

Highly Efficient Single-Chip 10/100 Non-PCI Ethernet Controller



PRODUCT FEATURES

Data Brief

Highlights

- Member of LAN9118 Family; optimized for medium-performance applications
- Easily interfaces to most 16-bit embedded CPU's
- Efficient architecture with low CPU overhead
- Integrated PHY; supports external PHY via MII interface
- Supports audio & video streaming over Ethernet: multiple standard-definition (SD) MPEG2 streams
- Medium-speed member of LAN9118 Family (all members are pin-compatible)

Target Applications

- Printers, kiosks, security systems
- General embedded applications
- Audio distribution systems
- Basic Cable, satellite, and IP set-top boxes
- Video-over IP Solutions, IP PBX & Video Phones
- Wireless routers & access points
- Digital video recorders

Key Benefits

- Non-PCI Ethernet controller for medium-performance applications
 - 16-bit interface
 - Burst-mode read support
- Eliminates dropped packets
 - Internal SRAM can store over 200 packets
 - Supports automatic or host-triggered PAUSE and back-pressure flow control
- Minimizes CPU overhead
 - Supports Slave-DMA
 - Interrupt Pin with Programmable Hold-off timer
- Reduces system cost and increases design flexibility
 - SRAM-like interface easily interfaces to most Embedded CPU's or SoC's
 - Low-cost, low-pin count non-PCI interface for embedded designs

- Reduced-Power Modes
 - Numerous power management modes
 - Wake on LAN
 - Magic packet wakeup
 - Wakeup indicator event signal
 - Link Status Change
- Single chip Ethernet controller
 - Fully compliant with IEEE 802.3/802.3u standards
 - Integrated Ethernet MAC and PHY
 - 10BASE-T and 100BASE-TX support
 - Full- and Half-duplex support
 - Full-duplex flow control
 - Backpressure for half-duplex flow control
 - Preamble generation and removal
 - Automatic 32-bit CRC generation and checking
 - Automatic payload padding and pad removal
 - Loop-back modes
- Flexible address filtering modes
 - One 48-bit perfect address
 - 64 hash-filtered multicast addresses
 - Pass all multicast
 - Promiscuous mode
 - Inverse filtering
 - Pass all incoming with status report
 - Disable reception of broadcast packets
- Integrated Ethernet PHY
 - Auto-negotiation
 - Automatic polarity detection and correction
- Efficient host bus interface
 - Simple, SRAM-like interface
 - 16-bit data bus
 - Large, 16Kbyte FIFO memory that can be allocated to RX or TX functions
 - One configurable Host interrupt
- Miscellaneous features
 - Low profile 100-pin TQFP package; green, lead-free package also available
 - Integral 1.8V regulator
 - General Purpose Timer
 - Support for optional EEPROM
 - Support for 3 status LEDs multiplexed with Programmable GPIO signals
- 3.3V Power Supply with 5V tolerant I/O
- 0 to 70°C

ORDERING INFORMATION:**LAN9115-MD FOR 100 PIN, TQFP PACKAGE****LAN9115-MT FOR 100 PIN, TQFP PACKAGE (GREEN, LEAD-FREE)**

80 Arkay Drive
Hauppauge, NY 11788
(631) 435-6000
FAX (631) 273-3123

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General Description

The LAN9115 is a full-featured, single-chip 10/100 Ethernet controller designed for embedded applications where performance, flexibility, ease of integration and system cost control are required. The LAN9115 has been architected to provide the best price-performance ratio for any 16-bit application with medium performance requirements. The LAN9115 is fully IEEE 802.3 10BASE-T and 802.3u 100BASE-TX compliant.

The LAN9115 includes an integrated Ethernet MAC and PHY with a high-performance SRAM-like slave interface. The simple, yet highly functional host bus interface provides a glue-less connection to most common 16-bit microprocessors and micro controllers. LAN9115 includes large transmit and receive data FIFO's to accommodate bandwidth-intensive and high-latency applications. In addition, the LAN9115 memory buffer architecture allows the most efficient use of memory resources by optimizing packet granularity.

Applications

The LAN9115 is well suited for many medium-performance embedded applications, including:

- Printers, kiosks, POS terminals and security systems
- Audio distribution systems
- General embedded systems
- Basic cable, satellite and IP set-top boxes
- Voice-over-IP solutions
- Basic Cable, satellite, and IP set-top boxes

The LAN9115 supports numerous power management and wakeup features. The LAN9115 can be placed in a reduced power mode and can be programmed to issue an external wake signal via several methods, including Magic Packet, Wake on LAN and Link Status Change. This signal is ideal for triggering system power-up using remote Ethernet wakeup events. The device can be removed from the low power state via a host processor command.

The LAN9115 also supports features which reduce or eliminate packet loss. Its internal 16Kbyte SRAM can hold over 200 received packets. If the receive FIFO gets too full, the LAN9115 can automatically generate flow control packets to the remote node, or assert back-pressure on the remote node by generating a network collision.

The diagram shown in Figure 1, "System Block Diagram utilizing the SMSC LAN9115", describes a typical system configuration of the LAN9115 in a typical embedded environment.

The LAN9115 is designed to be general purpose Ethernet controller that is platform independent. The LAN9115 consists of four major functional blocks. The four blocks are:

1. 10/100 Ethernet PHY
2. 10/100 Ethernet MAC
3. RX/TX FIFO's
4. Slave Interface Module

Block Diagrams

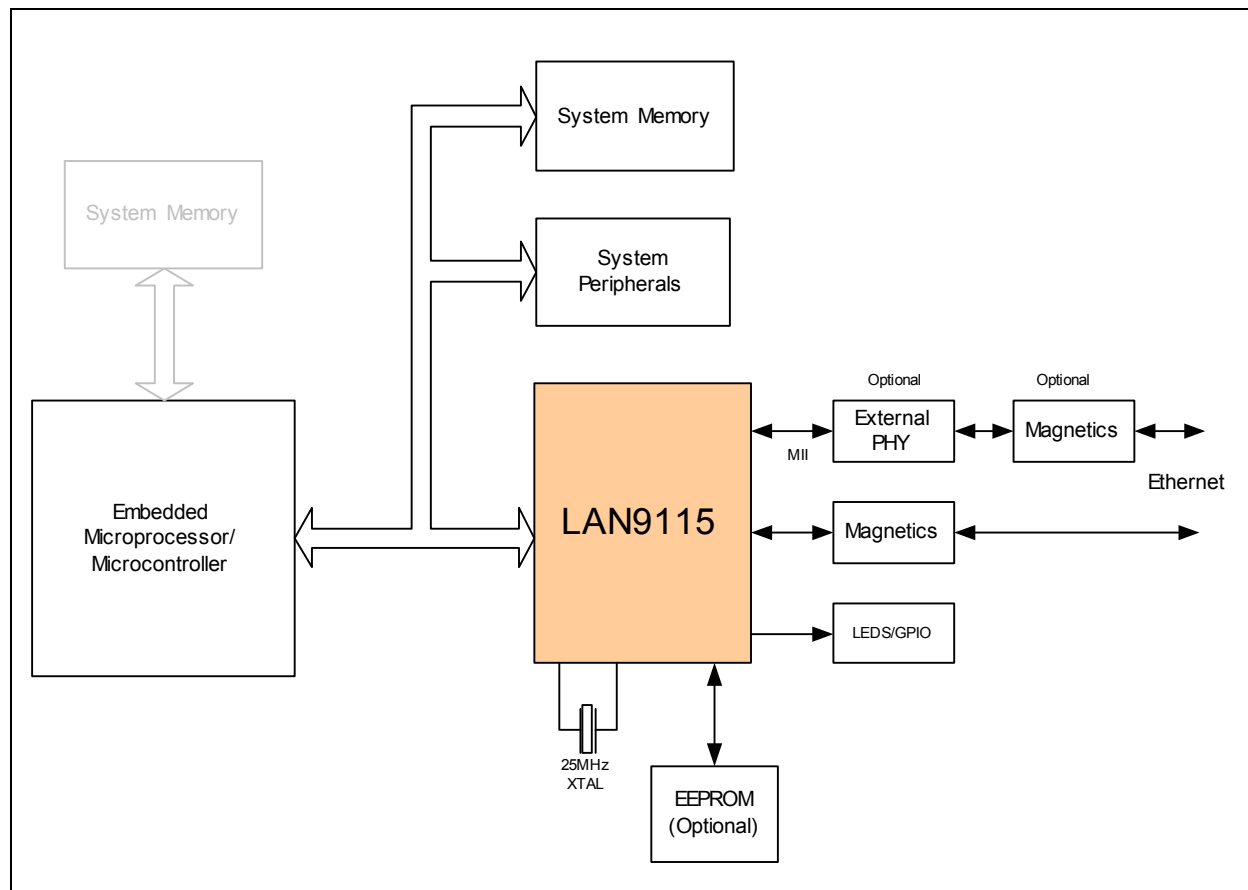


Figure 1 System Block Diagram utilizing the SMSC LAN9115

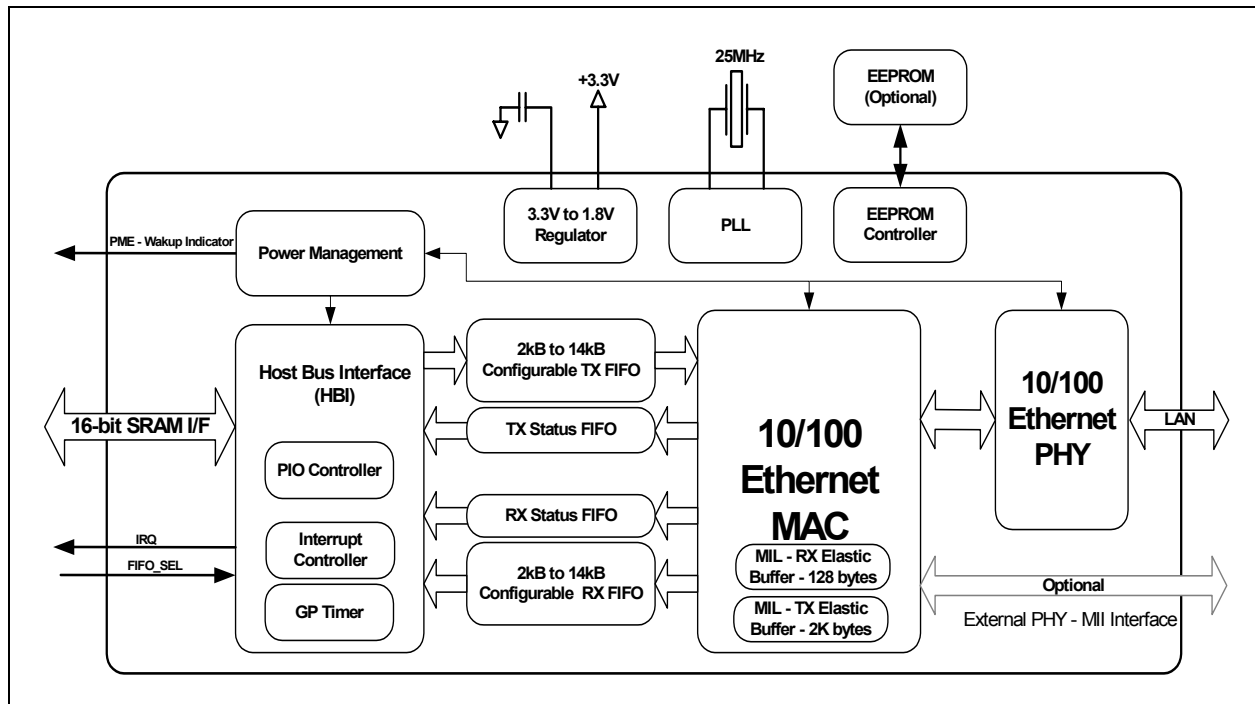


Figure 2 LAN9115 Internal Block Diagram

Pin Description

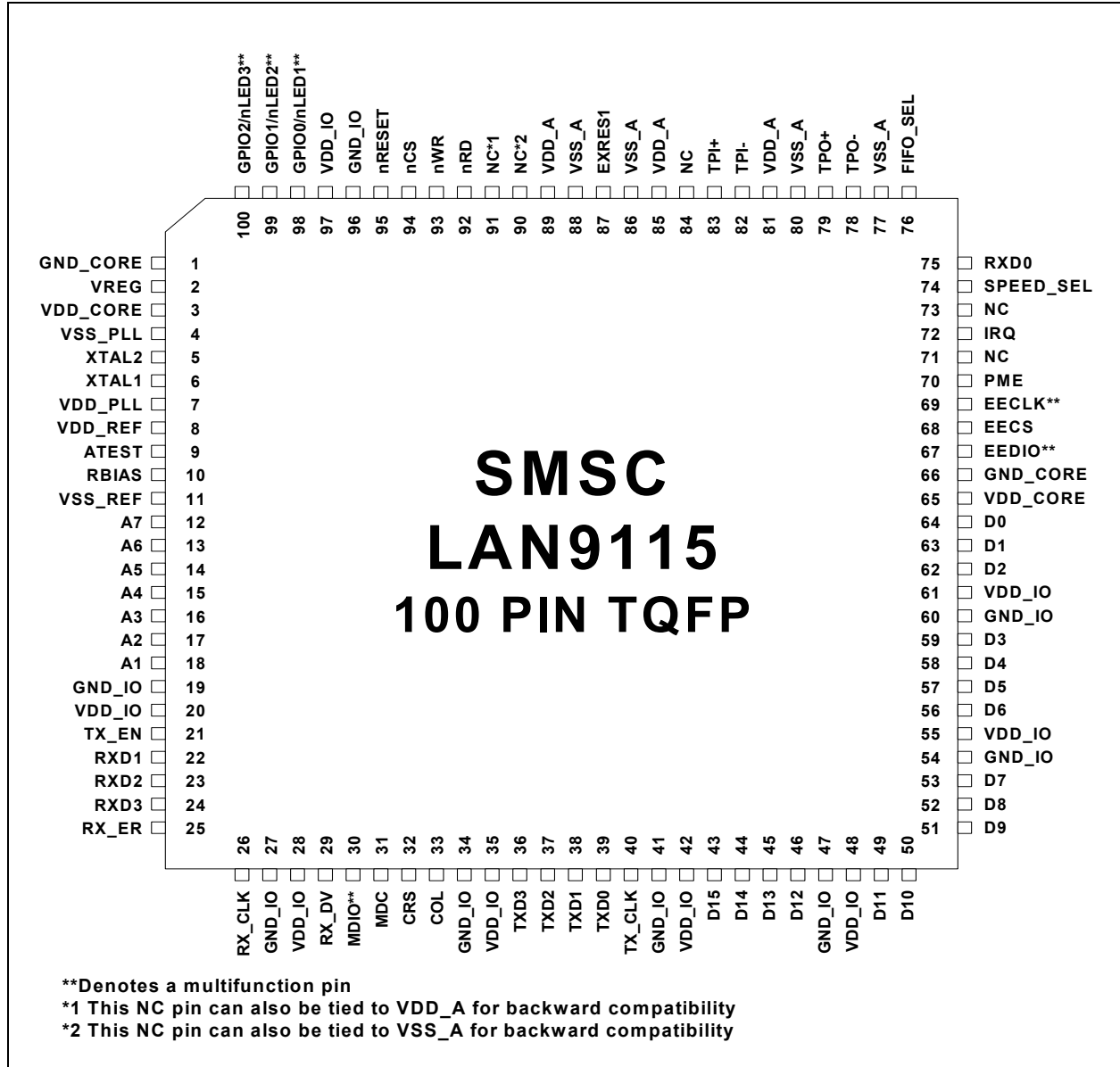


Figure 3 Pin Configuration

Package Outline

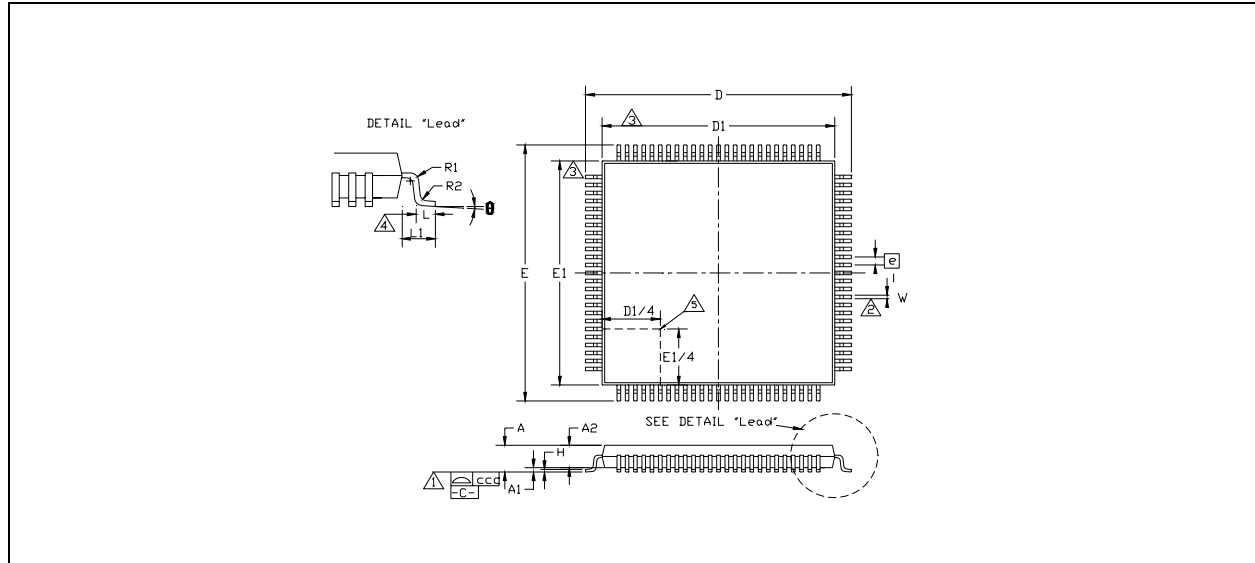


Figure 4 100 Pin TQFP Package Outline

Table 1 100 Pin TQFP Package Parameters

	MIN	NOMINAL	MAX	REMARKS
A	~	~	1.60	Overall Package Height
A1	0.05	~	0.15	Standoff
A2	1.35	~	1.45	Body Thickness
D	15.80	~	16.20	X Span
D1	13.90	~	14.10	X body Size
E	15.80	~	16.20	Y Span
E1	13.90	~	14.10	Y body Size
H	0.09	~	0.20	Lead Frame Thickness
L	0.45	0.60	0.75	Lead Foot Length
L1	~	1.00	~	Lead Length
e	0.50 Basic			Lead Pitch
θ	0°	~	7°	Lead Foot Angle
W	0.17	0.22	0.27	Lead Width
R1	0.08	~	~	Lead Shoulder Radius
R2	0.08	~	0.20	Lead Foot Radius
ccc	~	~	0.08	Coplanarity

Notes:

- ¹ Controlling Unit: millimeter.
- ² Tolerance on the true position of the leads is ± 0.04 mm maximum.
- ³ Package body dimensions D1 and E1 do not include the mold protrusion. Maximum mold protrusion is 0.25 mm.
- ⁴ Dimension for foot length L measured at the gauge plane 0.25 mm above the seating plane.
- ⁵ Details of pin 1 identifier are optional but must be located within the zone indicated.