

DATASHEET



BENEFITS

MODULAR DESIGN FOR COST-EFFECTIVE UPGRADEABILITY

- 3 ports of 40 GbE
- 12 ports of 10 GbE

DUAL PURPOSE FOR PREMIUM ACCESS OR AGGREGATION SWITCH

REDUNDANT, LOAD-SHARING POWER SUPPLIES ENHANCES AVAILABILITY

FULL-POWER POE+/POH BUDGET

MULTIGIGABIT SUPPORT FOR 802.11AC WAVE 2 DEPLOYMENTS

- Up to 8x 2.5 GbE ports

IPSEC VPN SECURITY ENSURES COMPLIANCE AND DATA CONFIDENTIALITY

MARKET-LEADING STACKING SCALABILITY

- Up to 12 switches per stack
- Up to 10 km using standard optics or cables

ADVANCED L3 ROUTING DELIVERS NETWORK DESIGN FLEXIBILITY

- BGP, OSPF, VRRP, PIM, PBR

CAMPUS FABRIC REDUCES COST OF OPERATIONS, INCREASES FLEXIBILITY

- Delivers the benefits of a chassis with the flexibility of distributed stacking
- Scales to over 1800 ports

ENERGY EFFICIENT DESIGN

- Supports IEEE 802.3az standard

ENTERPRISE STACKABLE SWITCH DELIVERS PREMIUM CAPABILITIES AND ULTIMATE FLEXIBILITY

The Brocade® ICX® 7450 switch delivers the performance, flexibility, and scalability required for enterprise Gigabit Ethernet (GbE) access deployment. It offers market-leading stacking density with up to 12 switches (576x 1 GbE and 144x 1/10 GbE ports) per stack and combines chassis-level performance with “pay as you grow” scalability of a stackable solution. The mid-market stackable switch is one of the first in its class to offer 40 GbE uplinks, enabling enterprises to dramatically increase their network capacity while using their existing optical wire infrastructure. In addition, the Brocade ICX 7450 is the industry's first stackable switching solution to leverage the advantages of site-to-site IPsec VPN security to ensure end-to-end data integrity without the need for dedicated encryption appliances.

The modular design of the switch provides three slots for scaling up to 12 1/10 GbE SFP/SFP+ ports, 12 10GBASE-T ports, or up to three 40 GbE QSFP+ ports for uplink or stacking. Organizations can initially deploy 1 GbE or 10 GbE uplink ports and easily upgrade to 40 GbE ports on-demand with a new, high-speed module. As a result, Brocade ICX 7450 delivers high performance across all ports for flawless support of latency-sensitive applications.

System-level high-availability features, such as dual hot-swappable, load-sharing, and redundant power supplies, and hot-swappable fan trays offer another level of availability for the campus wiring closet, all in a 1 RU form factor.

The switch is an ideal network solution for campus network 1 GbE and 2.5 GbE access or small aggregation deployment with 10 GbE or 40 GbE uplinks to the core. The switch is also suitable for a data center Top-of-Rack (ToR) solution, providing a mix of 1 GbE and 10 GbE server connectivity ports with 10 GbE or 40 GbE uplinks to the data center aggregation or core.

Deployed as a standalone switch, a stack, or a network fabric, organizations reap the benefits of a flexible platform and the assurance that their investments are protected.



Figure 1: Up to 12 Brocade ICX 7450 switches can be stacked together using two full-duplex QSFP+ 40 Gbps ports that provide a fully redundant backplane with 960 Gbps of stacking bandwidth.

FULL POWER SUPPORT FOR NEXT-GENERATION EDGE DEVICES

The Brocade ICX 7450 can deliver both power and data across network connections, providing a single-cable solution for the latest edge devices. In addition to supporting the Power over Ethernet (PoE/PoE+) standards, the switch also supports Power over HDBaseT (PoH). This high power standard delivers up to 90 watts per port through a standard Ethernet cable, simplifying the wiring of next-generation Ethernet-connected devices such as large HD displays, video surveillance equipment, and VDI thin terminals. The PoE/PoE+ and PoH capabilities reduce the number of required power receptacles and power adapters while increasing reliability and wiring flexibility. With a 1,500-watt PoE budget per switch (with two power supplies), the Brocade ICX 7450 24- and 48-port PoE models can supply up to Class 4 PoE+ power (30 watts) to every port and PoH power (90 watts) on eight dedicated ports.

MULTIGIGABIT ETHERNET SUPPORT

Designed to handle next-generation 802.11ac Wave 2 wireless access points, the Brocade ICX 7450-32ZP switch offers 8x2.5 GbE ports to connect multi-gigabit wireless access points. Moreover, the switch's non-blocking architecture offers up to 240 Gbps of uplink bandwidth, ensuring smooth end-to-end traffic flow from the wireless edge to the core.

INTEGRATED HIGH-PERFORMANCE IPSEC SERVICE

BROCADE ICX 7450 PRODUCT FAMILY

All Brocade ICX 7450 models offer three modular slots for interchangeable uplink/stacking modules (one in the front, two in the back), dual power supply slots, dual fan trays, one RJ-45 network management port, one mini USB serial management port, and one USB storage port on the front panel.

	Brocade ICX 7450-24 Switch 24x10/100/1000 Mbps RJ-45 ports
	Brocade ICX 7450-24P Switch 24x10/100/1000 Mbps RJ-45 PoE+ ports with eight pre-assigned ports supporting PoH (90 W)
	Brocade ICX 7450-32ZP Switch 24x10/100/1000 Mbps RJ-45 PoE+ ports with eight pre-assigned ports supporting PoH (90 W) and 8x100/1000 Mbps/2.5 GbE RJ-45 PoE+ ports
	Brocade ICX 7450-48 Switch 48x10/100/1000 Mbps RJ-45 ports
	Brocade ICX 7450-48P Switch 48x10/100/1000 Mbps RJ-45 PoE+ ports with eight pre-assigned ports supporting PoH (90 W)
	Brocade ICX 7450-48F Switch 48x100/1000 Mbps SFP ports



Figure 2: Brocade ICX 7450 rear view shown with two optional Ruckus ICX7400-1X40GQ QSFP+ uplink/stacking modules, two AC power supplies, and two fan trays.

Ruckus offers an industry-first stackable switching solution that delivers encryption from the wiring closet, providing a cost-effective way to ensure data security and integrity across the premises without needing to purchase dedicated encryption appliances.

The Brocade ICX 7450 switch with the integrated IPsec VPN service module consolidates network switching and encryption to provide unprecedented VPN deployment flexibility and cost savings. By initiating an IPsec tunnel from the switch for transporting selected traffic, organizations save the time and reduce the costs from having to install and manage encryption software on individual computers or deploy purpose-built encryption appliances.

The Brocade ICX 7450 Service Module provides hardware-based acceleration for IPsec VPNs using Advanced Encryption Standards (AES). It leverages programmable hardware technology to future-proof data protection, enabling more capabilities to be added as business needs evolve. The ICX 7450 also supports redundant service modules on a stack basis, insuring that, in the unlikely event of a service module failure, encryption could continue without interruption using another service module on the same switch or the same stack.

BROCADE ICX 7450 PORT AND SERVICE MODULE OPTIONS

Five different optional modules are offered for the Brocade ICX 7450. These modules are interchangeable and can be inserted in the three modular slots within the Brocade ICX 7450.¹

Ruckus ICX7400-4X1GF Module	4-port 100 Mbps/1 GbE SFP
Ruckus ICX7400-4X10GF Module	4-port 1/10 GbE SFP/SFP+ for uplink or stacking
Ruckus ICX7400-4X10GC Module	4-port 1/10 GbE 10GBASE-T copper
Ruckus ICX7400-1X40GQ Module	1-port 40 GbE QSFP+ for uplink or stacking
Ruckus ICX7400-SERVICE-MOD Module	Service module for IPsec VPN encryption



Figure 3: Five different optional port modules are offered for the Brocade ICX 7450 with a choice of 1 GbE SFP, 10 GbE SFP/SFP+, 10GBASE-T, and 40 GbE QSFP+ options and an IPsec VPN service module.

EEE POWER SAVINGS

The Brocade ICX 7450 Switch supports the IEEE 802.3az standard for Energy Efficient Ethernet (EEE), reducing power consumption during periods of low utilization. Ports are placed into a low power mode when no data is being transmitted.

DATA CENTER TOP-OF-RACK SWITCH

With class-leading 10 GbE and 40 GbE port count, the Brocade ICX 7450 is a great solution as a Top-of-Rack (ToR) switch in a mixed 1 GbE/10 GbE server connectivity environment. It is designed to fit in server racks, consuming only one rack unit and offering dual integrated power supplies and fan assemblies with front-to-back or back-to-front airflow for flexible cooling options. In data center environments where most servers have 1 GbE and some 10 GbE network interfaces, the 1RU switch provides a cost-effective 1 GbE/10 GbE ToR switch. In this configuration some of the 10 GbE or 40 GbE ports can be used to connect to the data center aggregation switches.

¹The Ruckus ICX7400-1X40GQ module cannot be installed in the front-facing slot of the 32-port and 48-port Brocade ICX 7450 models (Brocade ICX 7450-48, 7450-48P, 7450-48F, 7450-32ZP). The Ruckus ICX7400-4X1GF module cannot be installed in the rear slots of any model of the Brocade ICX 7450 Switch and is not supported by the Brocade ICX 7450-32ZP model.

ENTERPRISE-CLASS FEATURES ACROSS ALL RUCKUS ICX SWITCHES

The Ruckus ICX switch family delivers the enterprise class features for flexibility, scalability and simplified management.

- Ruckus Campus Fabric technology delivers unmatched flexibility, scalability and simplified management for campus network deployments. Incorporating all of the ICX 7000 switch families with up to 1800 ports in a single logical domain, Campus Fabric allows customers the benefits of a traditional chassis, with the flexibility of stackable switches at a dramatically reduced Total Cost of Ownership (TCO)
- Advanced stacking goes beyond traditional stacking with capabilities that take flexibility, ease of management and cost effectiveness to the next level, including:
 - Stacking on standard Ethernet ports
 - Long-distance stacking
 - No hardware module required for stacking
 - In Service Software Upgrade (ISSU) to minimize downtime
 - Superior scalability with the industry-leading number of switches per stack
 - Stacking at the access, aggregation and core layers
- Enterprise-Class Availability to improve resiliency and minimize downtime, including:
 - Hitless stack failover
 - Hot-insertion/removal of stack members
 - Redundant power supplies
 - In Service Software Upgrades for switch stacks
- On-boarding and security policies across ICX switches and wireless networks.
- OpenFlow 1.3 protocol support in hybrid mode allows user to deploy traditional Layer 2/3 forwarding with OpenFlow on the same port for Software Defined Network (SDN) enabled programmable control of the network
- Open Standards based management, monitoring and authentication
 - sFlow-based network monitoring to help analyze traffic statistics and trends on every link and overcome unexpected network congestion
 - Open-standards management includes Command Line Interface (CLI), Secure Shell (SSHv2), Secure Copy (SCP), and SNMPv3
 - Support for Access Controller Access Control System (TACACS/TACACS+) and RADIUS authentication helps ensure secure operator access
 - LLDP and LLDP-MED protocol support for configuring, discovering, and managing network infrastructure such as QoS, security policies, VLAN assignments, PoE power levels, and service priorities

BROCADE ICX 7450 FEATURE/MODEL COMPARISON

	24 or 48 RJ-45 Ports		24, 32, or 48 PoE+ Ports			48 SFP Ports
FEATURE	Brocade ICX 7450-24	Brocade ICX 7450-48	Brocade ICX 7450-24P	Brocade ICX 7450-32ZP	Brocade ICX 7450-48P	Brocade ICX 7450-48F
Switching capacity (data rate, full duplex)	288 Gbps	336 Gbps	288 Gbps	328 Gbps	336 Gbps	336 Gbps
Forwarding capacity (data rate, full duplex)	214 Mpps	250 Mpps	214 Mpps	244 Mpps	250 Mpps	250 Mpps
Fixed ports: 10/100/1000 Mbps RJ45	24	48	24	24	48	
Fixed ports: 100/1000 Mbps SFP						48
Fixed ports: 100 Mbps/1000 Mbps/ 2.5 Gbps RJ45				8		
Modular slots	3	3	3	3	3	3
Modular ports: 1 Gbps SFP (max.)	4	4	4		4	4
Modular ports: 1/10 GbE SFP/ SFP+ (max.)	12	12	12	12	12	12
Modular ports: 1/10GBASE-T RJ45 (max.)	12	12	12	12	12	12
Modular ports: 40 GbE QSFP+ (max.)	3	2	3	2	2	2
Modular service: IPsec VPN	With module	With module	With module	With module	With module	With module
Maximum PoE class 3 ports (15.4 W per port)			24 (1 AC PSU)	32 (1 AC PSU)	48 (1 AC PSU)	
Maximum PoE+ ports (30 W per port)			24 (1 AC PSU)	32 (2 AC PSU)	48 (2 AC PSU)	
Maximum PoH ports (90 W per port)			8 (1 AC PSU)	8 (1 AC PSU)	8 (1 AC PSU)	
Base IPv4/v6 Layer 3 routing (static routing)	•	•	•	•	•	•
Advanced IPv4/v6 Layer 3 routing (OSPF, BGP, VRRP, PIM, PBR, VRF)	With license	With license	With license	With license	With license	With license
Aggregated stacking bandwidth	960 Gbps	960 Gbps	960 Gbps	960 Gbps	960 Gbps	960 Gbps
Stacking density (maximum switches in a stack)	12	12	12	12	12	12
Stacking ports (maximum ports ² usable for stacking)	Up to 4×10 GbE SFP+ or 2×40 GbE QSFP+					
Maximum stacking distance (distance between stacked switches)	10 km	10 km	10 km	10 km	10 km	10 km

² 10 GbE SFP+ or 40 GbE QSFP+ modules are required for stacking.

BROCADE ICX 7450 FEATURE/MODEL COMPARISON

	24 or 48 RJ-45 Ports		24, 32, or 48 PoE+ Ports			48 SFP Ports
	Brocade ICX 7450-24	Brocade ICX 7450-48	Brocade ICX 7450-24P	Brocade ICX 7450-32ZP	Brocade ICX 7450-48P	Brocade ICX 7450-48F
FEATURE	POWER					
Power inlet (AC)	C14					
Input voltage/frequency	AC: 100 to 240 VAC @ 50 to 60 Hz DC: 40 to 60 VDC					
Maximum current draw (at 100 VAC, one power supply)	13.3 Amp	13.3 Amp	12.5 Amp	12.5 Amp	12.5 Amp	13.3 Amp
Power supply rated maximum output (AC)	2×250 W	2×250 W	2×1,000 W	2×1,000 W	2×1,000 W	2×250 W
Power supply rated maximum output (DC)	2×510 W	2×510 W	2×510 W	2×510 W	2×510 W	2×510 W
PoE power budget (AC) (two AC power supplies)			1,500 W	1,500 W	1,500 W	
PoE power budget (DC) (two DC power supplies)			516 W	516 W	516 W	
Switch power consumption ³ (25°C)	63 W	93 W	75 W	90 W	106 W	119 W
Idle (no PoE load)	64 W	95 W	911 W	922 W	930 W	120 W
10% traffic ⁴ (full PoE load)	69 W	100 W	916 W	930 W	935 W	123 W
100% traffic ⁴ (full PoE load)						
Airflow	Reversible, front-to-back, or back-to-front (depending on power supplies and fans installed)					
Switch heat dissipation ^{3,5} (25°C)	215 BTU/hour	317 BTU/hour	256 BTU/hour	307 BTU/hour	362 BTU/hour	406 BTU/hour
Idle (no PoE load)	218 BTU/hour	324 BTU/hour	259 BTU/hour	314 BTU/hour	369 BTU/hour	409 BTU/hour
10% traffic ⁴ (full PoE load)	235 BTU/hour	341 BTU/hour	276 BTU/hour	330 BTU/hour	386 BTU/hour	420 BTU/hour
100% traffic ⁴ (full PoE load)						
FEATURE	ENVIRONMENT					
Weight ³	6.4 kg (14.11 lb)	6.5 kg (14.33 lb)	6.9 kg (15.21 lb)	7.2 kg (15.87 lb)	7.2 kg (15.87 lb)	6.8 kg (14.99 lb)
Dimensions	440 mm (17.323 in.) W × 393.7 mm (15.5 in.) D × 43.7 mm (1.720 in.) H; 1U					
Acoustics ³ (25°C, ISO 7779)	46 dBA	47 dBA	49 dBA	49 dBA	49 dBA	46 dBA
MTBF ³ (25°C)	628,369 hours	571,520 hours	466,576 hours	448,376 hours	444,360 hours	576,586 hours

³ Switch includes one AC power supply, one fan, one 4×10 GbE SFP+ uplink module, two QSFP+ stacking modules.

⁴ Traffic load on all ports connected with maximum possible PoE/PoE+ loads (if equipped).

⁵ PoE power not included in switch heat dissipation figures since the heat is not dissipated at the switch.

BROCADE ICX 7450 SPECIFICATIONS

FEATURES	CAPABILITIES
Connector options	<ul style="list-style-type: none"> • 10/100/1000 Mbps, 2.5 Gbps, 10 Gbps 10GBASE-T ports: RJ-45 • 100 Mbps SFP ports • 1 Gbps SFP ports • 10 Gbps SFP+ ports • 40 Gbps QSFP+ ports • Out-of-band Ethernet management: 10/100/1000 Mbps RJ-45 • Console management: Mini-USB RS232 serial port (Mini-B plug) • File Transfer: USB port, standard-A plug • For the latest information about supported optics, please visit www.ruckuswireless.com/optics.
DRAM	• 2 GB
NVRAM (flash)	• 2 GB
Packet Buffer Size	• 24 port: 4 MB, 48 port: 8 MB
Maximum MAC addresses	• 32,768
Maximum VLANs	• 4,096
Maximum PVLANS	• 32
Maximum STP (spanning trees)	• 254
Maximum VEs	• 255
Maximum routes (in hardware)	<ul style="list-style-type: none"> • 15,168 (IPv4) • 5,120 (IPv6) • 16,000 (Next Hop Addresses)
Trunking	<ul style="list-style-type: none"> • Maximum ports per trunk: 16 • Maximum trunk groups: 256
Maximum jumbo frame size	• 9,216 bytes
Average latency	• 1.3 μ s
QoS priority queues	• 8 per port
IPsec performance	<ul style="list-style-type: none"> • Maximum throughput: 10 Gbps, full-duplex • Maximum tunnels: 100 (IPv4 and IPv6)
Multicast Groups	<ul style="list-style-type: none"> • 8192 (Layer 2) • 8192 (Layer 3)
VRF	• 32

BROCADE ICX 7450 SPECIFICATIONS

FEATURES	FEATURE SETS	
Layer 2 switching	<ul style="list-style-type: none"> 802.1s Multiple Spanning Tree 802.1x Authentication Auto MDI/MDIX BPDU Guard, Root Guard Dual-Mode VLANs MAC-based VLANs, Dynamic MAC-based VLAN activation Dynamic Voice VLAN Assignment Dynamic VLAN Assignment Fast Port Span GVRP: GARP VLAN Registration Protocol IGMP Snooping (v1/v2/v3) IGMP Proxy for Static Groups IGMP v2/v3 Fast Leave Inter-Packet Gap (IPG) adjustment Link Fault Signaling (LFS) MAC Address Filtering 	<ul style="list-style-type: none"> MAC Learning Disable MLD Snooping (v1/v2) Multi-device Authentication Per-VLAN Spanning Tree (PVST/PVST+/PVRST) Mirroring - Port-based, ACL-based, MAC Filter-based, and VLAN-based PIM-SM v2 Snooping Port Loop Detection Private VLAN Remote Fault Notification (RFN) Single-instance Spanning Tree Trunk Groups (static, LACP) Uni-Directional Link Detection (UDLD) Metro-Ring Protocol (MRP) (v1, v2) Virtual Switch Redundancy Protocol (VSRP) Q-in-Q and selective Q-in-Q Topology Groups
Base Layer 3 IP routing	<ul style="list-style-type: none"> IPv4 and IPv6 static routes ECMP Port-based Access Control Lists Layer 3/Layer 4 ACLs Host routes 	<ul style="list-style-type: none"> Virtual Interfaces Routed Interfaces Route-only Support Routing Between Directly Connected Subnets
Premium Layer 3 IP routing (with software license)	<ul style="list-style-type: none"> IPv4 and IPv6 dynamic routes OSPF v2, OSPF v3 (IPv6) PIM-SM, PIM-SSM, PIM-DM, PIM passive (IPv4/IPv6 multicast routing functionality) PBR Virtual Route Redundancy Protocol VRRP v3 (IPv6) VRRP-E (IPv4, IPv6) 	<ul style="list-style-type: none"> BGP4, BGP4+ (IPv6) GRE IPv6 over IPv4 tunnels VRF (IPv4 and IPv6) MSDP RIP v1/v2, RIPng
Quality of Service (QoS)	<ul style="list-style-type: none"> ACL Mapping and Marking of ToS/DSCP (CoS) ACL Mapping and Marking of 802.1p ACL Mapping to Priority Queue Classifying and Limiting Flows Based on TCP Flags DiffServ Support Honoring DSCP and 802.1p (CoS) 	<ul style="list-style-type: none"> MAC Address Mapping to Priority Queue Priority Queue Management using Weighted Round Robin (WRR), Strict Priority (SP), and a combination of WRR and SP Priority Flow Control
Traffic management	<ul style="list-style-type: none"> ACL-based inbound rate limiting and traffic policies Broadcast, multicast, and unknown unicast rate limiting 	<ul style="list-style-type: none"> Inbound rate limiting per port Outbound rate limiting per port and per queue

BROCADE ICX 7450 SPECIFICATIONS

Security	<ul style="list-style-type: none"> • IPsec 128/256 AES-GCM (with service module) • MACsec • 802.1X Authentication • MAC Authentication • Flexible authentication • Web authentication • DHCP snooping • Dynamic ARP inspection • Neighbor Discovery (ND) Inspection • Bi-level Access Mode (Standard- and EXEC-level) • EAP pass-through support • IEEE 802.1X username export in sFlow • Protection against Denial of Service (DoS) attacks • Authentication, Authorization, and Accounting (AAA) • MAC Address Locking MAC Port Security • Advanced Encryption Standard (AES) with SSHv2 • RADIUS/TACACS/TACACS+ • Secure Copy (SCP) • Secure Shell (SSHv2) 	<ul style="list-style-type: none"> • Local Username/Password • Change of Authorization (CoA) RFC 5176 • RFC Conformance for Encryption: • RFC 5996 Internet Key Exchange Protocol Version 2 (IKEv2) • RFC 4303 IP Encapsulating Security Payload (ESP) • RFC 6379 Suite B Cryptographic Suites for IPsec (Suite-B-GCM-256 and Suite-B-GCM-128) • RFC 5903 Elliptic Curve Groups Modulo a Prime (ECP Groups) for IKEv2 • RFC 4868 Using HMAC-SHA-256, HMAC-SHA-384, and HMAC-SHA-512 with IPsec • RFC 4754 IKEv2 Authentication Using the Elliptic Curve Digital Signature Algorithm (ECDSA) • RFC 4106 The use of Galois/Counter Mode (GCM) in IPsec Encapsulating Security Payload (ESP)SP800-56A Recommendation for Pair-Wise Key Establishment Schemes Using Discrete Logarithm Cryptography • Encrypted Syslog (RFC 5425) • RADSEC (RFC 6614)
SDN features	<ul style="list-style-type: none"> • OpenFlow v1.0 and v1.3 • OpenFlow with hybrid port mode 	<ul style="list-style-type: none"> • Operates with OpenDaylight SDN Controllers and the applications running on the controller
IEEE standards compliance	<ul style="list-style-type: none"> • 802.1AB LLDP • 802.1D MAC Bridging • 802.1p Mapping to Priority Queue • 802.1s Multiple Spanning Tree (MST) • 802.1w Rapid Reconfiguration of Spanning Tree • 802.1x Port-based Network Access Control (PNAC) • 802.3 Carrier Sense Multiple Access/Collision Detection (CSMA/CD) • 802.3ab 1000BASE-T • 802.1 AX-2008 Link Aggregation • 802.3ae 10 Gigabit Ethernet 	<ul style="list-style-type: none"> • 802.3af Power over Ethernet • 802.3at Power over Ethernet Plus • 802.3u 100Base-TX • 802.3x Full duplex and Flow Control • 802.3z 1000Base-SX/LX • 802.3 MAU MIB (RFC 2239) • 802.3ba 40 and 100 Gbps Ethernet • 802.1AE-MACsec (with license) • 802.3az Energy Efficient Ethernet • 802.1Q VLAN Tagging • 802.1BR Bridge Port Extension
IETF RFC standards compliance	<p>For a complete list of RFCs supported by the Ruckus FastIron® software platform, please consult the “FastIron Features and Standards Support Matrix” document available from support.ruckuswireless.com.</p>	
High availability	<ul style="list-style-type: none"> • Redundant hot-swappable power supplies • Hot-swappable fan trays • Layer 3 VRRP/VRRP-E protocol redundancy • Real-time state synchronization across the stack 	<ul style="list-style-type: none"> • Hitless failover and switchover from master to standby stack controller • Hot insertion and removal of stacked units • Layer 2 VSRP switch redundancy • In Service Software Update (ISSU)

BROCADE ICX 7450 SPECIFICATIONS

FEATURES	NETWORK AND DEVICE MANAGEMENT	
Management	<ul style="list-style-type: none"> • DHCP Auto Configuration • Configuration Logging • Digital Optical Monitoring • Display Log Messages on Multiple Terminals • Embedded Web Management (HTTP/HTTPS) • Embedded DHCP Server • Industry-standard Command Line Interface (CLI) • Brocade Network Advisor (sold separately) • Key-based activation of optional software features • USB file management and storage • Macro for batch execution • Out-of-band Ethernet Management • ERSPAN support for remote traffic monitoring • TFTP • TELNET Client and Server • Bootp 	<ul style="list-style-type: none"> • SNMPv1/v2c • DHCP Server and DHCP Relay • SNMPv3 Intro to Framework • Architecture for Describing SNMP Framework • SNMP Message Processing and Dispatching • SNMPv3 Applications • SNMPv3 User-based Security Model • SNMP View-based Access Control Model SNMP • sFlow • NTP Network Time Protocol • Multiple Syslog Servers • SCP • Virtual Cable Tester (VCT) • For Management MIB, please consult the “FastIron MIB Reference” document available from support.ruckuswireless.com.

FEATURES	ENVIRONMENT
Temperature	Operating temperature: -5°C to 50°C/23°F to 122°F Storage temperature: -40°C to 70°C/-40°F to 158°F
Humidity	Operating relative humidity: 10% to 90% at 50°C, non-condensing Non-operating relative humidity: 5% to 95% at 70°C, non-condensing
Altitude	Operating altitude: 10,000 ft. (3,000 m) maximum Storage altitude: 39,000 ft. (12,000 m) maximum

FEATURES	COMPLIANCE/CERTIFICATION
Electromagnetic emissions	FCC Class A (Part 15); EN 55022/CISPR-22 Class A; VCCI Class A; ICES-003 Electromagnetic Emission; AS/NZS 55022; EN 61000-3-2 Power Line Harmonics; EN 61000-3-3 Voltage Fluctuation and Flicker EN 61000-6-3 Emission Standard
Safety	CAN/CSA-C22.2 NO. 60950-1-07; UL 60950-1; IEC60950-1; EN 60950-1:2006 Safety of Information Technology Equipment; EN 60825-1 Safety of Laser Products
Immunity	EN 61000-6-1 Generic Immunity and Susceptibility; EN 55024 Immunity Characteristics; EN 61000-4-3 Radiated, Radio Frequency, Electromagnetic Field; EN 61000-4-4 Electrical Fast Transient; EN 61000-4-5 Surge; EN 61000-4-6 Conducted Disturbances Induced by Radio-Frequency Fields; EN 61000-4-8 Power Frequency Magnetic Field; EN 61000-4-11 Voltage Dips and Sags
Environmental regulatory compliance	RoHS-compliant (6 of 6); WEEE-compliant
Vibration	IEC 68-2-36, IEC 68-2-6
Shock and drop	IEC 68-2-27, IEC 68-2-32

BROCADE ICX 7450 ORDERING INFORMATION

PART NUMBER	SWITCH BUNDLES
ICX7450-24-E	24-port 1 GbE switch bundle includes 4×10 GbE SFP+ uplinks/stacking, 2×40 GbE QSFP+ uplinks/stacking, 1×250 W AC power supply and one fan, front-to-back airflow.
ICX7450-24-40G-E	24-port 1 GbE switch bundle includes 3×40 GbE QSFP+ uplinks/stacking, 1×250 W AC power supply and one fan, front-to-back airflow.
ICX7450-24P-E	24-port 1 GbE switch PoE+ bundle includes 4×10 GbE SFP+ uplinks/stacking, 2×40 GbE QSFP+ uplinks/stacking, 1×1,000 W AC power supply and one fan, front-to-back airflow.
ICX7450-24P-40G-E	24-port 1 GbE switch PoE+ bundle includes 3×40 GbE QSFP+ uplinks/stacking, 1×1,000 W AC power supply and one fan, front-to-back airflow.
ICX7450-24P-E-RMT3	24-port 1 GbE switch PoE+ bundle includes 4×10 GbE SFP+ uplinks/stacking, 2×40 GbE QSFP+ uplinks/stacking, 1×1,000 W AC power supply and one fan, front-to-back airflow, three years 24×7 remote support.
ICX7450-32ZP-E	24-port 1 GbE and 8-port 2.5 GbE switch PoE+ bundle includes 4×10 GbE SFP+ uplinks/stacking, 2×40 GbE QSFP+ uplinks/stacking, 1×1,000 W AC power supply, and one front-to-back airflow fan.
ICX7450-48-E	48-port 1 GbE switch bundle includes 4×10 GbE SFP+ uplinks/stacking, 2×40 GbE QSFP+ uplinks/stacking, 1×250 W AC power supply and one fan, front-to-back airflow.
ICX7450-48P-E	48-port 1 GbE switch PoE+ bundle includes 4×10 GbE SFP+ uplinks/stacking, 2×40 GbE QSFP+ uplinks/stacking, 1×1,000 W AC power supply and one fan, front-to-back airflow.
ICX7450-48P-E-RMT3	48-port 1 GbE switch PoE+ bundle includes 4×10 GbE SFP+ uplinks/stacking, 2×40 GbE QSFP+ uplinks/stacking, 1×1,000 W AC power supply and one fan, front-to-back airflow, three years 24×7 remote support.
ICX7450-48P-STK-E	48-port 1 GbE switch PoE+ bundle includes 2×40 GbE QSFP+ uplinks/stacking, 1×1,000 W AC power supply and one fan, front-to-back airflow (stack member with no uplink module).
ICX7450-48P-STK-E-RMT3	48-port 1 GbE switch PoE+ bundle includes 2×40 GbE QSFP+ uplinks/stacking, 1×1,000 W AC power supply and one fan, front-to-back airflow, three years 24×7 remote support (stack member with no uplink module).
ICX7450-48F-E	48-port 1 GbE SFP fiber switch bundle includes 4×10 GbE SFP+ uplinks/stacking, 2×40 GbE QSFP+ uplinks/stacking, 1×250 W AC power supply and one fan, front-to-back airflow.
ICX7450-48F-E-RMT3	48-port 1 GbE SFP fiber switch bundle includes 4×10 GbE SFP+ uplinks/stacking, 2×40 GbE QSFP+ uplinks/stacking, 1×250 W AC power supply and one fan, front-to-back airflow, three years 24×7 remote support.

PART NUMBER	BARE SWITCHES
ICX7450-24	24-port 1 GbE switch with three modular slots for optional uplink/stacking ports. Power supplies, fans, and modules need to be ordered separately.
ICX7450-24P	24-port 1 GbE switch PoE+ with three modular slots for optional uplink/stacking ports. Power supplies, fans, and modules need to be ordered separately.
ICX7450-32ZP	24-port 1 GbE and 8-port 2.5 GbE switch PoE+ with three modular slots for optional uplink/stacking ports. Power supplies, fans, and modules need to be ordered separately.
ICX7450-48	48-port 1 GbE switch with three modular slots for optional uplink/stacking ports. Power supplies, fans, and modules need to be ordered separately.
ICX7450-48P	48-port 1 GbE switch PoE+ with three modular slots for optional uplink/stacking ports. Power supplies, fans, and modules need to be ordered separately.
ICX7450-48F	48-port 1 GbE switch SFP with three modular slots for optional uplink/stacking ports. Power supplies, fans, and modules need to be ordered separately.
ICX7400-4X1GF	Brocade ICX 7450 4-port 100 Mbps/1 GbE SFP module.
ICX7400-4X10GF	Brocade ICX 7450 4-port 1/10 GbE SFP/SFP+ module (for stacking or uplinks).
ICX7400-4X10GC	Brocade ICX 7450 4-port 1/10 GbE 10GBASE-T copper module.
ICX7400-1X40GQ	Brocade ICX 7450 1-port 40 GbE QSFP+ module (for stacking or uplink).
ICX7400-SERVICE-MOD	Brocade ICX 7450 Service Module for IPsec VPN encryption.

BROCADE ICX 7450 ORDERING INFORMATION

PART NUMBER	POWER SUPPLIES AND FANS
RPS15-E	Brocade ICX 7450/6610 non-PoE 250 W AC power supply with front-to-back airflow.
RPS15-I	Brocade ICX 7450/6610 non-PoE 250 W AC power supply with back-to-front airflow.
RPS16-E	Brocade ICX 7450/6610 PoE 1,000 W AC power supply with front-to-back airflow.
RPS16-I	Brocade ICX 7450/6610 PoE 1,000 W AC power supply with back-to-front airflow.
RPS16DC-E	Brocade ICX 7450/6610 PoE 510 W DC power supply with front-to-back airflow.
RPS16DC-I	Brocade ICX 7450/6610 PoE 510 W DC power supply with back-to-front airflow.
ICX-FAN10-E	Brocade ICX 7450 front-to-back airflow fan.
ICX-FAN10-I	Brocade ICX 7450 back-to-front airflow fan.

PART NUMBER	FEATURE LICENSE AND ACCESSORIES
ICX7450-PREM-LIC	Brocade ICX 7450 Layer 3 Premium Software License.
ICX-MACSEC-LIC	License to enable MACsec encryption.
ICX7000-RMK	FRU, rack mount kit, two post, Ruckus ICX 7750/7450.
XBR-R000295	FRU, rack mount kit, four post, 24 in. to 32 in. depth rack.
BR-NTWADV-IP-BASE	Brocade Network Advisor IP management software license for up to 50 devices; required for initial purchase of IP only management; minimum of one year of support required.

PART NUMBER	OPTICS
E1MG-100FX-OM	100BASE-FX SFP optic MMF, LC connector, optical monitoring-capable.
E1MG-100FX-A	100BASE-FX SFP optic MMF, LC connector, optical monitoring-capable, TAA-compliant.
E1MG-100FX-IR-OM	100BASEFX-IR SFP optic for SMF with LC connector, optical monitoring-capable. For distances up to 15 km.
E1MG-100FX-LR-OM	100BASEFX-LR SFP optic for SMF with LC connector, optical monitoring-capable. For distances up to 40 km.
E1MG-BXD	1000BASE-BXD SFP optic, SMF, 1,490 nm, LC connector. This optic can be connected only to an E1MG-BXU at the far end.
E1MG-BXU	1000BASE-BXU SFP optic, SMF, 1,310 nm, LC connector. This optic can be connected only to an E1MG-BXD at the far end.
E1MG-LX-A	1000BASE-LX SFP optic SMF, LC connector, optical monitoring-capable. For distances up to 10 km, TAA-compliant.
E1MG-LHA-OM-T	1000BASE-LHA SFP optic, MMF, LC connector, optical monitoring-capable (70 km), industrial temperature.
E1MG-LX-OM	1000BASE-LX SFP optic SMF, LC connector, optical monitoring-capable. For distances up to 10 km.
E1MG-SX-A	1000Base-SX SFP optic, MMF, LC connector, optical monitoring-capable, TAA-compliant.
E1MG-SX-OM	1000BASE-SX SFP optic, MMF, LC connector, optical monitoring-capable.
E1MG-TX	1000BASE-T SFP copper, RJ-45 connector.
E1MG-TX-A	1000BASE-TX SFP Copper, RJ-45 Connector, TAA-compliant.
10G-SFPP-USR	10 GbE Ultra-Short Reach (USR), SFP+ optic (LC), target range 100 m over MMF.
10G-SFPP-USR-SA	10 GbE Ultra-Short Reach (USR), SFP+ optic (LC), target range 100 m over MMF, standard temperature, TAA compliant.
10G-SFPP-SR	10GBASE-SR, SFP+ optic (LC), for up to 300 m over MMF.
10G-SFPP-SR-SA	10GBASE-SR, SFP+ optic (LC), for up to 300 m over MMF, standard temperature, TAA-compliant.
10G-SFPP-SR-S	10GBASE-SR, SFP+ optic (LC), for up to 300 m over MMF, standard temperature.
10G-SFPP-LR	10G-SFPP-LR 10GBASE-LR, SFP+ optic (LC), for up to 10 km over SMF.
10G-SFPP-LR-SA	10GBASE-LR, SFP+ optic (LC), for up to 10 km over SMF, standard temperature, TAA-compliant.
10G-SFPP-LR-S	10GBASE-LR, SFP+ optic (LC), for up to 10 km over SMF, standard temperature.

BROCADE ICX 7450 ORDERING INFORMATION

10G-SFPP-ER	10GBASE-ER, SFP+ optic (LC), for up to 40 km over SMF.
10G-SFPP-ZR	10GBASE-ZR, SFP+ optic (LC), for up to 80 km over SMF.
10G-SFPP-LRM	10GBASE-LRM, SFP+ optic (LC), 220 m over OM1/OM2/OM3 MMF.
10G-SFP-BXD-S	10GBASE-LR, Bidirectional Downstream SFP+ optic (LC), for up to 10 km over SMF, STD Temp.
10G-SFP-BXU-S	10GBASE-LR, Bidirectional Upstream SFP+ for up to 10 km over SMF LC connector, STD Temp.
40G-QSFP-SR-BIDI	40GE SR QSFP+ optic (LC), bidirectional, 100 m over OM3 MMF.
40G-QSFP-SR4	40GBASE-SR4 QSFP+ optic (MTP 1×8 or 1×12), 100 m over MMF OM3. 150 m over MMF OM4 (not compliant with 10GBASESR4 modules per IEEE 802.ae standard).
40G-QSFP-ESR4	40GBASE-ESR4 QSFP+ optic (MTP 1×8 or 1×12), 300 m over MMF, (10GBASE-SR compatible, breakout).
40G-QSFP-SR4-INT	40GBASE-SR4 QSFP+ optic (MTP 1×8 or 1×12), 100 m over MMF (10GBASE-SR compatible, breakout-capable).
40G-QSFP-LM4	40GBASE-LM4 QSFP+ optic (LC), for up to 160 m over MMF and 2 km over SMF, 1-pack.
40G-QSFP-LR4	40GBASE-LR4 QSFP+ optic (LC), for up to 10 km over SMF.

PART NUMBER	DIRECT-ATTACHED CABLES
1G-SFP-C-0101	1 GbE SFP direct-attached copper cable, 1 m, 1-pack.
1G-SFP-C-0501	1 GbE SFP direct-attached copper cable, 5 m, 1-pack.
10G-SFPP-TWX-0101	10 GbE SFP+ direct-attached active copper cable, 1 m, 1-pack.
10G-SFPP-TWX-0301	10 GbE SFP+ direct-attached active copper cable, 3 m, 1-pack.
10G-SFPP-TWX-0501	10 GbE SFP+ direct-attached active copper cable, 5 m, 1-pack.
10G-SFPP-TWX-P-0101	10 GbE SFP+ direct-attached passive copper cable, 1 m, 1-pack.
10G-SFPP-TWX-P-0301	10 GbE SFP+ direct-attached passive copper cable, 3 m, 1-pack.
10G-SFPP-TWX-P-0501	10 GbE SFP+ direct-attached passive copper cable, 5 m, 1-pack.
10GE-SFPP-AOC-0701	10 GbE SFP+ Direct-attached active optic cable, 7 m, 1-pack.
10GE-SFPP-AOC-1001	10 GbE SFP+ Direct-attached active optic cable, 10 m, 1-pack.
40G-QSFP-C-00501	40 GbE direct-attached QSFP+ to QSFP+ Passive copper cable, 0.5 m, 1-pack.
40G-QSFP-C-0101	40 GbE direct-attached QSFP+ to QSFP+ Passive copper cable, 1 m, 1-pack.
40G-QSFP-QSFP-C-0101	40 GbE direct-attached QSFP+ to QSFP+ Active copper cable, 1 m, 1-pack.
40G-QSFP-QSFP-C-0301	40 GbE direct-attached QSFP+ to QSFP+ Active copper cable, 3 m, 1-pack.
40G-QSFP-QSFP-C-0501	40 GbE direct-attached QSFP+ to QSFP+ Active copper cable, 5 m, 1-pack.
40G-QSFP-QSFP-AOC-1001	40 GbE direct-attached QSFP+ to QSFP+ Active copper cable , 10 m, 1-pack.

For the latest information about supported optics and cables, please visit www.ruckuswireless.com/optics.

ORDERING NOTES

Customers have two options when ordering a Brocade ICX 7450 Switch. They can select one of the six pre-built units from the “Switch Bundles” section, or they can build their own custom unit by selecting a “Bare Switch” and adding their choice of power supplies, fans, port modules, and the IPsec VPN service module.

Pre-built units ordered from the “Switch Bundles” section include a power cord, two-post rack mounting brackets, and a USB serial console cable. Units ordered from the “Bare Switches” section include two-post rack mounting brackets and a USB serial console cable. AC power supplies ordered separately include a power cord. Stacking cables must be ordered separately.

WARRANTY

Brocade ICX 7450 Switches are covered by the Ruckus Assurance Limited Lifetime Warranty. For details, visit www.ruckuswireless.com/warranty.

BEST-IN-CLASS SUPPORT

Brocade ICX 7450 switches come with 90 days of free technical support from the Ruckus Technical Assistance Center (TAC). For continued access to the TAC past the initial 90 days, customers must purchase a Ruckus Technical Support contract. For details, visit support.ruckuswireless.com/programs.

LEGAL DISCLAIMER

Product features, functionality and specifications may change or be discontinued without notice. Nothing in this document shall be deemed to create a warranty of any kind, either express or implied, statutory or otherwise, including but not limited to, any implied warranties of merchantability, fitness for a particular purpose, non-infringement of third-party rights or availability with respect to any products and services.

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