

Viking Series

10x1000Base-T + 2x10GBase-SR Ports, MIL-DTL-38999, L2 Managed Ethernet Switch, 28VDC

10x1000Base-T + 2x10GBase-SR Ports

FEATURES

- 10x 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 +70°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.



L2 Managed D38999 10 Gigabit Ethernet Switch

DESCRIPTION

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

The external copper cable interface of the Viking series 10/100/1000Base-T + 10GBase-SR Ethernet switch is a D38999/25-35 Series III connector with 10x IEEE-802.3U compliant Gigabit Ethernet ports 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
10x10/100/1000Base-T + 2x10GBase-SR	VS448-AiWN
See Appendix A2 for more part number options	

ABSOLUTE MAXIMUM RATINGS

Absolute maximum limits mean that no catastrophic damage will occur if the product is subjected to these ratings for short periods, provided each limiting parameter is in isolation and all other parameters have values within the performance specification. It should not be assumed that limiting values of more than one parameter can be applied to the product at the same time.

Parameter	Symbol	Minimum	Typical	Maximum	Unit
Storage Temperature	T_s	-55		+100	°C

RECOMMENDED OPERATING CONDITIONS

Parameter	Symbol	Minimum	Typical	Maximum	Unit
Operating Temperature	T_A	-40		+70	°C
Supply Voltage	V_{cc}	+12.0	28.0	+36.0	V
Power Supply Noise (p-p)	N_p			200	mV

INTERFACE SPECIFICATIONS COMPLIANCE

Requirement	Feature	Condition	Notes
MIL-STD-883	ESD	Class II	2200V
MIL-STD-810	Vibration	3.8g ² /Hz	43G rms
MIL-STD-810	Shock	40.0g	6-9mS
MIL-STD-810	Immersion	1.0 meter	2 .0Hours
MIL-STD-1344	Flame Resistance	Method 1012	30 Seconds
MIL-STD-1344	Damp Heat	10 Cycles	24 Hours
MIL-STD-38999	Mating Durability	500 Cycles	<0.5dB Change
FDA / CDRH / IEC - 825-1	Eye Safety	Class 1	No Safety Interlocks Required

MATERIALS

Item	Detail	Notes
Shell and housing	T-6061 Aluminum Alloy	
Plating	OD-CD, NI or ZN-NI	
Insert	Thermoplastic	
Interfacial Seal	Elastomer	
Weight	35.2oz. / 997.90Gr.	

ELECTRICAL PERFORMANCE SPECIFICATIONS T_A = Operating Temperature Range

Parameter	Symbol	Typical	Maximum	Unit
Power Supply Current @ 28VDC	P_i	700	750	mA
Power	P	19.6	21.0	W

ITEM	CONDITION	SECTION OF STANDARD	TEST SECTION	CAT.	REQUIRED THRESHOLD	NOTES
			RTCA/DO-	160G		
1	Ground Survival Low Temperature (non-operating)	Section 4	4.5.1	A1	-55°C	
2	Short-time Operating Low Temperature	Section 4	4.5.1	A1	-40°C	
3	Operating Low Temperature	Section 4	4.5.2	A1	-15°C	
4	Operating High Temperature	Section 4	4.5.4	A1	+55°C	
5	Short-time Operating High Temperature	Section 4	4.5.3	A1	+70°C	
6	Ground Survival High Temperature (non-operating)	Section 4	4.5.3	A1	+85°C	
7	Temperature Variation	Section 5	5.3.1	B	minimum rate of 5 °C per minute	
8	Altitude testing	Section 4	4.6.1	C2	Amended from 25,000 ft. to 35,000 ft.	
9	Rapid Decompression	Section 4	4.6.2	A1	8,000 ft. to 35,000 ft. within 15 seconds	
10	Humidity testing	Section 6	6.3.2	B		
11	Operational Shock	Section 7	7.2	B		
12	Crash Safety - Impulse	Section 7	7.3.1	B	20G, sawtooth pulse, 20ms	
13	Crash Safety - Sustained	Section 7	7.3.3	B	9G	
14	Functional (standard) Vibe Test	Section 8	8.5	S	Curve B3	Category S, Curve B3
15	Explosive Atmosphere	Section 9	9.6	E		
16	Lightning Induced	Section 22	22	A2E2		
17	Static Electricity Discharge (ESD)	Section 25	25.5	A	15,000 Volts	
			MIL-STD-	461F		
18	Conducted Emission	CE102	5.5		For Air force, Fixed-wing aircraft	Air Force Applicable tests in Table V "Requirement Matrix" of MIL-STD-461F for Fixed-wing Aircraft
19	Conducted Susceptibility	CS101	5.7		For Air force, Fixed-wing aircraft	
20	Conducted Susceptibility	CS114	5.13		For Air force, Fixed-wing aircraft	
21	Conducted Susceptibility	CS115	5.14		For Air force, Fixed-wing aircraft	
22	Conducted Susceptibility	CS116	5.15		For Air force, Fixed-wing aircraft	
23	Radiated Emission	RE102	5.17		For Air force, Fixed-wing aircraft	
24	Radiated Susceptibility	RS103	5.20		For Air force, Fixed-wing aircraft	
			MIL-STD-	704A, Category B		
25	Power Input	MIL-STD-704A	IAW MIL-HDBK-704-8	B		

10 + 2 Port Viking Ethernet Switch, D38999, 28VDC
 10x1000Base-T + 2x10GBase-SR Ports, L2+ Managed Ethernet Switch

Ethernet Switch Management Features

PERFORMANCE	PARAMETER
Port Speeds	Wire-speed switching on all ports
Maximum Transmission Unit (MTU)	Up to 9600 bytes
MANAGEMENT AND MONITORING	PARAMETER
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
L2 SWITCHING	PARAMETER
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
SECURITY	PARAMETER
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 ⁻¹²)	P_o	-5.0		-1.0	dBm
Optical Output Wavelength	λ_{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 ⁻¹²)	P_i	-11.1		0.0	dBm
Optical Wavelength	λ_{IN}	840	850	860	nM

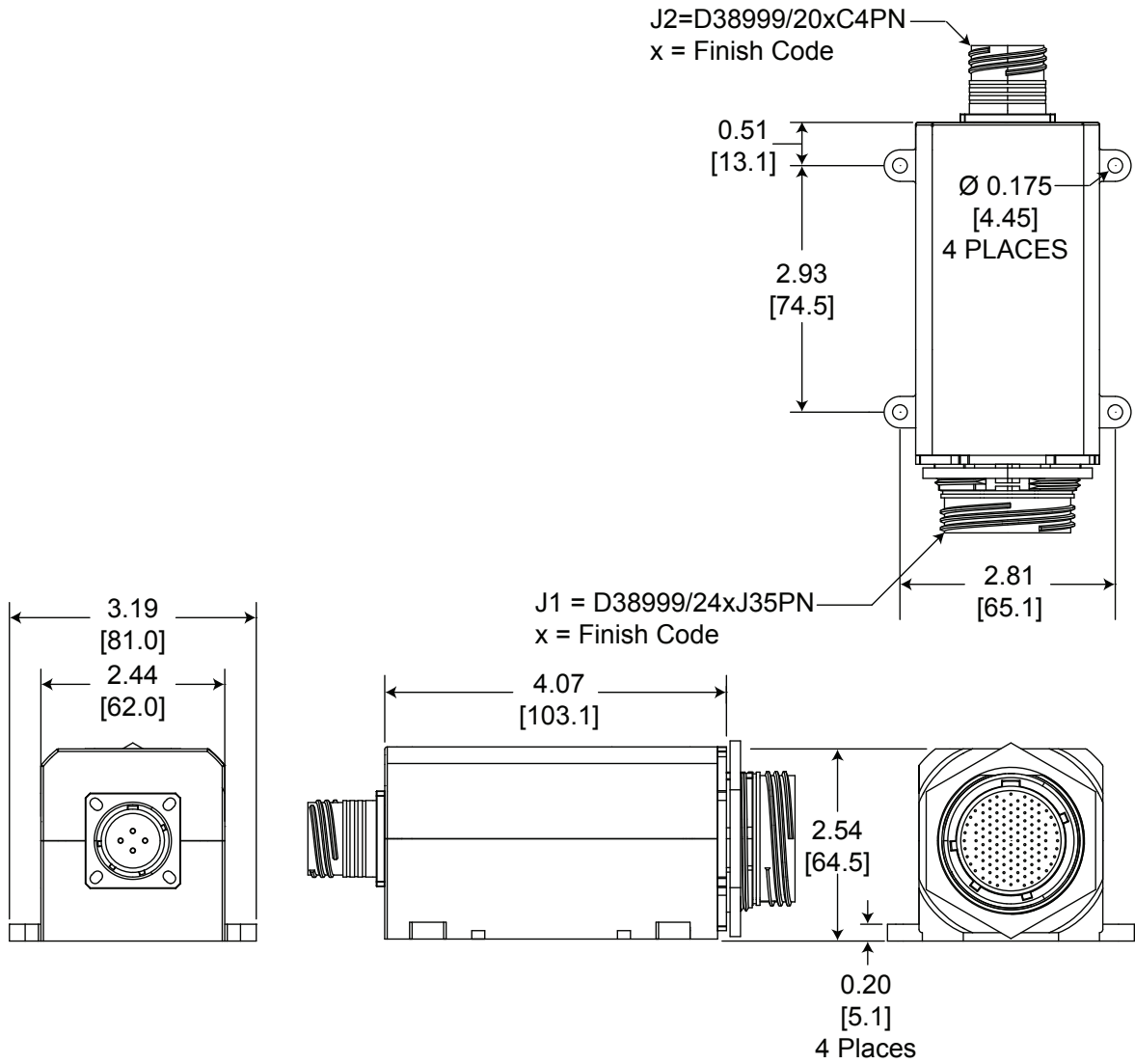
OPTICAL LINK DISTANCES

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

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OUTLINE DRAWING

Dimensions are shown as: inches [mm]



10 + 2 Port Viking Ethernet Switch, D38999, 28VDC
 10x1000Base-T + 2x10GBase-SR Ports, L2+ Managed Ethernet Switch

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

Port #	Pin #	Function	RJ-45 Eq. Pin #	Logic Family
1	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	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	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	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 / D38999/24xJ35PN ELECTRICAL PIN FUNCTIONS - Continued on next page

Port #	Pin #	Function	RJ-45 Eq. Pin #	Logic Family
5	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	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	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	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 / D38999/24xJ35PN ELECTRICAL PIN FUNCTIONS - Continued from previous page

Port #	Pin #	Function	RJ-45 Eq. Pin #	Logic Family	
9	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	21	MDA+	1		
	32	MDA-	2		
	22	MDB+	3		
	33	MDB-	6		
	23	MDC+	4		
	34	MDC-	5		
	24	MDD+	7		
	35	MDD-	8		
All	1	Vcc	N/A	N/A	
	2				
	3				
	4				
	5	GND			
	6				
	7				
	14				
	100	Reset			Active Low LVTTTL
	121	CLI			RS232_IN*
	128	CLI			RS232_OUT*
47	Ground	RS232_GND*			

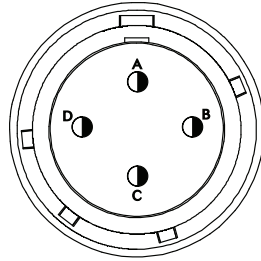
*RS-232 port is wired in a straight-through configuration

10 + 2 Port Viking Ethernet Switch, D38999, 28VDC
10x1000Base-T + 2x10GBase-SR Ports, L2+ Managed Ethernet Switch

J2 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

PORT NUMBER	TX	RX
1	A	B
2	C	D

APPENDIX A1

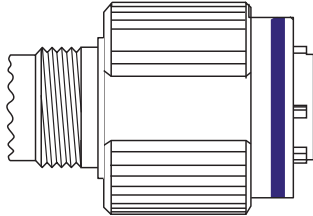
MIL-DTL-38999 FIBER OPTIC CABLE PLUG / MIL-T-29504 RECEPTACLE TERMINI

*D38999 PLUG - RECEPTACLE INSERT

MIL-DTL-38999 CABLE PLUG

MS PLUG P/N

*D38999/26xC04Sy



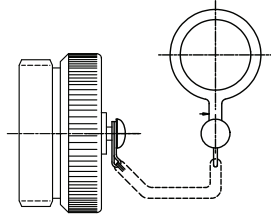
x = Finish, y = Polarization Option

*CABLE PROTECTION CAP

D38999/32 PLUG PROTECTION CAP

MS PLUG CAP P/N

*D38999/32W11N

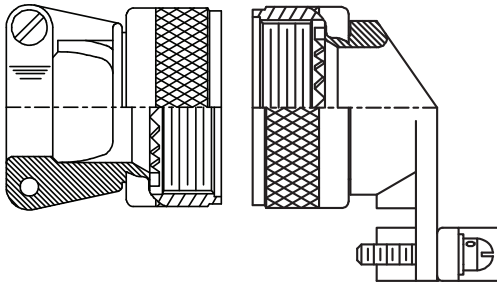


*CABLE BACKSHELL

MIL-C-85049 CABLE BACKSHELL

MS BACKSHELL P/N

*MS85049/xxxxxx**



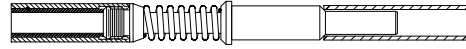
**Straight or angled backshell - defined by application / mounting configuration

*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

10 + 2 Port Viking Ethernet Switch, D38999, 28VDC
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APPENDIX A2

PART NUMBER OPTIONS

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

VS448 - Ai W N

Base Part Number
VS448 = Viking Switch

Configuration
Ai= L2 Managed Qualified
10+2 Port 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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