



TRITON-320 PXA320 module

The TRITON-320 is a complete computer, implemented on a board smaller than a credit card, and ready to be designed into your embedded system. TRITON-320 includes an Intel® / Marvell PXA processor, SDRAM and Flash memory. The integrated LCD-controller enables direct connection of a LCD screen, and the standard PCMCIA interface permits simple extension and integration into a target system.

The TRITON-320 is specifically targeted at embedded applications where size, high cpu-performance and extremely low power consumption are critical factors.

Unique features:

- World's smallest PXA320 module : 2.66 x 1.02 x 0.16 inches
- Lowest power consumption PXA320 module available, due to use of 1.8V DDR-SDRAM and NAND Flash, gives ultra-long battery life and down to 2mW in sleep mode
- Single 3.0V to 5.5V supply allows direct connection of Lithium cells
- Only module to deliver all PXA320 interface signals on connector
- 16-bit A/A/D multiplexed external memory interface
- High efficiency programmable power supply
- On-module voltage regulator is able to power carrier board
- BSP's for Windows CE 6.0 and Linux 2.6, both developed totally in-house
- Manufactured in-house to ISO 9001 quality standard



Monahans

The Intel® / Marvell Monahans processor is designed to meet the growing demands of a new generation of leading-edge embedded products. Featuring advanced technologies that offer high performance, flexibility and robust functionality, the Intel / Marvell Monahans processor is packaged specifically for the embedded market and is ideal for the low-power framework of battery-powered devices. The Intel / Marvell Monahans processor is the first Intel / Marvell XScale® technology-based processor to include Intel® Wireless MMX™ technology. This enables high-performance multimedia acceleration with an industry proven instruction set. Another innovative feature is the Intel® Quick Capture technology, which provides one of the industry's most flexible and powerful camera interfaces for capturing digital images and video. The new capabilities of Wireless Intel SpeedStep® Power Manager technology provide a quantum leap forward in low-power operation, while maintaining the highest levels of performance.

U-Boot Universal Bootloader

TRITON is delivered with pre-installed U-Boot firmware. U-Boot supports several low-level-debugging options and file download via serial Xmodem or Ethernet. These files can additionally be stored into the permanent flash-memory to be started by command or power-on.

TRITON Development Kit-4

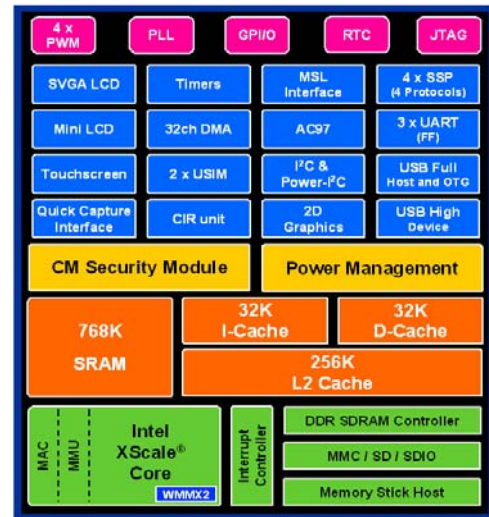
A complete PXA320 hardware reference platform running both embedded Windows CE 6 and Linux 2.6.x is available. Please refer to the TRITON Development Kit-4 datasheet on our website.

Features

Intel / Marvell XScale® Technology	Highly scalable PXA320 core up to 806 MHz
Embedded Packaging	67.6mm x 26 mm x 4.2mm rugged DIMM-Module can be tied to carrier with stand-off fasteners
Extended Temperature Range	-25°C to 85°C ambient temperature range standard
Reduced Power Consumption	Wireless Intel SpeedStep® Power Manager technology with four low-power modes can change frequency and voltage dynamically. 1.8V ultra low power memories on-board.
Incredible Multimedia	Familiar Intel® Wireless MMX™ technology instructions designed for high-performance multimedia and advanced video.
Advanced Camera Interface	Intel® Quick Capture technology supports cameras for capturing digital images, video and low-power, real-time previews.
Enhanced LCD Controller	Dual-panel LCD with up to 24-bit color. Hardware color space conversion with 768 KB of on-chip SRAM for faster video. Two overlays reduce LCD bandwidth. Integrated Intel Quick Capture technology enables fast video preview.

Large Peripheral Set

- Quick Capture Interface
- USB 1.1 Host/
- USB 2.0 Client
- PWM x4
- 4-bit SD I/O
- USIM card
- Keypad controller
- UART x3
- AC97/I2C
- SSP x3
- Enhanced LCD controller
- I2C
- JTAG

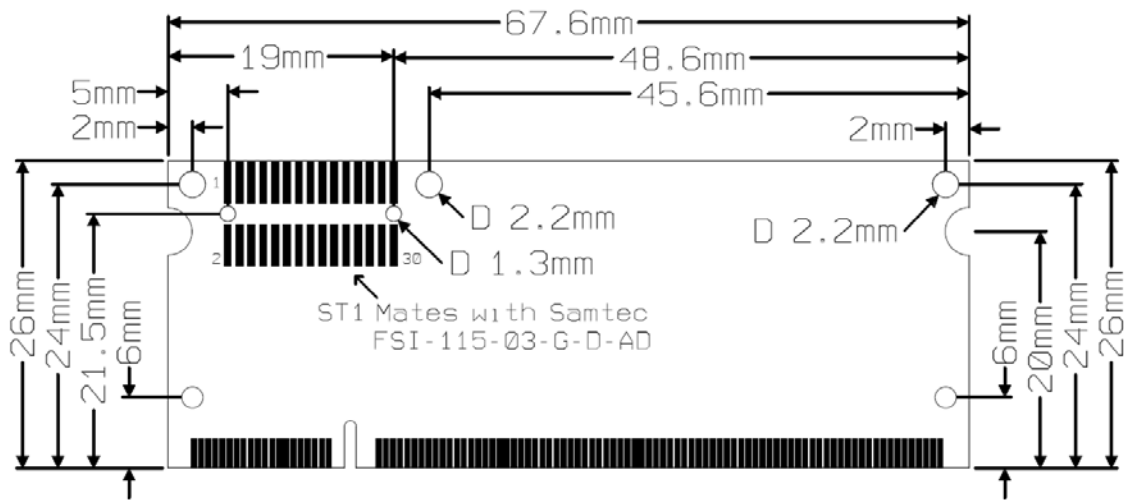


Marvell's Non-Disclosure Agreement

Marvell requires an NDA to provide the PXA320 design documents. The NDA is obtained from your local Marvell distributor. Unfortunately, our experience is that government organizations and defence suppliers are likely to have the NDA refused. In this case we recommend using either the PXA270 or Freescale i.MX27 as no NDA is required.

TRITON-320 features

- Intel® / Marvell® PXA320 (806MHz)
- 64 MByte mobile DDR-SDRAM (260MHz 1.8V ultra low power, 32bit)
- 128 MByte NAND Flash memory
- 16-bit multiplexed external memory interface
- RTC controller (DS1339)
- Single 3.0V to 5.5V power supply
- U-Boot firmware
- Worlds smallest DIMM-module (67.6mm x 26 mm x 4.2mm)
- Operating temperature range -25°C..85°C
- RoHS compliant



Ordering information

Order Number	PXA320	SDRAM	Flash
TRITON-320/806/64S/128F/E85	806 MHz	64MB	128MB

Date: 20080730

Title: TRITON-320_Datasheet.doc

DIMM200 connector pinout (part 1/14)
Control signals and power supply
Control signal supply voltage: 2.8V

Pin	Signal	Connected to	Type	Min. high level voltage	Operating range	Description
1	GND					
2	PWR_ON	PMIC	Input	~2.3V	Max. 6V	Wakeup Input
3	NRESET	PMIC	Output	~2,3V		Reset Output
4	VIN_BUBAT	PMIC	Supply		2.7 to 5.5V (max. 6V)	Backup Battery
5	VIN	PMIC	Supply		2.7 to 5.5V (max. 6V)	Main Power Supply Input
6	nGPIO_RESET	MHP	Input			
7	VIN	PMIC	Supply		2.7 to 5.5V (max. 6V)	Main Power Supply Input
8	NRESET_IN	PMIC	Input	~2.3V	Max. 6V	Reset Input

DIMM200 connector pinout (part 2/14)
IO1
Supply voltage: 3.3V

Pin	Signal	ALT0	ALT1	ALT2	ALT3	ALT4	ALT5	ALT6	ALT7
9	GND								
10	GPIO127	GPIO127	KP_MKOUT<6>	KP_DKIN<0>					
11	GPIO4_2	GPIO4	KP_DKIN<7>						
12	GPIO2_2	GPIO2	USBHPEN						
13	GPIO123	GPIO123	KP_MKOUT<2>						
14	GPIO126	GPIO126	KP_MKOUT<5>	KP_DKIN<1>					
15	GPIO113	GPIO113	KP_MKIN<0>						
16	GPIO5_2	GPIO5	KP_MKOUT<7>						
17	GPIO115		KP_MKIN<2>	KP_DKIN<2>					
18	GPIO3_2	GPIO3	USBHPWR						
19	GPIO114		KP_MKIN<1>	KP_DKIN<1>					
20	GPIO116		KP_MKIN<3>	KP_DKIN<3>					
21	GPIO119	GPIO119	KP_MKIN<6>						
22	GPIO124	GPIO124	KP_MKOUT<3>	KP_DKIN<3>					
23	GPIO118		KP_MKIN<5>	KP_DKIN<5>					
24	GPIO120	GPIO120	KP_MKIN<7>						
25	GPIO121	GPIO121	KP_MKOUT<0>						
26	GPIO125	GPIO125	KP_MKOUT<4>	KP_DKIN<2>					
27	GPIO122	GPIO122	KP_MKOUT<1>						
28	GPIO0_2	GPIO0		ONE_WIRE					
29	GPIO1_2	GPIO1							
30	GPIO117		KP_MKIN<4>	KP_DKIN<4>					

DIMM200 connector pinout (part 3/14)
USB / TSI
Supply voltage: 3.3V

Pin	Signal	ALT0	ALT1	ALT2	ALT3	ALT4	ALT5	ALT6	ALT7
31	GND								
32	3V3								
33	USBH1_P								
34	TSI_YP								
35	USBH1_N								
36	TSI_XP								
37	USBOTG_P								
38	TSI_XM								
39	USBOTG_N								
40	TSI_YM								

DIMM200 connector pinout (part 4/14)
GPIO
Supply voltage: 1.8V

Pin	Signal	ALT0	ALT1	ALT2	ALT3	ALT4	ALT5	ALT6	ALT7
41	GPIO1								
42	GPIO0								

DIMM200 connector pinout (part 5/14)
DFI
Supply voltage: 3.3V

Pin	Signal	ALT0	ALT1	ALT2	ALT3	ALT4	ALT5	ALT6	ALT7
43	GND								
44	DF_ALE_WE2								
45	DF_ADDR0								
46	DF_IO8								
47	nPOE (GPIO2)	GPIO2	RDY						
48	DF_IO1								
49	nPIOR (GPIO3)	GPIO3	NCS<2>						
50	DF_IO4								
51	nPIOW (GPIO4)	GPIO4	NCS<3>						
52	DF_IO11								
53	nXCVREN								
54	DF_IO13								
55	nDF_UNLOCK								
56	DF_IO12								
57	nBE0								
58	DF_IO15								
59	ND_CLE								
60	DF_IO14								

DIMM200 connector pinout (part 6/14)

DFI (continued)

Supply voltage: 3.3V

Pin	Signal	ALT0	ALT1	ALT2	ALT3	ALT4	ALT5	ALT6	ALT7
61	DF_INT_RnB		47k pull-up onboard						
62	GPIO7	GPIO7			nIOS16				
63	DF_nRE								
64	DF_ALE_nADV1								
65	DF_SCLK_E								
66	nLUA								
67	nBE1								
68	DF_ADDR1								
69	DF_nCS1								
70	GND								
71	DF_IO0								
72	nLLA								
73	DF_ADDR3								
74	DF_nWE								
75	DF_IO2								
76	DF_IO10								
77	DF_ADDR2								
78	DF_IO6								
79	DF_IO9								
80	nIOIS16 (GPIO6)	GPIO6			nPIOW				
81	DF_IO3								
82	DF_IO5								
83	GPIO8	GPIO8			nPWAIT				
84	DF_IO7								
85	nPWAIT (GPIO5)	GPIO5			nPIOR				

DIMM200 connector pinout (part 7/14)

IO3

Supply voltage: LDO4 (3V0)

Pin	Signal	ALTO	ALT1	ALT2	ALT3	ALT4	ALT5	ALT6	ALT7
86	GND								
87	GPIO11	GPIO11	PWM<0>						
88	GPIO16	GPIO16	U_nVS1						
89	GPIO9	GPIO9							
90	GPIO12	GPIO12	PWM<1>						
91	GPIO13	GPIO13	PWM<2>						
92	GPIO17	GPIO17	U_nVS2						
93	GPIO15	GPIO15	U_VS0						
94	GPIO14	GPIO14	PWM<3>						

DIMM200 connector pinout (part 8/14)

MMC1

Supply voltage: 3.3V

Pin	Signal	ALTO	ALT1	ALT2	ALT3	ALT4	ALT5	ALT6	ALT7
95	GND								
96	GPIO19	GPIO19	U_DETECT			MM1_DATA<1>			
97	GPIO21	GPIO21	U_nRST			MM1_DATA<3>			
98	GPIO22	GPIO22				MM1_CLK			
99	GPIO23	GPIO23				MM1_CMD			
100	GPIO20	GPIO20	U_CLK			MM1_DATA<2>			
101	GPIO18	GPIO18	U_IO			MM1_DATA<0>			

DIMM200 connector pinout (part 9/14)

MMC2

Supply voltage: LDO2 (1V8)

Pin	Signal	ALTO	ALT1	ALT2	ALT3	ALT4	ALT5	ALT6	ALT7
102	GPIO24	GPIO24				MM2_DATA<0>			
103	GPIO26	GPIO26				MM2_DATA<2>			
104	GPIO27	GPIO27				MM2_DATA<3>			
105	GPIO29	GPIO29				MM2_CMD			
106	GPIO28	GPIO28				MM2_CLK			
107	GPIO25	GPIO25				MM2_DATA<1>			

DIMM200 connector pinout (part 10/14)
IO4
Supply voltage: 3.3V

Pin	Signal	ALT0	ALT1	ALT2	ALT3	ALT4	ALT5	ALT6	ALT7
108	GND								
109	GPIO31	GPIO31							
110	GPIO32	GPIO32	SCL						
111	GPIO33	GPIO33	SDA						
112	GPIO40	GPIO40	AC97_nACRESET	SSPSYSCLK2					
113	GPIO36	GPIO36	AC97_SDATA_IN1	SSPSFRM2					
114	GPIO30	GPIO30							
115	GPIO37	GPIO37	AC97_SDATA_OUT	SSPTXD2			U2D_OPMMODE0		
116	GPIO39	GPIO39	AC97_BITCLK	SSPEXTCLK2			U2D_TXVALID		
117	GPIO42	GPIO42		UART1_TXD	U2D_DATA1				
118	GPIO34	GPIO34	AC97_SYSCLK				UTM_RXVALID?		
119	GPIO44	GPIO44		UART1_DCD	U2D_DATA3				
120	GPIO43	GPIO43		UART1_CTS	U2D_DATA2				
121	GPIO47	GPIO47		UART1_DTR	U2D_DATA6				
122	GPIO41	GPIO41		UART1_RXD	U2D_DATA0				
123	GPIO10	GPIO10	UTM_CLK						
124	GPIO48	GPIO48		UART1_RTS	U2D_DATA7				
125	GPIO35	GPIO35	AC97_SDATA_IN0	SSPCLK2			UTM_RXACTIVE?		
126	GPIO45	GPIO45		UART1_DSR	U2D_DATA4				
127	GPIO38	GPIO38	AC97_SYNC	SSPRXD2					
128	GPIO46	GPIO46		UART1_RI	U2D_DATA5				

DIMM200 connector pinout (part 11/14)
CIF
Supply voltage: LDO3 (3V0)

Pin	Signal	ALT0	ALT1	ALT2	ALT3	ALT4	ALT5	ALT6	ALT7
129	GND								
130	GPIO51	GPIO51	CIF_DD<2>		U2D_DATA2				
131	GPIO53	GPIO53	CIF_DD<4>		U2D_DATA4				
132	GPIO52	GPIO52	CIF_DD<3>		U2D_DATA3				
133	GPIO54	GPIO54	CIF_DD<5>		U2D_DATA5				
134	GPIO50	GPIO50	CIF_DD<1>		U2D_DATA1				
135	GPIO56	CIF_DD<7>			U2D_DATA7				
136	GPIO58	GPIO58	CIF_DD<9>	UTM_RXVALID					
137	GPIO59	CIF_MCLK	UTM_RXACTIVE						
138	GPIO57	GPIO57	CIF_DD<8>						

DIMM200 connector pinout (part 12/14)
CIF (continued)
Supply voltage: LDO3 (3V0)

Pin	Signal	ALT0	ALT1	ALT2	ALT3	ALT4	ALT5	ALT6	ALT7
139	GPIO61	CIF_HSYNC		U2D_OPMODE0					
140	GPIO60	CIF_PCLK	U2D_RXERROR						
141	GPIO49	GPIO49	CIF_DD<0>		U2D_DATA0				
142	GPIO62	CIF_VSYNC		U2D_OPMODE1					
143	GPIO55	GPIO55	CIF_DD<6>		U2D_DATA6				

DIMM200 connector pinout (part 13/14)
LCD
Supply voltage: LDO4 (3V0)

Pin	Signal	ALT0	ALT1	ALT2	ALT3	ALT4	ALT5	ALT6	ALT7
144	GND								
145	GPIO64	GPIO64	L_DD<9>						
146	GPIO15_2	GPIO15	L_LCLK_A0						
147	GPIO14_2	GPIO14	L_FCLK_RD						
148	GPIO13_2	GPIO13	L_DD<7>						
149	GPIO63	GPIO63	L_DD<8>						
150	GPIO11_2	GPIO11	L_DD<5>						
151	GPIO66	GPIO66	L_DD<11>						
152	GPIO9_2	GPIO9	L_DD<3>						
153	GPIO12_2	GPIO12	L_DD<6>						
154	GPIO7_2	GPIO7	L_DD<1>						
155	GPIO10_2	GPIO10	L_DD<4>						
156	GPIO74		U2D_RESET	L_VSYNC					
157	GPIO8_2	GPIO8	L_DD<2>						
158	GPIO67	GPIO67	L_DD<12>						
159	GPIO6_2	GPIO6	L_DD<0>						
160	GPIO70	GPIO70	L_DD<15>						
161	GPIO73		UTM_TXREADY	L_CS					
162	GPIO68	GPIO68	L_DD<13>						
163	GPIO71		L_DD<16>						
164	GPIO72		L_DD<17>						
165	GPIO69	GPIO69	L_DD<14>						
166	GPIO17_2	GPIO17	L_BIAS						
167	GPIO65	GPIO65	L_DD<10>						
168	GPIO16_2	GPIO16	L_PCLK_WR						

DIMM200 connector pinout (part 14/14)

IO6

Supply voltage: 3V3

Pin	Signal	ALT0	ALT1	ALT2	ALT3	ALT4	ALT5	ALT6	ALT7
169	GND								
170	GPIO87	GPIO87	SSPEXTCLK			MSL1_OB_DAT<2>	U2D_RXERROR		
171	GPIO104		UART1_RTS	USB_P2_7		U2D_OPMODE1			
172	GPIO85		SSPTXD			MSL1_IB_DAT<3>	UTM_RXVALID		
173	GPIO83		SSPCLK			MSL1_IB_DAT<1>			U2D_TXVALID
174	GPIO86		SSPRXD			MSL1_OB_DAT<1>	UTM_RXACTIVE		
175	GPIO93		SSPCLK4						
176	GPIO89		SSPCLK3	UART3_CTS					
177	GPIO84	GPIO84	SSPSFRM			MSL1_IB_DAT<2>			
178	GPIO90		SSPSFRM3	UART3_RTS					
179	GPIO91		SSPTXD3	UART3_TXD					
180	GPIO96		SSPRXD4						
181	GPIO88	GPIO88	SSPSYSCLK			MSL1_OB_DAT<3>			U2D_OPMODE0
182	GPIO98		UART1_TXD	USB_P2_6	U2D_RESET				
183	GPIO97	GPIO97	UART1_RXD	USB_P2_2					
184	GPIO95		SSPTXD4						
185	GPIO99		UART1_CTS	USB_P2_1			U2D_XCVR_SEL		
186	GPIO100		UART1_DCD	USB_P2_4			U2D_TERM_SEL		
187	GPIO94		SSPSFRM4						
188	GPIO101		UART1_DSR	USB_P2_8	U2D_SUSPENDM_X				
189	GPIO92		SSPRXD3	UART3_RXD					
190	GPIO102		UART1_RI	USB_P2_3	UTM_LINESTATE 0				
191	GPIO103		UART1_DTR	USB_P2_5	UTM_LINESTATE 1				
192	GPIO106	GPIO106	UART3_RTS						
193	GPIO107	GPIO107	UART3_TXD						
194	GPIO111		UART2_TXD	KP_DKIN<6>					
195	GPIO105	GPIO105	UART3_CTS						
196	GPIO108	GPIO108	UART3_RXD						
197	GPIO110		UART2_RXD	KP_DKIN<5>					
198	GPIO112		UART2_CTS	KP_DKIN<7>					
199	GPIO109		UART2_RTS	KP_DKIN<4>					
200	GND								

ST1 connector pinout
JTAG
Supply voltage: 2V8

Pin	Signal	ALTO	ALT1	ALT2	ALT3	ALT4	ALT5	ALT6	ALT7
1	TCK		47k pull-down onboard						
2	3V3								
3	TDI								
4	3V3								
5	nTRST								
6	3V3								
7	TDO								
8	3V3								
9	TMS								
10	GND								
11	nTEST_JIG	<i>powersupply</i>	47k pull-up to	VCC_BATT onboard					
12	GND								
13	SPARE	<i>powersupply</i>	47k pull-down onboard						
14	GND								

ST1 connector pinout
MSL
Supply voltage: LDO2 (1V8)

Pin	Signal	ALTO	ALT1	ALT2	ALT3	ALT4	ALT5	ALT6	ALT7
15	GPIO81	GPIO81	UART1_DTR					MSL1_IB_STB	
16	GND								
17	GPIO80		UART1_RI	USB_P3_6				MSL1_IB_CLK	
18	GND								
19	GPIO79		UART1_DSR	USB_P3_5				MSL1_IB_DAT<0>	
20	GND								
21	GPIO77		UART1_CTS	USB_P3_3				MSL_OB_STB	
22	GND								
23	GPIO76		UART1_TXD	USB_P3_2				MSL1_OB_CLK	
24	GND								
25	GPIO82	GPIO82	UART1_RTS					MSL1_IB_WAIT	
26	GND								
27	GPIO78		UART1_DCD	USB_P3_4				MSL1_OB_WAIT	
28	GND								
29	GPIO75		UART1_RXD	USB_P3_1				MSL1_OB_DAT<0>	
30	GND								