



## 5VT1610 Network Processor SoC Family

**Optimal SoC with ARM1136J-S and DSP-Core integrated that can take advantage of high performance and low cost in embedded applications**

The 5VT's 5VT1610 SoC combines a most market-leading ARM1136J-S Processor running up to 700MHz, with an embedded DSP Coprocessor, a Multi-port DRAM Memory Controller (MDMC), both NAND and NOR Flash Memory Controller, a Security Hardware Engine, a High Speed USB 2.0 MASTER/PHY, a PCI Host/Device and a myriad of serial and parallel interfaces together as an optimal SoC solution for embedded devices that requiring high-performance and cost-effective applications.

The 5VT1610 supports booting from either NAND or NOR Flash. The MDMC provides access up to 1GB of 16-bit DDRI/II SDRAM, and access thru 64-bit data bus to the LCD and GMAC Controller. The Mobile Storage Controller provides access to memory card compliant with MMC 4.3 and SD 2.0 (Class-6).

To optimize video/image applications on a single SoC platform, the 5VT1610 SoC integrates a Color LCD Controller which drives a variety of mono and color LCDs with panel resolution support up to 1024x768 at RGB interface.

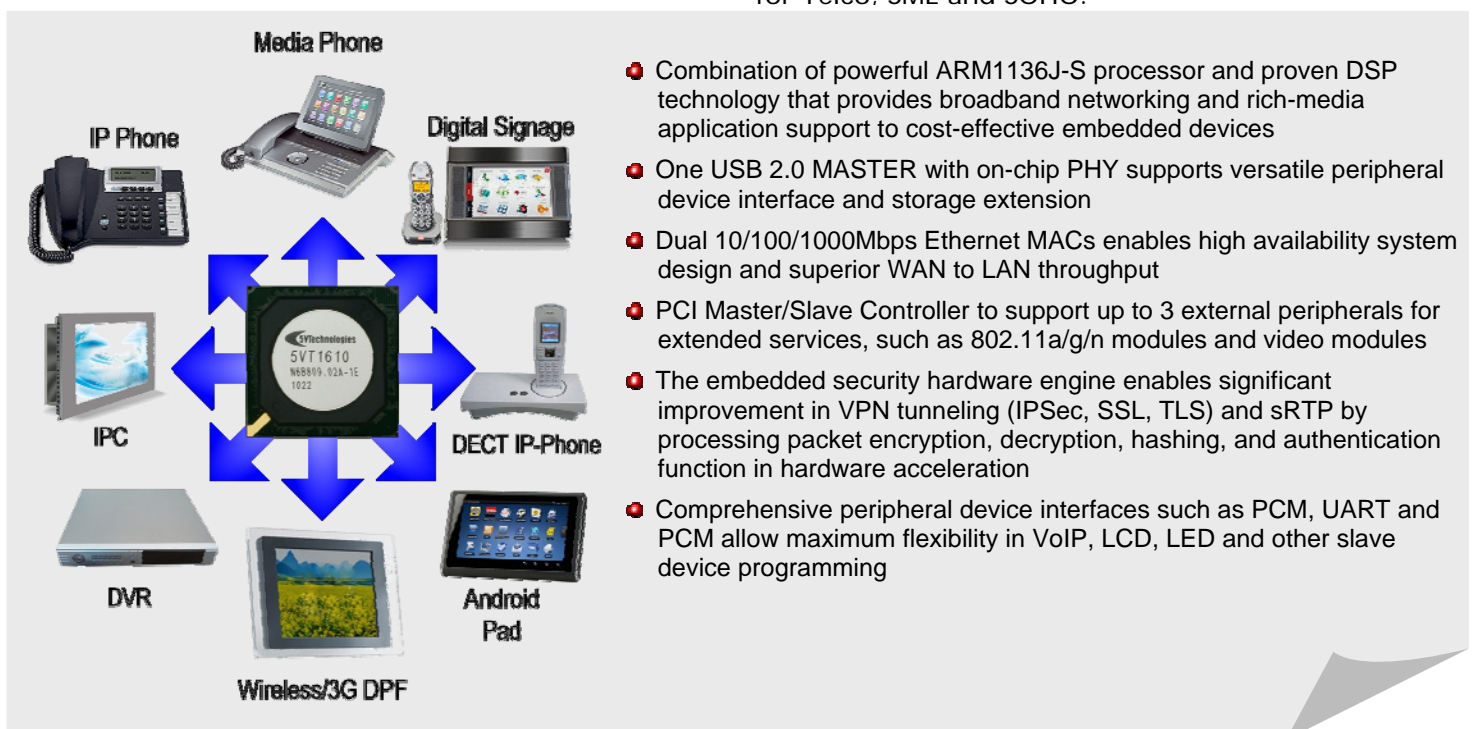
The USB interface contains dedicated DMA engine, PLL and UTMI compliant transceiver (PHY), which provides supports of high-speed transfer rates (up to 480Mbps) and host mode operations.

### *Superior Performance pumped up by advanced Multi-layer AMBA2.0 Matrix*

The multi-layer AMBA2.0 Matrix provides separate 64-bit AHB buses for connection dedicated with 128KB L2-Cache, GMAC0, GMAC1 and LCD Controller. The Matrix also provides separate 32-bit AHB buses for connection dedicated with all other key AHB masters (DSP-Core, Security Engine, HDMA, USB-MASTER, Mobile Storage, AHB/APB Bridge). This ensures the highest bandwidth throughput and also eliminates the arbitration delays, except when two masters attempt to access the same slave at the same time.

### *High Solution Flexibility thru integrating SoftDSP and HardDSP technology*

The 5VT1610 SoC provides not only an embedded HardDSP coprocessor that running up to 250MHz but also various market proven SoftDSP modules. These two DSP technologies are integrated together as the most flexible and cost effective framework solution to drive up the most comprehensive support to real-time voice processing and multimedia signaling control. It could provide highest flexibility on design to Media Phone, VoIP, Streaming Audio/Video, P2P Home Box, Digital Signage and many other applications required for Telco, SME and SOHO.



## Key Features

### Processor

- ▶ 700MHz, 64-bit ARM1136J-S
- ▶ 16KB I-Cache and 16KB D-Cache
- ▶ 128KB Level-2 Cache
- ▶ DSP Extensions support
- ▶ 32/64-bit Multi-port Memory Controller

### DSP Coprocessor

- ▶ 250MHz, 16-bit
- ▶ 32KB I-Cache
- ▶ 96KB Internal Data RAM

### External Memory Interface

- ▶ NAND Flash Controller: up to 16GB
  - Support 2K/4K Bytes/page NAND Flash
- ▶ NOR Flash Controller: up to 64MB
- ▶ SDRAM: addressing up to 1GB
  - DDR1: 16-bit/350Mbps
  - DDR2: 16-bit/700Mbps
- ▶ Mobile Storage: up to 2 devices
  - SD v2.0: Class-6, up to 32GB
  - MMC v4.3: up to 4GB

### System Function

- ▶ Selectable boot-up from NAND or NOR Flash memory
- ▶ Embedded Security Hardware Engine
  - Supports IPsec/TLS/SSL/sRTP
- ▶ HDMA Controller
- ▶ Watchdog timer, 32-bit
- ▶ Two 32-bit APB timers
- ▶ RTC, 32KHz real-time clock
- ▶ Vector Interrupt Controller
- ▶ JTAG interface for debug access

### Communication & Connectivity

- ▶ One High-Speed(480Mbps) USB 2.0 MASTER with PHY
- ▶ One PCI interface, Host & Device mode
  - PCI 2.3 Compliant, support up to 3 devices (Host mode)
- ▶ Two GMAC, 10/100/1000Mbps
  - 2 GMII/RGMII/MII/RMII interface
- ▶ Integrated 1/2/4/8/16/24-bit Color LCD Controller at RGB interface
  - Panel resolution, up to 1024x768
- ▶ One SPI Master, support up to 5 slaves
- ▶ One Master/Slave I<sup>2</sup>C, FS-mode support
- ▶ One PCM High-way interface
  - 8KHz/16KHz sampling rate
  - 16-bit/8-bit data stream
  - Up to 8 voice channels
- ▶ One I<sup>2</sup>S interface, up to 96KHz sampling rate
- ▶ One AC97/AACI interface
  - Up to 4 channels with DMA and FIFO
- ▶ Fast UART/IrDA interface
  - Configurable up to 4 ports
  - DMA access support, 921Kbps
- ▶ GPIO interface, up to 24 pins
  - Programmable as input or output

### Operating Voltage

- ▶ Core Voltage: 1.0V
- ▶ I/O Voltage: 1.8V/2.5V, 3.3V

### Package

- ▶ HSBGA-484: 23mmx23mm, 1.0mm pitch

### System Software

- ▶ Operating System
  - Linux 2.6.28
  - Google Android 2.1 & 2.3
- ▶ TCP/IP Networking Support
  - Routing: NAT, MAC Bridging, IGMP Proxy, IGMP Snooping V1/V2
  - IP Assignment: Static, PPPoE, DHCP(Client/Server), IP Alias
  - VPN Pass-through: FTP, PPTP, IPsec, L2TP, SIP
  - NAT Traversal: STUN, uPnP
  - DNS: Client/Relay/SRV, DDNS
  - Firewall: MAC/IP/URL Filter, Virtual Server, Virtual DMZ, Port Trigger, DOS (Denial of Service)
  - QoS: DiffServ/TOS, Priority Scheduling, 802.1Q
- ▶ Management Interface
  - Web, SNMP v1/v2, MIB I/II, System Log, Auto-provision
  - Telnet, TFTP, HTTP, HTTPS, SNTp

## Selection Guide for 5VT1610 Family

Part Number	ARM1136 Speed	DSP Speed	VPN Engine	USB 2.0 MASTER/PHY	PCI 2.3 Master/Slave	PCM 8/16-bit	Color LCD Controller	Temperature Range (°C)	Package
5VT1610	700MHz	250MHz	1	1	1	8 channels	1	0 to +70	HSBGA-484

## Development Tools

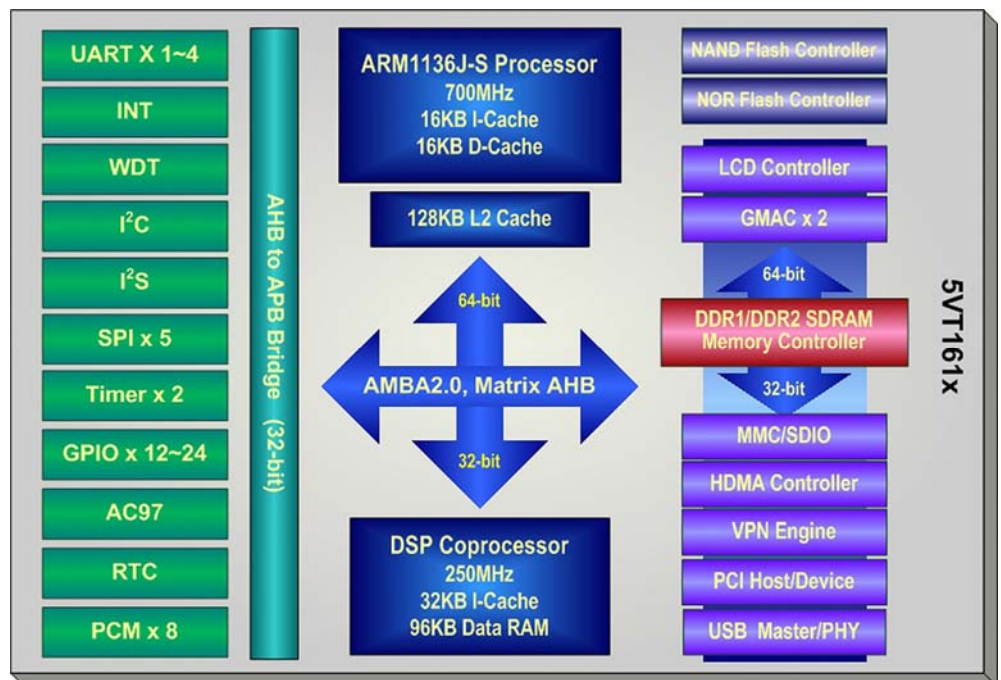
Available to pre-certified solution/SI partners, the useful Evaluation Kits upon ordering is configurable to be composed of the "Evaluation Board" with "Daughter-card" options at FXO, FXS, Keypad and LCD module for various application developments.

The SDK and Software tool chains are shipped with the Evaluation Kits to help users with the development works.

For the most updates of current Evaluation Kits and all available options, please visit

<http://www.5vtechnologies.com>

## 5VT1610 System Block Diagram



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