

Toradex Colibri

Migration Guide



Revision history

Date	Doc. Rev.	Changes
23-Oct-07	Rev. 1.0	Initial release. Supported modules: Colibri PXA270 V1.0 / V1.2 Colibri PXA320 V1.2 Colibri PXA300 V1.0
26-Oct-07	Rev. 1.1	Description for Data[31:16] on PXA270 module added. Supported modules: Colibri PXA270 V1.0 / V1.2 Colibri PXA320 V1.2 Colibri PXA300 V1.1
13-Dec-07	Rev. 1.2	CAN description for Orchid removed (there is no CAN on the Orchid) Supported modules: Colibri PXA270 V1.0 / V1.2 Colibri PXA320 V1.2 Colibri PXA300 V1.1
12-Sept-08	Rev. 1.3	PXA310 data added (in general it is equal to PXA300) PXA320: changed pin names from -> to (these pins have no GPIO functionality) GPIO56 -> CIF_DD<7> GPIO59 -> CIF_MCLK GPIO60 -> CIF_PCLK GPIO61 -> CIF_HSYNC GPIO62 -> CIF_VSYNC
29-Okt-08	Rev. 1.4	SODIMM Pin 99 can't be used as GPIO on Colibri PXA3xx modules. Added a note regarding second instance of GPIOs.
31-Dec-08	Rev. 1.5	SODIMM Pin 184 can't be used as GPIO on Colibri PXA300 and PXA310 modules Minor changes to clarify several descriptions.
17-Feb-09	Rev. 1.6	Added PS2 description (Mouse and Keyboard)
24-Sep-09	Rev. 1.7	Added notes 12 and 13 to compatibility list (SODIMM Pin 88,90,92)
22-Jan-10	Rev. 1.8	Removed broken www link to EvalBoard schematic. PXA310 GPIO97 and GPIO98 have pull-up and pull-down description (Note 14 Compatibility List)
04-Jun-10	Rev. 1.9	Spelling correction Added different analog input voltage range description (Chapter 2.7 section 10).
10-Jun-10	Rev. 2.0	Added clarification to chapter 2.7 section 10.
02-Sep-10	Rev. 2.1	Add first preliminary information for the Colibri T20
06-Sep-10	Rev. 2.1	Added details for Colibri PXA270 V2.2 and Colibri PXA320 V2.0 modules (Chapter 3, notes 10 and 11)
27-Dec-10	Rev. 2.2	Add information about Colibri T20 address signals (Chapter 3, note 24) Add information about USB 2.0 high speed to Chapter 2.3, 2.4 and 2.5 Change name Colibri Tegra T20 -> Colibri T20
23-Nov-11	Rev. 2.3	Changed Disclaimer Removed old HW version number from table header. Added design guide for bulk capacitance on carrier boards Refer to specific Colibri datasheets for SODIMM pin 24
12-Jun-12	Rev. 2.4	Added clarification about PXA310 SODIMM pin 47 (GPIO7): do not use as alternate function GPIO. See new note 25 for PXA 310 GPIO 7
24-Jul-12	Rev. 2.5	Added note 26 and 27 in chapter 3 Added note 12 in chapter 2.7
14-Dec-12	Rev. 2.6	Add information about Colibri T30 Update links Add information about Evalboard V3.1
19-Apr-13	Rev. 2.7	Added information about Colibri PXA300 XT
21-May-14	Rev 2.8	Section 2.7, Design Guide for Customer Specific Hardware Minor corrections
18-Sep-14	Rev 3.0	Extracted compatibility list to a separate Excel document -> http://docs.toradex.com/102216-colibri-compatibility-guide.xlsx Added Colibri VFxx information Added Colibri iMX6 information

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1. Introduction

This migration guide contains the needed steps to switch between the several Toradex Colibri modules and some general design guidelines. Please also check the extracted compatibility list in excel format: <http://docs.toradex.com/102216-colibri-compatibility-guide.xlsx>

We are always enhancing our Colibri module software. Visit our web page for BSP updates. <http://developer.toradex.com>

1.1 Abbreviations

Abbreviation	Note
Colibri PXA300 (XT)	Colibri PXA300 and Colibri PXA300 XT
Colibri PXA3xx	Colibri PXA300 (XT) and Colibri PXA310 and Colibri PXA320
Colibri PXAxxx	Colibri PXA270 and Colibri PXA3xx
Colibri Txx	Colibri T20 and Colibri T30
Colibri	Colibri PXAxxx and Colibri Txx
Colibri VFxx	Colibri VF50 (IT) and Colibri VF61 IT
Colibri iMX6	Colibri iMX6DL and Colibri iMX6S

2. Migration Guide for Colibri Modules

2.1 Architectural Differences

Colibri PXA270	Colibri PXA320	Colibri PXA300 (XT)	Colibri PXA310	Colibri T20	Colibri T30	Colibri VF50 (IT)	Colibri VF61 IT	Colibri iMX6
32-Bit Data bus	16-Bit Data bus (multiplexed AAD and demultiplexed)	16-Bit Data bus (multiplexed AAD and demultiplexed)	16-Bit Data bus (multiplexed AAD and demultiplexed)	16/32-Bit Data bus(multiplexed AAD and demultiplexed)	16 Bit (multiplexed AAD and demultiplexed)	-	-	16-Bit Data bus
26 dedicated address bits	12 dedicated address bits	12 dedicated address bits	12 dedicated address bits	28 dedicated address bits	28 dedicated address bits	-	-	26 dedicated address bits
4 chip selects available	3 chip select available	3 chip select available	3 chip select available	8 chip select available	8 chip select available	-	-	4 chip select available
Ethernet Controller DM9000E	AX88796B	AX88796B	AX88796B	AX88772B	AX88772B	Micrel KSZ8041NLI	Micrel KSZ8041NLI	Micrel KSZ8041NLI
32-Bit SDRAM (104MHz)	32-Bit DDR SDRAM (260MHz)	16-Bit DDR SDRAM (260MHz)	16-Bit DDR SDRAM (260MHz)	32-Bit DDR2 SDRAM (666MHz)	32-Bit DDR3 SDRAM	16-Bit DDR3 SDRAM	16-Bit DDR3 SDRAM	32-Bit DDR3 (iMX6S) 64-Bit DDR6 (iMX6DL)
PCMCIA interface	PCMCIA interface	No PCMCIA interface	No PCMCIA interface	No PCMCIA interface	No PCMCIA interface	No PCMCIA interface	No PCMCIA interface	No PCMCIA interface
Audio and Touch interface	Audio and Touch interface	Colibri PXA300: No Audio and Touch interface Colibri PXA300 XT: Audio and Touch interface	Audio and Touch interface	Audio and Touch interface	Audio and Touch interface	No Audio interface Touch interface available	Audio and Touch interface	Audio and Touch interface

2.2 Migration Guide for Colibri Evaluation Board V3.1

For Colibri PXA270:
Set the Jumper JP6 (next to the Ethernet connector) to 1-2.

For Colibri PXA3xx, Colibri Txx, Colibri iMX6, and Colibri VFxx:
Set the Jumper JP6 to 2-3.

See the Evalboard schematic for details about the jumper setting. (<http://developer.toradex.com>)

2.3 Migration Guide for Colibri Evaluation Board V2.1

For Colibri PXA270:
Set the Jumper JP7 (next to the Ethernet connector) to 1-2.

For Colibri PXA3xx, Colibri Txx, Colibri iMX6, and Colibri VFxx:
Set the Jumper JP7 to 2-3.

See the Evalboard schematic for details about the jumper setting. (<http://developer.toradex.com>)

The USB interfaces on the Evaluation board are not USB 2.0 high speed compatible. For more information see: [http://developer.toradex.com/knowledge-base/usb-2.0-high-speed-\(480mbps\)](http://developer.toradex.com/knowledge-base/usb-2.0-high-speed-(480mbps))

Plug in the Colibri and power on the Evalboard. WinCE will start up.
All standard interfaces of the Colibri Evaluation board are now ready to use.

2.4 Evalboard Prior to Version 2.1

The Colibri modules will start up and all standard interfaces are available except Ethernet.
Ethernet is only supported for Colibri PXA270 modules.
Ask Toradex for more information about this. (colibri@toradex.com)

2.5 Orchid V1.0

For Colibri PXA270:
Set the Jumper JP2 (near the Ethernet connector) to 1-2.

For Colibri PXA3xx, Colibri Txx, Colibri iMX6, and Colibri VFxx:
Set the Jumper JP2 to 2-3.

The USB interfaces on the Evaluation board are not USB 2.0 high speed compatible. For more information see: [http://developer.toradex.com/knowledge-base/usb-2.0-high-speed-\(480mbps\)](http://developer.toradex.com/knowledge-base/usb-2.0-high-speed-(480mbps))

Insert the Colibri module into the Orchid and power the device. The WinCE will start up and all interfaces will.

2.6 Protea V1.1

For Colibri PXA270:
Set the Jumper JP2 (next to the Ethernet connector and battery socket) to 1-2.

For Colibri PXA3xx, Colibri Txx, Colibri iMX6, and Colibri VFxx:
Set the Jumper JP2 to 2-3.

The USB interfaces on the Evaluation board are not USB 2.0 high speed compatible. For more information see: [http://developer.toradex.com/knowledge-base/usb-2.0-high-speed-\(480mbps\)](http://developer.toradex.com/knowledge-base/usb-2.0-high-speed-(480mbps))

Insert the Colibri module into the Protea and power the device. The WinCE will start up and all interfaces will work (except CAN and RS485/422 because this drivers aren't included in the Toradex standard WinCE image).

2.7 Design Guide for Customer Specific Hardware

In general you should regard our Colibri Evalboard and Iris carrier board schematics and design your hardware similar to it.

(<http://developer.toradex.com/hardware-resources/arm-family/carrier-board-design>)

See the Colibri datasheets for more information about pin out. The SODIMM pins that have a really different function are described below.

1. Pull up all the nCS signals that you are using on your HW.
2. Not all of the Colibri modules have exactly the same Ethernet controller (AX88796BL, AX88772B, DM9000) therefore a slightly different circuit is used. See the Evalboard schematic for details.
3. SODIMM pin 22 is nVDD_FAULT on the Colibri PXA270 and nGPIO_RESET on the Colibri PXA3xx, and a normal GPIO on Colibri Txx modules. Make sure you have appropriate glue logic to generate the right behavior if all modules will be used. Or just leave it open, that will work on all modules.
4. SODIMM pin 24: In general this pin should be left unconnected to be compatible with all Colibri modules. On some Colibri modules this pin is nBATT_SENSE. Please contact colibri@toradex.com for more information about low battery handling on Colibri modules.
5. The SODIMM pins 118, 120, 122, 124, 134, 136, 138, 140, 142, 144, 146, 184, 186, 188 are Address[25:12] on the Colibri PXA270. On the Colibri PXA3xx most of them are GPIOs. On the Colibri Txx and iMX6 this pins can be used as addresses or GPIOs. Don't use this signals in a design for all modules or add proper glue logic to your HW. Colibri VFxx modules don't support Address/Data bus.
6. The SODIMM pins 150, 152, 154, 156, 158, 160, 162, 164, 166, 168, 170, 172, 174, 176, 178 and 180 are Data[31:16] on the Colibri PXA270. On the Colibri PXA3xx, Colibri T30, and Colibri iMX6 they are GPIOs. Don't use this signals in a design for different modules or add proper glue logic to your HW. The Colibri T20 has a 32bit bus, but it is not 100% compatible with the Colibri PXA270. Colibri VFxx modules don't support Address/Data bus.
7. The SODIMM pins 126,128,130, 132 are DQMs which are available on Colibri PXA270 modules only. Don't use this signals in a design for all modules or add proper glue logic to your HW.
8. Some of the GPIOs on Colibri PXA3xx have a second instance (e.g. GPIO1_2). It is not possible to use both pins as GPIO (GPIO1 and GPIO1_2). There is no problem if one of the two pins is set to an alternate function different to GPIO. E.g. if one pin is used as LCD data signal you can use the other pin as GPIO without any restrictions. Take care when using GPIOs with second instances.
Affected GPIOs: PXA320: GPIO[17:0]; PXA310: GPIO[10:0]; PXA300(XT): GPIO[6:0]
9. There are signals which are connected to more than one SODIMM pin. Please refer to the notes in the compatibility list.
10. The analog inputs (SODIMM pin 2, 4, 6, 8) have different input voltage ranges depending on the audio-/touch-controller used on the Colibri module. Make sure you add a proper circuit onto your carrier board or do not use voltages higher than 3.3V if you want to support current and future Colibri modules. **We recommend using 3.3V as maximum voltage on all AD inputs to ensure the compatibility to future Colibri modules.**

Audio-/Touch-Codesc (Colibri Modules)	Analog Voltage Input Range
NXP UCB1400: - Colibri PXA 270 up to and including V 1.2 - Colibri PXA320 up to and including V 1.2	AD 0-3 (SODIMM pin 2, 4, 6, 8): 0V to 7.5V
Wolfson WM9715L: - Colibri PXA300 XT - Colibri PXA310 - Colibri PXA270 V 2.1 and higher - Colibri PXA320 V 2.0 and higher - Colibri T20	AD 0, 1, 3 (SODIMM pin 2, 6, 8): 0V to 3.3V AD 2 (SODIMM pin 4): 0V to 5V
STMicroelectronics STMPE811 / Freescale SGTL5000: - Colibri T30 - Colibri iMX6	AD 0-3 (SODIMM pin 2, 4, 6, 8): 0V to 3.3V
Vybrid Internal ADC - Colibri VFxx	AD 0-3 (SODIMM pin 2, 4, 6, 8): 0V to 3.3V (there are more ADC inputs available on Vybrid modules.)

11. Bulk Capacitance: In order to satisfy the in-rush current during start-up of a Colibri module we recommend using bulk capacitors of about **450uF** in total on the main 3.3V power supply. Take a look at the EvalBoard schematic as a reference.
12. The following pins **must** be connected as described below. Take a look at the EvalBoard schematic as a reference.

Supply Source	Signal Name
General 3.3V	3V3
General 3.3V or filtered 3.3V(for better audio quality and touch accuracy)	AVDD_AUDIO
General Ground	GND
General Ground or filtered Ground	VSS_AUDIO
Locale Ground for Ethernet	AGND_LAN
Battery for RTC or general 3.3V	VCC_BATT
Do not connect these signals to GND, let them unconnected if functionality is not needed.	HEADPHONE_GND, MIC_GND

3. Compatibility List Colibri Modules

The compatibility list has been extracted to a separate spread sheet document: <http://docs.toradex.com/102216-colibri-compatibility-guide.xlsx>

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