# The Ribbon Communications SBC 2000™

Communications devices are growing smaller and smarter, so Ribbon Communications designed a Session Border Controller (SBC) that was smaller and smarter, too. The SBC 2000 Session Border Controller is an advanced SBC independently verified for performance, delivering robust security features and interoperability between disparate networks. The SBC 2000 configurations are designed for ease of deployment and growth. Both session and port expansion can be remotely enabled via a simple license, eliminating the need for a truck-roll and an on-site technician. The Ribbon SBC 2000 also features a wide range of I/O and call capacities as well as built-in survivability for Microsoft® Skype® for Business, Yealink®, Polycom®, BroadSoft™, and other SIP/TDM/FXx clients, so calls go through even if the wide area network (WAN) goes down. The SBC 2000 is certified for Direct Routing with Microsoft Teams.

## System Capabilities

**Sessions**
- Maximum number of total concurrent calls: 600
- Maximum number of TDM-to-SIP calls: 480
- Maximum number of SIP-to-SIP calls: 600
- Maximum number of transcoded sessions (based upon codec type): 600
- Maximum number of total concurrent calls associated with Survivable Branch Appliance (SBA): 240

**Call Set-Up**
- Maximum call set-up rate: 4 cps

**Registrations**
- Maximum number of registered users: 1,000

**Encryption**
- Maximum number of TLS sessions: 600
- Maximum number of SRTP sessions: 600

**Business Continuity**
- PSTN fallback when WAN is down
- Site survivability for SIP clients (including Yealink® Teams and Polycom® UC phones and conference bridges) through a built-in SIP registrar
- Skype for Business Survivable Branch Appliance (SBA)
- Resilient Branch Appliance (RBA) for Lync survivability over 3G/4G
- Local survivability with BroadWorks
- Multiple SIP trunking service provider support for redundancy
- ITSP E911 Support
- 911 Call Preemption
- Rapid Ethernet Port Fail-over, to maintain in-progress calls in the event of an Ethernet port or switch problem
- Multiple Spanning Tree Protocol, to prevent routing loops
- Microsoft® Office 365® Phone System E911 support; SIP PIDF-LO pass through and ELIN Gateway

## Management Capabilities

**Operations, Administration and Management**
- Single, secure, web-based GUI with real-time monitoring

- 3 step Configuration Wizard, for quick provisioning between:
    - SIP trunks ↔ SIP phones, ISDN-based PBXs, and SIP-based PBXs such as the Avaya® Aura® Communication Manager and the Cisco® Unified Communications Manager
    - Microsoft Skype for Business ↔ SIP trunks, ISDN trunks, or FXO ports
    - Microsoft Teams Direct Routing ↔ SIP Trunks, ISDN trunks, or SIP-based PBXs
- REST-based programmatic interface to remotely manage multiple SBC 2000s
- SNMP v2c/v3 for comprehensive network management using third-party management systems
- Configuration backup and restore; Configuration upload from one site to another; Partial configuration import/export through REST
- CDR Reporting
- Syslogs and local logging for troubleshooting, with support for free Ribbon LX syslog server and log parser tool
- Historical Stats and TCAs

**Authentication**
- Local user (User name/password)
- Active Directory®
- RADIUS

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## Media Services

- G.711, G.722, G.722.2 (AMR-WB), G.723.1, G.726 (32 kbps), G.729A/B (8 kbps), T.38, SILK-NB/WB
- Transcoding
- Video
- T.38 with CNG tone detection
- DTMF/RFC4733; Inband DTMF; SIP INFO/RFC-2833
- Voice Activity Detection (VAD)
- G.168 Echo Cancellation with standard 128 ms tail length
- Comfort noise generation and packet loss concealment
- Automatic call type detection — voice, fax or modem
- Music on-hold
- Call progress tones — ringback, busy, re-order
- RTP inactivity monitoring (dead call detection)
- RTP pass-through and media bypass
- RTCP/RTCP-XR
- Caller ID support

## Signaling

- Maximum number of signaling groups: 100
- TDM Signaling (ISDN): AT&T 4ESS/5ESS, Nortel DMS-100, Euro ISDN (ETSI 300-102), QSIG, NTT InsNet (Japan), ANSI National ISDN-2 (NI-2)
- TDM Signaling (CAS): T1 CAS (E&M, Loop start); E1 CAS (R2)
- Back-to-Back User Agent (B2BUA)
- SIP (UDP/TCP/TLS) ↔ SIP (UDP/TCP/TLS)
- SIP (UDP/TCP/TLS) ↔ CAS/PRI/FXS
- CAS/PRI/FXS ↔ CAS/PRI/FXS
- SIP Message Manipulation (SMM)

## Protocol Support

- SNMPv2c, SNMPv3
- HTTPS
- RIPv2, OSPF as dynamic IP routing protocols
- SIP (RFC 3261) over UDP, TCP, TLS
- RTP/RTCP (RFC 3550, 3551)
- RTP/RTCP multiplexing over single UDP port (RFC 5761)
- IPv4, IPv6, and IPv4/IPv6 interworking
- DNS
- DHCP server
- DHCP client
- Asynchronous DNS for SIP
- NAT
- Support for Reason Header

## Routing/Policy

- Interactive Connectivity Establishment (ICE), RFC 8445
- Full implementation support, including connectivity check generation
- Lite support, for public Internet ICE agents
- Maximum number of call route entries: 15,000
- Azure® and on-premises Active Directory®/LDAP-based call routing
- Routing based on quality metrics
- Least cost routing
- Time of Day routing
- Event-based action set
- On-board call forking (up to eight end points)

- Supplementary services
  - Call hold
  - Call transfer (blind & assisted)
  - Call forward
- Embedded policy/routing engine
- Optional centralized policy/routing via Ribbon Centralized Policy Server (PSX Server) using SIP
- Screening, blocking, routing, presentation, call type filters
- Route prioritization
- Leading digit routing; International routing;  URI-based routing
- Digit manipulation (name/number manipulation using regular expression and Active Directory lookup)
- SIP routing
  - Based on source and destination IP address
  - Fully Qualified Domain Name (FQDN)
- Detect proxy failure and route to alternate paths
- Re-route on failure based on full Cause Code re-routing on T1/E1 trunks
- One number fax support (single DID for voice and fax)

## Security

- TLS (Transaction Layer Security) for signaling encryption
  - TLS 1.2 (RFC 5246)
  - DTLS version 1.2 (RFC 6347)
- Secure Real-time Transport Protocol (SRTP) & Control Protocol (SRTCP) for media and media control encryption
  - SDES (Session Description Protocol Security Descriptions) key negotiation (RFC 4568)
  - DTLS extension for SRTP/SRTCP (RFC 5764)
- Built-in VoIP firewall
- Microsoft Windows® firewall for Application Solution Module to manage Lync SBA
- Multiple unique X.509 public key certificates/PKCS #12 files (up to 11)
- Wildcard certificate support
- Topology hiding; User privacy
- Prevention of Denial-of-Service (DoS) and Distributed DoS (DDoS) attacks
- Dialed Number Identification Service (DNIS), Calling Line Identification (CLID), Call type pre-authentication
- Traffic separation (VLAN interface separation)
- Malformed packet protection
- Access Control Lists (ACLs)
- IPsec VPN tunnel
- NAT/NAPT and port forwarding, NAT traversal
- Duplicate IP detection on ASM/SBA
- 2 GB on-board eUSB memory for secure Active Directory replication

## Quality of Service (QoS)

- Bandwidth management
- Call Admission Control (CAC) (deny excessive calls based on static configuration for  bandwidth management)
- P-time mediation for rate limiting
- Per-call statistics
- Diffserv/DSCP marking

## Packet Network Time Source

- Network Time Protocol (NTP) per RFC1708

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## Microsoft® Teams®
- Certified SBC for Phone System Direct Routing
  - Enhanced 911 (E911)
  - SILK-NB, SILK-WB codec support for improved Teams user experience
  - Analog FXS device/Analog Telephony Adapter (ATA) support, including downstream EdgeMarc Intelligent Edge™ devices
  - Media Bypass enhancements to improve user experience, including support for deployments behind a public router (option to configure SBC with private IP address)
  - Multiple encryption certificates to ease migration from on-premises Skype for Business Server to Office 365 Phone System
  - Video media stream forwarding
- Supports multiple tenant-related Direct Routing deployments with Microsoft partners/PSTN carriers

## Microsoft Skype® for Business
- Qualified Survivable Branch Appliance (SBA) for Microsoft Lync® 2010, Lync 2013, and Skype for Business deployments
- Qualified Enhanced Gateway for Lync 2013, Lync 2010 & Skype for Business deployments
- Lync 2013 and Lync 2010 qualified SBC and E-911 ELIN Gateway
- Microsoft Office 365® Exchange® Unified Messaging qualified
- Non-Lync SIP client user state reporting (e.g., presence, user busy, etc.) to Lync clients
- Microsoft SCOM support
- Lync Quality of Experience (QoE) monitoring collects call RTP stream data and sends to Lync QoE server
- Skype for Business SDN API 2.2 support
- Integration with PeterConnects® Attendant, Directory, and Manager/Assistant (for SBA clients)
- Integration with Nectar® Unified Communications Management Platform (UCMP)
- Integration with Event Zero UC Commander™ (for SBA clients)

## Server Module
**Memory**
- 8 GB of DDR4 with ECC (Error-Correcting Code)

**CPU**
- Intel® Pentium® Processor: Broadwell family, dual core, 4 threads, 2.20 GHz

**Storage**
- 256 GB SSD

**Capabilities**
- Maximum number of Microsoft Skype for Business/Lync users associated with the Survivable Branch Appliance: 1000
- Maximum number of concurrent calls associated with Microsoft Skype for Business/Lync Survivable Branch Appliance: 240
- Validated as interoperable with BroadWorks Release 19.sp1 and compatible with BroadWorks Releases 18.0, 18.sp1, 19.0 SIP interface

- 2 Microsoft Hyper-V® enabled VOSEs (Virtual Operating System Environments) to support hosting of 3rd party applications (Windows Server 2012 R2 only)

**Operating System**
- Microsoft Windows Server® 2012 R2, Windows Server 2008 R2

## Redundancy
- Redundant power supply

## Additional Hardware Specifications
**Front Panel**
- Status indicators front panel LEDs
  - Power
  - Alarm
  - Peer node
  - Ready
- Dual USB 2.0 interface for main SBC board
- Additional dual USB 2.0 ports for ASM (optional)
- WAN and LAN Interfaces
  - 4 x 10/100/1000 BASE-T Ethernet ports with VLAN support
  - Auto-MDIX
- Administration Port
  - 1 x 10/100/1000 BASE-T Ethernet port

**Rear Panel**
- Physical PSTN Interfaces
  - Up to 16 T1/E1 − 2 x from one to eight T1/E1 spans per digital module
  - Up to 48 FXS ports − 2 x 24 ports

**Chassis**
- 1U, rack mount
- Inches: 17.5" wide x 1.75" high x 21" deep
- Centimeters: 44.4 wide x 4.4 high x 53.4 deep

**Chassis Mounting Options**
- EIA-standard 19" equipment rack with 2 or 4 posts (for 4-post racks: mounting equipment is provided with a depth of 24" or 30")

**AC Power Option**
- Input Voltage: 100-240 VAC nominal, auto-switching, 47-63 Hz
- AC Maximum Input Current: 3.0A at 115 VAC; 1.6A at 230 VAC
- AC Input Voltage Range (Nominal): 100-127 VAC and 200-240 VAC
- Max Power Consumption: 360 W

**Cooling System**
- Internal forced convection

**Weight Maximum Fully Populated**
- 23 lbs. (10.43 kg)

**Environmental**
- 5 to 40˚ C operating
- -40 to 70˚ C storage
- 5 to 85% non-condensing operating humidity

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## About Ribbon Communications

Ribbon is a company with two decades of leadership in real-time communications. Built on world class technology and intellectual property, Ribbon delivers intelligent, secure, embedded real-time communications for today's world. The company transforms fixed, mobile and enterprise networks from legacy environments to secure IP and cloud-based architectures, enabling highly productive communications for consumers and businesses. With locations in 28 countries around the globe, Ribbon's innovative, market-leading portfolio empowers service providers and enterprises with rapid service creation in a fully virtualized environment. The company's Kandy Communications Platform as a Service (CPaaS) delivers a comprehensive set of advanced embedded communications capabilities that enables this transformation.

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