

# New Products for Forth Embedded Systems

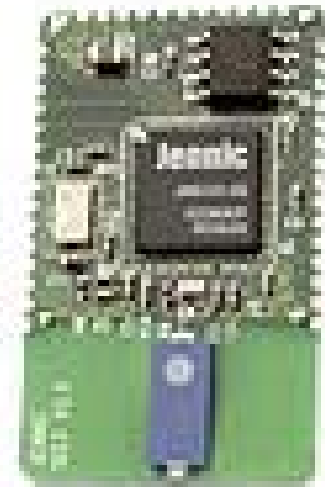
Dave Jaffe

# CPUs and I/O

- Single board embedded computers that support Forth (or could support Forth)
- I/O devices that connect to CPU boards that employ a serial interface

# Jennic CPU with ZigBee

- 32-bit RISC, 64 Kbytes ROM, 96 Kbytes RAM, 2 serial ports
- External oscillator, flash memory, antenna



<http://www.jennic.com/site/products/wireless/01-01.php>

# Lorax Works - proSeed

- Microcontroller with:
  - 16 GPIO
  - 16 ADC
  - 128 Kbytes RAM
  - 128 Kbytes EEPROM
  - 70 Mhz SX CPU
  - 24-pin
  - **ANS Forth**



<http://www.loraxworks.com/>

# Gumstick Robostix

- Intel PXA255 - 200 or 400 Mhz
- 64 Mbytes SDRAM and 4 Mbytes flash
- 3 UARTS, I<sup>2</sup>C, USB, 2 PWM, LCD controller, JTAG
- Board - \$39 to \$49, Platform - \$139



<http://www.gumstix.com>

# Gumstick WaySmall

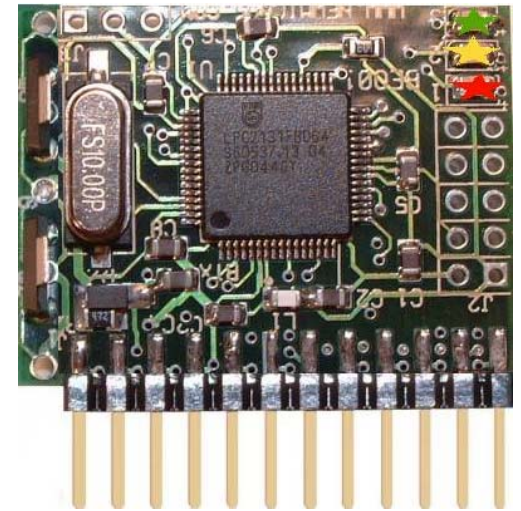
- Intel XScale PXA255 – 200 or 400 Mhz
- With or without Bluetooth
- 2 serial ports
- \$99 - \$174
- Linux software
- Expansion boards



<http://www.gumstix.com>

# New Micros ARM Micro

- 32/16-bit ARM7TDMI-S uprocessor - 60 Mhz
- \$29 board - \$64 development kit
- 32 / 512 Kbyte flash, 8 / 32 Kbyte
- MPE Forth or MaxForth?
- 16 GPIO shares these functions:
  - 8 channels 10-bit A/D
  - Two 4-wire SPI Interface
  - I<sup>2</sup>C bus Interface
  - PWM channel
  - Timers - 8 Input Capture and 8 Output Match
  - Real Time Clock
  - WatchDog Timer



<http://www.newmicros.com/>

# Serial Interfacing

- Serial communication
  - Send
  - Receive
  - Handshaking
    - Hardware
    - Software
  - Protocol
- Types of serial commands
  - Strings, including digits and control codes
  - Calculated numbers



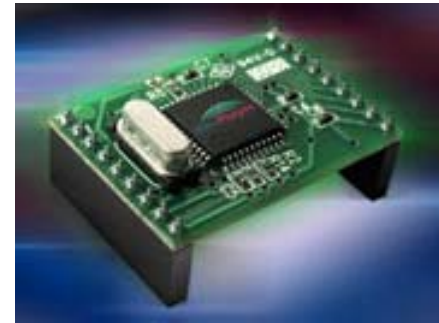
# Serial Hardware

- Processor considerations
  - Multiple serial ports
  - Bit-banging
  - Level shifting

# Forth Serial Interface

- Creating and manipulating strings
- Creating and managing buffers
- Implementing hardware and software protocols
  - ACK / NAK
  - Retries and timeouts
- Some Forth code - click here [code](#)

# Serial to Ethernet



- SitePlayer - \$29.95
- Flash webpage memory
- Switch and digital inputs
- Insert variables into viewed webpage
- SiteObjects - images, text, graphics, sound change with live data input
- 8051 variant CPU with 64 kb flash

<http://www.siteplayer.com>

# MaxStream ZigBee Module

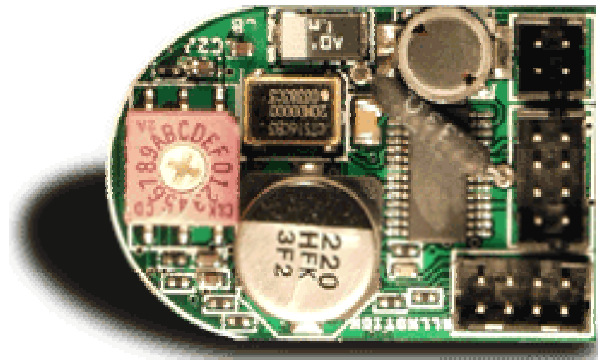
- Standardized protocol built-in
- Short and long range modules available
- Mesh networking topologies
- 2.4 Ghz - 65 K network addresses
- 250 Kbps
- Low power requirements
- Low bandwidth applications



<http://www.maxstream.net/products/index.php>

# AllMotion Stepper or Servo Drivers

- Driver and controller
- Built-in I/O
- Daisy chainable
- Power-up commands
- 2 amp peak, 1.5 amp continuous
- 16 motors supported
- Position, Velocity and Torque modes
- Programmable ramps and speeds



<http://www.allmotion.com/index.htm>

# Radicom Serial Modem

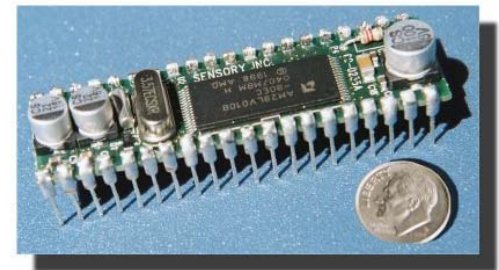
- Built-in DAA
- AT command set
- 56 kbps Downstream, 48 kbps Upstream
- FAX capabilities
- Voice recording and playback
- DTMF



<http://www.radi.com/>

# Sensory Voice Recognition

- Speaker independent and dependent recognition
- Speech output menu prompting
- Integrated 8-bit microcontroller, A/D, D/A, 24 digital outputs, no serial ports
- Development kit & software - \$495
- Board - \$30



<http://www.sensoryinc.com/html/products/vrstamp.html>

# Reach Color Touch LCD

- Controller board drives LCD panels
- Optional touch interface - returns string when LCD button is pressed
- Serial commands to download text (24 fonts) and .bmp graphics
- Commands to create lines, circles, boxes, buttons



<http://www.reachtech.com/display/slcd.html>



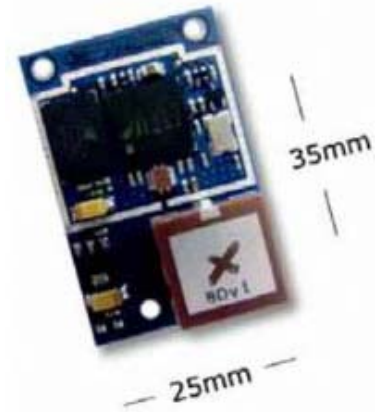
# Z-World Color Touchscreen

- RCM3720 RabbitCore
- Reach Technologies LCD Control
- Hitachi 5.7" TFT Color Touch Screen
- Industrial enclosure and power supply
- \$900 for kit



[http://www.rabbitsemiconductor.com/products/CTS\\_App\\_Kit/](http://www.rabbitsemiconductor.com/products/CTS_App_Kit/)

# Ezurio Bluetooth



- AT-style command set
- 9600 baud communication rate
- 200 meter range
- 2 x 8-bit ADC
- 8 GPIO
- Integrated or external antenna

<http://www.ezurio.com/products/bism/>

# Lantronix Device Server

- 10/100base-T
- Integrated webserver - 384 Kbytes
- AES encryption
- Full TCP/IP



# Lantronix Wireless

- WiFi for embedded systems
- Full TCP/IP
- Encryption options
- Embedded webserver
- 11 GPIO



# Serial Servo Controller

- Controls 8 servo motors
- Daisy-chain up to 16 units
- \$20



<http://www.pololu.com/products/pololu/#servcon>