



Objectives

- Provide OEM developers with full schematics and documentation for an embedded Internet solution
- Demonstrate a working VG330-based Embedded Internet board with a low bill of materials cost

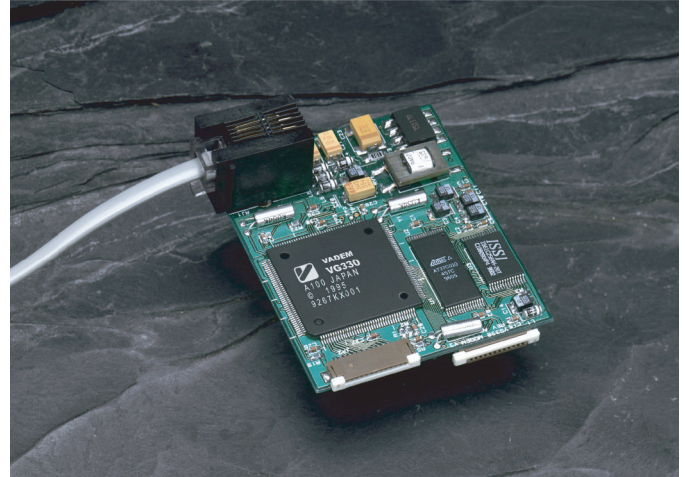
Benefits

- Delivers a ready-to-manufacture, low-cost, system design for Embedded Internet applications
- Delivers fast time-to-market for OEM's embedded Internet applications
- Drastically reduces the development and manufacturing costs for an Internet-enabled appliance
- Shields designer from ground-up system design effort
- Allows OEM designer to focus on core functionality of product
- Combined with the IPoint™ software (see *IPoint product brief*), IPump provides a turnkey solution for Internet-based data transfer for embedded applications
 - ⇒ Lowers cost of data communication with remote devices
 - ⇒ Enables near real-time data collection and device control

Features

- Delivers a ready-to-manufacture system design
 - ⇒ Schematics available
- Vadem's VG330—16-bit, 32 MHz, single-chip PC
- Uses only 512KB of RAM, 512KB of ROM
- 14.4 Kbps modem—upgradable to 28.8Kbps or 33.6Kbps
- DAA for phone line interface
- Serial and GPIO system interfaces
- Datalight's ROMDOS™ and Vadem's IPoint software
- Vadem's VG330 BIOS or General Software's Embedded BIOS™

IPump...



a ready-to-prototype reference design for embedded Internet applications.

Overview

IPump is a complete hardware and software system that provides OEMs with a low-cost, turnkey Internet access solution. It consists of Vadem's single chip VG330 platform, all the necessary Internet software components, and a ready-to-manufacture reference design.

IPump addresses a growing demand from OEMs to incorporate Internet connectivity into mission-specific embedded devices in order to enable **remote data collection and device control**. Embedded devices enabled for Internet access are termed **Embedded Internet Appliances**. Examples of these appliances include:

- Utility meters
- Security and remote surveillance systems
- POS systems, ATMs, and vending machines
- Remote healthcare devices
- Network monitoring
- Remote Diagnostic devices
- Remote printing for digital cameras

Some of these applications currently employ field personnel to monitor and collect data from installed devices, leading to high operational costs. Other applications use modems and regular phone connections to facilitate communication between equipment operator sites and remote field installed devices. However, the distributed nature of installed devices and the costs of long-distance phone calls can still lead to high operational costs.

The ubiquity of the Internet, and increasingly cost-effective means of accessing it, are providing a lower cost alternative for equipment operators who need to communicate with remote appliances. However, undertaking development of this capability from scratch often represents too large an investment for an OEM.

IPump Reference Design

The IPump reference design offers OEMs a quick path to implement an embedded Internet design, drastically reducing the system design time (and cost) and therefore the OEM's time-to-market. It achieves this by:

- Leveraging the VG330's high integration—realizing a reduced component count and system design time
- Offering a DOS compatible CPU—providing a standard software development environment

An OEM may also use **IPoint** to accelerate the development of Internet software applications targeted for the VG330. The IPump/IPoint combination provides OEMs with a complete hardware/software solution for embedded Internet appliances.

IPump Hardware

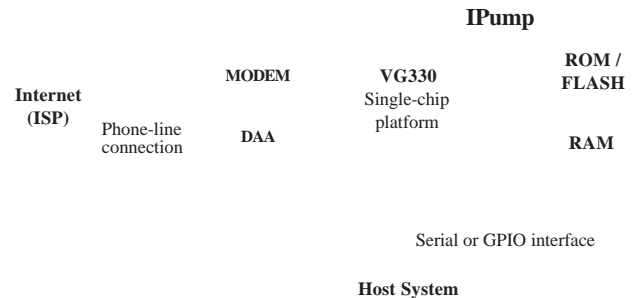
The IPump reference design is offered as a set of full Orcad schematics and gerber files, which can be used by the OEM as a baseline development architecture and easily modified to generate a customized design. Even for non-Internet related applications, IPump is a valuable baseline VG330 design.

The IPump solution uses Vadem's VG330 single-chip PC. The VG330 is a 32MHz, highly integrated, DOS compatible single-chip platform incorporating all standard PC peripherals.

To keep the BOM cost to a minimum, IPump uses a 14.4Kbps modem for Internet connectivity. Due to the relatively small amount of data that typically needs to be transferred in embedded Internet application, this speed is

usually sufficient. 28.8Kbps and 33.6Kbps modems can easily be inserted, however, where greater transfer rates are required.

IPump Block Diagram



IPump Software Environment

In its capacity as a reference design targeted for embedded Internet applications, IPump is supported by the IPoint™ software (*see the IPoint product brief for more details*). This simplifies and accelerates the development of Internet-based data transfer applications targeted for VG330 systems. OEMs can develop IPump applications using the IPoint API which provides users high-level functions to:

Connect to an ISP

Connect to a remote computer system over the Internet

Send and receive data “files” to and from remote computer systems over the Internet using FTP

Send (SMTP) E-mail message to remote computer systems.

IPoint also includes BIOS and DOS, making the IPump an open DOS platform and simplifying the software development process. Standard DOS development and debugging tools may be used to develop custom software applications which can then be transferred to the OEM's VG330-based target system. Applications may also be debugged on the VG330 itself using its ICE capabilities.

