

DRAGON MACH4x00

Industrial Backbone Routers and Switches



PRODUCT BULLETIN



The DRAGON MACH4x00 routers enable you to build secure, high speed network backbones using devices which were designed from day one to meet the specific requirements of modern OT networks.

- **Architect your precise network topology** with the DRAGON MACH4x00 switches and routers
- **Match your bandwidth requirements**, with dual speed 2.5 Gigabit and 10 Gigabit uplink ports
- **Benefit from high network availability** through the use of hot swappable power supplies and fans
- **Create resilient networks** using coherent industrial redundancy protocols from the network edge to its core
- **Implement secure infrastructure** using the extensive security functions included in the Hirschmann Operating System



Hirschmann Operating System HiOS

The HiOS Operating System has been developed by Hirschmann based on more than twenty years of experience with industrial network configuration and operation. It provides a single operating system for a complete range of hardware platforms, thereby ensuring functional compatibility across all network devices.

Industrial HiVision Network Management Software

Industrial HiVision has been developed by Hirschmann to facilitate the configuration and supervision of industrial networks. This highly graphical software provides a real time view of your network health, thereby increasing operational availability and accelerating fault finding.



Benefits at a Glance

Hardware

- Assured future bandwidth with 10 Gigabit uplink ports
- Subsequent network expansion through modular design
- Maximum uptime using hot swap power supplies
- Spontaneous maintenance of hot swap fans
- Any network topology using copper and SFP port cards

Software

- Proactive threat management through extensive security functionality
- Seamless network redundancy via edge to core protocols
- Accelerated deployment based on customized factory default
- Reduced cost of ownership with free of charge software updates
- Product developed securely according to IEC 62443-4-1

Management

- Intuitive configuration through a graphical user interface
- Rapid deployment using command line scripting
- High operational visibility with comprehensive SNMP management
- Integration into control systems via industrial communication protocols
- Effortless device replacement through removable memory cards

The Industrial Router for OT Networks

Data density is increasing rapidly and industrial backbone networks need higher bandwidths to efficiently transport large amounts of data from the field level to the control room and beyond. With up to eight ports that can support both 2.5 Gigabit or 10 Gigabit, the DRAGON MACH4x00 meets your bandwidth requirements both now and in the future. Two internal redundant power supplies increase device availability, without taking up additional rack space. Hot swap fans can be exchanged at your convenience.

Typical IT routers must provide a large number of software functions to support many generic network deployments. The DRAGON MACH4x00 was designed from the start as an industrial network router. Its focused feature set not only includes standard switching and routing protocols, but also specialized industrial functionality. This includes ring redundancy mechanisms, as well as industrial communication protocols such as EtherNet/IP, Profinet, and IEC 61850.

Applications

The DRAGON MACH4x00 series is designed for applications that require large amounts of bandwidth. It also provides a high-performance demarcation point between IT and OT networks. With a maximum available PoE power budget of 1200W, the system is ideal for demanding applications where high PoE power is required.

Markets

The DRAGON MACH4x00 series is well suited for transportation scenarios that require high network uptime and wire-speed routing. These include mass transit systems, railway and train stations, airports and rail-rolling stock. Oil and gas and PT&D applications will also benefit from the industrial functionality. The evolution of these products has been influenced by input from customers in the consumer packaged goods and automotive industries.



Backbone Routers and Switches



Rack Mount Routers and Switches



Panel Mount Routers and Switches



DIN Rail Switches



The DRAGON MACH4x00 series allows engineers to build OT networks using industrial-grade products running HiOS software from the edge to the backbone.

Technical Information - Basic Unit

Product Description Basic Units

Type	DRAGON MACH4000-52G	DRAGON MACH4000-48G+4X	DRAGON MACH4500-80G+8X
Description	Full Gigabit Ethernet Backbone Switch with internal redundant power supply, modular design and advanced Layer 2 and Layer 3 HiOS features		
Port Type and Quantity	Ports in total up to 52 Basic unit: 4 x 1 GE SFP, expandable with four media modules 10 or 12 FE/GE ports each	Ports in total up to 52 Basic unit: 4 x 1/2.5/10 GE SFP+, expandable with four media modules 10 or 12 FE/GE ports each	Ports in total up to 88 Basic unit: 8 x 1/2.5/10 GE SFP+ plus 32 x FE/GE ports, expandable with four media modules 10 or 12 FE/GE ports each
Order No.	DRAGON MACH4000-52G- 942 318-001 - L2A 942 318-002 - L3A-UR 942 318-003 - L3A-MR	DRAGON MACH4000-48G+4X- 942 154-001 - L2A 942 154-002 - L3A-UR 942 154-003 - L3A-MR	DRAGON MACH4500-80G+8X- 942 153-001 - L2A 942 153-002 - L3A-UR 942 153-003 - L3A-MR

More Interfaces

V.24 Interface	1 x RJ45 socket
SD Card Slot	1 x to connect auto-configuration adapter ACA31 (SD)
USB Slot	1 x to connect auto-configuration adapter ACA22 (USB)

Power Requirements

Out-of-Band Management	1 x RJ45 socket
Operating Voltage	PSU unit input: 100-240 V AC; switch can be operated with either 1 or 2 field-replaceable PSU units (to be ordered separately)
Power Consumption	Max. 200 W

Mechanical Construction

Dimensions (WxHxD)	480 mm x 88 mm x 445 mm		
Weight	7.3 kg	7.3 kg	7.8 kg
Protection Class	IP20		

Software

Supported HiOS Software Levels	Layer 2 Advanced (L2A) or Layer 3 Advanced (L3A) with Unicast or Multicast Routing
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Software Layer 2 Advanced

Management	Dual Software Image Support, TFTP, SFTP, SCP, LLDP (802.1AB), LLDP-MED, SSHv2, V.24, HTTP, HTTPS, Traps, SNMP v1/v2/v3, Telnet, DNS Client
Diagnostics	Management Address Conflict Detection, MAC Notification, Signal Contact, Device Status Indication, TCPDump, LEDs, Syslog, Persistent Logging on ACA, Email Notification, Port Monitoring with Auto-Disable, Link Flap Detection, Overload Detection, Duplex Mismatch Detection, Link Speed and Duplex Monitoring, RMON (1,2,3,9), Port Mirroring 1:1, Port Mirroring 8:1, Port Mirroring N:1, RSPAN, SFLOW, VLAN Mirroring, Port Mirroring N:2, System Information, Self-Tests on Cold Start, Copper Cable Test, SFP Management, Configuration Check Dialog, Switch Dump, Snapshot Configuration Feature
Configuration	BOOTP/DHCP Client with Auto-Configuration, DHCP Server: per Port, DHCP Server: Pools per VLAN, AutoConfiguration Adapter ACA31 (SD card), AutoConfiguration Adapter ACA21/22 (USB), HiDiscovery, DHCP Relay with Option 82, Command Line Interface (CLI), CLI Scripting, Full-featured MIB Support, Web-based Management, Context-sensitive Help
Security	MAC-based Port Security, Port-based Access Control with 802.1X, Guest/unauthenticated VLAN, Integrated Authentication Server (IAS), RADIUS VLAN Assignment, RADIUS Policy Assignment, Multi-Client Authentication per Port, MAC Authentication Bypass, DHCP Snooping, IP Source Guard, Dynamic ARP Inspection, Denial-of-Service Prevention, LDAP, Ingress MAC-based ACL, Egress MAC-based ACL, Ingress IPv4-based ACL, Egress IPv4-based ACL, Time-based ACL, VLAN-based ACL, Ingress VLAN-based ACL, Egress VLAN-based ACL, ACL Flow-based Limiting, Access to Management restricted by VLAN, Device Security Indication, Audit Trail, CLI Logging, HTTPS Certificate Management, Restricted Management Access, Appropriate Use Banner, Configurable Password Policy, Configurable Number of Login Attempts, SNMP Logging, Multiple Privilege Levels, Local User Management, Remote Authentication via RADIUS, User Account Locking

Software Layer 2 Advanced

Redundancy	HIPER-Ring (Ring Switch), HIPER-Ring over Link Aggregation, Link Aggregation with LACP, Link Backup, Media Redundancy Protocol (MRP) (IEC62439-2), MRP over Link Aggregation, Redundant Network Coupling, Sub Ring Manager, RSTP 802.1D-2004 (IEC62439-1), MSTP (802.1Q), RSTP Guards
Industrial Profiles	EtherNet/IP Protocol, IEC61850 Protocol (MMS Server, Switch Model), ModbusTCP, PROFINET IO Protocol
Switching	Independent VLAN Learning, Fast Aging, Static Unicast/Multicast Address Entries, QoS / Port Prioritization (802.1D/p), TOS/DSCP Prioritization, Interface Trust Mode, CoS Queue Management, IP Ingress DiffServ Classification and Policing, IP Egress DiffServ Classification and Policing, Queue-Shaping / Max. Queue Bandwidth, Flow Control (802.3X), Egress Interface Shaping, Ingress Storm Protection, Jumbo Frames, VLAN (802.1Q), Protocol-based VLAN, VLAN Unaware Mode, GARP VLAN Registration Protocol (GVRP), Voice VLAN, MAC-based VLAN, IP subnet-based VLAN, GARP Multicast Registration Protocol (GMRP), IGMP Snooping/Querier per VLAN (v1/v2/v3), Unknown Multicast Filtering, Multiple VLAN Registration Protocol (MVRP), Multiple MAC Registration Protocol (MMRP), Multiple Registration Protocol (MRP)
Time Synchronization	SNTP Client, SNTP Server; DRAGON MACH4000-xx only: PTPv2 Transparent Clock two-step, PTPv2 Boundary Clock, Buffered Real Time
Miscellaneous	Manual Cable Crossing, Port Power Down

Software Layer 3 Advanced (additional features)

Redundancy	VRRP, VRRP Tracking, HiVRRP (VRRP enhancements)
Routing	Full Wire-Speed Routing, Port-based Router Interfaces, VLAN-based Router Interfaces, Loopback Interface, ICMP Filter, Net-directed Broadcasts, Static Unicast Routing, OSPFv2, RIP v1/v2, Equal Cost Multiple Path (ECMP), ICMP Router Discovery (IRDP), Proxy ARP, Static Route Tracking, IP/UDP Helper
Multicast Routing	IGMP v1/v2/v3, IGMP Proxy (Multicast Routing), DVMRP, PIM-DM (RFC3973), PIM-SM / SSM (RFC4601)

Ambient Conditions

Operating Temperature	0°C to 60°C
Storage Temperature	-40°C to 70°C
Rel. Humidity (non-condensing)	10% to 90%

Approvals

Basic Standard	C-Tick, CE, EN61131
Safety of Industrial Control Equipment	UL 61010-1 and UL 61010-2-201
Safety of information technology equipment	EN 60950-1
Transportation	EN 50121-4

Scope of delivery

Scope of delivery	Device, 1x Fan module D4K-AIR, 1x D4K-PSU-PANEL, 4x D4K-LC-PANEL, General safety instruction
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NOTE: These are the prominent technical specifications. For complete technical specifications visit: www.belden.com

Technical Information - Accessories

Part Number	Product Code	Product Description
Port Modules		
942 155-001	D4K-12TP-RJ45	12 x FE/GE TX ports, field-replaceable
942 155-501	D4K-12SFP	12 x FE/GE SFP slots, field-replaceable
942 294-001	D4K-10TP-PoE	10 x FE/GE PoE+ ports; max. PoE power 300 W; PoE power supplied by an external PSU; field-replaceable
Power Supply		
942 156-001	D4K-PSU-300W-HV	DRAGON MACH4x00 300W power supply, field-replaceable
Others / Spare Parts		
942 157-001	D4K-AIR	DRAGON MACH4x00 fan unit, field-replaceable
942 222-001	D4K-LC-PANEL	Blanking plate for port module slot
942 222-002	D4K-PSU-PANEL	Blanking plate for PSU slot

Optical Transceivers for DRAGON MACH4x00

Part Number	Product Code	Product Description
2.5 Gigabit Ethernet SFP Transceivers		
942 162-001	M-SFP-2.5-MM/LC EEC	Multimode Fiber (MM) 50/125 μ m 0 to 550 m, 850 nm; 4 dB link budget; OM3 fiber (3.5 dB/km, 2000 MHz*km)
		Multimode Fiber (MM) 50/125 μ m 0 to 400 m, 850 nm; 4 dB link budget; OM2 fiber (3.5 dB/km, 500 MHz*km)
		Multimode Fiber (MM) 62.5/125 μ m 0 to 170 m, 850 nm; 4 dB link budget; OM1 fiber (3.5 dB/km, 200 MHz*km)
942 163-001	M-SFP-2.5-SM-/LC EEC	Singlemode Fiber (SM) 9/125 μ m 0 to 5 km, 1310 nm; 8.5 dB link budget; 0.55 dB/km; (GR-253 CORE)
942 164-001	M-SFP-2.5-SM/LC EEC	Singlemode Fiber (SM) 9/125 μ m 0 to 20 km, 1310 nm; 13 dB link budget; 0.55 dB/km; (GR-253 CORE)
942 165-001	M-SFP-2.5-SM+/LC EEC	Singlemode Fiber (SM) 9/125 μ m 21 to 45 km, 1310 nm; 12 to 25 dB link budget; 0.55 dB/km; (GR-253 CORE)
942 220-001	M-SFP-2.5-LH/LC	Singlemode Fiber (SM) 9/125 μ m 0 to 80 km, 1551 nm; 14 to 28 dB link budget; 0.25 dB/km
10 Gigabit Ethernet SFP+ Transceivers		
942 210-001	M-SFP-10-SR/LC EEC	Multimode Fiber (MM) 50/125 μ m 0 to 82 m, 850 nm; 8.1 dB link budget; OM2 fiber (3 dB/km, 500 MHz*km)
		Multimode Fiber (MM) 50/125 μ m 0 to 300 m, 850 nm; 8.1 dB link budget; OM3 fiber (3 dB/km, 2000 MHz*km)
		Multimode Fiber (MM) 50/125 μ m 0 to 400 m, 850 nm; 8.1 dB link budget; OM4 fiber (3 dB/km, 4700 MHz*km)
		Multimode Fiber (MM) 62.5/125 μ m 0 to 33 m, 850 nm; 8.1 dB link budget; OM1 fiber (3.2 dB/km, 200 MHz*km)
942 211-001	M-SFP-10-LR/LC EEC	Singlemode Fiber (SM) 9/125 μ m 0 to 10 km, 1310 nm; 7.4 dB link budget; 0.4 dB/km
942 212-001	M-SFP-10-ER/LC EEC	Singlemode Fiber (SM) 9/125 μ m 10 to 40 km, 1550 nm; 3 to 15 dB link budget; 0.25 dB/km
942 213-001	M-SFP-10-ZR/LC	Singlemode Fiber (SM) 9/125 μ m 40 to 80 km, 1550 nm; 11 to 22 dB link budget; 0.25 dB/km
10 Gigabit DAC cable		
942 280-001	SFP-10-DAC-05m	Passive 10 Gigabit DAC cable, 0.5 meter
942 280-002	SFP-10-DAC-1m	Passive 10 Gigabit DAC cable, 1 meter
942 280-003	SFP-10-DAC-2m	Passive 10 Gigabit DAC cable, 2 meter
942 280-004	SFP-10-DAC-4m	Passive 10 Gigabit DAC cable, 4 meter



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