

## Viking Series

20x1000Base-T + 2x10GBase-SR Ports, MIL-DTL-38999, L2+ Managed Ethernet Switch, 28VDC



### FEATURES

- 20x triple-speed (10/100/1000 Mbps) copper Ethernet ports
- 2x 10GBase-SR Multimode fiber optic Ethernet ports
- Copper cable link distances up to 100 Meters (EIA/TIA Cat-5E)
- Optical fiber link distances up to 300 Meters (50/125µ 2000MHz\*Km MMF)
- Operating temperature range from -40°C to +75°C
- Full duplex flow control per IEEE Std 802.3X and half duplex back pressure, symmetric and asymmetric
- Shock, vibration and immersion resistant per MIL-STD-810
- Olive drab cadmium plating meets stringent corrosion resistance specifications
- Aluminum connectors and housings are strong, durable and light weight
- Auto sensing of half or full duplex operation
- 802.1Q VLAN switch with 32K MACs and 4K VLANs
- Push, pop, and translate ingress/egress
- Policing with storm control and MC/BC protection
- Hierarchical quality of service (QoS)

### APPLICATIONS

Viking series 10/100/1000Base-T + 10GBase-SR Ethernet switches enable high speed network communications in harsh environments.

The MIL-DTL-38999, Series III shells provides sealed interfaces that are water-tight to MIL-STD-810 when mated.

The 10Gbps multimode optical fiber interface supports applications where copper cable link distance, bandwidth, weight or bulk make the use of twisted pair, twinax or quadax copper conductors unacceptable.

### DESCRIPTION

Viking series 20+2 Ethernet switches consist of 20x 10/100/1000Base-T ports plus 2x10GBase-SR MMF ports integrated into a wall or floor mounted assembly.

The external copper cable interfaces of the Viking series 10/100/1000Base-T + 10GBase-SR Ethernet switches are 2xD38999/25-35 Series III connectors with 10x IEEE-802.3U compliant Gigabit Ethernet ports in each connector plus the power supply, CLI and ground connections. The external fiber optic cable interface of the Viking series 10+2 Ethernet switch is a D38999/13-04 Series III connector with 2x 10GBase-SR multimode fiber optic Ten Gigabit Ethernet ports.

Viking series Ethernet switches are vibration isolated, environmentally hardened components designed for use in harsh environment applications.

- Sealed against liquid and solid contaminants
- Shock and vibration resistant

### ORDERING INFORMATION

Application	Part Number
20x10/100/1000Base-T + 2x10GBase-SR	VS506-AMWN
See Appendix A2 for more part number options	

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## POWER

Standard	Feature	Minimum	Typical	Maximum	Unit
MIL-STD-1275D / 704F	Supply Voltage	+12.0	28.0	+36.0	VDC
	Current		1300	1400	mA
	Power Consumption		36.4	39.2	W

## EMI / EMC

Standard	Method	Feature	Minimum	Maximum	Unit
MIL-STD-461F	CS101	Conducted Susceptibility, Power Leads	30	150	KHz
	CE102	Conducted Emissions, Power Leads	10	10000	KHz
	RE102	Radiated Emissions, Electric Field	0.01	18,000	MHz
	RS103	Radiated Susceptibility, Electric Field	30	18,000	MHz

## RELIABILITY

Standard	Method	Feature	Maximum	Unit
HDBK-217F	Parts Count	MTBF	TBD	Hours
		FITS	TBD	10 <sup>9</sup> Hours

## SAFETY

Standard	Feature	Condition	Notes
FDA / CDRH / IEC-825-1	Eye Safety	Class 1	No Safety Interlocks Required

## ENVIRONMENTAL

Standard	Method	Feature	Minimum	Maximum	Notes
MIL-STD-810G	501, 502	Storage Temperature	-55	+100	°C
	501, 502	Operating Temperature	-40	+75	°C
	514	Random Vibration	10	2000	Hz
	516	Operating Shock		40.0g	11mS
	507.5	Humidity - Non Condensing		95% RH	40 °C
	500	Operational Altitude		3,962	M
	500	Storage Altitude		12,192	M
	510.4	Blowing Sand and Dust		10	g/M <sup>3</sup>

## MATERIALS

Item	Detail	Notes
Chassis and Connectors	T-6061 Aluminum Alloy	
Chassis Finish	OD-CD, NI or ZN-NI	
PCB	Conformal Coating	
Weight	<70.0oz. / 2.0Kg	

## Ethernet Switch Management Features

<b>PERFORMANCE</b>	<b>PARAMETER</b>
Port Speeds	Wire-speed switching on all ports
Maximum Transmission Unit (MTU)	Up to 9600 bytes
<b>MANAGEMENT AND MONITORING</b>	<b>PARAMETER</b>
Management Port Access	(CLI) over Serial; Web Browser, HTTP / HTTPS
Simple Network Management Protocol	SNMP v1 / v2 / v3
DHCP Client	DHCP Port-Based Allocation
IEEE 802.1AB-2005 Link Layer Discovery – LLDP	LLDP defined by IEEE 802.1AB
<b>L2 SWITCHING</b>	<b>PARAMETER</b>
MAC Addresses – Static / Auto MAC addr. Learning/Ageing	Up to 32K Addresses
QoS: Quality of Service Classification/Prioritization of Data	Number of active traffic classes (1, 2, 4 or 8)
VLAN: Virtual Local Area Network Segmentation	Up to 4K VLAN's
Internet Group Management Protocol	IGMPv2 snooping
Port Mirroring	Ingress and Egress mirroring
Link Aggregation	Static or LACP
Storm Control for UC, BC and Unknown	Policer for flooded unicast, multicast and broadcast frames
Random Early Discard (RED)	Weighted Random Early Detection
Spanning Tree Protocol	RSTP & STP
STP Loop prevention	Loop Guard
IEEE-802.1ad Provider Bridge	Native or Translated VLAN
<b>SECURITY</b>	<b>PARAMETER</b>
Port-Based 802.1X	Port access control based on IEEE802.1X
MAC-Based Authentication	MD5 authentication against RADIUS server
Web & CLI Authentication	User Authorization Levels for CLI and Web management
ACLs for filtering/policing/port copy	Access Control Lists for filtering, policing or port copy

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**OPTICAL TRANSMITTERS  $T_A$  = Operating Temperature Range**

Parameter	Symbol	Minimum	Typical	Maximum	Unit
Optical Output Power (BER<10 <sup>-12</sup> )	$P_o$	-5.0		-1.0	dBm
Optical Output Wavelength	$\lambda_{OUT}$	840	850	860	nM
Spectral Width	$\Delta\lambda_{RMS}$			0.45	nM
Extinction Ratio	ER	3.0	5.5		dB

**OPTICAL RECEIVERS  $T_A$  = Operating Temperature Range**

Parameter	Symbol	Minimum	Typical	Maximum	Unit
Optical Sensitivity (BER<10 <sup>-12</sup> )	$P_i$	-11.1		0.0	dBm
Optical Wavelength	$\lambda_{IN}$	840	850	860	nM

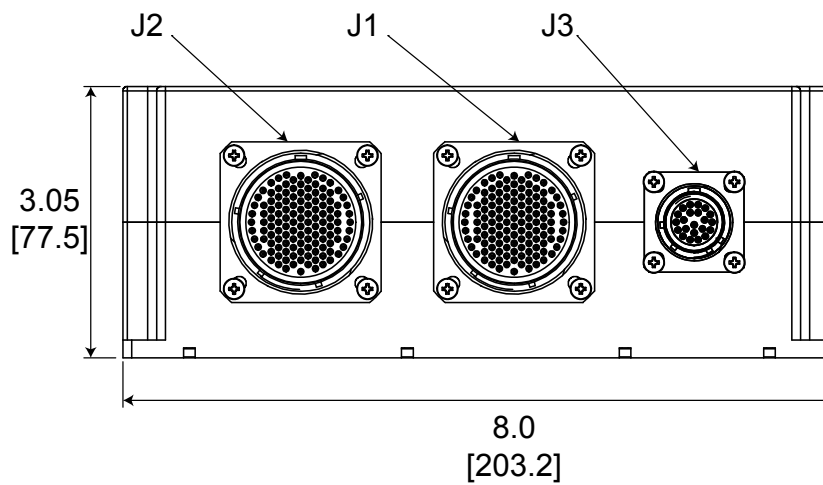
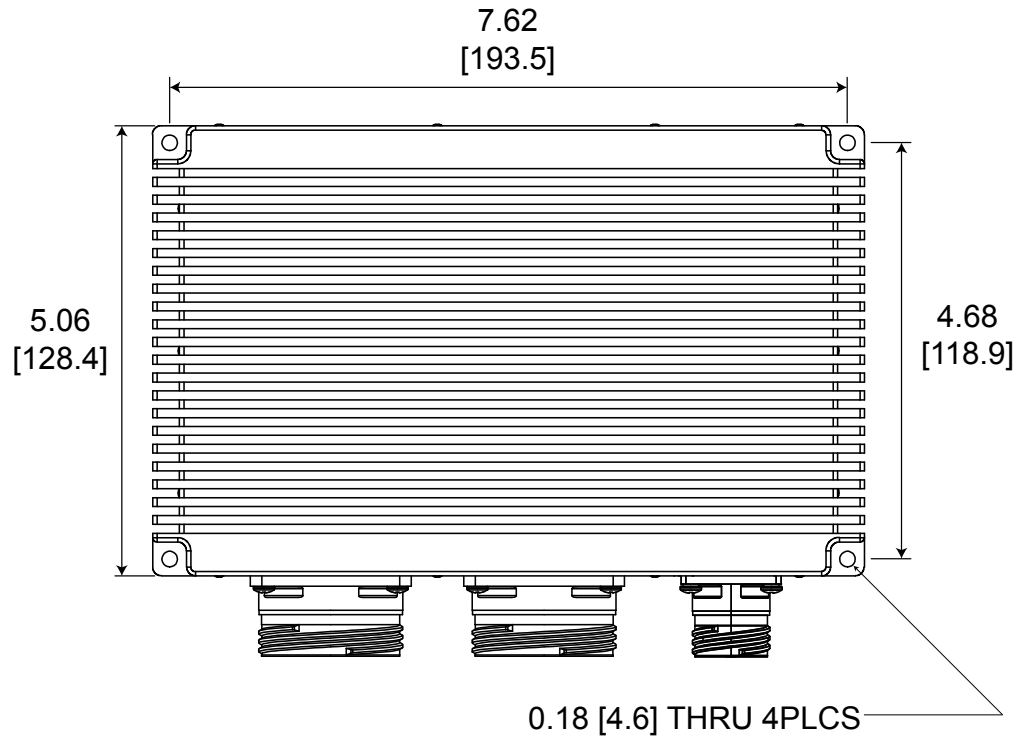
**OPTICAL LINK DISTANCES**

Cable Type	62.5/125 $\mu$ 160MHz*Km	62.5/125 $\mu$ 200MHz*Km	50/125 $\mu$ 400MHz*Km	50/125 $\mu$ 500MHz*Km	50/125 $\mu$ 2000MHz*Km
Maximum Supported Link Distance - Meters	26	33	66	82	300

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**OUTLINE DRAWING**

Dimensions are shown as: inches [mm]



Viking Ethernet Switch, D38999, 28VDC  
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**J1 & J2 / D38999/24xJ35PN ELECTRICAL PIN FUNCTIONS - Continued on next page**

J1 Port #	J2 Port #	Pin #	Pin Function	RJ-45 Eq. Pin #	Logic Family
1	11	9	MDA+	1	IEEE-802.3 - 10/100/1000Base-T
		17	MDA-	2	
		10	MDB+	3	
		18	MDB-	6	
		11	MDC+	4	
		19	MDC-	5	
		12	MDD+	7	
		20	MDD-	8	
2	12	25	MDA-	2	
		36	MDA+	1	
		26	MDB-	6	
		37	MDB+	3	
		27	MDC-	5	
		38	MDC+	4	
		28	MDD-	8	
		39	MDD+	7	
3	13	48	MDA+	1	
		59	MDA-	2	
		49	MDB+	3	
		60	MDB-	6	
		50	MDC+	4	
		61	MDC-	5	
		51	MDD+	7	
		62	MDD-	8	
4	14	71	MDA+	1	
		82	MDA-	2	
		72	MDB+	3	
		83	MDB-	6	
		73	MDC+	4	
		84	MDC-	5	
		74	MDD+	7	
		85	MDD-	8	

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**J1 & J2 / D38999/24xJ35PN ELECTRICAL PIN FUNCTIONS - Continued on next page**

J1 Port #	J2 Port #	Pin #	Pin Function	RJ-45 Eq. Pin #	Logic Family
5	15	94	MDA+	1	IEEE-802.3 - 10/100/1000Base-T
		105	MDA-	2	
		95	MDB+	3	
		106	MDB-	6	
		96	MDC+	4	
		107	MDC-	5	
		97	MDD+	7	
		108	MDD-	8	
6	16	109	MDA+	1	
		117	MDA-	2	
		110	MDB+	3	
		118	MDB-	6	
		111	MDC+	4	
		119	MDC-	5	
		112	MDD+	7	
		120	MDD-	8	
7	17	90	MDA+	1	
		101	MDA-	2	
		91	MDB+	3	
		102	MDB-	6	
		92	MDC+	4	
		103	MDC-	5	
		93	MDD+	7	
		104	MDD-	8	
8	18	66	MDA+	1	
		78	MDA-	2	
		67	MDB+	3	
		79	MDB-	6	
		68	MDC+	4	
		80	MDC-	5	
		69	MDD+	7	
		81	MDD-	8	

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**J1 & J2 / D38999/24xJ35PN ELECTRICAL PIN FUNCTIONS - Continued from previous page**

J1 Port #	J2 Port #	Pin #	Pin Function	RJ-45 Eq. Pin #	Logic Family	
9	19	43	MDA+	1	IEEE-802.3 - 10/100/1000Base-T	
		55	MDA-	2		
		44	MDB+	3		
		56	MDB-	6		
		45	MDC+	4		
		57	MDC-	5		
		46	MDD+	7		
		58	MDD-	8		
10	20	21	MDA+	1		
		32	MDA-	2		
		22	MDB+	3		
		33	MDB-	6		
		23	MDC+	4		
		34	MDC-	5		
		24	MDD+	7		
		35	MDD-	8		
J1 Only HTTPS Dedicated Management Port		115	MDA+	1		
		116	MDA-	2		
		122	MDB+	3		
		123	MDB-	6		
		124	MDC+	4		
		125	MDC-	5		
		126	MDD+	7		
		127	MDD-	8		
J1 Only Console Management		113	GND	N/A		N/A
		121	CLI			RS232_IN
		128				RS232_OUT
		100	Reset			Active Low LVTTTL
J1 Only Power Supply		1	Vcc		N/A	
		2				
		3				
		4				
		5	GND			
		6				
		7				
		14				

All other pins are N/C - Factory use only

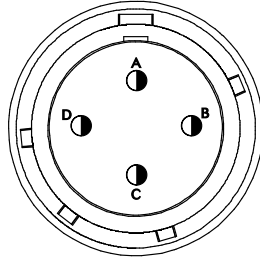


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## **J3 PIN FUNCTIONS**

### **ETHERNET PORT AND PIN ASSIGNMENTS**

#### **TOP**



Front view of the D38999 optical  
insert shown, fiber optic cable plug  
opposite - see Appendix A1 for details

#### **MIL-DTL-38999 OPTICAL INTERFACE**

<b>PORT NUMBER</b>	<b>TX</b>	<b>RX</b>
1	A	B
2	C	D

## APPENDIX A1

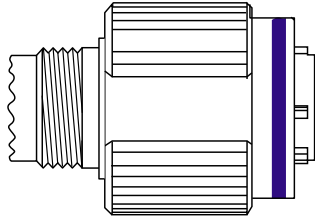
### MIL-DTL-38999 FIBER OPTIC CABLE PLUG / MIL-T-29504 RECEPTACLE TERMINI

#### \*D38999 PLUG - RECEPTACLE INSERT

##### MIL-DTL-38999 CABLE PLUG

MS PLUG P/N

\*D38999/26xC04Sy



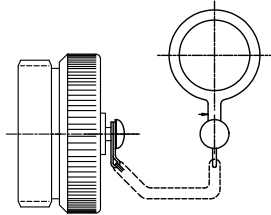
x = Finish, y = Polarization Option

#### \*CABLE PROTECTION CAP

##### D38999/32 PLUG PROTECTION CAP

MS PLUG CAP P/N

\*D38999/32W11N

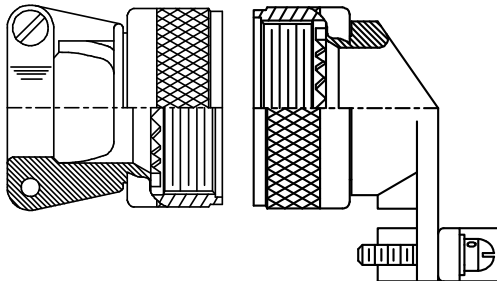


#### \*CABLE BACKSHELL

##### MIL-C-85049 CABLE BACKSHELL

MS BACKSHELL P/N

\*MS85049/xxxxxx\*\*



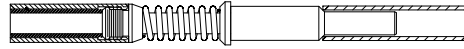
\*\*Straight or angled backshell - defined by application / mounting configuration

#### \*FIBER OPTIC TERMINUS

##### M29504 RECEPTACLE TERMINUS

RECEPTACLE

\*M29504/05-xxxx\*\*



\*\*defined by fiber optic cable configuration

#### D38999 PLUG PORT FUNCTIONS

PORT NUMBER	TX	RX
1	A	B
2	C	D

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## APPENDIX A2

### PART NUMBER OPTIONS

20 10/100/1000Base-T Ports + Two 10GBase-SR Ports

**VS506 - AM W N**

Base Part Number

**VS506** = 20+2 Viking  
Ethernet Switch

Configuration

**AM** = L2+ Managed  
Ethernet Switch

Shell Finish

**F** = NI  
**W** = OD CD / NI  
**Z** = ZN / NI

Shell Polarization

**N** = N  
**A** = A  
**B** = B  
**C** = C  
**D** = D

Other mounting and interface options are available.  
Please consult the Protokraft website for alternate configurations.



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