

The Embedded Planet Platform

Helping You Simplify And Accelerate Your Embedded Product Development

In a world inundated with embedded products that claim to reduce time to market and speed development, it has become harder to make the right platform choice for application development. Embedded Planet provides a platform of software and hardware components that work together, helping you get to market faster and with a reliable and optimized network solution. This platform is overviewed in the following article.

DESIGN - DEVELOP - DEPLOY

Embedded Planet TM has pioneered a new way of building embedded devices that enables its clients to rapidly turn ideas into prototypes and market-ready products with a single, integrated platform using proven, scaleable software and hardware components. Embedded Planet brings together best-of-breed technologies, including patented technologies, to create a world class embedded product development platform. We leverage our work with customers, developers, and suppliers in multiple vertical markets to gain exposure to the latest technologies.

Embedded Planet technology and the MotorolaTM or IBM PowerPCTM architecture provide an ideal foundation for the development of Internet-enabled, mobile, wireless and multimedia network edge devices.

The PlanetCoreTM software suite helps you bring out the hardware and software functionalities into your product. During the entire process, the web based PlanetTrack support program enables quick access to resources and links you to our partners.

THE EMBEDDED PLANET PLATFORM

The Embedded Planet platform includes MotorolaTM and IBMTM PowerPCTM processor based computing engines in PC/104, Credit Card, and EBX form factors. Development platforms for leading RTOS including embedded MontaVistaTM Linux, Wind RiverTM VxWorksTM, and Microsoft[®] WindowsTM CE 3.0 are available. All boards come with the PlanetCore software suite that includes the loader, burner, and diagnostics. Each board also includes Ethernet debug cable accessories, a universal (5v) power supply, CD-ROM with design, reference, and development information. Technical support is provided to guide you through the user manual and hardware set-up and as you develop your application can be through the web-based PlanetTrack system.

The Embedded Planet Platform (Figure 1) shows how your application (on the top layer) development efforts can benefit from the various components of the platform. The various components of the platform include:

- Computing Engines / Single Board Computers

- I/O Modules
- RPX Bus
- Planet Core
- RTOS/BSP - Software Development Platforms
- (Your) Application

You can begin your project with design by leveraging our platform of production ready hardware components and software. Then develop on the same Embedded Planet components for the prototype phase. And finally deploy using our components or licensing our designs for your production. It is our mission to ensure your success and we can sell Intellectual Property and schematics for any of solutions to help meet customer requirements.

COMPUTING ENGINES

The Embedded Planet Computing Engines have been designed to help reduce time to market and increase reliability for companies building complicated networking solutions. Scaleable in size and configuration, they provide a flexible, production-ready platform for your embedded applications. Embedded Planet provides Computing Engines in PC/104, Credit Card, and EBX form factors for developers building products that extend the range of today's Internet. The PC/104 mechanical form factor is compact and satisfies the key requirement of embedded control application -

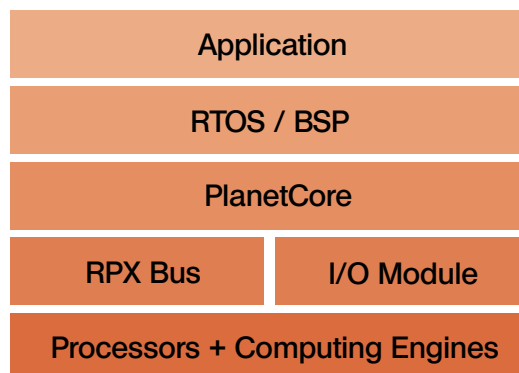


Figure 1. The Embedded Planet Platform.

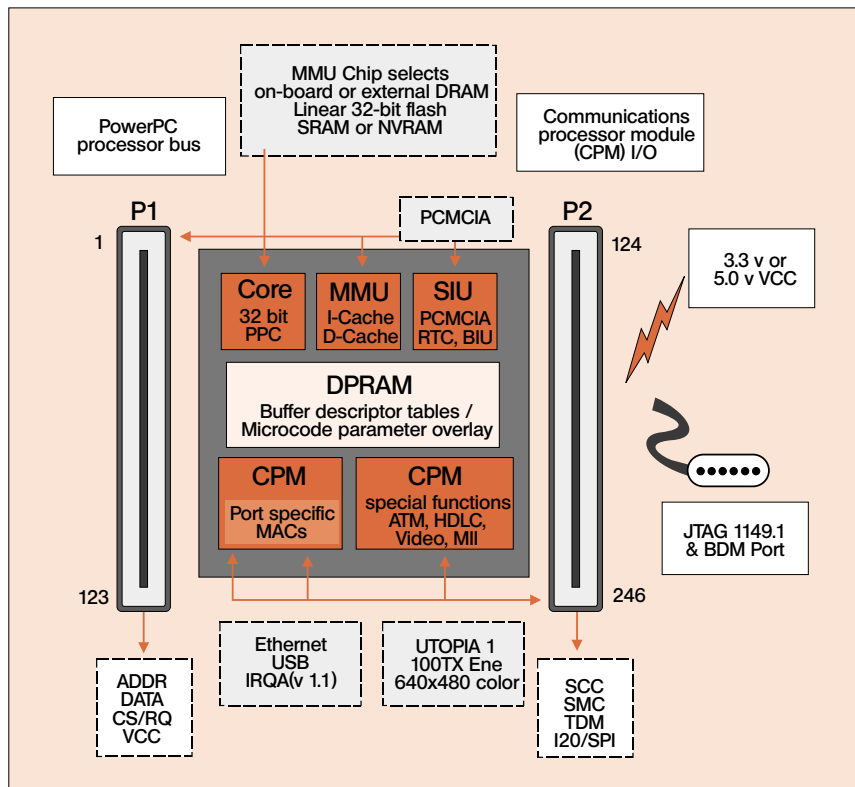


Figure 2. The RPX Bus

reduced space. All boards include Embedded Planet's PlanetCore, which provides firmware and utilities for loading, setup, and diagnostics of the hardware. Computing engine configurations for RAM, Flash and most components can be customized to meet your requirements and production quantity pricing is available.

I/O MODULES

The Embedded Planet platform also includes a line of I/O modules to enhance the Computing Engine in order to assist with your development. These include the H I/O X multimedia card, the M I/O X card, the Epson SED1386 video controller and the V I/O X multimedia card.

The H I/O X multimedia card includes audio, video, touchscreen, serial, and I/O features. The M I/O X card is the credit card form factor version of the HI/OX with a pass through connector.

The Epson SED1386 video controller is incorporated into a credit card form factor and talks directly to the CPM of the PowerQUICC processor. The V I/O X multimedia card includes video, touchscreen, extra RAM and Flash, RS232 / RS485 and I/O features.

RPX BUS

The RPX Bus (Figure 2) gives a developer direct access to the processor via a standard connector, which provides high performance connection and makes integration to custom I/O features easy. The RPX Bus Design Guidelines help you integrate Embedded Planet computing engines into your prod-

ucts and helps you build your own specific I/O functions. The Bus also allows you to develop and prototype using one device and move directly to a production version. The RPX processor family maximizes flexibility in design and functionality. The special functions of the Motorola 8xx processors are mapped through the RPX Bus (P1 and P2) to two standard connectors. The 120-pin connectors provide direct access to the processor while allowing a modular and scalable product design. Embedded Planet also offers a 64 bit based RPX Super Bus for the RPX Super 8260 product. The RPX Super Bus is a next generation version of the RPX Bus and provides all the features of the 8260 PowerPC.

The RPX bus that is part of each RPX board consists of two fine-pitch surface-mount connectors with 120 pins each. The two expansion connectors are the Bus expansion connector (P1) and the I/O expansion connector (P2). These interfaces allow I/O expansion cards to be designed and interfaced to the CPU boards. Most CPU and CPM signals are routed to the connectors for processor interface. Pins A1 (on left) and B1 (on right) of the connectors are identified on the PCB.

PLANETCORE™

PlanetCore is a suite of utilities designed to support Embedded Planet's computing engines and I/O modules. These utilities provide key functions for getting the board running as fast as possible. PlanetCore is comprised of three independent software components:

- Target based application boot loader
- Host based flash burner

- Suite of drivers, diagnostics and utilities for the I/O functions of the Motorola PowerPC and Embedded Planet's products

The PlanetCore boot loader resides in flash and provides guidelines for initializing Embedded Planet CPU boards and starting application code. It provides:

- Small memory footprint < 256k
- Boots quickly
- Can optionally test the DRAM
- Command line interface via monitor port - has online help
- High or low boot capable
- Configured via EEPROM settings
- Robust serial and Ethernet (tftp) communications and data transfers (can download s-records or binary)
- Can boot user applications from FLASH or tftp using the 10/100Base-T interfaces

The PlanetCore flash burner erases and programs AMD flash memory in a one-step process. The burner program source code is not required to generate an image. The image is in an s-record format, loaded by the boot loader or Background Mode Debugger (BMD) products. Multiple sections of flash may be programmed in a single file.

The PlanetCore diagnostics and utilities reside in flash (but can be removed to maximize memory) and provides for testing of on-board and add-on card IO. The diagnostics are used to test the integrity of the on-board and IO card hardware. It uses monitor port for user interface. The diagnostics come preprogrammed into FLASH, but the end user can remove the diagnostics if not needed to conserve memory. The diagnostics are available for on-board tests and IO card tests. The on-board tests include:

- Memory (Flash, DRAM, NVRAM)
- Dip switches and LED's
- SPI and I2C buses
- PCMCIA
- Ethernet
- IO-card diagnostics that are specific to each card - For example, HCARD diagnostics would include: UART, Video encoder, LCD, Audio, Touchscreen, and Infrared.

RTOS AND BOARD SUPPORT PACKAGE / PLANETS

For Embedded Planet's CPU engines and planets, Embedded Planet developed the BSPs for Linux, VxWorks and Windows CE RTOS so that customer can develop their application with their desired operating systems. In other words, customer does not have to develop the drivers for the components included. All drivers for the specific RTOS are included in the planet and source code for each BSP is available.

Embedded Planet also offers Planets that combine all the hardware and software components into one product or platform. Planets allow embedded software

application developers to start writing code for within minutes. The complete solution provides the RTOS and all components needed to start writing code allowing quick prototype of potential product features. These platforms are provided for leading RTOS including embedded Linux, VxWorks and Windows CE 3.0. The system contains most of the computer functions required for embedded designs, including operating system software, and is targeted to developers planning to use embedded Linux, VxWorks or Windows CE along with Motorola and IBM PowerPC processors.

The ready-to-run systems comes complete with a 640x480 color LCD with touch screen panel, power supply, I/O and DC cables, a PC/104 form-factor MPC based single board computer (SBC), and an I/O expansion motherboard.

TECHNICAL SUPPORT

Embedded Planet provides industry leading technical support via our PlanetTrack™ system. PlanetTrack allows direct access to Embedded Planet technical support engineers and partner technical support engineers to provide complete solution support. Our PlanetTrack system allows Embedded Planet to coordinate support required to complete your development project. In addition, PlanetTrack also includes our continuously updated knowledge base covering all Embedded Planet products. Firmware and Software upgrades are included and can be easily downloaded.

Realizing the power of the Internet, Embedded Planet has provided PlanetTrack, a fully web-based system to support Embedded Planet's Software Development Platforms. The Web based architecture underlying PlanetTrack provides excellent advantages to our customers. Most competitive systems are only Web-enabled and require customers to install software on every machine that will be accessing the system through a browser. But with PlanetTrack, an ordinary Web browser is all you need. In addition, the web-based structure enables creating new reports through the browser. Hence, customers all over the world with a browser can access, view, and make reports any time and from anywhere.

PRODUCTS SUMMARY

- **RPX SUPER** (Figure 3) is the first Motorola PowerQUICC II 8260 based computing solution in a PC/104 mechanical form-factor. It features scal-

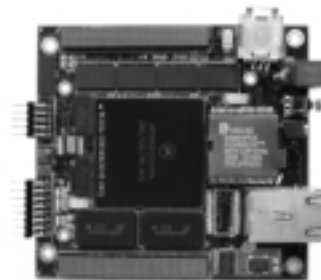


Figure 3. RPX SUPER.

able linear Flash memory of up to 32MB, separately controlled SDRAM arrays for both the Power PC bus and the local bus up to 128MB and 10/100 Ethernet brought out from the communications processor bus. The RPX Super supports all speeds of the PowerPC 8260, and all of its derivatives.

- **RPX CLLF** feature PC/104 mechanical form factor and is based on the 860x processors. The CLLF comes with up to 32 MB of flash and 16MB of SDRAM. It also features 10/100 Ethernet and single or dual slot Type I, II, and III PCMCIA.
- **RPX 405** features PC/104 mechanical form factor with IBM 405 PowerPC processor. The RPX 405 comes with up to 32 MB of flash and 64MB of SDRAM. It also features 100BaseT Ethernet.
- **RPX CLCC** is the cost effective credit card size alternative to CLLF. It features the 860x processor. The CLCC comes with up to 16 MB of flash and 16MB of SDRAM. It also features and single slot Type I, II, and III PCMCIA.
- **RPX LITE** feature 823(e) or 850x processors and come in PC/104 mechanical form factor. The LITE comes with up to 16 MB of flash and 16MB of SDRAM. It also features and single slot Type I, II, and III PCMCIA.
- **RPX LICC** is the cost effective credit card-size version of RPX Lite, with similar features and peripherals. The LICC comes with up to 16 MB of flash and 16MB of SDRAM. It also features and single slot Type I, II, and III PCMCIA.
- **Linux Planet 1.2** software development platform for embedded Linux and Motorola PowerPC processors enable rapid development of prototypes and debugging of applications. The application-proven computing engines migrate from prototype to production, minimizing design and development time, speeding time to market. USB software adds to the rich variety of the platform connectivity options.
- **Blue Planet 1.1** software development platform is a comprehensive package of software, highly reliable, application-proven computing engines, and superior customer support. It features a tightly integrated hardware and software package with the Windows CE image loaded in Flash. The computing engine features the MPC823e PowerPC Processor and also includes the HI/OX I/O daughter card. Ethernet debug cable kits and CD-ROM with design, reference, and product development information are also included.

- **Customization** of any computing engine can be delivered.
- **Intellectual Property** - for all computing engines and software can be provided.
- **Integration** - Embedded Planet can design and product your specific solution based on your requirements.

CONCLUSION

This single, integrated platform and scaleable software and hardware components are all available at Embedded Planet. This platform enables application developers to rapidly turn their ideas into prototypes and get to market quicker than ever before. In addition, the partnerships with industry leaders have made technology and expertise available to customers, making development and support easier. Embedded Planet has brought together best-of-breed technologies to create a world class embedded product development platform so that embedded developers all over can design, develop, and deploy their applications with greater reliability and speed ■

Matt Hoover, Director, Product Marketing, has more than 16 years of embedded systems development and field application experience. In prior positions with Wind River Systems, and Rockwell Automation, Matt focused his product marketing responsibilities on specific market segments including Industrial Automation, Networking, Automotive and Medical. Matt's extensive client facing and strategic team management duties include execution and management roles in engineering, marketing, sales and support. This deep and broad background has provided Matt with a complete understanding of embedded systems and direct knowledge of how OEMs design, develop and deploy their products. He holds a Bachelor of Science degree in Computer Science, and an MBA.

Sujan Manandhar, Database Marketing Manager, has worked in the high tech sector for three years and has had held management positions in two previous jobs. Sujan has an MBA from Kent State University, with a concentration in Information Systems. He also has a dual Bachelors Degree in Management and Marketing.

All Trademarks are the property of their respective owners.



Let us know about your events to be included in Dedicated Systems Magazine
and the on-line Dedicated Systems Encyclopaedia!
Contact Nico Van Wijmeersch at +32-2-520.55.77 or info@dedicated-systems.com