



Applications Information

Power Supply Characteristics

786LCD/mITX

This note describes the power supply characteristics of the 786LCD/mITX board including static/dynamic power consumption and power-on load characteristics.



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Revision history

Revision	Date	Description/changes
B	31-01-06	786LCD/mITX PIII ULV400/100 figures added 786LCD/mITX PIII LV733/133 figures updated
A	10-11-05	Added summary and updated Inrush section with secondary inrush as well – when PCI reset is being released
0	26-10-05	Initial 768LCD/mITX Power Supply characteristics



Power Supply Characteristics of 786LCD/mITX

In order to ensure safe operation of the board, the ATX power supply must monitor the supply voltage and shut down if the supplies are out of range – refer to the hardware manual for actual power specification.

The 786LCD/mITX board is powered through the ATX connector and does not require the additional 12V separate supply for CPU as specified in the ATX specification; besides this the power supplied to the board must be within the ATX specification.

The requirements to the supply voltages are as follows:

Supply	Min	Max	Note
Vcc3	3.168V	3.432V	Should be $\pm 4\%$ for compliance with the ATX specification
Vcc	4.75V	5.25V	Should be $\pm 5\%$ for compliance with the ATX specification
+12V	11.4V	12.6V	Should be $\pm 5\%$ for compliance with the ATX specification
-12V	-13.2V	-10.8V	Should be $\pm 10\%$ for compliance with the ATX specification
-5V	-5,50V	-4.5V	Not required for the 786LCD/mITX board
5VSB	4.75V	-5.25V	Should be $\pm 5\%$ for compliance with the ATX specification

Static Power Consumption

The static power consumption of the 786LCS/ETX Board is measured under:

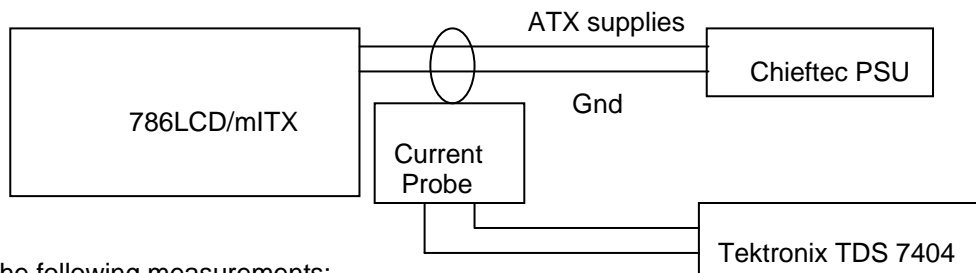
- 1- WindowsXP, Desktop idle
- 2- WindowsXP, 3DMARK
- 3- WindowsXP, CPU BURN

Test system configuration

The following items were used in the test setup:

1. 786LCD/mITX board fully mounted & w. 256MB onboard SDRAM (133MHz)
2. Celeron 733/133
3. 12V active cooler (Inside Technology)
4. PS/2 keyboard & mouse
5. CRT
6. HD
7. ATX PSU (Chieftec 340W)
8. Tektronix TDS 7404, P6345 probes
9. Fluke Current Probe 80i-100S AC/DC

Test setup



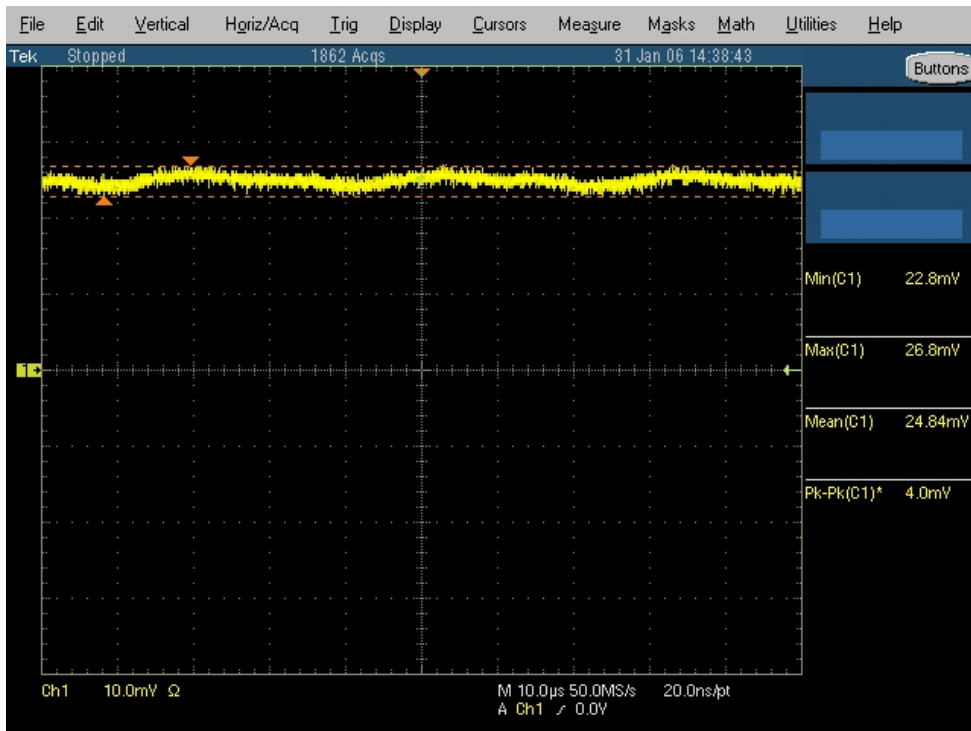
Note that in the following measurements:

1. The Power consumption of CRT, HD and Floppy is not included.
2. Channel 1 shows the Current draw made from the PSU VCC- 10mV equals 1A.



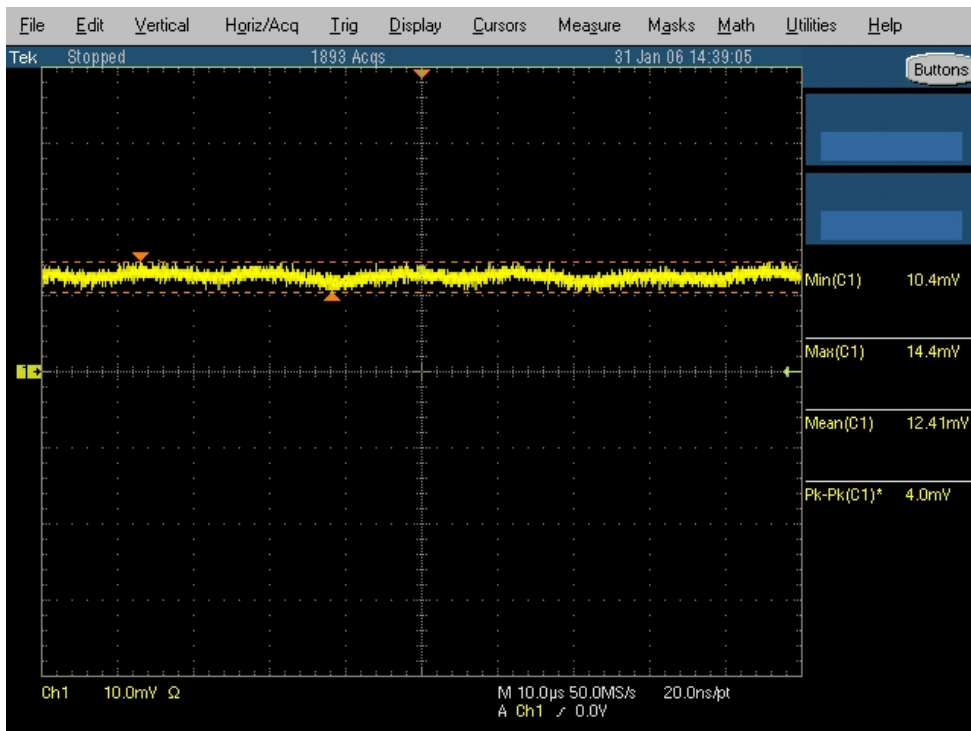
Celeron 733/133 LV WindowsXP, Desktop idle

+3V3



$$P_{\text{WindowsXP, Desktop idle, 3V3}} = 100 \cdot 24.84 \text{E-}3 \cdot 3.3 \text{V} = \mathbf{8.2 \text{W}}$$

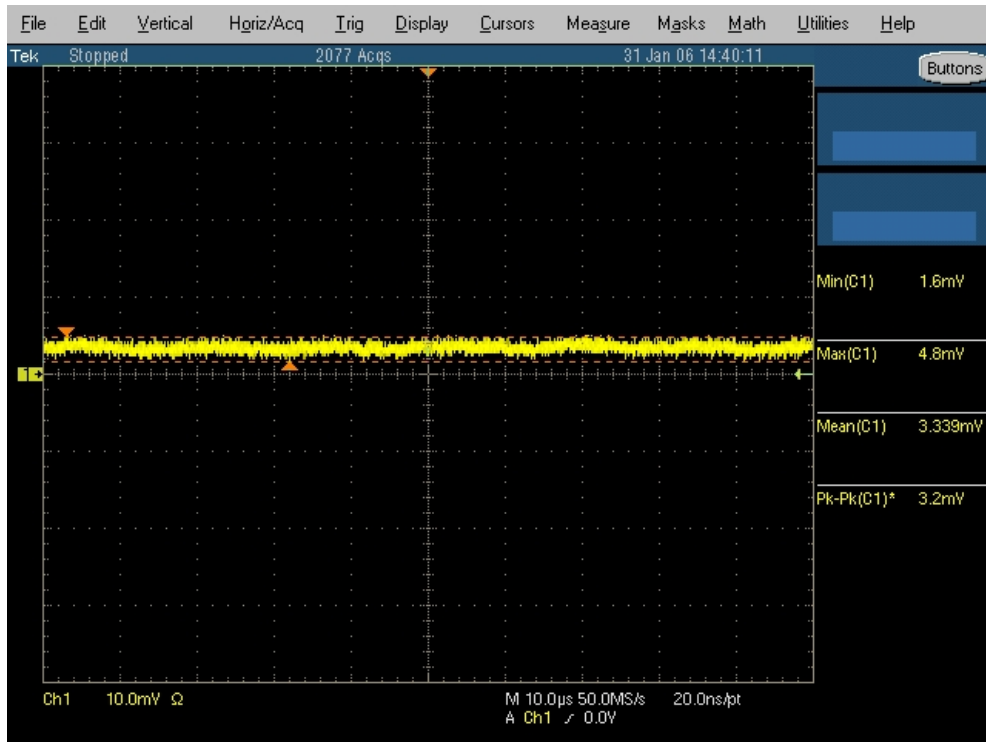
+5V



$$P_{\text{WindowsXP, Desktop idle, 5V}} = 100 \cdot 12.41 \text{E-}3 \cdot 5 \text{V} = \mathbf{6.2 \text{W}}$$

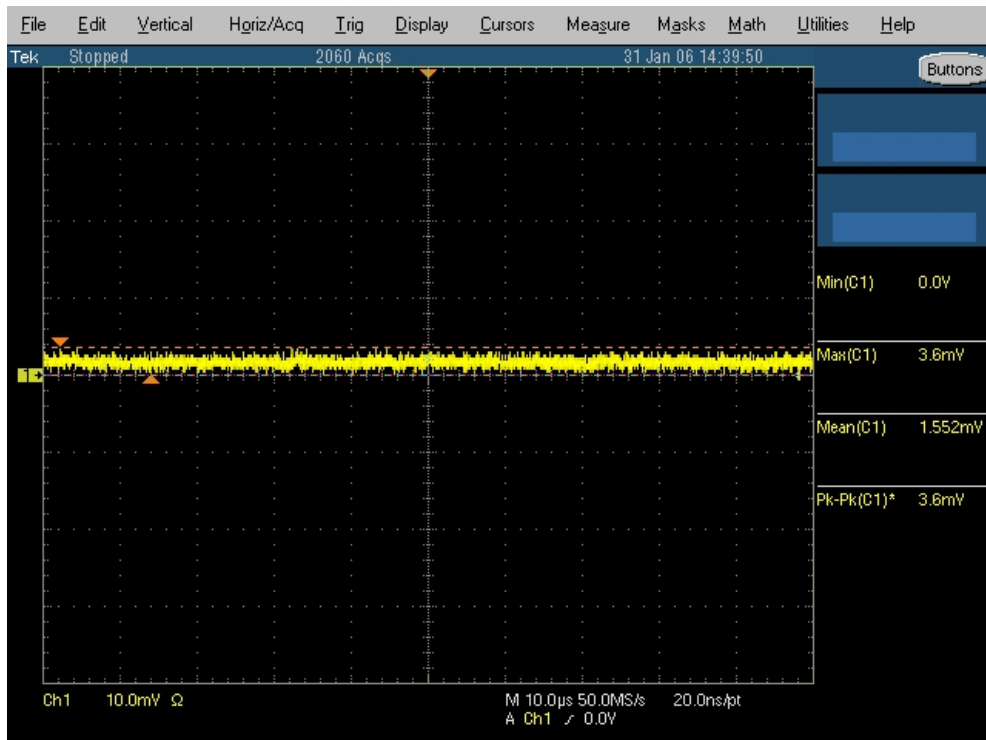


+12V



$$P_{\text{WindowsXP, Desktop idle, 12V}} = 100 * 3.339E-3 * 12V = 4.0W$$

+5VSB



$$P_{\text{WindowsXP, Desktop idle, 5VSB}} = 100 * 1.552E-3 * 5V = 0.78W$$

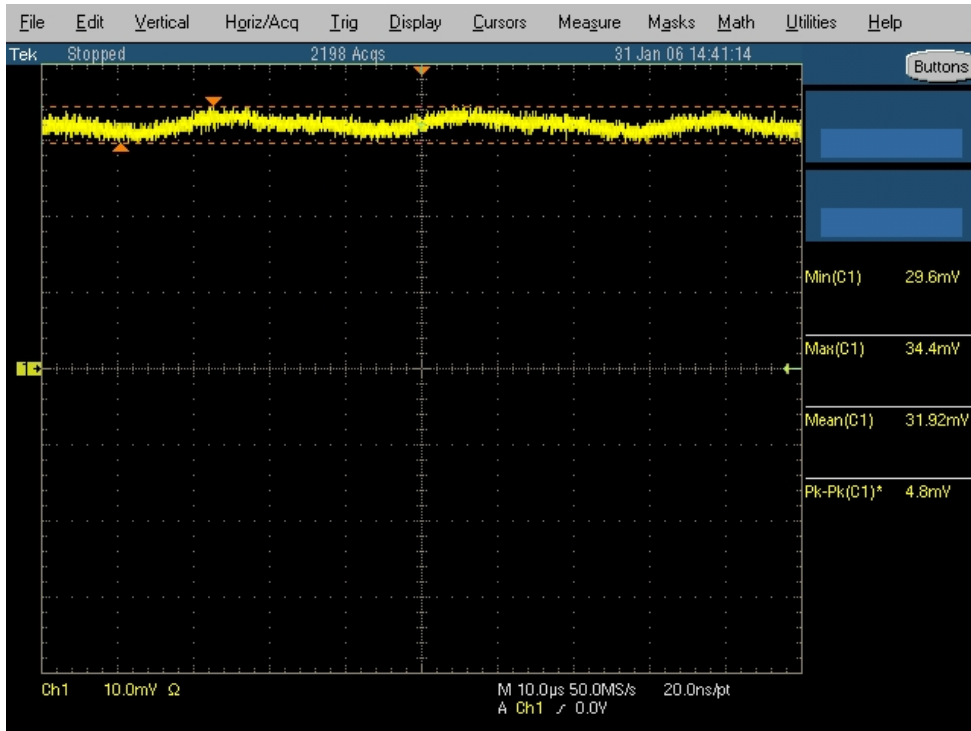
Summary:

Supply	Current draw	Power consumption
+3V3	2.484A	8.2 Watt
+5V	1.241A	6.2 Watt
+12V	103.5mA	4.0 Watt
+5VSB	155.2mA	0.78 Watt
Total		19.18 Watt



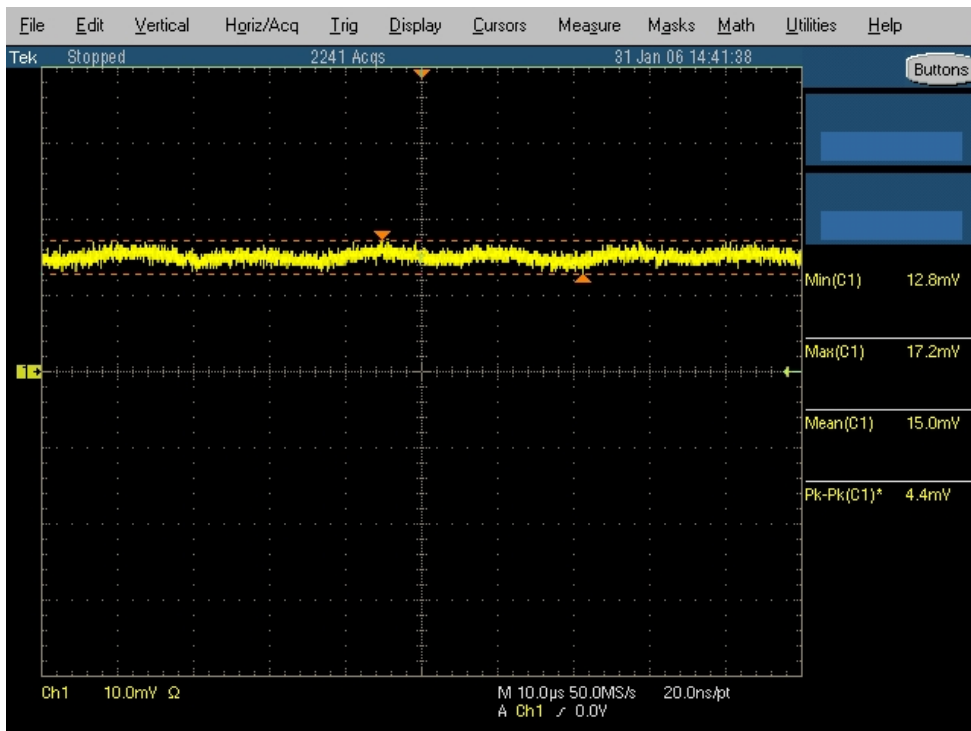
Celeron 733/133 LV WindowsXP, 3DMARK 2000

+3V3



$$P_{\text{WindowsXP, Desktop idle, 3V3}} = 100 * 31.92E-3 * 3.3V = 10.5W$$

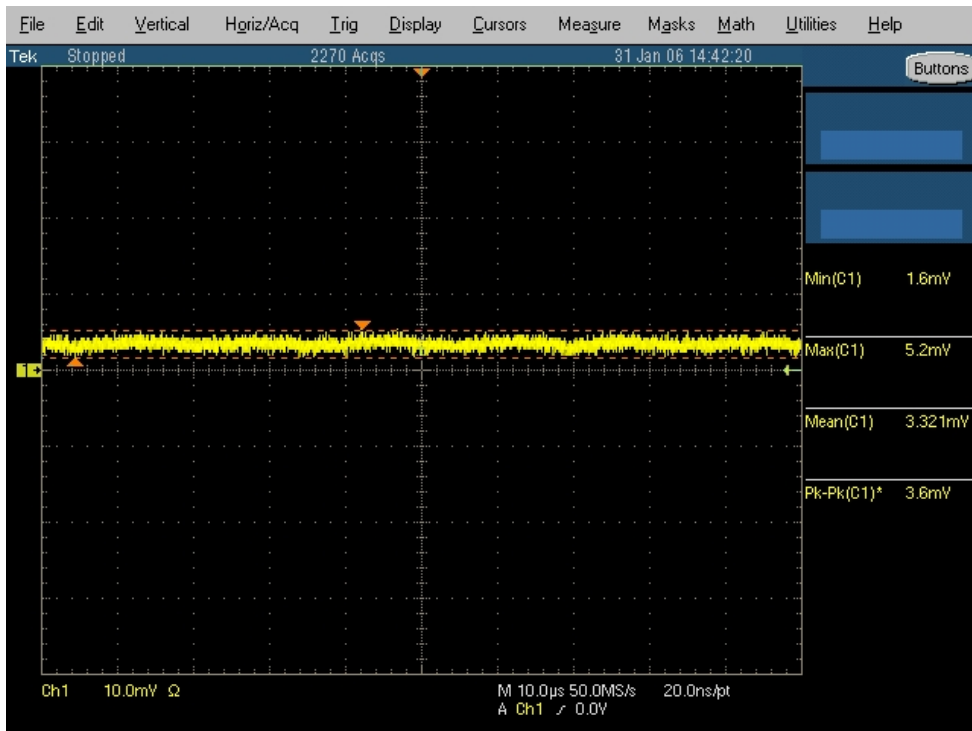
+5V



$$P_{\text{WindowsXP, Desktop idle, 5V}} = 100 * 15.0E-3 * 5V = 7.5W$$

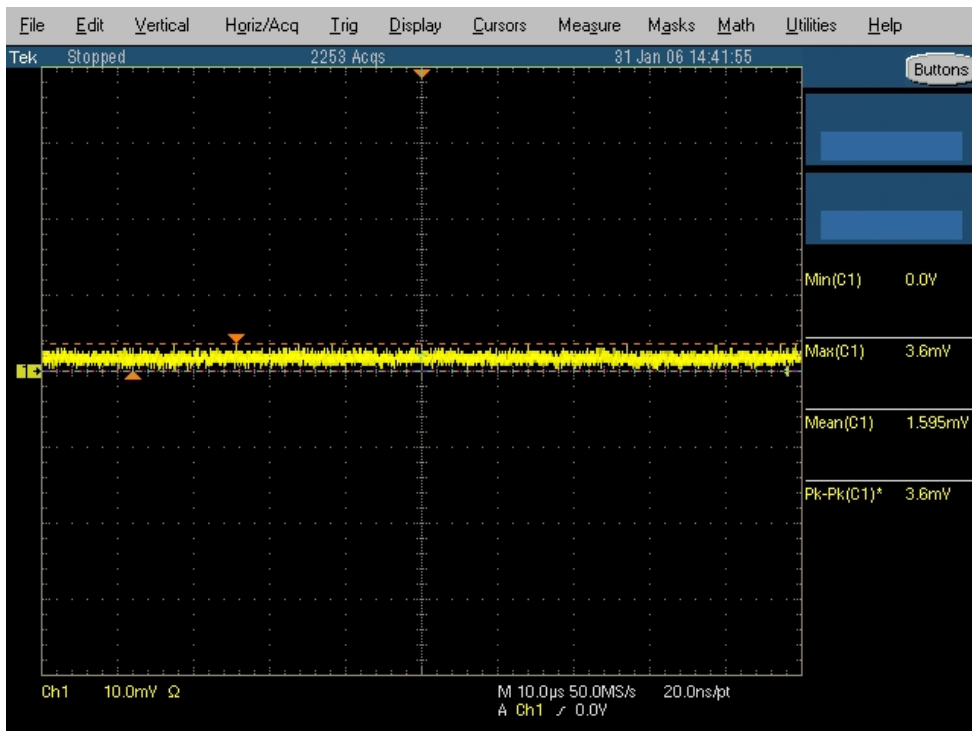


+12V



$$P_{\text{WindowsXP, Desktop idle, 12V}} = 100 * 3.321E-3 * 12V = \mathbf{4.0W}$$

+5VSB



$$P_{\text{WindowsXP, Desktop idle, 5VSB}} = 100 * 1.595E-3 * 5V = \mathbf{0.80W}$$

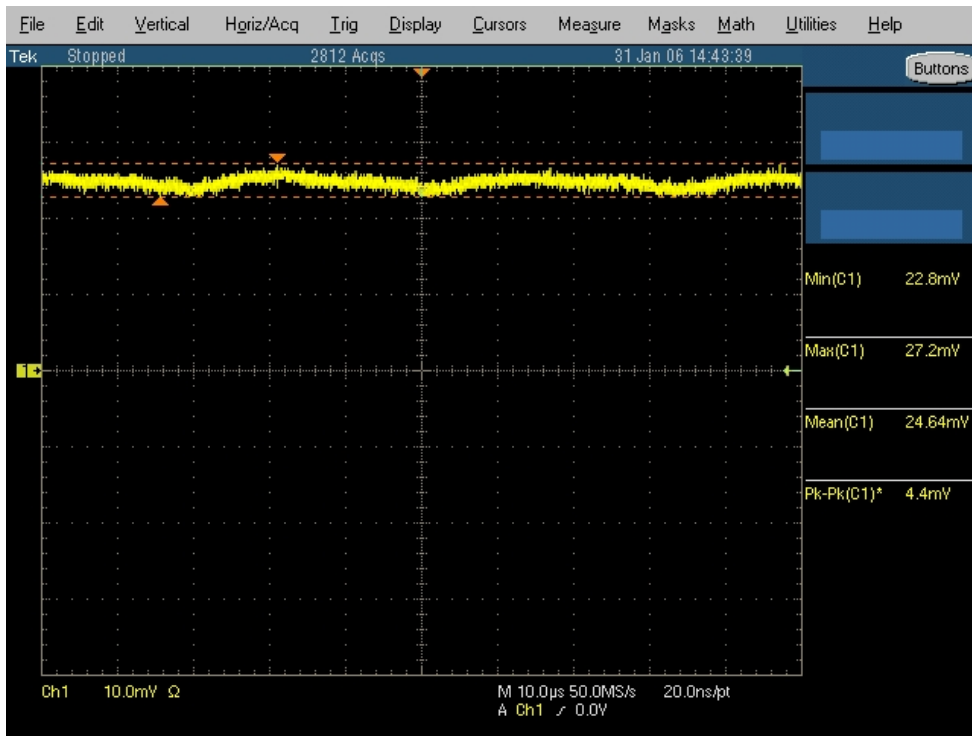
Summary:

Supply	Current draw	Power consumption
+3V3	3.192A	10.5 Watt
+5V	1.500A	7.5 Watt
+12V	332.1mA	4.0 Watt
+5VSB	159.5mA	0.8 Watt
Total		22.8 Watt



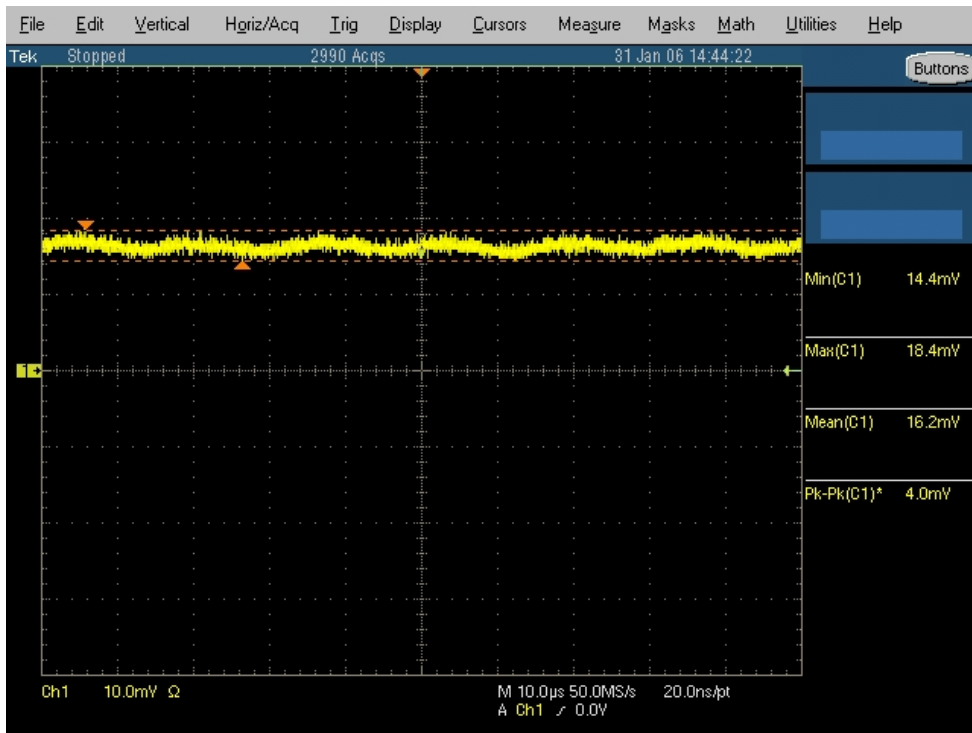
Celeron 733/133 LV WindowsXP, CPU Burn

+3V3



$$P_{\text{WindowsXP, Desktop idle, 3V3}} = 100 * 27.2E-3 * 3.3V = 9.0W$$

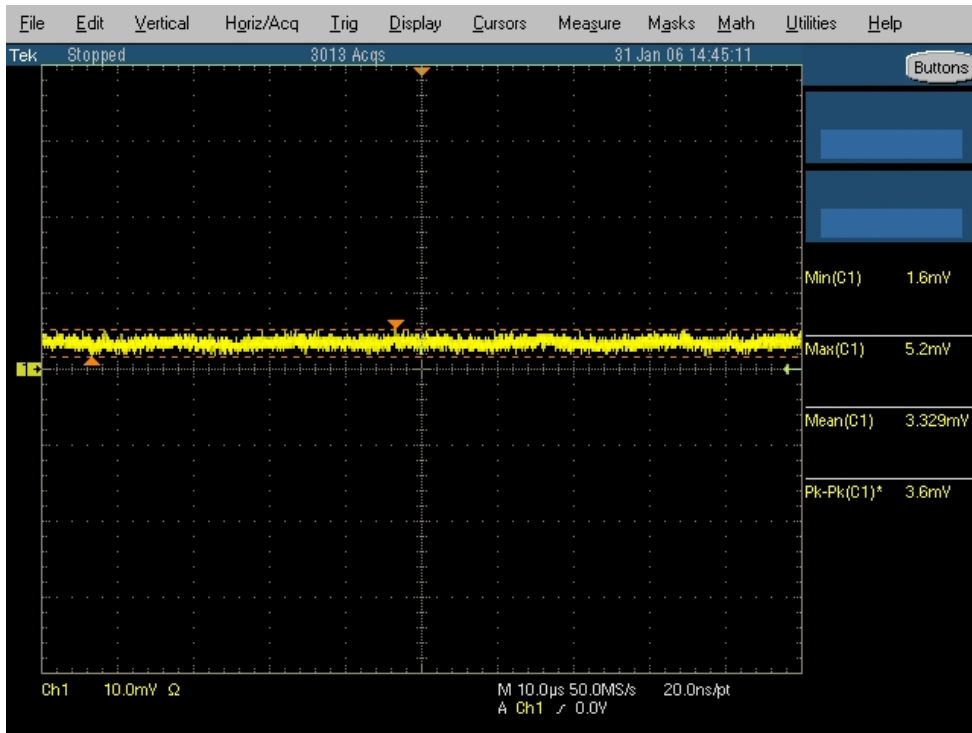
+5V



$$P_{\text{WindowsXP, Desktop idle, 5V}} = 100 * 16.2E-3 * 5V = 8.1W$$

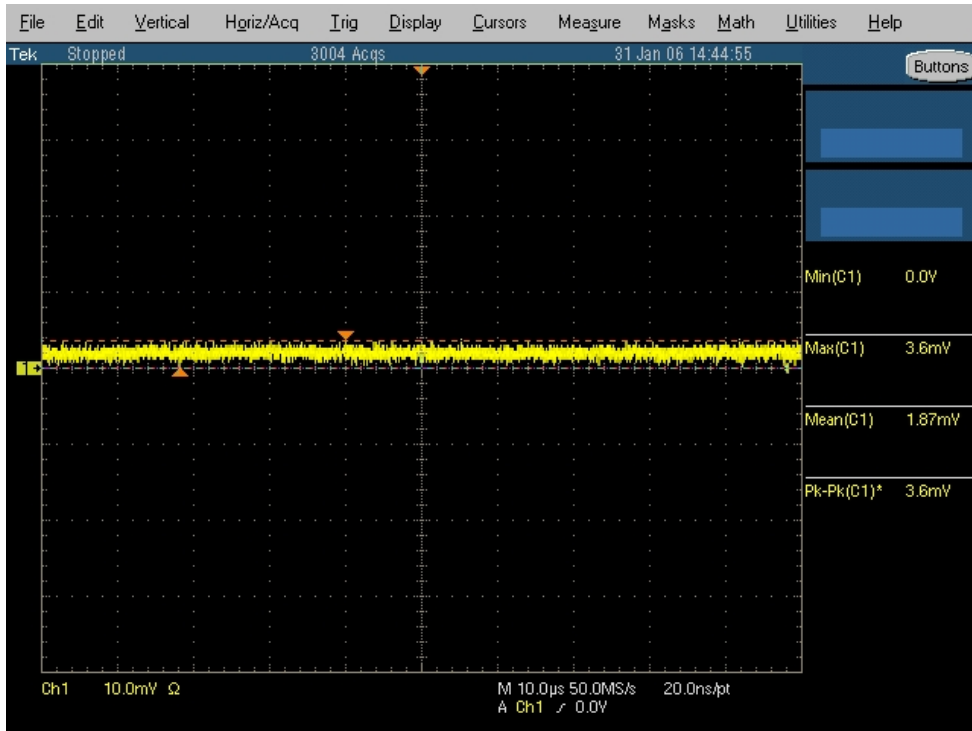


+12V



$$P_{\text{WindowsXP, Desktop idle, 12V}} = 100 * 3.329E-3 * 12V = \mathbf{4.0W}$$

+5VSB



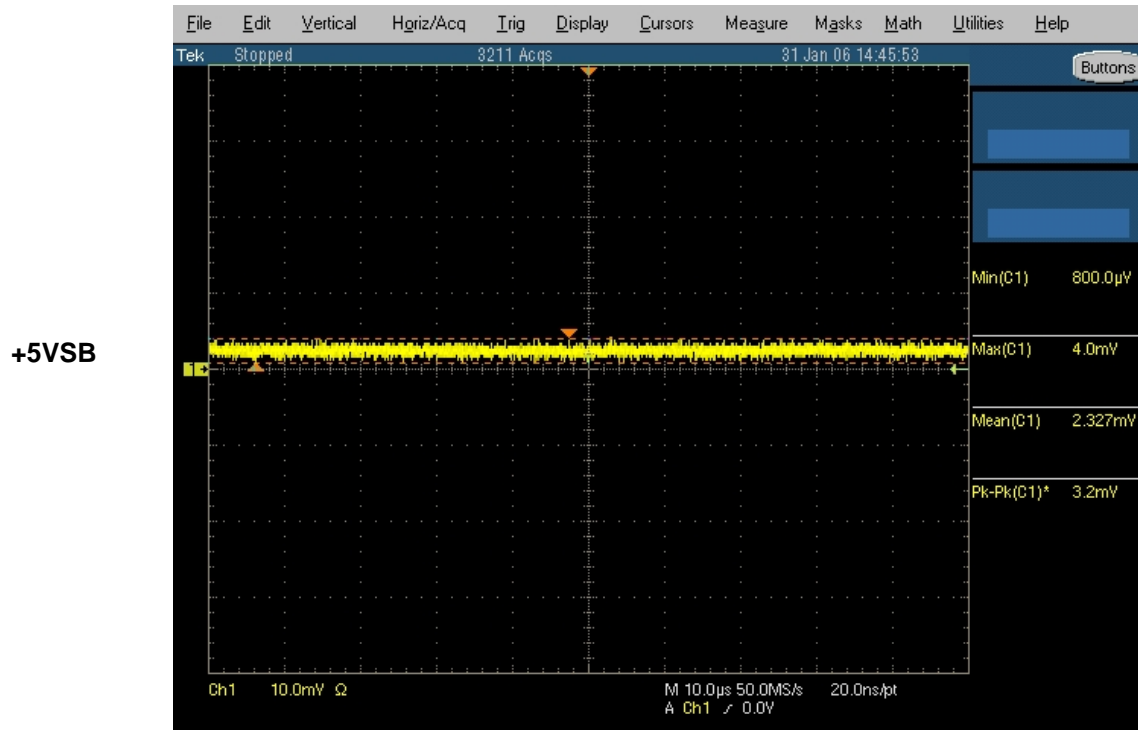
$$P_{\text{WindowsXP, Desktop idle, 5VSB}} = 100 * 1.87E-3 * 5V = \mathbf{0.94W}$$

Summary:

Supply	Current draw	Power consumption
+3V3	2.464A	9.0 Watt
+5V	1.620A	8.1 Watt
+12V	332.9mA	4.0 Watt
+5VSB	187mA	0.94 Watt
Total		22.04 Watt



Celeron 733/133 LV S3 / Standby power consumption

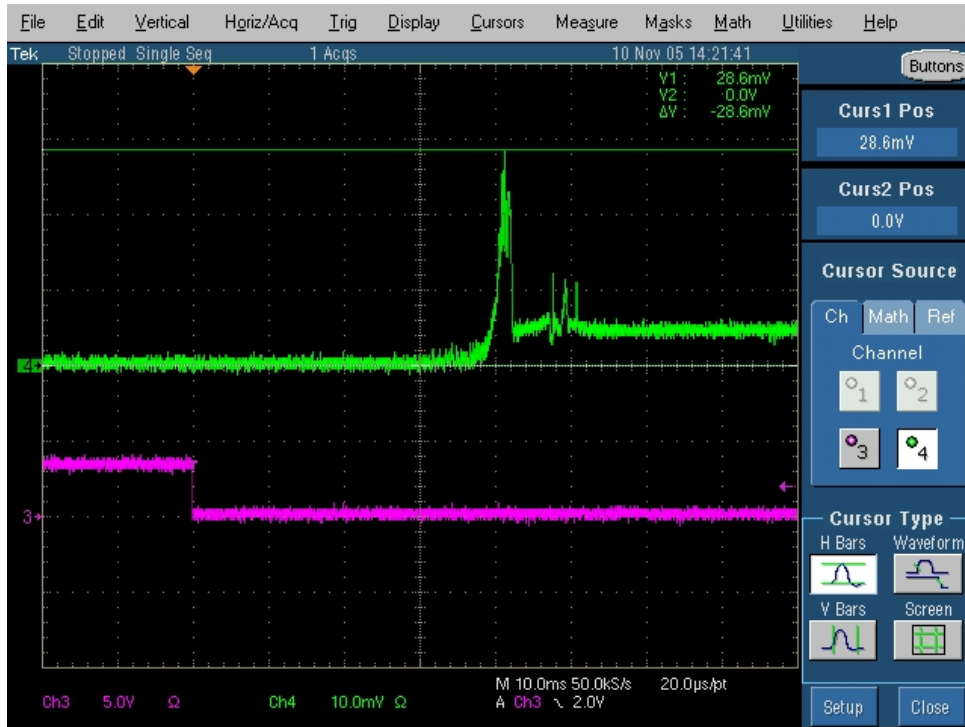


$$I_{DOS, S3, 5VSB} = 100 * 2.327E-3 = 233mA$$

$$P_{DOS, S3, 5VSB} = 100 * 2.327E-3 * 5V = 1.2W$$

Celeron 733/133 LV Power-On Load Characteristic

+3V3 Initial Inrush vs. PS_ON#



+3V3 Secondary Inrush vs. PS_ON#



$$I_{3V3 \text{ peak, inrush}} = 100 * 28.6E-3 = 2.86A$$



+5V Initial Inrush vs. PS_ON#

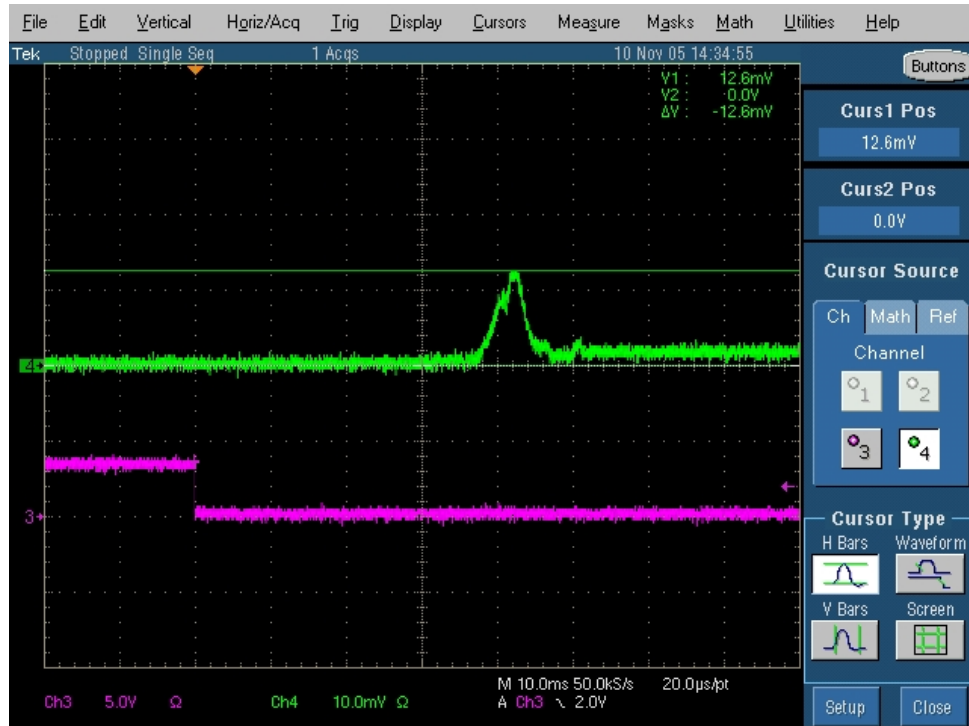


+5V Secondary Inrush vs. PS_ON#

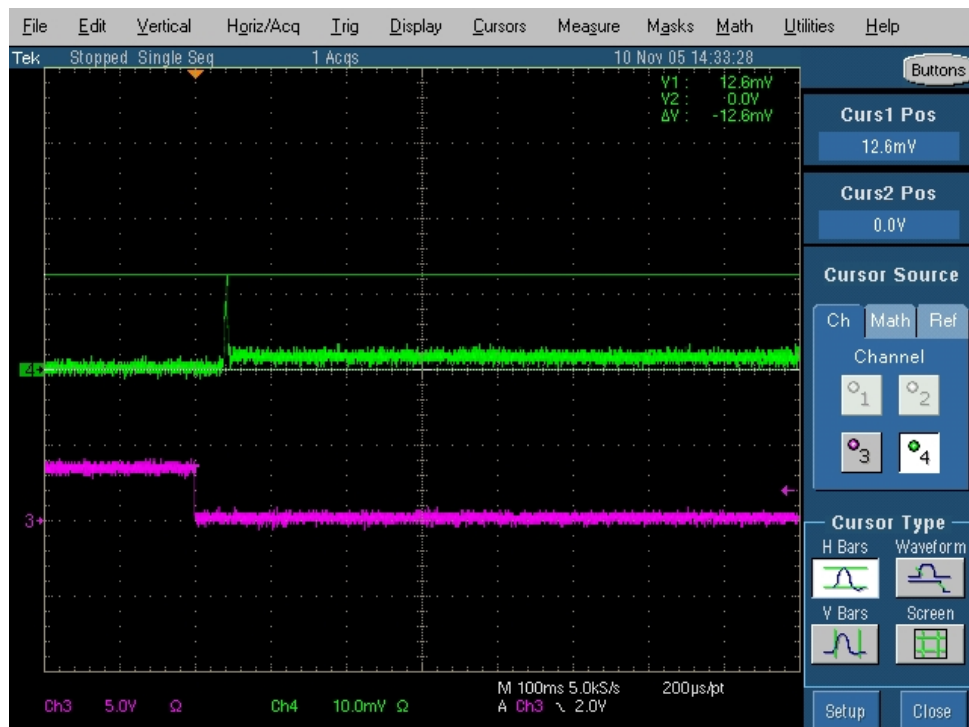


$$I_{5V \text{ peak, inrush}} = 100 * 52.8E-3 = 5.28A$$

+12V Initial Inrush vs. PS_ON#



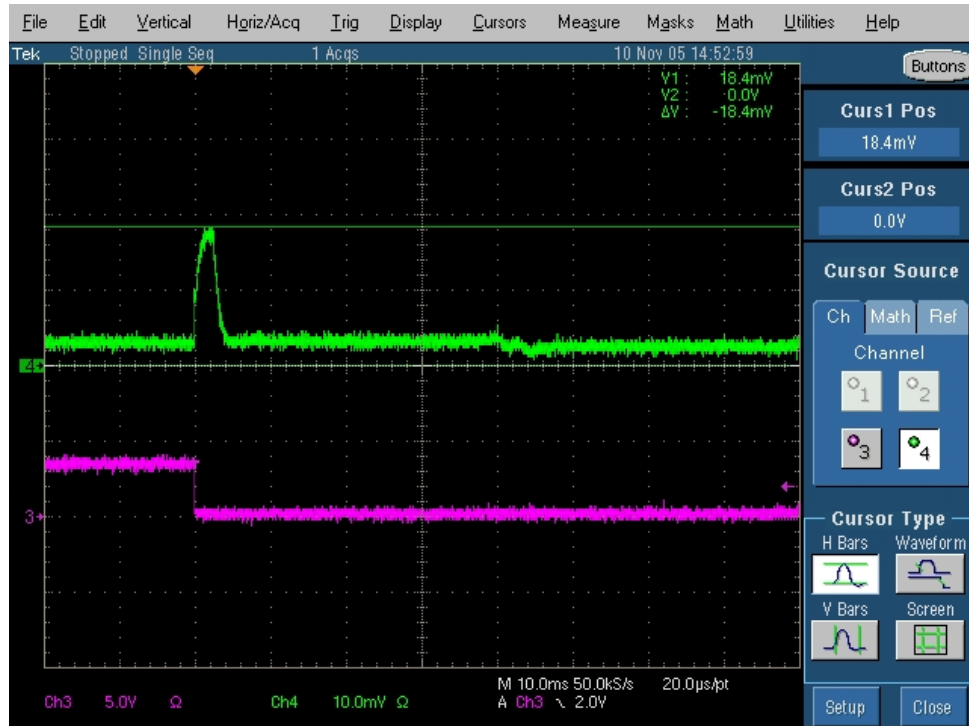
+12V Secondary Inrush vs. PS_ON#



$$I_{12V \text{ peak, inrush}} = 100 * 12.6E-3 = 1.26A$$



+5VSB Initial Inrush vs. PS_ON#



+5VSB Secondary Inrush vs. PS_ON#

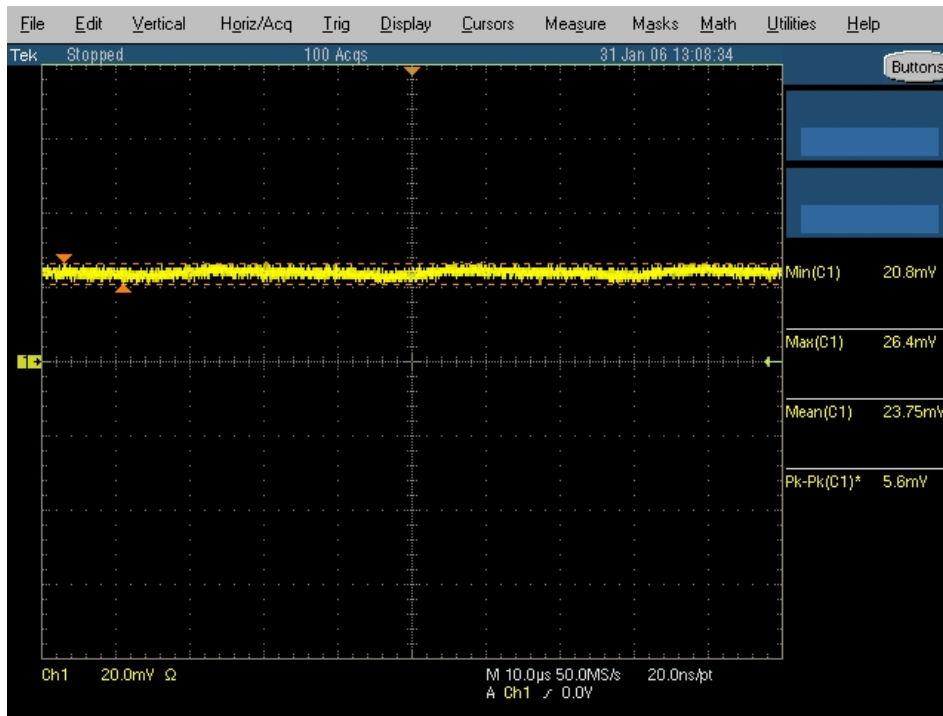


$$I_{5V \text{ peak, inrush}} = 100 * 18.4E-3 = 1.84A$$



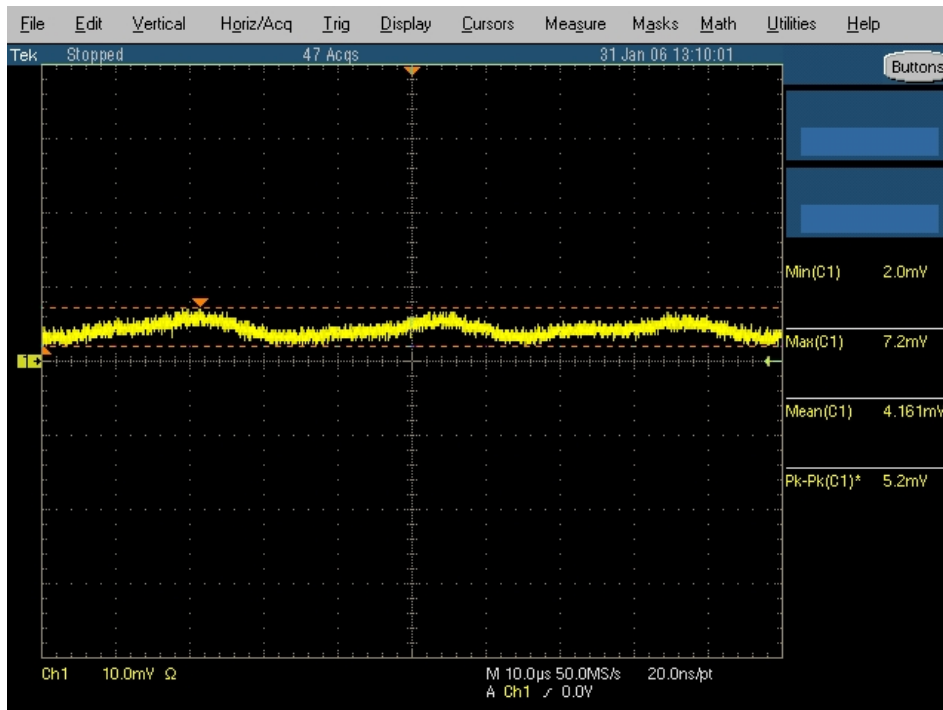
Celeron 400/100 LV WindowsXP, Desktop idle

+3V3



$$P_{\text{WindowsXP, Desktop idle, 3V3}} = 100 * 23.75E-3 * 3.3V = 7.8W$$

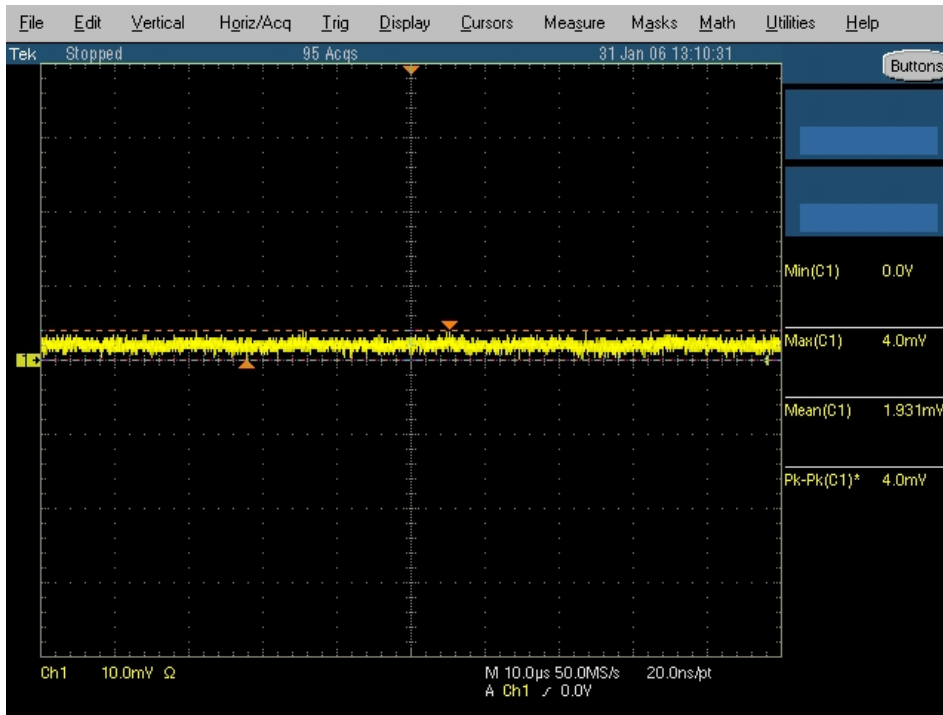
+5V



$$P_{\text{WindowsXP, Desktop idle, 5V}} = 100 * 4.161E-3 * 5V = 2.1W$$

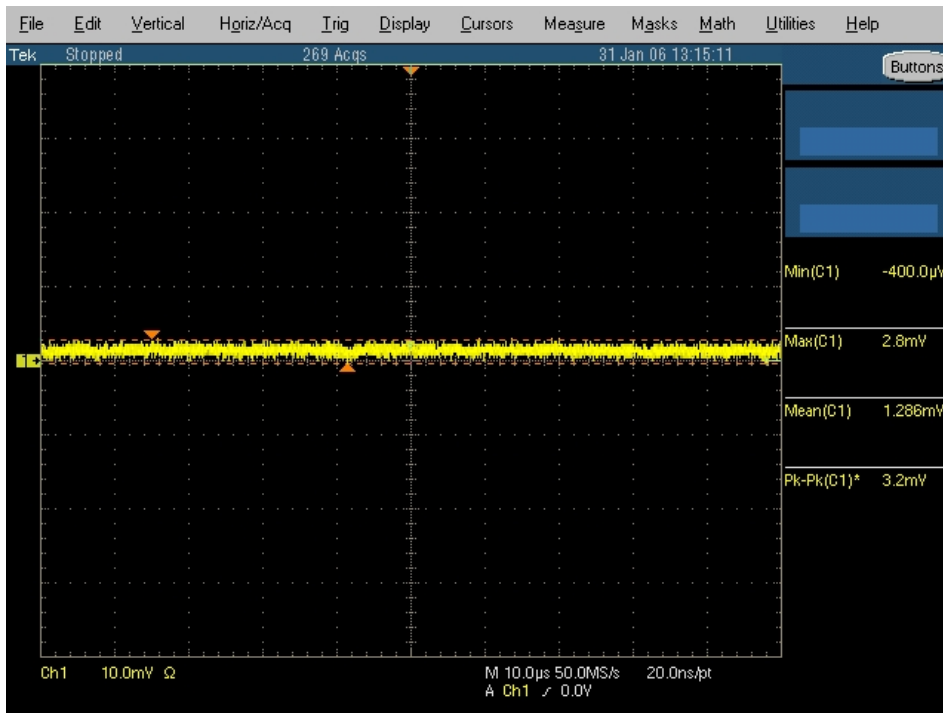


+12V



$$P_{\text{WindowsXP, Desktop idle, 12V}} = 100 * 1.931E-3 * 12V = \mathbf{2.3W}$$

+5VSB



$$P_{\text{WindowsXP, Desktop idle, 5VSB}} = 100 * 1.266E-3 * 5V = \mathbf{0.64W}$$

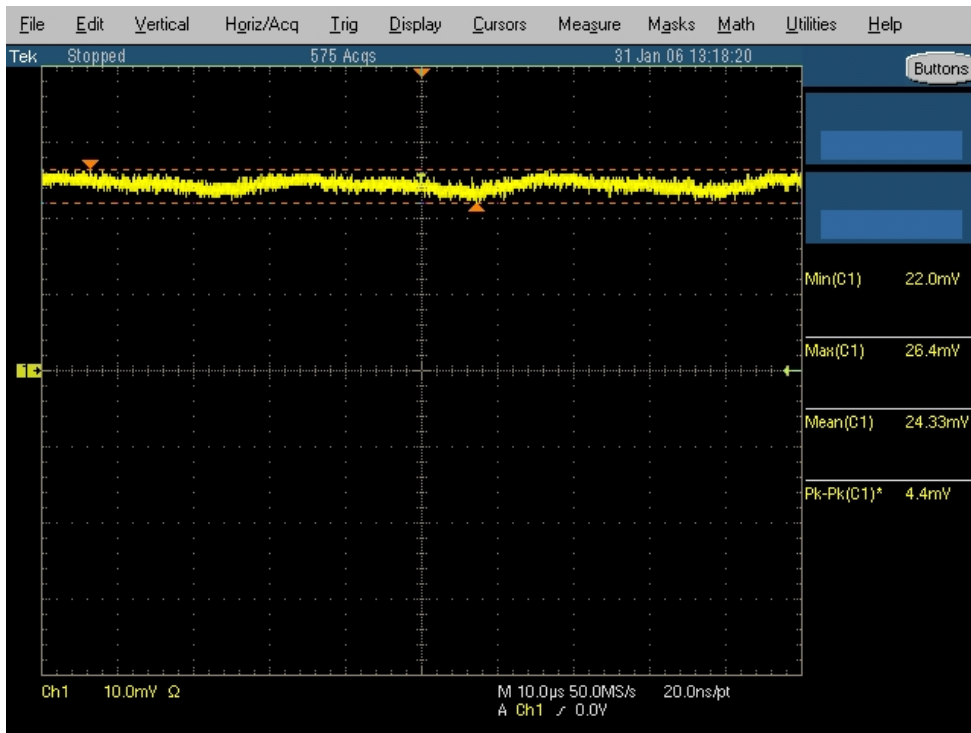
Summary:

Supply	Current draw	Power consumption
+3V3	2.375A	7.8 Watt
+5V	416.1mA	2.1 Watt
+12V	193.1mA	2.3 Watt
+5VSB	126.6mA	0.64 Watt
Total		12.84 Watt



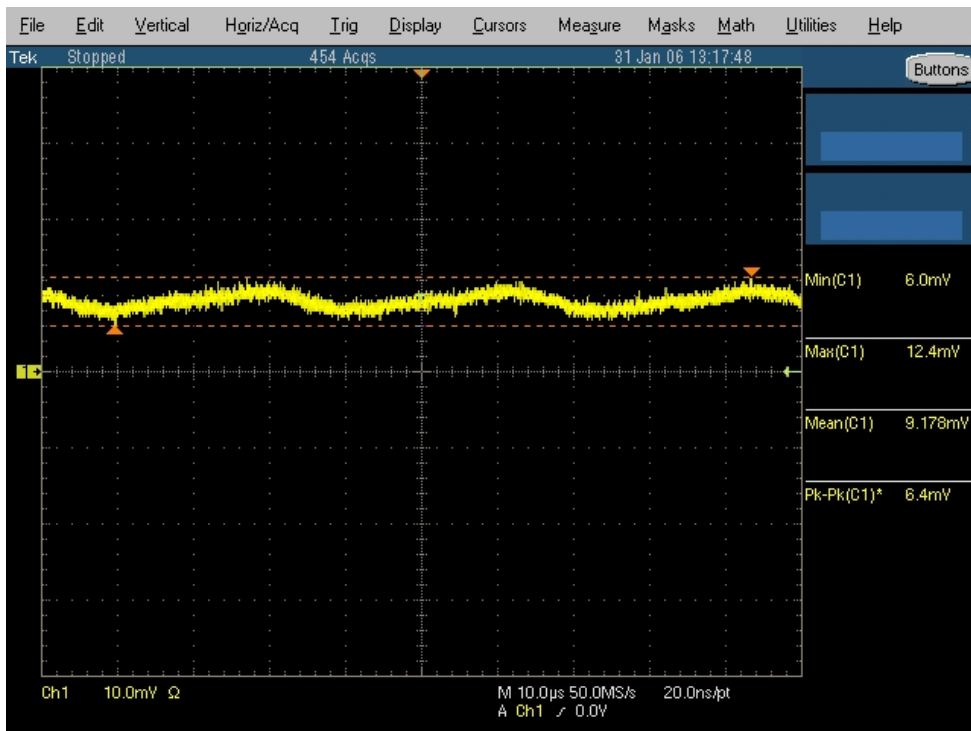
Celeron 400/100 ULV WindowsXP, 3DMARK 2000

+3V3



$$P_{\text{WindowsXP, Desktop idle, 3V3}} = 100 \cdot 24.33 \text{E-}3 \cdot 3.3 \text{V} = 8.0 \text{W}$$

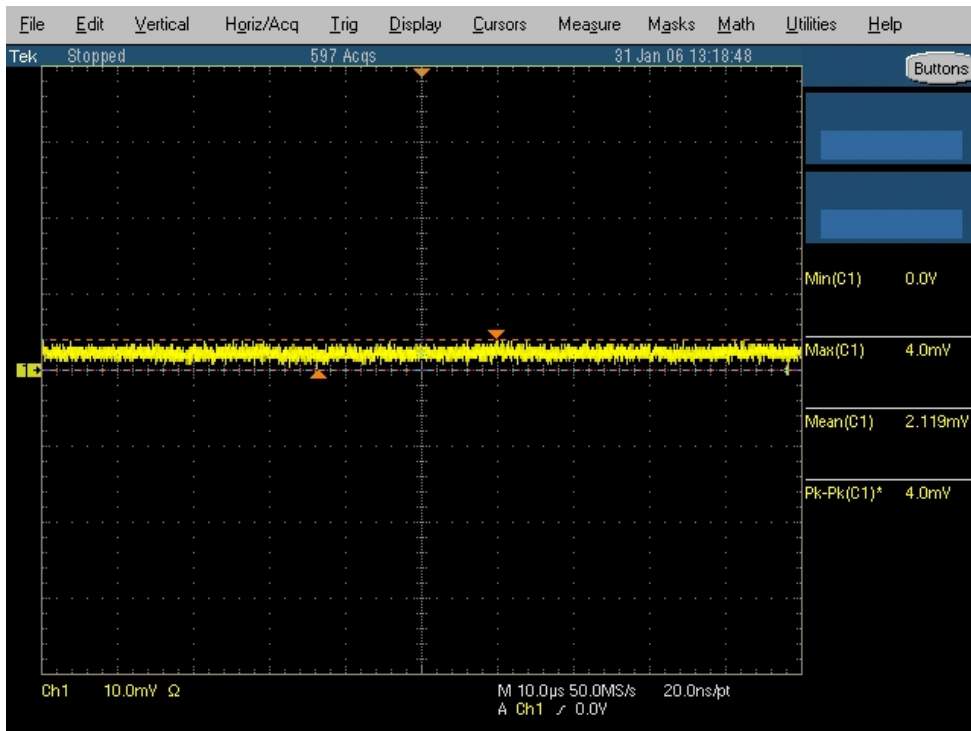
+5V



$$P_{\text{WindowsXP, Desktop idle, 5V}} = 100 \cdot 9.178 \text{E-}3 \cdot 5 \text{V} = 4.6 \text{W}$$

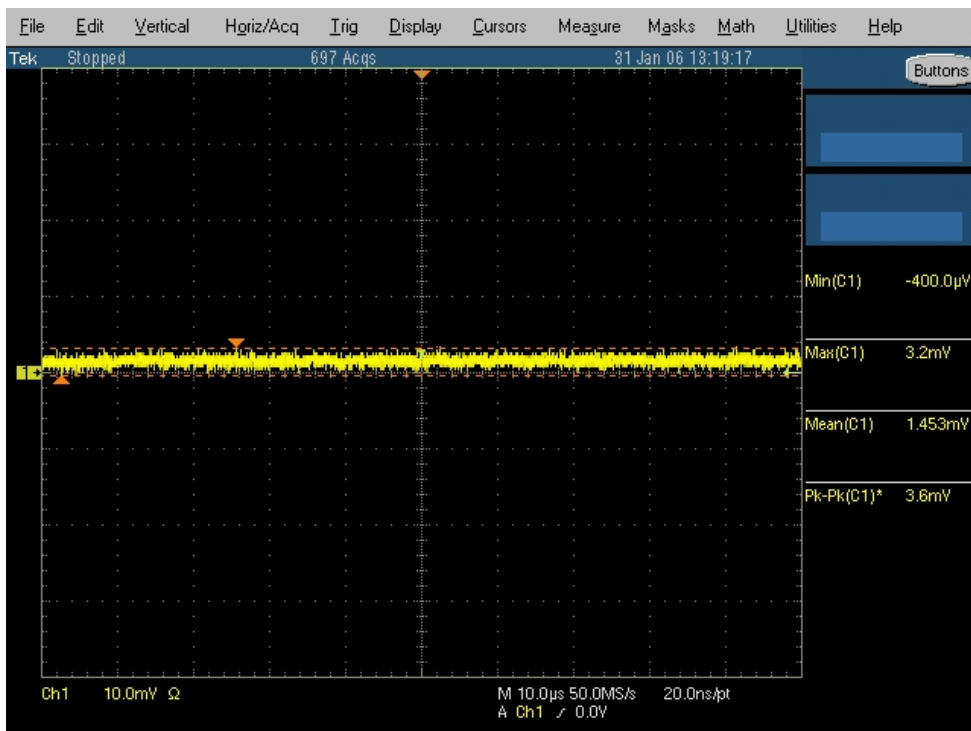


+12V



$$P_{\text{WindowsXP, Desktop idle, 12V}} = 100 \times 2.119 \text{E-}3 \times 12 \text{V} = \mathbf{2.5 \text{W}}$$

+5VSB



$$P_{\text{WindowsXP, Desktop idle, 5VSB}} = 100 \times 1.453 \text{E-}3 \times 5 \text{V} = \mathbf{0.25 \text{W}}$$

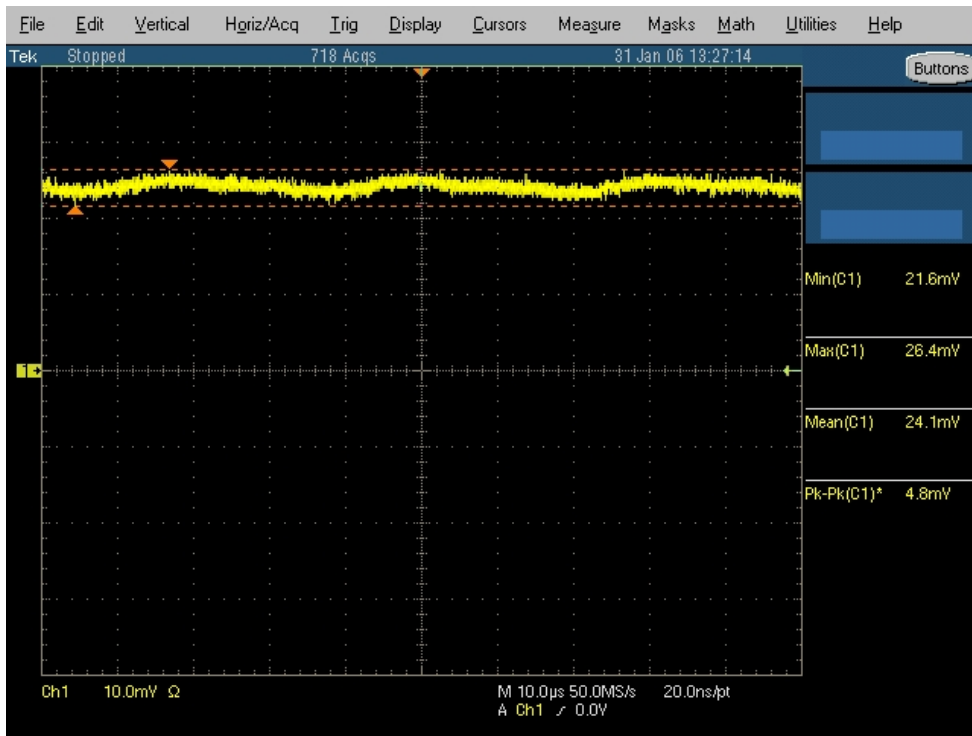
Summary:

Supply	Current draw	Power consumption
+3V3	2.433A	8.0 Watt
+5V	917.8mA	4.6 Watt
+12V	211.9mA	2.5 Watt
+5VSB	145.3mA	0.73 Watt
Total		15.83 Watt



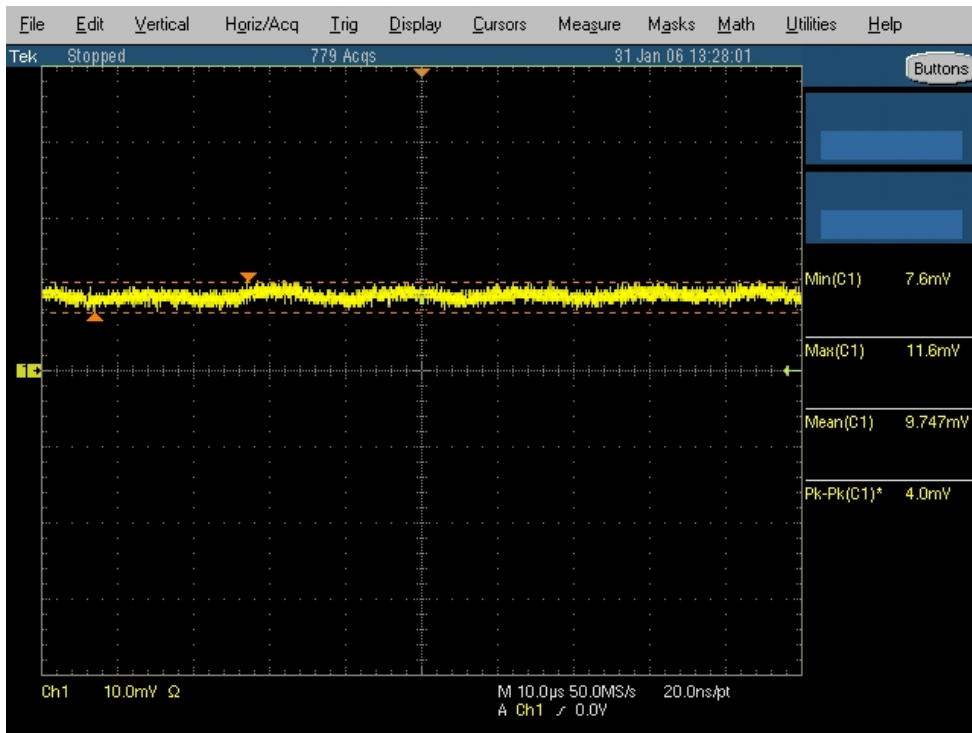
Celeron 400/100 ULV WindowsXP, CPU Burn

+3V3



$$P_{\text{WindowsXP, Desktop idle, 3V3}} = 100 * 24.1E-3 * 3.3V = 8.0W$$

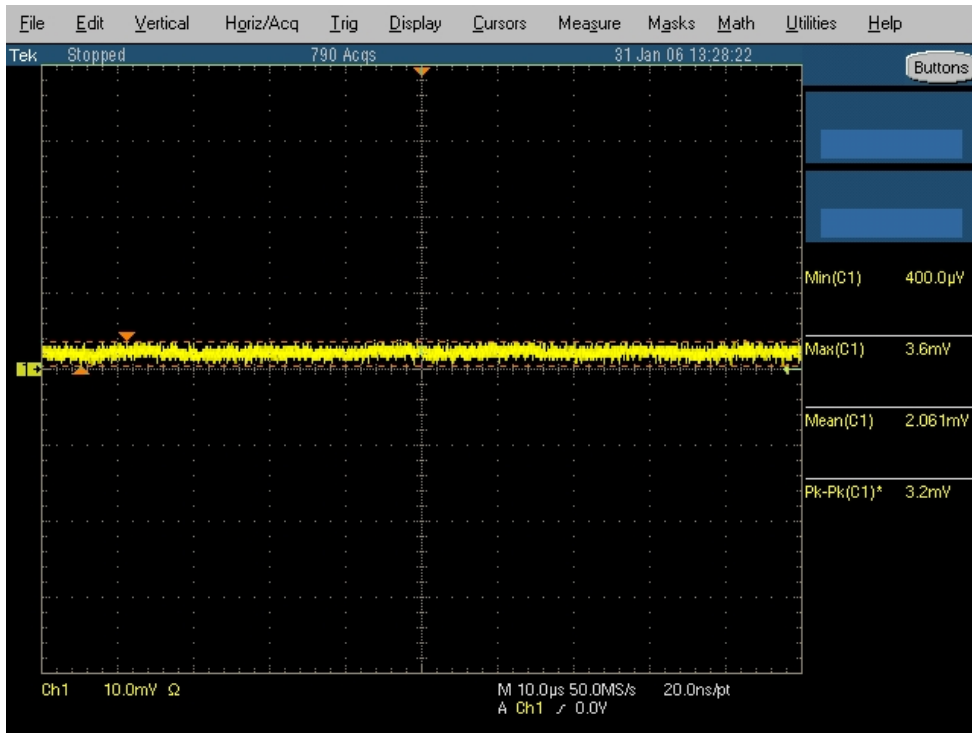
+5V



$$P_{\text{WindowsXP, Desktop idle, 5V}} = 100 * 9.747E-3 * 5V = 4.9W$$

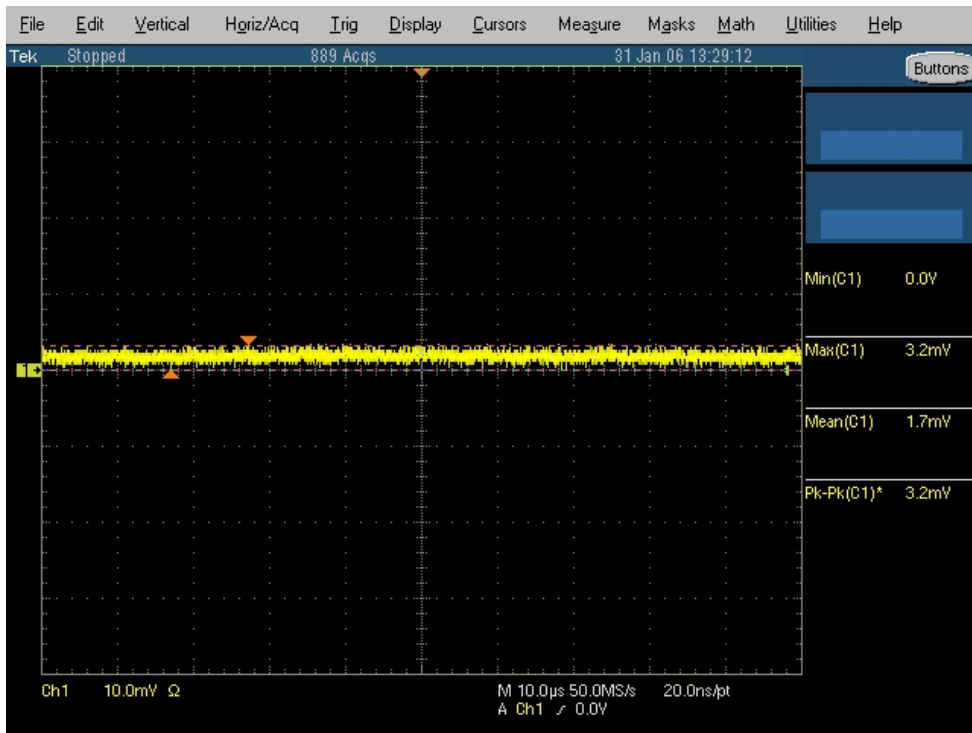


+12V



$$P_{\text{WindowsXP, Desktop idle, 12V}} = 100 * 2.061E-3 * 12V = 2.5W$$

+5VSB



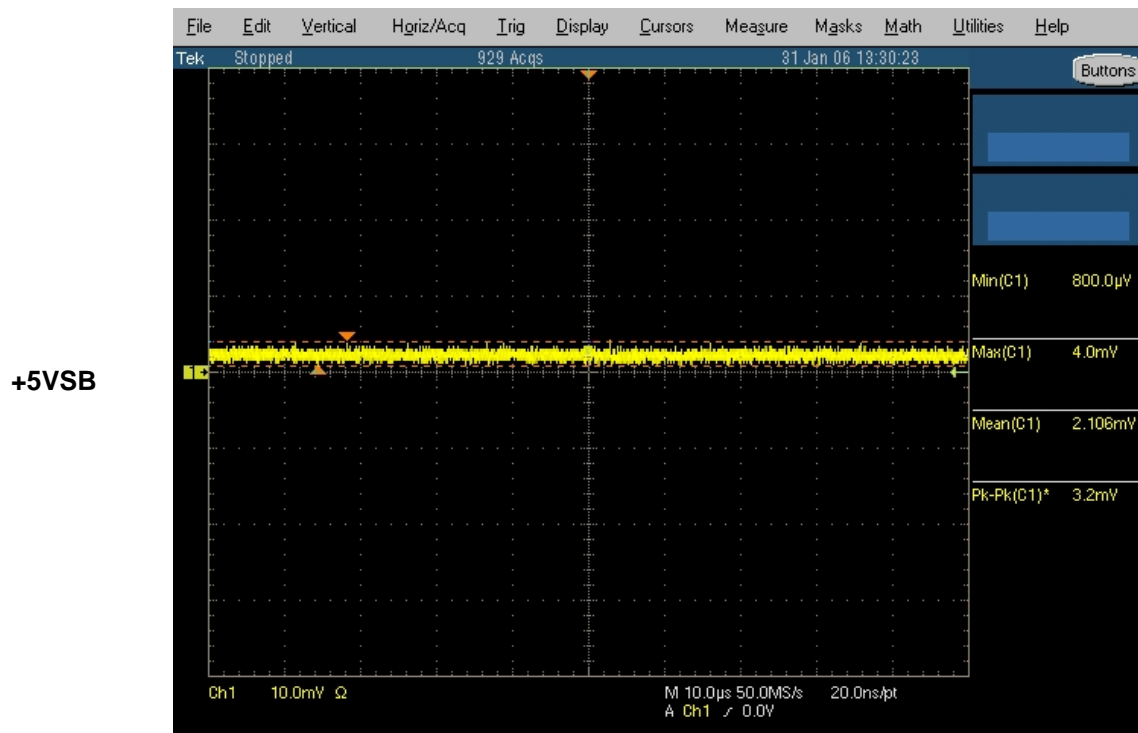
$$P_{\text{WindowsXP, Desktop idle, 5VSB}} = 100 * 1.7E-3 * 5V = 0.85W$$

Summary:

Supply	Current draw	Power consumption
+3V3	2.410A	8.0 Watt
+5V	974.7mA	4.9 Watt
+12V	206.1mA	2.5Watt
+5VSB	170mA	0.85 Watt
Total		16.25 Watt



Celeron 400/100 ULV S3 / Standby power consumption



$$I_{DOS, S3, 5VSB} = 100 * 2.106E-3 = 211\text{mA}$$

$$P_{DOS, S3, 5VSB} = 100 * 2.106E-3 * 5V = 1.1W$$

Celeron 400/100 ULV Power-On Load Characteristic

Refer to Section "Celeron 733/133 LV Power-On Load Characteristic"



Summary

786LCD/mITX Celeron 733/133

During S0 operation the following current/power consumption can be expected.

Windows XP Idle

Supply	Current draw	Power consumption
+3V3	2.484A	8.2 Watt
+5V	1.241A	6.2 Watt
+12V	103.5mA	4.0 Watt
+5VSB	155.2mA	0.78 Watt
Total		19.18 Watt

Windows XP 3DMARK2000

Supply	Current draw	Power consumption
+3V3	3.192A	10.5 Watt
+5V	1.500A	7.5 Watt
+12V	332.1mA	4.0 Watt
+5VSB	159.5mA	0.8 Watt
Total		22.8 Watt

Windows XP CPUBURN

Supply	Current draw	Power consumption
+3V3	2.464A	9.0 Watt
+5V	1.620A	8.1 Watt
+12V	332.9mA	4.0 Watt
+5VSB	187mA	0.94 Watt
Total		22.04 Watt

During S3 / Standby the following current/power consumption can be expected

Supply	Current draw	Power consumption
+3V3	0A	0 Watt
+5V	0A	0 Watt
+12V	0A	0 Watt
+5VSB	233mA	1.2 Watt
Total		1.2 Watt

Initial Inrush on the power supplies

Supply	Current draw	Power consumption
+3V3	2.86A	N/A
+5V	5.28A	N/A
+12V	1.26A	N/A
+5VSB	1.84A	N/A



786LCD/mITX Celeron 400/100

During S0 operation the following current/power consumption can be expected.

Windows XP Idle

Supply	Current draw	Power consumption
+3V3	2.375A	7.8 Watt
+5V	416.1mA	2.1 Watt
+12V	193.1mA	2.3 Watt
+5VSB	126.6mA	0.64 Watt
Total		12.84 Watt

Windows XP 3DMARK2000

Supply	Current draw	Power consumption
+3V3	2.433A	8.0 Watt
+5V	917.8mA	4.6 Watt
+12V	211.9mA	2.5 Watt
+5VSB	145.3mA	0.73 Watt
Total		15.83 Watt

Windows XP CPUBURN

Supply	Current draw	Power consumption
+3V3	2.410A	8.0 Watt
+5V	974.7mA	4.9 Watt
+12V	206.1mA	2.5Watt
+5VSB	170mA	0.85 Watt
Total		16.25 Watt

During S3 / Standby the following current/power consumption can be expected

Supply	Current draw	Power consumption
+3V3	0A	0 Watt
+5V	0A	0 Watt
+12V	0A	0 Watt
+5VSB	211mA	1.1 Watt
Total		1.1 Watt