

LAN-083e.A0

Boot Configuration for phyCORE®-i.MX 6UL/ULL with eMMC

Content

1	Introduction.....	2
2	Changing the Boot Configuration	4
	2.1 General.....	4
	2.2 Requirements to Switch from NAND to eMMC Memory Type SOMs.....	4
	2.3 Alternative SD Card Boot	4
3	phyBOARD-Segin Reference Schematic.....	5
	3.1 Boot Configuration	5
	3.2 Boot Selection	5
4	Revision History	6

1 Introduction

This Application Note provides guidelines on how to set the boot configuration resistors when using different versions of the phyCORE-i.MX 6UL/ULL module.

This guideline is written specifically for users that currently use the original NAND based PCL-063 phyCORE-i.MX 6UL/ULL and would like to support the new eMMC based version on their carrier board.

Table 1 shows the standard boot configuration for NAND, eMMC, and an external SD-Card.

Boot Configuration	BCFG1 [7:0]	BCFG2 [7:0]	BCFG4 [7:0]
NAND 1Gb (64 pages p. block, 4 address bytes)	10010010	00000000	00000000
NAND 2/4Gb (64 pages p. block, 5 address bytes)	10010011	00000000	00000000
eMMC (usdhc 2 interface)	01100000	01001000	00000000
SD-Card (usdhc 1 interface)	01000010	00100000	00000000

Table 1: Standard Boot Configuration Options



Caution!

- The boot mode configuration resistors must be placed on the carrier board for development! Later on, if the eFUSES are used, the resistors can be unpopulated.
- *Table 2* lists the eFUSES BOOT_CFGx[7:0] and the corresponding input pins.
- Use 10 kΩ pull-up and pull-down resistors on the carrier board to configure eFUSES BOOT_CFGx[7:0] in accordance with the module features. *Table 1* shows some available options for the boot configuration.
- To avoid accidental change of the boot configuration, please make sure that the signals shown in *Table 2* are not driven by any device on the baseboard during reset.

Due to the above points, PHYTEC recommends booting from eFUSE for volume production and using internal boot mode for the development process¹ only.

1: For series production, PHYTEC offers the phyCORE-i.MX 6UL/ULL with a custom configuration of the eFUSES

NXP Processor Configuration Pin	phyCORE Pin #	phyCORE Signal	Signal Type	Signal Level	Description
BCFG1[0]	25	X_LCD_D0	I	3.3 V	LCD_DATA_00
BCFG1[1]	26	X_LCD_D1	I	3.3 V	LCD_DATA_01
BCFG1[2]	27	X_LCD_D2	I	3.3 V	LCD_DATA_02
BCFG1[3]	28	X_LCD_D3	I	3.3 V	LCD_DATA_03
BCFG1[4]	29	X_LCD_D4	I	3.3 V	LCD_DATA_04
BCFG1[5]	30	X_LCD_D5	I	3.3 V	LCD_DATA_05
BCFG1[6]	31	X_LCD_D6	I	3.3 V	LCD_DATA_06
BCFG1[7]	33	X_LCD_D7	I	3.3 V	LCD_DATA_07
BCFG2[0]	34	X_LCD_D8	I	3.3 V	LCD_DATA_08
BCFG2[1]	35	X_LCD_D9	I	3.3 V	LCD_DATA_09
BCFG2[2]	36	X_LCD_D10	I	3.3 V	LCD_DATA_10
BCFG2[3]	37	X_LCD_D11	I	3.3 V	LCD_DATA_11
BCFG2[4]	38	X_LCD_D12	I	3.3 V	LCD_DATA_12
BCFG2[5]	39	X_LCD_D13	I	3.3 V	LCD_DATA_13
BCFG2[6]	40	X_LCD_D14	I	3.3 V	LCD_DATA_14
BCFG2[7]	41	X_LCD_D15	I	3.3 V	LCD_DATA_15
BCFG4[0]	42	X_LCD_D16	I	3.3 V	LCD_DATA_16
BCFG4[1]	43	X_LCD_D17	I	3.3 V	LCD_DATA_17
BCFG4[2]	44	X_LCD_D18	I	3.3 V	LCD_DATA_18
BCFG4[3]	45	X_LCD_D19	I	3.3 V	LCD_DATA_19
BCFG4[4]	46	X_LCD_D20	I	3.3 V	LCD_DATA_20
BCFG4[5]	47	X_LCD_D21	I	3.3 V	LCD_DATA_21
BCFG4[6]	48	X_LCD_D22	I	3.3 V	LCD_DATA_22
BCFG4[7]	49	X_LCD_D23	I	3.3 V	LCD_DATA_23

Table 2: Boot Configuration Pins at the phyCORE-Connector

2 Changing the Boot Configuration

2.1 General

In order to boot from different boot sources, make sure that you have all configuration resistors available on your baseboard which are needed for your chosen boot source.

If you want to change the boot configuration in your system, you can “reconfigure” with lower resistor values (e.g. 1 k Ω). Please refer to the phyBOARD-Segin schematic ([Section 3](#)).

2.2 Requirements to Switch from NAND to eMMC Memory Type SOMs

If your custom carrier board is designed to boot from NAND, you need to arrange for additional pull-up and pull-down resistors (as a population option) for pins BCFG1[0,1,4,5,6,7] and BCFG2[3,6] in order to boot from eMMC.

2.3 Alternative SD Card Boot

If you need the ability to switch the boot from non-volatile memory (either NAND or eMMC) to an SD card, you will need to include a logic to switch the signals below as well.

2.3.1 NAND Logic

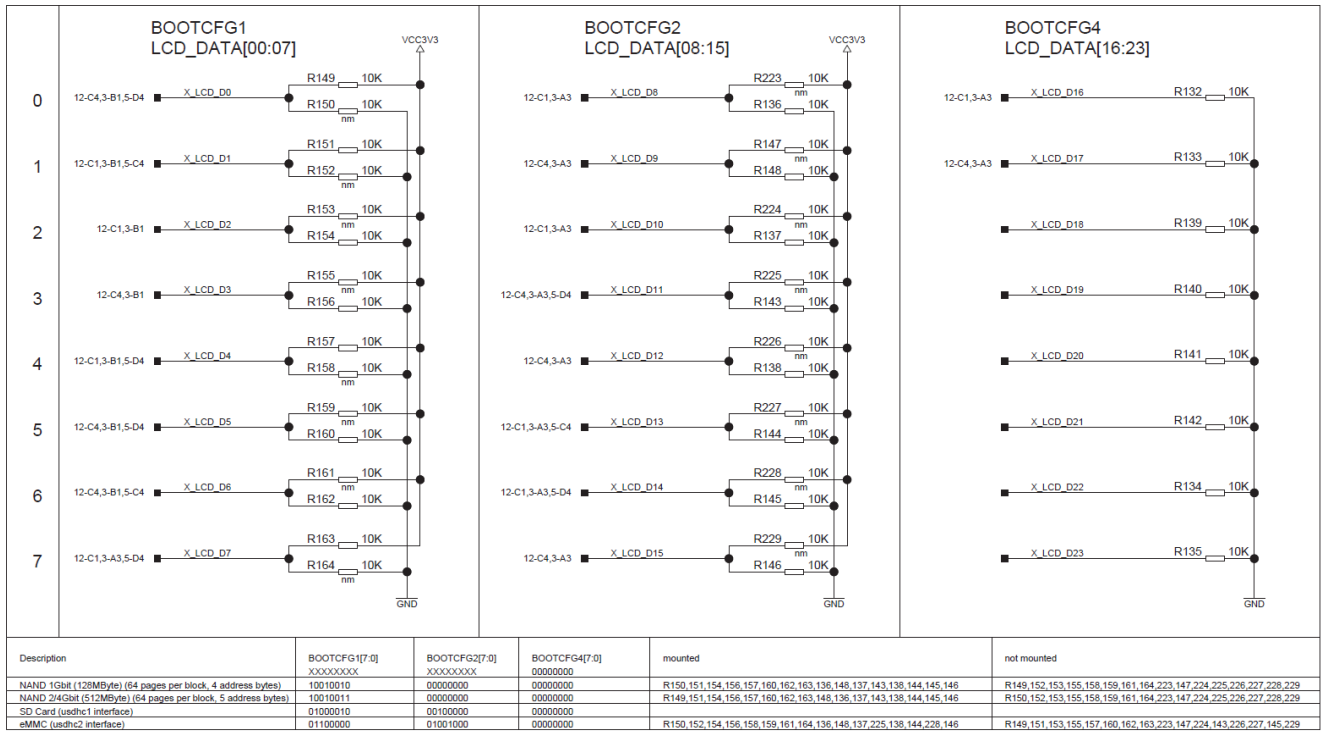
- BCFG1[6] and BCFG2[5] – pull-up
- BCFG1[0,4,7] – pull-down

2.3.2 eMMC Logic

- BCFG1[1] and BCFG2[5] – pull-up
- BCFG1[5] and BCFG2[3,6] – pull-down

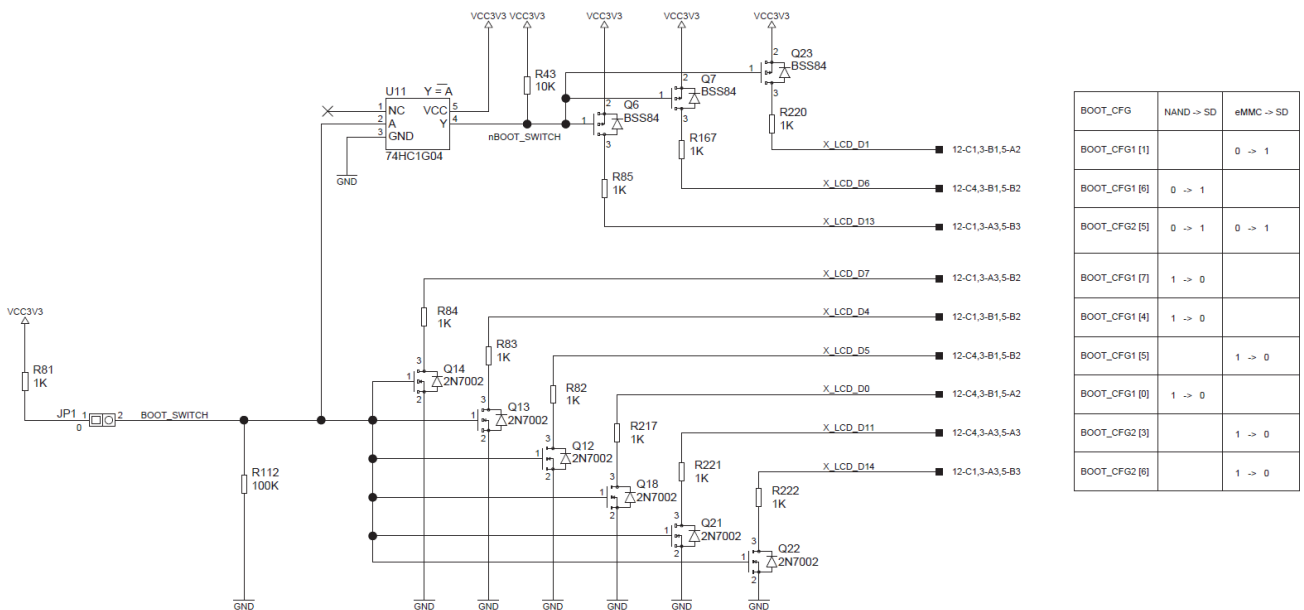
3 phyBOARD-Segin Reference Schematic

3.1 Boot Configuration



This schematic extract shows the default boot configuration and the standard pull-ups and pull-downs that are needed to switch boot configurations from NAND, eMMC, and SD Card on the phyBOARD-Segin carrier board.

3.2 Boot Selection



This schematic extract shows example circuitry for making boot selections between on-board, non-volatile memory and external SD Card (when either NAND and eMMC module version support is required.)

4 Revision History

Version	Changes	Date	Author
LAN-083e.A0	First edition	19.10.2018	R. Stidronski

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