

Toradex Colibri

Migration and Design 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 2.6 section 10).
10-Jun-10	Rev. 2.0	Added clarification to chapter 2.6 section 10.
02-Sep-10	Rev. 2.1	Add first preliminary information for the Colibri Tegra 2
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)

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27-Dec-10	Rev. 2.2	Add information about Colibri Tegra 2 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 Tegra 2
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



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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.

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



2. Migration Guide for Colibri Modules

2.1 Architectural Differences

Colibri PXA270	Colibri PXA320	Colibri PXA300	Colibri PXA310	Colibri Tegra 2 Sample
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)	32-Bit Data bus
26 dedicated address bits	12 dedicated address bits	12 dedicated address bits	12 dedicated address bits	28 dedicated address bits
4 chip selects available	3 chip select available	3 chip select available	3 chip select available	8 chip select available
Ethernet Controller DM9000E	AX88796B	AX88796B	AX88796B	AX88772B
32-Bit SDRAM (104MHz)	32-Bit DDR SDRAM (260MHz)	16-Bit DDR SDRAM (260MHz)	16-Bit DDR SDRAM (260MHz)	32-Bit DDR2 SDRAM (666MHz)
PCMCIA interface	PCMCIA interface	No PCMCIA interface	No PCMCIA interface	No PCMCIA interface
Audio and Touch interface	Audio and Touch interface	No Audio and Touch interface	Audio and Touch interface	Audio and Touch interface



2.2 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 PXA3x0 and Colibri Tegra 2:

Set the Jumper JP7 to 2-3.

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

The USB interfaces on the Evaluation board are not USB 2.0 high speed compatible. For more information see:

[http://wiki.toradex.com/index.php/USB_2.0_High_Speed_\(480Mbps\)](http://wiki.toradex.com/index.php/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.

2.3 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)

2.4 Orchid V1.0

For Colibri PXA270:

Set the Jumper JP2 (near the Ethernet connector) to 1-2.

For Colibri PXA3x0 and Colibri Tegra 2:

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://wiki.toradex.com/index.php/USB_2.0_High_Speed_\(480Mbps\)](http://wiki.toradex.com/index.php/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.



2.5 Protea V1.1

For Colibri PXA270:

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

For Colibri PXA3x0 and Colibri Tegra 2:

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://wiki.toradex.com/index.php/USB_2.0_High_Speed_\(480Mbps\)](http://wiki.toradex.com/index.php/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).



2.6 Design Guide for Customer Specific Hardware

In general you should regard our Colibri Evalboard schematics and design your hardware similar to it. (<http://www.toradex.com>).

See the different Colibri datasheets for more information about pin out. The SODIMM pins that have a really different function are described below. There are also some important notes for building your own carrier boards.

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. (<http://www.toradex.com>).
3. SODIMM pin 22 is nVDD_FAULT on the Colibri PXA270 and nGPIO_RESET on the Colibri PXA3x0. Make sure you have the proper glue logic to generate the right behavior if both 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 refer to the according Colibri datasheet for more information about this pin.
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 PXA3x0 most of them are GPIOs. On the Colibri Tegra 2 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.
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 PXA3x0 they are GPIOs. Don't use this signals in a design for both modules or add proper glue logic to your HW. The Colibri Tegra 2 has a 32bit bus, but it is not 100% compatible with the Colibri PXA270.
7. The SODIMM pins 126, 128, 130, 132 are DQMs which are not available on all. 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: 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-Codec (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 PXA310 all versions - Colibri PXA270 V 2.1 and higher - Colibri PXA320 V 2.0 and higher - Colibri Tegra 2	AD 0, 1, 3 (SODIMM pin 2, 6, 8): 0V to 3.3V AD 2 (SODIMM pin 4): 0V to 5V

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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.



3. Compatibility List Colibri PXAxxx Modules

!!! Caution: Pay attention to the notes of the individual signals !!!

3.1 SODIMM Connector

SODIMM Pin	Colibri PXA270	Colibri PXA320	Colibri PXA320 multiplexed pins	Colibri PXA300	Colibri PXA300 multiplexed pins	Colibri PXA310	Colibri PXA310 multiplexed pins	Colibri T20	Colibri T20 multiplexed pins	Compatible Functions
1	MIC_IN	MIC_IN	SYS_EN	SYS_EN		MIC_IN ⁶	SYS_EN	MIC_IN		MIC_IN ² , SYS_EN ⁵
3	MIC_GND	MIC_GND				MIC_GND ⁶		MIC_GND		MIC_GND ²
5	LINEIN_L	LINEIN_L				LINEIN_L ⁶		LINEIN_L		LINEIN_L ²
7	LINEIN_R	LINEIN_R				LINEIN_R ⁶		LINEIN_R		LINEIN_R ²
9	VSS_AUDIO	VSS_AUDIO				VSS_AUDIO ⁶		VSS_AUDIO		VSS_AUDIO ^{2,16}
11	VSS_AUDIO	VSS_AUDIO				VSS_AUDIO ⁶		VSS_AUDIO		VSS_AUDIO ^{2,16}
13	HEADPHONE_GND	HEADPHONE_GND				HEADPHONE_GND ⁶		HEADPHONE_GND		HEADPHONE_GND ²
15	HEADPHONE_L	HEADPHONE_L				HEADPHONE_L ⁶		HEADPHONE_L		HEADPHONE_L ²
17	HEADPHONE_R	HEADPHONE_R				HEADPHONE_R ⁶		HEADPHONE_R		HEADPHONE_R ²
19	GPIO46	GPIO30		GPIO110 ⁸		GPIO110 ⁸		GPIO_C3		STD_RXD
21	GPIO47	GPIO31		GPIO8		GPIO8		GPIO_C2		STD_TXD
23	GPIO40	GPIO101		GPIO103		GPIO103		GPIO_Z0		FF_DTR
25	GPIO100	GPIO99	GPIO113	GPIO101 ⁸	GPIO115 ⁸	GPIO101 ⁸	GPIO115 ⁸	GPIO_Z1		FF_CTS, KP_MKIN<0> ¹⁷
27	GPIO27	GPIO88	GPIO104	GPIO90	GPIO106	GPIO90	GPIO106	GPIO_Y7		FF_RTS, SSPSYSCLK ¹⁸
29	GPIO33	GPIO103		GPIO105		GPIO105		GPIO_C1		FF_DSR
31	GPIO10	GPIO100		GPIO102		GPIO102		GPIO_C6		FF_DCD
33	GPIO34	GPIO97		GPIO99		GPIO99		GPIO_Y5		FF_RXD
35	GPIO39	GPIO98		GPIO100		GPIO100		GPIO_Y4		FF_TXD
37	GPIO38	GPIO102	GPIO117	GPIO104	GPIO119	GPIO104	GPIO119	GPIO_Y6		FF_RI, KP_MKIN<4> ¹⁷
39	GND	GND		GND		GND		GND		GND
41	GND	GND		GND		GND		GND		GND
43	GPIO0	GPIO28	EXT_WAKEUP0	GPIO13	EXT_WAKEUP0	GPIO13	EXT_WAKEUP0	GPIO_C7		WAKEUP_Source0, MM_CD(CardDetect)

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SODIMM Pin	Colibri PXA270	Colibri PXA320	Colibri PXA320 multiplexed pins	Colibri PXA300	Colibri PXA300 multiplexed pins	Colibri PXA310	Colibri PXA310 multiplexed pins	Colibri T20	Colibri T20 multiplexed pins	Compatible Functions
										GPIO)
45	GPIO1	GPIO29	EXT_WAKEUP1	GPIO127		GPIO127		GPIO_V3		PRDY ^{2,4}
47	GPIO32	GPIO22		GPIO7		GPIO7		GPIO_I2		MM_CLK
49	GPIO109	GPIO19		GPIO4		GPIO4		GPIO_AA1		MM_DAT<1>
51	GPIO110	GPIO20		GPIO5		GPIO5		GPIO_AA2		MM_DAT<2>
53	GPIO111	GPIO21		GPIO6		GPIO6		GPIO_AA3		MM_DAT<3>
55	GPIO19	GPIO78		GPIO80 ⁶		GPIO10_2 ⁶		GPIO_B6		SDA1 (PS2 Mouse GPIO)
57	GPIO86	GPIO71		GPIO70		GPIO70		GPIO_M0		LDD<16>
59	GPIO12	GPIO14	CIF_DD<7> (GPIO56) ¹	GPIO20	CIF_DD<7> (GPIO46)	GPIO20	CIF_DD<7> (GPIO46)	GPIO_B4	GPIO_L5	PWM<A>, CIF_DD<7>
61	GPIO87	GPIO72		GPIO71		GPIO71		GPIO_M1		LDD<17>
63	GPIO14	GPIO42	GPIO105	GPIO31 ^{6,8}		GPIO9_2 ⁶		GPIO_B7		SCL1 (PS2 Mouse GPIO)
65	GPIO106	GPIO58	GPIO124	GPIO48	GPIO124	GPIO48	GPIO124	GPIO_L7		CIF_DD<9>, KP_MKOUT<3> ¹⁷ , SDA2 (PS2 Keyboard GPIO)
67	GPIO17	GPIO55		GPIO45		GPIO45		GPIO_A7	GPIO_L4	PWM<D> ¹⁹ , CIF_DD<6>
69	GPIO20	GPIO75		GPIO77 ⁶		GPIO8_2 ⁶		GPIO_T2		SCL2 (PS2 Keyboard GPIO)
71	GPIO81	GPIO49		GPIO39		GPIO39		GPIO_T4		CIF_DD<0>, BL_ON (LCD back-light GPIO)
73	GPIO52	GPIO76		GPIO78 ⁶		PWR_GPIO2 ^{6,7}		GPIO_A0		
75	GPIO53	CIF_MCLK (GPIO59) ¹	GPIO77	CIF_MCLK (GPIO49)	GPIO79 ⁶	CIF_MCLK (GPIO49)		GPIO_T1		CIF_MCLK, PRST (PCMCIA reset GPIO) ^{2,4}
77	GPIO82	GPIO79		GPIO81 ⁶				GPIO_T3		
79	GPIO83	GPIO53		GPIO43		GPIO43		GPIO_L2		CIF_DD<4>
81	GPIO84	CIF_VSYNC (GPIO62) ¹	GPIO81	CIF_VSYNC (GPIO52)	GPIO83	CIF_VSYNC (GPIO52)	GPIO83	GPIO_D6		CIF_FV, PCD (PCMCIA card detect GPIO) ^{2,4}
83	GND	GND		GND		GND		GND		GND
85	GPIO107	GPIO57	GPIO125	GPIO47	GPIO125	GPIO47	GPIO125	GPIO_L6		CIF_DD<8>, KP_MKOUT<4> ¹⁷ , nPPEN (PCMCIA power enable) ^{2,4}
87	nRESET_OUT	nRESET_OUT		nRESET_OUT		nRESET_OUT		(GMI_RST_N)		nRESET_OUT

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SODIMM Pin	Colibri PXA270	Colibri PXA320	Colibri PXA320 multiplexed pins	Colibri PXA300	Colibri PXA300 multiplexed pins	Colibri PXA310	Colibri PXA310 multiplexed pins	Colibri T20	Colibri T20 multiplexed pins	Compatible Functions
								GPIO_I4		
89	nWE	DF_ALE_nWE		DF_ALE_nWE		DF_ALE_nWE		GPIO_I0 (GMI_WR_N)		nWE
91	nOE	DF_CLE_nOE		DF_CLE_nOE		DF_CLE_nOE		GPIO_I1		nOE
93	RDnWR	GPIO27	RDnWR	GPIO12 ³	RDnWR	GPIO12 ³	RDnWR	GPIO_I0 (GMI_WR_N)	GPIO_W0	RDnWR ²⁰
95	DNC ⁹ (RDY(GPIO18)) ¹¹	GPIO2		GPIO0		GPIO0		GPIO_I7 (GMI_WAIT)	GPIO_I5 (GMI_IORDY)	RDY
97	GPIO48	GPIO54		GPIO44		GPIO44		GPIO_L3		CIF_DD<5>, nPOE ^{2,4}
99	GPIO49	DF_ALE_nWE	(GPIO93) ¹⁰	DF_ALE_nWE	(GPIO95) ¹⁰	DF_ALE_nWE	(GPIO95) ¹⁰	GPIO_I0 (GMI_WR_N)	GPIO_Z3	nPWE ^{2,4}
101	GPIO51	GPIO6	GPIO51	GPIO41		GPIO41		GPIO_L0		CIF_DD<2>, nPIOW ^{2,4}
103	GPIO50	GPIO5	GPIO52	GPIO42		GPIO42		GPIO_L1		CIF_DD<3>, nPIOR ^{2,4}
105	GPIO15	GPIO73	EXT_nCS0	GPIO16 ⁸	EXT_nCS0 ⁸	GPIO16 ⁸	EXT_nCS0 ⁸	GPIO_K2		nCSx
107	GPIO79	GPIO9	EXT_nCS1	GPIO15	EXT_nCS1	GPIO15	EXT_nCS1	GPIO_K3		nCSx
109	GND	GND		GND		GND		GND		GND
111	ADDRESS0	EXT_ADDRESS0		EXT_ADDRESS0		EXT_ADDRESS0		GPIO_J6		ADDRESS0 ²⁴
113	ADDRESS1	EXT_ADDRESS1		EXT_ADDRESS1		EXT_ADDRESS1		GPIO_J5		ADDRESS1 ²⁴
115	ADDRESS2	EXT_ADDRESS2		EXT_ADDRESS2		EXT_ADDRESS2		GPIO_W6		ADDRESS2 ²⁴
117	ADDRESS3	EXT_ADDRESS3		EXT_ADDRESS3		EXT_ADDRESS3		GPIO_W7		ADDRESS3
119	ADDRESS4	EXT_ADDRESS4		EXT_ADDRESS4		EXT_ADDRESS4		GPIO_C0		ADDRESS4
121	ADDRESS5	EXT_ADDRESS5		EXT_ADDRESS5		EXT_ADDRESS5		GPIO_A1		ADDRESS5
123	ADDRESS6	EXT_ADDRESS6		EXT_ADDRESS6		EXT_ADDRESS6		GPIO_U0		ADDRESS6
125	ADDRESS7	EXT_ADDRESS7		EXT_ADDRESS7		EXT_ADDRESS7		GPIO_U1		ADDRESS7
127	GPIO36	GPIO26		GPIO11 ³		GPIO11 ³		GPIO_BB3		
129	GPIO89	GPIO2_2		GPIO0_2		GPIO0_2		GPIO_W2		USBH_PEN
131	GPIO88	GPIO3_2		GPIO1_2		GPIO1_2		GPIO_W3		USBH_OC
133	GPIO37	GPIO94		GPIO96		GPIO96		GPIO_BB2		
135	GPIO35	GPIO95		GPIO97		GPIO97 ¹⁴		ACC1_DETECT	GPIO_K6	
137	GPIO41	GPIO96		GPIO98		GPIO98 ¹⁴		USB1_VBUS	GPIO_K5	USBC_DET (USB cable detect GPIO)
139	USBH_P	USBH1_P		USBH1_P		USBH1_P		USB3_DP		USBH_P

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SODIMM Pin	Colibri PXA270	Colibri PXA320	Colibri PXA320 multiplexed pins	Colibri PXA300	Colibri PXA300 multiplexed pins	Colibri PXA310	Colibri PXA310 multiplexed pins	Colibri T20	Colibri T20 multiplexed pins	Compatible Functions
141	USBH_N	USBH1_N		USBH1_N		USBH1_N		USB3_DN		USBH_N
143	USBC_P	USBC_H_P		USBC_H_P		USBC_H_P		USB1_DP		USBC_P
145	USBC_N	USBC_H_N		USBC_H_N		USBC_H_N		USB1_DN		USBC_N
147	GND	GND		GND		GND		GND		GND
149	DATA0	DF_IO0		DF_IO0		DF_IO0		GPIO_G0		DATA0
151	DATA1	DF_IO1		DF_IO1		DF_IO1		GPIO_G1		DATA1
153	DATA2	DF_IO2		DF_IO2		DF_IO2		GPIO_G2		DATA2
155	DATA3	DF_IO3		DF_IO3		DF_IO3		GPIO_G3		DATA3
157	DATA4	DF_IO4		DF_IO4		DF_IO4		GPIO_G4		DATA4
159	DATA5	DF_IO5		DF_IO5		DF_IO5		GPIO_G5		DATA5
161	DATA6	DF_IO6		DF_IO6		DF_IO6		GPIO_G6		DATA6
163	DATA7	DF_IO7		DF_IO7		DF_IO7		GPIO_G7		DATA7
165	DATA8	DF_IO8		DF_IO8		DF_IO8		GPIO_H0		DATA8
167	DATA9	DF_IO9		DF_IO9		DF_IO9		GPIO_H1		DATA9
169	DATA10	DF_IO10		DF_IO10		DF_IO10		GPIO_H2		DATA10
171	DATA11	DF_IO11		DF_IO11		DF_IO11		GPIO_H3		DATA11
173	DATA12	DF_IO12		DF_IO12		DF_IO12		GPIO_H4		DATA12
175	DATA13	DF_IO13		DF_IO13		DF_IO13		GPIO_H5		DATA13
177	DATA14	DF_IO14		DF_IO14		DF_IO14		GPIO_H6		DATA14
179	DATA15	DF_IO15		DF_IO15		DF_IO15		GPIO_H7		DATA15
181	GND	GND		GND		GND		GND		GND
183	LINK_AKT	LINK_AKT#		LINK_AKT#		LINK_AKT#		LINK_AKT		LINK_AKT
185	SEED100	SPEED100#		SPEED100#		SPEED100#		SEED100		SEED100
187	TXO-	TXO-		TXO-		TXO-		TXO-		TXO-
189	TXO+	TXO+		TXO+		TXO+		TXO+		TXO+
191	AGND_LAN	GND		GND		GND		AGND_LAN		AGND_LAN
193	RXI-	RXI-		RXI-		RXI-		RXI-		RXI-
195	RXI+	RXI+		RXI+		RXI+		RXI+		RXI+
197	GND	GND		GND		GND		GND		GND

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SODIMM Pin	Colibri PXA270	Colibri PXA320	Colibri PXA320 multiplexed pins	Colibri PXA300	Colibri PXA300 multiplexed pins	Colibri PXA310	Colibri PXA310 multiplexed pins	Colibri T20	Colibri T20 multiplexed pins	Compatible Functions
199	GND	GND		GND		GND		GND		GND
2	AD3	AD3		GPIO23 ⁶		AD3 ⁶		AD3		AD3 ^{2,15}
4	AD2	AD2		GPIO24 ⁶		AD2 ⁶		AD2		AD2 ^{2,15}
6	AD1	AD1		GPIO25 ⁶		AD1 ⁶		AD1		AD1 ^{2,15}
8	AD0	AD0				AD0 ⁶		AD0		AD0 ^{2,15}
10	AVDD_AUDIO	AVDD_AUDIO				AVDD_AUDIO ⁶		AVDD_AUDIO		AVDD_AUDIO
12	AVDD_AUDIO	AVDD_AUDIO				AVDD_AUDIO ⁶		AVDD_AUDIO		AVDD_AUDIO
14	TSPX	TSPX		GPIO27 ⁶		TSPX ⁶		TSPX		TSPX ²
16	TSMX	TSMX		GPIO28 ⁶		TSMX ⁶		TSMX		TSMX ²
18	TSPY	TSPY		GPIO29 ⁶		TSPY ⁶		TSPY		TSPY ²
20	TSMY	TSMY		GPIO107 ⁶		TSMY ⁶		TSMY		TSMY ²
22	nVDD_FAULT	GPIO_RESET#		GPIO_RESET#		GPIO_RESET#		GPIO_BB4		
24	nBATT_FAULT	BATT_SENSE		nBATT_FAULT		nBATT_FAULT		GPIO_BB5		BATT_FAULT detection (Each module has different level)
26	nRESET_EXT	nRESET_EXT		nRESET_EXT		nRESET_EXT		nRESET_EXT		nRESET_EXT
28	GPIO11	GPIO13		GPIO19		GPIO19		GPIO_B5		PWM, CHOUT<0> ²¹
30	GPIO16	GPIO11		GPIO17		GPIO17		GPIO_A6		PWM<C>
32	GPIO44	GPIO109		GPIO111		GPIO111		GPIO_B1		BT_CTS
34	GPIO45	GPIO112		GPIO114		GPIO114		GPIO_K7		BT_RTS
36	GPIO42	GPIO110		GPIO112		GPIO112		GPIO_B0		BT_RXD
38	GPIO43	GPIO111		GPIO113		GPIO113		GPIO_J7		BT_TXD
40	VCC_BATT	VCC_BATT		VCC_BATT		VCC_BATT		VCC_BATT		VCC_BATT ²²
42	3V3	3V3		3V3		3V3		3V3		3V3
44	GPIO77	GPIO17_2		GPIO75		GPIO75		GPIO_J1	GPIO_W1	L_BIAS
46	GPIO65	GPIO13_2		GPIO61		GPIO61		GPIO_E7		LDD<7>
48	GPIO67	GPIO64		GPIO63		GPIO63		GPIO_F1		LDD<9>
50	GPIO69	GPIO66		GPIO65		GPIO65		GPIO_F3		LDD<11>
52	GPIO70	GPIO67		GPIO66		GPIO66		GPIO_F4		LDD<12>

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SODIMM Pin	Colibri PXA270	Colibri PXA320	Colibri PXA320 multiplexed pins	Colibri PXA300	Colibri PXA300 multiplexed pins	Colibri PXA310	Colibri PXA310 multiplexed pins	Colibri T20	Colibri T20 multiplexed pins	Compatible Functions
54	GPIO71	GPIO68		GPIO67		GPIO67		GPIO_F5		LDD<13>
56	GPIO76	GPIO16_2		GPIO74		GPIO74		GPIO_B3		L_PCLK_WR
58	GPIO61	GPIO9_2		GPIO57		GPIO57		GPIO_E3		LDD<3>
60	GPIO60	GPIO8_2		GPIO56		GPIO56		GPIO_E2		LDD<2>
62	GPIO66	GPIO63		GPIO62		GPIO62		GPIO_F0		LDD<8>
64	GPIO73	GPIO70		GPIO69		GPIO69		GPIO_F7		LDD<15>
66	GPIO72	GPIO69		GPIO68		GPIO68		GPIO_F6		LDD<14>
68	GPIO75	GPIO15_2		GPIO73		GPIO73		GPIO_J3		L_LCLK_A0
70	GPIO59	GPIO7_2		GPIO55		GPIO55		GPIO_E1		LDD<1>
72	GPIO63	GPIO11_2		GPIO59		GPIO59		GPIO_E5		LDD<5>
74	GPIO68	GPIO65		GPIO64		GPIO64		GPIO_F2		LDD<10>
76	GPIO58	GPIO6_2		GPIO54		GPIO54		GPIO_E0		LDD<0>
78	GPIO62	GPIO10_2		GPIO58		GPIO58		GPIO_E4		LDD<4>
80	GPIO64	GPIO12_2		GPIO60		GPIO60		GPIO_E6		LDD<6>
82	GPIO74	GPIO14_2		GPIO72		GPIO72		GPIO_J4		L_FCLK_RD
84	3V3	3V3		3V3		3V3		3V3		3V3
86	GPIO24	GPIO84		GPIO86 ⁸		GPIO86 ⁸		GPIO_D3		SSPFRM
88	GPIO23	GPIO83 ^{12,13}		GPIO85 ^{12,13}		GPIO85 ^{12,13}		GPIO_D0		SSPCLK
90	GPIO26	GPIO85 ¹²		GPIO87 ¹²		GPIO87 ¹²		GPIO_D1		SSPRXD
92	GPIO25	GPIO86 ^{12,13}		GPIO88 ^{12,13}		GPIO88 ^{12,13}		GPIO_D4		SSPTXD
94	GPIO85	CIF_HSYNC (GPIO61) ¹	PCE1#	CIF_HSYNC (GPIO51)		CIF_HSYNC (GPIO51)		GPIO_D7		CIF_LV, nPCE ^{1,2,4}
96	GPIO54	CIF_PCLK (GPIO60) ₁	PCE2#	CIF_PCLK (GPIO50)		CIF_PCLK (GPIO50)		GPIO_T0		CIF_PCLK, nPCE ^{2,4}
98	GPIO55	GPIO50	PREG#	GPIO40		GPIO40		GPIO_D5		CIF_DD<1>, nPREG ^{2,4}
100	GPIO104 (PSKTSEL)	GPIO122	PXCVREN#	GPIO122		GPIO122		GPIO_X5		KP_MKOUT<1> ¹⁷ , nPXCVREN ^{2,4}
102	GPIO56	GPIO8		GPIO12 ³	RDnWR	GPIO12 ³	RDnWR	GPIO_X6		nPWAIT ^{2,4}
104	GPIO57	GPIO7		GPIO11 ³		GPIO11 ³		GPIO_X7		nIOIS ^{16,2,4}
106	GPIO80	GPIO87	EXT_nCS2	GPIO89	EXT_nCS2	GPIO89	EXT_nCS2	GPIO_K4		nCSx
108	3V3	3V3		3V3		3V3		3V3		3V3

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SODIMM Pin	Colibri PXA270	Colibri PXA320	Colibri PXA320 multiplexed pins	Colibri PXA300	Colibri PXA300 multiplexed pins	Colibri PXA310	Colibri PXA310 multiplexed pins	Colibri T20	Colibri T20 multiplexed pins	Compatible Functions
110	ADDRESS8	EXT_ADDRESS8		EXT_ADDRESS8		EXT_ADDRESS8		GPIO_U2		ADDRESS8
112	ADDRESS9	EXT_ADDRESS9		EXT_ADDRESS9		EXT_ADDRESS9		GPIO_U3		ADDRESS9
114	ADDRESS10	EXT_ADDRESS10		EXT_ADDRESS10		EXT_ADDRESS10		GPIO_U4		ADDRESS10
116	ADDRESS11	EXT_ADDRESS11		EXT_ADDRESS11		EXT_ADDRESS11		GPIO_U5		ADDRESS11
118	ADDRESS12	GPIO114		GPIO116 ⁸		GPIO116 ⁸		GPIO_U6		
120	ADDRESS13	GPIO115		GPIO117 ⁸		GPIO117 ⁸		GPIO_P4		
122	ADDRESS14	GPIO116		GPIO118 ⁸		GPIO118 ⁸		GPIO_P5		
124	ADDRESS15	GPIO118		GPIO120 ⁸		GPIO120 ⁸		GPIO_P6		
126	DQM0	BE0#		BE0#		BE0#		GPIO_J0 (GMI_CS0_N)		DQM0 ²³
128	DQM1	BE1#		BE1#		BE1#		GPIO_J2 (GMI_CS1_N)		DQM1 ²³
130	DQM2	DF_RE_OE#		DF_RE_OE#		DF_RE_OE#		GPIO_I3 (GMI_CS6_N)		
132	DQM3	DF_WE#		DF_WE#		DF_WE#		GPIO_I6 (GMI_CS7_N)		
134	ADDRESS25	GPIO10		GPIO38 ⁸				GPIO_X4		
136	ADDRESS24	GPIO119		GPIO2_2 ⁸		GPIO2_2 ⁸		GPIO_X3	GPIO_M2	
138	ADDRESS23	GPIO120		GPIO3_2 ⁸		GPIO3_2 ⁸		GPIO_X2	GPIO_M3	
140	ADDRESS22	GPIO121		GPIO121 ⁸		GPIO121 ⁸		GPIO_X1	GPIO_M4	
142	ADDRESS21	GPIO123		GPIO123 ⁸		GPIO123 ⁸		GPIO_X0	GPIO_M5	
144	ADDRESS20	GPIO126		GPIO4_2 ⁸		GPIO4_2 ⁸		GPIO_A5	GPIO_M6	
146	ADDRESS19	GPIO127		GPIO5_2 ⁸		GPIO5_2 ⁸		GPIO_A4	GPIO_M7	
148	3V3	3V3		3V3		3V3		3V3		3V3
150	DATA16	GPIO80		GPIO82 ⁶				GPIO_K0		
152	DATA17	GPIO0_2	GPIO12	GPIO126	GPIO18	GPIO126	GPIO18	GPIO_K1	OWR	
154	DATA18	GPIO89		GPIO91	GPIO53	GPIO91	GPIO53	GPIO_B2		
156	DATA19	GPIO90		GPIO92		GPIO92		GPIO_Z2		
158	DATA20	GPIO91		GPIO93		GPIO93		GPIO_N5		
160	DATA21	GPIO92		GPIO94		GPIO94		GPIO_N4		
162	DATA22	GPIO43		GPIO32 ⁶				GPIO_N6		
164	DATA23	GPIO44		GPIO33 ⁶				GPIO_Z4		
166	DATA24	GPIO45		GPIO34 ⁶				GPIO_AA4		

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SODIMM Pin	Colibri PXA270	Colibri PXA320	Colibri PXA320 multiplexed pins	Colibri PXA300	Colibri PXA300 multiplexed pins	Colibri PXA310	Colibri PXA310 multiplexed pins	Colibri T20	Colibri T20 multiplexed pins	Compatible Functions
168	DATA25	GPIO46		GPIO35 ⁶				GPIO_AA5		
170	DATA26	GPIO47	GPIO82	GPIO36 ⁶				GPIO_AA6		
172	DATA27	GPIO48		GPIO37 ⁶				GPIO_AA7		
174	DATA28	GPIO25		GPIO10		GPIO10		GPIO_N0		
176	DATA29	GPIO24		GPIO9		GPIO9		GPIO_N1		
178	DATA30	GPIO5_2		GPIO6_2 ⁸		GPIO6_2 ⁸		GPIO_N2		
180	DATA31	GPIO41		GPIO30 ⁶				GPIO_N3		
182	3V3	3V3		3V3		3V3		3V3		3V3
184	ADDRESS18	XCVREN#		DNC ⁹		DNC ⁹		GPIO_A3		
186	ADDRESS17	LUA#		LUA#		LUA#		GPIO_A2		
188	ADDRESS16	LLA#		LLA#		LLA#		GPIO_P7		
190	GPIO112	GPIO23		GPIO14		GPIO14		GPIO_T7		MM_CMD
192	GPIO92	GPIO18		GPIO3		GPIO3		GPIO_AA0		MM_DAT<0>
194	GPIO118	GPIO33		GPIO22		GPIO22		GPIO_C5		I2C_SDA
196	GPIO117	GPIO32		GPIO21		GPIO21		GPIO_C4		I2C_SCL
198	3V3	3V3		3V3		3V3		3V3		3V3
200	3V3	3V3		3V3		3V3		3V3		3V3



3.2 Extension Connector (on the back of the Module)

The Colibri Tegra 2 has a 24 pin FFC extension connector which is not compatible with the extension connector of the Colibri PXAxxx modules. See the Colibri Tegra 2 datasheet for more information about the pinout.

Extension Connector	PXA270	PXA320V1.2	PXA320 V1.2 multiplexed pins	PXA300 V1.1	PXA300 V1.1 multiplexed pins	PXA310 V1.2	PXA310 V1.2 multiplexed pins	Compatible
1	GPIO9	GPIO16		GPIO86 ⁸		GPIO86 ⁸		
2	GPIO13	GPIO120		GPIO3_2 ⁸		GPIO3_2 ⁸		KP_DKIN<7>, KP_MKIN<7>
3	GPIO21	GPIO108		GPIO110 ⁸		GPIO110 ⁸		
4	GPIO22	GPIO5_2		GPIO6_2 ⁸		GPIO6_2 ⁸		KP_MKOUT<7>
5	GPIO90	GPIO107		GPIO109		GPIO109		
6	GPIO91	GPIO119		GPIO2_2 ⁸		GPIO2_2 ⁸		KP_MKIN<6>
7	GPIO93	GPIO42	GPIO105	GPIO31 ⁸		DNC ⁹		
8	GPIO94	GPIO106		GPIO108		GPIO108		KP_DKIN<1>
9	GPIO96	GPIO127		GPIO5_2 ⁸		GPIO5_2 ⁸		KP_DKIN<X>, KP_MKOUT<6>
10	GPIO97	GPIO116		GPIO118 ⁸		GPIO118 ⁸		KP_MKIN<3>
11	GPIO99	GPIO118		GPIO120 ⁸		GPIO120 ⁸		KP_DKIN<X>, KP_MKIN<5>
12	GPIO101	GPIO114		GPIO116 ⁸		GPIO116 ⁸		KP_MKIN<1>
13	GPIO102	GPIO115		GPIO117 ⁸		GPIO117 ⁸		KP_MKIN<2>
14	GPIO103	GPIO121		GPIO121 ⁸		GPIO121 ⁸		KP_MKOUT<0>
15	GPIO105	GPIO123		GPIO123 ⁸		GPIO123 ⁸		KP_MKOUT<2>
16	GPIO108	GPIO126		GPIO4_2 ⁸		GPIO4_2 ⁸		KP_MKOUT<5>
17	GPIO115	GPIO17		GPIO101 ⁸	GPIO115 ⁸	GPIO101 ⁸	GPIO115 ⁸	
18	GPIO116	GPIO15		GPIO16 ⁸	EXT_nCS0 ⁸	GPIO16 ⁸	EXT_nCS0 ⁸	



Notes:

1. IF_DD<7>, CIF_MCLK, CIF_PCLK, CIF_HSYNC and CIF_VSYNC (former GPIO 56 and 59-62) on PXA320 don't have an alternate function GPIO. Recommendation for PXA320 and compatible designs:
Don't use SODIMM pin 94 (CIF_HSYNC) and SODIMM pin 96 (CIF_PCLK) as GPIO. You can use SODIMM pins 59, 75 and 81(CIF_DD<7>, CIF_MCLK and CIF_VSYNC) as GPIO because there is another GPIO multiplexed to this SODIMM pins. Set the alternate function of CIF_DD<7>, CIF_MCLK and CIF_VSYNC to 0x7 (tristate) if you would like to use the multiplexed GPIO's.
2. The Colibri PXA300 module doesn't have PCMCIA, audio and touch interface.
3. On the Colibri PXA300/PXA310 modules, some GPIOs are connected to two SODIMM pins each. Be careful by using these pins.
4. The Colibri PXA310 and Colibri Tegra 2 doesn't have PCMCIA signals.
5. The Colibri PXA270 doesn't have the SYS_EN signal.
6. These signals are not 100% compatible between Colibri PXA300 and PXA310. Take care when developing a combined baseboard for Colibri PXA300/PXA310.
7. PWR_GPIO2 on the Colibri PXA310 is the GPIO2 of the National PMIC LP3972. It's not recommended to use this pin on Colibri PXA310 or designs that have to be compatible with the Colibri PXA310.
8. These pins are connected to an SODIMM pin and to an extension connector pin. Be careful by using these pins when using the extension connector.
9. Do not connect this pin.
10. Colibri PXA320 V2.0 and higher: You can use this pin as GPIO. For more details please refer to the Colibri PXA320 datasheet.
All other Colibri PXA3xx modules and versions: This pin is always nWE (DF_ALE_nWE). It's not possible to use this pin as GPIO.
11. SODIMM Pin 95:
Colibri PXA270: GPIO18 is always alternate function RDY (used internally).
up to HW V1.2: Because of a bug in the Ethernet Controller on the Colibri PXA270 this pin can't be used. Do not connect this pin.
HW V2.1 and higher: RDY can be used for VLIO bus accesses with a common pull-down circuit.
12. These pins are used when updating the CPLD on the PXA (SODIMM pin 88, 90, 92). Do not drive these pins until the CPLD update is done. The CPLD update has to be started manually (Toradex Bootloader V3.3 and higher). You can use these pins when not performing a CPLD update.
13. These pins have an internal pull-up of about 10kOhm.
14. PXA310 GPIO97 has an internal pull-down of about 75kOhm.
PXA310 GPIO98 has an internal pull-up of about 1MOhm.
15. Analog input voltage range is not the same for all Colibri modules. See chapter 2.6 section 10.
16. Supply VSS_AUDIO and AVDD_AUDIO even if you don't need any of the analog function of the Colibri module.
17. Dedicated matrix keypad functions are not available on the Colibri Tegra 2. As an alternative normal GPIOs can be used to realize a matrix keypad interface
18. SYSCLK not available on Colibri Tegra 2
19. Colibri PXA3xx does not have PWM<D>
20. The Colibri Tegra 2 does not have an RDnWR signal, instead we provide the GMI_WR_N
21. The Colibri Tegra 2 does not have a CHOUT function
22. This pin needs to be connected even if the internal RTC is not used
23. The Colibri Tegra 2 does not have DQM signals
24. On the Colibri Tegra 2 the address signals are mapped differently than on the Colibri PXAxxx, please see the Colibri Tegra 2 Datasheet for more information



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