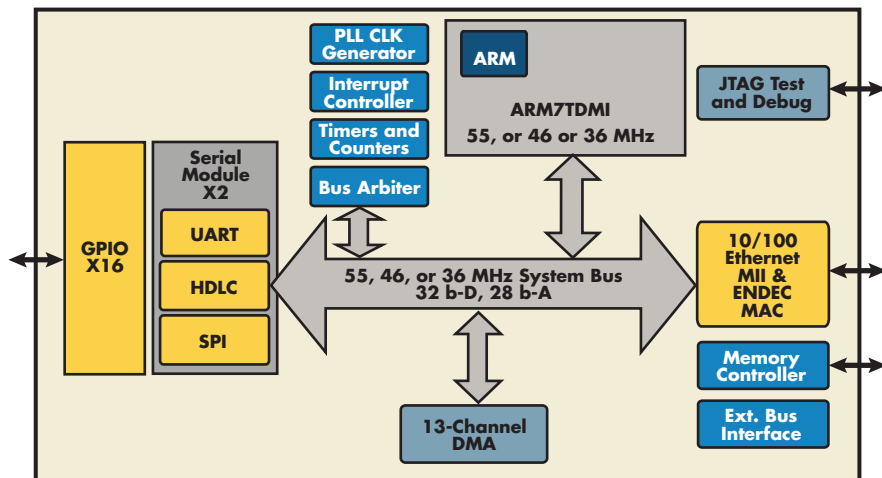


## NS7520

### 177-Pin BGA; Lead-Free, RoHS Compliant



- 32-bit, 36, 46 or 55 MHz NET+ARM processor
- 0.18 micron CMOS process
- 10/100Base-T Ethernet
- Low-cost



### Features/Benefits

- 32-bit high-performance ARM7TDMI RISC processor
- Integrated 10/100Base-T Ethernet MAC
- 2 kB Rx and 512B Tx buffers
- Patented 13-channel DMA controller
- Software compatibility across product line to ease future migration
- Includes complete royalty-free, production-ready, networking software
- Achieve dramatic time-to-market reductions with pre-integrated hardware/software
- Reduce product unit costs with complete SoC solution
- Save engineering resources – no networking development
- Reduce design risk with fully-integrated and tested solution

### Overview

The NS7520 is a very low-cost, easy-to-integrate network-attached processor. It is designed for connecting serial devices to IP networks. Part of our NET+ARM family of 32-bit processors, the NS7520 includes a 10/100Base-T Ethernet MAC and two independent serial ports (each independently programmable into UART, HDLC, or SPI mode).

The NS7520 includes an ARM7TDMI 32-bit RISC processor core with a rich complement of support peripherals, including a memory controller for glueless connection to various types of memory (including Flash, SDRAM, EEPROM, and others); programmable timers; 13-channel DMA controller; external bus expansion module; and 16 General Purpose I/O (GPIO) pins.

Like all of our processors, the NS7520 is supported by the royalty-free NET+Works® software development tool suite. The integrated NET+Works package contains either Green Hills® MULTI® or Microcross GNU X-Tools™, MAJIC™ debugger, Express Logic's ThreadX™ real time operating system, a TCP/IP stack, networking applications software, utilities, and numerous networking applications examples. Linux support for the NS9520 is also available.

Please contact us at 1-877-OEM-DIGI or 952-912-3444 for additional information or to discuss your specific application requirements.

# Hardware Specifications

## 32-BIT ARM7TDMI RISC PROCESSOR

- 32-bit ARM and 16-bit Thumb instruction sets which can be mixed for performance/code density tradeoffs
- 15 general purpose 32-bit registers
- 32-bit program counter and status register
- 5 supervisor modes, one user mode
- 36, 46 or 55 MHz speed versions available
- Embedded ICE-RT real time debug unit
- Full support for 1149.1 JTAG boundary scan testing

## INTEGRAL 10/100 ETHERNET MAC

- 10/100 Mbps MII PHY interface
- 10 Mbps ENDEC interface supports TP-PMD & fiber-PMD devices
- Full- or half-duplex
- Auto sensing
- 512 B Tx FIFO
- 2 kB Rx FIFO
- Intelligent receive-side buffer size selection
- External CAM filtering support
- Separate Tx and Rx DMA channels

## 13-CHANNEL (DMA) CONTROLLER

- 6 fly-by and memory-to-memory channels
- 2 channels support Ethernet module
- 4 channels support 2 serial modules
- 2 external DMA memory-to-memory channels
- 5 internal memory-to-memory channels
- DMA arbiter, with bandwidth allocation for each channel

## SERIAL PORTS

- 2 fully independent HDLC/UART/SPI serial ports
- Internal or external clock support
- 32 B Tx and 32 B Rx FIFOs
- 2 dedicated DMA channels per module
- Internal programmable bit-rate generators
- Asynchronous mode bit rates: 75 bps to 230.4 kbps
- Synchronous mode bit rates: 1200 bps to 4 Mbps
- Odd, even, or no parity
- 5, 6, 7 or 8 bits
- 1 or 2 stop bits
- Receive-side character and buffer gap timers
- 4 receive-side data match detectors

## BUS INTERFACE

- 32-bit data, 28-bit address bus
- 5 independent programmable chip selects
- Supports 8-, 16-, 32-bit peripherals
- Supports external address decoding and cycle termination
- Supports dynamic bus sizing
- Glueless support for Flash, SRAM, EDO DRAM, SDRAM, EEPROM
- Address multiplex support
- Internal refresh controller (CAS before RAS)
- Up to 16 MB SDRAM
- Burst-mode support
- 0-63 programmable wait states per chip select

## TIMERS

- 2 independent 27-bit programmable timers
- Programmable watchdog timer (interrupt or reset on expiration)
- Programmable bus timer

## GENERAL PURPOSE I/O

- 16 programmable GPIO pins

## EXTERNAL INTERRUPTS

- 4 external level-sensitive interrupts

## CLOCK GENERATOR

- Low-cost external crystal
- On-board Phase Locked Loop (PLL)
- Optional external oscillator

## OPERATING VOLTAGE

- Core: 1.5V  $\pm$  0.1V
- I/O Ring: 3.3V  $\pm$  10%

## OPERATING FREQUENCY

- 36 MHz: 0° C to 70° C
- 46 MHz: -40° C to 85° C
- 55 MHz: 0° C to 70° C
- 55 MHz: -40° C to 85° C

## PACKAGE

- 177-pin Ball-Grid Array (BGA)
- 0.8 mm ball pitch
- 13 mm x 13 mm
- Lead-free; RoHS compliant

**NET+Works Integrated Development Package**

NET+ARM network attached processors are the core of the NET+Works family of solutions, which add intelligence and connectivity to electronic devices. We offer extensive networking software to support industrial automation, building automation, point-of-sale, office automation and other enterprise applications.

**DEVELOPMENT TOOLS**

- Green Hills® MULTI® IDE or Microcross GNU X-Tools™

**RTOS**

- ThreadX® picokernel

**BOARD SUPPORT PACKAGE**

- 10/100Base-T Ethernet
- UART
- SPI
- HDLC
- DMA
- Flash
- USB host & device

**NETWORKING PROTOCOLS**

- TCP/IP
- UDP
- PING
- PPP
- IGMP
- DHCP
- Telnet

**NETWORKING SERVICES WITH APIs**

- HTTP v1.1 Server
- POP3 and SMTP Email
- FTP Client and Server
- SNMP v1 MIBII and proxy agent
- DHCP Client and DNS Client

**UTILITIES**

- HTML-to-C compiler
- Flash download utility
- Automated build environment
- NVRAM device manager
- Boundary Scan Description Language (BSDL) support

**TECHNICAL SUPPORT**

- One year of software maintenance and technical support

**DEVELOPMENT BOARD**

- NET+ARM-based development board with Raven JTAG In Circuit Emulator (ICE)

**MODEL.....PART NUMBERS**

**Model**  
 36 MHz, 0° C to 70° C operation  
 46 Mhz, -40° C to 85° C operation  
 55 MHz, 0° C to 70° C operation  
 55 MHz, -40° C to 85° C operation

**Worldwide**  
 NS7520B-1-C36  
 NS7520B-1-I46  
 NS7520B-1-C55  
 NS7520B-1-I55

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**Digi International**, the leader in device networking for business, develops reliable products and technologies to connect and securely manage local or remote electronic devices over the network or via the web. With over 20 million ports shipped worldwide since 1985, Digi offers the highest levels of performance, flexibility and quality.

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