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Cisco Catalyst ESS9300 Embedded Series Switch

Contents

The Cisco® Catalyst® ESS9300 Embedded Series Switch is built for secure, high-bandwidth networking and is optimized for size, weight, and power to operate in extreme environments.

Product overview

The Cisco Catalyst ESS9300 Embedded Switch Series revolutionizes Cisco's embedded networking portfolio with high-speed and security capabilities. The 10GE switch is optimized to meet specialized form-factor, ruggedization, port density, and power needs of many applications requiring customization and complements Cisco's off-the-shelf Industrial Ethernet switching portfolio.

The small-form-factor, board configuration options, and optimized power consumption provide Cisco partners and integrators the flexibility to design custom solutions for defense, oil and gas, transportation, mining, and other industries. With its zeroization, secure boot, and physical alarm relay capabilities, the embedded switch has the crucial security features needed to protect networks from cyber and physical threats. The ESS9300 runs the trusted and feature-rich Cisco IOS® XE Software, allowing Cisco partners and integrators to offer their customers the familiar Cisco IOS Command-Line Interface (CLI) and management experience on their ESS9300-based solutions. Additionally, Cisco IOS® XE Software also offers a powerful graphical management interface that is built-in, called WebUI, for an even more enhanced user experience.
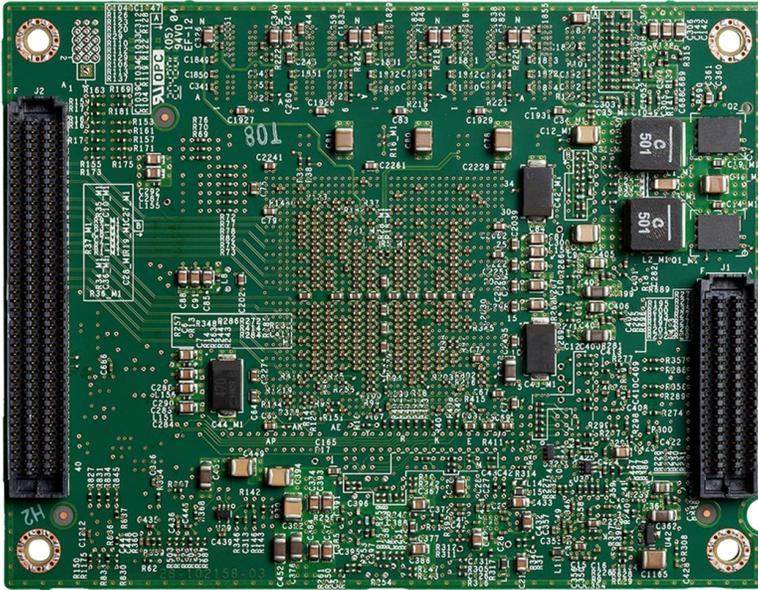
Figure 1.
ESS9300

The ESS9300 is a ruggedized 10G embedded platform designed for embedded applications for tactical, outdoor, and mobile installations requiring low power, small size, and ruggedization. Its features include:

- Single board

- Small form-factor board size (110 x 85 mm; 4.3 x 3.3 in.).

- 10 ports of 10G: Enhanced Small Form-Factor Pluggable (SFP+).

- Ethernet management port (optional).

- RS-232 and USB console.

- Common +3.3VDC and +5VDC power inputs.

- Advanced next-generation Cisco IOS XE software.

- Low power – 35W (typical).

Primary features

Feature	Benefit
10G links	Enables high-quality video and data communications for the next generation of bandwidth-intensive use cases such as tactical data centers, HD video surveillance, self-driving vehicles, and future-readiness.
Robust industrial design	Small form factor packing 10G allows integrators to pack higher port density into a compact form factor and build custom solutions that can withstand harsh environments (temperature range of -40° to 85°C, -40° to 185°F).
Security	Enterprise-grade Cisco IOS XE switching security features help ensure highly secure voice, video, and data communications. Secure boot and Cisco Anti-counterfeit technology ensure authenticity for both hardware and software. Zeroization is a feature that is important to the defense and government intelligence communities to ensure that network access and security credentials are not compromised by theft of hardware. Alarm relay contacts can also be used to ensure physical integrity of the device enclosure.
Manageability	Facilitates easy deployment and rapid configuration with easy-to-use Web UI and familiar Cisco CLI.
Layer 2 switching	Enables third-party integrators to offer rich enterprise-grade Layer 2 switching feature set to end customers.
Quality of service	Allows customers to prioritize flows and helps ensure that mission-critical flows are not affected by low-priority traffic.

Hardware specifications

Description	Specification
Interfaces	10 ports of 10G /1G (approved SFP+/SFPs), 1 management port of 10/100/1000BASE-T RS-232 and USB console
Memory	4 GB DDR4 DRAM 8 GB onboard eMMC flash storage (2.5 GB usable space)
Power supply	3.3VDC and +5VDC (+/-3%)
Power consumption	35W (typical)
Connectors	SEARAY Connector Series from SAMTEC: • SEAF-20-05.0-S-06-2-A-K 120-pin (J1) • SEAF-40-05.0-S-06-2-A-K 240-pin (J2)
Dimensions (W x D)	ESS-9300-10X-E: 110 x 85 mm (4.3 x 3.3 in.)
Weight	ESS-9300-10X-E: 88 g (3.1 oz)

Scale specifications

Features	Description
Forwarding rate	Line rate for all ports and all packet sizes
Number of queues	8
Number of VRF[1]	32
MAC addresses	16,000
VLAN IDs	1000
Internet Group Management Protocol (IGMP) groups	1000
Number of Spanning Tree Protocol (STP) instances	128

[1] Supported with -E SKUs (with Network Advantage license).

Software features

Network Essentials License	Description
Layer 2 switching	IEEE 802.1Q VLAN Trunking, 802.1W Spanning Tree Rapid Reconfiguration, 802.1ab LLDP (Link Layer Discovery Protocol), 802.1s - Multiple Spanning Tree Protocol (MSTP) Standard Compliance, 802.1s VLAN Multiple Spanning Trees, 802.1Q Tunneling, 802.3 standard, Unidirectional Link Detection (UDLD), Cisco Discovery Protocol, unicast MAC filter, VLAN Trunk Protocol (VTP) v2 and v3, EtherChannel, voice VLAN, Per-VLAN Spanning Tree Plus (PVST+), and Rapid STP (RSTP)
Multicast	IGMPv1, v2, v3 snooping, IGMP filtering, IGMP querier
Management	Web UI, MIB, SmartPort, Simple Network Management Protocol (SNMP), syslog, Dynamic Host Configuration Protocol (DHCP) server, Switched Port Analyzer (SPAN) session (1), Full Flexible NetFlow (FnF), Network Time Protocol (NTP)
Security	Zeroization, secure boot, port security, IEEE 802.1X, DHCP snooping, dynamic Address Resolution Protocol (ARP) inspection, IP Source Guard, private VLAN. MAC authentication bypass, 802.1X multidomain authentication, storm control - unicast, multicast, broadcast, Secure Copy (SCP), Secure Shell (SSH), SNMPv3, TACACS+, RADIUS server/client, MAC address notification, Bridge Protocol Data Unit (BPDU) guard, hardware physical alarm inputs (2), and relay output (1), MACsec-128 (are supported on all 10x10G ports simultaneously at line rate).
Certificate Based MACsec Note: Network Advantage license required when using 256-bit MACsec	Certificate-based MACsec Encryption feature uses 802.1X port-based authentication with Extensible Authentication Protocol-Transport Layer Security (EAP-TLS) to carry Certificates for ports where MACsec encryption is required This feature makes it feasible to manage the key at the centralized server over preshared key-based MACsec Uses MACsec and the MACsec Key Agreement (MKA) Protocol

Network Essentials License	Description
Quality of service (QoS)	Ingress policing, rate limit, egress queuing/shaping, auto QoS
Layer 2 IPv6	IPv6 host support, HTTP over IPv6, SNMP over IPv6

Network Advantage License	Description
IP routing	OSPF (V2 and V3), RIP (V1 and V2), ISIS (for IPv4 and IPv6), EIGRP (for IPv4 and IPv6), PBR (Policy Based Routing)
Virtualization	VRF-lite
Security	MACsec-256 (are supported on all 10x10G ports simultaneously at line rate)
IP Multicast	PIM Sparse Mode (PIM-SM), PIM dense mode (PIM-DM) and PIM Sparse dense mode
High Availability	Bidirectional Forwarding Detection (BFD) echo mode, HSRP (IPv4 and IPv6), VRRP (IPv4 and IPv6)

Note: Please refer to the "New Features for Cisco Catalyst IE and ESS Switches" section of each of the software release notes for a more complete list of features. The above tables attempt to provide the most popular features. Referring to the release notes also has the benefit of specifying the minimum required release to support the desired feature.

The main page for release notes is here: https://www.cisco.com/c/en/us/support/ios-nx-os-software/ios-xe-17/products-release-notes-list.html.

Please be sure to select the titles that begin with, "Release Notes for Cisco Catalyst IE9300 Rugged Series Switches, and Cisco Catalyst ESS9300 Embedded Series Switch.

Environmental specifications

Specification	Description
Industrial-grade board component temperature	–40° to 85°C (–40° to 185°F) component local ambient temperature specification
Operating temperature	–40° to 85°C (–40° to 185°F). Temperature range of a completed solution depends on the thermal design characteristics of the enclosure used by the system integrator
Storage temperature	–40° to 85°C (–40° to 185°F)
Operating altitude	4.572 km (15,000 ft) –40° to 74°C (–40° to 165°F) 12.2 km (40,000 ft) –40° to 25°C (–40° to 77°F)
Nonoperating altitude	12.2 km (40,000 ft)
Mean Time Between Failures (MTBF)	ESS9300 Ground, fixed, controlled: 48.2 years

Management and standards

Descriptions	Specifications
SNMP MIB objects	BRIDGE-MIB
	CISCO-ACCESS-ENVMON-MIB
	CISCO-AUTH-FRAMEWORK-MIB
	CISCO-BRIDGE-EXT-MIB
	CISCO-BULK-FILE-MIB
	CISCO-CALLHOME-MIB
	CISCO-CAR-MIB
	CISCO-CDP-MIB
	CISCO-CONFIG-COPY-MIB
	CISCO-CONFIG-MAN-MIB
	CISCO-DATA-COLLECTION-MIB
	CISCO-DHCP-SNOOPING-MIB
	CISCO-ENTITY-VENDORTYPE-OID-MIB
	CISCO-ENVMON-MIB
	CISCO-ERR-DISABLE-MIB
	CISCO-FLASH-MIB
	CISCO-FTP-CLIENT-MIB
	CISCO-IF-EXTENSION-MIB
	CISCO-IGMP-FILTER-MIB
	CISCO-IMAGE-MIB
	CISCO-IP-STAT-MIB
	CISCO-LAG-MIB
	CISCO-LICENSE-MGMT-MIB
	CISCO-MAC-AUTH-BYPASS-MIB
	CISCO-MAC-NOTIFICATION-MIB
	CISCO-MEMORY-POOL-MIB
	CISCO-PAE-MIB
	CISCO-PING-MIB
	CISCO-PORT-QOS-MIB
	CISCO-PORT-SECURITY-MIB
	CISCO-PORT-STORM-CONTROL-MIB
	CISCO-PRIVATE-VLAN-MIB
	CISCO-PROCESS-MIB
	CISCO-PRODUCTS-MIB
	CISCO-ENTITY-ALARM-MIB

Descriptions	Specifications
	CISCO-SNMP-TARGET-EXT-MIB
	CISCO-STP-EXTENSIONS-MIB
	CISCO-SYSLOG-MIB
	CISCO-UDLDP-MIB
	CISCO-VLAN-IFTABLE-RELATIONSHIP-MIB
	CISCO-VLAN-MEMBERSHIP-MIB
	CISCO-VTP-MIB
	ENTITY-MIB
	ETHERLIKE-MIB
	HC-RMON-MIB
	IEEE8021-PAE-MIB
	IEEE8023-LAG-MIB
	IF-MIB
	LLDP-EXT-MED-MIB
	LLDP-MIB
	NOTIFICATION-LOG-MIB
	OLD-CISCO-CPU-MIB
	OLD-CISCO-SYSTEM-MIB
	RMON-MIB
	SMON-MIB
	SNMP-COMMUNITY-MIB
	SNMP-FRAMEWORK-MIB
	SNMP-MPD-MIB
	SNMP-NOTIFICATION-MIB
	SNMP-PROXY-MIB
	SNMP-TARGET-MIB
	SNMP-USM-MIB
	SNMP-VIEW-BASED-ACM-MIB
	SNMPV2-MIB
	802.1X MIB

Descriptions	Specifications
IEEE standards	IEEE 802.1D MAC Bridges, STP
	IEEE 802.1p Layer2 COS prioritization
	IEEE 802.1q VLAN
	IEEE 802.1s Multiple Spanning-Trees
	IEEE 802.1w Rapid Spanning-Tree
	IEEE 802.1X Port Access Authentication
	IEEE 802.1AB LLDP
	IEEE 802.3ad Link Aggregation (LACP)
	IEEE 802.3ah 100BASE-X SMF/MMF only
	IEEE 802.3x full duplex on 10BASE-T
	IEEE 802.3 10BASE-T specification
	IEEE 802.3u 100BASE-TX specification
	IEEE 802.3ab 1000BASE-T specification
	IEEE 802.3z 1000BASE-X specification
RFC compliance	RFC 768: UDP
	RFC 783: TFTP
	RFC 791: IPv4 protocol
	RFC 792: ICMP
	RFC 793: TCP
	RFC 826: ARP
	RFC 854: Telnet
	RFC 959: FTP
	RFC 1157: SNMPv1
	RFC 1901,1902-1907 SNMPv2
	RFC 2273-2275: SNMPv3
	RFC 2571: SNMP Management
	RFC 1166: IP Addresses
	RFC 1256: ICMP Router Discovery
	RFC 1305: NTP
	RFC 1492: TACACS+
	RFC 1493: Bridge MIB Objects
	RFC 1643: Ethernet Interface MIB
	RFC 1757: RMON
	RFC 2068: HTTP
	RFC 2131, 2132: DHCP
	RFC 2236: IGMP v2
	RFC 3376: IGMP v3

Descriptions	Specifications
	RFC 2474: DiffServ Precedence
	RFC 3046: DHCP Relay Agent Information Option
	RFC 3580: 802.1X RADIUS
	RFC 4250-4252 SSH Protocol
	RFC4884 - Extended ICMP to Support Multi-part Messages[*]

[*] Supported in future IOS-XE release

Optics supported

Part number	Specification	SFP type	Max distance	Cable type	Temp range[*]	DOM support
GLC-SX-MM-RGD=	1000BASE-SX	GE	550m	MMF	IND	Yes
GLC-LX-SM-RGD=	1000BASE-LX/LH	GE	550m/10km	MMF/SMF	IND	Yes
GLC-SX-MMD=	1000BASE-SX	GE	550m	MMF	EXT	Yes
GLC-LH-SMD=	1000BASE-LX/LH	GE	550m/10km	MMF/SMF	EXT	Yes
GLC-BX-D=	1000BASE-BX10	GE	10km	SMF	COM	Yes
GLC-BX-U=	1000BASE-BX10	GE	10km	SMF	COM	Yes
GLC-ZX-SM-RGD=	1000BASE-ZX	GE	Approx. 70km	SMF	IND	Yes
GLC-EX-SMD=	1000BASE-EX	GE	40km	SMF	EXT	Yes
SFP-GE-S=	1000BASE-SX	GE	550m	MMF	EXT	Yes
GLC-SX-MM=	1000BASE-SX	GE	550m	MMF	COM	No
GLC-T-RGD=	1000BASE-T	GE	100m	Copper	IND	NA
GLC-LH-SM=	1000BASE-LX/LH	GE	550m/10km	MMF/SMF	COM	No
GLC-TE=	1000BASE-T	GE	100m	Copper	EXT	NA
GLC-T=	1000BASE-T	GE	100m	Copper	COM	NA
CWDM-SFP-xxxx= (8 freq)	CWDM 1000BASE-X	GE		SMF	COM	Yes
DWDM-SFP-xxxx= (40 freq)	DWDM 1000BASE-X	GE		SMF	COM	Yes
SFP-10G-BXD-I=	10GBASE-BX10	10GE	10km	SMF	IND	Yes
SFP-10G-BXU-I=	10GBASE-BX10	10GE	10km	SMF	IND	Yes
SFP-10G-LR-X=	10GBASE-LR	10GE	10km	SMF	EXT	Yes

Part number	Specification	SFP type	Max distance	Cable type	Temp range*	DOM support
SFP-10G-SR=	10GBASE-SR	10GE	400m	MMF	COM	Yes
SFP-10G-LR=	10GBASE-LR	10GE	10km	SMF	COM	Yes
SFP-H10GB-CUxM=	10G Passive Twinax	10GE	1m/3m/5m	Twinax	COM	NA
SFP-H10GB-ACUxM=	10G Active Twinax	10GE	7m/10m	Twinax	COM	NA
SFP-10G-T-X*	10GBASE-T	10GE	Up to 30 meters	Cat6A/Cat7	EXT	NA

* Requires 17.6.1 or greater

Regulatory compliance

Compliance	Standards
Emissions	CISPR32: 2015/AMD1: 2019, EN 55032:2013 FCC Part 15B ICES-003
Immunity	CISPR24:2010, EN55024:2010 EN55035:2017, CISPR35:2016 EN61000-4-2 ESD EN61000-4-3 Radiated Immunity EN61000-4-4 Electrical Fast Transients/ Bursts EN61000-4-5 Surge EN61000-4-6 Conducted immunity EN61000-4-8 Power Frequency Magnetic field immunity EN61000-4-10 Damped Oscillatory Magnetic field immunity EN61000-4-11 Voltage Dips and Interruptions EN61000-4-16 Conducted Low Frequency Immunity EN61000-4-18 Damped Oscillatory Wave Immunity
MIL standard	MIL-STD-461G
Safety	CB to IEC62368-1:2014, CB to IEC60950-1:2005/AMD2:2013 UL Recognition
Other	RoHS (EU, China, Taiwan)

Compliance tests performed using Test Platform.

Ordering information

The ESS 9300 is available in the following configurations:

Product ID	Product description
ESS-9300-10X-E	ESS9300 board, no cooling plate, Network Essentials software
ESS9300-NW-A=	Cisco Network Advantage license for ESS9300 Series Spare

Warranty information

The ESS9300 has a 1-year Limited Hardware Warranty.

Further warranty information for the ESS9300 switch is available at
https://www.ciscoservicefinder.com/warrantyfinder.aspx.

Product sustainability

Information about Cisco's Environmental, Social and Governance (ESG) initiatives and performance is provided in Cisco's CSR and sustainability reporting.

Sustainability Topic		Reference
General	Information on product-material-content laws and regulations	Materials
	Information on electronic waste laws and regulations, including our products, batteries and packaging	WEEE Compliance
	Sustainability Inquiries	Contact: csr_inquiries@cisco.com
	Information on product takeback and reuse program	Cisco Takeback and Reuse Program
	Operating/non-operating environmental conditions	Environmental specifications
	Emissions, immunity and safety certifications	Regulatory compliance
	MIL standard	Regulatory compliance
Power	Power consumption	Product overview Hardware specifications
	Power supply	Hardware specifications
Material	Product packaging weight and materials	Contact: environment@cisco.com
	Dimensions	Product overview Hardware specifications
	Weight	Hardware specifications

Cisco and partner services

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For more information

For more information about the Cisco Catalyst ESS9300 Embedded Series Switch, visit https://www.cisco.com/go/ess9300 or contact your local account representative.

Document history

New or Revised Topic	Described In	Date
MACsec-256 security feature	Network Advantage License	April 12, 2023
Added ESS9300-NW-A= Network Advantage Spare License	Ordering Information	April 12, 2023
Added Certificate based MACsec In Software Features	Network Essential License	January 10, 2024
Added a Footnote in Compliance Section	Compliance Section	January 12, 2024

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