



i.MX27 SOM-LV Addendum to LogicLoader™ User's Manual

LogicLoader Documentation

Logic Product Development
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Abstract

This document contains information that addresses how LogicLoader runs specifically on the i.MX27 SOM-LV. As such, this document acts as a supplement to the *LogicLoader User's Manual*.

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REVISION HISTORY

REV	EDITOR	REVISION DESCRIPTION	LogicLoader Version	APPROVAL	DATE
A	Szilveszter Balogh	Initial Release	2.4.1	SB	08/18/08

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1 i.MX27 SOM-LV Memory Map Diagrams

1.1 SDRAM Configuration

The i.MX27 SOM-LV is designed to accommodate SDRAM/DDRAM of different sizes. Under LogicLoader's default configuration, all memory installed is accessible.

Please refer to Freescale's *MCIMX27 Multimedia Applications Processors Reference Manual* (document number: MCIMX27RM) for more information on the SDRAM controller.

1.2 MMU Remap: Physical Memory to Logical Memory

LogicLoader sets up the MMU to remap physical memory to logical memory. Type 'info cpu' at the loosh prompt to see how LogicLoader remaps physical memory to logical memory.

1.3 Physical Hardware Memory Map

i.MX27 SOM-LV Logical Memory Map during execution of LogicLoader for 128 MB of SDRAM

0xFFFF_FFFF	SRAM
0xFFFF_4C00	Unused
0xD800_5000	PCMCIA/CF
0xD800_4000	Unused
0xD800_1000	NAND Flash Controller
0xD800_0000	Unused
0xC020_0000	NOR Flash (2 MB)
0xC000_0000	Unused
0xA800_0000	SDRAM (128 MB)
0xA000_0000	Unused
0x1002_C000	Ethernet Controller
0x1002_B000	Unused
0x1002_2000	LCD Controller
0x1002_1000	Unused
0x1000_B000	UART0
0x1000_A000	Unused
0x0000_0000	Unused

Figure 1.1: i.MX27 SOM-LV Hardware Memory Map

1.4 LogicLoader and the Configuration Block in Flash Memory

The i.MX27 SOM-LV comes with LogicLoader programmed into the SOM's resident NOR boot flash array (see Figure 1.2 below). LogicLoader resides in the first 4 blocks (0 to 3) of NOR flash. The optional Configuration Block may be added with the 'config CREATE' command; if added, the Configuration Block resides in block 4 of NOR flash.

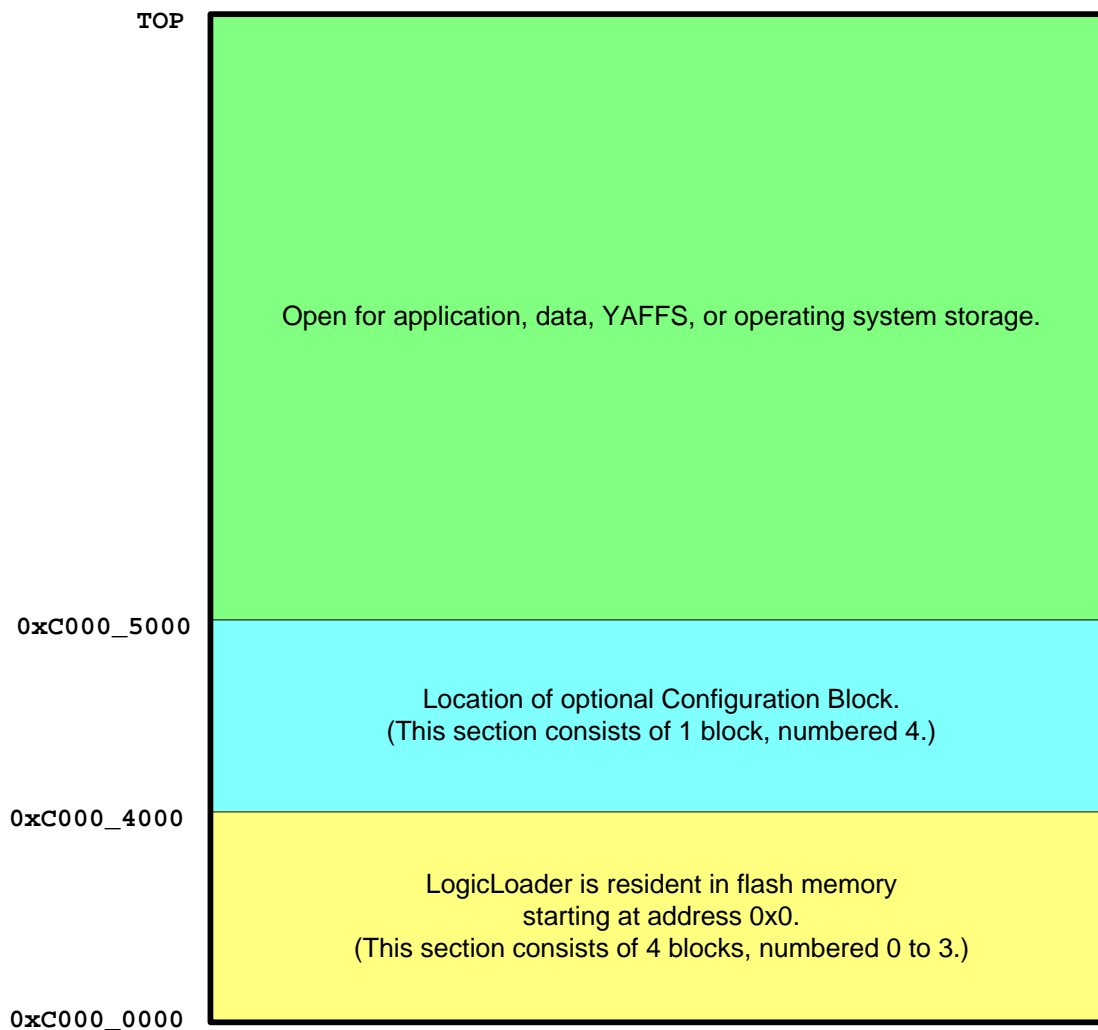


Figure 1.2: NOR Boot Flash Memory Layout

NAND memory (64 MB) can be used for YAFFS file systems, etc. However, the NAND device is only accessible through the NAND controller.

1.5 LogicLoader's Location in RAM

Logic's LogicLoader bootloader executes out of SDRAM. The diagram below (Figure 1.3) depicts the run-time location of LogicLoader. Refer to the Zoom *i.MX LITEKIT QuickStart Guide* for steps required to start LogicLoader.

Run-time location of LogicLoader:

At reset, LogicLoader relocates itself from flash memory to system SDRAM. LogicLoader then spends the remainder of its run-time executing out of system SDRAM.

Note: The size of LogicLoader's code and variable sections are estimates. This size depends on the exact features built into the LogicLoader image and may change with new releases. The location of LogicLoader's stack is dynamically determined at run-time based on the size of the code and variable section. Therefore, the location of the stack is provided as an estimate in this diagram.

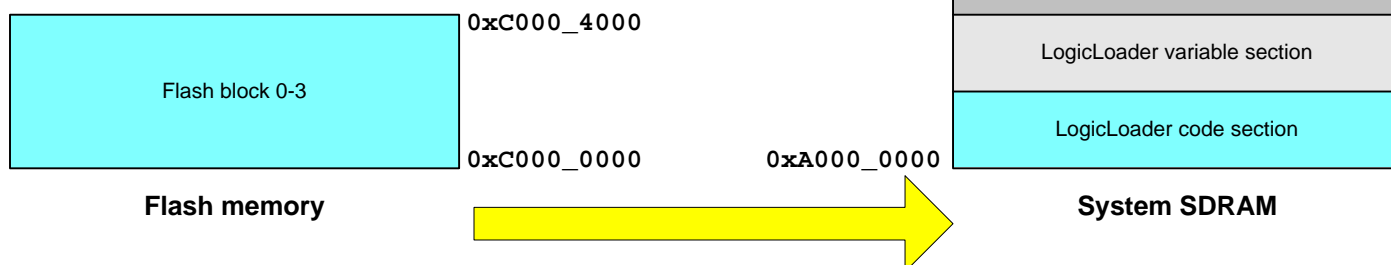


Figure 1.3: LogicLoader RAM Execution Environment

1.6 NAND Flash Support

The i.MX27 SOM-LV supports two types of flash memory: NOR and NAND. NOR flash is a contiguous memory device that is typically used for boot time code. NAND flash is a block device commonly used for bulk storage. Since NAND flash is a block device, a program typically cannot be executed directly out of NAND. Also, reading and writing to the device is more complicated than to a NOR flash device since the NAND memory is only accessible via the NAND controller. This is where LogicLoader's implementation of YAFFS is most useful.

On a standard configuration i.MX27 SOM-LV, the 64 MB of NAND flash contains 4,096 blocks, where each block is 16Kbytes.

1.6.1 YAFFS Support of NAND Flash

YAFFS will manage where data is stored and read from within the NAND device, while also managing the bad block areas of the device. Most manufacturers of NAND devices only guarantee about 98% of the blocks to be free of bad bits. YAFFS will keep track of the bad blocks and replace them with blocks marked good. Also, bad blocks can develop over the lifetime of the device; YAFFS will detect and relocate those blocks as well.

1.6.2 Creating a YAFFS Partition in NAND Flash

LogicLoader uses two commands to configure the NAND device with YAFFS: 'part-add' and 'mount'. See *LogicLoader User's Manual* for more detailed information on creating YAFFS partitions in NAND flash. When using the 'part-add' command for a NAND device, the <start> and <length> fields refer to the start block and block length of the YAFFS partition. To determine the total number of blocks in the NAND device, type 'info mem' at the LogicLoader command prompt.

2 i.MX27 SOM-LV LogicLoader Functionality

2.1 Supported Hardware Peripherals

The table below lists i.MX27 SOM-LV-specific peripherals supported by LogicLoader.

Hardware Peripheral	Support (Y/N)	Details
Audio	N	--
Display:	Y	LogicLoader supports 16 bits per pixel; custom displays can be supported by using the configuration block
LCD-3.5-QVGA-20	Y	Display kit with LCD part number LQ035Q7DB02
LCD-3.6-QVGA-10R	Y	Display kit with LCD part number LQ036Q1DA01
LCD-5.7-QVGA-10	Y	Display kit with LCD part number LQ057Q3DC02
LCD-6.4-VGA-10R	Y	Display kit with LCD part number LQ64D343
LCD-10.4-VGA-10	Y	Display kit with LCD part number LQ10D368
LCD-12.1-SVGA-10	Y	Display kit with LCD part number LQ121S1DG41
Ethernet	Y	10/100MBit support; MAC address stored in the configuration block
NOR Flash Memory	Y	--
NAND Flash Memory	Y	Using YAFFS
IrDA	N	--
Memory Card Expansion:	Y	CompactFlash memory cards are only supported. 16 -> 256 MB CompactFlash memory cards have been verified.
IO Mode PCMCIA/ CF	N	--
Memory Mode CF	Y	Recommended: SanDisk, Toshiba, PNY
SD/MMC	Y	Recommended: SanDisk (memory-mode only)
Smart Card	N	--
Processor:		
Cache	Y	16Kbyte Instruction & Data cache
Clock	Y	399 MHz CPU / 133 MHz External Bus
Power Management	N	--
MMU	Y	--
PS/2	N	--
RTC	N	--
SDRAM	Y	128 MB DDR mode
SSP	N	--
Serial Port:		
UARTA	Y	115200 baud standard, RTS flow only; 2400 to 460800 baud can be supported by using the configuration block
UARTB	N	--
UARTC	N	--
CAN	N	--
Touch Screen	N	--
USB Host	N	--
USB OTG	N	--
Misc:		
GPIO	Y	Use 'w' and 'x' commands to access data direction and data registers to control GPIO lines per register description in Hardware Specification document.
Status	Y	Toggles to show system "heartbeat"

**Note: If a peripheral is not mentioned on this list, it should be assumed there is no native support for it in LogicLoader besides the ability to read and write from registers.*

3 Disclaimer

Logic strives to provide the most up to date information. However, the list of supported features in this document is partial and subject to change.

The “Supported Hardware Peripherals” list was created to describe the supported features for fully populated standard SOM builds. If the SOM in use is a custom build or has some hardware feature omitted, the commands related to those hardware features may not function.

If you need software support on demand, please contact Logic Product Development sales at: product.sales@logicpd.com.