OMAP35x SOM-LV to DM3730/AM3703 SOM-LV Migration

Application Note 496

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Abstract

This application note describes the differences between the OMAP35x SOM-LV and the DM3730/AM3703 SOM-LV.

Revision History

REV	EDITOR	DESCRIPTION	APPROVAL	DATE
A	RAH, NJK, MB	-Initial release	RAH, NJK	09/16/11
B	SO, RAH	-Section 6.1: Added paragraph three regarding minimum pin configuration in LogicLoader v2.5	SO	03/05/12
C	SO	-Table 2.1: Updated available OS BSPs for DM3730/AM3703 SOM-LV; -Table 5.1: Corrected processor signal name for pin J2.174; -Section 6.2: Changed Android BSP to Gingerbread 2.3.4; -Section 6.3: Changed Linux Kernel version to 3.0; -Section 7: Updated bootloader information to indicate that LogicLoader is required for Windows CE, while X-Loader is required for Android and Linux	BSB, RAH	10/16/12

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1 Introduction

This application note describes the differences between the OMAP35x SOM-LV and the DM3730/AM3703 SOM-LV. The primary audience for this document is customers who currently use the OMAP35x SOM-LV in their design and are considering transitioning to the newer DM3730/AM3703 SOM-LV.

1.1 Scope of Document

Though this document addresses the differences between the SOMs, it is meant to be a high-level perspective. When it comes to designing in the DM3730/AM3703 SOM-LV, please review the appropriate schematics, hardware design files, and other applicable documents specific to the product. These documents are available on the DM3730 SOM-LV Development Kit downloads page.[1]

2 Features Comparison

This section gives a general feature set description of each SOM-LV module. For more detailed information about the physical specification requirements of each product, please refer to the *OMAP35x SOM-LV Hardware Specification*[2] or the *DM3730/AM3703 SOM-LV Hardware Specification*.[3]

Table 2.1: SOM-LV Features Comparison

Feature	OMAP35x SOM-LV	DM3730/AM3703 SOM-LV	Notes
Size	31 x 76.2 x 7.4 mm	31 x 76.2 x 7.4 mm	—
LogicLoader Version	LogicLoader v2.4	LogicLoader v2.5	—
Available OS BSPs	Linux Kernel 2.6.32; Windows CE 6.0	Android Gingerbread 2.3.4; Linux Kernel 3.0; Windows CE 6.0	—
Temperature Ranges	Commercial temp; Extended temp; Industrial temp	Commercial temp; Extended temp; Industrial temp	—
ARM Core	ARM Cortex-A8	ARM Cortex-A8	—
ARM Core Max Speed (MHz)	600*	1000	*720 MHz OMAP35x processor is available for custom configurations
DSP Core	TMS320C64x+ (OMAP3530 only)	TMS320C64x+ (DM3730 only)	—
DSP Core Max Speed (MHz)	430* (OMAP3530 only)	800 (DM3730 only)	*520 MHz DSP core is available for custom configurations
Mobile DDR SDRAM (MB) / NAND Flash (MB)	128/256*; 256/512	256/512	*128/256 available only in commercial temp
802.11 Wireless Ethernet	802.11 b/g	802.11 b/g/n	—
Bluetooth	2.0 + EDR	2.1 + EDR	—
SD/MMC	8-bit available on MMC1	8-bit mode de-featured	Development kit uses 4-bit mode
UART4	Not available	gpmc_wait2/uart4_tx gpmc_wait3/uart4_rx	Additional UART
All other peripherals remain the same			

[1] http://support.logicpd.com/auth/downloads/DM3730-AM3703-SOM-LV/
[2] http://support.logicpd.com/downloads/1105/
[3] http://support.logicpd.com/downloads/1439/

3 Electrical Comparison

3.1 Signal Differences

3.1.1 Additional Camera GPI Only Signals

With the new camera configuration in the DM3730/AM3703 SOM-LV, the signals listed below are now additional input-only signals. Systems using these signals as outputs will need a redesign.

Table 3.1: DM3730/AM3703 SOM-LV Additional GPI Only Signals

GPIO Signal	SOM-LV Signal	SOM-LV Pin
GPIO_105	CSI_D6	J2.145
GPIO_106	CSI_D7	J2.147
GPIO_107	CSI_D8	J2.151
GPIO_108	CSI_D9	J2.153

3.1.2 Buffer Strength

For the DM3730/AM3703 SOM-LV, GPIO_128 no longer needs a series termination resistor.

3.2 Power and Performance

3.2.1 VDD1 Operating Points

The DM3730/AM3703 SOM-LV supports different operating points for VDD1, shown in Table 3.2. Verify the maximum speed of the processor against the model number of the DM3730/AM3703 SOM-LV that is purchased.

Table 3.2: DM3730/AM3703 SOM-LV VDD1 Operating Points

Operating Point (OPP)	ARM Core Frequency (MHz)	DSP Core Frequency (MHz)	Voltage (V)
OPP1G	1000	800	1.35
OPP130	800	660	1.2
OPP100	600	520	1.1
OPP50	300	260	.9735

3.2.2 VDD2 Operating Points

The DM3730/AM3703 SOM-LV supports different operating points for VDD2, shown in Table 3.3.

Table 3.3: DM3730/AM3703 SOM-LV VDD2 Operating Points

Operating Point (OPP)	L3_ICLK frequency (MHz)	Voltage (V)
OPP100	200	1.15
OPP50	100	.9735

3.2.3 Recommended Operating Conditions for Main Battery

The recommended maximum voltage for Main Battery on the OMAP35x SOM-LV is 4.5V. For the DM3730/AM3703 SOM-LV, the recommended maximum voltage is 4.3V, while the typical remains 3.3V.

3.2.4 Current Requirements

The DM3730/AM3703 SOM-LV supports higher frequencies than the OMAP35x SOM-LV. Because of this, many of the typical current requirements have increased. It is important to verify that your design can accommodate the additional current. Additional details can be found in Section 3 of the *DM3730/AM3703 SOM-LV Hardware Specification*.

4 Mechanical Comparison

The OMAP35x SOM-LV and the DM3730/AM3703 SOM-LV share the same physical connectors, PCB size, and overall baseboard footprint. The two SOMs are physically equivalent.

5 Pin Comparison

All pin-number-to-signal-name combinations associated with the J1 and J2 connectors for both the OMAP35x SOM-LV and the DM3730/AM3703 SOM-LV are the same.

However, some differences do exist in the processor signals associated with the same BGA ball number. These differences are listed in Table 5.1 below. Only signals attached to J1 or J2 are listed.

Table 5.1: Processor Signal Differences

J1/J2 Pin Number	J1/J2 Signal Name	BGA Ball Number	OMAP35x Processor Signal	DM3730/AM3703 Processor Signal
J1.133	uP_DREQ0	J8	GPMC_WAIT3, SYS_nDMAREQ1, GPIO_65	GPMC_WAIT3, SYS_nDMAREG1, UART4_RX, GPIO_65
J1.156	uP_UARTA_DTR	AE21	SYS_BOOT5, MMC2_DIR_DAT3, GPIO_7	SYS_BOOT5, MMC2_DIR_DAT3, DSS_D22, GPIO_7
J1.163	LCD_BACKLIGHT_PWR	AF21	SYS_BOOT6, GPIO_8	SYS_BOOT6, DSS_D23, GPIO_8
J1.203	LCD_D8	F27	DSS_D8, GPIO_78	DSS_D8, UART3_RX_IRRX, GPIO_78
J1.205	LCD_D9	G26	DSS_D9, GPIO_79	DSS_D9, UART3_TX_IRTX, GPIO_79
J2.13, J2.15, J2.124	SIM0_VEN	R27	MMC1_DAT6	SIM_PWRCTRL
J2.18	uP_PCC_nWAIT	K8	GPMC_WAIT2, GPIO_64	GPMC_WAIT2, UART4_TX, GPIO_64
J2.128	SIM0_CLK	P26	MMC1_DAT5	SIM_CLK
J2.132	SIM0_IO/TX	P27	MMC1_DAT4	SIM_IO
J2.136	SIM0_nRESET	R25	MMC1_DAT7	SIM_RST
J2.174	LCD_D23	AC28	DSS_D23, SDI_CLKN, GPIO_93	DSS_D23/DSI_CLKN, DSS_D5, GPIO_93
J2.176	LCD_D22	AC27	DSS_D22, SDI_CLKP, GPIO_92	DSS_D22/DSI_CLKP, McSPI3_CS1, DSS_D4, GPIO_92
J2.192	TV_OUT2	W28	TV_OUT2	CVIDEO2_OUT
J2.192	TV_OUT2	W27	TV_VFB2	CVIDEO2_VFB
J2.194	TV_OUT1	Y28	TV_OUT1	CVIDEO1_OUT
J2.194	TV_OUT1	Y27	TV_VFB1	CVIDEO1_VFB

6 Software Comparison

6.1 LogicLoader Bootloader

The DM3730/AM3703 SOM-LV requires LogicLoader v2.5 for Windows CE 6.0. Please note that LogicLoader v2.5 is not available for the OMAP35x SOM-LV.

The main difference between the two versions of LogicLoader is that LogicLoader v2.5 no longer includes a config block. In lieu of the config block, LogicLoader uses a set of files in the */lboot* partition (*lboot.lol*, *lboot.var*, *lboot.sup*).

Also, LogicLoader v2.5 now does minimal pin configuration. Any pin not directly used by LogicLoader v2.5 is left in its default boot state. If previous software required pin configurations done in LogicLoader v2.4, that configuration must now be done in the *lboot.sup* or *lboot.lol* scripts.

Please see the *LogicLoader v2.5 User Guide*[4] and the *LogicLoader v2.5 Command Description Manual*[5] for specific details about this new set of files and additional information about the changes that exist between the two versions. The introductions of each document contain a list of changes and a description of where to find those changes within the document.

6.2 Android Gingerbread 2.3.4 BSP

An Android Gingerbread 2.3.4 BSP is only available for the DM3730/AM3703 SOM-LV. The Linux kernel that comes with the DM37x Android Gingerbread 2.3.4 BSP is based on version 3.0.

Please see the *DM37x Android Gingerbread 2.3.4 BSP Release Notes*, available in the DM37x Android Gingerbread 2.3.4 BSP Pre-Built Binaries download,[6] or the *DM37x Android Gingerbread 2.3.4 BSP User Guide*[7] for further details.

6.3 Linux BSP

The Linux BSP Kernel version has been updated to 3.0 for the DM3730/AM3703 SOM-LV.

Please see the *DM37x Linux BSP Release Notes*, available in the DM37x Linux BSP download,[8] or the *DM37x Linux BSP User Guide*[9] for further details.

6.4 Windows Embedded CE

The DM37x Windows Embedded CE 6.0 BSP closely resembles the OMAP35x Windows Embedded CE 6.0 BSP. Structurally, the two BSPs are equivalent; however, the following differences should be taken into consideration:

- OSDesign has been changed from *LOGIC_SOM_OMAP35x_SHOW* to *LOGIC_SOM_ARM_A8.*
- Platform has been changed from *LOGIC_SOM_OMAP35x* to *LOGIC_ARM_A8.*
- SOC has been changed from *OMAP35XX_TPS659XX_TI_V1* to *ARM_A8_TPS659XX_TI_V1.*

[4] http://support.logicpd.com/downloads/1428/
[5] http://support.logicpd.com/downloads/1440/
[6] http://support.logicpd.com/downloads/1494/
[7] http://support.logicpd.com/downloads/1517/
[8] http://support.logicpd.com/downloads/1451/
[9] http://support.logicpd.com/downloads/1431/

Please see the *DM37x Windows Embedded CE 6.0 BSP Release Notes*, available in the DM37x Windows Embedded CE 6.0 Source BSP download,[10] or the *DM37x Windows Embedded CE 6.0 BPS User Guide*[11] for further details.

7 Summary

From a hardware perspective, the OMAP35x SOM-LV and the DM3730/AM3703 SOM-LV are nearly identical. When migrating from the OMAP35x SOM-LV to the DM3730/AM3703 SOM-LV, be sure to take into account the BGA ball signal associations that were enacted at the processor level.

From a bootloader perspective, the DM3730/AM3703 SOM-LV requires the latest LogicLoader v2.5.x for Windows CE 6.0 and X-Loader for Android and Linux.

From an operating system perspective, the two SOMs require different BSPs, although the DM3730/AM3703 SOM-LV BSPs started with the OMAP35x SOM-LV BSPs as their base.

[10] http://support.logicpd.com/downloads/1429/
[11] http://support.logicpd.com/downloads/1423/

