VS Vision Systems GmbH / Part Number 6830

Model Information

## Main Features

- AM3352 ARM Cortex-A8 @ 600MHz
- 256MB DDR3 / 256MB NAND Flash
- 1 x SD-Slot / 1 x SIM card slot
- 5 x LAN (1 Gigabit, 4 Fast Ethernet)
- 3 x USB 2.0 (2 Host, 1 OTG)
- 2 x RS232/422/485
- 1 x CAN Bus
- 8 x Digital-I/O (4 Input, 4 Output), 1 x I²C
- 1 x mPCIe-slot (for e.g. 3G/4G-Modem)
- WLAN 802.11b/g/n optional
- Low Power, fanless, safe connectors
- Operating Temperature −20°C - 65°C
- DIN RAIL mountable
- BSPs: Debian, OpenWrt, Buildroot, Yocto

Contact Online...

# Baltos iR 5221

**Quick Link:** | Main Features | More Pictures | Overview | Software Specifications | System | Serial Ports | CAN Bus | Wireless interface (option) | Power Requirements | Housing and Mounting | Environmental Data | Standards | MTBF (Mean Time Between Failures) | Warranty | Open Source Software | Ordering Information | Options | Packaging |

## More Pictures

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## Overview

The OnRISC Baltos iR 5221 is a fanless and DIN-Rail mounting suitable industrial embedded PC with compact dimensions. It is based on an ARM Cortex-A8 with NEON SIMD Coprocessor, with up to 1GHz CPU clock speed. Low power consumption (3W typical), an extended temperature range (−20°C to 65°C), a wide power supply (12 — 50V DC) and an impressive MTBF (10.5 Years at 45°C) are qualities that make it an ideal system for industrial automation.

### IoT-Cloud Support

Thanks to it's rich connectivity Baltos devices can be used as IoT Gateways connecting sensors/actuators and arbitrary cloud providers like Amazon's AWS IoT, Microsoft's Azure IoT Hub and others using MQTT protocol directly or via the cloud providers own APIs.
Besides Baltos series can also serve as a controller. Both roles can be easily programmed using either traditional programming languages or Node-RED*, a visual flow-based programming for the Internet of Things.

### Easy-to-use starter kits

Baltos embedded systems run several Linux flavored distributions on an ARM core as an operating system. In addition, two pre-packaged bootable SD cards are provided: The Debian GNU/Linux and an upstream OpenWrt image; the latter includes an install-option to the internal flash memory. A VPN router firmware specialized in easy-to-use VPN networking is also available (VPNRouter).

### Booting options and BSPs

Baltos iR 5221 can be booted from either NAND flash or SD card. The NAND flash is a robust boot medium capable of withstanding power cuts and vibrations. SD cards have the advantage of providing arbitrarily large storage amounts. Buildroot, Yocto and OpenWrt BSPs provide a small footprint and would fit well into the NAND storage, whereas Debian is best used on the SD card.

**Rich connectivity**

The system allows extension with broadband GSM/3G/4G-Modems for installation on mobile internet bases. WLAN802.11b/g/n is available as a common option; furthermore, three locations for SMA-antenna sockets are provided. The great variety of interfaces such as LAN, USB, RS232/422/485 serial ports, I²C, Digital I/O and CAN-Bus enable Baltos iR 5221 to act like a powerful gateway between networks, various industrial devices and field buses. The Baltos series are fully ESD and surge protected, complying with IEC 61000-4-2 (8KV air and 4KV contact).

**Secure Remote Access**

For the Baltos series there is a software option that uses the viaVPN Cloud system (www.viaVPN.com), which can be remotely accessed and monitored over the Internet. viaVPN provides secure and strongly encrypted access, without the need for any reconfiguration of existing firewalls. In case a customer's firmware/application is accessible via Ethernet or Wifi — as for example via a web interface or Telnet/SSH connection — viaVPN extends the access over internet by a protected VPN tunnel.

## Software Specifications

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|---|---|
| **Linux** | Debian:<br>Latest stable release available as ready-to-run SD card image or can be built/customized via ELBE project (Github)<br>Buildroot:<br>BSP with Kernel and bootloader patches and basic configuration (Github)<br>Yocto:<br>layer-baltos with Kernel and bootloder patches suitable for new projects or integration into already available projects (Github)<br><br>Buildroot and Yocto are suitable for installation to NAND Flash |
| **OpenWrt** | Based on branch DD 'Designated Driver', comes ready-to-use on an SD card. Installation into NAND Flash memory is supported.<br>To self-create this software the setup procedure is on GitHub.<br><br>The daemon to access the viaVPN system provides secure Remote Access over Internet. It supports a Debian-based Installation, and Buildroot as well. |
| **Remote Access (option)** | Connect via Internet<br>viaVPN provides easy access to remotely installed systems. Software installation is quickly done with convenient tools to get access from everywhere.<br>Security<br>All communication uses a VPN-tunnel encrypted by SSL/TLS and AES-256.<br>Firewall friendly, ready for 3G/4G use<br>viaVPN Cloud Server access uses common web ports. Reconfiguration of firewalls is not required. This enables the use with mobile networks. |

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## System

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|---|---|
| **Hardware** | • Sitara AM3352 ARM Cortex-A8 RISC CPU @ 600MHz<br>• 256MB DDR3<br>• Real time clock with battery backup |
| **Mass Storage** | • 256MB NAND Flash memory (bootable)<br>• SD 2.0 / SDHC SD-card slot (bootable) |

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| **Network** | • 1x 1000/100/10 Mbps Gigabit Ethernet<br>• 4x 100/10 Mbps on integrated Fast Ethernet Switch<br>• WLAN 802.11b/g/n optional: 3 x SMA antenna sockets |
| **Expansion Slots** | • 1 x miniPCIe slot with USB 2.0 and 1 x SIM card slot<br>• usage with GSM/3G/4G modems and GPS<br>• usage as additional CAN Bus port or serial port |
| **Serial Peripherals** | • 2x USB 2.0 as Host<br>• 1x USB 2.0 OTG<br>• 2x RS232/422/485 high speed<br>• 1x Console Port RS232<br>• 1x I²C |
| **CAN Bus** | • 1x CAN High Speed, 20kbps up to 1Mbps<br>• Signals: CAN_H, CAN_L, CAN_GND<br>• SocketCAN, CANopen (CANFestival) |
| **Digital Input/Output** | • 4x TTL Output signals (64mA sink / 32mA source)<br>• 4x TTL Input signals<br>• IRQ for input signals<br>• Terminal block connector |
| **LED** | • 1x Power, 1x 3G, 1x WLAN, 1x Application<br>• LAN: 5x Link and Speed |

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## Serial Ports

| | |
|---|---|
| **No. of Ports/Type** | 2 × RS232/422/485 selected by software or by DIP-switches<br>Highspeed UART, 64 Byte FIFO (16C750) |
| **Connector** | DB-9 male |
| **Protection** | 16kV ESD surge protection |
| **Operating Modes** | • RS232<br>• RS422 full duplex (120Ω on/off)<br>• RS485 4 wire, full duplex (120Ω on/off)<br>• RS485 2 wire, half duplex (120Ω on/off) |
| **Configuration** | One DIP switch per port can set operating mode and RS422/485 termination<br>Software can override the operating mode for each port<br>No High/Low biasing resistors needed |
| **Signals** | • RS232: TxD,RxD, RTS,CTS, DTR,DSR, DCD, RI, GND<br>• RS422: Tx+/-, Rx+/-, GND<br>• RS485 4 wire: Tx+/-, Rx+/-, GND<br>• RS485 2 wire: Data+/-, GND |
| **RS485 Data Direction control** | Driver Automatic via RTS |
| **Data bits** | 5, 6, 7, 8 |
| **Stop bits** | 1, 2 |
| **Parity** | None, Even, Odd, Mark, Space |
| **Flow Control** | RTS/CTS, XON/XOFF |
| **Baudrate** | RS232: 200 bps to 921.6/1000 kbps<br>RS422/485: 200 bps to 3.7Mbps<br>Supports non-standard baudrates |

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## CAN Bus

| | |
|---|---|
| **No. of Ports/Type** | 1 × CAN Bus |
| **Connector** | DB-9 male |
| **Protection** | 16kV ESD surge protection |
| **Signals** | CAN_H, CAN_L, CAN_GND |
| **Speed** | CAN 2.0A / 2.0B up to 1 Mbit/s |

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|---|---|
| **Transceiver** | SN65HVD233 (Texas Instruments) |
| **Linux OS** | Supports SocketCAN |
| **VSCAN API** | Unified API for control all VScom CAN-Adapters |
| **CANopen** | Open source CANfestival framework fully implements CANopen functionality. |

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## Wireless interface (option)

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|---|---|
| **Standards** | 2.4GHz Radio, supports IEEE Std. 802.11b/g/n |
| **WLAN Modes** | Access Point (AP) or Client (Station) |
| **TX Power** | 802.11b:<br>Typ. 15.5dBm ±1.5 dBm @ 1Mbps (DSSS)<br>Typ. 15.5dBm ±1.5 dBm @ 11Mbps (OFDM)<br>802.11g:<br>Typ. 15.6dBm ±1.5 dBm @ 6Mbps (CCK)<br>Typ. 13.5dBm ±1.5 dBm @ 54Mbps (OFDM)<br>802.11n:<br>Typ. 13.4dBm ±1.5 dBm @ 6.5Mbps (OFDM)<br>Typ. 13.3dBm ±1.5 dBm @ 150 Mbps(OFDM) |
| **RX Sensitivity** | 802.11b:<br>-95.6dBm @ 1Mbps, -88dBm @ 11Mbps<br>802.11g:<br>-91.3dBm @ 6Mbps, -74.2dBm @ 54 Mbps<br>802.11n:<br>-88.8dBm @ 6.5Mbps (20 MHz), -72dBm @ 72.2Mbps (20 MHz) |
| **Transmission Rate** | 802.11b: 11Mbps<br>802.11g: 6 to 54Mbps<br>802.11n: 6.5 to 150Mbps |
| **Transmission Distance** | Up to 100m in open areas |
| **Wireless security** | • WEP<br>• WPA<br>• WPA2<br>• WPA2-Enterprise (IEEE 802.1X/RADIUS) |
| **Antenna Connector** | RP (Reverse-Polarity) SMA |

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## Power Requirements

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|---|---|
| **Input Voltage** | 12 — 50V DC |
| **Power Consumption** | • 0.2A @ 12V minimal<br>• 0.4A @ 12V typical, plus devices on USB and Aux. Power |
| **Connector** | 3-pin Terminal Block |
| **Aux.Power Output** | on Digital I/O connector: 0.5A @ 5V max. |

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## Housing and Mounting

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|---|---|
| **Case** | 0.8mm sheet metal |
| **Weight** | w/o box 0.55kg; w/h box 0.9kg |
| **Dimensions** | 154×104×50 mm³ (W×L×H) |
| **Packaged** | 185×152×60 mm³ |
| **Mounting** | • DIN Rail<br>• Wall mount |

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## Environmental Data

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|---|---|
| **Operating Temp** | −20°C — 65°C |
| **Storage Temp** | −30°C - 85°C |
| **Ambient Humidity** | 10-85% non-condensing |

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## Standards

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|---|---|
| **Declarations** | CE, FCC |
| **Environment** | RoHS |
| **EMI** | • EN 55022 Class B<br>• EN 61000-3-2: Limits of harmonic current emissions<br>• EN 61000-3-3: Limitation of voltage changes<br>• 47 CFR FCC Part 15 Subpart B |
| **EMS (EN 55024)** | • EN 61000-4-3: Radiated RFI<br>• EN 61000-4-4: Electrical Fast Transient<br>• EN 61000-4-5: Surge<br>• EN 61000-4-6: Induced RFI<br>• EN 61000-4-8: Power Frequency Magnetic Field<br>• EN 61000-4-11: Power supply dips |
| **ESD** | EN 61000-4-2 4kV contact 8kV air for<br>• Serial Ports<br>• CAN Bus<br>• USB<br>• Ethernet<br>• DC Power connector<br>• Digital-I/O |

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## MTBF (Mean Time Between Failures)

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| **MTBF** | 26.5 Years @ 25°C<br>10.4 Years @ 45°C |
| **Standard** | Telcordia (Bellcore) Standard; RelCalc. 5.0 BELL-7 |

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## Warranty

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| **Warranty Period** | 2 years |

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## Open Source Software

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| **Licenses** | This product uses open source software to fulfill part of its functions. Licenses for the open source software are granted under the GNU General Public License in various versions. For details about those see the information in the firmware download and visionsystems.de/opensource |

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## Ordering Information

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|---|---|
| **6830** | OnRISC Baltos iR 5221 |

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## Options

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|---|---|
| **6031** | Power adapter 110-230V AC to 12V @1A, DC, EU plug |
| **6034** | Power adapter 110-230V AC to 12V @1A, DC, US plug |
| **6689** | WLAN Kit internal<br>internal module 802.11b/g/n, pigtail and antenna<br>Purchase time option, not for later retrofitting |
| **3314** | GSM/UMTS mPCIe card for 3G modem |
| **3318** | 4G-Modem LTE for mPCIe incl. IPEX cable & SMA Antenna |
| **6829** | DIO Extender<br>Addon board to use Industrial Voltages 0 – 30V for Digital-I/O |

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| **432** | USB-CAN Plus mPCIe<br>PCI Express Mini Card for second CAN Bus port |
| **600** | USB-COM Plus mPCIe<br>PCI Express Mini Card for a third serial port |
| **6841** | Daemon viaVPN, provides secure Remote Access system over Internet |
| **6835** | Starter Kit Debian<br>• 4GB SD card for DEBIAN/GNU Linux<br>• Power adapter 12V @ 1A<br>• Adapter cable for console port |
| **6842** | Starter Kit OpenWRT<br>• 4GB SD card for OpenWRT<br>• Power adapter 12V @ 1A<br>• Adapter cable for console port |

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## Packaging

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|---|---|
| **Packing list** | • OnRISC Baltos iR 5221 system<br>• Printed Quick Installation Guide<br>• Terminal blocks for Power Supply, Digital-I/O, CAN Bus<br>• DIN Rail Adapter 24mm<br>• Wall mounting plates |

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## External WLAN (demonstrated on Baltos iR 2110)

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