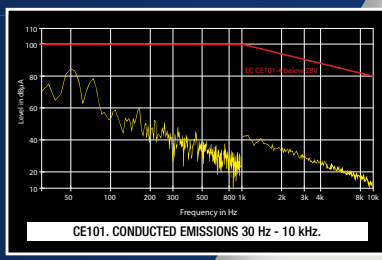
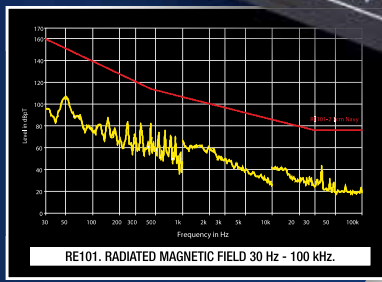


CM-UCMS-MIL-DS-0418



Powered by **SoCe**

MILITARY CM-MIL2004 HSR



UNIVERSAL COTS MILITARY SWITCH

- Designed for demanding multi platform DOD Military Programs.
- Managed 20 Port GbE Switch.
- 4 Port 1000-Base Fiber Optic Links.
- General Purpose Service Ethernet Port.
- Auxiliary RS232 Console Port.
- Advanced Real Time Processing.
- Latest Generation ARM® Cortex Hardware.
- Multilayer Management, Security & Monitoring.
- Sealed Military Enclosure Cold Plate Cooled.
- Dual Redundant MIL-STD-704 AC/DC Power Supply.
- System Operation Front Panel LED Indicators.
- Optimized Conduction-Cooled Heat Dissipation.
- Real Time High/Low Temperature Monitoring.
- Remote Reset, Battleshort & Standby System Control.
- Dual Oversized in-line EMI/EMC Power Input Filters.
- Tested and Certified by Independent Official Laboratories per MIL-STD-810G & MIL-STD-461G.

CERTIFIED FOR IMMEDIATE DEPLOYMENT
The leading ATR manufacturer



SWITCH OVERVIEW



The CM-MIL2004-HSR is a COTS general purpose 20+4 port managed Gigabit Ethernet Switch that is packaged in a reliable, lightweight and compact MIL-STD-810G certified enclosure. A military compliant dual redundant power supply is fitted in full equipped versions to cover all applications and accept American & European standard AC/DC voltages for immediate worldwide operation.

Latest generation conduction-cooled electronics have been custom designed to fit enclosure mechanics and withstand harsh environments. The Switch is fitted with a complete set of active auxiliary electronics and supervisory systems that are indispensable for next generation programs and provide increased payload safety, greater system control and easy integration.



↑50+W
PAYLOAD POWER DISSIPATION

LED	NAME	COLOR	FUNCTION WHEN PANEL LED IS ILLUMINATED
ON	PAYLOAD-POWER ON	GREEN	Indicates PSU output DC power is supplied OK and within voltage tolerances
BIT	BUILT-IN-TEST	GREEN	Indicates Switch electronics has passed self test successfully (no fault detected)
PFM	POWER FAIL MONITOR	RED	Indicates Switch external power input voltage falls below the minimum range
TSPW	TEMP SUPERVISOR ON	GREEN	Indicates the Temperature Supervisor Unit is DC powered (TSU is operational)
DTR_1	DATA TRAFFIC RING 1	YELLOW	Flashes when data transfer occurs in Communication Ports assigned to Ring 1
DTR_2	DATA TRAFFIC RING 2	YELLOW	Flashes when data transfer occurs in Communication Ports assigned to Ring 2
TSLO	LOW TEMP FAIL	RED	TSU indicates the system is operating below the Low Temperature threshold
TSHI	HIGH TEMP FAIL	RED	TSU indicates the system is operating above the High Temperature threshold

LED indicators inform of system power input/output status, data transfer activity, payload electronics self test pass/fail, operational temperature compliance and standby mode. This information serves during operation in-the-field, maintenance and software development.

SWITCH VERSIONS & FEATURES



The MIL COTS Switch is precision engineered to satisfy the most demanding military programs.

A 'STANDARD' version incorporates all the features that are common in the military rugged Switch market.

A 'PLUS' improved version fits a wide set of extras that make it ideal for new generation critical systems.

When reliability and performance matter, version 'PLUS' includes a Dual Redundant PSU, Temperature Supervisory Unit, Cold Start-up Heaters, Double Capacitor Bank for extended hold up time, Front Panel LED Indicators, Remote Operation capability & Power Fail Monitor. This version is delivered within an extended fins enclosure that provides 30% greater self-dissipation capability.

Oversized In-line EMI/EMC Filters

Low and High frequency filters are fitted for full MIL-STD-461G compliance. These filters have been selected-on-test (matched) in Official Labs for performance.

PSU Input Protection

The Switch dual PSU modules are reverse polarity protected, also fitting an inrush current and over voltage limiter.

DC/DC Converters

Installed DC/DC converters provide over current and short circuit protection, input/output galvanic isolation, thermal protection and military temperature range.

Extended Hold-up

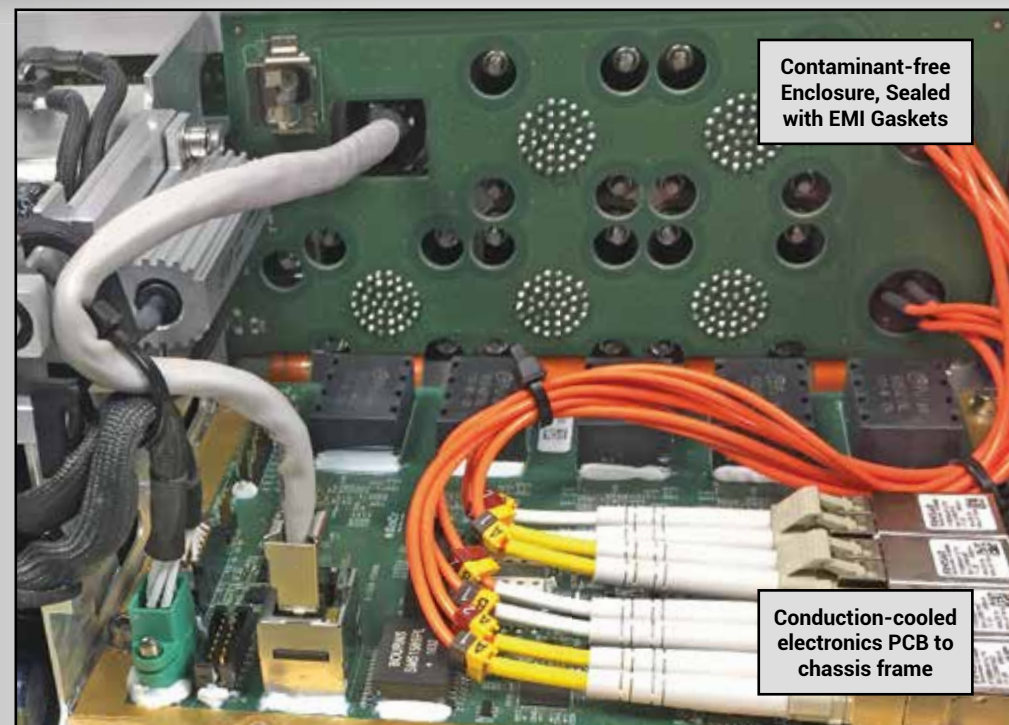
An oversized set of hold-up capacitors are fitted to maintain Switch circuitry DC voltages in the event of momentary power loss of the PSU input voltage.

Time Delay Fuses

Six military PCB fuses are fitted across the dual PSU modules in order to provide protection to the front end stage, DC/DC converters and TSU power electronics.

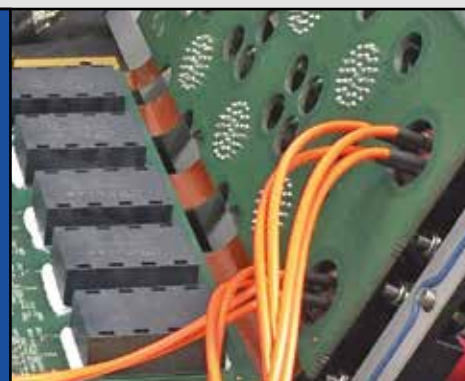
Power Fail Monitor

A power supervisory device continuously monitors the primary AC or DC Switch PSU input power voltage and notifies the payload when power failure is imminent.



FLEX I/O Wiring Solution

The Switch digital payload is comprised of a conduction-cooled main PCB and a front panel PCB that are connected via flexi-circuits. This high tech solution carries hundreds of signals within a small space, avoiding conventional cable I/O wiring or board-to-board connectors. Advantages include superior signal integrity and electrical performance, built-in signal track ground shielding and reduced installation time and production cost.



DC Supervisor

The PSU DC output voltage is monitored via a micropower chip to ensure voltage level is within a specified tolerance. The monitor chip illuminates the panel ON green LED when payload voltage is in range.

PSU Faraday Cavity

The internal Switch layout incorporates an independent metallic partition for housing the PSU modules and in-line filters. This greatly reduces PSU heat and avoids electrical noise on payload electronics.

Dual Input Diode

A dual diode with common cathode is installed on the rear of the front panel when the STD Switch is ordered for redundant operation with two external batteries.

Switch PSU Specifications

- PSU operating Temperature: -40 to +90°C
- PSU storage Temperature: -50 to +120°C
- PSU DC/DC converter average efficiency: 89%
- PSU Hold-up Time: 56 ms @ 28VDC - 40W.

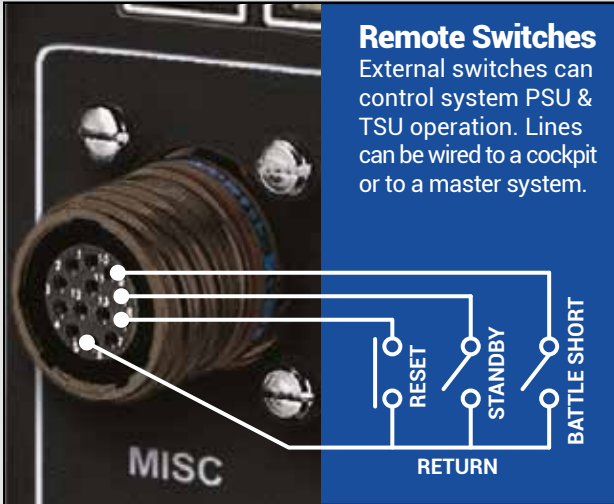
- DC/DC converter in-to-out galvanic isolation: 3000 Vrms
- DC/DC converter baseplate-to-out galvanic isolation: 500 Vrms
- DC PSU over-voltage transient suppression: 2.5x nominal 12.5 ms
- AC PSU over-voltage output surge suppression: 1Kv during 50 μ s
- PSU DC power output Ripple and Noise: less than 30 mV RMS

TEMPERATURE SUPERVISOR



A Temperature Supervisory Unit (TSU) is fitted in the MIL COTS 'PLUS' version. This device protects Switch electronics against extreme climatic conditions, switching the power supplies OFF (Standby) when the internal temperature is under or over the established limits. Users may set HI & LO temperature trip-points to regulate and optimize the system safety operational temperature range.

Heating elements are also fitted for mitigating against cold startups. An 'early warning' signal advises the digital electronics prior to shutdown-to-standby, allowing critical data to be orderly stored and saved. Switch power is restored once internal temperatures are within operational limits. All functions can be user enabled or disabled by soldered bridges.



Remote Switches
External switches can control system PSU & TSU operation. Lines can be wired to a cockpit or to a master system.



Thermal Monitoring

The Low and High TSU temperature trip points are user adjustable through two multi-turn trimming resistors located in the power supply PCB. Factory presets fitted with fixed resistors can be installed in production series.

Thermal Heaters

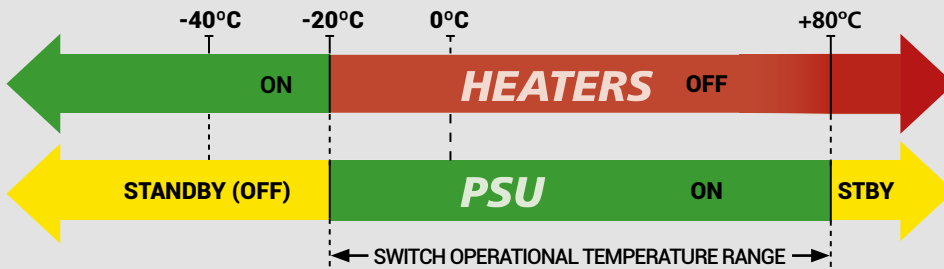
Resistive heating elements powered by the TSU are bolted to the enclosure frame in order raise internal temperatures during cold startups.

Battle Short Switch

Ability to disable the TSU during an emergency or battle situations via the remote 'Battle short' switch. This bypasses and overrides all critical TSU functionalities despite the risk of payload temperature over-stress.

Front Panel LEDs

TSU status and operations can be visualized in real time via three chassis front panel LEDs: TSPW (TSU power on), TSHI (system over temperature) and TSL0 (system under temperature).



BATTLE Remote	STANDBY Remote	SYSTEM POWER SUPPLY & TSU STATUS
Switch-OFF	Switch-OFF	NORMAL OPERATION. Both PSU and TSU operate normally.
Switch-OFF	Switch-ON	PSU in STAND-BY MODE. The PSU converters are forced to stand-by. No DC power is available to the digital payload. The TSU operates normally.
Switch-ON	Switch-OFF	BATTLE MODE (TSU DISABLED). The PSU is operating normally. The TSU is not allowed to shut-down the system power regardless of temperature.
Switch-ON	Switch-ON	PSU in STAND-BY MODE. The PSU converters are forced to stand-by. No DC power is available to the digital payload. The TSU is disabled.

TSU Power Supply

TSU circuitry is powered by an independent +5VTSU @ 2 Watt PSU. This module is permanently connected to the Switch primary power input & remains operational during Standby.

PSU Standby Switch

Allows the user to manually set the system to 'low power' Standby mode without requiring to switch off the mains breaker, should the system be required to operate for a few hours but remain available on demand.

Delayed Shut-down

An AC/DC FAIL* signal advises the Switch CPU when power failure is imminent prior to power shut-down. Ethernet communications and critical data in memory, etc may be orderly stopped or saved.

Reset Push Button

A remote push button allows to RESET the Switch digital payload without switching off the mains breaker. TSU remote operations can be manually activated by an operator or via a master computer.

TSU Power Supply Specifications

- Provides +5VTSU DC output voltage, up to 2 Watts.
- Autorange input 80-265 VAC 20-1000 Hz. 7 mA typical.
- 28VDC 32mA, 48VDC 18mA, 270VDC 4mA typical ($\pm 40\%$)
- Output current short circuit protection in +5V_TSU: 400 mA.

TSU Heater Elements

- DC 12 VDC @ 3.3 Amps.
- DC 28 VDC @ 1.5 Amps.
- DC 48 VDC @ 0.8 Amps.
- DC 270 VDC @ 0.15 Amps.
- AC 115 VAC @ 0.3 Amps.
- AC 220 VAC @ 0.18 Amps.

MILITARY PSU INPUT OPTIONS



The MIL COTS Switch power supply unit is extremely versatile in order to cover the full range of system applications regardless of the available end platform primary (main) and secondary power voltage.

The three integrated high performance PSU blocks incorporate a range of features that are only available in latest generation advanced military systems.

When Switch reliability is mission critical and faults are not tolerated, the 'PLUS' dual redundant PSU version ensures low stress load sharing for the twin DC/DC converters and mitigates the risk of an output power failure.

A wide variety of single or redundant AC/DC power input combinations are supported as standard to guarantee flawless operation in worst case scenarios.

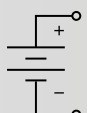
'STANDARD' VERSION POWER SUPPLY

AC GENERATOR

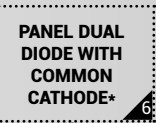


220 or 115 VAC
(±30% @ 40-880Hz)

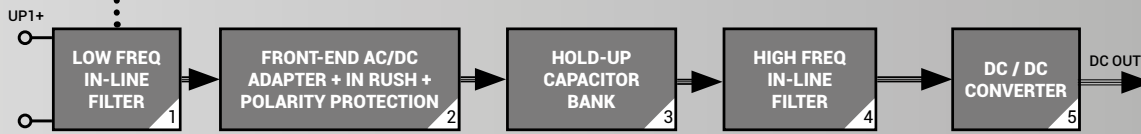
DC BATTERY



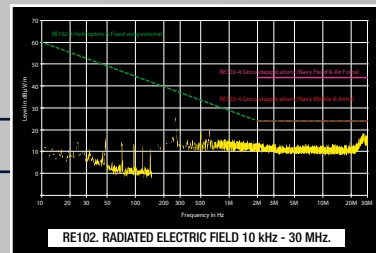
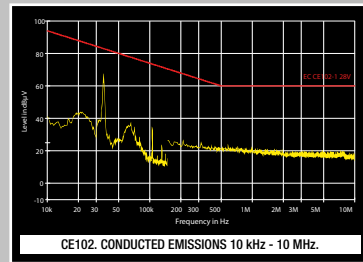
12 or 28 VDC
(18-36 VDC @ 75W)
(9-36 VDC @ 50W)



* Part factory fitted only in 2SDC Configured Systems



NOTE: UP1 & UP2 are Universal Input Power Terminals



MIL COTS SWITCH ELECTRONICS
PAYLOAD
(MAIN BOARD)

'PLUS' VERSION POWER SUPPLY

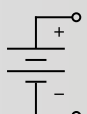
NOTE: Primary and Secondary PSUs are floating, independent and galvanically isolated.

AC GENERATOR

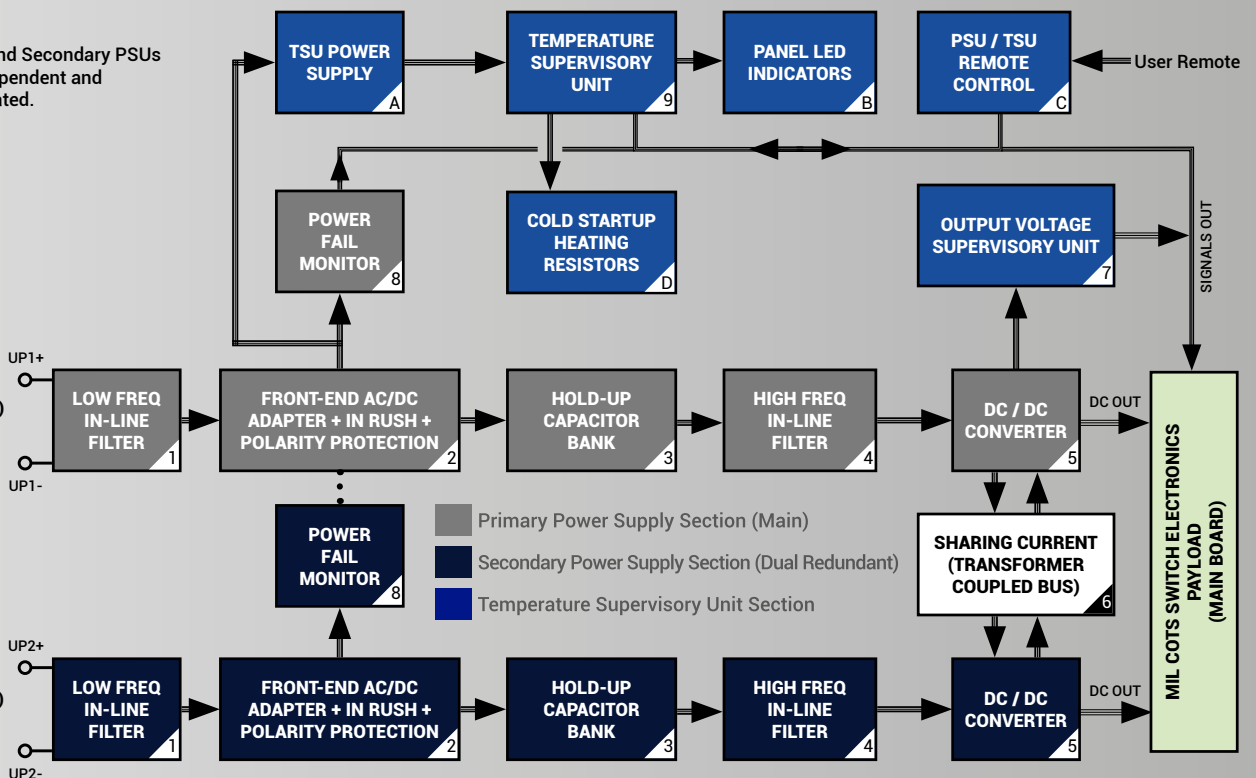


220 or 115 VAC
(±30% @ 40-880Hz)

DC BATTERY



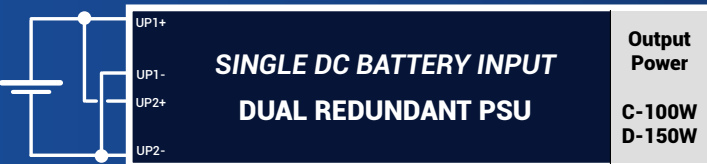
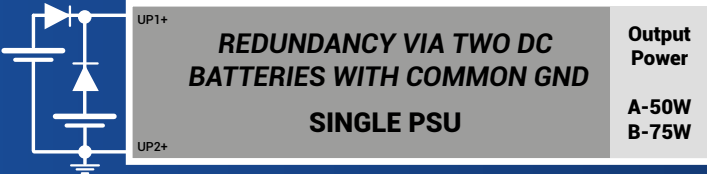
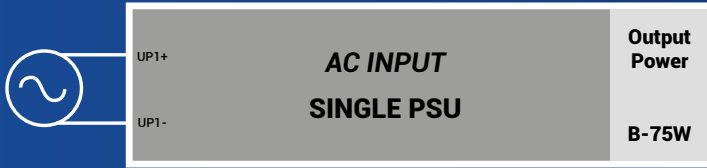
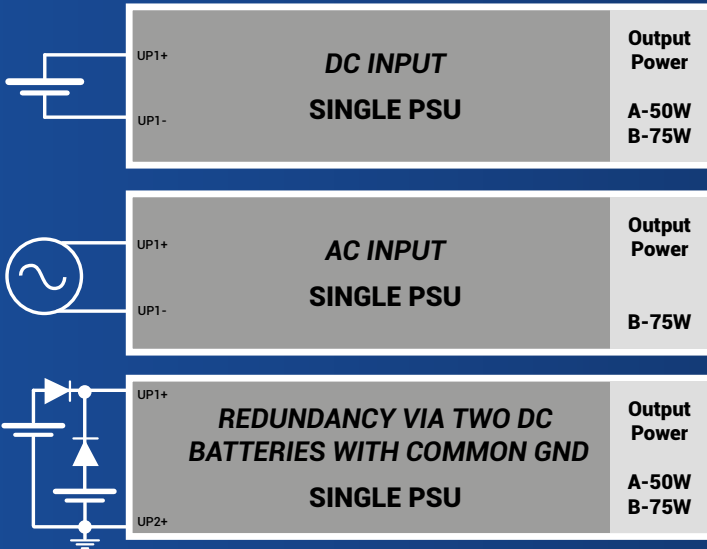
12 or 28 VDC
(18-36 VDC @ 75W)
(9-36 VDC @ 50W)



- Primary Power Supply Section (Main)
- Secondary Power Supply Section (Dual Redundant)
- Temperature Supervisory Unit Section

MIL COTS SWITCH ELECTRONICS
PAYLOAD
(MAIN BOARD)

STANDARD VERSION



PLUS VERSION - DUAL REDUNDANT PSU

1. - 1SDC

Suited for UAVs, light armored vehicles and mobile ground weapon or communication systems equipped with DC batteries.

2. - 1SAC

Ideal for Navy and Aircraft platforms fitted with 115 or 220VAC generators. This configuration is also suitable for laboratory and maintenance facilities.

3. - 2SDC

Ideal for military UAVs, mobile ground weapon systems and heavy armored vehicles fitting multiple DC battery banks that share a common ground.

4. - 2DRAC

Suited for mission critical AC applications aboard Navy and Aircraft platforms that require dual redundancy, greater reliability and extended MTBF.

5. - 2DRACDC

Ideal for multi-role mission critical applications that require both AC and DC dual redundancy, greater reliability and extended MTBF.

6. - 2DRDC

For mission critical UAVs, ground systems and heavy armored vehicles that require full dual DC redundancy, greater reliability and extended MTBF.

7. - 1DRDC

For single battery mission critical UAVs, mobile weapon systems & light armored vehicles requiring dual redundancy, greater reliability & extended MTBF.

8. - 1DRAC

For single AC generator mission critical UAVs, Navy and Aircraft platforms requiring dual redundancy, greater reliability and extended MTBF.

CODE	SWITCH PSU PART NUMBER CONFIGURATION
1	Switch is powered by One External AC or DC Source
2	Switch is powered by Two External AC or DC Sources
S	A single PSU is fitted in the Switch (STANDARD Version)
DR	Two (dual redundant) PSUs are fitted in the Switch (PLUS Version)
115VAC	The input voltage is 115VAC @ 40-880Hz
220VAC	The input voltage is 220VAC @ 40-880Hz
12VDC	The input voltage is 12VDC (9-36VDC @ 50W)
28VDC	The input voltage is 28VDC (9-36VDC @ 50W or 18-36VDC @ 75W)
48VDC	The input voltage is 48VDC (36-75VDC @ 75W)
270VDC	The input voltage is 270VDC (180-375VDC @ 75W)
A-50W	The Switch fits a single 9-36VDC PSU with 50W output
B-75W	The Switch fits a single AC or 18-36VDC PSU with 75W output
C-100W	The Switch fits two redundant 9-36VDC PSUs with 50W+50W output each
D-150W	The Switch fits two redundant AC or 18-36VDC PSUs with 75W+75W output each

PSU PART NUMBER EXAMPLES

- 1 S 12VDC A-50W
- 1 S 115VAC B-75W
- 1 DR 12VDC C-100W
- 1 DR 28VDC D-150W
- 2 DR 12VDC 12VDC C-100W
- 2 DR 28VDC 220VAC D-150W
- 2 DR 115VAC 220VAC D-150W
- 2 DR 270VDC 48VDC D-150W
- 2 DR 115VAC 12VDC C-100W
- 2 DR 115VAC 28VDC D-150W

FUNCTIONAL OVERVIEW

Powered by

SoCe



Ports Configuration

- 4x 1000-Base-SX Fiber Optic HSR/PRP Port (other media options optional)
- 20x 10/100/1000-BaseT Copper Ports

Zync UltraScale + EG

EG devices feature a quad-core ARM® Cortex-A53 platform running up to 1.5GHz. Combined with dual-core Cortex-R5 real-time processors, a Mali-400 MP2 graphics processing unit, and 16nm FinFET+ programmable logic, EG devices have the specialized processing elements needed to excel in next generation Aerospace and Defense applications.

RAM Memory

- 16Gb DDR4 - 64-bit w/ ECC attached to Processor Subsystem

HSR / PRP Technology

- Reconfigurable Switch Architecture: flexible combination of low-latency HSR/PRP, L2 and L3 blocks

Redundancy

- IEC 624393 Clause-4 PRP 'Parallel Redundancy Protocol'
- IEC 624393 Clause-5 HSR 'High availability Seamless Redundancy'
- Optional IEC 62439-2 Media Redundancy Protocol (MRP)
- Optional Device Level Ring (DLR) Redundancy
- Optional IEEE 802.1w for RSTP (Rapid Spanning Tree Protocol)

Layer-3 Functionalities (not applies to HSR/PRP ports)

- IPv4/IPv6
- Multicast IP Routing
- IGMP Snooping
- DSCP TOS
- Dynamic Routing
- BGPv4, BGPv6, OSPFv2, RIPv2
- Static routing

Security

- IEEE 802.1X access control: port & MAC based authentication, MAC Port binding & authentication for login security
- TACACS+, and RADIUS Authentication
- Secure Shell (SSH) Protocol v2
- Internal Gyroscope and Accelerometer for security purposes
- TPM chip for identity authentication
- AES 256/HMAC/RSA 2048 Encryption/Authentication & Signature for firmware and bitstream

Telecontrol

- Protocol SNMP V1/V2/V3

TT-Ethernet

- IEEE 1588 AS profile -TSN- supported (station & switches)

Gateway

- Optional CAN 2.0 Integrated ports
- Optional RS-232/422/485 buses with Modbus / Profibus / Serial Console

Layer-2 General Functionalities

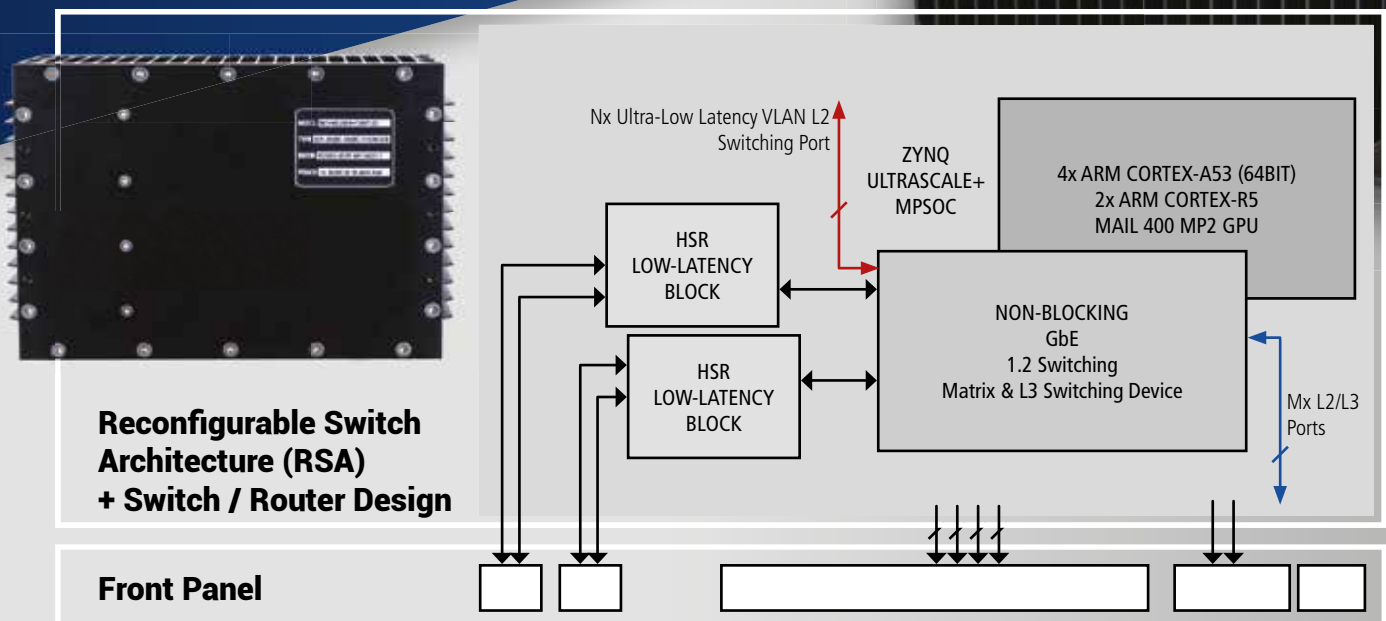
- IEEE 802.3-2000
- Automatic MAC Address Learning and Aging
- Static MAC Table
- Port-Based Virtual LANs (VLANs)
- IEEE 802.1Q for VLAN Tagging
- IEEE 802.1Q for VLAN based Ethernet Priorities
- Ethertype Based Switching
- IEEE 802.1p for Class of Service (CoS)
- IEEE 802.1ab for Link Layer Discovery Protocol (LLDP)
- Priority Modes: PCP (802.1p), Ethertype (Up to 16)
- Broadcast protection configurable via register
- Layer 2 Multicast Filtering
- Jumbo Frame Support
- IEEE 1588 StateLess TC (Transparent Clock)

Synchronization

- IEEE 1588v2 PTP 'Precision Time Protocol' Profiles with E2E mode and P2P mode of operation
- IEEE 1588v2 PTP 'Precision Time Protocol' over HSR & PRP
- Optional Ordinary Clock & Boundary Clock mode of operation
- S(NTP) & Client

Management and Monitoring

- HTTPS WEB interface with secure firmware/bitstream update
- Graphic representation of Network status (HSR DANs & VDANs)
- Statistics independent per port
- SNMP RFC 1157/RFC
- DHCP (Client and Server)
- ANSI C Low Level Library
- System Syslog
- MIB Support
- Console Port



ORDERING INFORMATION



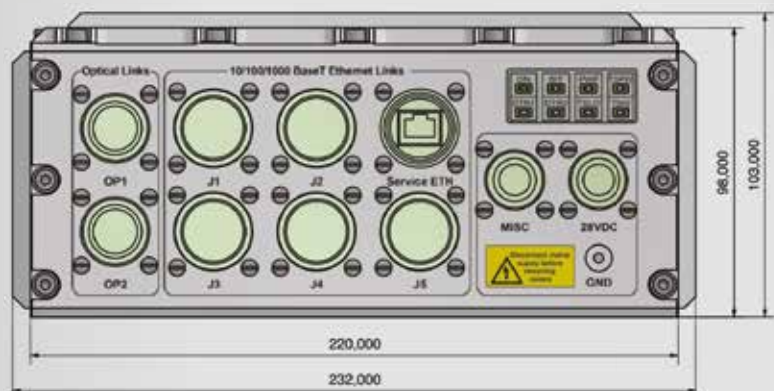
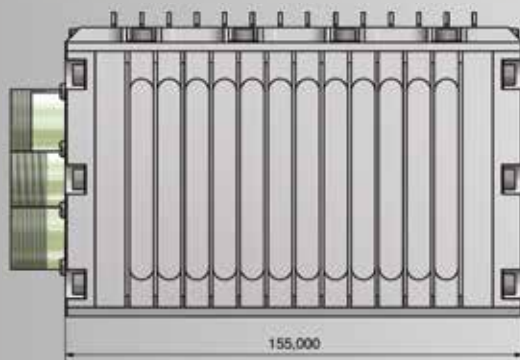
CM-MIL2004-HSR / PLUS / 2DR 28VDC 220VAC D-150W / B / E

System Version (STD or PLUS) _____
 Primary Input Power _____
 Secondary Input Power _____
 PSU Output Power _____
 Mounting (Base or Side or NAS622 or Legs) _____
 Color (Black or Earth) _____

GENERAL SPECIFICATIONS	
Dimensions (mm)	220 (W) 155 (D) 98 (H)
Weight (Kg)	1.9Kg (metalwork) 3.4Kg (with PSU & Payload)
DC Power Input / Consumption	+28VDC, +48VDC, +270VDC / 50W Max.
AC Power Input / Consumption	115VAC 40-800Hz, 220VAC 40-800Hz / 50W Max.
I/O Ports	Ethernet (5x4), Fiber (2x2), RS232 (1), RJ45 (1)
Power & Control	Miscellaneous (13pin), Power (5pin)

MILITARY STANDARDS	
MIL-STD-461G	CE101, CE102, CS101, CS114, CS116, RE101, RE102, RS101, RS102
MIL-STD-810G	Method: 501.4, 502.4, 507.4, 508.5, 509.9, 513.5, 514.5, 516.5
MIL-DTL-38999, MIL-STD-704F, MIL-STD-1474D, MIL-STD-110F, MIL-STD-1275D, IP68	

MIL-STD TESTING & SYSTEM DIMENSIONS



The MIL COTS Switch is mounted as standard via six M4 bottom cover threads that provide secure attachment to the application vehicle base plate. Other mounting options are available upon request. These include side or rear panel fixings, protruding bottom cover legs, front NAS-622 hooks and self-clinching pilot pins, or other.

The enclosure has a self dissipation capacity up to 50W and is not dependent upon cold plate mounting. Cold plate installation is recommended to significantly improve thermal performance and decrease payload Delta-T by approximately 12-15°C. This will double the MTBF of the enclosed electronics.

LEARN MORE: WWW.CMCOMPUTER.COM
OR CALL : +34 954 253 116 | +34 954 253 119

