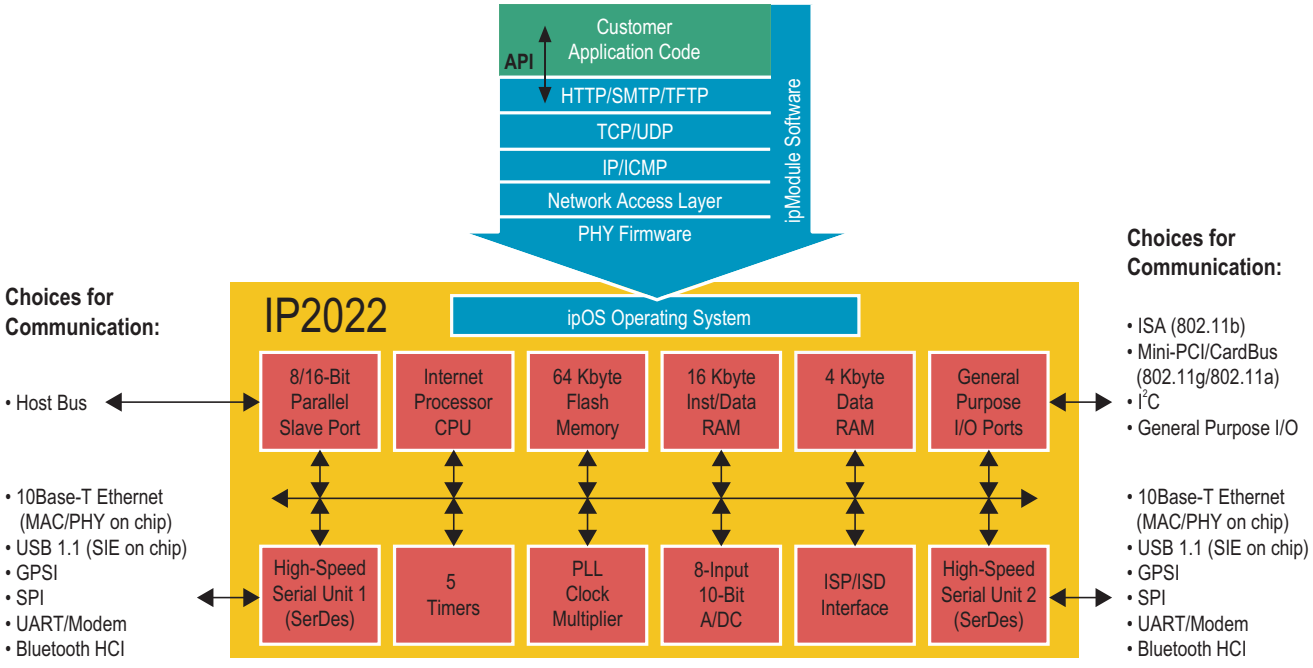
IP2022™

Wireless Network Processor

Product Brief

The IP2022™ Processor is the first member of the Ubicom IP2000™ product family of wireless network processors that deliver Software I/O™ solutions using pre-built software modules and configuration tools to create true single-chip solutions for a wide range of communication applications. This unique processor is optimized for Internet and network connectivity solutions, and is ideally suited for use in node and bridge/gateway portions of the Internet infrastructure. The heart of the IP2022 is a very high performance deterministic processor, available in 120 and 160 MIPS versions, with on-chip high-speed flash and SRAM memory. Two full-duplex serializer/deserializers (SerDes) enable software implementation of most common device I/O. To complement the IP2022 processor, Ubicom provides a world-class development environment based on GNUPro® tools. The IP2022 – a single adaptable platform – enables connectivity with numerous communications and device physical interfaces like 802.11b, 802.11g, 802.11a, Bluetooth™, HomePlug®, Ethernet, USB, I²C, SPI, GPSI, and UART.



Wireless Network Processor Capabilities

- Foundation for Highly Flexible Connectivity Solutions
  - o Physical layers in software
  - o High performance deterministic CPU
    - 120 and 160 MIPS versions available
  - o On-chip program and data memory
  - o Sophisticated power management support
  - o General-purpose hardware peripherals
  - o Built-in programming & debugging support
  - o Complete development environment

Physical Layers in Software

- Software Device I/O
  - o I²C, SPI, GPSI, UART, USB
- Software Communications I/O
  - o 802.11b (via ISA), 802.11g/802.11a (via mini-PCI/CardBus), Bluetooth, HomePlug, Ethernet (via MAC/PHY on chip)
- Adaptable Hardware Functions
  - o 2 independent full-duplex SerDes ports
  - o 52 general-purpose I/O pins
  - o 4 linear feedback shift registers (LFSR)

Wireless Network Processor

IP2022

Deterministic CPU

- 120 and 160 MIPS performance versions
- Single-cycle instruction execution on most instructions
- Predictable execution rate for hard real-time applications
- Deterministic 3-cycle internal interrupt response
- Hardware context switch
- Compact 16-bit fixed-length instructions
- Sixteen-level hardware stack
- 8 x 8 signed/unsigned single-cycle multiply
- Pointers and stack operation optimized for C compiler
- Uniform, linear address space

On-Chip Memory

- 64 Kbyte (32K x 16) program flash memory
- 16 Kbyte (8K x 16) program/data RAM
- 4 Kbyte data RAM
- Self-programming with built-in charge pump
- Addresses up to 2Mbytes (128K linear) of external memory

Sophisticated Power Management

- Operating voltage of 2.3V to 2.7V for 120 MHz (2.55V to 2.7V for 160 MHz)
- Real-time selectable clock sources
- Selectable divider for core clock frequencies
- Stop clock operation
- SPEED instruction for core speed control
- Built-in power-on-reset (POR) logic

General-Purpose Hardware Peripherals

- Two 16-bit timers with 8-bit prescalers supporting:
  - Timer mode, PWM mode, capture/compare mode
- Host interface, 8/16-bit selectable for use as a co-processor
- External memory interface
- 10-bit, 8-channel ADC with 1/2 LSB accuracy
- Analog comparator with hysteresis enable/disable
- One 8-bit timer with programmable 15-bit prescaler
- One 8-bit real-time clock/counter with prescaler
- Watchdog timer with postscaler
- On-chip 50x PLL clock multiplier with pre- and post-divider
  - 4.8 MHz input produces 120 MHz operation with post-divide by 2
  - 3.2 MHz input produces 160 MHz operation
- Brown-out minimum supply voltage detector
- 8 external interrupt inputs

Programming and Debugging

- Updatable application program by the customer
  - Runtime self-programming
- On-chip in-system programming
- On-chip in-system debugging at full speed
- Programming at device supply voltage

Complete Development Environment

- Ubicom's Software Development Kit (SDK)
  - ipOS™ operating system
  - ipModule™ software – pre-built connectivity modules
    - ipBlue™ module – Bluetooth
    - ipEthernet™ module – native 10Base-T Ethernet
    - ipFile™ module – file system
    - ipHomePlug™ module – HomePlug power line networking
    - ipIO™ module – device I/O support
      - I^2C, SPI, GPSI, UART, Parallel
    - ipStack™ module – TCP/IP stack
    - ipStorage™ module – external flash controller
    - ipUSBDevice™ module – USB 1.1
    - ipWeb™ module – HTTP Web Server
    - ipWLANAccessPoint™ module – 802.11b access point
    - ipWLANStation™ module – 802.11b station (node)
- Red Hat® GNUPro tools
  - GCC ANSI C compiler
  - Assembler
  - Linker
  - GNU debugger
- Ubicom's Configuration Tool
  - Integrated tool to support rapid development efforts
- Unity™ Integrated Development Environment (IDE)
  - Editor, project manager, graphic user interface to GNU debugger, device programmer

IP2000 Processor Series Lineup

Feature	IP2012-120	IP2022-120	IP2022-160
Speed	120 MHz	120 MHz	160 MHz
General Purpose I/O	48	52	52
SerDes Units	1	2	2
External SRAM Controller	No	Yes	Yes
On-Chip Memory			
Flash – Program	64 Kbyte	64 Kbyte	64 Kbyte
SRAM – Program/Data	16 Kbyte	16 Kbyte	16 Kbyte
SRAM – Data	4 Kbyte	4 Kbyte	4 Kbyte
Timers	5	5	5
ADC (10-bit)	8 channels	8 channels	8 channels

Ubicom, Inc. is making ubiquitous communications a reality, through wireless network processor and software platforms that enable all electronic devices to be connected to each other – securely, cost-effectively and transparently. With headquarters in Mountain View, California, Ubicom also has offices in Belgium, Taiwan and Hong Kong. For more information, visit www.ubicom.com.

UBICOM™
635 Clyde Avenue
Mountain View, CA 94043
Tel: 650.210.1500
Fax: 650.210.8715
Email: sales@ubicom.com
Web: www.ubicom.com

IP2K-DPB-2022-35 (3/12/2003)