



LH7A404-11 Boot Time Quantification Data

White Paper 304

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REVISION HISTORY

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1 Introduction

This document provides boot time data for the LH7A404-11 Card Engine. The LH7A404-11 used for this document had the following configuration: CPLD version 0x32, LogicLoader version 2.0.3 and Windows CE version 5.00.

2 Overview

The tables in section 3 present average load times for a variety of Windows CE images on the LH7A404-11 Card Engine.

3 Boot Time Quantification for the LH7A404-11

3.1 Key Terms and Definitions

The terms and definitions below correspond to the tables on the following pages:

Image Type: This describes three kinds of Windows CE images:

- RAM – This image is loaded directly to SDRAM and run from SDRAM
- Flash – This image is linked to be downloaded, stored, and run from the Card Engine's flash memory.
- Relocation – This image is packaged in the .bin file to be stored in flash, but the image will relocate itself into SDRAM during the initialization sequence of the WinCE image.

ENET Download: Amount of time to download image from Platform Builder to SDRAM on hardware platform via Ethernet Crossover cable. This time is measured from when Platform Builder begins to download the image to the development station to when LogicLoader displays "Bootme got jump command" (indicating that the download was successful).

CF Download: Amount of time to download image from CompactFlash card to SDRAM using LogicLoader. This time is measured from when the "load" command is executed in LogicLoader to when LogicLoader confirms that the load was successful.

YAFFS Download: Amount of time to download image from the YAFFS flash memory partition in LogicLoader to SDRAM. This time is measured from when the "load" command is executed in LogicLoader to when LogicLoader confirms that the load was successful.

Flash Burn: Amount of time to burn the Windows CE image from SDRAM to FLASH using the 'burn' command in LogicLoader. This time is measured from when the "burn" command is executed in LogicLoader to when LogicLoader confirms that the flash-burn was successful.

Relocation: Amount of time to load a Windows CE relocation image from FLASH to SDRAM. This time is measured from when LogicLoader jumps to the Windows CE image to when the OAL begins loading from SDRAM.

Image Loaded: Amount of time to completely boot a Windows CE image. This time is measured from when LogicLoader jumps to the Windows CE image to when the Windows CE OS is fully functional.

3.2 Boot Time for a Headless “Tiny Kernel” Device

3.2.1 System and Test Information

- LH7A404-11 Zoom Starter Development Kit
- LoCE Binary BSP version 2.0.1 (lpd_loce_bsp_2_1_0)
- Image Size: 412 KB

- Image Drivers and Features:
 - lpd_kernel_a404_50_2_1_1_0

Image Type	ENET Download (seconds)	CF Download (seconds)	YAFFS Download (seconds)	Flash Burn (seconds)	Relocation (seconds)	Image Loaded (seconds)
RAM	1.75	1.3	< 1	N/A	N/A	1.3
Flash	N/A	N/A	N/A	3.7	N/A	2
Relocation	N/A	N/A	N/A	3.7	< 1	1.5

Figure 3.1: Boot Time for Headless Device

3.3 Boot Time for a Small Display-Based Device

3.3.1 System and Test Information

- LH7A404-11 Zoom Starter Development Kit
- LoCE Binary BSP version 2.0.1 (lpd_loce_bsp_2_1_0)
- Image Size: 4.19 MB

- Image Drivers and Features:
 - lpd_lh7a40x_lcdc_a40x_50_1_3_1
 - lpd_lh7a404_touch_a404_50_1_1_0
 - lpd_kernel_a404_50_2_1_1_0

Image Type	ENET Download (seconds)	CF Download (seconds)	YAFFS Download (seconds)	Flash Burn (seconds)	Relocation (seconds)	Image Loaded (seconds)
RAM	17	12.4	2.1	N/A	N/A	1.8
Flash	N/A	N/A	N/A	31.9	N/A	3.7
Relocation	N/A	N/A	N/A	31.9	< 1	2.5

Figure 3.2: Boot Time for Small Display-Based Device

3.4 Boot Time for a Large Display-Based Device

3.4.1 System and Test Information

- LH7A404-11 Zoom Starter Development Kit
- LoCE Binary BSP version 2.0.1 (lpd_loce_bsp_2_1_0)
- Image Size: 14.3 MB

- Image Drivers and Features:
 - lpd_lh7a40x_lcd_a40x_50_1_3_1
 - lpd_lh7a40x_touch_a40x_50_1_1_0
 - lpd_kernel_a40x_50_2_1_1_0
 - lpd_atamemcf_a40x_50_1_3_0
 - lpd_lh7a40x_audio_a40x_50_0_1_0
 - lpd_lh7a40x_uart_a40x_50_1_3_0
 - lpd_lh7a40x_usbh_a40x_50_1_0_0
 - lpd_lh7a40x_usbf_a40x_50_1_3_0
 - lpd_smsc91c111_async_a40x_50_1_2_0

Image Type	ENET Download (seconds)	CF Download (seconds)	YAFFS Download (seconds)	Flash Burn (seconds)	Relocation (seconds)	Image Loaded (seconds)
RAM	60	40.7	7	N/A	N/A	5.5
Flash	N/A	N/A	N/A	109	N/A	10.2
Relocation	N/A	N/A	N/A	109	1.5	8

Figure 3.3: Boot Time for Large Display-Based Device