Cisco Embedded Service 2020 Series Switches

The Cisco® Embedded Service 2020 Series Switches are optimized for mobile and embedded networks that require switching capability in harsh environments. Customers in such industries as oil and gas, mining, transportation, and defense are all increasingly requiring IP based networks. The flexible, compact form factor of the switch cards, complemented by Cisco IOS® Software, provides highly secure data, voice, and video communications to stationary and mobile network nodes.

Product Overview

The ESS 2020 is designed for embedded applications requiring low cost, small size, and ruggedization:

- Consists of main board and optional port expansion board
- Conforms to common PC104 form factor board size (approximately 4” x 4”)
- Main board:
  - 2x Gigabit Combo ports: Small Form-Factor Pluggable (SFP) (100 Mb and 1G) or RJ45 uplink
  - 8x 10/100BASE-T Ethernet ports
  - RS-232 console
- Expansion board (optional): 16x 10/100BASE-T Ethernet ports
- Common +3.3Vdc and +5Vdc power inputs
- Onboard Ethernet magnetics

Primary Features

- **Security:** Dot1x, port security, and Dynamic Host Configuration Protocol (DHCP) allow dynamic port-base authentication; Secure Shell Version 2 (SSHv2); Simple Network Management Protocol Version 3 (SNMPv3) provides encrypted administrator traffic during Telnet and SNMP sessions; TACACS+ and RADIUS authentication facilitate centralized control and restrict unauthorized users
- **Resiliency:** Flex links for fast recovery, Cisco Resilient Ethernet Protocol (REP) for fast convergence
- **Manageability:** Auto SmartPort, Web Device Manager, Telnet, HTTPS access, and SNMP

Switch performance and scalability

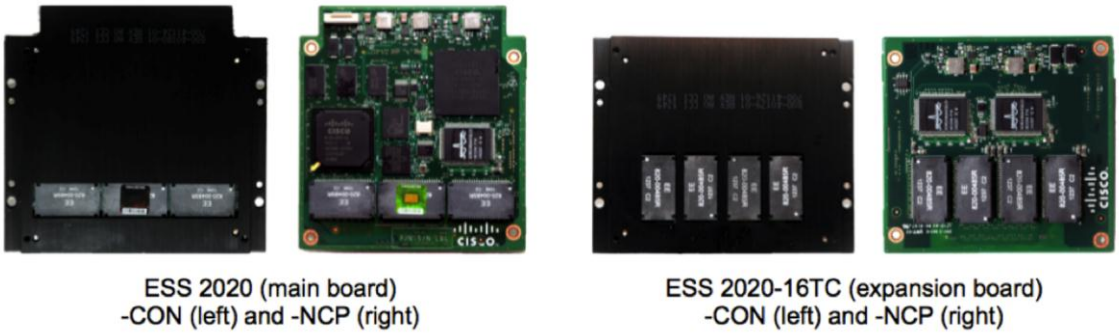
- Line rate/nonblocking application-specific integrated circuit (ASIC)-based architecture
- Forwarding rate: 6.6Mpps with 64-byte frames
- Forwarding bandwidth: 4.4Gbps
- Egress buffer: 2MB
- Unicast MAC addresses: 8000
- IGMP multicast groups: 255
- Max VLANs: 255

- IPv4 MAC security ACEs: 384 (default TCAM template)

Switch Configurations

Figure 1 shows ESS 2020 models, and Table 1 shows Cisco ESS 2020 Ordering information. Tables 2 through 6 show license upgrade information, product specifications, software features, environmental specifications, and management and standards information, respectively.

Figure 1. ESS 2020 Switches



ESS 2020 (main board)
-CON (left) and -NCP (right)

ESS 2020-16TC (expansion board)
-CON (left) and -NCP (right)

Table 1. Cisco ESS 2020 Series Ordering Information

Product Number	Description
ESS-2020-NCP	Embedded Service 2020 Switch, Main board, No cooling plate, LAN Lite software
ESS-2020-CON	Embedded Service 2020 Switch, Main board, Conduction cooled, LAN Lite software
ESS-2020-NCP-B	Embedded Service 2020 Switch, Main board, No cooling plate, LAN Base software
ESS-2020-CON-B	Embedded Service 2020 Switch, Main board, Conduction cooled, LAN Base software
ESS-2020-16TC-NCP	Embedded Service 2020 Switch, Expansion board, No cooling plate
ESS-2020-16TC-CON	Embedded Service 2020 Switch, Expansion board, Conduction cooled
ESS-2020-24TC-NCP	Embedded Service 2020 Switch, Main/Expansion board bundle, No cooling plate, LAN Lite software
ESS-2020-24TC-CON	Embedded Service 2020 Switch, Main/Expansion board bundle, Conduction cooled, LAN Lite software
ESS-2020-24TC-NCPB	Embedded Service 2020 Switch, Main/Expansion board bundle, No cooling plates, LAN Base software
ESS-2020-24TC-CONB	Embedded Service 2020 Switch, Main/Expansion board bundle, Conduction cooled, LAN Base software

Table 2. License Upgrade

Product Number	Description
ESS-2020-L-B=	Embedded Service 2020 Switch, LAN Lite to LAN Base software upgrade, Paper license
L-ESS-2020-L-B=	Embedded Service 2020 Switch, LAN Lite to LAN Base software upgrade, Electronic license

Table 3. Product Specifications

Description	Specification
Interfaces	• Main board: 2x GE (copper or fiber), 8x FE, RS-232 console • Expansion board (optional): 16x FE (total of 24x FE when combined with main board)
Hardware	• 256 MB DRAM with ECC memory • 64 MB on-board flash memory
Power supply	• +3.3Vdc and +5Vdc (+/- 5%)
Power consumption	• Main board: 6.5W (typical) • Expansion board: 3.6W (typical) • Both boards: 10.1W (typical)
Connectors	• Commercially available board-to-board connectors
Dimensions (W x D)	• ESS-2020-NCP: 3.8” x 4” • ESS-2020-16TC-NCP: 3.8” x 3.6” • ESS-2020-CON: 4.5” x 4.2” • ESS-2020-16TC-CON: 4.5” x 3.7”
Weight	• ESS-2020-NCP: 2.3 ounces • ESS-2020-16TC-NCP: 2.1 ounces • ESS-2020-CON: 23.0 ounces • ESS-2020-16TC-CON: 21.6 ounces

Table 4. Cisco ESS 2020 Software Features

LAN Lite License (Default)	Features
Layer 2 switching	IEEE 802.1, 802.3 standard (see Table 6), VTPv2, NTP, UDLD, CDP, LLDP, Unicast MAC filter, Flex Link, REP
Security	SCP, SSH, SNMPv3, TACACS+, RADIUS Server/Client, MAC Address Notification, BPDU Guard, SPAN session (1)
Multicast	IGMPv1, v2, v3 Snooping, IGMP filtering, IGMP Querier
Management	Web Device Manager, MIB, SmartPort, SNMP, syslog
LAN Base License	**Features**
Layer 2 switching	VTPv3, EtherChannel, Voice VLAN
Security	Port-Security, DHCP Snooping, Dynamic Arp Inspection, IP Source Guard, 802.1x, Guest VLAN. MAC Authentication Bypass, 802.1x Multi-Domain Authentication, Storm Control, Trust Boundary
Quality of service	Ingress Policing, Rate-Limit, Egress Queuing/shaping, AutoQoS
Management	Storm Control – Unicast, Multicast, Broadcast, SPAN Sessions (2), RSPAN, DHCP Server, Customized TCAM/SDM size configuration
L2 IPv6	IPv6 Host support, HTTP over IPv6, SNMP over IPv6
Layer 3 routing	IPv4 Static Routing

Table 5. Environmental Specifications

Description	Specification
Industrial-grade board component temperature	• 40C to +85C (-40F to +185F) component local ambient temperature specification
Operating temperature	• -40C to +85C (-40F to +185F) for conduction cooled SKUs as measured at the center top surface of thermal plate • Temperature range of a completed solution depends on the enclosure thermal design characteristics used by the system integrator
Storage temperature	• -40C to +85C (-40F to +185F)
Operating altitude	• 4.572m (15,000ft)

Description	Specification
Nonoperating altitude	• 12,200m (40,000ft)
MTBF	ESS-2020 (-CON and -NCP) • Ground, Fixed, Controlled: 1,899,080 (in hours) • Ground, Mobile: 474,770 (in hours) ESS-2020-16TC (-CON and -NCP) • Ground, Fixed, Controlled: 2,408,980 (in hours) • Ground, Mobile: 602,245 (in hours) ESS-2020 + ESS-2020-16TC (-CON and -NCP) • Ground, Fixed, Controlled: 1,136,670 (in hours) • Ground, Mobile: 284,168 (in hours)
Warranty	• One year limited warranty

Table 6. Management and Standards

Description	Specification	Specification
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 951: BootP • 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 1534 DHCP and BootP interoperation • RFC 1542: Bootstrap Protocol • RFC 1643: Ethernet Interface MIB • RFC 1757: RMON • RFC 2068: HTTP • RFC 2131, 2132: DHCP • RFC 2236: IGMP v2 • RFC 3376: IGMP v3 • RFC 2474: DiffServ Precedence • RFC 3046: DHCP Relay Agent Information Option • RFC 3580: 802.1x RADIUS • RFC 4250-4252 SSH Protocol
SFP transceivers[1]	• GLC-FE-100FX-RGD 2km/MMF[2] • GLC-FE-100FX 2km/MMF • GLC-FE-100LX-RGD 10km/MMF • GLC-FE-100EX 40km/SMF[3] • GLC-FE-100LX 10km/SMF • GLC-FE-100BX-D 10km/SMF • GLC-FE-100BX-U 10km/SMF • GLC-FE-100ZX 80km/SMF	• GLC-SX-MM-RGD 220-550m/MMF • GLC-SX-MM 220-550m/MMF • GLC-SX-MMD DOM supported • GLC-LH-SM 550m/MMF, 10km/SMF • GLC-LH-SMD 550m/MMF, 10km/SMF DOM • GLC-LX-SM-RGD 550m/MMF, 10km/SMF • GLC-ZX-SM-RGD 70-100km/SMF • GLC-EX-SMD DOM supported • GLC-BX-D 10km/SMF • GLC-BX-U 10km/SMF • CWDM SFP 100km/SMF • DWDM SFP

Description	Specification	Specification
SNMP MIB objects	• BRIDGE-MIB • CALISTA-DPA-MIB • CISCO-ACCESS-ENVMON-MIB • CISCO-ADMISSION-POLICY-MIB • CISCO-AUTH-FRAMEWORK-MIB • CISCO-BRIDGE-EXT-MIB • CISCO-BULK-FILE-MIB • CISCO-CABLE-DIAG-MIB • CISCO-CALLHOME-MIB • CISCO-CAR-MIB • CISCO-CDP-MIB • CISCO-CIRCUIT-INTERFACE-MIB • CISCO-CLUSTER-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-PAGP-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-RESILIENT-ETHERNET-PROTOCOL-MIB • CISCO-RTTMON-ICMP-MIB • CISCO-RTTMON-IP-EXT-MIB • CISCO-RTTMON-MIB • CISCO-RTTMON-RTP-MIB	• CISCO-SNMP-TARGET-EXT-MIB • CISCO-STACK-MIB • CISCO-STACKMAKER-MIB • CISCO-STP-EXTENSIONS-MIB • CISCO-SYSLOG-MIB • CISCO-TCP-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 • IP-FORWARD-MIB • IP-MIB • LLDP-EXT-MED-MIB • LLDP-MIB • NETRANGER • NOTIFICATION-LOG-MIB • OLD-CISCO-CHASSIS-MIB • OLD-CISCO-CPU-MIB • OLD-CISCO-FLASH-MIB • OLD-CISCO-INTERFACES-MIB • OLD-CISCO-IP-MIB • OLD-CISCO-MEMORY-MIB • OLD-CISCO-SYS-MIB • OLD-CISCO-SYSTEM-MIB • OLD-CISCO-TCP-MIB • OLD-CISCO-TS-MIB • RMON-MIB • RMON2-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 • TCP-MIB • UDP-MIB

[1] For the complete list of the supported SFP models, refer to the “ESS 2020 Hardware Technical Guide.”

[2] MMF = multimode fiber.

[3] SMF = single-mode fiber.

Warranty Information

Warranty information is available on www.cisco-servicefinder.com/warrantyfinder.aspx.

Service and Support

Cisco is committed to minimizing total cost of ownership (TCO). The company offers a portfolio of technical support services to help make sure that its products operate efficiently, remain highly available, and benefit from the most up-to-date system software. The services and support programs described in Table 7 are available as part of the Cisco Desktop Switching Service and Support solution and are available directly from Cisco and through resellers.

More information on Cisco Service and Support programs can be found at www.cisco.com/go/services.

Table 7. Cisco Services and Support Programs

Service and Support	Features	Benefits
Advanced Services		
• Cisco Total Implementation Solutions (TIS), available direct from Cisco • Cisco Packaged TIS, available through resellers • Cisco SMARTnet® and SMARTnet Onsite support, available direct from Cisco • Cisco Packaged SMARTnet support program, available through resellers • Cisco SMB Support Assistant	• Project management • Site survey, configuration, and deployment • Installation, text, and cutover • Training • Major moves, adds, and changes • Design review and product staging • Access to software updates 24 hours • Web access to technical repositories • Telephone support through the Cisco Technical Assistance Center (TAC) • Advance replacement of hardware parts	• Supplements existing staff • Helps ensure that functions meet needs • Mitigates risk • Helps enable proactive or expedited issue resolution • Lowers TCO by taking advantage of Cisco expertise and knowledge • Minimizes network downtime

For more information about Cisco products, contact:

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- **Australia:** 612 9935 4107
- **Other:** 408 526-7209
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