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OpenRISC Alekto

Hardware Manual

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1 Overview

The OpenRISC Alekto is an ARM9-based RISC industrial embedded computer. The great variety of interfaces like LAN, CF, USB, I²C, serial interface and digital I/O makes it easy to connect various industrial devices to the OpenRISC Alekto.

Compact dimensions and DIN Rail mounting capability make the OpenRISC Alekto to a space saving and flexible mounting industrial computer. It is feasible to be installed even in space limited environments.

Due to RISC based architecture the OpenRISC Alekto has very small power consumption (6,5 Watt), so fanless heat dissipation is possible. Working in an extended temperature range from -10°C up to 65°C the OpenRISC Alekto can be used under harsh industrial conditions. Therefore the OpenRISC Alekto is downright designed for industrial automation.

1.1 Product Features

- ARM9 32-bit RISC CPU, 166MHz
- 64MB SDRAM on board
- 4MB Flash Disk on board
- 2 x RS232/RS422/RS485 serial ports
- 8 independent digital I/O channels
- 1 x CF-Slot in True IDE mode (accepts Microdrives)
- 2 x USB 2.0 as Host
- MiniPCI-slot for expansion with WLAN, GPS etc.
- 2 x Ethernet interfaces for redundant networking or routing functions
- I²C bus with max. 330kHz clock
- RTC
- Ready-to-Run Debian Linux for ARM operating system
- DIN-Rail and wall-mount installation
- Robust, fanless design
- Wide temperature range -10 to 65°C
- Buzzer, Watch Dog Timer

1.2 Hardware Specifications

1.2.1 System

	OpenRISC Alekto
CPU	ARM9 32-bit RISC CPU, 166MHz
RAM	64MB SDRAM
Flash	4MB
CF-Slot	True IDE mode (accepts Microdrives)
USB	2 x 2.0 as Host (external) 2 x 2.0 as Host (internal)
LAN	10baseT/100baseTX Autodetect and Auto-MDI(X)
Serial Ports	2 x RS232/RS422/RS485 up to 3.6Mbps
Digital I/O	8 x input/output signals (32 mA max.)
Console Port	RS232, up to 115200bps
I²C	max. 330kHz
RTC	yes
Buzzer	yes
Watch Dog Timer	yes
MiniPCI-Slot	yes
Reset Button	HW Reset, long hold to access BIOS via Telnet
Power Input	9-30V
Power Consumption	max. 1.5A @ 12V
Dimensions (W x L x H)	157 x 106 x 53 mm 157 x 112 x 53 mm with DB9 connector

Table 1: Product Hardware Specifications

1.2.2 Serial Ports

Two serial ports are provided in RS232/422/485 modes that can be switched by software. For the detailed information about the supported modes refer to the Table 2.

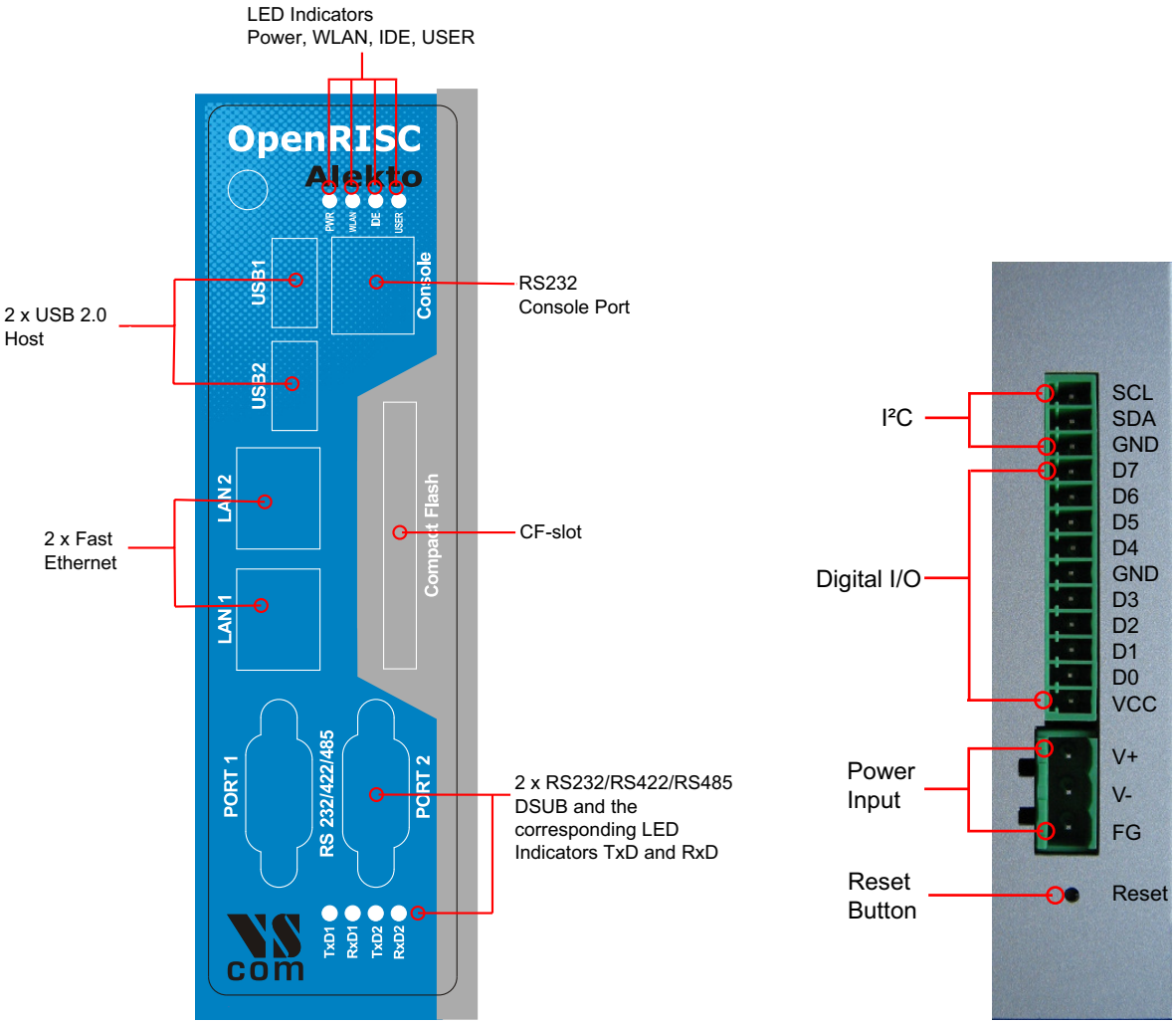
	RS232	**RS422**	**RS485**
Modes	full duplex	full duplex	4-wire, full duplex 2-wire, half duplex, with echo 2-wire, half duplex, without echo
Signals	TxD, RxD, RTS, CTS, DTR, DSR, DCD, RI, GND	Tx+/-, Rx+/-, GND	2 Wire: Data+/-, GND 4 Wire: Tx+/-, Rx+/-, GND
Data Direction Control			by (Automatic Receive Transmit control) ART or by RTS
Speed	up to 921.6 Kbps	up to 3.6 Mbps	up to 3.6 Mbps

Table 2: Serial Interface Specifications

1.2.3 Digital I/O

Eight input/output signals at TTL level are provided. The signal direction is individually configurable. Each signal carries up to 32mA in both directions. For input mode the change of at least one input signal generates an interrupt.

2 Position of Connectors and Functions



(a) Front View (b) Top View

Figure 1: Appearance

2.1 LEDs

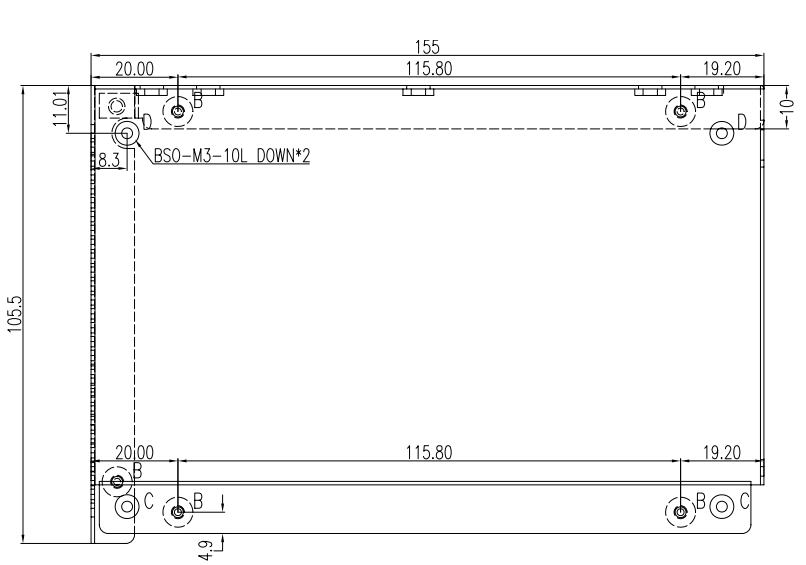
Name	Color	Description
POWER	Red	Power is on
WLAN	Blue	WLAN card has a connection to AP
IDE	Yellow	CF is in use
USER	Green	Customizable
LAN1, LAN2	Yellow	Ethernet connection established, blinks with traffic
	Green	On if 100 Mbps link
TxD1, TxD2	Green	Transmit traffic
RxD1, RxD2	Yellow	Receive traffic

Table 3: LED Indicators

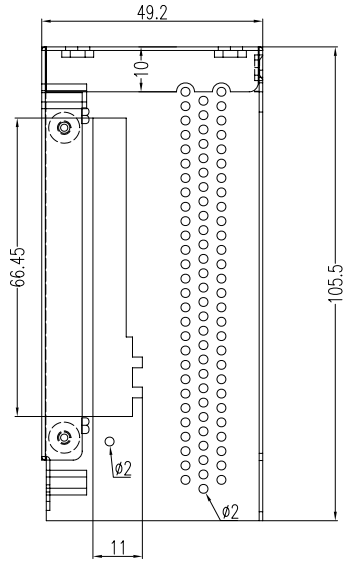
2.2 Reset Button

With Reset button you can restart the OpenRISC Alekto without removing the power. Another function can be used in BIOS. For further information refer to the "OpenRISC User Manual" section "BIOS". The Reset button should be used only in the cases, where reboot command is not available, to avoid filesystem integrity errors.

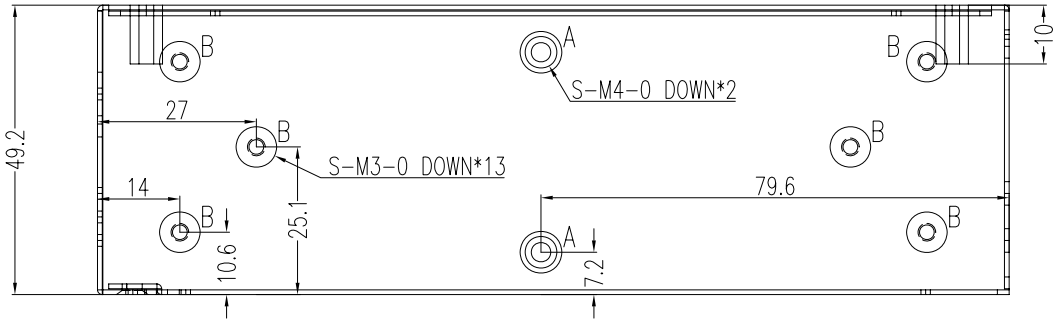
3 Dimensions



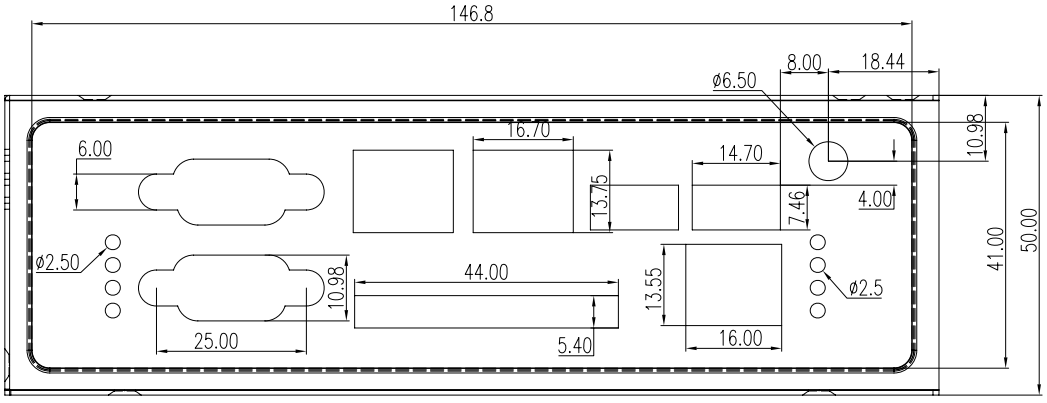
(a) Right



(b) Top



(c) Rear



(d) Front

Figure 2: Case

4 Connectors

4.1 Power

The OpenRISC Alekto device is powered by a single power supply in a wide range from 9V to 30V. A suitable power supply adapter is part of the packaging list. Connect the cable to the power jack at the top side of OpenRISC Alekto, and put the adapter into the socket. The Power LED (red) on OpenRISC Alekto will light. You can connect a power supply of your choice, providing the technical requirements are met.

Warning: disconnect the OpenRISC Alekto before performing installation or wiring. The wire size must follow the maximum current specifications. The maximum possible current in the power wires as well as in the common wires must be taken under consideration. If the current rises above the maximum ratings, the wiring can overheat, causing serious damage to your equipment. When powered, the OpenRISC Alekto's internal components generate heat, and consequently the outer case may feel warm to the touch.

4.2 Grounding

Grounding and wire routing help limit the effects of noise due to electromagnetic interference (EMI). Run the ground connection from the ground screw to the grounding surface prior to connecting devices.

4.3 LAN

The connectors for Ethernet are the usual RJ45. Simply connect it to your switch or hub. When the connect is done the Link LED on RJ45 (yellow) will light. When data traffic occurs on the network, this LED will blink. It depends on your network whether a 100Mbit or a 10Mbit connect will be established. A 100Mbit net causes the Speed LED on RJ45 (green) to light, otherwise it will remain dark.

4.4 Serial

The OpenRISC Alekto has two DSUB 9 male connectors. All three modes of operating RS232, RS422 or RS485 are entirely configured by software. For the pinout refer to the Table 4.

Please note the function of the GND signal in RS 422 and RS 485 modes: this signal must also be connected between the serial devices. So in reality a 2-wire and a 4-wire connection need 3 wire and 5 wire respectively. With the exception of very special configurations, a serial connection in RS422/RS485 mode without GND connection violates the specifications for RS 422 and RS 485 standards.

4.5 Console Port

The console port (RS232) has RJ45 connector. An adapter cable to DB9 male is provided. The pinout of the DB9 male connector is the same as PORT1/2 in RS232 mode, without signal RI.

Pin	RS232	RS422	RS485 2wire
1	DCD	Tx- (A)	Data- (A)
2	RxD	Tx+ (B)	Data+ (B)
3	TxD	Rx+ (B)	
4	DTR	Rx- (A)	
5	GND	GND	GND
6	DSR		
7	RTS		
8	CTS		
9	RI		

Table 4: DSUB Pinout

4.6 CF-Slot

The CF-slot supports True IDE mode for storage expansion. The memory size of the CF-Card is not limited. For use with one of the Linux Images it is recommended to use a 512Mb CompactFlash. Microdrives can be also used.

4.7 USB

The OpenRISC Alekto provides two USB 2.0 Host interfaces. They can be used for Mass Storage Devices, like Flash- or Hard Drive, Bluetooth and WLAN adapters etc. Two additional ports can be internally accessed through the JP2 connector on the CPU board.

4.8 Digital I/O

The OpenRISC Alekto provides 8 digital input/output channels. The data direction for each channel can be independently set to input or output. An interrupt for an input channel can also be independently enabled to detect signal level changes. The physical driver operates with 32mA for both high and low level.

4.9 I²C

The I²C interface operates at the maximum frequency of the 330 KHz. The connector for I²C is located on the terminal digital I/O block and has three pins: SCL, SDA and GND. When required the I²C device can be powered with the VCC output of the digital I/O terminal block.

5 Product Support Information

The following services are provided on the www.vscom.de and www.visionsystems.de for the customers to support our products:

- driver updates
- product information
- user's manual updates

For special technical support issues please use service@visionsystems.de.