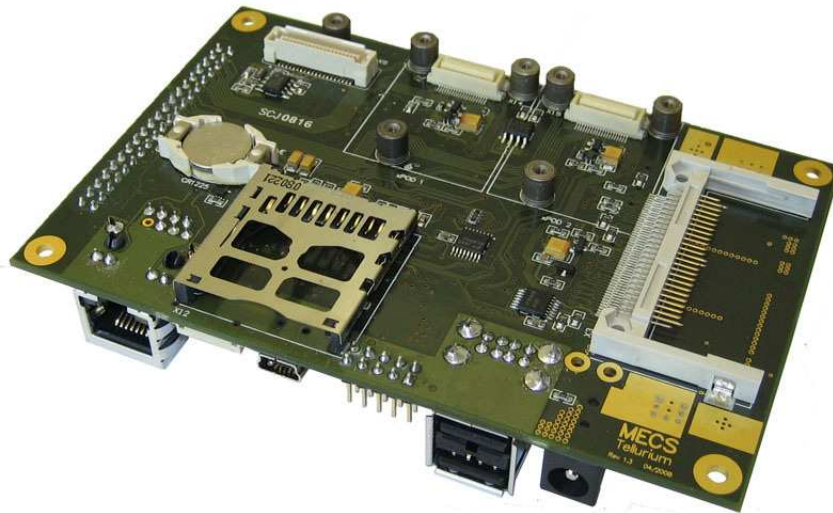


MECS Tellurium V1.3

Datasheet



Revision History

Date	Doc. Rev.	MECS Version	Changes
03-Mar-10	Rev. 1.4	V1.3	Update to xPOD connector pin out and location drawing
22-Sept-08	Rev. 1.3	V1.3	Drawing update, PWM and SSP pin corrections
08-Apr-08	Rev. 1.2	V1.3	Update for MECS Tellurium version 1.3
23-Mar-08	Rev. 1.1	V1.2	Update for MECS Tellurium version 1.2

Contents

1. Introduction	3
2. Features	3
2.1. User Interface	3
2.2. Communication Interfaces	4
2.3. Expansion Interfaces	4
2.4. Card Interfaces	4
3. Technical Specifications	5
3.1. Operating System	5
3.2. Processor Options	5
3.3. xPOD Interface	6
3.4. Power Supply	7
3.5. Detailed Interface Description	7
3.6. Display interface	9
3.7. Real-Time Clock	10
4. Reference Documents	11
4.1. Processor	11
4.2. Ethernet	11
4.3. Audio, Touch Screen and A/D Converter	11
4.4. USB Hub Controller	11
4.5. Real-Time Clock	11
5. MECS Tellurium Connectors	12
5.1. Connectors	12
5.2. Locations	13
5.3. Display Connector	16
5.4. Touch Screen	17
5.5. Generic expansion	18
5.6. xPOD	20
5.7. External Power Supply	23
5.8. Audio	24
5.9. RS-232	25
5.10. DC power jack	25

1. Introduction

MECS™ (Modular Embedded Computer System) is a modular hardware platform that can be used to build low power computing systems optimised for specific applications.

The modular architecture that is intrinsic to MECS ensures that it is flexible and configurable, making it suitable for use in a wide variety of applications. Maximum product longevity can be reached as the platform is fully upgradeable through the use of a range of Colibri modules and xPOD™ (Expansion Peripheral On-board Device) modules.

This document provides technical details of the MECS Tellurium platform, including interface descriptions, mechanical drawings and connector pin-out information.

The MECS Tellurium carrier board provides regulated power supplies, industry standard interfaces such as USB, Ethernet, Compact Flash and SD (Secure Digital), as well as an on board USB hub, an extremely low power real-time clock (RTC) and xPOD module support.

A range of Colibri modules based on the Intel and Marvell X-Scale microcontrollers provide a variety of processor options, RAM capacities and non-volatile memory storage for operating system, application and user data. The Colibri module can be selected based upon the intended applications requirements, allowing the optimal price versus performance balance to be achieved.

The xPOD interfaces provide a simple method of extending platform functionality to support features such as Wireless LAN (802.11b/g), Bluetooth, CAN (Controller Area Network), GPS, and more.

2. Features

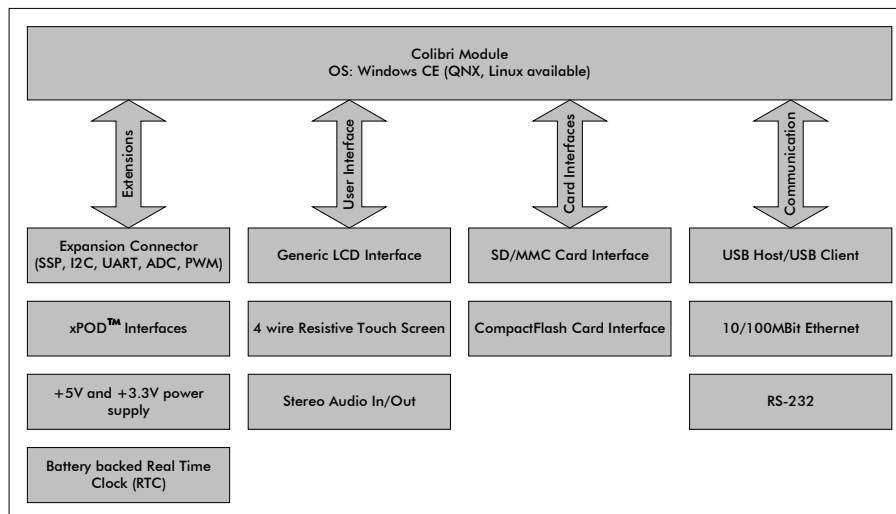


Figure 1: MECS Tellurium Block Diagram

2.1. User Interface

- Generic LCD 40 pin connector interfacing to a wide range of active and passive TFT colour and monochrome LCD panels. Maximum resolution of 1024x768 @ 18 BPP (262,144 colours). Support for serially driven displays via SSP interface.
- Touch Screen 4-wire resistive touch screen connected via 4 pin header¹
- Audio Headphone Out (stereo) and Line In (stereo)¹
- Keyboard, mouse Supported via USB interface

2.2. Communication Interfaces

Ethernet	10/100Mb
USB	1x USB client (mini-B connector) 4x USB host (2x xPOD reserved, 2x A-type connector)
Asynchronous Serial	1x Full Function RS-232. Maximum 921,600bps

2.3. Expansion Interfaces

Expansion Connector	Expansion interface providing the following I/O interfaces: 1x I2C 1x SSP (supporting SPI, MicroWire and custom SPP protocols) 1x BT UART 4x PWM Outputs 4x ADC Inputs ¹ Reset In/Reset Out 2x xPOD GPIO Interfaces
xPOD	2x xPOD sockets supporting the following I/O interfaces: 1x I2C 1x SSP 1x USB 1x UART 1x SDIO Reset In/Reset Out 1x xPOD GPIO Interface

2.4. Card Interfaces

SD/MMC	1x SD/MMC Card Slot (Push to lock/eject mechanism)
CompactFlash	1x CompactFlash card interface. Large range of memory cards and other CompactFlash compatible expansion peripherals ¹

¹Interfaces may not be available with certain Colibri modules. Please check compatibility table specified in section 3.

3. Technical Specifications

3.1. Operating System

Windows CE is the recommended operating system to use with the MECS Tellurium product, and ships pre-installed on any of the Colibri modules. Board support packages are available for custom application development using available Microsoft development tools including eMbedded Visual C++ 4.0 and Visual Studio.

Linux and QNX operating systems are available from third parties.

3.2. Processor Options

The MECS Tellurium platform supports a variety of Colibri modules based around the Intel and Marvell X-Scale processor family. Currently supported modules are as follows:

Processor	Marvell PXA320
Clock frequency	806MHz
RAM	128MB DDR RAM (32 bit)
FLASH	1GB FLASH (8 bit)
Processor	Intel PXA270
Clock frequency	312MHz
RAM	64MB SDRAM (32 bit)
FLASH	32MB FLASH (32 bit)
Processor	Intel PXA270
Clock frequency	520MHz
RAM	64MB SDRAM (32 bit)
FLASH	32MB FLASH (32 bit)
Processor	Marvell PXA300
Clock frequency	208MHz
RAM	64MB DDR RAM (32 bit)
FLASH	128MB FLASH (8 bit)

Table 1: Supported Colibri Modules

Function	PXA270	PXA300	PXA320
Audio	•		•
CompactFlash	•		•
Ethernet	•	•	•
Expansion Interface	•	1	•
External Power Supply	•	•	•
Generic LCD interface	•	•	•
RS-232	•	•	•
SD/MMC Card	•	•	•
Touch Screen	•		•
USB Host	•	•	•
USB Client	•	•	•
xPOD 1	•	•	•
xPOD 2	•	•	•

Table 2: Compatibility Table

¹ Reduced interface supported. Please see section 6.

3.3. xPOD Interface

The xPOD™ standard provides a mechanism for easily expanding system functionality through additional plug-in hardware modules. The xPOD standard defines an electrical interface specification and a mechanical form factor, ensuring hardware compatibility between the Tellurium platform and future additions to the xPOD module family.

The xPOD electrical interface provides a wide range of serial communication interfaces, GPIO interfaces and regulated power supplies as follows:

- SSP (Synchronous Serial Protocol)¹
- UART (Universal Asynchronous Receive Transmit) [software handshaking only]
- I2C (Inter-Integrated Circuit)
- Full speed USB 2.0
- SDIO (Secure Digital I/O)²
- Reset In/Reset Out
- 2x Host GPIO (connected to GPIO signals on the Colibri SODIMM connector)
- +5V and +3.3V regulated power supplies
- 8x xPOD GPIO (connected directly to the expansion connector so that the platform can communicate with any external devices through a single interface)

Not all interfaces will be used by every xPOD module: each xPOD module can make use of the interfaces that it needs to achieve the functionality specific to that xPOD.

There are 2 xPOD interfaces available on the Tellurium platform.

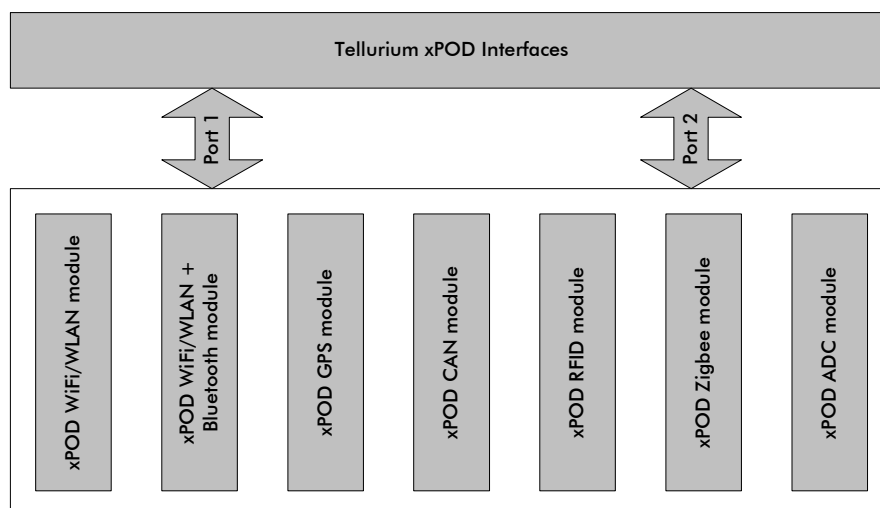


Figure 2: xPOD interfaces and example xPOD plug-in modules

Each xPOD interface supports a single xPOD module. An example of current and future xPOD modules are shown in figure 2. New xPOD devices are being constantly added to support additional functionality, so please check with your local distributor for xPOD availability.

¹ The SPP interface is shared between the xPOD 1 interface and the 40 way expansion interface on the MECS Tellurium platform.

² The SDIO interface is multiplexed between both xPOD 1 and xPOD 2 interfaces and the SD/MMC card slot on the MECS Tellurium platform.

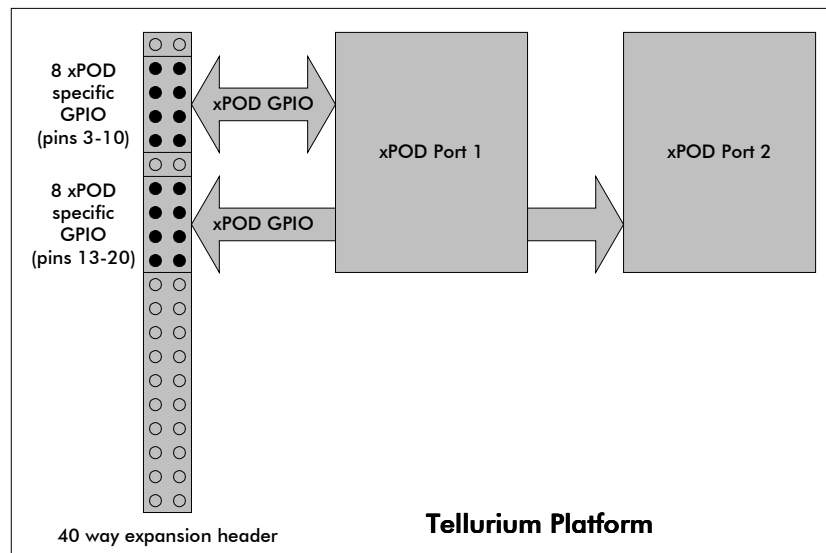


Figure 3: xPOD GPIO interfaces between xPOD ports and the 40-way expansion connector

Figure 3 shows how the xPOD GPIO interface is mapped to individual pins on the 40-way expansion connector. The functionality of these pins will depend upon the type of xPOD module installed.

For instance, with the 4 channel 10 bit ADC xPOD installed, 4 of the xPOD GPIO pins become ADC input pins and 4 become analogue ground pins. This enables the Tellurium platform to provide a single, robust expansion interface for external connectivity, whose functionality can be tailored to individual applications requirements by selecting the required xPOD hardware modules.

3.4. Power Supply

The power supply on MECS is a buck type switched mode high-efficiency supply providing both +3.3V and +5V regulated supplies.

It is capable of supplying up to 3A @ +3.3V (9.9W) and 3A @ +5V (15W). The power supply has a built in thermal shutdown mechanism which will place the supply into thermal shutdown should an over-temperature condition occur to prevent damage.

Input voltage: 7-48V DC supported (absolute maximum of 75V).

Power availability: Up to 3A @ 3.3V and 3A @ 5V

Reverse polarity protection is included.

3.5. Detailed Interface Description

CompactFlash interface

Interface supports both Type I and Type II cards. Available for non-volatile FLASH memory expansion and peripheral expansion (e.g. WiFi, Bluetooth, GPS, RFID, etc).

SD card interface

SD card interface supports 4 bit, 1 bit and SPI interface mode. The bus is multiplexed with the xPOD interfaces on the Tellurium platform. In order to use the SD interface, one of the three possible device interfaces must be selected (i.e. SD card slot, xPOD port 1 or xPOD port 2). Figure 4 shows a schematic representation of how the SD interface is multiplexed between the three device interfaces.

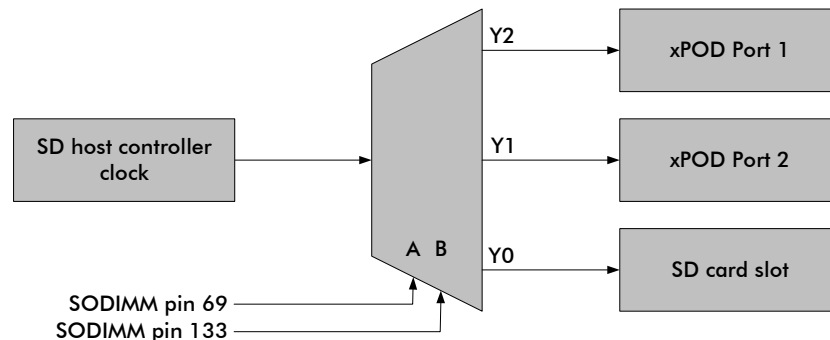


Figure 4: Multiplexed SD clock signal

By default, the SD card slot is selected. Care should be taken when using an xPOD module which makes use of the SD card interface if it is also intended to make use of the SD card slot. Coexistence software may be required to support multiple SD devices at the same time, and the user should be aware that restrictions may apply to the use of the SD interface when sharing it between multiple devices.

B	A	Selected interface
L	L	SD card slot
L	H	xPOD Port 2
H	L	xPOD Port 1

Table 3: Multiplexer truth table

Table 3 shows the multiplexer truth table.

USB host/client

An on-board USB 2.0 compliant hub controller allows up to two USB host devices to be connected via the available type A USB connector ports at any one time. A further two USB 2.0 compliant ports are available through the two xPOD interface connectors for use by installed xPOD modules.

Ethernet

10/100Mb Ethernet is available via the on-board RJ-45 connector. X9 must be set according to the following table depending upon the installed Colibri module:

Colibri Module	X9 Setting
PXA270	1 - 2
PXA300	2 - 3
PXA320	2 - 3

Table 4: Ethernet jumper setting

RS-232 Serial

An RS-232 compliant serial port is available via the 10 way 2.54mm pitch on-board male header

SSP

Synchronous Serial Ports (SSP) are available¹ via the 40 way male expansion header and on the xPOD interfaces. 2 independent SSPs are available; one accessible via an xPOD interface connector and the second shared between the 40 way expansion connector and the xPOD 2 interface connector. SPI™ (Serial Peripheral Interface), MicroWire™ and custom SSP protocols are supported.

UART serial

A Bluetooth Asynchronous Serial Port is available via the on-board 40 way expansion header and xPOD port 1 (only the Rx and Tx signals are supported on the xPOD interface – i.e. no hardware flow control). A standard (no hardware flow control) UART serial port is available on xPOD port 2.

I2C

The Phillips Inter-Integrated Circuit (I-Squared-C) bus is available via the 40 way expansion header and both xPOD interfaces. This bus is used to configure the on-board USB hub controller and for xPOD module detection and configuration. The on-board RTC is also interfaced via the I2C bus.

ADC inputs

4x 10 bit Analogue-to-Digital Converter inputs are available via the 40 way expansion connector, depending upon the installed Colibri module (please see section 6 for more information). These inputs are filtered using an RC network prior to reaching the converter input pins. The time-constant for each RC network is ~100ms.

PWM outputs

4x Pulse Width Modulated outputs are provided via the expansion interface.

GPIO

Certain pins on the expansion interface can have their pins configured for GPIO (General Purpose Input/Output) use. Please see the relevant Colibri module datasheet for alternative pin function.

3.6. Display interface

The Tellurium platform provides a generic digital display interface capable of driving almost any active or passive TFT panel with up a resolution of up to 1024x768 @ 18 bpp (262,144 colours). This interface also provides a PWM channel for back light brightness control and an SSP interface for displays that require power up configuration. Both regulated 3.3V and 5V supplies are available on this interface.

A large range of display interface connectors are available for the MECS Tellurium platform allowing fast and easy integration with a variety of industry standard displays, from highly transmissive CCFL to widescreen LED backlit. The range of displays supported by off the shelf connectors is being constantly expanded – please contact your local distributor for a comprehensive list.

¹ Please see section 5.6 for more detailed information.

3.7. Real-Time Clock

An on-board real-time clock (RTC) based around the STMicroelectronics M41T81S ensures that accurate time can be kept in the event of a power failure or when the system is legitimately powered down. The RTC provides counters for tenths/hundredths of seconds, seconds, minutes, hours, day, date, month year and century.

An ultra low battery supply current of 0.6 μ A ensures extremely long backup battery lifetime, which is further enhanced by the devices ability to automatically switch between battery supply and primary 3.3V power supply when the latter is available.

In the event of an unexpected power failure, the RTC can provide a timestamp indicating what time the power failure occurred.

3.8. Status LEDs

There are four individual LEDs on the Tellurium.

Two are located in the area which contains the on-board 3.3V and 5V power supplies. When lit, these indicate that the associated supply is powered (the silkscreen text adjacent to each LED indicates which LED is associated with which supply).

There is an orange LED which is located adjacent to the USB hub IC (device marked NXP ISP1520). When the USB hub is operational (hence a host link with the Colibri USB port is present) this LED will pulse at a rate of approximately 1Hz. During normal operation, this LED should be pulsing. Any other state indicates the hub is not functioning correctly.

The fourth LED is a green LED located in the vicinity of the USB client port (mini-B connector). This LED will light to indicate when a connected USB host device is providing power to the port.

4. Reference Documents

4.1. Processor

Intel® PXA270 Processor Electrical, Mechanical and Thermal Specification Datasheet:

www.intel.com/design/pca/applicationsprocessors/datashts/280002.htm

Intel® PXA27x Processor Family Design Guide:

www.intel.com/design/pca/applicationsprocessors/manuals/280001.htm

Intel® PXA27x Processor Family Developers Manual:

www.intel.com/design/pca/applicationsprocessors/manuals/280000.htm

Marvel® PXA3xx Processor Family Documentation requires an NDA. Please contact your local Marvel representative for information on how to obtain these.

4.2. Ethernet

DM9000E Ethernet Controller

DM9000 Datasheet VF03:

<http://www.davicom.com.tw/big5/download/Data%20Sheet/DM9000-DS-F03-930914.pdf>

DM9000 Application Notes V1.22

http://www.davicom.com.tw/big5/download/Data%20Sheet/DM9000_Application_Notes_Ver_1_22%20061104.pdf

4.3. Audio, Touch Screen and A/D Converter

UCB1400 AC97 Audio and Touch Screen Controller

<http://www.nxp.com/pip/UCB1400-02.html>

UCB1400 Datasheet Rev. 02:

<http://www.semiconductors.philips.com/acrobat/datasheets/UCB1400-02.pdf>

AN10154_2: Notes on using the UCB1400 24-Jul-02:

http://www.semiconductors.philips.com/acrobat/applicationnotes/AN10154_2.pdf

4.4. USB Hub Controller

NXP ISP1520 USB2.0 Compliant Universal Serial Bus Hub Controller

www.nxp.com/pip/ISP1520_4.html

4.5. Real-Time Clock

STMicroelectronics Real-Time Clock

<http://www.st.com/stonline/products/literature/ds/10773/m41t81s.htm>

5. MECS Tellurium Connectors

5.1. Connectors

The following is the complete list of connectors supported:

Connector	Description
X1	RS-232
X2	USB Client
X3	CompactFlash card slot
X4	Touch screen
X5	Display
X6	Ethernet
X7	CPU Module
X8	Generic I/O Expansion
X9	Ethernet Select
X10	External Power Supply
X11	Audio
X12	SDIO card slot
X13	USB Host
X14	xPOD 1
X15	xPOD 2

Table 5: Connector description

This section provides detailed information on the signal pin-out of each connector, where necessary.

5.2. Locations

Top side

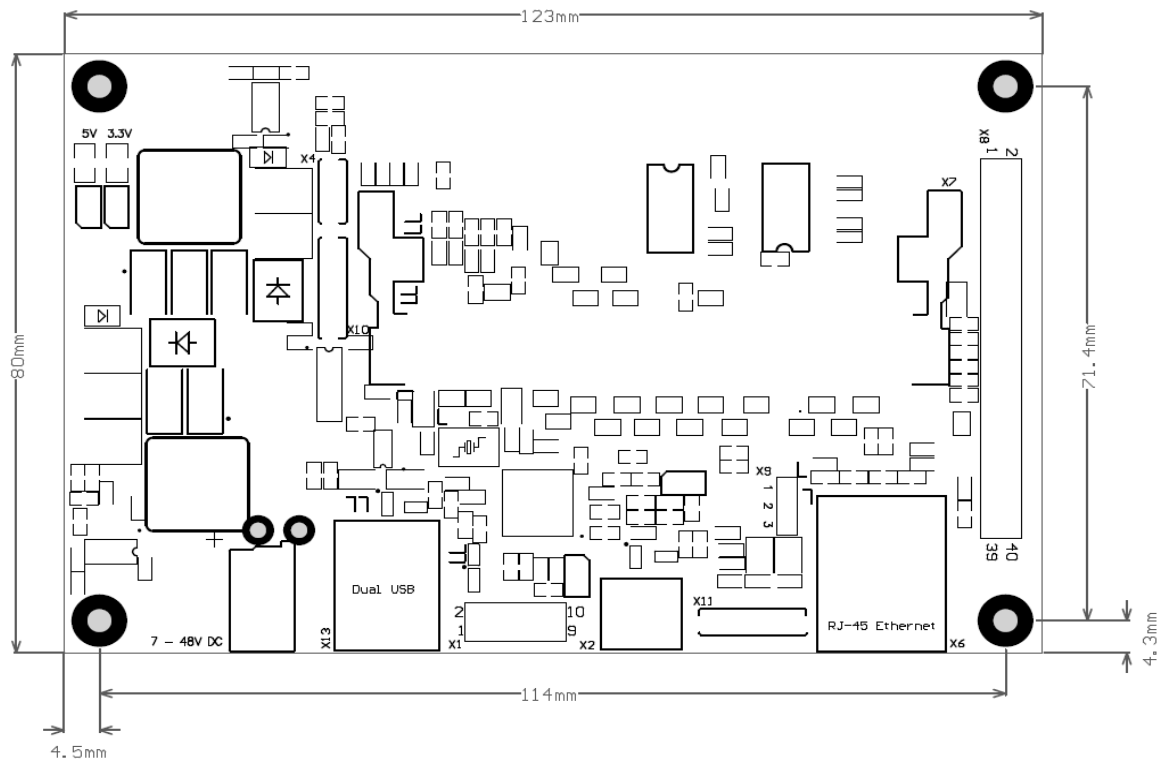


Figure 5: MECS Tellurium platform top side

Bottom side

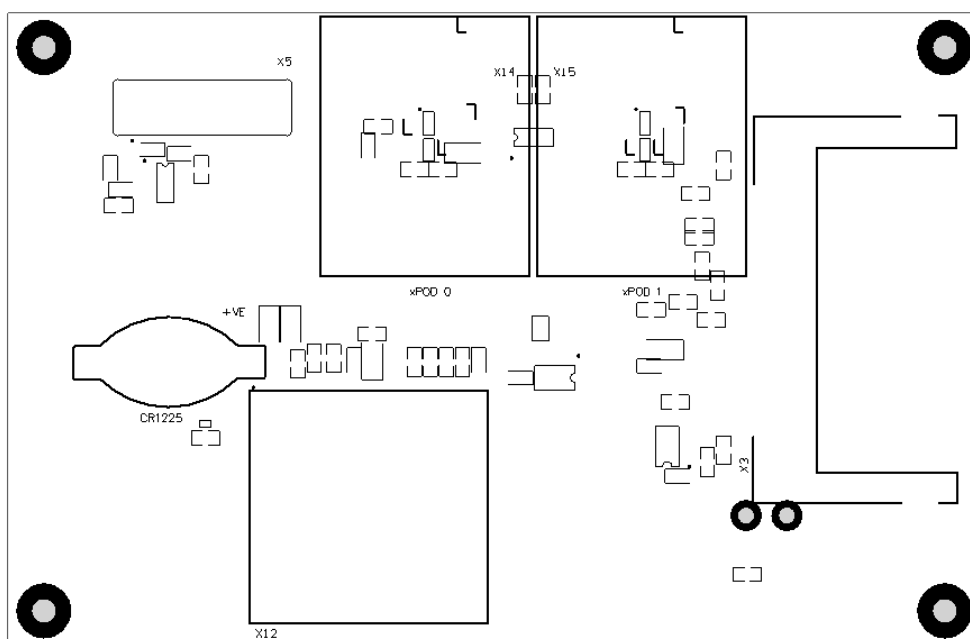
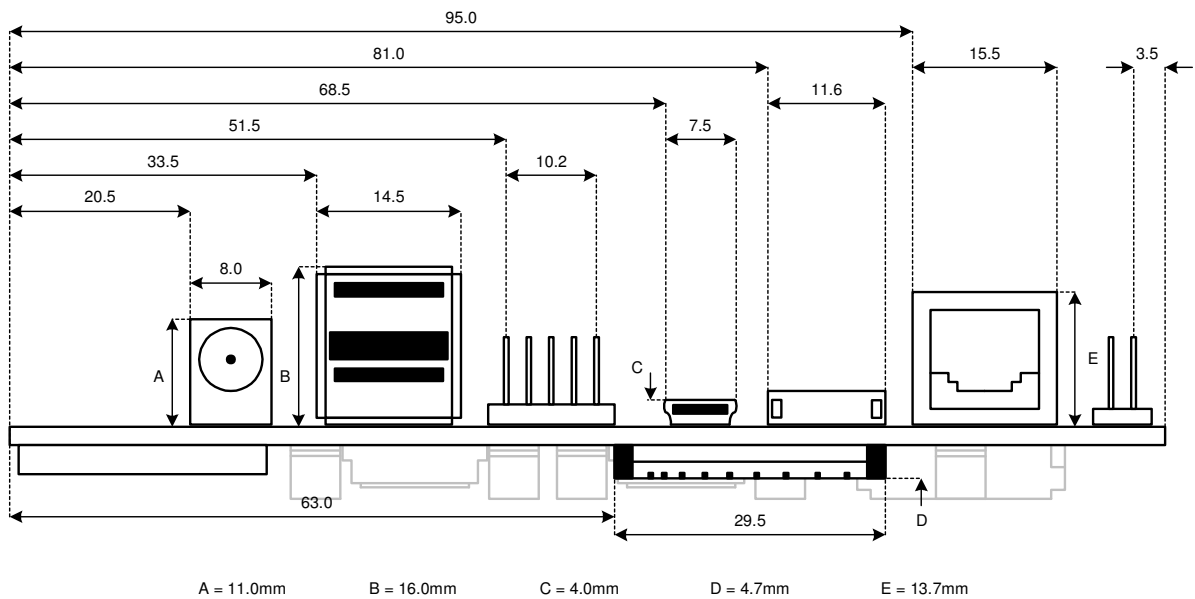


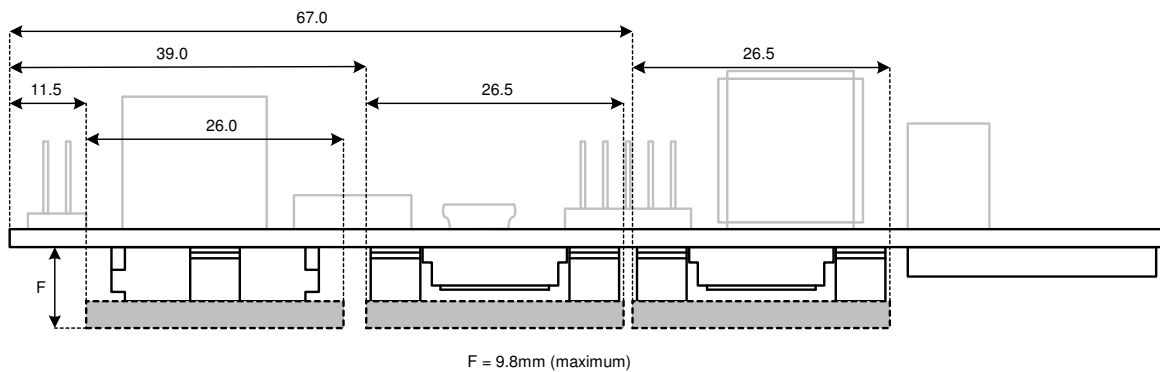
Figure 6: MECS Tellurium platform bottom side

Front and rear view

Front view



Rear view

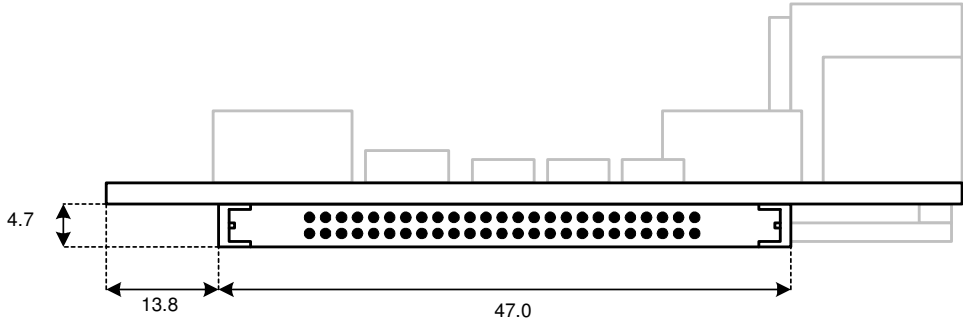


Note that the exact height may be less than specified in dimension F; this specifies the absolute maximum for any installed xPOD or display connector

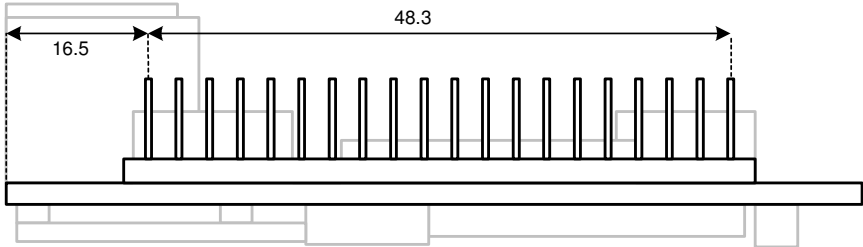
All dimensions in mm (millimeter) unless otherwise stated

Side view

Side view (Compact Flash)

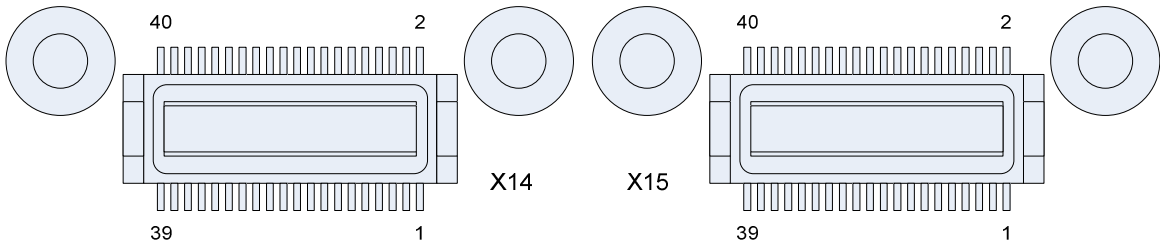


Side view (I/O Expansion connector)



All dimensions in mm (millimeter) unless otherwise stated

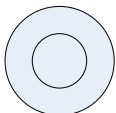
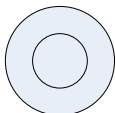
xPOD connector view



MECS Tellurium PCB (bottom side)

xPOD 1

xPOD 2



5.3. Display Connector

Connector manufacturer Tyco
 Number of ways: 40
 Pin pitch: 0.8mm
 Maximum voltage: 100VAC
 Maximum current: 0.5A
 Connector part number: 5177984-1
 Connector partner part number: 5177983-1

Pin	SODIMM Pin	Default Function	PXA270	PXA300	PXA320	Description	Pull-up/Pull-down/Filtering/ESD/EMI
1	92	SSPTXD	•	•	•	Synchronous Serial Port Transmit	
2	90	SSPRXD	•	•	•	Synchronous Serial Port Receive	
3	88	SSPCLK	•	•	•	Synchronous Serial Port Clock	
4	86	SSPFRM	•	•	•	Synchronous Serial Port Frame	
5	-	GND				Ground	
6	65	DME	•	•	•	Display Memory Enable	
7	82	L_FCLK	•	•	•	Frame clock	
8	80	LDD6	•	•	•	Green data 0 (LSB)	
9	-	GND	•	•	•	Ground	
10	78	LDD4	•	•	•	Blue data 4	
11	76	LDD0	•	•	•	Blue data 0 (LSB)	
12	74	LDD10	•	•	•	Green data 4	
13	72	LDD5	•	•	•	Blue data 5 (MSB)	
14	71	BL_ON				Back light On	
15	-	GND				Ground	
16	70	LDD1	•	•	•	Blue data 1	
17	68	L_LCLK	•	•	•	Line clock	
18	66	LDD14	•	•	•	Red data 2	
19	-	GND				Ground	
20	64	LDD15	•	•	•	Red data 3	
21	62	LDD8	•	•	•	Green data 2	
22	61	LDD17	•	•	•	Red data 5 (MSB)	
23	60	LDD2	•	•	•	Blue data 2	
24	58	LDD3	•	•	•	Blue data 3	

25	-	GND				Ground	
26	57	LDD16	•	•	•	Red data 4	
27	56	L_PCLK	•	•	•	Pixel clock	
28	54	LDD13	•	•	•	Red data 1	
29	-	GND				Ground	
30	52	LDD12	•	•	•	Red data 0 (LSB)	
31	50	LDD11	•	•	•	Green data 5 (MSB)	
32	48	LDD9	•	•	•	Green data 3	
33	46	LDD7	•	•	•	Green data 1	
34	-	GND				Ground	
35	-	GND				Ground	
36	30	PWM0	•	•	•	PWM 0 (for brightness control)	
37	-	5V				+5V power supply	220R/100MHz/2A ferrite bead
38	-	GND				Ground	
39	-	3V3				+3.3V power supply	220R/100MHz/2A ferrite bead
40	44	L_BIAS	•	•	•	Bias or DE (Data Enable)	

Table 6: Display connector data

5.4. Touch Screen

A 4-wire resistive touch screen controller allows a wide range of resistive touch screen panels to be connected for user input. The touch screen is connected via the 4 pin touch screen connector.

Pin	SODIMM Pin	Default Function	PXA270	PXA300	PXA320	Description	Pull-up/Pull-down/Filtering/ESD/EMI
1	14	TSPX	•		•	Resistive touch screen input	
2	16	TSMX	•		•	Resistive touch screen input	
3	18	TSPY	•		•	Resistive touch screen input	
4	20	TSMY	•		•	Resistive touch screen input	

5.5. Generic expansion

Connector manufacturer:	Molex
Number of ways:	40
Pin pitch:	2.54mm
Maximum voltage:	TBD
Maximum current:	TBD
Connector part number:	WM26840-ND
Connector partner part number:	TBD

Pin	SODIMM Pin	Default Function	PXA270	PXA300	PXA320	Description	Pull-up/Pull-down/Filtering/ESD/EMI
1	-	GND				Ground	
2	-	3V3				+3.3V power supply	220R/100MHz/2A ferrite bead
3	-	XPOD1_GPIO5	•	•	•	XPOD GPIO 5 (direct connection to XPOD 1 interface)	
4	-	XPOD1_GPIO7	•	•	•	XPOD GPIO 7 (direct connection to XPOD 1 interface)	
5	-	XPOD1_GPIO1	•	•	•	XPOD GPIO 1 (direct connection to XPOD 1 interface)	
6	-	XPOD1_GPIO3	•	•	•	XPOD GPIO 3 (direct connection to XPOD 1 interface)	
7	-	XPOD1_GPIO4	•	•	•	XPOD GPIO 4 (direct connection to XPOD 1 interface)	
8	-	XPOD1_GPIO6	•	•	•	XPOD GPIO 6 (direct connection to XPOD 1 interface)	
9	-	XPOD1_GPIO0	•	•	•	XPOD GPIO 0 (direct connection to XPOD 1 interface)	
10	-	XPOD1_GPIO2	•	•	•	XPOD GPIO 2 (direct connection to XPOD 1 interface)	
11	-	GND				Ground	
12	-	5V				+5V power supply	220R/100MHz/2A ferrite bead
13	-	XPOD2_GPIO5	•	•	•	XPOD GPIO 5 (direct connection to XPOD 2 interface)	
14	-	XPOD2_GPIO7	•	•	•	XPOD GPIO 7 (direct connection to XPOD 2 interface)	
15	-	XPOD2_GPIO1	•	•	•	XPOD GPIO 1 (direct connection to XPOD 2 interface)	
16	-	XPOD2_GPIO3	•	•	•	XPOD GPIO 3 (direct connection to XPOD 2 interface)	
17	-	XPOD2_GPIO4	•	•	•	XPOD GPIO 4 (direct connection to XPOD 2 interface)	
18	-	XPOD2_GPIO6	•	•	•	XPOD GPIO 6 (direct connection to XPOD 2 interface)	
19	-	XPOD2_GPIO0	•	•	•	XPOD GPIO 0 (direct connection to XPOD 2 interface)	
20	-	XPOD2_GPIO2	•	•	•	XPOD GPIO 2 (direct connection to XPOD 2 interface)	
21	194	I2C_SDA	•	•	•	I2C bus data line	2K2 pull-up resistor
22	196	I2C_SCL	•	•	•	I2C bus clock	2K2 pull-up resistor
23	90	SSPRXD	•	•	•	Synchronous Serial Port Receive	
24	86	SSPFRM	•	•	•	Synchronous Serial Port Frame	

25	92	SSPTXD	•	•	•	Synchronous Serial Port Transmit	
26	88	SSPCLK	•	•	•	Synchronous Serial Port Clock	
27	36	BT_RXD	•	•	•	Bluetooth UART serial port receive	
28	32	BT_CTS	•	•	•	Bluetooth UART serial port clear-to-send	
29	38	BT_TXD	•	•	•	Bluetooth UART serial port transmit	
30	34	BT_RTS	•	•	•	Bluetooth UART serial port request-to-send	
31	30	PWM0	•	•	•	Pulse Width Modulated output 0	
32	28	PWM2	•	•	•	Pulse Width Modulated output 2	
33	67	PWM1	•	¹	¹	Pulse Width Modulated output 1	
34	59	PWM3	•	•	•	Pulse Width Modulated output 3	
35	4	RAW_AD2	•	¹	•	Analogue-to-Digital Converter input 2	RC filter, T ~ 100ms
36	2	RAW_AD3	•	¹	•	Analogue-to-Digital Converter input 3	RC filter, T ~ 100ms
37	8	RAW_AD0	•		•	Analogue-to-Digital Converter input 0	RC filter, T ~ 100ms
38	6	RAW_AD1	•	¹	•	Analogue-to-Digital Converter input 1	RC filter, T ~ 100ms
39	26	nRESET_IN	•	•	•	Reset in (pull low to reset)	10nF capacitor to ground
40	87	nRESET_OUT	•	•	•	Reset out (pulled low during Colibri reset)	

Table 7: Generic expansion connector

The XPOD GPIO signals that are available on the expansion connector allow direct connection to the XPOD interfaces. Their function is dependent upon the installed XPOD module(s). Custom XPOD modules can make use of these interface connections.

¹ These pins are only available as GPIO.

5.6. xPOD

Connector manufacturer:	Hirose
Number of ways:	40
Pin pitch:	0.5mm
Maximum voltage:	50VAC
Maximum current:	0.3A
Connector part number:	DF17
Connector partner part number:	DF17

5.6.1 xPOD 1 interface

Pin	SODIMM Pin	Default Function	PXA270	PXA300	PXA320	Description	Pull-up/Pull-down/Filtering/ESD/EMI
1	-	5V				+5V power supply	220R/100MHz/2A ferrite bead
2	-	3V3				+3.3V power supply	220R/100MHz/2A ferrite bead
3	-	5V				+5V power supply	220R/100MHz/2A ferrite bead
4	-	3V3				+3.3V power supply	220R/100MHz/2A ferrite bead
5	36	BT_RXD	•	•	•	Bluetooth UART serial port receive	
6	-	GND				Ground	
7	38	BT_TXD	•	•	•	Bluetooth UART serial port transmit	
8	-	GND				Ground	
9	192	MDAT0	•	•	•	SDIO bit 0	
10	190	MMCMD	•	•	•	SDIO command	
11	49	MDAT1	•	•	•	SDIO bit 1	
12	1	XPOD_1_CLK	•	•	•	SDIO multiplexed clock – XPOD 1 clock	
13	51	MDAT2	•	•	•	SDIO bit 2	
14	43	MMCD	•	•	•	SDIO Card Detect	
15	2	VCC_USB1	•	•	•	+5V current limited USB power supply	220R/100MHz/2A ferrite bead, transient ESD
16	53	MDAT3	•	•	•	SDIO bit 3	
17	2	USBH1_P	•	•	•	USB data line	15K pull down, choke, transient ESD
18	86	SSPFRM	•	•	•	Synchronous Serial Port Frame	
19	2	USBH1_N	•	•	•	USB data line	15K pull down, choke, transient ESD
20	90	SSPRXD	•	•	•	Synchronous Serial Port Receive	
21	2	GND_USB1	•	•	•	USB power ground	220R/100MHz/2A ferrite bead, transient ESD

22	92	SSPTXD	•	•	•	Synchronous Serial Port Transmit	
23	88	SSPCLK	•	•	•	Synchronous Serial Port Clock	Series RC termination
24	106	H1_GPIO0	•	•	•	Host GPIO 0	
25	73	H1_GPIO1	•	•	•	Host GPIO 1	
26	87	nRESET_OUT	•	•	•	Reset out (pulled low during Colibri reset)	
27	194	I2C_SDA	•	•	•	I2C bus data line	2K2 pull-up resistor
28	196	I2C_SCL	•	•	•	I2C bus clock	2K2 pull-up resistor
29	-	XPOD1_GPIO0	•	•	•	XPOD GPIO 0 (direct connection to XPOD 1 interface)	
30	-	XPOD1_GPIO1	•	•	•	XPOD GPIO 1 (direct connection to XPOD 1 interface)	
31	-	XPOD1_GPIO2	•	•	•	XPOD GPIO 2 (direct connection to XPOD 1 interface)	
32	-	XPOD1_GPIO3	•	•	•	XPOD GPIO 3 (direct connection to XPOD 1 interface)	
33	-	XPOD1_GPIO4	•	•	•	XPOD GPIO 4 (direct connection to XPOD 1 interface)	
34	-	XPOD1_GPIO5	•	•	•	XPOD GPIO 5 (direct connection to XPOD 1 interface)	
35	-	XPOD1_GPIO6	•	•	•	XPOD GPIO 6 (direct connection to XPOD 1 interface)	
36	-	XPOD1_GPIO7	•	•	•	XPOD GPIO 7 (direct connection to XPOD 1 interface)	
37	26	nRESET_IN	•	•	•	Reset in (pull low to reset)	10nF capacitor to ground
38	-	GND				Ground	
39	-	GND				Ground	
40	-	GND				Ground	

Table 8: xPOD 1 interface connector

5.6.2 xPOD 2 interface

Pin	SODIMM Pin	Default Function	PXA270	PXA300	PXA320	Description	Pull-up/Pull-down/Filtering/ESD/EMI
1	-	5V				+5V power supply	220R/100MHz/2A ferrite bead
2	-	3V3				+3.3V power supply	220R/100MHz/2A ferrite bead
3	-	5V				+5V power supply	220R/100MHz/2A ferrite bead
4	-	3V3				+3.3V power supply	220R/100MHz/2A ferrite bead
5	19	STD_RXD	•	•	•	Standard UART serial port receive	
6	-	GND				Ground	
7	21	STD_TXD	•	•	•	Standard UART serial port transmit	
8	-	GND				Ground	
9	192	MDAT0	•	•	•	SDIO bit 0	
10	190	MMCMD	•	•	•	SDIO command	

11	49	MDAT1	•	•	•	SDIO bit 1	
12	¹	XPOD_2_CLK	•	•	•	SDIO multiplexed clock – XPOD 2 clock	
13	51	MDAT2	•	•	•	SDIO bit 2	
14	43	MMCD	•	•	•	SDIO Card Detect	
15	²	VCC_USB2	•	•	•	+5V current limited USB power supply	220R/100MHz/2A ferrite bead, transient ESD
16	53	MDAT3	•	•	•	SDIO bit 3	
17	²	USBH2_P	•	•	•	USB data line	15K pull down, choke, transient ESD
18	63	SSPFRM2	•	³	³	Synchronous Serial Port Frame	
19	²	USBH2_N	•	•	•	USB data line	15K pull down, choke, transient ESD
20	131	SSPRXD2	•	³	³	Synchronous Serial Port Receive	
21	²	GND_USB2	•	•	•	USB power ground	220R/100MHz/2A ferrite bead, transient ESD
22	129	SSPTXD2	•	³	³	Synchronous Serial Port Transmit	
23	55	SSPCLK2	•	³	³	Synchronous Serial Port Clock	
24	105	H2_GPIO0	•	•	•	Host GPIO 0	
25	107	H2_GPIO1	•	•	•	Host GPIO 1	
26	87	nRESET_OUT	•	•	•	Reset out (pulled low during Colibri reset)	
27	194	I2C_DATA	•	•	•	I2C bus data line	2K2 pull-up resistor
28	196	I2C_CLK	•	•	•	I2C bus clock	2K2 pull-up resistor
29	-	XPOD2_GPIO0	•	•	•	XPOD GPIO 0 (direct connection to XPOD 2 interface)	
30	-	XPOD2_GPIO1	•	•	•	XPOD GPIO 1 (direct connection to XPOD 2 interface)	
31	-	XPOD2_GPIO2	•	•	•	XPOD GPIO 2 (direct connection to XPOD 2 interface)	
32	-	XPOD2_GPIO3	•	•	•	XPOD GPIO 3 (direct connection to XPOD 2 interface)	
33	-	XPOD2_GPIO4	•	•	•	XPOD GPIO 4 (direct connection to XPOD 2 interface)	
34	-	XPOD2_GPIO5	•	•	•	XPOD GPIO 5 (direct connection to XPOD 2 interface)	
35	-	XPOD2_GPIO6	•	•	•	XPOD GPIO 6 (direct connection to XPOD 2 interface)	
36	-	XPOD2_GPIO7	•	•	•	XPOD GPIO 7 (direct connection to XPOD 2 interface)	
37	26	nRESET_IN	•	•	•	Reset in (pull low to reset)	10nF capacitor to ground
38	-	GND				Ground	
39	-	GND				Ground	
40	-	GND				Ground	

Table 9: xPOD 2 interface connector

¹ These pins are SDIO multiplexed pins.

² These pins are served by the on-board USB hub and OC protected power supply ICs.

³ This interface is not supported in hardware for the PXA3xx and must be emulated in software; this may not be suitable for certain xPODs which require a high speed SSP interface.

5.7. External Power Supply

Connector manufacturer: Harwin
 Number of ways: 8
 Pin pitch: 1.25mm
 Maximum voltage: 150VAC
 Maximum current: 1A
 Connector part number: M30-6000846
 Connector partner part number:

Pin	Default Function	Description	Pull-up/Pull-down/Filtering/ESD/EMI
1	3V3	+3.3V power supply	220R/100MHz/2A ferrite bead
2	3V3	+3.3V power supply	220R/100MHz/2A ferrite bead
3	GND	Ground	
4	GND	Ground	
5	5V	+5V power supply	220R/100MHz/2A ferrite bead
6	5V	+5V power supply	220R/100MHz/2A ferrite bead
7	BL_ON	Back light on (+3.3V level signal)	
8	nBN_ON_5V	Back light on (inverted, +5V level signal)	

Table 10: External power supply connector

5.8. Audio

Connector manufacturer: Harwin
 Number of ways: 8
 Pin pitch: 1.25mm
 Maximum voltage: 150VAC
 Maximum current: 1A
 Connector part number: M30-6000846
 Connector partner part number:

Pin	SODIMM Pin	Default Function	PXA270	PXA300	PXA320	Description	Pull-up/Pull-down/Filtering/ESD/EMI
1	5	LINEIN_L	•		•	Audio line in left	
2	7	LINEIN_R	•		•	Audio line in right	
3	9, 11	AUDIO_AGND	•		•	Audio ground	
4	15	HEADPHONE_LF	•		•	Headphone left	
5	17	HEADPHONE_RF	•		•	Headphone right	
6	9, 11	AUDIO_AGND	•		•	Audio ground	
7	-	N/C				Not connected	
8	-	N/C				Not connected	

Table 11: Audio interface connector

5.9. RS-232

Connector manufacturer:	TBD
Number of ways:	10
Pin pitch:	1.27mm
Maximum voltage:	TBD
Maximum current:	TBD
Connector part number:	TBD
Connector partner part number:	TBD

Pin	SODIMM Pin	Default Function	PXA270	PXA300	PXA320	Description	Pull-up/Pull-down/Filtering/ESD/EMI
1	31 ¹	FF_DCD_232	•	•	•	Full function UART Carrier Detect	
2	37 ¹	FF_RI_232	•	•	•	Full function UART Ring Indicator	
3	29 ¹	FF_DSR_232	•	•	•	Full function UART Data Set Ready	
4	27 ¹	FF_RTS_232	•	•	•	Full function UART Request To Send	
5	33 ¹	FF_RXD_232	•	•	•	Full function UART Receive Data	
6	35 ¹	FF_TXD_232	•	•	•	Full function UART Transmit Data	
7	25 ¹	FF_CTS_232	•	•	•	Full function UART Clear To Send	
8	23 ¹	FF_DTR_232	•	•	•	Full function UART Data Terminal Ready	
9	-	GND				Ground	
10	-	GND				Ground	

Table 12: RS-232 interface connector

5.10. DC power jack

DC power jack is centre positive. Centre pin diameter is 2.5mm.

Disclaimer:

Toradex AG reserves the right to make changes, without notice, to any product, including circuits and/or software described or contained in this datasheet.

Toradex AG assumes no responsibility or liability for the use of the described product(s), conveys no license or title under any patent, copyright, or mask work rights to these products, and makes no representations or warranties that these products are free from patent, copyright, or mask work right infringement, unless otherwise specified.

Trademark Acknowledgement:

Brand and product names are trademarks or registered trademarks of their respective owners.