Data Sheet

# SMS-682 SwitchBox II

## Features

- Fully Managed or Unmanaged standalone switch/router in a rugged enclosure
  - Industry standard CLI, Web, SNMP Interfaces
  - Extensive MIBs support
- MIL-STD-38999 connectors with 24 + 2 Ethernet interfaces
  - Up to 20/24 auto negotiating 10/100/1000Base-T Gigabit Ethernet (GbE) ports
  - Optional four optical ports (1000Base-SX)
  - Up to two 10GbE uplink/expansion ports
- High-performance Layer 2/3+ switching/routing software
  - Extensive IETF RFCs supported
  - Switching, VLANs, Routing, IP Multicast, Tunneling, QoS
  - SSH, SSL, Secure memory erase
  - Wire-speed IPv4/v6 support
- Comprehensive Built-in Test (BIT) support
  - Power-up, Initiated, and Continuous BIT
- Enhanced security with PMC-110 CryptoNet™
  - Statefull Firewall (ICSA certified)
  - Network Address Translation (NAT)
  - Access Control List (ACL) filtering
  - Encryption/Decryption/Authentication
  - VPN with secure tunneling (IPSec/L2TP)
  - Intrusion detection and content filtering
- IPMI capable (roadmap)
  - Health Monitoring (voltage, current & temperature)
- Industry leading technical and life-cycle management support
- Operating Environment
  - Natural Convection-cooled chassis -40° to 55°C
  - 0.04g2/Hz vibration per MIL-STD-810E
  - 40G Shock per MIL-STD-810E
  - Wide 18V to 40V input range with 50V transient per MIL-STD-704E
  - Meets MIL-STD-461E for various EMC requirements

## Overview

Enabling the vision of Network Centric operations and extending the reach of transformational networks, the SMS-682 SwitchBox II is a GbE multi-layer switch/router that is ideally suited for building Intra-Platform Networks (IPNs) for air, land, and sea vehicles or ground stations. SMS-682 SwitchBox II enables fast, reliable forwarding (switching and routing) of control and data packets with up to 24 wire speed 10/100/1000MB/s interfaces and up to two high-speed 10GB/s uplinks that can be used to connect multiple chassis, cards, or even processors within platform networks.

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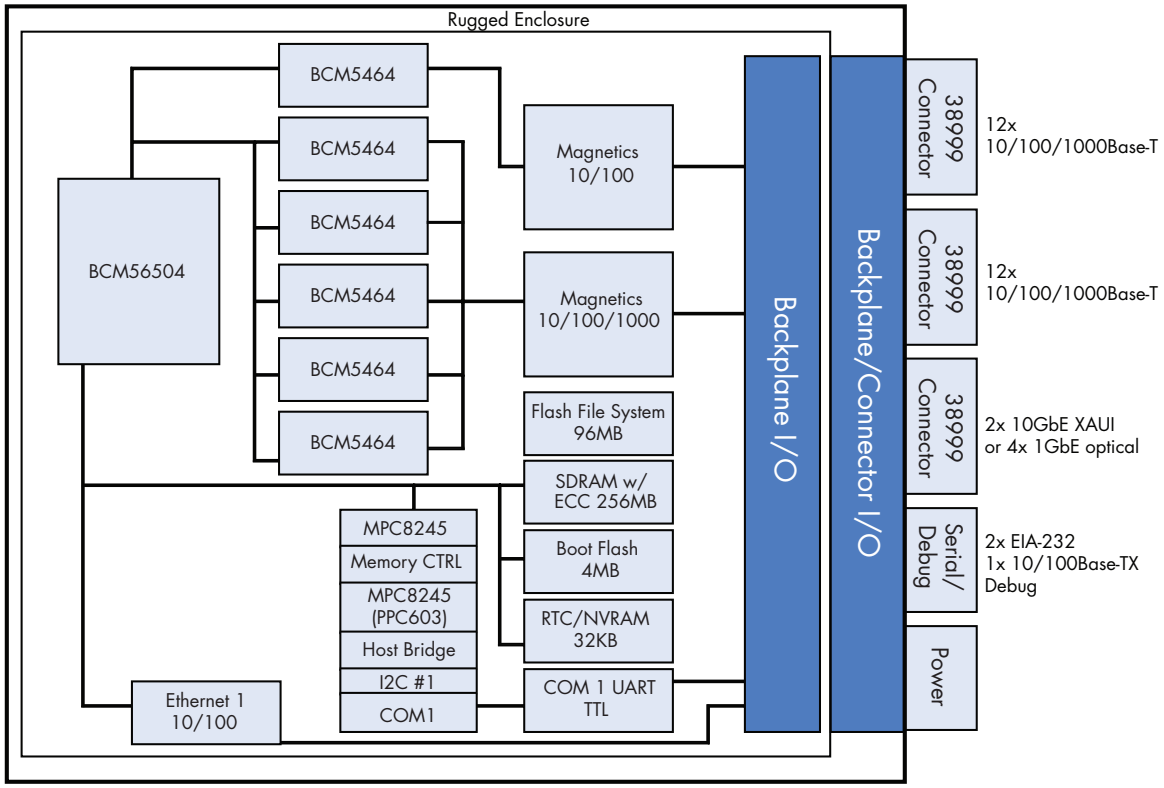
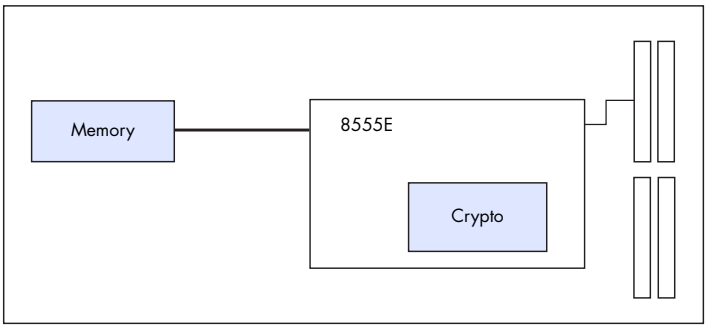
Figure 1: SMS-682 Integrated Solution Block Diagram




Using star, dual star, mesh and hybrid network topologies, the SMS-682 SwitchBox II provides a flexible cost effective solution that can be used to architect reliable 1 or 10GbE communications infrastructure for current and future networked platforms. Redundancy and fail-over can be implemented using dual star and mesh networks while investment dollars can be retained by implementing hybrid network topologies that co-exist with legacy and/or next generation interconnection strategies. Ready to deploy, the Curtiss-Wright Controls Embedded Computing SMS-682 SwitchBox II allows systems integrators to reduce development costs and Time-to-Market (TTM) by simply connecting the SMS-682 SwitchBox II Ethernet interfaces to the appropriate networked devices, and focusing on the optimal partitioning and segmentation of their application's network.



## Designed for Maximum Performance

Allowing system integrators to develop and deploy high-performance switch-fabric based architectures today, the SMS-682 SwitchBox II provides a completely integrated and unified management, control and data plane solution for wire-speed performance of switched GbE traffic. Whether it is small, medium or larger IPNs, the SMS-682 provides unique port combinations that scale from 20 and 24GbE port versions.

The SMS-682 SwitchBox II is completely integrated solution (Figure 1) with 24x 1GbE and 2x 10GbE interfaces with an option of four optical 1GbE ports. Table 1 lists the various port types supported by the SMS-684.

Based on the industry leading Broadcom® StrataXGS® III multi-layer switch, the SMS-682 SwitchBox II is capable of providing up to 24 10/100/1000MB/s Ethernet ports with 64 million packets/second (line rate) aggregate switching capacity. The key features at the core of each Broadcom® StrataXGS® III that facilitate low latency wire-speed performance include 1MB of high-speed fully integrated on-chip packet buffer memory, fast filter processors (FFP) per port, and advanced packet flow control capability per port. The two 10GbE XAUI ports can be used to stack routers to enable higher port counts, or they can be used to create high-speed 10GbE backbones.

Table 1: SMS-682 Port Type Specification

| Port Type | Specification |
|---|---|
| 10Base-T | 802.3 standard |
| | Automatic (MDI/MDIX) crossover |
| | Maximum of 100 meters per segment length |
| 100Base-TX | 802.3u standard |
| | Automatic (MDI/MDIX) crossover |
| | Maximum of 100 meters per segment length |
| 1000Base-T | 802.3ab standard |
| | Automatic (MDI/MDIX) crossover |
| | Maximum of 100 meters per segment length |
| 1000Base-SX | Full duplex or simplex optics with separate Tx/Rx interfaces |
| | Multi-mode support |
| | Core/cladding: 62.5/125 or 50/125 |
| | IEEE 802.3z |
| 10GbE XAUI | Signaling supports 10GBASE-CX4 |
| | IEEE 802.3ae |

## BCM5464 Quad-port 10/100/1000Base-T Gigabit Copper Transceiver

The SwitchBox II solutions utilizes six BCM5464 chips, which each provide four complete 10/100/1000Base-T GbE transceivers integrated on a single monolithic CMOS chip, is a member of Broadcom's QuadSquad™ family of quad GbE PHYs. The BCM5464 is optimized for low-power and small footprint size to enable high-port density applications. The BCM5464's digital signal processor based architecture and advanced power management techniques combine to achieve robust and low-power operation over the existing Category 5 twisted-pair wiring.

## Advanced Security

The SMS-682 SwitchBox II can also be configured as a Unified Threat Management (UTM) router that is capable of strong perimeter defense through an ICSA certified firewall. This is achieved with the PMC-110 CryptoNet. This optional security PMC module provides an industrial strength statefull firewall that can protect against multiple evasive attacks. SMS-682 security features include:

- Statefull firewall (ICSA certified)
- Access control list (ACL) filtering
- Network Address Translation (NAT)
- Encryption/Decryption/Authentication
- Key generation/management
- Enables VPN with secure tunneling (IPSec/L2TP)

The PMC-110 CryptoNet connects to the StrataXGS® III multilayer switch through 2GbE interfaces and can be managed through a serial EIA-232 port.

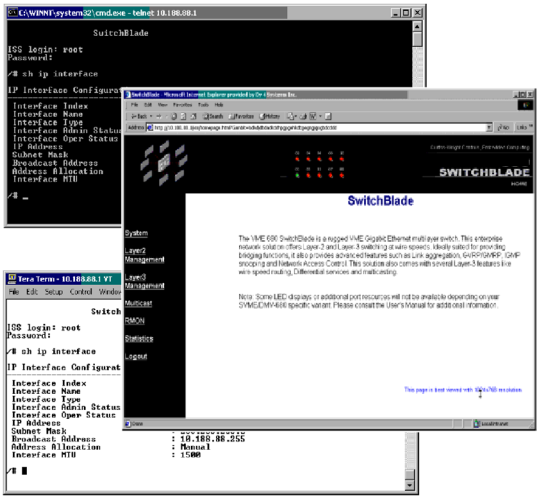
## Managed vs. Unmanaged Switches

Both managed and unmanaged versions of the SMS-682 SwitchBox II are available. The unmanaged version functions only as a L2 switch with minimal software and a quick boot time. The managed version is a L2/L3 router with complete managed L2/L3 software, Quality of Service (QoS), IP multicasting, and basic security. Management interfaces include "industry standard" CLI, SNMP, and web for easy configuration and network management. (Refer to Table 2 on page 4 for Management Interfaces and Connection Strategies.)

Table 2: Management Interfaces & Connection Strategies

| Interface | Connection | Client |
|---|---|---|
| CLI | - EIA-232<br>- Any in-band Ethernet port | Terminal Program<br>Telnet |
| Web | - Any in-band Ethernet port | Web Browser |
| Network Management Station (NMS) | - Any in-band Ethernet port | Standard off the shelf NMS Software |

Figure 2: CLI, Web, Telnet & SNMP Management Interfaces for SMS-682 SwitchBox II




## Complete Integrated Software Solution

Managed versions of the SMS-682 SwitchBox II provide extensive pre-integrated software that runs on its processor. Major software components include the full suite of Layer 2/3 software protocols required for intelligent switching and routing of IP packets (Figure 5 and Figure 6). Curtiss-Wright Controls also provides extra software features such as declassification, and Built-in Tests (BIT). BIT tests include Power BIT (PBIT), Continuous BIT (CBIT), and Initiated BIT (IBIT). Declassification is a utility that erases the non-essential contents in the Flash File System. This process deletes the routing tables, filters and purges the switch of Ethernet packets and restores default configuration files from flash. This provides an extra layer of memory protection, and the ability to recover default information in the event of corruption.

## Accessories

For building networks in the lab environment, Curtiss-Wright Controls provides various cables that can be used with the SMS-682 in the lab environment. Examples of two cables are illustrated in Figure 3 and Figure 4. See Table 6 for all the appropriate variants and cables for the SMS-682 SwitchBox II.

Figure 3: Example J1 cable for SMS-682 – 38999 cable that breaks out 12 x RJ45 connectors

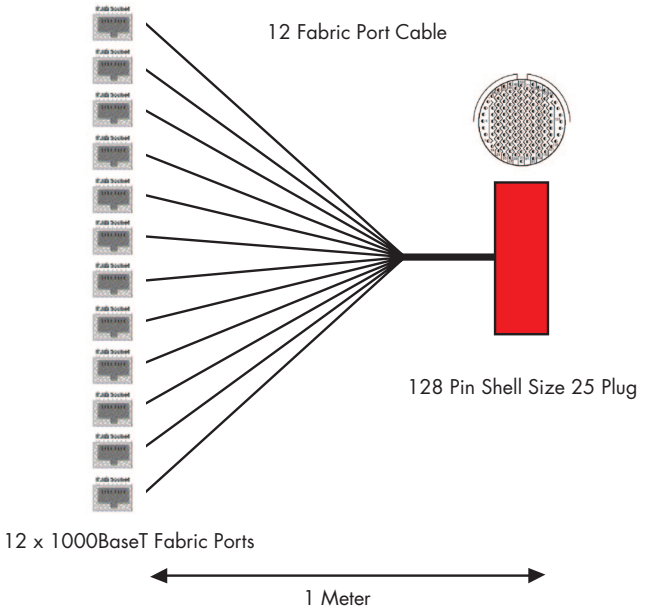



Figure 4: Example J4 cable for SMS-682 – 38999 cable that breaks out two EIA-232 serial port, one 10/100 debug port & a discrete reset interface

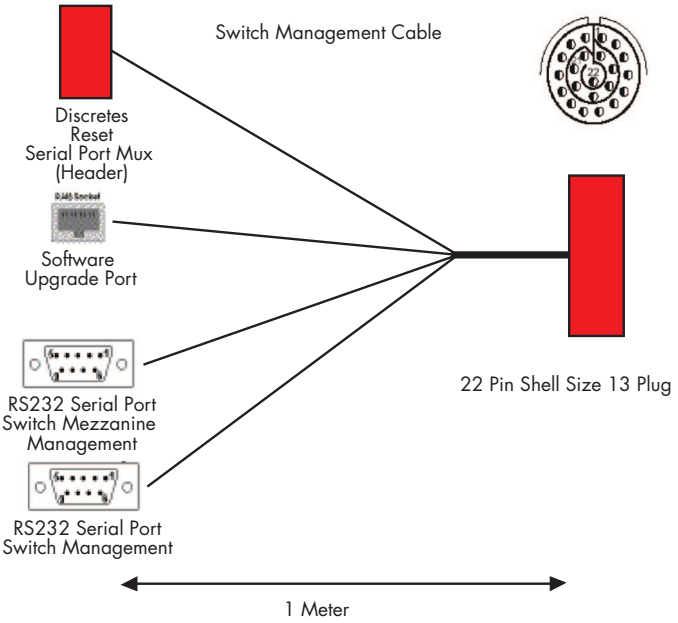


Figure 5: The SMS-682 SwitchBox II Software Block Diagram

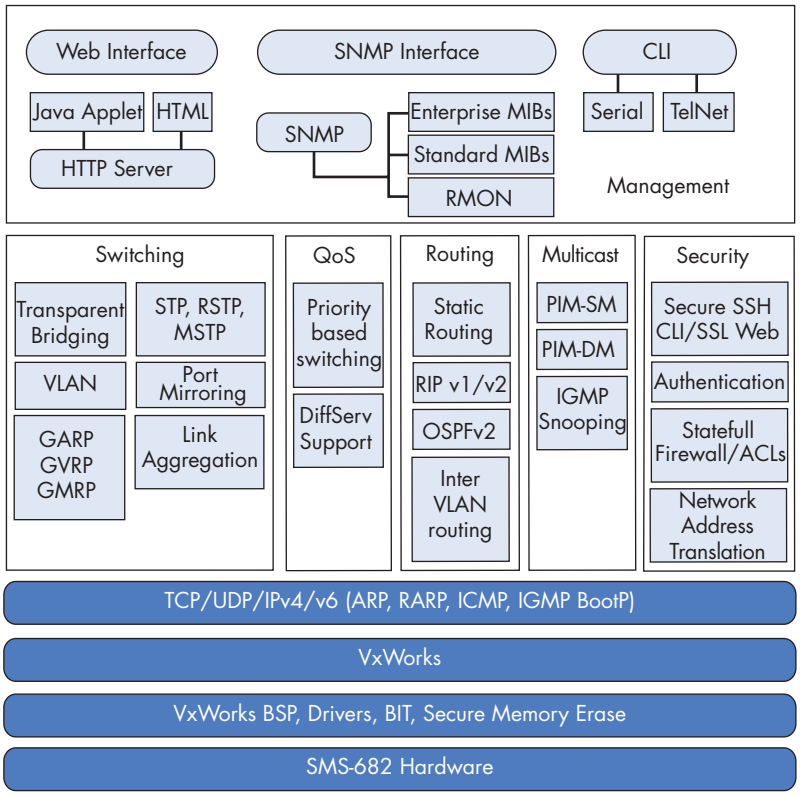
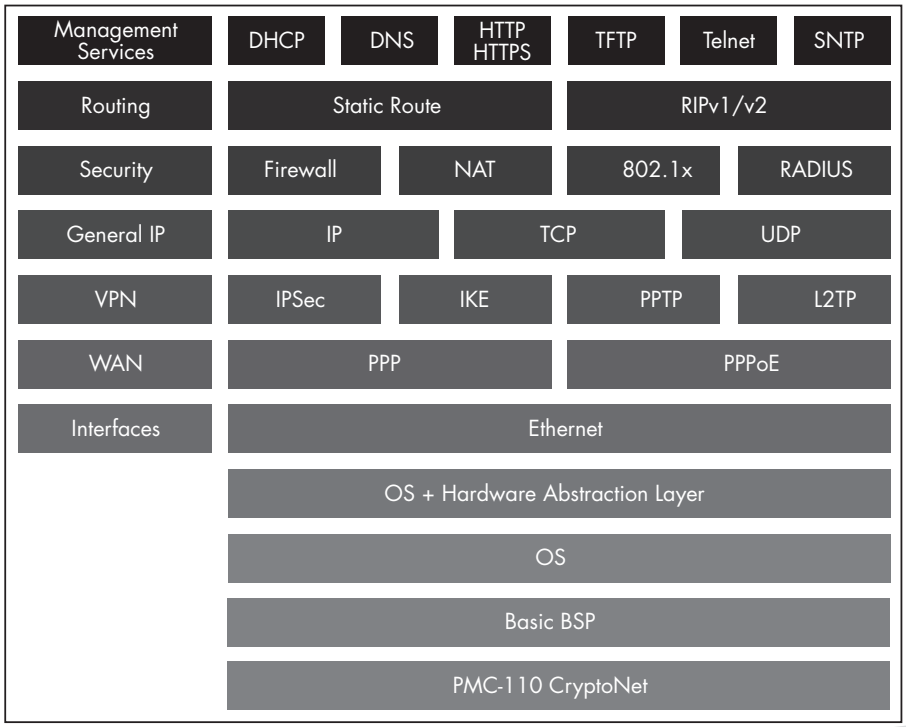



Figure 6: The Enhanced Security Software Block Diagram of PMC-110 CryptoNet Running on MPC8555E Processor



## Specifications

### Table 3: Overall Feature Specifications

| Feature | Specification |
|---|---|
| Number of Ports | Up to 24x 1GbE ports plus up to 2x 10GbE ports (depending on variant purchased) |
| Out of Band Ports | 10/100Base-TX Ethernet interface for software update |
| | JTAG support |
| | EIA-232 serial interface |
| Packaging | Standalone 6U box with power supply |
| Dimensions | (L) 11.4 x (W) 9.4 x (H) 3.75 |
| Weight | 14.5 lbs |
| Power | 50W |
| Throughput | 64 million packets/second aggregate switching capacity (24-port version) |
| Capacity | Packet Buffer 2MB pool |
| | Support for Jumbo packets up to 9KB |
| | Up to 16,384 Layer 2 MAC addresses |
| | Up to 4,096 Layer 3 IPv6 routes |
| | 4,096 Virtual LANs supported |
| | 1024 Layer 2 Multicast groups |
| | Content Aware Processor<br>- 16 internal lookup processors<br>- 4096 flows per processor |
| Layer 2 Features | Loop free, Transparent bridging |
| | Rapid Spanning Tree Protocol (RSTP) |
| | Multiple Spanning Tree Protocol (MSTP) |
| | VLAN Routing and Support |
| | LAN information passing via GARP |
| | VLAN registration passing via GVRP |
| | Propagation of Multicast registration via GMRP |
| | Forwarding Multicast traffic using IGMP Snooping |
| | Increased Bandwidth and load sharing with Link Aggregation |
| | Support for Port Mirroring |
| | Support for Rate Limiting on each port |

| Feature | Specification |
|---|---|
| Layer 3 Features | Unicast routing protocols like RIP, BGP & OSPF |
| | Inter VLAN routing |
| | Quality of Service QoS, in the form of differential services |
| | Supports both:<br>- Differential Services Code Point DSCP mapping<br>- Per Hop behavior |
| | Multicast route computation using PIM & DVMRP<br>- SM - sparse mode<br>- DM - dense mode |
| | Redundancy and Load Sharing through VRRP |
| General Features | Support for DHCP Server/BOOTP server |
| | Switch Configuration Save and Restore |
| | Log file download via TFTP |
| | Management of Switch through<br>- SNMP<br>- WebNM<br>- CLI |
| | Secure management interfaces through secure http (SSL) and secure shell (SSH) |
| | RMON System probe for groups 1 (Statistics), 2 (History), 3 (Alarm), and 9 (Events) |
| | Power On Built-in Self Test |

### Table 4: Summary of Hardware Specifications

| Feature | Description |
|---|---|
| Multi-layer switch | Broadcom® StrataXGS® III 565xx series |
| Management/Control Processor | MPC8245 processor |
| Memory | 256MB SDRAM with ECC, 4MB boot flash |
| | 96MB Flash File System Disk |
| 1GbE Ports | Up to 24 |
| 10GbE Ports | Up to 2 |
| Serial Ports | Up to 2 EIA-232 |
| Debug Ports | 1 Ethernet port, 1 JTAG connector |

## Table 5: Summary of Software Specifications*

| Feature | Standard |
|---|---|
| MIB Support | |
| MIB II | RFC 1213 |
| MIB II for SNMPv2c | RFC 1907, 3418 |
| SNMP Community MIB | RFC 3548 |
| SNMP Message Processing and Dispatching MIB | RFC 3412 |
| SNMP Notification MIB | RFC 3413 |
| SNMP Target MIB | RFC 3413 |
| SNMP User Based Security Model MIB | RFC 3414 |
| SNMP View Based Access Control MIB | RFC 3415 |
| Interface group MIB | RFC 2233 |
| Bridge MIB | RFC 1493 |
| MIB for Ethernet-like interfaces (requires support in hardware) | RFC 2665 |
| VLAN MIB | RFC 2674 |
| Spanning Tree Protocol MIB | RFC 1493 |
| Rapid STP MIB | Draft/Prop MIB |
| Multiple STP MIB | Prop MIB |
| Link Aggregation MIB | IEEE 802.3ad, additional Prop MIB |
| Port-based Network Authentication Control MIB | IEEE 802.1X |
| IPv4 MIB | RFC 2011, 2013, 2096, Prop MIB |
| IGMP MIB | RFC 2933 |
| DHCP | Prop MIB |
| RIP v1/v2 MIB | RFC 1723, 1724, 2453, Prop MIB |
| Radius Client MIB | RFC 2618 |
| OSPFv2 MIB | RFC 1850, Prop MIB |
| PIM MIB | RFC 2934, Prop MIB |
| BGPv4 MIB | RFC 1657, Prop MIB |
| DVMRP MIB | Prop MIB |
| VRRP MIB | RFC 2787 |
| Tunnel MIB | Prop MIB |
| IPv6 MIB | RFC 2465, Prop MIB |
| MLD MIB | RFC 3019, Prop MIB |
| RIPv6 MIB | Prop MIB |
| OSPFV3 | Draft, Prop MIB |

| Feature | Standard |
|---|---|
| Management & Administration | |
| SNMP v1/v2c/v3 (Both IPv4 and IPv6 based) | RFC 1155, 1157, 1212, 1213, 1215, 1905, 2089, 2578, 3411, 3412, 3413, 3414, 3415, 3416, 3417 (partial), 3584 |
| CLI (Telnet and console) (both IPv4 and IPv6 based) | - |
| CLI command completion (using Tab) | - |
| Context Sensitive Help in CLI | - |
| Multi-session telnet server | - |
| Web UI (embedded HTTP server) (both IPv4 and IPv6 based) | RFC 1945 |
| Multiple levels of user privileges (CLI And WebUI) | - |
| TLS Protocol | RFC 2246 |
| SSL Protocol Version 3.0 | RFC 2246 |
| SSH Protocol Architecture | Draft |
| SSH Transport Layer Protocol | Draft |
| SSH Authentication Protocol | Draft |
| SSH Connection Protocol | Draft |
| MIB save/restore using FLASH | - |
| MIB save/restore through TFTP | - |
| Trace route logging | - |
| Log file upload to remote system | - |
| IP authorized managers | - |
| Enterprise OID support | - |
| Chassis Management | - |
| Power over Ethernet support | IEEE 802.1af |
| Statistics | |
| RMON (1, 2, 3 & 9 groups) | IEEE 2819 |
| Port Mirroring | - |
| Other | |
| Broadcast Storm Control | - |
| Stacking Support | - |

*Note: Not all RFCs may be listed here. Please contact your local Sales Representative for complete RFC information.

## Table 6: Recommended Parts List for SMS-682 SwitchBox II

| Part Number | Description |
|---|---|
| Variants | |
| SMS-682-2020-M5 | Managed router, 20-ports 1GbE, Layer 2/3 software, standalone 1 slot 6U chassis with power supply. Good to +71°C degrees ambient. |
| SMS-682-2124-M5 | Managed router, 20-ports 1GbE, 4-ports fast Ethernet, Layer 2/3 software, standalone 1 slot 6U chassis with power supply. Good to +71°C degrees ambient. |
| SMS-682-2326-M5 | Managed router, 20-ports 1GbE, 4-ports optical GbE (SX), 2-ports 10GbE, Layer 2/3 software, standalone 1 slot 6U chassis with power supply. Good to +71°C degrees ambient. |
| SMS-682-2226-M5 | Managed router, 24-ports 1GbE, 2-ports 10GbE, Layer 2/3 software, standalone 1 slot 6U chassis with power supply. Good to +71°C degrees ambient. |
| SMS-682-2226M5S | Managed router, 24-ports 1GbE, 2-ports 10GbE, Layer 2/3 software. Includes PMC-110 CryptoNet™ with advanced security (firewall, NAT, IPSec, IKE, Cryptography). Standalone 1 slot 6U chassis with power supply. Good to +71°C degrees ambient. |
| Cable Accessories | |
| CBL-SMS-682-J1 | 38999 Break out cable for the SMS-682 SwitchBox II. Breaks out to 12 Cat5e cables with RJ45 interfaces. Keyed for J1. (Lab use only). |
| CBL-SMS-682-J2 | 38999 Break out cable for the SMS-682 SwitchBox II. Breaks out to 12 Cat5e cables with RJ45. Note if J3-1 GbE optic cable used, last 4GbE ports will be routed to J3 as optical ports. Keyed for J2. (Lab use only). |
| CBL-SMS-682-J3-1 | Break out cable for the SMS-682 SwitchBox II. Breaks out the last 4GbE ports as optical LC plugs. Keyed for J3. (Lab use only). |
| CBL-SMS-682-J3-2 | Break out cable for the SMS-682 SwitchBox II. Breaks out two 10GbE XAUI ports. Keyed for J3. (Lab use only). |
| CBL-SMS-682-J4 | 38999 Break out cable for the SMS-682 SwitchBox II. Breaks out 2x 10/100 Ethernet ports, 2x Serial ports. Keyed for J4. (Lab use only). |
| CBL-SMS-682-J5 | SMS-682 SwitchBox II power cable. Keyed for J5. (Lab use only) |

| Part Number | Description |
|---|---|
| Connector Mating Kit | |
| MKIT-SMS-682-J1245 | SMS-682 mating kit for connectors: J1, J2, J4, J5 |
| MKIT-SMS-682-J3 | SMS-682 mating kit for J3-1 (1G optical), J3-2 (10G copper) |
| Maintenance | |
| MNT-684-0000 | Yearly Software Maintenance |

## Table 7: SMS-682 SwitchBox II Environmental Information

| Environmental Test Name | Test Specification/ Category | Test Levels |
|---|---|---|
| Temperature, Humidity, Altitude | MIL-STD-810F Method 520.2 | -40°C to 55°C; 0 to 10,000ft |
| Vibration | MIL-STD-810F Method 514.5, Procedure I | PSD .05 - .1g2/Hz, 5-2000Hz |
| Acceleration | MIL-STD-810F Method 515.5, Procedure I & II | 15g |
| Salt Fog | MIL-STD-810F Method 509.4 | per standard |
| Contamination by Fluids | MIL-STD-810F Method 504 | Kerosene, petrol, Hydraulic Oil (mineral), Lubricating Oil (mineral), Lubricating Oil (ester), Corrosion Preventative Fluid, Ethylene Glycol (80 and 50%), NBC Decontamination agents |
| Sand and Dust | MIL-STD-810F Method 510.4, Procedure I & II | per standard |
| Rain/ Waterproofness | MIL-STD-810F, Method 506.4, Procedure III | per standard |
| Explosion Proofness | MIL-STD-810F Method 511.4, Procedure I | per standard |
| Shock | MIL-STD-810F Method 516.5, Procedure I | 30g, 11ms |
| Voltage Spike | DO-160E, Section 17, Category A | per standard |
| Conducted Susceptibility | DO-160E, Section 18, Category Z | per standard |
| Induced Susceptibility | DO-160E, Section 19, Category C | per standard |
| RF Susceptibility | DO-160E, Section 20, Category Y | per standard |
| Emission of RF Energy | DO-160E, Section 24, Category M | per standard |

## Warranty

This product has a one year warranty.

## Contact Information

To find your appropriate sales representative, please visit:

Website: www.cwcembedded.com/sales

Email: sales@cwcembedded.com

## Technical Support

For technical support, please visit:

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