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.

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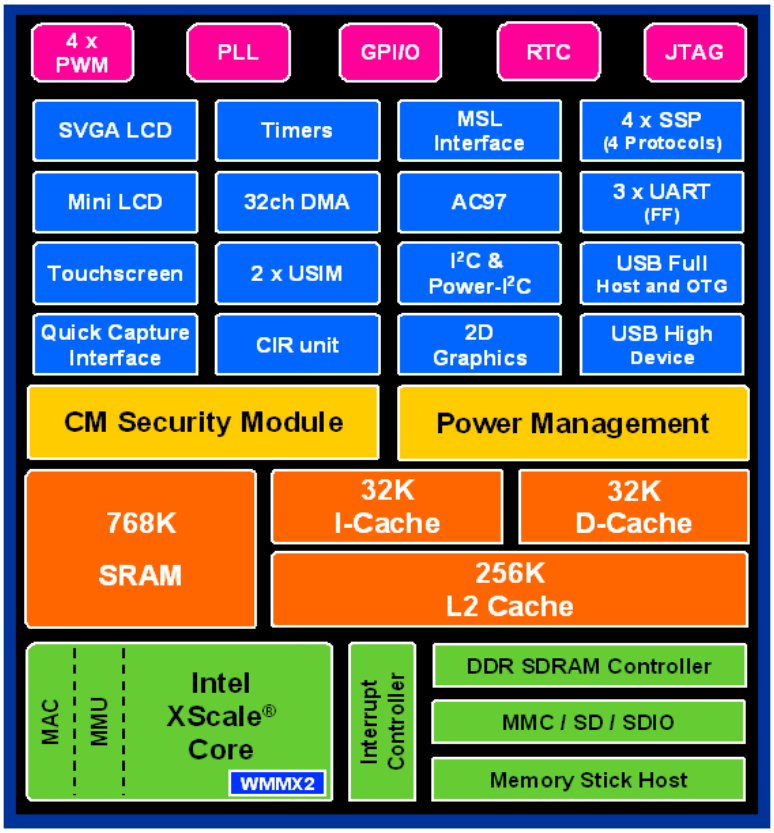
Features

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.

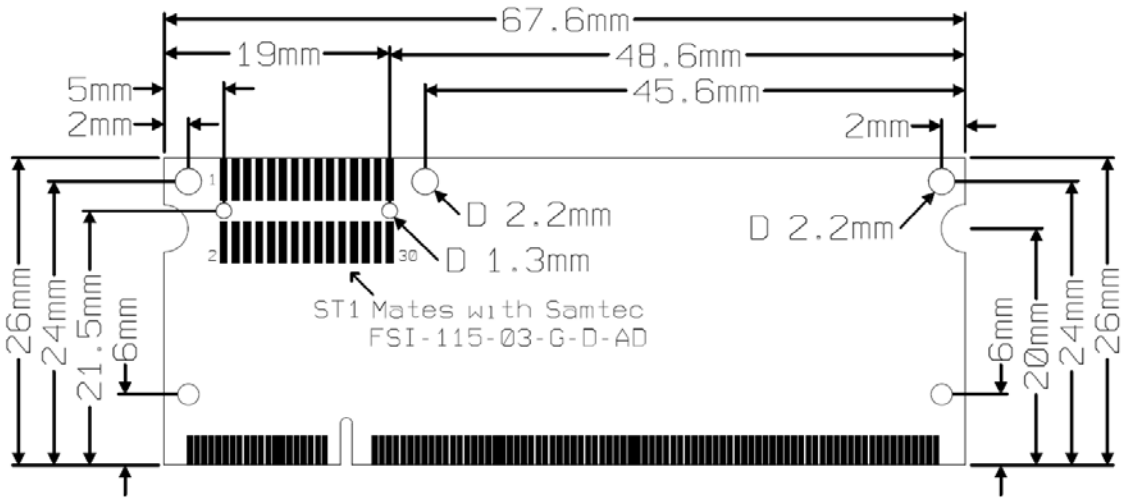
Large Peripheral Set

- 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



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

DIMM200 connector pinout (part 1/13) **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 2/13) **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 3/13) **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								
41	GPIO1								
42	GPIO0								

DIMM200 connector pinout (part 4/13) **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 5/13) **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				

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DIMM200 connector pinout (part 6/13) **IO3** **Supply voltage: 3.3V**

Pin	Signal	ALT0	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 7/13) **MMC1** **Supply voltage: 3.3V**

Pin	Signal	ALT0	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	PGIO23				MM1_CMD			
100	GPIO20	GPIO20	U_CLK			MM1_DATA<2>			
101	GPIO18	GPIO18	U_IO			MM1_DATA<0>			

DIMM200 connector pinout (part 8/13) **MMC2** **Supply voltage: LDO2 (3V0)**

Pin	Signal	ALT0	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>			

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DIMM200 connector pinout (part 9/13) **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 10/13) **CIF** **Supply voltage: LDO2 (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 11/13) **CIF (continued)** **Supply voltage: LDO2 (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 12/13) **LCD** **Supply voltage: LDO4 (3V0)**

Pin	Signal	ALT0	ALT1	ALT2	ALT3	ALT4	ALT5	ALT6	ALT7
144	GND								
145	GPIO64	GPIO64	L_DD<9>						
146	GPIO16_2	GPIO16	L_PCLK_WR						
147	GPIO17_2	GPIO17	L_BIAS						
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	GPIO14_2	GPIO14	L_FCLK_RD						
167	GPIO65	GPIO65	L_DD<10>						
168	GPIO15_2	GPIO15	L_LCLK_A0						

DIMM200 connector pinout (part 13/13) **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		SSPSCLK			MSL1_IB_DAT<1>			U2D_TXVALID
174	GPIO86		SSPRXD			MSL1_OB_DAT<1>	UTM_RXACTIVE		
175	GPIO93		SSPSCLK4						
176	GPIO89		SSPSCLK3	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	ALT0	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	*powersupply*	47k pull-up to	VCC_BATT onboard					
12	GND								
13	SPARE	*powersupply*	47k pull-down onboard						
14	GND								

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

Pin	Signal	ALT0	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								