VR2000
In Vehicle Computer and Router

The Thorcom VR2000 is a high performance in-vehicle computer and application host, IP router and vehicle locator designed for mobile data, vehicle tracking and in-vehicle communications and networking applications.

The VR2000 combines a high performance 400MHz 32-bit RISC processor (ARM920T) with low power consumption and a wide range of serial communications interfaces (RS232, USB and Ethernet) for connection to radio bearers and communications equipment, as well as digital inputs and outputs for telemetry and data capture.

The VR2000 features a dual-channel graphics controller that permits connection of VGA or DVI screens, including touch-screens. This allows the VR2000 to display information on a small screen located in the vehicle cab, and to display more detail on a larger screen in the rear of a vehicle.

VR2000 has a feature-rich set of IP networking protocols and facilities including TETRA packet data (IP over TETRA) and GPRS (IP over GSM) with support for Network Address Translation (NAT), high performance firewall and Virtual Private Networking (VPN) with security/encryption (IPSEC/3DES).

With four RS232 serial ports, four USB ports and two 10/100Mbps Ethernet ports the VR2000 is equipped with a wealth of connectivity options to allow connections to multiple communications bearers, input/output devices such as keyboards, touch-screen interfaces, barcode readers, and wireless networks.

The design incorporates high performance industrial grade Compact FLASH memory for long-term program and data storage. Battery backed Static RAM (SRAM) is used to store short-term data such as vehicle telemetry information. A rugged internal hard disk option is available for high capacity storage needs. The ultra-low power consumption (typically less than 4 watts) and wide supply voltage range ensures that the VR2000 can remain operating in the harsh vehicle environment for extended periods, compared with PC based solutions that typically consume 10-100 times more power.

Applications for VR2000

- Mobile Data And Job Dispatch
- Mobilisation and Status Applications
- Satellite Navigation
- Mobile web browsing and email
- Form based information transfer
- Vehicle maintenance management

Key features

- High performance 32-bit RISC CPU (ARM920T based)
- Large memory 128Mb SDRAM (256Mb optional)
- Hard disk drive or Compact FLASH type I/II for storage
- Onboard VGA controller and touch-screen support (dual option)
- Integrated Trimble 12-channel GPS receiver
- 2 x 10/100Mbps Ethernet ports
- 4 x RS232 serial ports (RJ45 connectors)
- 4 x USB ports for keyboard, touch-screen, bar-code readers and more
- Battery backed Realtime clock and Static RAM (SRAM)
- 8 x Digital inputs (6 general purpose + Alarm + Ignition)
- 2 x Digital outputs + 1 x 10A switching relay
- Power management and supply monitoring Operates from 12V, 24V or 42V vehicle supply
- Low power consumption (typically 4 watts)
- AC97 audio interface (line levels, microphone, speaker)
- Debian ARM Linux operating system

Network Connectivity

- Stateful packet inspection firewall (iptables)
- Network Address Translation (NAT)
- IP routing
- Secure multi-bearer support for load balancing and resilience (eg TETRA and GPRS)

"The VR2000 integrates secure multi-bearer communications and mission critical mobile data into a highly optimised 'one-box' solution."

THORCOM

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Technical Specifications

CPU & Memory

CPU Samsung S3C2440 32-bit RISC CPU @ 400MHz

Memory 128Mb SDRAM standard, 256Mb SDRAM (option)

FLASH 64Mb NAND FLASH for boot loader and custom applications

VGA & Display

Controller Silicon Motion SM501 dual-channel VGA controller for 1 or 2 screens, VGA, DVI, LVDS options

Memory 8Mb integrated
VRAM 64Mb option

Storage

Internal 2.5" notebook HD drive (option)

CF Card 16Mb - 4Gb type I/II CF card or CFA/IDE microdrive option

SRAM 1Mb Static RAM, battery backed (user data)

NVRAM 1Kb IIC bus non-volatile (ABLE configuration)

Connectivity

Ethernet 2 x Davicom DM9000 10/100 Mbps Ethernet controllers, RJ45

4 x RS232 serial ports (TXD/RXD, CTS/RTS, DCD/DTR) at 300-115200bps, RJ45

USB 2 x USB v1.1 OHCI host ports,

4 x external ports via on-board hub, Type A

Input/Output

GPS 12 channel Trimble Lassen iQ receiver, SMA

Inputs 8 x digital inputs, 2 special (IGN & ALARM), 6 general purpose, universal operation, Molex socket

Outputs 1 x 10A SPDT relay

3 x open collector transistor (max 250mA @ 30V), Molex socket

Audio AC97 codec with Line In, Line Out, mono microphone input, 2W mono speaker output, PC99 colour coded

Power Supply

Voltage +10.0 to 32.0 VDC, Molex socket

Power 3.5W typical, 4.0W max (excluding HDD & USB devices)

Backup CR2032 3.0V Lithium Coin-cell (user replaceable)

Microprocessor controlled power supply system with intelligent power on/off and watchdog functions

Enclosure

Case Aluminium extrusion, IP54 rated

Size 32mm (H) x 190mm (W) x 190mm (D)

Weight 900g (without HDD)

1100g with HDD

Environmental

Temp. -10 to +55 Celsius

Humidity 0-90% RH (non-condensing)

EMC 89/336/EEC (EN 310 489) and Vehicle EMC directive 95/54/EEC

Linux operating system

VR2000 is powered by Debian GNU Linux (for ARM CPU) with a customised 2.6 Linux Kernel provided by Thorcom to support the VR2000feature set. Production units run with a minimal installation of the operating system packages required for system operation. Special versions of the VR2000 are available with integral hard disk drives and full Debian Linux installation for software developers.

Integrated GPS receiver Vehicle tracking & recording

The VR2000 incorporates a high performance TrimbleT Lassen-iQ 12 channel GPS receiver for positioning and timing applications which include Automatic Vehicle Location (AVL) and data logging. The VR2000 is supplied with Thorcom's proven vehicle location system software, providing an intelligent 'rules based' vehicle location sub-system which minimises transmissions and maximises their effectiveness. The integrated GPS receiver also allows 'black box' recorder mode to be implement for recording vehicle journey, driving speeds and status information gathered from digital inputs or externally connected sensors, for example temperature or fuel levels.

Power supply and power management

The VR2000 has been designed for operation in the harsh vehicle environment where the power source can be unreliable. The VR2000 PSU module is highly efficient and operates from 10.0 to 32.0 volts (12V or 24V vehicle supply). The unit has the ability to monitor and sense the supply voltage and control the power supply to other devices allowing them to be switched on/off at appropriate times under software control. VR2000 will typically be configured to monitor the supply voltage from the vehicle battery and perform an orderly shutdown ahead of the supply becoming exhausted.

Safety and approvals

The VR2000 has been tested for Electrical/ EMC specifications to 95/54/ EEC (Vehicle EMC Directive) and is 'e' marked. The VR2000 is CE marked to 89/336/EEC, and tested to EN 301 489-1 for use in the home/office environment. The VR2000 has been conformance tested for use on the Airwave TETRA network in the U.K. as well as Orange and Vodafone GPRS networks.

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