

Ocelot Family of Ethernet Switches

December 2016

Introducing Microsemi's New Ocelot Industrial IoT Ethernet Switch ICs



- Ocelot is a low port count, small form factor Ethernet switch family for the Industrial IoT market
- **Adds a low-cost, 4-10 port 1G / 2.5G switch family to overall portfolio**
- Top applications
 - Industrial Automation, Smart Grid, Physical Security, Process Control and Intelligent Transportation Systems



Industrial Ethernet Switch Reference Design Using VSC7514 Ocelot-10 Switch IC and IStAX Software

Available NOW

Part #	Name	1G* Ports	2.5G* Ports	1000BT PHYs	Interfaces			Ext temp	1588	Use Case
					SGMII	QSGMII	PCIe			
VSC7511	Ocelot-4um	4	1	4	■		■	**	Unmanaged	
VSC7512	Ocelot-10um	10	3	4	■	■	■	**	Unmanaged	
VSC7513	Ocelot-8	8	1	4	■	■	■	■	Managed	
VSC7514	Ocelot-10	10	3	4	■	■	■	■	Managed	

* Denotes maximum ports. Shall not surpass the device's max available I/O bandwidth.

** Supports Transparent Clock mode only

Ocelot Applications

Controlling, Powering & Securing Multiple Industrial Solutions



Industrial Automation

- Programmable Logic Controllers
- Motor Drive Control
- I/O & Safety Modules

Microsemi Products:

- Ethernet Switches & PHYs
- FPGAs, Timing/1588, PoE
- SiC MOSFETs/modules



Smart Energy Management

- Power Conversion/EV Charging
- Power Management
- Protection Relays

Microsemi Products:

- ENT Switches and PHY's
- SiC/IGBT FETs/modules
- FPGA, Timing MAC/1588



IP Security Cameras

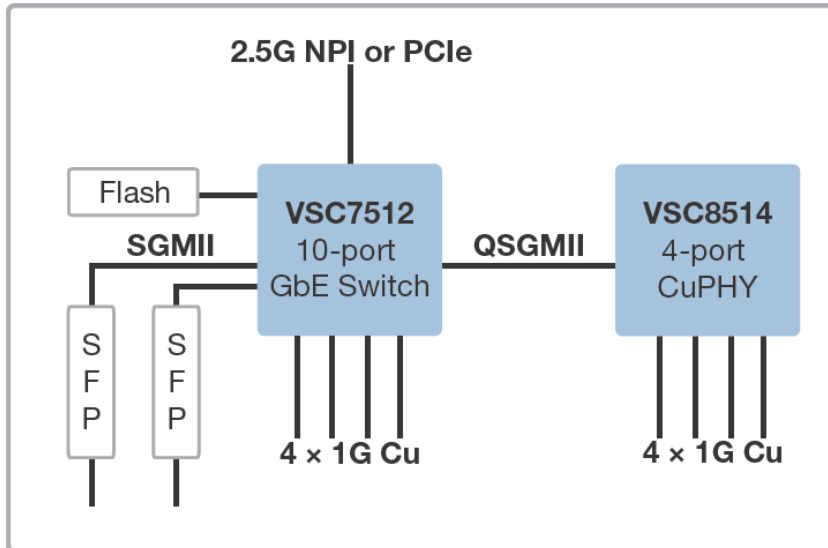
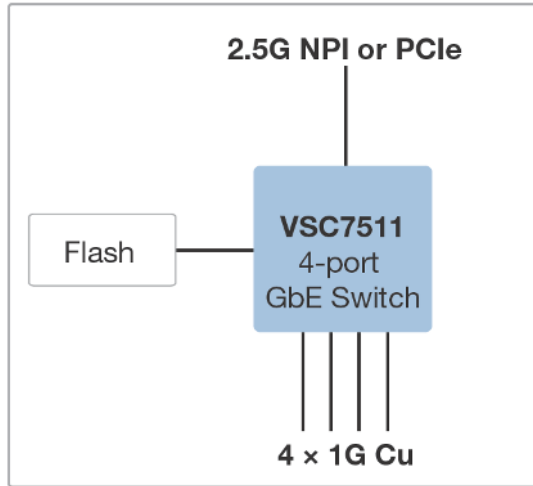
- Voice
- Video Surveillance and Storage
- Power and Connectivity

Microsemi Products:

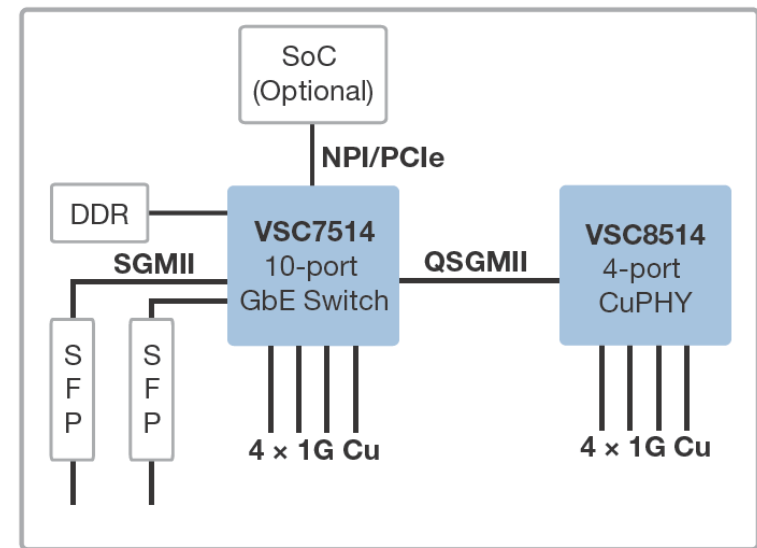
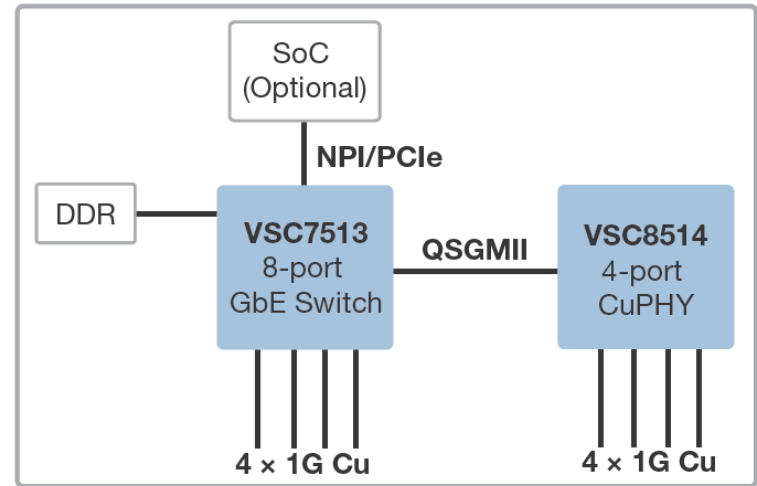
- ENT Switches and PHYs
- PoE/Midspans
- FPGA, Timing

Ocelot System Diagrams

Unmanaged

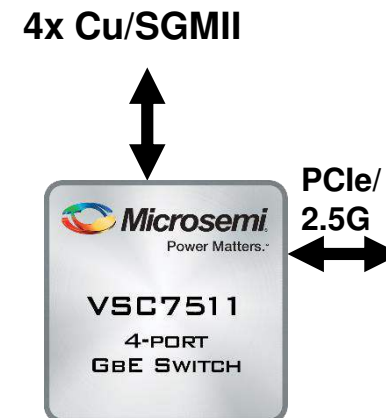


Managed

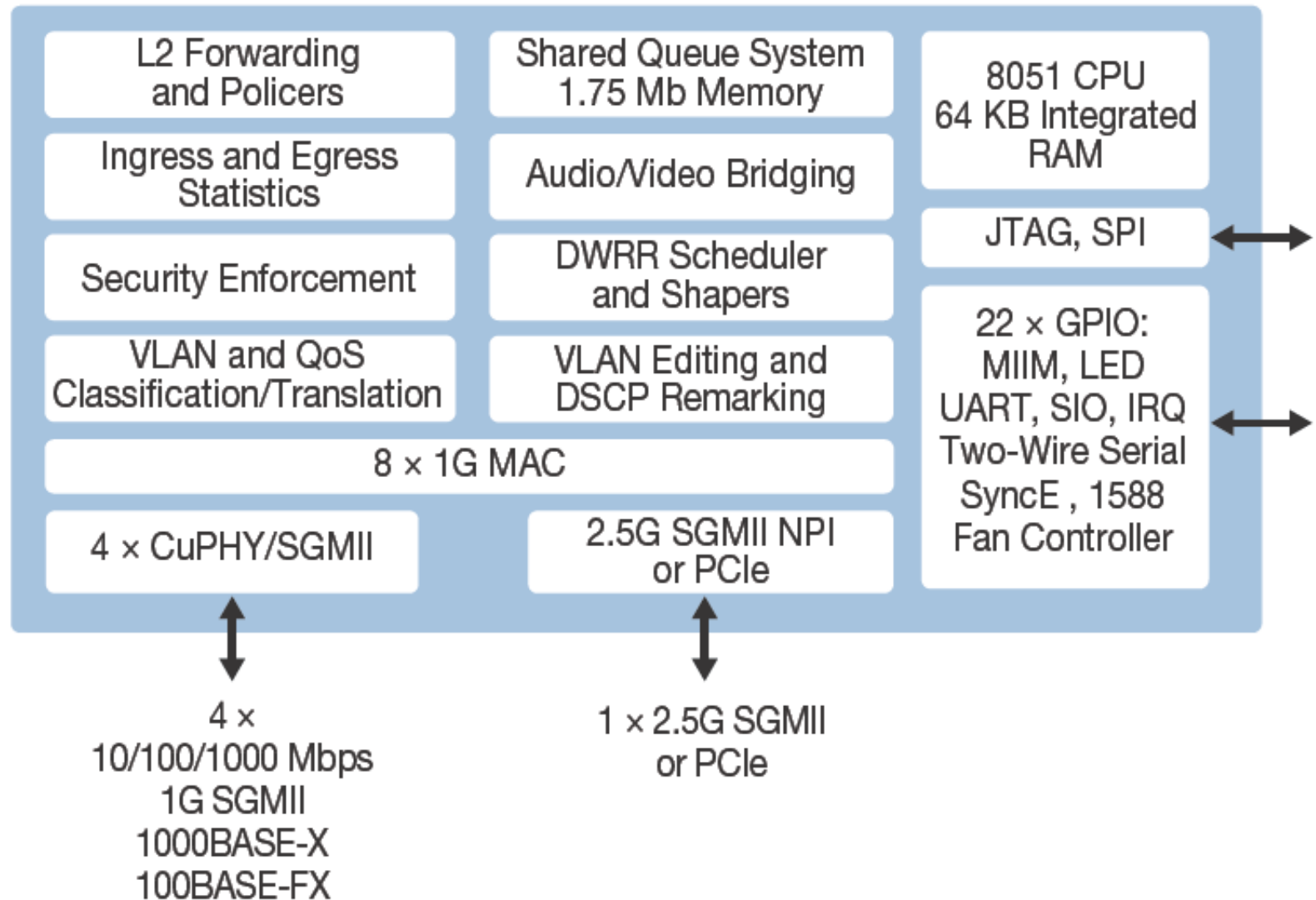


VSC7511 Ocelot-4um Features

KEY FEATURES	DETAILS
4-Port GbE Switch	4 integrated 10/100/1000BASE-T PHYs 2.5G-NPI or PCIe interface for external CPU port 4K MAC addresses 4K VLANs Jumbo frame (10kB) support 64 ACL based on the largest key size
Integrated TCAM	64 full (IPv6) TCAM entries supporting multi-stage lookup for advanced packet classification
QoS	1.8 Mbits Shared Buffer memory Q-in-Q Support
Power	Typical 2.5W, Max 4.1W (max) Overheat Protect
Package Size	13mm x 13mm DRQFN
Embedded Processor	8051 with 64Kbyte integrated RAM

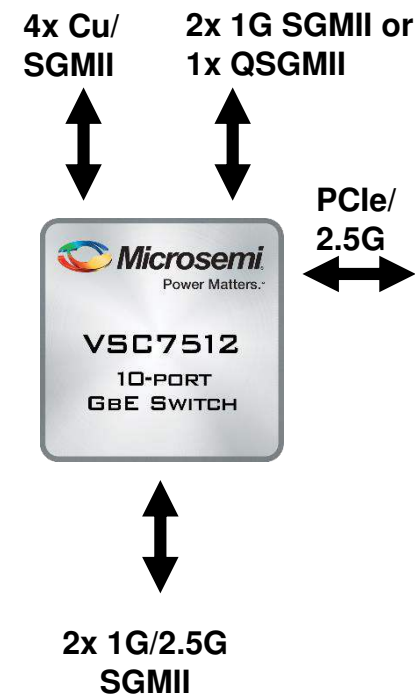


VSC7511 Ocelot-4um Block Diagram

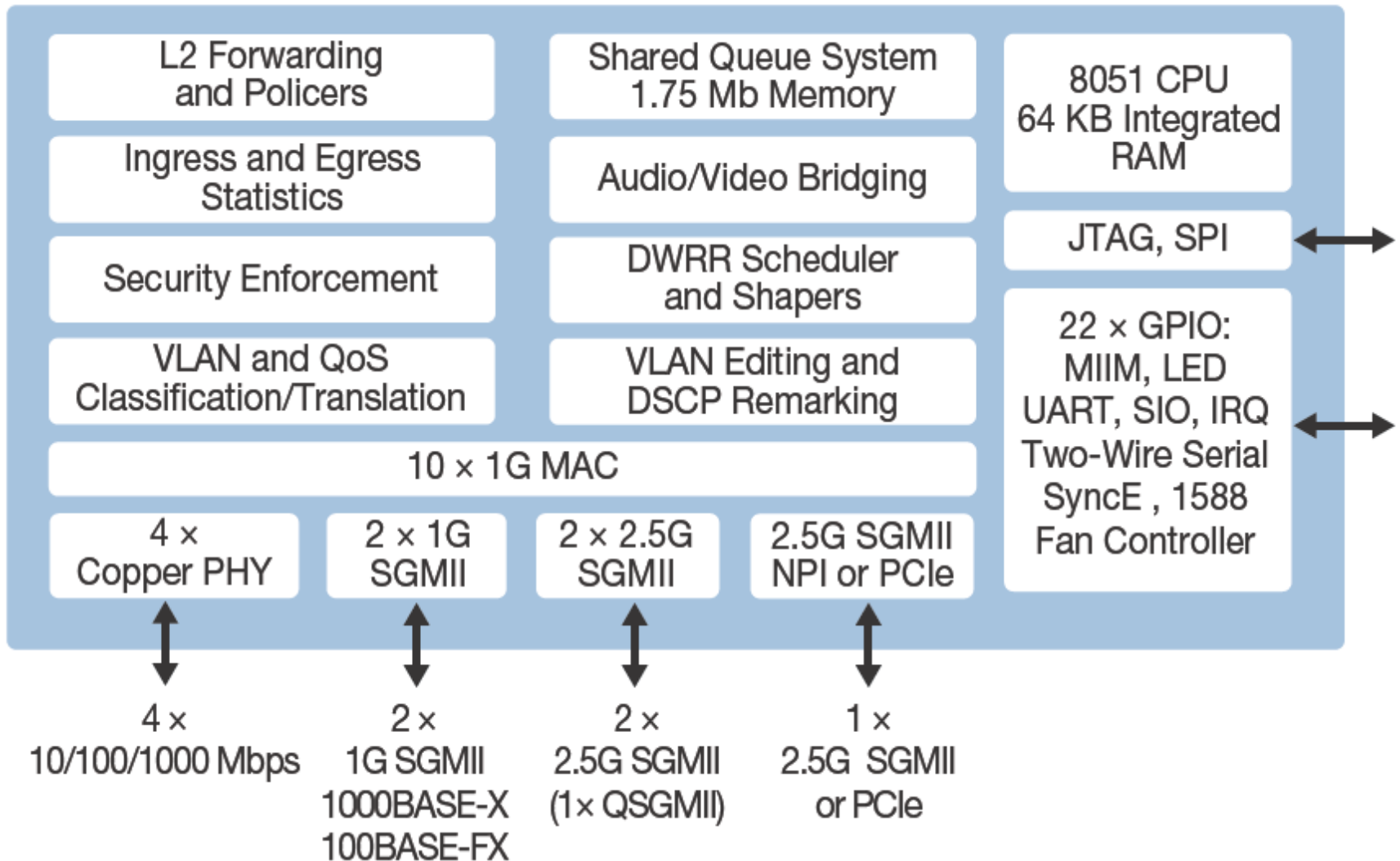


VSC7512 Ocelot-10um Features

KEY FEATURES	DETAILS
8-Port GbE Switch	4 integrated 10/100/1000BASE-T PHYs 2 x 1G Q/SGMII + 2 x 1G/2.5G SGMII (+1G NPI) 2.5G-NPI or PCIe interface for external CPU port 4K MAC addresses 4K VLANs Jumbo frame (10kB) support 64 ACL based on the largest key size
Integrated TCAM	64 full (IPv6) TCAM entries supporting multi-stage lookup for advanced packet classification
QoS	1.8 Mbits Shared Buffer memory Q-in-Q Support
Power	Typical 2.5W, Max 4.1W Overheat Protect
Package Size	13mm x 13mm DRQFN
Embedded Processor	8051 with 64Kbyte integrated RAM

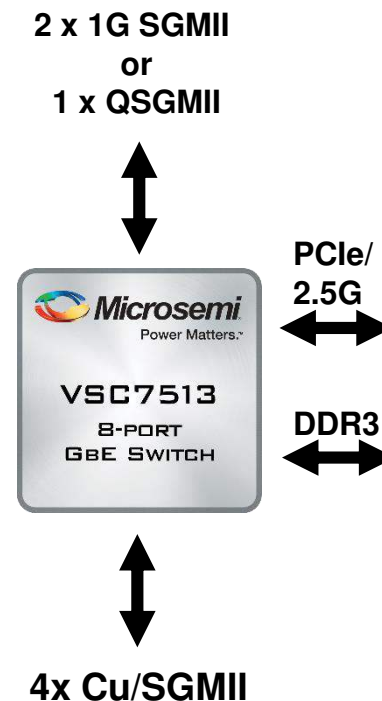


VSC7512 Ocelot-10um Block Diagram

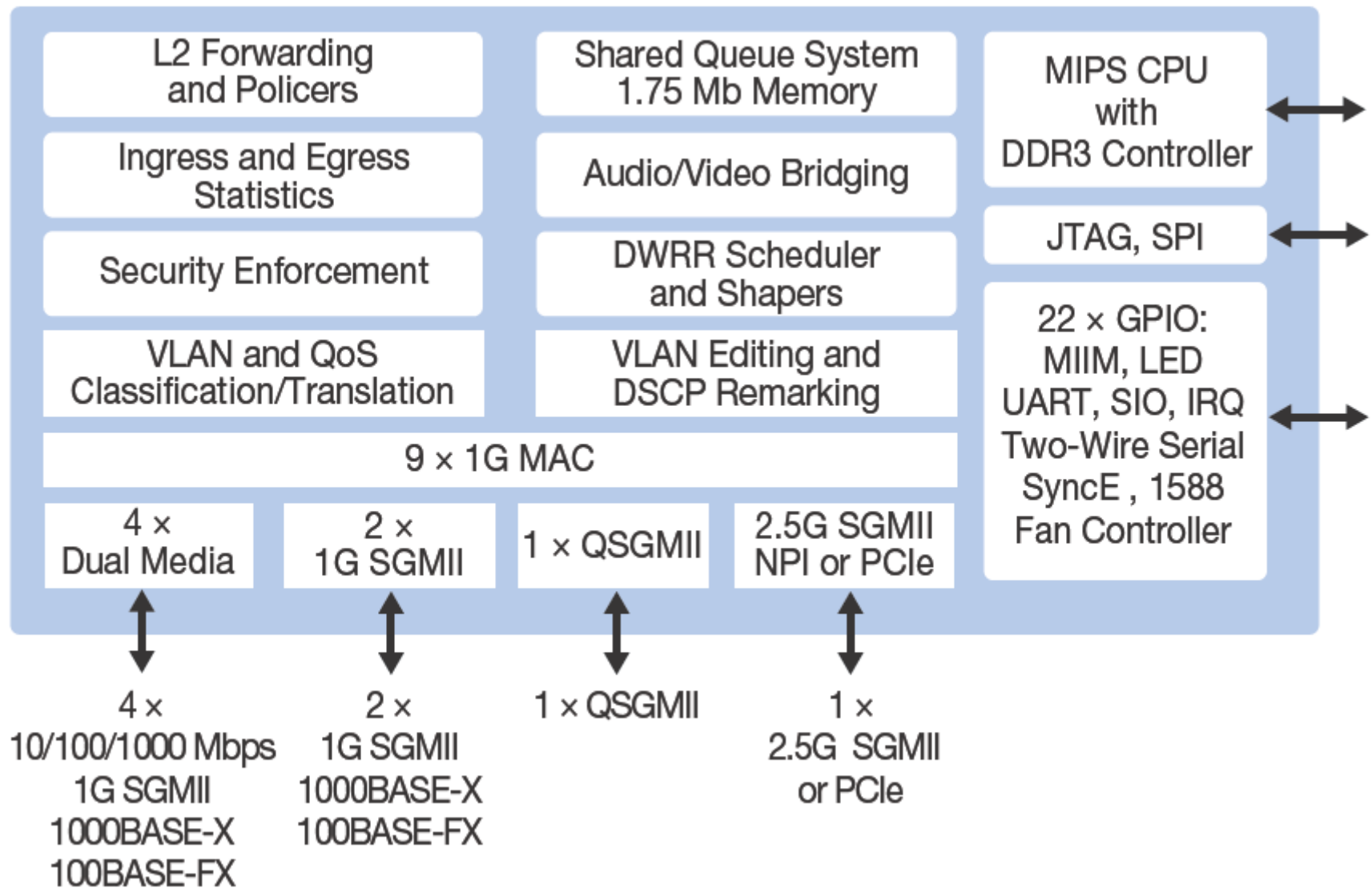


VSC7513 Ocelot-8 Features

KEY FEATURES	DETAILS
6-Port GbE Switch	4 integrated dual media 10/100/1000BASE-T PHYs 2 x 1G SGMII (+1G NPI) 2.5G-NPI or PCIe interface for external CPU port 4K MAC addresses 4K VLANs Jumbo frame (10KB) support 64 ACL based on the largest key size
Integrated TCAM	64 full (IPv6) TCAM entries supporting multi-stage lookup for advanced packet classification
Advanced QoS for Eight QoS Levels	1.8 Mbits Shared Buffer memory, 1.5K queues, WRED Priority flow control
Timing	IEEE 802.1AS and 1588v2
Power	Typical 2.8W, Max 4.5W
Package Size	17mm x 17mm CABGA
Embedded Processor	500 MHz MIPS Processor

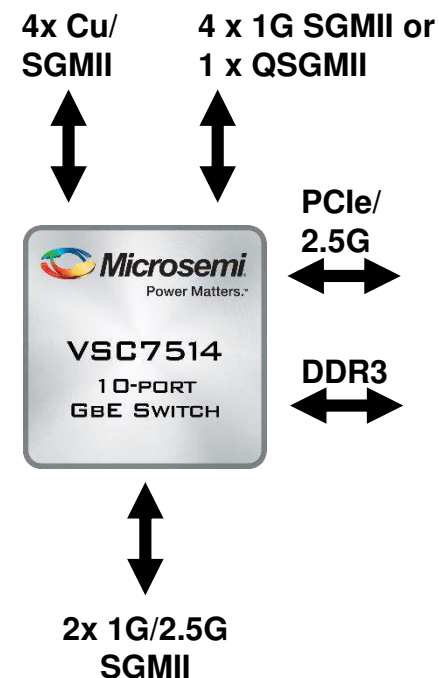


VSC7513 Ocelot-8 Block Diagram

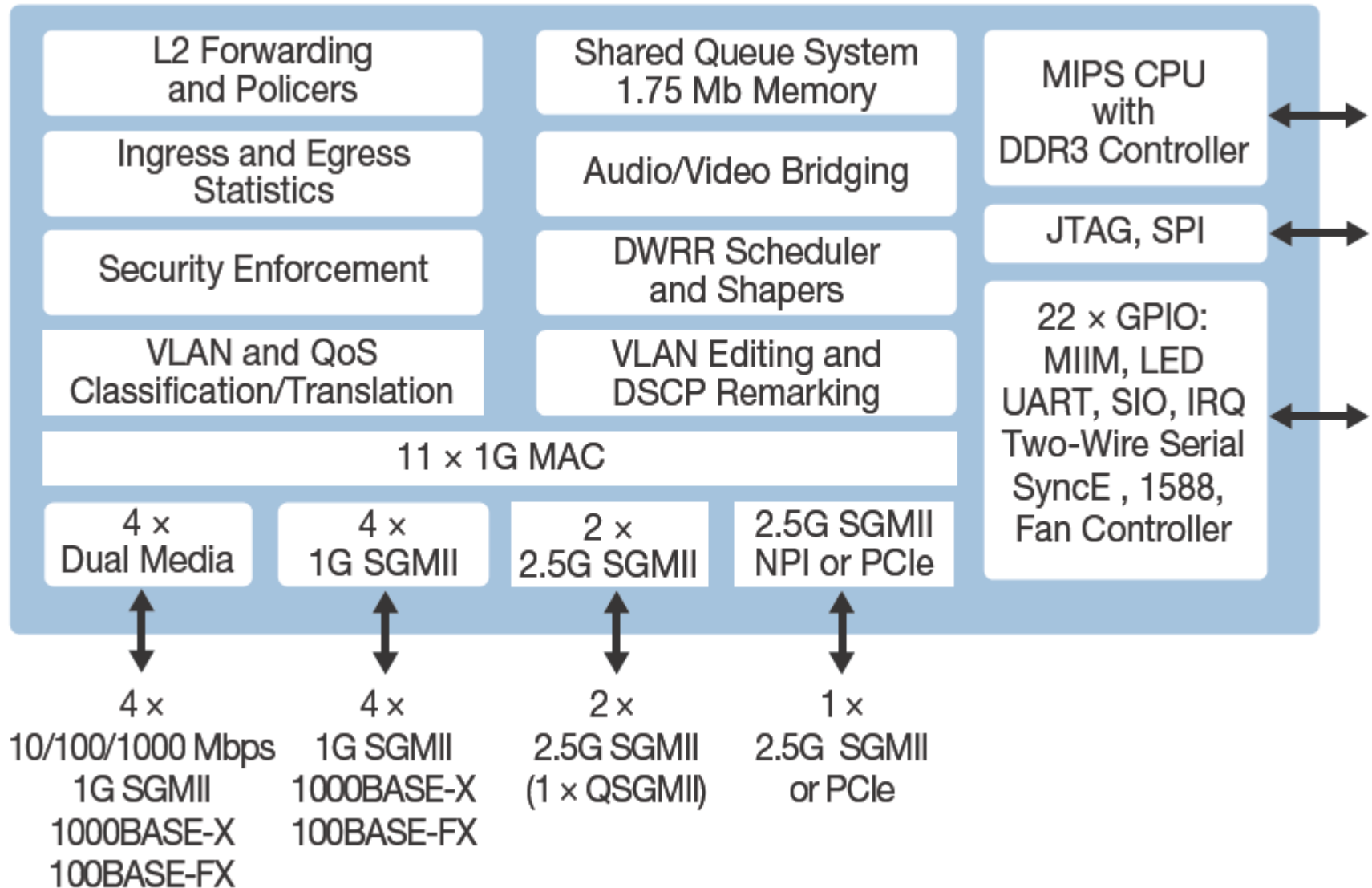


VSC7514 Ocelot-10 Features

KEY FEATURES	DETAILS
10-Port GbE Switch	4 integrated dual media 10/100/1000BASE-T PHYs 4 x 1G Q/SGMII + 2 x 1G/2.5G SGMII (+1G NPI) 2.5G-NPI or PCIe interface for external CPU port 4K MAC addresses 4K VLANs Jumbo frame (10KB) support 64 ACL based on the largest key size
Integrated TCAM	64 full (IPv6) TCAM entries supporting multi-stage lookup for advanced packet classification
Advanced QoS for Eight QoS Levels	1.8 Mbits Shared Buffer memory, 1.5K queues, WRED Priority flow control
Timing	IEEE 802.1AS and 1588v2
Power	Typical 2.8W, Max 4.5W
Package Size	17mm x 17mm CABGA
Embedded Processor	500 MHz MIPS Processor



VSC7514 Ocelot-10 Block Diagram



Microsemi's New Ocelot Ethernet Switches: Key Differentiation

■ Optimized for Industrial markets

- Port counts and interfaces (4-10 ports, SGMII, QSGMII, PCIe)
- Managed and unmanaged
- Up to three 2.5GE SGMII ports
- Dual media support (copper and fiber) with integrated PHYs
- Industry-specific features (including 1588 and remote monitoring)
- G.8032 Ethernet Ring Protection Switching (redundancy)
- Low power (<3W)
- Cable diagnostics (VeriPHY) while carrying active traffic
- Industrial temp range

■ Commitment to Industrial Software Roadmap

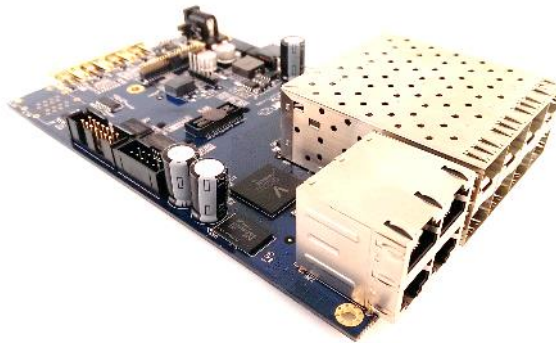
- IStaX package targeted specifically for Industrial applications
 - Minimizes time to market
 - Easy set up and management with a simple GUI and customizable look/feel

Microsemi's New Ocelot Ethernet Switches: Documentation and Reference Designs

- **Datasheets and product briefs** are available on the Microsemi web site NOW
 - Register and sign-in at <https://ethernet.microsemi.com/signin>
- **Three reference designs** are available



VSC5634EV - Unmanaged



VSC7514EV - Managed



VSC5635EV - Industrial

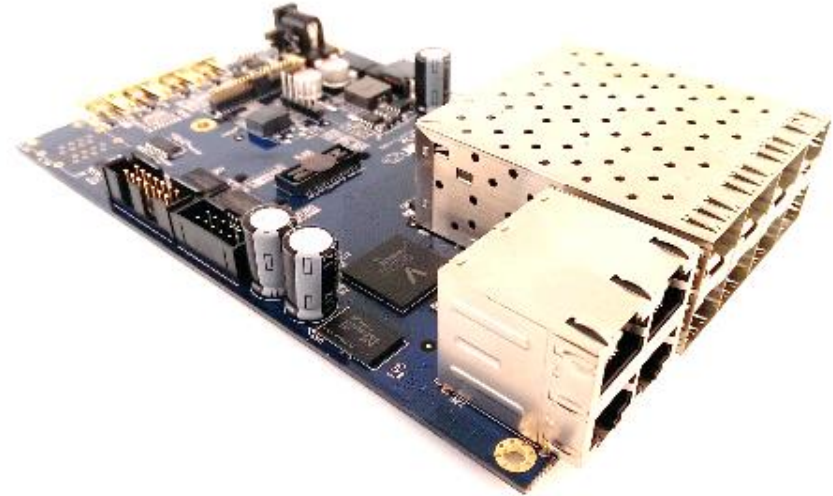
Ocelot Reference Designs: VSC5634EV – Unmanaged

- 8 x 10/100/1000BASE-T + 2 x SFP + Management port (10/100/1000BT)
 - Microsemi devices:
 - 1x VSC7512
 - 1x VSC8514
 - Interfaces:
 - 8x RJ45
 - 2x SFP
 - Optional add-on Port
 - 1x VSC8221 (Cu PHY)



Ocelot Reference Designs: VSC7514EV – Managed

- 4 x 10/100/1000BASE-T + 8 x SFP (two of these for dual media) + Management port (10/100/1000BT)
 - Microsemi devices:
 - 1x VSC7514
 - Interfaces:
 - 4x RJ45
 - 8x SFP
 - PTP
 - SyncE
 - PoE
 - Optional add-on Port
 - 1x VSC8221 (Cu PHY)



Ocelot Reference Designs: VSC5635EV – Industrial

- Turn-key design for Industrial applications
 - Mounted in DIN rail chassis
 - 8 x 10/100/1000BASE-T + 2 x SFP (1G/2.5G)
 - PoE+ support on all Cu ports
 - Redundant 56V PSUs
 - Microsemi devices:
 - 1x VSC7514
 - 1x VSC8584
 - Interfaces:
 - 8x RJ45
 - 2x SFP
 - PoE



The Microsemi Advantage

A Complete Industrial Ethernet Networking Solution

- Integrated Circuits
 - Ethernet Switches, PHYs, Timing PLLs and Oscillators, FPGAs, PoE Controllers and Line Drivers
- Software
 - IStaX, 1588 Timing
- IP
 - FGPA/SoC IP
- Systems
 - PoE Midspans, 1588 Grandmaster Clocks
- Ecosystem Partners
 - Nine Ways, Veracity

A Complete Solution Focusing on
Power optimization ▪ **Flexibility** ▪ **Reliability** ▪
Security ▪ **Interoperability** ▪ **Determinism**

Ethernet Switch/NPU Family

caracal *serval* **LYNX** **JAGUAR**
Ocelot SparX E-StaX WinPath

More details at: <http://www.microsemi.com/products/ethernet-solutions/ethernet-switches>

■ Fully Managed Switch

■ Un-/Lightly Managed Switch

■ NPU

Part #	Name	I/O BW (Gbps)	1G*** Ports	2.5G*** Ports	10G*** Ports	Integrated PHYs		Interfaces					Ext temp	SyncE	1588	Internal Shared Memory	L3 Routing	Stacking	Carrier Ethernet
						10G SFP+	1000BT	SGMII	RGMII	QSGMII	XAU1	SFI/XFI							
VSC7468	Jaguar-2	80	52	24	4	4									32 Mbits				
VSC7464	LynX-2	52	26	16	4	4									32 Mbits				
VSC7460	Jaguar-1	68	31	10	4										32 Mbits				
VSC7462	LynX-1	52	20	10	4										32 Mbits				
VSC7438	Serval-2	32	14	12	2	2									16 Mbits				
VSC7429	Caracal-2	29	26	2			12								4 Mbits				
VSC7428	Caracal-1	13	11	2			8								4 Mbits				
VSC7418	Serval-1	13	11	2											8 Mbits				
VSC7436	Serval2-Lite	34	10	6	2	2	2								8 Mbits				
VSC7423	Caracal-Lite	9	7	2			5								4 Mbits				
VSC7416	Serval-Lite	9	6	2											8 Mbits				
WP3-SPO	WP3 SuperLite	2	6	3											0.75 MB + 1x DDR3				
WP3SL	WP3 SuperLite	4	6	3											0.75 MB + 2x DDR3				
WP3	WinPath3	10	16	6	2										2.5 MB + 3x DDR3				
WP4	WinPath4	40	24	12	4										8.5 MB + 7x DDR3				
VSC7434	E-StaX-III-68	68	29	4	4										32 Mbits				
VSC7432	E-StaX-III-48	48	27	2	2										16 Mbits				
VSC7431	E-StaX-III-28	48	28												16 Mbits				
VSC7449	SparX-IV-90	90	52	24	4	4				R					32 Mbits				
VSC7448	SparX-IV-80	80	52	24	4	4				R					32 Mbits				
VSC7442	SparX-IV-52	52	52												16 Mbits				
VSC7444	SparX-IV-44	44	26	16	2	2				R					16 Mbits				
VSC7440	SparX-IV-34	34	10	6	2	2	2								8 Mbits				
VSC7427	SparX-III-26	26	26				12								4 Mbits				
VSC7422	SparX-III-25um	26.5	25	1			12								4 Mbits				
VSC7426	SparX-III-24	24	24				12								4 Mbits				
VSC7425	SparX-III-18	18	18				12								4 Mbits				
VSC7421	SparX-III-17um	19	17	2			12								4 Mbits				
VSC7414	SparX-III-11	13	11	2											8 Mbits				
VSC7424	SparX-III-10	10	10				8								4 Mbits				
VSC7420	SparX-III-10um	13	10	2			8								4 Mbits				
VSC7511	Ocelot-4um	6.4	4				4								1.75 Mbits				
VSC7512	Ocelot-10um	12.5	10	2			4								1.75 Mbits				
VSC7513	Ocelot-8	8	8				4								1.75 Mbits				
VSC7514	Ocelot-10	13	10	2			4								1.75 Mbits				

NOTES: R = RXAU1 / XAU1

*** = (1) These are MAX ports excluding the NPI port (VSC742X NPI port included),

(2) MAX 1G / 2.5G / 10G are not supported at the same time and shall not surpass the max available I/O bandwidth

(3) 1G integrated ports support dual media Copper or Fiber applications

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