

Applications Information

Power Supply Characteristics

786LCD/3.5”

Revision 1.0.0

1 Power Supply Characteristics of 786LCD/3.5"

This note describes the power supply characteristics of the 786LCD/3.5" board including static/dynamic power consumption, power-on load characteristics, and a watchdog threshold analysis.

1.1 General information

In order to ensure safe operation of the board, the onboard hardware watchdog monitors the supply voltage and asserts reset when the Vcc supply is below 4.76V (max). This ensures that the board is running only while the components operate in their specified voltage range. This voltage limit obviously applies to the voltage seen at the supply to the watchdog on the board. Keep in mind to account for losses from the power supply to the board. Refer to the Hardware Manual for further information.

The Power Connector on the 786LCD/3.5" board is a 12 poled Molex connector (Mating part 43025-1200 / Molex). The Power supply attached should be able to deliver +5V and 3.3V as a minimum; connection of PSON# is not required, but can be used to provide ATX functionality when SB5V is also available.

Below is shown the Power Connector specification. Note that the +5V is divided in two separate nets, with Pin 7 supplying onboard 5V circuits and Pin 8 supplying the switch mode regulators. This is done to minimize the switch mode noise on the onboard 5V circuits.

Note	Signal	PIN		Signal	Note
	Vcc3	2	1	Vcc3	
	Vcc3	4	3	GND	
	GND	6	5	GND	
3	SB5VSW	8	7	Vcc	2
	PSON#	10	9	SB5V	
1	-12_ext	12	11	+12_ext	1

Note:

1. +12V_ext is not used, but only directed to the PC104+ connector.
2. This pin is used for onboard supply of the onboard 5V circuits.
3. This pin is used for supply of the onboard switch mode regulators.

The requirements to the supply voltages are as follows:

Supply	Min	Max	Note
Vcc3	3.14V	3.46V	Should be 3.3V \pm 5%.
Vcc	4.76V	5.25V	Minimum voltage should be 4.875V for compliance with IEEE-996 standard.
+12Ve	11.4V	12.6V	Should be \pm 5% for compliance with IEEE-996 standard. Connection of +12V is not required to operate the board.
-12Ve	-12.6V	-11.4V	Should be \pm 5% for compliance with IEEE-996 standard. Connection of -12V is not required to operate the board.

1.2 Static Power Consumption

The static power consumption of the 786LCS/3.5" Board is measured under:

- 1- DOS, idle prompt.
- 2- Windows98, idle.
- 3- Windows98, full load. (*

The tested system configuration is:

1. PIII 700/100, 1*128MB SDRAM (100MHz).
2. 5V active cooler (Inside Technology)
3. PS/2 keyboard & mouse.
4. CRT.
5. HD & Floppy.

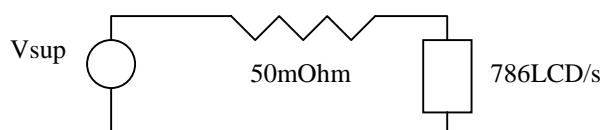
(Power consumption of CRT, HD and Floppy is not included in these measurements).

PIII	DOS PROMPT	WIN98 IDLE	WIN98 FULL LOAD *
Vcc	15.5W	4.8W	18W
Vcc3	5.3W	4.3W	8.9W

*) 3D-MARK2000. See description at www.madonion.com

1.3 Dynamic Power Consumption

The dynamic power consumption of the 786LCD/3.5" board is measured as the ac-voltage over a 50mOhm resistance in series on the voltage supply line. See the figures 1 and 2.



	WIN98 IDLE *	WIN98 FULL LOAD **
Vcc3	0.4W	4.1W
Vcc	5.8W	5.6W

*)Win98 idle: Vcc3: 6mV(peak-peak) \rightarrow 0.12A \rightarrow 0.4W

Vcc: 58mV(peak-peak) \rightarrow 1.16A \rightarrow 5.8W

**)Win98 full load: Vcc3: 62mV(peak-peak) \rightarrow 1.24A \rightarrow 4.1W

Vcc: 56mV(peak-peak) \rightarrow 1.12A \rightarrow 5.6W

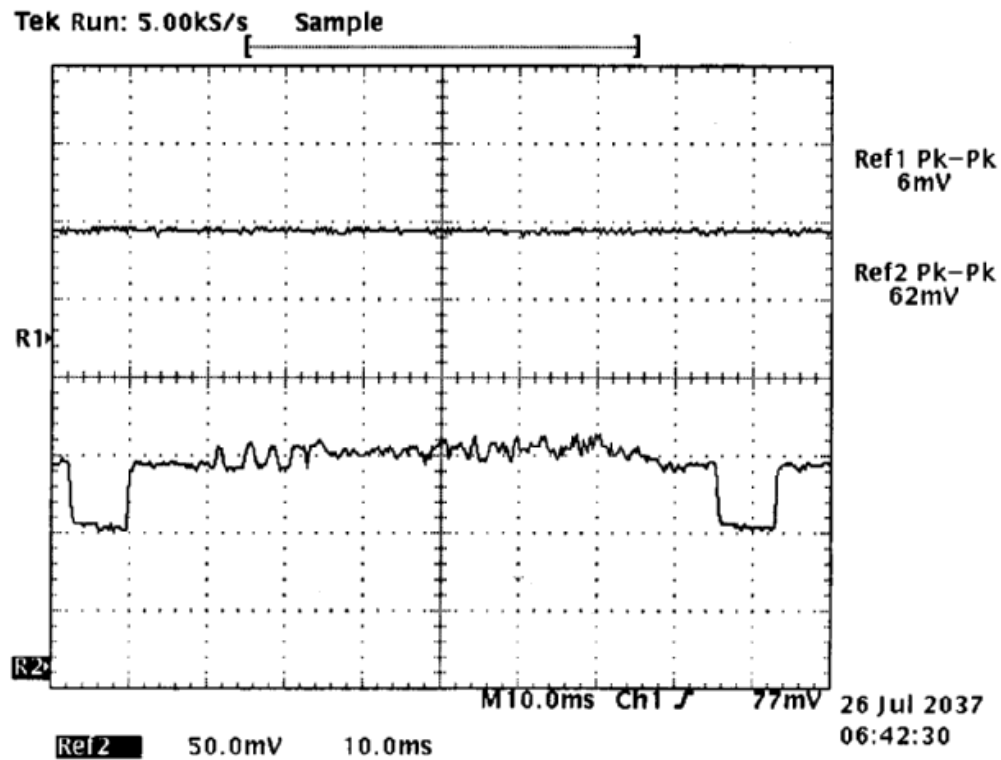


Figure 1 – Vcc3: Dynamic load in Win98 - idle (ref 1), full load (ref 2).

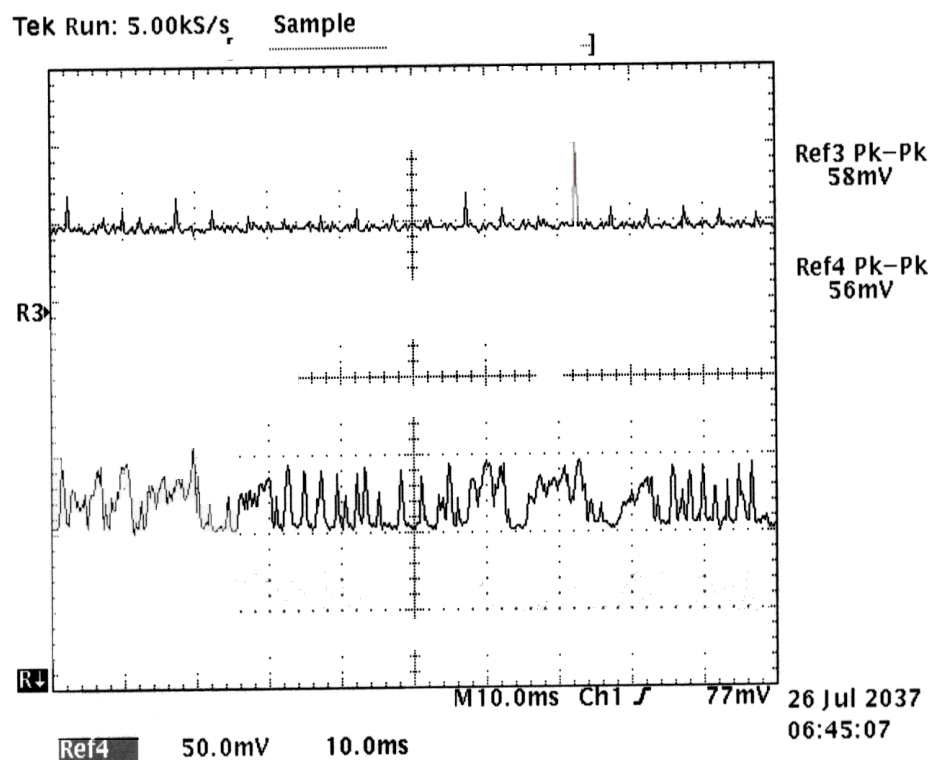


Figure 2 - Vcc: Dynamic load in Win98 - idle (ref 3), full load (ref 4).

1.4 Power-On Load Characteristic

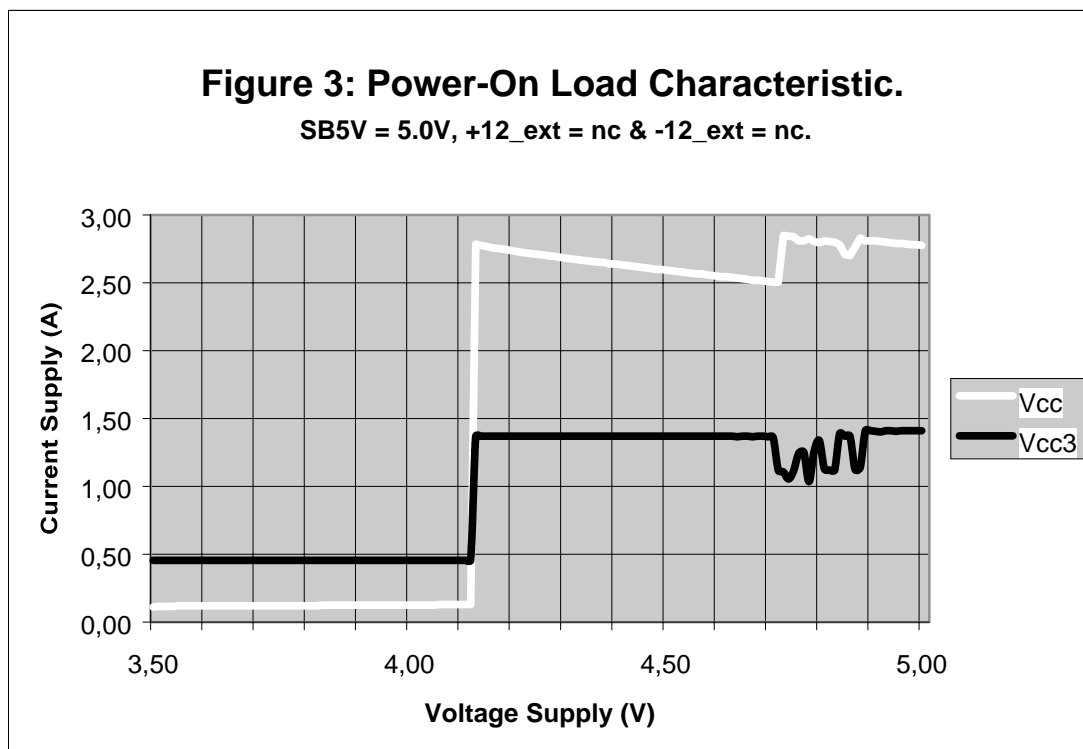
During power-on and power-off 3.3V must track 5V and there must be less than 0.5 volts difference between them. The 10%-95% voltage ramp rate must be between 2-200mSec and the voltages must settle to a point within the specified range within 1.0 second after power is applied or the PS-ON# is activated (driven low).

Figure 3 shows the load characteristic of the 786LCD/3.5" board when the supply voltages 3.3v (Vcc3) and 5.0 (Vcc + SB5VSW) is raised from 0 to 3.3 and 5V respectively (power-on).

(SB5V is 5.0 volt and neither 12_ext nor -12_ext are supplied to the board)

The onboard Vtt, V1.8, V2.5, and Vcore voltage supplies are active from Vcc = 4.15V. When Vcc exceeds app. 4.76V the watchdog releases the board reset.

+/-12V are not required for operation of the board, and are only used for devices connected on the PC104+ connector.



1.5 Watchdog Threshold Analysis

When the supply voltage exceeds 4.76V the watchdog on the 786LCD/3.5" board releases the board reset after 200ms. The power-on load characteristic above (figure 3) shows that the current only increases app. 200mA when the reset is released. This means that the external power supply must be capable of delivering only 1A/s to ensure proper threshold transition.

Furthermore, the watchdog has a 40mV hysteresis, which reduces the demands on the external power supply during the threshold transition.

Independent of how far the voltage drops below the threshold level the watchdog will reset the board and ensure a proper start-up when another watchdog threshold transition occurs.