FIBERROAD

INDUSTRIAL L3 MANAGED TSN ETHERNET SWITCH

Product Data Sheet

Introducing the Fiberroad FR-TSN44DD, a groundbreaking TSN Industrial Ethernet Switch that is set to revolutionize the world of industrial automation. With its cutting-edge features and advanced capabilities, this switch is truly a game-changer. Boasting an impressive 12x10/100/1000BASE-T RJ45 ports and 24xGigabit Ethernet RJ45/SFP ports, it provides lightning-fast connectivity for all your network needs. But that's not all – there are also four additional 1G/10G BASE-X SFP ports which further enhance its versatility and adaptability. Encased in a rugged IP40 metal case, this beast of a switch guarantees stable operation even in the harshest environments imaginable. It effortlessly addresses every level of the industrial automation network - from the field bus to the factory backbone - ensuring seamless communication throughout your entire system.

Main Features

- 12xGigabit RJ45 Ports + 12xGigabit SFP ports+ 4 x 1.25/10G SFP ports.
- Fully Layer 3 Managed switch function, unicast and multicast routing
- IPv4 dynamic routing protocol supports RIPv2 and OSPFv2, IPv6 dynamic routing protocol supports OSPFv3
- IEEE 1588v2 PTP Precision Time Protocol and SyncE
- Features IEEE 802.1AS Time Synchronization, IEEE802.1Qbu Frame Preemption, IEEE 802.1Qbv Time Aware Shaper and IEEE 802.1CB Seamless Redundancy
- Supports RSTP/MSTP/ERPSv2/APS/MRP
- RADIUS/TACACS+ users access authentication
- -40 ℃ to +75℃ operating temperature
- DC9-56V input, active to active redundant power failure on one supply
- DIN-rail and wall mountable designs

This powerhouse utilizes Time-sensitive Networking (TSN) technology along with IEEE 1588 Precision Time Protocol (PTPv2) for impeccable time synchronization on all ports - ensuring every operation runs seamlessly in harmony. The FR-TSN44DD effortlessly supports TSN IEEE standards essential for a complete real-time communication solution that exceeds expectations at every turn. From utilizing the incredible IEEE 802.1AS-REV profile for unmatched time synchronization to harnessing the power of IEEE 802.1Qbv Enhancements for Scheduled Traffic and IEEE 802.1Qbu Frame Preemption to optimize data transmission efficiency; this switch has got it all covered! And let's not forget about its prowess in handling critical data thanks to features like the innovative Interspersing Express Traffic (IET) provided by IEEE 802.3br and per-stream filtering and policing abilities offered by IEEE 802.1Qci - enabling seamless reliability even during demanding operations!

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Hardware Specifications	
Copper Port	12x10/100/1000Base-T RJ45 auto-MDI/MDI-X
SFP/SFP+ Port	12x100/1000Base-X SPF 4X1/10G SFP/SFP+ slots Compatible with 100BASE-FX,1000BASE-SX/LX/BX,2500BASE-X,5000BASE-X SFP and 10GBASE-SR/LR SFP+ optical transceiver
Reset Button	＜5 sec: System Reboot ＞ 5 sec: Factory Default
Connector	5 removable terminal block for power input Pin 1-2 for Power 1, Pin 3-4 for Power 2
Alarm	One relay output for power failure. Alarm relay current carry ability:2A @ 24VDC
Enclosure	IP40 aluminum case
Installation	Rack Mounting
Dimension(WxDxH)	400mm x 300mm x 45mm
Weight	2.6kg
Power Consumption	Max. 20 watts/57.3BTU(System on) MAX. 40watts/10.3BTU(Full loading)
Electrostatic Discharge	Contact discharge：±8kV Discharge in air: ±15kV
Surge Protection	Power Supply: ±4kV RJ45 Port: ±2kV
LED Indicators	P1(Green), P2(Green), ALM(Red). RUN(Green) SFP: 1/2.5/5G(Green), 10G(Green) RJ45: 10/100M(Green), 1000M(Green)
Switching Specifications	
Switch Architecture	Store-and-forward
Switch Captacity	128 Gbps/non-blocking
Address Table	32K entries, automatic sources address learning and aging
Data Buffer	32Mbits
Jumbo Frame	14K bytes
Flow Control	IEEE 802.3x pause frame for full duplex Back pressure for half duplex
Layer 3 Function	
IP Interfaces	Max. 128 VLAN interface
Routing Table	Max. 512 static route entries Max. 3072 routing table entries
Routing Protocol	IPv4 RIPv2 IPv4 OSPFv2 IPv6 OSPFv3 IPv4 Hardware Static Routing IPv6 Hardware Static Routing
Layer 2 Functions	
Port Configuration	Port Disable/Enable Auto-negotiation 10/100/1000Mbps full and half duplex mode selection Flow control disable/enable Port link capability control
Port Status	Display each port's speed duplex mode, link status, flow control status, auto-negotiation status, trunk status

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Port Mirroring	TX/RX/Both Many-to-1 monitor Mirror – Remote Switched Port Analyzer(Cisco RSPAN) Supports up to 5 sessions
VLAN	IEEE 802.1Q tagged VLAN IEEE 802.1ad Q-in-Q tunneling Private VLAN MAC-based VLAN VLAN Translation VCL Protocol-based VLAN Voice VLAN MVR(Multicast VLAN registration), MVRP(Multiple VLAN Registration Protocol GVRP Up to 4K VLAN groups, out of 4095 VLAN IDs
Link Aggregation	IEEE 802.3ad LACP/static trunk 8 trunk groups with 16 ports per trunk group
Spanning Tree Protocol	IEEE 802.1D Spanning Tree Protocol IEEE 802.1w Rapid Spanning Tree Protocol IEEE 802.1s Multiple Spanning Tree Protocol Supports 7 MSTP instance BPDU Guard, BPDU filtering and BPDU transparent Root Guard
IGMP Snooping	IPv4 IGMP(v1/v2/v3) snooping IPv4 IGMP querier mode support Supports 255 IGMP groups
MLD Snooping	IPv6 MLD(v1/v2) snooping IPv6 querier mode support Support 255 MLD groups
Bandwidth Control	Per port bandwidth control Ingress: 10Kbps ~ 13128Mbps Egress: 10Kbps ~ 13128Mbps
Ring , Redundancy, Protection	**APS Protocol (1+1 , 1:1 Mode)** **MRP(Media Redundancy Protocol)** **ITU-T G.8032 ERPSv2** Recovery time＜10ms @ 3 nodes Recovery time＜50ms @ 16 node Supports Major and sub-ring
Discovery and Monitoring	UPnP(Universal Plug and Play) LLDP LLDP-MED UDLD(Unidirectional Link Detection) sFLOW
OAM	IEEE 802.3ah OAM, IEEE 802.1ag Connectivity Fault Management(CFM)
Synchronization	**IEEE 1588v2 PTP(Precision Time Protocol)** PTP Master PTP Slave Boundary Clock Peer-to-peer transparent clock End-to-end transparent clock Profile:1588/G.8265.1/G.8275.1/802.1AS **SyncE**
QoS	Traffic classification based, strict priority and WRR 8-level priority for switching -Port number -802.1p priority -802.1Q VLAN tag -DSCP/ToS field in IP packet
Time-Sensitive Networking Protocols	**High Precision Time Synchronization** -IEEE1588(Time Stamping) -802.1AS-Rev gPTP default profile

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	Shapers - 802.1Qbv(Time-aware Scheduling) - 802.1Qch(Cyclic Queuing and forwarding) **TSN Stream Policing** - 802.1Qci (Per Stream Filtering and Policing) **Redundancy** - 802.1CB (Frame Replication and Elimination for Redundancy for seamless redundancy) **Delay Reduction** - IEEE 802.1Qbu Frame Preemption
Security Functions	
Access Control List	IP-based ACL/MAC-based ACL ACL based on: - MAC Address - IP Address - Ethertype - Protocol Type - VLAN ID - DSCP - 802.1q Priority Up to 512 entries
Security	Port Security IP source guard, up to 512 entries Dynamic ARP inspection, up to 1K entries Command line authority control based on user level Static MAC address, up to 64 entries
AAA	RADIUS client TACACS+ client
Network Access Control	IEEE 802.1x port-based network access control MAC-based authentication Local/RADIUS authentication
Management	
Basic Management Interfaces	Console; Telnet; Web browser; SNMPv1,v2c
Secure Management Interfaces	SSHv2, TLSv1.2, SNMPv3
System Management	Firmware upgrade by HTTP protocol through Ethernet network Configuration upload/download through HTTP Remote Syslog System Log NTP Firo NMS
SNMP MIBs	RFC 1213 MIB-II RFC 1493 Bridge MIB RFC 1643 Ethernet MIB RFC 2863 Interface MIB RFC 2665 Ether-Like MIB RFC 2819 RMON MIB (Group 1,2,3 and 9) RFC 2737 Entity MIB RFC 2618 RADIUS Client MIB RFC 2863 IF-MIB RFC 2933 IGMP-STD-MIB RFC 3411 SNMP-Frameworks-MIB RFC 4292 IP Forward MIB RFC IP MIB RFC 4836 MAU-MIB IEEE 802.1X PAE LLDP

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Regulatory & Warranty		
Safety	IEC/EN 62368-1	
EMI	EN55032 Class A, CISPR 32 FCC Part 15B Class A	
EMS	EN61000-4-2 (ESD) EN61000-4-3 (RS) EN61000-4-4 (EFT) EN61000-4-5 (Surge) EN61000-4-6 (CS) EN61000-4-8 (PFMF	
Shock	IEC 60068-2-27	
Free Fall	IEC 60068-2-32	
Vibration	IEC 60068-2-6	
Environmental	RoHS	
Standards Compliance	IEEE 802.3 10BASE-T IEEE 802.3u 100BASE-TX/100BASE-FX IEEE 802.3z Gigabit 1000T IEEE 802.3z Gigabit SX/LX IEEE 802.3bz 2.5G/5G BASE-X IEEE 802.3x flow control and back pressure IEEE 802.3ad port trunk with LACP IEEE 802.1D Spanning Tree Protocol IEEE 802.1w Rapid Spanning Tree Protocol IEEE 802.1s Multiple Spanning Tree Protocol IEEE 802.1p Class of Service IEEE 802.1Q VLAN tagging IEEE 802.1X Port Authentication Network Control IEEE 802.1ab LLDP IEEE 802.3ah OAM IEEE 802.1ag Connectivity Fault Management(CFM) IEEE 802.1AS Timing and Synchronization for Time-sensitive Application IEEE 802.1Qbu Frame Preemption	IEEE 802.1Qci Per-Stream Filtering and policing(PSFP) IEEE 802.1Qbv Enhancements for Scheduled Traffic IEEE 802.1CB Frame Replication and Elimination for Reliability(FRER) RFC 768 UDP RFC 783 TFTP RFC 791 IP RFC 792 ICMP RFC 2068 HTTP RFC 1112 IGMP v1 RFC 2236 IGMP v2 RFC 3376 IGMP v3 RFC 2710 MLD v1 RFC 3810 MLD v2 RFC 2328 OSPF v2 RFC 5340 OSPF v3 RFC 2453 RIP v2 ITU-T G.8032 ERPS Ring
Warranty	5 Years, Details See: www.fiberroad.com	
Environment		
Operating Temperature	-40 ℃ to +75℃	
Storage Temperature	-40 ℃ to +85℃	
Humidity	5 to 95%(non-condensing)	

Package Contents	
Device	1xTSN Industrial Ethernet Switch
Cable	1xDB9 female to RJ45
Installation Kit	2xRack Mount Kit
Documentation	1 x Quick installation guide 1 x Warranty card 1x Product notice

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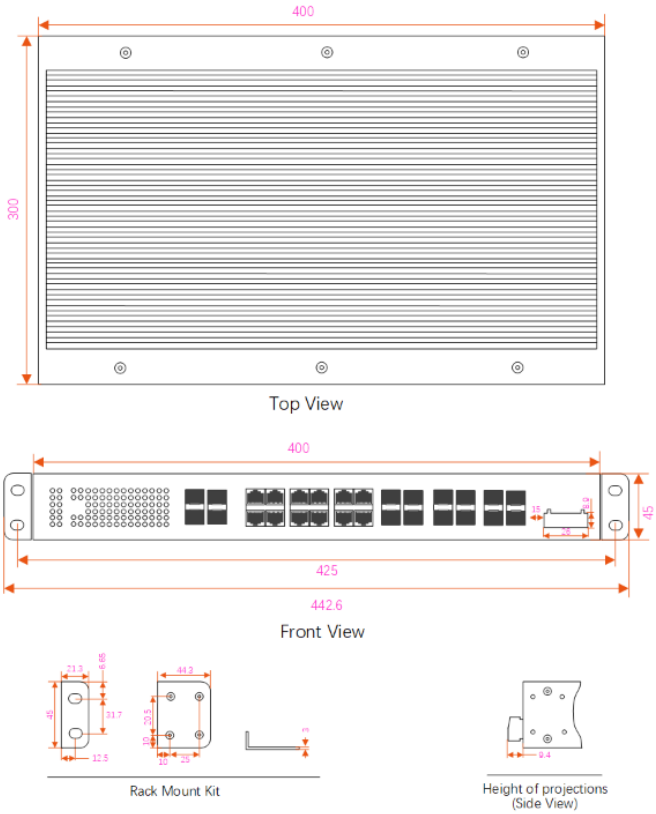
Dimensions

Unit: mm



Accessories(Sold Separately)

Power Supply	
FR-I-60-24	DIN-rail 24 VDC power supply with 60W/0.6A, 85 to 264 VAC, or 120 to 370 VDC input, -20 to 70°C operating temperature
FR-I-120-48	DIN-rail 48-58V VDC power supply with 120W/1.2A, , 85 to 264 VAC, or 120 to 370 VDC input, -20 to 70°C operating temperature
FR-I-240W-48	DIN-rail 48-55V VDC power supply with 240W/2A, , 85 to 264 VAC, or 120 to 370 VDC input, -20 to 70°C operating temperature
FR-I-480W-48	DIN-rail 48-55V VDC power supply with 480W/4A, , 85 to 264 VAC, or 120 to 370 VDC input, -20 to 70°C operating temperature

SFP Optical Transceiver	
FRSX-1L311C-I	1.25Gb/s 1310nm 10km SFP, wide operation temperature range of -40℃-85℃ (-40℉ - 185℉)
FRSX-1L341C-I	1.25Gb/s 1310nm 40km SFP，wide operation temperature range of -40℃-85℃ (-40℉ - 185℉)
FRSX-1L5X1C-I	1.25Gb/s 1550nm 80/100km SFP，wide operation temperature range of -40℃-85℃ (-40℉ - 185℉)
FRSX-1L3523/5323C-I	1.25Gb/s 1310nm/1550nm 20km BiDi SFP，wide operation temperature range of -40℃-85℃ (-40℉ - 185℉)

Armored Fiber Patch Cable / LAN Cable	
FRPC-A-LC	Armored LSZH LC UPC to LC UPC Duplex OS2 single mode 7.0mm for Ourdoor Application , 1-50m
FRLC-A-CAT6	Armored Cat6 Snagless shielded(SFTP) Ethernet Network Patch Cable, 26AWG, 1000Base-T, 0.5m – 3m

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Precautions

To avoid damage to the equipment and personal injury caused by improper use, please observe the following precautions:

- Keep the power off during installation, wear an anti-static wrist, and ensure that the anti-static wrist is in good contact with the skin to avoid potential safety hazards.
- The switch can work normally under the correct power supply. Please confirm that the power supply voltage matches the voltage indicated by the switch.
- Before powering on the switch, please make sure that the power circuit is not overloaded, so as not to affect the normal operation of the switch and even cause unnecessary damage.
- To avoid the risk of electric shock, do not open the case while the switch is working, even if it is not charged, do not open it yourself.
- Before cleaning the switch, pull out the power plug of the switch. Do not wipe with a wet cloth. Do not use liquid to clean it.
- The equipment installed in the rack is generally from bottom to top to avoid overload installation.
- Avoid placing other heavy objects on the surface of the switch to avoid accidents.

Order Information

Model Number	10/100/1000Base-T(X), RJ45	100/1000Base-X, SPF	1/10G, SFP/SFP+	Input Voltage	Operating Temp.
FR-TSN44DD	12	12	4	DC9-56V	-40 to +75℃

The information in this document is subject to change without notice. Fiberroad Technology Co., Limited has made all effects to ensure the accuracy of the information, but all information in this document does not constitute any kind of warranty. Visit our website for the most up-to-date product information

For more information

For more information about Fiberroad Industrial Ethernet Switch series products,
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