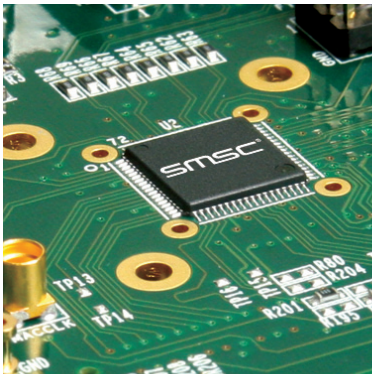
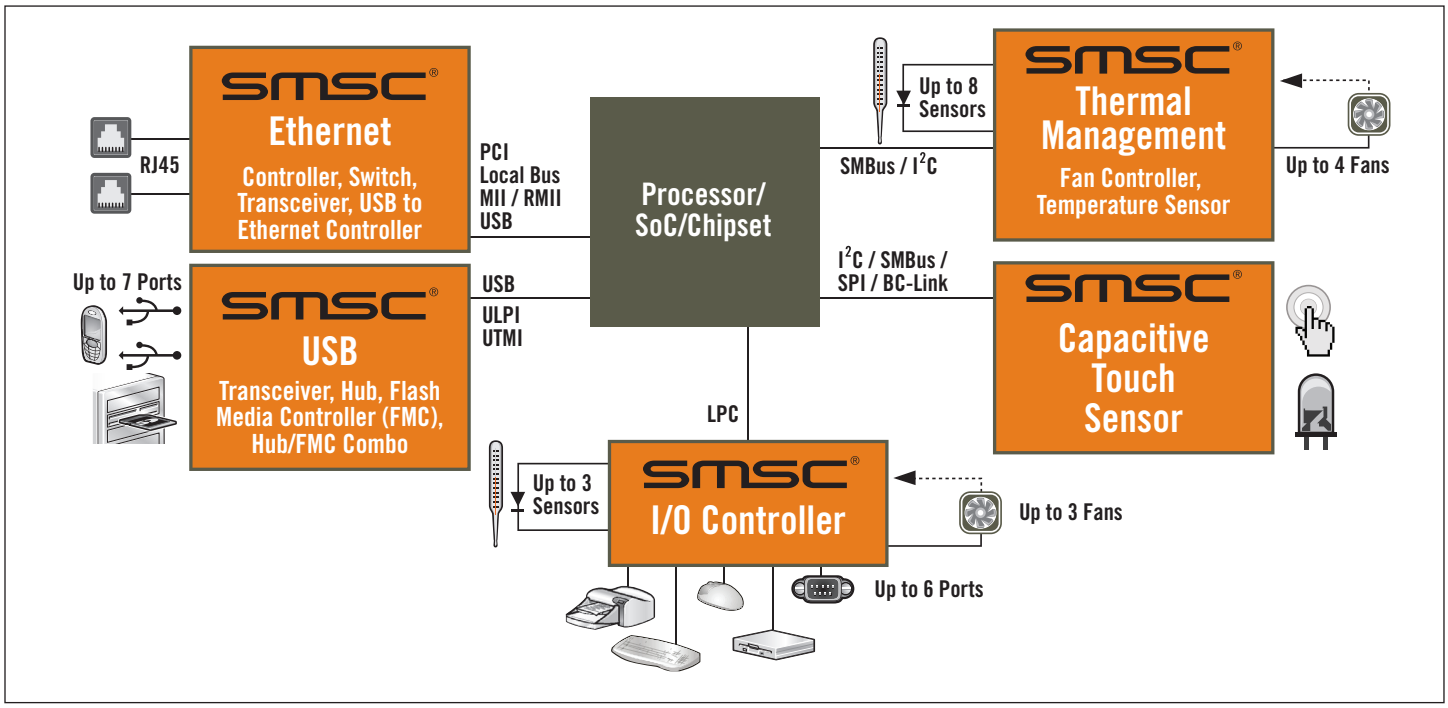


Embedded & Industrial Solutions

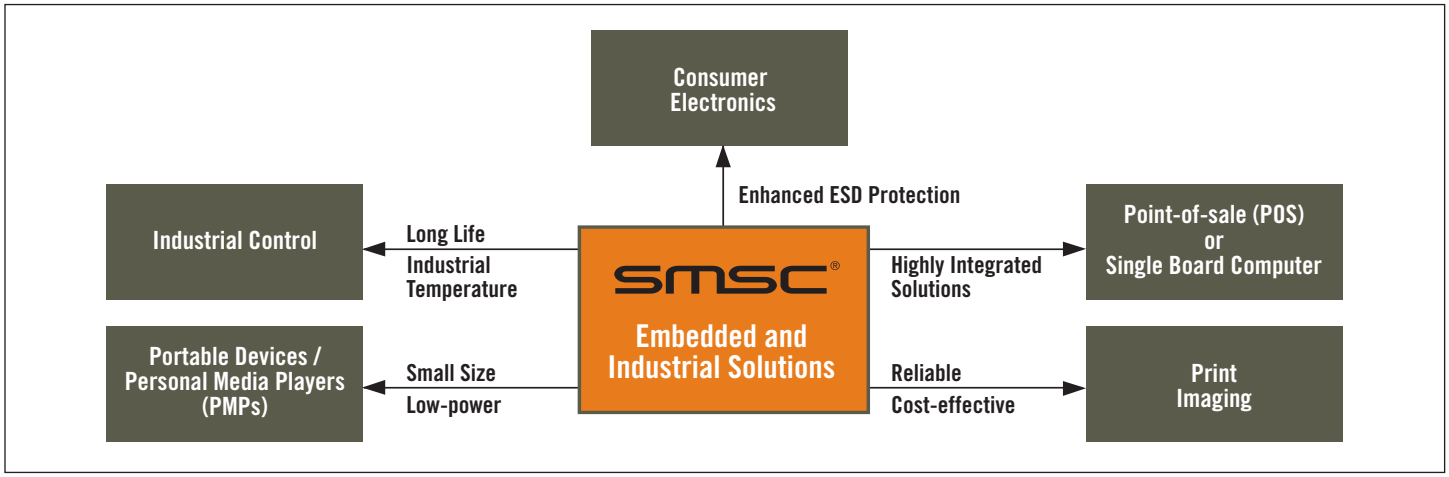
Flexible, Integrated Design Solutions to Meet the Performance, Layout, Connectivity and System BOM Requirements of Embedded and Industrial Applications

Embedded and industrial applications have long product life cycles and often require multiple connectivity options. These designs are becoming smaller, more power-intensive and may also require industrial temperature support. SMSC's Ethernet, USB, thermal management, capacitive touch sensor and I/O controller products are specifically designed to satisfy the longevity, reliability, high-performance and low-power requirements of these unique applications.

Application Diagram



SMSC Solutions for Embedded and Industrial Applications



SUCCESS BY DESIGN

SMSC's Embedded & Industrial Products and Services

	Benefits	Product Number
SMSC Ethernet	**Ethernet Controllers** – High-performance 10/100 Ethernet controllers with reduced processor loading features; HP Auto-MDIX support*; PCI and local bus interface options	**LAN922x Family** **LAN921x Family** **LAN9420**
	Ethernet Switches – 2/3-port, full-featured switching technology supporting 16/32-bit local bus or MII/RMII/Turbo MII interfaces	**LAN93xx Family**
	Ethernet Transceivers – Small-footprint, low-power, full-featured 10/100 Ethernet transceivers offering system BOM cost savings and enhanced ESD protection	**LAN87xx Family**
	USB to Ethernet Controllers – Hi-Speed USB 2.0 to 10/100/1000 Ethernet controllers; industry's first single-chip Hi-Speed USB 2.0 hub and 10/100/1000 Ethernet controllers	**LAN95xx Family** **LAN7500**
SMSC USB	**USB Transceivers** – Built-in ESD and over-voltage protection circuitry, ultra-small package, system BOM cost savings	**USB333x Family** **USB332x Family** **USB331x Family**
	USB Hubs – 2/3/4/7-port options; low-power, high-performance, built-in ESD protection, flexible layout configuration; USB Battery Charging rev. 1.1-compliant	**USB251x Family**
	USB Flash Media Controllers – Supports a wide variety of media card formats; enhances Windows Vista® ReadyBoost™ performance	**USB224x Family** **USB225x Family**
	USB Hub/FMC Combos – Board space and system BOM cost savings; power reduction; improved manufacturability	**USB26xx Family** **USB4640**
SMSC Thermal Management	**Fan Controllers** – Supports pulse width modulation (PWM) or linear fan, standalone mode, closed-loop support	**EMC21xx Family** **EMC230x Family**
	Temperature Sensors – 1 to 8 zones; highly-accurate, scalable temperature monitoring in a small package	**EMC14xx Family** **EMC10xx Family**
SMSC Capacitive Touch Sensor	**Capacitive Touch Sensors** – Featuring RightTouch™ technology, sets a new standard in simplifying development, improving noise immunity and lowering BOM costs; 8kV HBM ESD protection; supports SPI or I^2C™ interfaces	**CAP10xx Family** **CAP11xx Family**
SMSC I/O Controller	**I/O Controllers** – Integrated with 2/4/6 UARTs/serial ports to reduce system BOM cost; only i-temp I/O controller family currently available in market	**SCH311x Family**

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Speed Your Designs to Market with Added Confidence

SMSC's complimentary and confidential LANCheck and USBCheck online design reviews are personalized, value-added services exclusive to SMSC and available at no charge to customers who have selected our Ethernet or USB offerings for their application design-in. We will support your design process by providing guidance through the complete design cycle – from initial schematic design to PCB design.

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For additional information on LANCheck and USBCheck, please contact your local sales representative or visit www.smsc.com/lancheck or www.smsc.com/usbcheck.

Local Bus 10/100 Ethernet Controllers – LAN922x/921x Family

- LAN922x – Small-footprint, advanced performance options and wide range of software drivers supported
  - Supports local bus interface from 1.8V to 3.3V
  - Checksum in hardware to offload processing loading
- LAN921x – Includes external MII and high-throughput performance options

	LAN9221	LAN9220	LAN9217	LAN9218
Bus Interface	16-bit	16-bit	16-bit	32-bit
I/O Voltage Supported	1.8V to 3.3V	1.8V to 3.3V	3.3V	3.3V
Performance	High	Standard	High	High**
External MII			✔	
Mixed Endian	✔	✔		
Checksum Offload Engine	✔	✔		
Pin & Package	56-pin QFN	56-pin QFN	100-pin TQFP	100-pin TQFP

10/100 PCI Ethernet Controller – LAN9420

- 32-bit/33MHz, PCI 3.0-compliant interface
- Descriptor-based scatter-gather DMA engine and interrupt de-assertion for high-throughput and low CPU utilization
- HP Auto-MDIX support*
- Available in a 128-pin VTQFP package

10/100 Ethernet Switches – LAN93xx Family

- Industry's smallest (LAN9303/9303M), high-performance, 2/3-port MII/RMII/Turbo MII or non-PCI interfaces
- VLAN, QoS, Rate Limiting, IGMP monitoring, MIB and monitoring features supported
- Provides hardware support for the IEEE 1588 Precision Time Protocol (PTP), allowing clock synchronization on the network and packet time stamping (LAN931x only)

	LAN9303	LAN9303M	LAN9311	LAN9312
Interface	Single MII/RMII/ Turbo MII	Dual MII/RMII/ Turbo MII	16-bit Local bus	32-bit Local bus
Serial Interface	I^2C/SMI	I^2C/SMI	I^2C/SMI	I^2C/SMI
IEEE1588			✔	✔
Pin & Package	56-pin QFN (8x8mm)	72-pin QFN (10x10mm)	128-pin VTQFP (16x16mm)	128-pin VTQFP (16x16mm)

10/100 Ethernet Transceivers – LAN87xx Family

- Excellent ESD protection levels exceed IEC specifications
- LAN87xx features flexPWR® technology which supports variable I/O voltage to optimize power consumption
- LAN8710: MII/RMII interface, 10/100, 32-pin QFN package
- LAN8720: RMII interface, 10/100, 24-pin QFN package

Hi-Speed USB 2.0 to 10/100/1000 Ethernet Controllers – LAN95xx Family/LAN7500

- Integrated USB 2.0, Ethernet controller and PHY
- Integrated USB 2.0 hub with 2/3/4-port options (LAN951x only)
- Superior ESD protection
- Single 25MHz crystal input
- LAN9500A†: 10/100, 56-pin QFN (8x8mm) package
- LAN9512/9513/9514: 10/100, 64-pin QFN package, 2/3/4 USB downstream ports respectively
- LAN7500†: USB 2.0 to 10/100/1000, 56-pin QFN package

†Device available in near term

Hi-Speed USB 2.0 Transceivers – USB333x/332x/331x Family

- Complete line of USB 2.0 ULPI transceivers
- Integrated USB switch, ESD and over-voltage protection circuit, LDO regulators
- High levels of integration in extremely small package sizes

	USB333x Family†	USB332x Family	USB331x Family
ESD Protection	25kV	15kV	15kV
Over-voltage Protection	30V	30V	6V
Link Power Management	✔	✔	
USB-IF Battery Charging	v1.1	v1.0	v1.0
Package Size	1.95x1.95mm	1.95x1.95mm/5x5mm	4x4mm/3x3mm
Package Type	WLCSP	WLCSP/QFN	QFN/BGA

†USB333x family available in near term

Hi-Speed USB 2.0 Hubs – USB251x Family

- Hi-Speed USB 2.0, ultra low-power, small-footprint hub family

	Ports	MultiTrak™ Technology	Battery Charging 1.1	Extended Commercial Temp. Option	Pin & Package
USB2512B	2		✔	✔	36-pin QFN
USB2513B	3	✔	✔	✔	36-pin QFN
USB2514B	4	✔	✔	✔	36-pin QFN
USB2517	7	✔			64-pin QFN
USB2412	2				28-pin QFN

Hi-Speed USB 2.0 Flash Media Controllers – USB224x/225x Family

- Ultra Hi-Speed, fully-integrated, cost-effective FMCs

	CF***	SD/MMC ***	MS***	xD***	LUN	Pin & Package
USB2240		✔	✔	✔	1	36-pin QFN
USB2241		✔	✔		1	36-pin QFN
USB2242			✔		1	36-pin QFN
USB2244		✔			1	36-pin QFN
USB2250	✔	✔	✔	✔	4	128-pin VTQFP
USB2251	✔	✔	✔		4	128-pin VTQFP

Industrial temperature options (-40° to 85°C) are available for all parts above, except LAN9220, LAN9217 and LAN9312

Hi-Speed USB 2.0 Hub and Flash Media Controller Combo – USB26xx Family/USB4640

- Single-chip FMC combo with integrated Hi-Speed USB 2.0 hub
- USB4640† - USB Hi-Speed Inter-Chip (HSIC) interface combo, reduces power consumption by ~20% with HSIC upstream

	SD/ MMC	xD	MS	# SD Ports	CF	Internal Memory	Upstream Interface	# LUN	Pin & Package
USB2640	✔	✔	✔	1		✔	USB	1	48-pin QFN
USB2641	✔		✔	1		✔	USB	1	48-pin QFN
USB2660	✔	✔	✔	2		✔	USB	2	64-pin QFN
USB4640	✔	✔	✔	1		✔	HSIC	1	48-pin QFN
USB2601	✔		✔	1	✔	✔	USB	4	128-pin TQFP
USB2602	✔	✔	✔	1	✔	✔	USB	4	128-pin TQFP

†Device available for sampling in 2nd half 2010. 20% power reduction when compared to other SMSC USB upstream-based solutions.

Fan Controllers – EMC21xx/230x Family

- Programmable fan speed based on temperature reading or software control
- Supports standalone mode – load contents from an I^2C EEPROM for auto-programming with no software required

	# Fans	PWM/ Linear Control	Remote Temp. Monitors	System Shutdown	Voltage Monitors	Pin & Package
EMC2101	1	PWM	1	No	No	8-pin SOIC/ 8-pin MSOP
EMC2103-1	1	PWM	1	Yes	No	12-pin QFN/ 16-pin QFN
EMC2103-2			3			
EMC2104	2	PWM	4	Yes	Yes	20-pin QFN
EMC2105	1	Linear	4	Yes	Yes	20-pin QFN
EMC2106	2	PWM/ Linear	4	Yes	Yes	28-pin QFN
EMC2113	1	PWM	3	Yes	No	16-pin QFN
EMC2301	1	PWM	N/A	No	N/A	8-pin MSOP
EMC2302	2	PWM	N/A	No	N/A	10-pin MSOP
EMC2303	3	PWM	N/A	No	N/A	12-pin QFN
EMC2305	5	PWM	N/A	No	N/A	16-pin QFN

Temperature Sensors – EMC14xx/10xx Family

- I^2C interface temperature sensor with ±1°C accuracy
- Resistance Error Correction
- Single temperature with 2 interrupts: EMC1001
- Dual to quad zones with hardware shutdown: EMC1422/1423/1424 - 2/3/4 zones respectively
- Dual to quad zones with Beta Compensation: EMC1412/1413/1414 - 2/3/4 zones respectively
- Six or more zones: EMC1046/1047/1428
- Available in a variety of package options

Capacitive Touch Sensors – CAP10xx/11xx Family

RightTouch™

- I^2C, SMBus, SPI or SMSC BC-Link™ interfaces
- 8kV HBM ESD protection
- CAP11xx family supports proximity
- Extensive noise filtering for wireless, DC-DC converter and backlight inverter frequencies

	CAP1014	CAP1088 CAP1188	CAP1066 CAP1166	CAP1028 CAP1128	CAP1026 CAP1126	CAP1006 CAP1106	CAP1005 CAP1105	CAP1033 CAP1133
Sensor Inputs	14	8	6	8	6	6	5	3
Slider	✔							
LED Drivers	11	8	6	2	2			3
ALERT	✔	✔	✔	✔	✔	✔		✔
Wake		✔	✔	✔	✔			
Reset	✔	✔	✔	✔	✔			
Interface	I^2C/ SMBus	I^2C/SPI/ BC-Link	I^2C/SPI/ BC-Link	I^2C/SPI/ BC-Link	I^2C/SPI/ BC-Link	I^2C/SPI/ BC-Link	SPI	I^2C/ SMBus
Pin & Package	5x5mm, 32-pin QFN	4x4mm, 24-pin QFN	4x4mm, 20-pin QFN	4x4mm, 20-pin QFN	4x4mm, 16-pin QFN	3x3mm, 10-pin DFN	3x3mm, 10-pin DFN	3x3mm, 10-pin DFN

I/O Controllers – SCH311x Family

- Highly-integrated I/O controller in a 128-pin VTQFP package
- Legacy I/O features include 2 to 6 UARTs, parallel port, PS/2 keyboard, mouse, floppy disk controller and 40 GPIOs
- PWM outputs, 3 tachometer inputs and temperature measurement
- Monitoring of 7 voltages and 6 voltage ID inputs
- SCH3112/3114/3116: 2/4/6 UARTs respectively
- Available in a 128-pin VTQFP package

* HP Auto-MDIX eliminates the need for special "crossover" cables when connecting LAN devices together.

** SMSC's highest performing Ethernet Controller with a 32-bit interface.

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- To request samples, a quote or to ask product-related questions, please email: chipinfo@smsc.com.
- For local sales office contact information, please visit www.smsc.com or click this live link (PDF version only).

Industrial temperature options (-40° to 85°C) are available for all parts above, except USB2601, USB2602 and USB2412

SMSC Literature #GC-MAR-099-02/10

For more information visit www.smsc.com or call 1.800.443.SEMI
SMSC 80 Arkay Drive, Hauppauge, NY 11788

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