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Nilo: Ultra Small 32 bit RISC Embedded Solution Supporting Linux / Window CE®



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General Specification I

CPU	ATMEL® AT91SAM9263 ⁴ 32 bits RISC ARM926EJ-S™ ARM® Thumb® Processor – 220 MIPS	
Operating System	LINUX Kernel 2.6.2x Windows CE 6.0®	
SDRAM Memory	32 MBytes	
NAND FLASH Memory	128 MBytes	
Serial DATA FLASH	8 MBytes	
Cache RAM	Integrated in CPU	
General Purpose I/O	Up to 87 Configurable Digital I/O (with internal configurable pull-up) -----	Note 1
Analog Inputs	2 x Single Ended Inputs Analog to Digital Converters (12 bits resolution)	
Pulse Width Modulators	4 x PWM -----	Note 2
Programmable Clock Outputs	3 x Digital Clock Outputs (up to 100MHz) -----	Note 2
Serial Communications Channels	1 x UART (TX, RX and GND) -----	Note 2
	3 x USART (TX, RX, CTS, RTS and GND) -----	Note 2
USB	2 x USB 2.0 Host Full Speed (12 Mbps) 1 x USB 2.0 Device Full Speed (12 Mbps)	
Ethernet	1 x 10/100 Mbps	
TFT Interface Controller	1 x Digital RGB 16 bits Interface (up to 2048 x 2048)	
Touch Panel Controller	1 x Analog Resistive	
Real Time Clock	1 x Ultra Low Power Real Time Clock with integrated Low Battery Detection	
Audio	Standard AC97 Controller -----	Note 2
Multimedia Card Interface	1 x SD Card Controller (up to 2 GBytes) -----	Note 2
LEDs	1 x Power supply LED 3 x Ethernet Status Outputs	

General Specification II

Additional Features

1 x SPI configurable as Master with 4 Chip Selects or Slave	Note 2
1 x I2C	Note 2
1 x Programmable Watch Dog Timer	
1 x RESET Input	
1 x RESET Open Collector Output Up to 20 Peripheral DMA Controller Channels	Note 3

External Bus Interface

16 bits Bus Data Width
22 bits Bus Address Width
SRAM Interface with one Chip Select Available

Image Sensor Interface

12-bit Data Interface for Support of High Sensibility Sensors	Note 2
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Power Supply

3.3 Vdc @ 750 mA (Main System Power)
3.0 Vdc @ 1 μ A (RTC Power)

Board Size

60 mm x 55 mm x 12 mm

Nilo Plug Connectors (J1 & J2)

SMD Male Board to Board Connector: Ref. NELTRON 2000P-120-290-020	Note 5
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Customer Mother Board Recommended Socket Connectors

SMD Female Board to Board Connector: Ref. NELTRON 2001S-120-270-020	Note 5
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Available Options

Extended SDRAM Memory

Up to 128 MBytes

Extended FLASH Memory

Up to 256 MBytes

Additional Notes

- Note 1 Shared with some peripherals. Final functionality defined by software configuration.
- Note 2 Shared with some GPIO. Final functionality defined by software configuration.
- Note 3 Some channels used for internal functionalities. Channels peripherals availables defined by software configuration.
- Note 4 For details about peripherals described, timings and in deep capabilities, please refer to the AT91SAM9263 datasheet available at www.atmel.com
- Note 5 Datasheet available in www.neltron.com.tw

Pin Description I
ANALOG INPUTS:
AD IN1: Pin 118 of J2 connector
AD IN2: Pin 116 of J2 connector
PULSE WIDTH MODULATORS:
PWM0: Pin 43 of J1 connector or Pin 60 of J2 connector
PWM1: Pin 45 of J1 connector
PWM2: Pin 51 of J1 connector or Pin 62 of J2 connector
PWM3: Pin 49 of J1 connector or Pin 105 of J1 connector
PROGRAMMABLE CLOCK OUTPUTS:
PCK0: Pin 42 of J1 connector or Pin 62 of J2 connector
PCK1: Pin 65 of J1 connector or Pin 71 of J1 connector
PCK2: Pin 8 of J1 connector
PCK3: Pin 107 of J1 connector
SERIAL COMMUNICATION CHANNELS:
DBGU: Can be used as debug serial port or as a generic TX/RX serial port
DTXD: Pin 66 of J2 connector
DRXD: Pin 64 of J2 connector
USART0:
TXD0: Pin 52 of J1 connector
RXD0: Pin 54 of J1 connector
RTS0: Pin 56 of J1 connector
CTS0: Pin 58 of J1 connector
SCK0: Pin 60 of J1 connector
USART1:
TXD1: Pin 72 of J2 connector.
RXD1: Pin 74 of J2 connector
RTS1: Pin 86 of J2 connector
CTS1: Pin 88 of J2 connector
SCK1: Pin 92 of J2 connector
USART2:
TXD2: Pin 76 of J2 connector
RXD2: Pin 78 of J2 connector
RTS2: Pin 82 of J2 connector
CTS2: Pin 84 of J2 connector
SCK2: Pin 90 of J2 connector
USB INTERFACES:
USBHA:
HDP A: Pin 13 of J1 connector
HDMA: Pin 11 of J1 connector
USBHB:
HDP B: Pin 7 of J1 connector
HDM B: Pin 5 of J1 connector
USB D:
DDP: Pin 19 of J1 connector
DDM: Pin 17 of J1 connector
DETECT: Pin 50 of J1 connector

Pin Description II
ETHERNET:
TX+: Pin 78 of J1 connector
TX-: Pin 80 of J1 connector
RX+: Pin 84 of J1 connector
RX-: Pin 86 of J1 connector
STATUS OUT1: Pin 68 of J1 connector
STATUS OUT2: Pin 70 of J1 connector
STATUS OUT3: Pin 72 of J1 connector
Important Note: <i>If Ethernet interface is used, pin 40 of J2 connector must be left disconnected</i>
TFT INTERFACE:
CONTROL PINS:
HSYNC: Pin 50 of J2 connector
VSYNC: Pin 48 of J2 connector
CLOCK: Pin 54 of J2 connector
DATA ENABLE: Pin 52 of J2 connector
CONTRAST: Pin 67 of J1 connector
Red Color Pins:
R0: Pin 5 of J2 connector
R1: Pin 7 of J2 connector
R2: Pin 9 of J2 connector
R3: Pin 11 of J2 connector
R4: Pin 4 of J2 connector
R5: Pin 6 of J2 connector
Green Color Pins:
G0: Pin 12 of J2 connector
G1: Pin 16 of J2 connector
G2: Pin 18 of J2 connector
G3: Pin 8 of J2 connector
G4: Pin 22 of J2 connector
G5: Pin 24 of J2 connector
Blue Color Pins:
B0: Pin 32 of J2 connector
B1: Pin 34 of J2 connector
B2: Pin 36 of J2 connector
B3: Pin 20 of J2 connector
B4: Pin 42 of J2 connector
B5: Pin 44 of J2 connector
TOUCH PANEL:
X RIGHT: Pin 112 of J1 connector
Y LOW: Pin 114 of J1 connector
X LEFT: Pin 116 of J1 connector
Y UP: Pin 118 of J1 connector
AUDIO:
AC97CK: Pin 79 of J1 connector
AC97FS: Pin 81 of J1 connector
AC97TX: Pin 83 of J1 connector
AC97RX: Pin 87 of J1 connector
SD CARD INTERFACE:
MCI1 CD: Pin 89 of J1 connector
MCI1 DAO: Pin 14 of J1 connector
MCI1 DA1: Pin 16 of J1 connector
MCI1 DA2: Pin 18 of J1 connector
MCI1 DA3: Pin 22 of J1 connector
MCI1 CDA: Pin 12 of J1 connector
MCI1 CK: Pin 8 of J1 connector

Pin Description III
I2C:
TWD: Pin 37 of J1 connector
TWCK: Pin 39 of J1 connector
EXTERNAL BUS INTERFACE:
DATA BUS:
EBI1 D0: Pin 15 of J2 connector
EBI1 D1: Pin 17 of J2 connector
EBI1 D2: Pin 19 of J2 connector
EBI1 D3: Pin 21 of J2 connector
EBI1 D4: Pin 25 of J2 connector
EBI1 D5: Pin 27 of J2 connector
EBI1 D6: Pin 29 of J2 connector
EBI1 D7: Pin 31 of J2 connector
EBI1 D8: Pin 35 of J2 connector
EBI1 D9: Pin 37 of J2 connector
EBI1 D10: Pin 39 of J2 connector
EBI1 D11: Pin 41 of J2 connector
EBI1 D12: Pin 45 of J2 connector
EBI1 D13: Pin 47 of J2 connector
EBI1 D14: Pin 49 of J2 connector
EBI1 D15: Pin 51 of J2 connector
ADDRESS BUS:
EBI1 A0: Pin 55 of J2 connector
EBI1 A : Pin 57 of J2 connector
EBI1 A : Pin 59 of J2 connector
EBI1 A : Pin 61 of J2 connector
EBI1 A : Pin 65 of J2 connector
EBI1 A : Pin 67 of J2 connector
EBI1 A : Pin 69 of J2 connector
EBI1 A : Pin 71 of J2 connector
EBI1 A : Pin 75 of J2 connector
EBI1 A : Pin 77 of J2 connector
EBI1 A10: Pin 79 of J2 connector
EBI1 A11: Pin 81 of J2 connector
EBI1 A12: Pin 85 of J2 connector
EBI1 A13: Pin 87 of J2 connector
EBI1 A14: Pin 89 of J2 connector
EBI1 A15: Pin 91 of J2 connector
EBI1 A16: Pin 95 of J2 connector
EBI1 A17: Pin 97 of J2 connector
EBI1 A18: Pin 99 of J2 connector
EBI1 A19: Pin 101 of J2 connector
EBI1 A20: Pin 105 of J2 connector
EBI1 A21: Pin 107 of J2 connector
CONTROL SIGNALS:
EBI1 NCS0: Pin 109 of J2 connector
EBI1 NWE: Pin 111 of J2 connector
EBI1 NRD: Pin 115 of J2 connector
EBI1 NBS1: Pin 117 of J2 connector

Pin Description IV
IMAGE SENSOR INTERFACE:
ISI_PCK: Pin 99 of J1 connector
ISI_HSYNC: Pin 101 of J1 connector
ISI_VSYNC: Pin 105 of J1 connector
ISI_MCK: Pin 107 of J1 connector
ISI_D0: Pin 90 of J1 connector
ISI_D1: Pin 92 of J1 connector
ISI_D2: Pin 94 of J1 connector
ISI_D3: Pin 98 of J1 connector
ISI_D4: Pin 100 of J1 connector
ISI_D5: Pin 102 of J1 connector
ISI_D6: Pin 106 of J1 connector
ISI_D7: Pin 108 of J1 connector
ISI_D8: Pin 109 of J1 connector
ISI_D9: Pin 113 of J1 connector
ISI_D10: Pin 115 of J1 connector
ISI_D11: Pin 117 of J1 connector
POWER SUPPLY & RESET:
RESET:
RESET_OUT: Pin 64 of J1 connector
EXT_RESET_IN: Pin 66 of J1 connector
POWER:
3V3: Power supply for the target. 3V3@750 mA
5V: It can be connected to a 5V tension for compatibility with other targets but it is not necessary for the Nilo board. 5V@0 mA. (Only for compatibility)
Vb: Power supply for the real-time clock. 3V from a lithium battery. 3V@1uA

Nilo Evaluation Board:



The NILO Evaluation Board is a mother board allowing the evaluation of the NILO Core.

There is available a complete reference design for this mother board (Schematics, Gerber Files, etc.) in order to speed up the time to market using the NILO Core Solution.

The NILO Evaluation Board contains most of the main characteristics of the NILO Core Solution, containing the next functionalities:

- TFT interface, Ethernet, SD, Speaker, Audio interface, USB host, USB device, Static RAM, I/O pins, Touch controller and many other communications interfaces available in NILO Core.

As part of our development services, it is possible to personalize the NILO Evaluation Board, developing custom solutions and boards for specific applications.

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