

Vertiv™ Avocent® ACS8000 Advanced Console System Serial Console Appliance GUIDE SPECIFICATIONS

1.0 GENERAL

1.1 Summary

This specification shall define the electrical and functional characteristics for a serial console appliance. The serial console provides remote access to the serial interfaces of connected target devices.

The serial console shall serve as a single point for access and administration of connected devices, such as serial consoles of IT equipment, modems, and power devices. The console system shall support secure remote data center management and out of band management of IT assets from any location worldwide. The serial console shall provide secure local (console port) and remote (IP, Cellular, and dial-up) access. The console system should run the Linux operating system with a persistent file system in Flash memory that can be upgraded with a local file on a computer connected to the serial console device.

1.2 Standards

The serial console shall be designed in accordance with applicable sections of the current revision of the following documents. Where a conflict arises between these documents and statements made herein, the statements in this specification shall govern.

Emissions and Immunity:

- FCC Class A
- CE Class (EU)
- ICES-003 (Canada)
- VCCI (Japan)
- RCM (Australia)
- Customs Union (CU)
- KCC (Korea)

Safety:

- UL (USA)
- cUL (Canada)
- EN-60950 (EU)
- CB
- Customs Union (CU)
- UL 60950-1 2nd ED (Cellular related)
- cUL 60950-1 2nd ED

- IEC 60950-1 2nd ED (Cellular Related)
- EMC/Radio Compliance (Cellular Related)
- FCC Part 15 Class B
- FCC Part 22, 24, 27

Network (Cellular Related)

- PTCRB

1.3 System Description**1.3.1 Modes of Operation**

The serial console shall remain in a continuous mode of operation upon booting that facilitates remote virtual connections and internal functions as initiated by users.

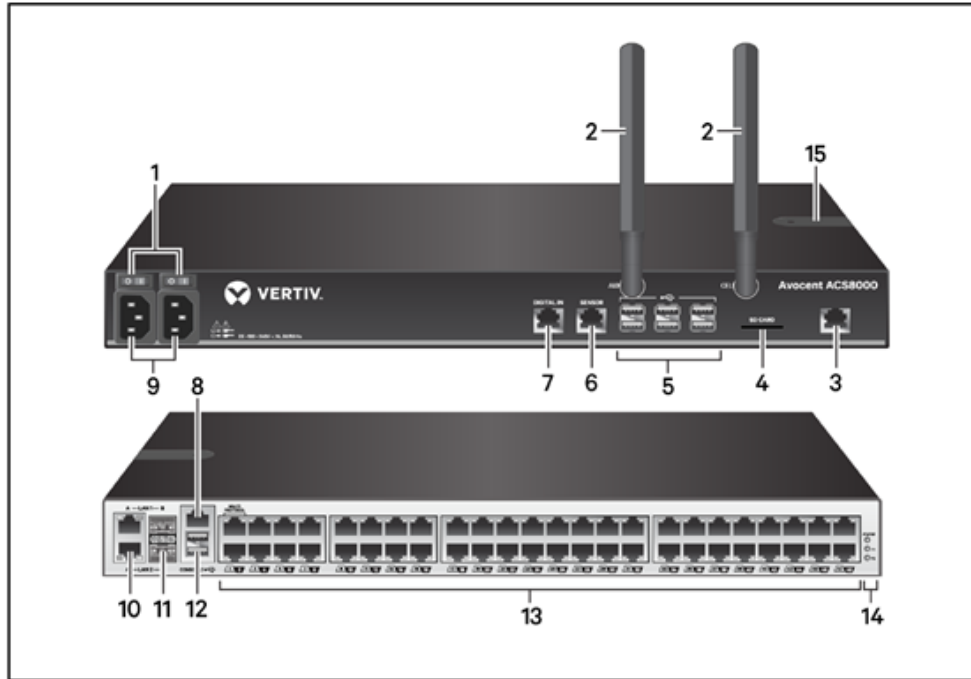
Secure access shall be made available through the following local (analog console port) and remote (digital IP, cellular, and dial-up) options.

- LAN/WAN IP network connection.
- Dial-up to a factory-configured internal modem (optional) or a modem connected to one of the serial or USB ports.
- Cellular variants shall support Wireless connections via 4G/LTE networks.
- Target device connected via a Telnet, SSH v2, or Raw connection to a target device.
- The console system console connection (as an administrator) via a local terminal or from a computer with a terminal emulation program that is connected to the console port.

More than one administrator shall be allowed to log into the console system and have an active CLI or web UI session.

1.3.2 Device Overview (all options shown)

The serial console shall support the following interfaces:



| Item | Description |
|-------|---|
| 1 | Power buttons (dual power supply shown - number varies depending on model) |
| 2 | Cellular antennas for the cellular modem (not available on some models) |
| 3 | Modem port for the internal modem (not available on some models) |
| 4 | SD card slot (not available on all models) |
| 5 | USB ports for supported USB devices and USB serial console hosts. The USB ports (Version 2.0) shall meet the HID Power Device standard, version 1.0, or later |
| 6 | Sensor port for a 1-Wire environmental sensor. Support for complete Vertiv™ Liebert® SN family of sensors including temperature, humidity, leak, and door sensors |
| 7 | Digital In port for customized inputs (Ex. leak, pressure, or dry contact sensors) |
| 8 | Console port for connecting a terminal or workstation. The console system is configured using a terminal or terminal emulator with session settings of: 9600, 8, N, and 1, with no flow control |
| 9 | Power supply (dual power supply shown - Various AC and DC power options available) |
| 10/11 | LAN ports. Built-in 10/100/1000 copper Ethernet interfaces and SFP module ports. If both LAN1 or LAN2 ports are connected, the fiber connection has priority |
| 12 | Two USB ports on the rear of the console system for additional USB devices |
| 13 | RJ45 Serial ports (connection to target devices) with support for CAT 5e or CAT 6 cables |
| 14 | Status LEDs |

| | |
|----|---------------|
| 15 | SIM card slot |
|----|---------------|

1.3.3 Power Options

1. Input Voltage

Input voltage specifications of the serial console shall be:

- **AC powered units:** 0 - 150VAC, 50/60Hz, single-phase, 2-wire-plus-ground
- **DC powered units:** - 48 VDC, +- 20%, 0.7A (Return, Ground and -48VDC terminals)

2. Power Supply Options

Model options shall exist to support single or dual AC power inputs. Model option shall also exist to support single or dual DC power inputs.

1.4 System Specifications

1.4.1 Hardware Specifications

The serial console shall include the following hardware specifications:

| Hardware | Descriptions |
|------------|---|
| CPU | Dual-core ARM Cortex-A9 MPCore with CoreSight |
| Memory | <ul style="list-style-type: none"> • 1GB DDR3L RAM • 16GB eMMC Flash |
| Interfaces | <ul style="list-style-type: none"> • 2 Gigabit Fiber SFP ports • 2 Gigabit (10/100/1000BT) Ethernet interfaces on RJ45 • 1 RS-232 serial console port on RJ45 • Up to 48 RS-232 serial ports on RJ45 • First 2 ports selectable between RS-232/RS-422/RS-485 • 8 USB 2.0 Ports on Type A connector • 1 full size SD Card slot • Environmental sensor port on RJ45 (1-wire) supporting Vertiv™ Liebert® SN sensors • 4 digital-in ports |
| Power | <ul style="list-style-type: none"> • Internal 100 VAC - 240 VAC, 50/60 Hz • Optional -48 VDC power supply • Optional dual entry, redundant AC and DC power supplies |

| | |
|---------------------------|--|
| Power Usage | <ul style="list-style-type: none"> • Nominal voltage 120VAC: <ul style="list-style-type: none"> • Typical 0.13A, 6.2W • Maximum 0.47A, 28W • Nominal voltage 240VAC: <ul style="list-style-type: none"> • Typical 0.10A, 7W • Maximum 0.29A, 28W • Nominal voltage 48VDC (±20%) <ul style="list-style-type: none"> • Typical 0.22A, 11W • Maximum 0.67A, 33W |
| Dimensions (W x D x H) | 17.25W x 9.5D X 1.75H in. (43.82 cm x 24.13 cm x 4.45 cm) |
| Weight | 6.4 lbs - 7.2 lbs |

1.4.2 Cellular Specifications (for models with cellular support)

Models with cellular support shall include the following specifications:

1. **Cellular Type:** 4G/LTE Cat.4 with 3G fallback.
2. **Cellular Frequency Bands (MHz):**
 - **4G Bands (MHz):** B2(1900), B4(AWS1700), B5(850), B12(700a), B13(700c), B14(700 FirstNet), B66(AWS-3 1700), B71(600).
 - **3G Bands (MHz):** B2(1900), B4(AWS1700), B5(850).
3. **SIM Card:** 2FF (aka mini-SIM) card slot.
4. **Dual Cellular Antennae:**
 - Dual antennae configuration for antenna diversity (Aux and Cell signals).
 - Dual female standard SMA ports to support standard SMA antennae.
 - 2 LTE Antenna included with the serial console unit (7.5" in length, 1 dBi gain, standard male SMA connector).
5. **Supported Carriers:**
 - **North America:** AT and T, Verizon.
 - **EMEA:** Carrier agnostic – EU carriers operating within supported bands.

1.4.3 Functional Specifications

The serial console shall provide the following functionality:

(More information on the specific implementation details, configuration, and usage of each functional element can be found in the serial console User guide, Command Line Reference guide, and/or Application Programming Interface guide.)

1. Operating System

- Yochto project-based Linux

2. Accessibility

- Zero Touch Provisioning (ZTP)
- In-band (Ethernet) and out-of-band (dial-up/cellular modem) support
- Optional built-in v.92 analog modem
- Optional built-in 4G/LTE cellular modem
- Local Console Port for device management
- USB 2.0/3.0 ports for use with USB peripherals and as serial console target ports

3. Availability

- Automatic Ethernet or Cellular failover (using second GbE port or 4G/LTE interface for failover)
- Support for multiple-routing tables
- External AC/DC power supply design
- Dual GbE Ethernet support
- USB support

4. Security

- Preset security profiles-secure, moderate, and open
- Custom security profiles with ability to restrict specific protocols, IP services, and TCP ports
- IPSec VPN with Third-Party certificates
- IPSec with NAT traversal support
- X.509 SSH certificate support
- SSHv1 and SSHv2
- TLS 1.3
- Local, RADIUS, TACACS+, LDA/AD authentication
- Two-factor authentication (RSA SecurID and 3rd party authentication challenge tokens)
- One-Time Password (OTP)
- Local, backup-user authentication support
- PAP/CHAP and Extensible Authentication Protocol (EAP) authentication (for dial-up lines)
- Group authorization:
 - TACACS+, RADIUS, and LDAP
 - Port Access

- Power Access
- Appliance privilege
- IP packet and security filtering
- User-access lists per port
- System event syslog
- IP forwarding support
- Secure factory defaults
- Strong password enforcement

5. Console Management

- Sun break-safe (Solaris Ready Certified)
- Break-over SSH support
- Off-line data buffering - local and remote (NFS/Syslog/ Vertiv™ Avocent® DSView™ management software)
- Level-based Syslog filters
- Time stamp and rotations for data buffering
- Support for unlimited simultaneous serial sessions on the same port with the ability to view (port-sniff) and toggle between sessions
- Configurable event notifications for all major areas of functionality
- Configurable event destinations
 - Syslog
 - SNMP Trap
 - Email
 - SMS
- Customizable, global time zone support
- Multiple and customizable user levels of access

6. Port Access

- Directly by server name or device name
- CLI Command
- TCP port alias
- Simultaneous Telnet and SSH access
- HTTP/HTTPS

7. System Management

- Configuration wizard in Web for first-time users
- Auto-discovery for automatic deployment
- Command line interface (CLI)
- Linux Shell access
- RESTful API
- Web Management Interface (HTTP/HTTPS)
- SNMP v2 and SNMP v3
- Internal temperature sensor

8. Cabling

- CAT-5 compatible adapters for simpler cabling
- Autosensing for Cyclades and Cisco pin-outs for serial ports
- Autosensing for baud rate
- Auto portname discovery

9. Upgrades

- Regular firmware uploads available online at no charge
- TFTP support for network boot
- Use of 3rd party

10. Power Device Management

- Automatic power device (PDU and UPS) discovery
- Integrated ability to manage and control PDUs from Vertiv and 3rd party vendors - view data such as device status, power consumption, power factor as well as control outlets (on/off/cycle) (if PDU is capable).
- Support the following PDU types:
 - Avocent/Cyclades - PM family
 - Vertiv - Vertiv™ MPX family
 - Geist - Vertiv™ Geist™ PDUs, all families
 - SPC - SPC power control device family
 - Raritan - PX G2 family
 - APC - Vertiv™ Geist™ rPDU2 family
 - ServerTech - ServerTech and ServerTech Pro2 families
 - Eaton -ePDU G3 family

- Integrated ability to manage and control UPS from Vertiv™ Liebert® GXT4 and Vertiv™ Liebert® GXT5 - view data such as device status, power consumption, power factor as well as control outlets (on/off/cycle).

1.5 Environmental Conditions

1. Ambient Temperature

- **Operating:** 14°F to 140°F (-10°C to 60°C)
- **Storage:** -4°F to 158°F (-20°C to 70°C)

2. Relative Humidity

- **Operating:** 20% to 80% non-condensing
- **Storage:** 0% to 95% non-condensing

3. Altitude

Altitude shall have no effect on the operation of the serial console.

4. Audible Noise

The serial console shall be a fan-less system that employs passive cooling. As such, the device shall not emit audible noise.

1.6 User Documentation

The specified Serial console system shall be supplied with a Safety Instruction and Warning Sheet and printed copy of quick start guide. The user manual shall be downloaded from the web and includes installation instructions, a functional description of the equipment with block diagrams, safety precautions, illustrations, step-by-step operating procedures, and general maintenance guidelines.

A separate Command Line Reference guide shall be available to outline the operation of the internal CLI.

A separate Application Programming Interface guide shall also be made available to outline the functionality exposed via the RESTful API along with instructions on access and use.

Additional user guides and technical information shall be available online.

1.7 Warranty

1.7.1 Standard Warranty

The serial console shall include a standard Avocent 90-day/2-year product warranty with the following terms:

The vendor shall warrant to the first person, firm, association, or corporation for whom the serial console is originally installed for use that this product is and will be free of defects in material and workmanship for a period of 90 days from the date of purchase by the user. The user shall have the option to register the product at any time within 90 days of the date of purchase to ensure warranty support and access to product updates during the 90-day warranty period. If the user registers the product within the 90 days of purchase, the warranty period shall be automatically extended at no additional charge to a period of 24 months from the date of purchase. The warranty period for government customers and customers located in Europe shall be 24 months without the requirement to register.

1.7.2 Uplifted Hardware Maintenance

The serial console vendor shall offer uplifted support agreements for serial console products. The customer shall be given the option to purchase 1-, 2-, or 4-year terms of uplifted hardware support at Silver or Gold levels. Each level provides benefits such as extended tech support hours, faster guaranteed support times, and hardware replacement (RMA).

The manufacturer's website shall provide more information and currently available programs.

1.8 Quality Assurance

1.8.1 Manufacturer Qualifications

More than 30 years of experience in the design, manufacture, and testing of serial console systems shall be required. The manufacturer shall be certified to ISO 9001:2008.

1.8.2 Mean Time Before Failure

Any model of the serial console shall have a Mean Time Before Failure (MTBF) of greater than 420,000 operational hours at 25°C and 180,000 operational hours at 40°C (based on Telcordia SR332 standards, Ground Benign, Controlled).

Serial console models with 8 serial target ports and dual-AC power supplies shall have a Mean Time Before Failure (MTBF) of greater than 535,000 operational hours at 25°C and 225,000 operational hours at 40°C (based on Telcordia SR332 standards, Ground Benign, Controlled).

1.8.3 Factory Testing

Before shipment, the manufacturer shall fully and completely test the system to ensure compliance with the specification.

1.8.4 Firmware Releases

The serial console shall have regular firmware releases made available online to support new features, update libraries, address bugs, and update security elements (including CVE mitigation).

2.0 PRODUCT

2.1 Fabrication

All materials and components making up the serial console shall be new, of current manufacture, and shall not have been in prior service except as required during factory testing.

2.1.1 Indicators and Controls

Serial Port Status Indicators

The serial console shall include two LEDs for each serial port that illuminate either green or yellow. These LEDs shall be incorporated into the RJ45 connector of each serial port.

Green LEDs shall indicate the status for physical connection with a serial port, remote connectivity (when applicable) and data transfer. Yellow shall LEDs indicate whether a serial port is being monitored along with the alert level (emergency, alert, or none) of a monitored target.

The LEDs shall operate in the manner indicated in the following table:

| State | Description for Green LEDs | Description for Yellow LEDs |
|----------------------------|---|---|
| Off (not illuminated) | No physical connection | No data buffering |
| On (solid green or yellow) | Device is physically connected to the serial port | Data buffering is enabled for the serial port |
| Slow blink | SSH or Raw session is active | Alert level is active |
| Fast blink | TX or RX data activity | Emergency level is active |

System Status Indicators

The serial console shall include LED system-level status indicators signifying when the system has been full booted and initialized as well as the operational status of each installed power supply.

The system level indicators shall be: System indicator, P1 power indicator, and P2 power indicator.

The STATUS LED is green when the console system is fully booted up and initialized. The P1 and P2 LEDs indicate an active power supply. P1 is green when Power Supply 1 is on. P2 is green when Power Supply 2 is on.

Controls

Control Buttons

There shall have toggle switches to enable and disable (power on/power off) each of the available power supplies.

2.2 Communication Options

2.2.1 Local Serial Console Port

A console port (serial RS-232) shall be provided on the rear of the serial console device, with an RJ-45 connector. This connector shall enable access to built-in Command Line interface and Linux shell environment of the serial console.

2.2.2 Remote Access

The serial console shall be provided the means to remotely manage the configuration of the device by the following means

- Auto-discovery for automatic deployment (Zero-Touch Provisioning)
- Command line interface (CLI) via SSH/Telnet
- Linux Shell access via SSH/Telnet
- RESTful API via TCP/IP networks
- Web Management Interface (HTTP/HTTPS)
- SNMP via TCP/IP networks
- Configuration wizard in Web for first-time users (via IP – HTTP/HTTPS)