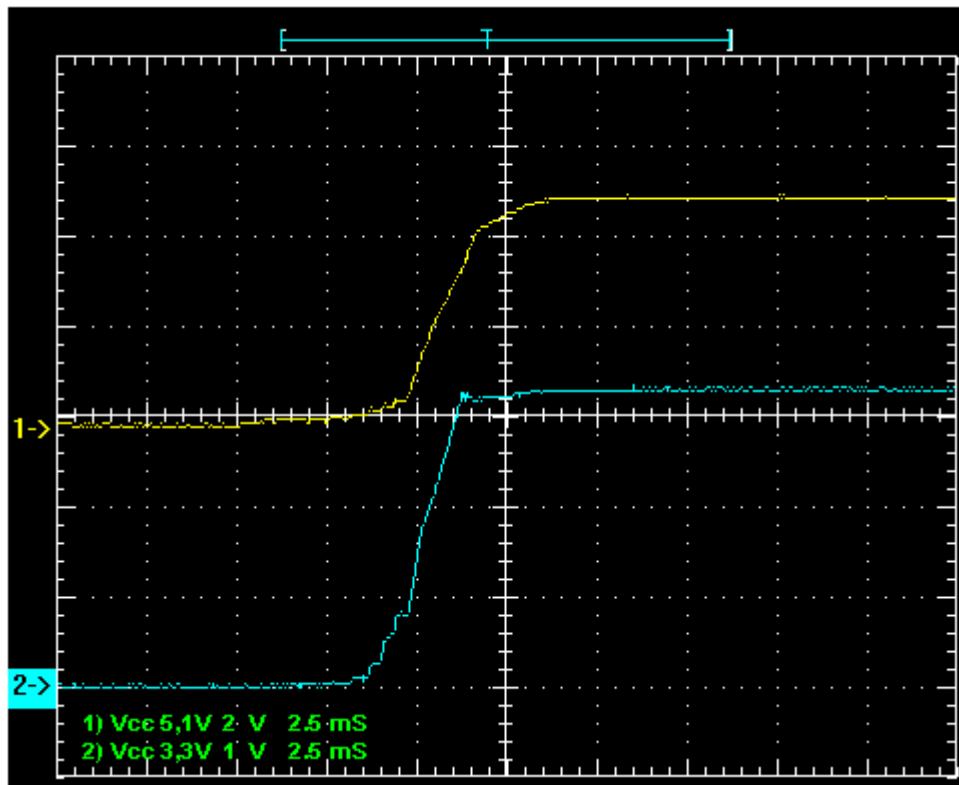
- The output voltage overshoot generated of the application (load changes) or removal of the input voltage, shall be less than 5% above the nominal voltage.
- No voltage of reverse polarity shall be present on any output during turn-on or turn-off.

Regulation:

- The power supply shall be unconditionally stable under all line/load/unload and transient load conditions including capacitive loads.
- The power supply unconditionally shall be work stable without minimum load on all output lines.

Rise time diagram:

Recommended start up ramp of a cPCI power supply for CP 306.
Kontron cPCI Power supply: CP3-SVE180 AC
AC/DC Type, Index ADBB, S. Nr. 26851000



2. Power requirement for CP306, 1,6Ghz Version

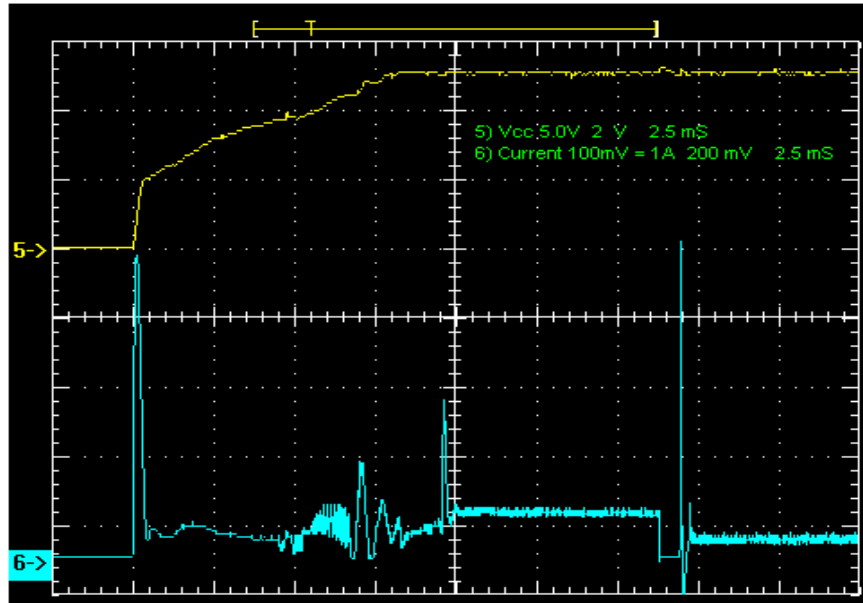
Inrush current

2.1. 5,0V Voltage, 2,5ms time division

Ch1: Vcc 5V

Ch2: Current 100mV = 1A

Time div. 2,5ms

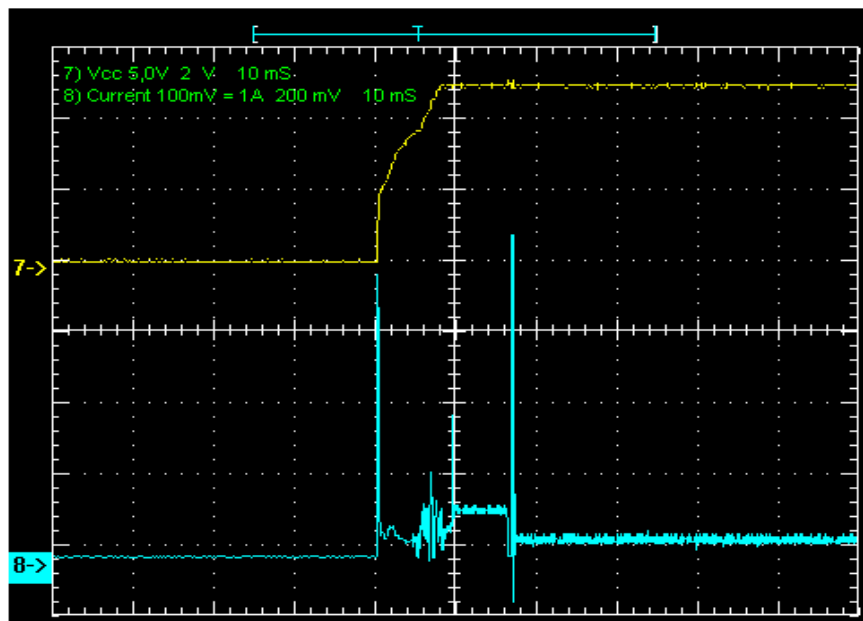


2.2. 5,0V Voltage, 10ms time division

Ch1: Vcc 5V

Ch2: Current 100mV = 1A

Time div. 10ms

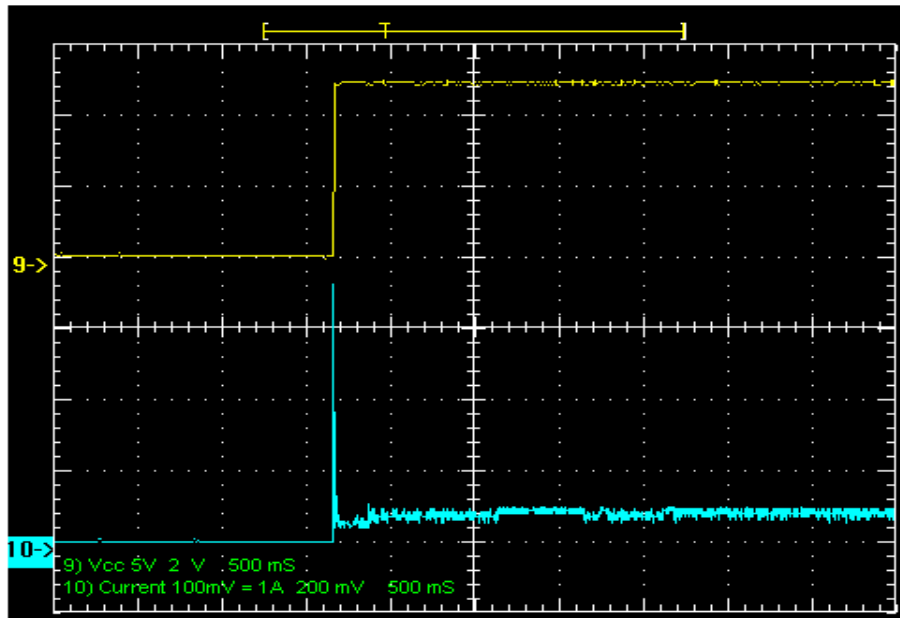


2.3. 5,0V Voltage, 500ms time division

Ch1: Vcc 5V

Ch2: Current 100mV = 1A

Time div. 500ms,



Current 5V

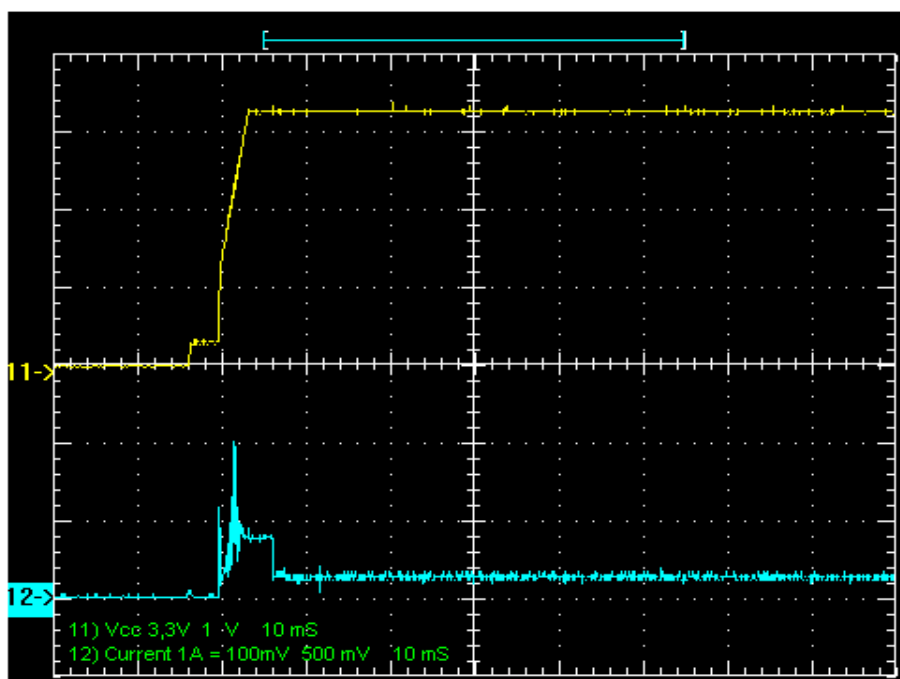
- Peak current: ~ 8,5A

2.4. 3,3V Voltage, 10ms time division

Ch1: Vcc 3,3V

Ch2: Current 100mV = 1A

Time dev. 10ms

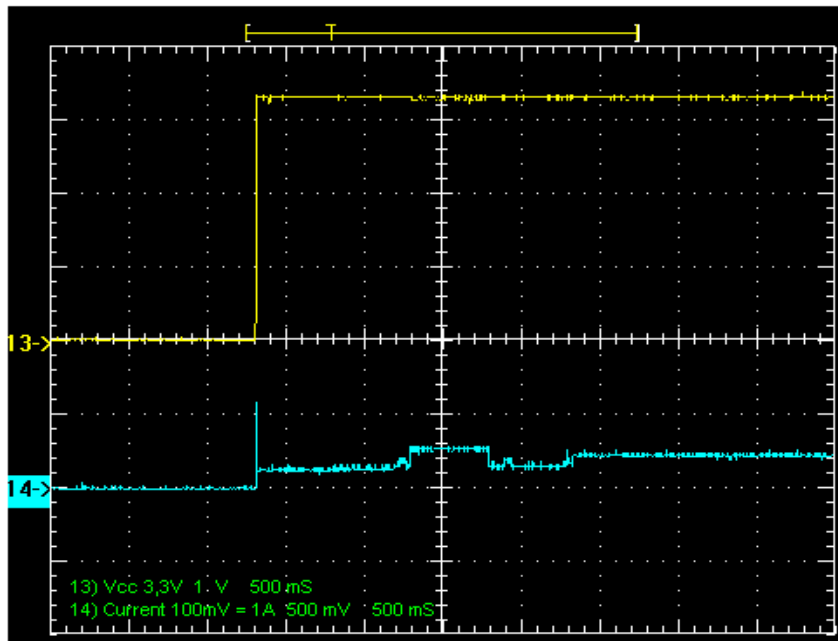


2.5. 3,3V Voltage, 500ms time division

Ch1: Vcc 3,3V

Ch2: Current 100mV = 1A

Time dev. 10ms



Current 3,3V

- Peak current: ~ 10 A

3. Power consumption

The power consumption tables below list the voltage and power specifications for the CP306 board and the CP306 accessories. The values were measured using an 8-slot passive CompactPCI backplane with two power supplies: one for the CPU, and the other for the hard disk. The operating systems used were DOS and Windows® 2000. All measurements were conducted at a temperature of 25°C. The measured values varied, because power consumption was dependent on processor activity.

The power consumption for the BIOS was measured with power management not active.

The power consumption for the BIOS was measured with power management not active.

Table 6-3: Power Consumption: BIOS

Power	Pentium-M 600 MHz	Pentium-M 1.1 GHz	Pentium-M 1.6 GHz
Core	0.956 V	1.180 V	1.484 V
5 V	0.49A / 2.45W	0.49A / 2.45W	0.54A / 2.7W
3.3 V	2.01A / 6.63W	2.01A / 6.63W	1.95A / 6.44W
Total	9.1W	9.1W	9.14W

The Power Consumption in Windows® 2000 IDLE Mode was measured at a VGA resolution of 1024X768

Table 6-4: Power Consumption: Windows® 2000 IDLE Mode

Power	Pentium-M 600 MHz	Pentium-M 1.1 GHz	Pentium-M 1.6 GHz
Core	0.956 V	1.180 V	1.484 V
5 V	0.24A / 1.2W	0.42A / 2.1W	1A / 5W
3.3 V	1.37A / 4.5W	1.37A / 4.5W	1.37A / 4.5W
Total	5.7W	6.6W	9.5W

The Power Consumption in Windows® 2000 at 100% CPU Usage (Game: 3D-Pinball) was measured at a VGA resolution of 1024X768

Table 6-5: Power Consumption: Windows® 2000 100% CPU Usage

Power	Pentium-M 600 MHz	Pentium-M 1.1 GHz	Pentium-M 1.6 GHz
Core	0.956 V	1.180 V	1.484 V
5 V	0.63A / 3.15W	1.5A / 7.5W	3.38A / 16.9W
3.3 V	1.72A / 5.7W	1.77A / 5.8W	1.7A / 5.6W
Total	8.85W	13.3W	22.5W

The Power Consumption in Windows® 2000 3D Mark Benchmark was measured at a VGA resolution of 1024X768 using a high performance VGA application

Table 6-6: Power Consumption: Windows® 2000 3D Mark Benchmark

Power	Pentium-M 600 MHz	Pentium-M 1.1 GHz	Pentium-M 1.6 GHz
Core	0.956 V	1.180 V	1.484 V
5 V	0.63A / 3.15W	1.68A / 8.4W	19.25W
3.3 V	2.74A / 9 W	2.74A / 9W	2.74A / 9W
Total	12.15W	17.4W	28.25W

The Power Consumption in Windows® 2000 High Power Tool was measured at a VGA resolution of 1024X768 with the processor running at maximum power consumption (no real Application)

Table 6-7: Power Consumption: Windows® 2000 High Power Tool

Power	Pentium-M 600 MHz	Pentium-M 1.1 GHz	Pentium-M 1.6 GHz
Core	0.956 V	1.180 V	1.484 V
5 V	0.71A / 3.5W	1.76A / 8.8W	5.3A / 26.5W
3.3 V	1.40A / 4.6W	1.4A / 4.6W	1.6A / 5.3W
Total	8.1W	13.4W	31.8W

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