



TEJAS[®]
NETWORKS

TJ1400P-M1 10-Gigabit Access Switch Series



TJ1400P-M1-24TD-LS



TJ1400P-M1-24PD-LS
TJ1400P-M1-24LPD-LS



TJ1400P-M1-24SD-LS-AD



TJ1400P-M1-24SD-M-AD



TJ1400P-M1-48TD-LS



TJ1400P-M1-48PD-LS
TJ1400P-M1-48LPD-LS

Overview

The TJ1400P-M1 10-Gigabit switch series is a set of Layer2+ switches designed to provide a wide range of capabilities to meet diverse deployment requirements that value continuous operation. The comprehensive Layer2 and Carrier Ethernet feature set and management capabilities provides excellent price/performance benefit.

Network Security is paramount today and 1400P-M1 ensures that with features like authentication of Clients via 802.1x for determining the authorized devices, and security features like IP Source Guard, ACLs, Storm Control the network is secured. Additional Layer3 functionality such as Static Routing and DHCP server add to the flexibility and may eliminate the need for co-located Layer3 equipment.

The Fiber based switches support redundant power, dual AC or AC-and-DC. The TJ1400P-M1-24SD-M model supports Carrier Ethernet features and can be used in service provider environments as well.

The switches support line-rate, non-blocking switching for predictable performance and are AC powered. The switches are 19" Rack mountable 1RU high and support an operating temperature range of +50 deg C.

Power over Ethernet (PoE) capability with support for PoE+ on all ports allows some of these switches to be used to power co-located and connected equipment making it an excellent option for Surveillance and WiFi applications, indoor and outdoor..

Key Features and Benefits

Secure Network Access

Authentication of the devices that connect to the switch allows you to ensure that there is no unauthorized use of the network. This is especially true in deployments that are remote. The DHCP snooping and Dynamic ARP inspection features on the switch allow the device to reject devices trying to use an IP-address that is provided to another authorized device.

Layer2 Switching

Comprehensive Layer2 feature set with Spanning Tree Protocols to prevent loops, Link aggregation to allow for increased interconnect bandwidth, and VLAN support allows for virtualization of networks. Multicast snooping and forwarding are supported for efficient Video.

Layer3 Switching

The switches support Static Routing of IPv4 and IPv6 traffic allows aggregation at Layer3 as well. A built in DHCP server allows the switch to assign IP-addresses to endpoints and build a standalone IP-network.

Carrier Ethernet

Carrier Ethernet Features like ERPS, CFM and Y.1731 allow the TJ1400P-M1-24SD-M switch to be used in Service Provider or Campus environment with increased visibility and resiliency and synchronization.

Quality of Service

In converged networks multiple applications can be given their own priorities and bandwidth. Customer traffic can be limited and uplink traffic shaped as required. Note that shaping needs to ensure that adequate attention is given to the packet buffering available on the device.

Power over Ethernet

Some models offer Power over Ethernet (PoE) capability. The PoE capable switches can act as the Power Source Equipment (PSE) and deliver 30W (802.1at) of power to connected Power Devices (PD). Scheduling the powering of the devices is a feature that allows you to turn off the devices when not required.

Green Ethernet

Energy Efficient Ethernet (EEE) capability as per IEEE 802.3az on the ports allows the ports to go into a low-power inactive state and reduce power.

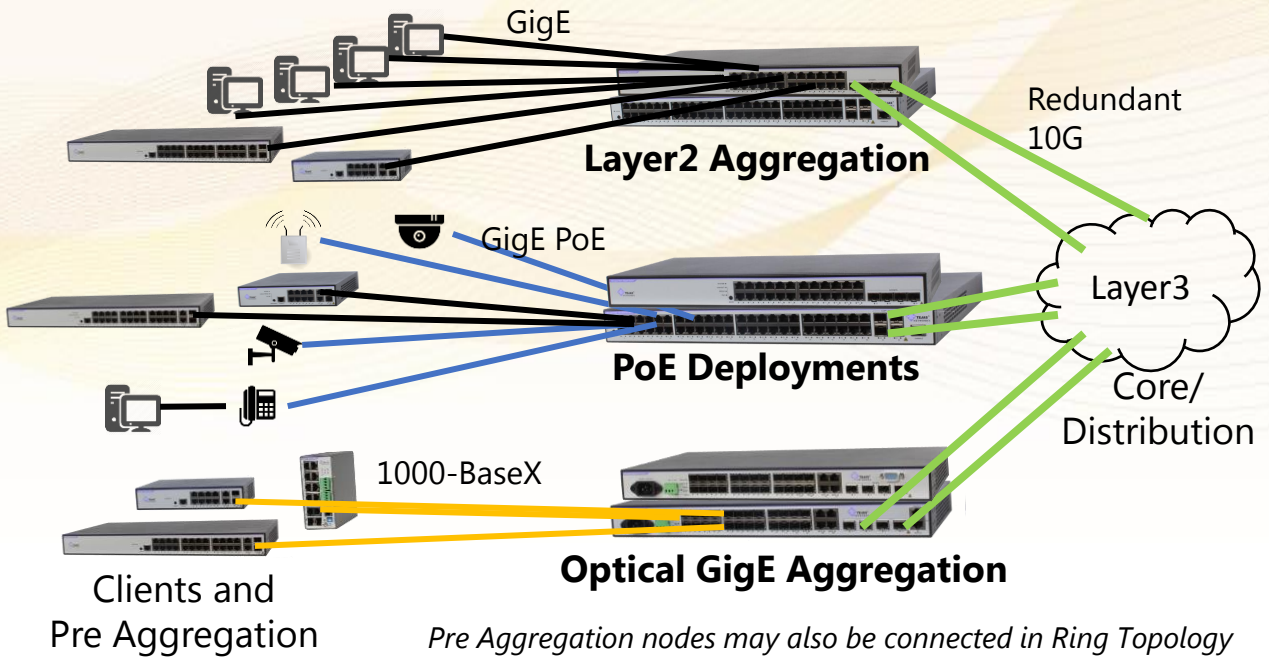
Flexible Deployments

All ports are Gigabit Ethernet ports with Auto Negotiation and MDIX support allowing for seamless interconnectivity of new and old equipment. Support of multiple uplinks allows for ring configurations for redundancy. Line rate forwarding allows high-capacity access equipment like 802.11ac Access Points. Optical ports allow for traffic to be collected at remote locations with the use of the appropriate SFP modules. Gigabit speeds reduce network latency. Jumbo frame support for Video applications

Secure Management

Management of the switch can be done locally using the console port or remotely using Secure access. A Graphical User Interface (GUI) provides easy access. Access to the switch CLI commands via RADIUS/TACACS+ ensures that all operations are authorized and logged. Traffic can also be selectively mirrored for analysis. Integration with NMS via SNMP/CLI and syslog is supported.

Sample Deployment Scenarios



Product models in this series

Aligned to the Naming convention followed in Tejas Ethernet Switches the 10-Gigabit Switches fit the nomenclature TJ1400P-M1-XXXXXX. The "Model-Type" is the identifier XXXXXX used to indicate the specific orderable switch which is a combination of port capabilities and software described here

Model-ID XXXXXX	RJ45 Ports 10/100/1000	PoE+ Capable	PoE Budget	SFP Port	SFP+ Uplink	Software Feature Set
24TD-LS	24				4	Layer2+
24PD-LS	24	24	370 W		4	Layer2+
24LPD-LS	24	24	185 W		4	Layer2+
24SD-LS	4 Combo			20+4 Combo	4	Layer2+
24SD-M	4 Combo			20+4 Combo	4	Layer2+ & CE
48TD-LS	48				4	Layer2+
48PD-LS	48	48	740 W		4	Layer2+
48LPD-LS	48	48	370 W		4	Layer2+

Power Supply

The Electrical client port switches have a single, wide range (90-240V, 50-60Hz), AC input in the rear. The 48-port switches also have a console port for local access in the front.

The Fiber Aggregation switches, TJ1400P-M1-24SD-LS and TJ1400P-M1-24SD-M, have redundant built-in power supplies accessible from front. They can be ordered with dual AC input or a combination of AC and built-in 48V DC power supply. Console and NMS ports are also in the front.

Hardware Characteristics

Model-ID XXXXXXX	Dimension (HxWxD) mm	Weight gms	MTBF hours	Processor	DRAM	Flash
24TD-LS	44x442x211	3.6 Kg	175,240	416MHz ARM	128 MB	32MB
24PD-LS	44x442x211	3.7 Kg	298,600	416MHz ARM	128 MB	32MB
24LPD-LS	44x442x211	3.7 Kg	159,000	416MHz ARM	128 MB	32MB
24SD-LS	44x442x211	3.1 Kg	342,500	416MHz ARM	128 MB	32MB
24SD-M	44x442x211	3.1 Kg	153,600	416MHz ARM	128 MB	32MB
48TD-LS	44x442x300	4.2 Kg	262,880	500MHz ARM	512 MB	160 MB
48PD-LS	44x442x375	5.6 Kg	150,300	500MHz ARM	512 MB	160 MB
48LPD-LS	44x442x375	5.0 Kg	156,650	500MHz ARM	512 MB	160 MB

Switch Scalability

Model-ID XXXXXXX	Switching Capacity	Forwarding Rate (64B)	MAC Table	Packet Buffer	VLAN support	Max Frame Size
24TD-LS	128 Gbps	95.23 Mpps	32K	4 MB	4096	10056 Bytes
24PD-LS	128 Gbps	95.23 Mpps	32K	4 MB	4096	10056 Bytes
24LPD-LS	128 Gbps	95.23 Mpps	32K	4 MB	4096	10056 Bytes
24SD-LS	128 Gbps	95.23 Mpps	32K	4 MB	4096	10056 Bytes
24SD-M	128 Gbps	95.23 Mpps	32K	4 MB	4096	10056 Bytes
48TD-LS	176 Gbps	130.95 Mpps	32K	4 MB	4096	10056 Bytes
48PD-LS	176 Gbps	130.95 Mpps	32K	4 MB	4096	10056 Bytes
48LPD-LS	176 Gbps	130.95 Mpps	32K	4 MB	4096	10056 Bytes

Power Consumption and Acoustics

Model-ID XXXXXXX	No Traffic, Load	Under Full Traffic, Load (30 W / port)	Acoustic
24TD-LS	31.7 W	45.5 W	Fan x1
24PD-LS	20.7 W	424.7 W	Fan x3
24LPD-LS	24.6 W	221.8 W	Fan x2
24SD-LS	17.1 W	38.5 W	
24SD-M	17.1 W	38.5 W	
48TD-LS	21.3 W	46.6 W	Fan x2
48PD-LS	42.4 W	858.1 W	Blower x1
48LPD-LS	35.2 W	460.9 W	Blower x1

LED Indicators

LED	Color	State	Description
SYSTEM	Green	On	The switch is Powered on correctly
		Off	The switch is not receiving power
Link/Act/Status Mode	Green	On	The port LEDs display Link/Act/Status
PoE Mode	Green	On	The port LEDs display PoE Status

The Mode button can be used to change the information displayed by the Port LEDs

LED	Color	State	Description
Port LED	Green	On	Port is connected and speed is 1000 Mbps
Link/Act/Status Mode	Amber	On	Port is connected and speed is 10 Mbps
	-	Blinking	Port is transmitting and receiving packets
		Off	Port is disconnected or disabled
Port LED PoE Mode	Green	On	Port is supplying PoE Power
	Amber	On	Abnormal State (overload) detected by switch
	-	Off	Port is not connected to PD or disabled
SFP+ Ports	Green	On	Port is connected and speed is 1Gbps
	Blue	On	Port is connected and speed is 10 Gbps
	-	Blinking	Port is transmitting and receiving packets
		Off	Port is disconnected or disabled

Environmental Range

Operating Temperature	-5 degC to +50 degC
Storage Temperature	-40 degC to +85 degC
Operating Altitude	Up to 3000 meters
Operating Humidity	0% to 95% non-condensing

Certifications and Compliances

Safety	CE, EN60950-1
EMI	FCC Part 15 Subpart B, Class A EN61000-6-4 compliant EN55022, EN55011
EMC	EN61000-4-2 for ESD : Electrostatic discharge EN61000-4-3 for RS : Radiated susceptibility EN61000-4-4 for EFT : Electrical Fast Transient EN61000-4-5 for Surge EN61000-4-6 for CS : Conducted susceptibility EN61000-4-8 for PFMF : Power frequency magnetic field

Networking and Software Features

Layer 3 Switching	
Static Routing	<ul style="list-style-type: none"> • IPv4 Unicast Static Routing (up to 64 routes) • IPv6 Unicast Static Routing (up to 64 routes)
Layer2 Switching	
Bridging	<ul style="list-style-type: none"> • Dynamic Learning of MAC addresses with notification of MAC address change and configurable Aging Timers • Static MAC addresses that are not subject to aging
Spanning Tree Protocol (STP)	<ul style="list-style-type: none"> • Standard Spanning Tree 802.1d • Rapid Spanning Tree (RSTP) 802.1w • Multiple Spanning Tree (MSTP) 802.1s (up to 8 Instances) • PortFast, BPDU Filter, Root Guard, Loop Guard • BPDU Guard, Error Recovery for enabling disabled link
Link Aggregation	<ul style="list-style-type: none"> • Link bonding using statically defined Link Aggregation Groups • Dynamic bonding using Link Aggregation Control Protocol (LACP) IEEE 802.3ad • Up to 5/13/26 link aggregation groups each with up to 4 members
VLAN support	<ul style="list-style-type: none"> • Port-based VLAN • 802.1Q tag-based VLAN • MAC-based VLAN • Protocol-based VLAN • Management VLAN • Private VLAN Edge (PVE) • Q-in-Q (double tag) VLAN • Voice VLAN • GARP VLAN Registration Protocol (GVRP) for propagating VLAN
UDLD	Unidirectional Link Detection to discover L2 mis-connections
IGMP Snooping and Filtering	<ul style="list-style-type: none"> • Snooping and filtering of IGMP v1/v2/v3 requests to deliver the bandwidth intensive IPv4 multicast traffic only to the requesters • Supports 256 groups
MLD Snooping and Filtering	Delivers IPv6 multicast packets only to the required receivers
IGMP Querier	IGMP querier is used to support a Layer 2 multicast domain of snooping switches in the absence of a multicast router
IGMP Proxy	IGMP snooping with proxy reporting or report suppression actively filters IGMP packets in order to reduce load on the multicast router
Multicast VLAN Registration (MVR)	It uses a dedicated manually configured VLAN, called the multicast VLAN, to forward multicast traffic over Layer 2 network in conjunction with IGMP snooping.
DHCP Relay	<ul style="list-style-type: none"> • Relay of DHCP traffic to DHCP server in different VLAN. • Works with DHCP Option 82

Security	
Secure Shell (SSH)	SSHv1 and SSHv2 are supported for secure remote access to the switch
Secure Socket Layer (SSL)	The browser based access to the switch is secured by encrypting the http traffic using SSL
802.1X	<ul style="list-style-type: none"> • IEEE802.1X: RADIUS authentication, authorization and accounting, MD5 hash, guest VLAN, single/multiple host mode and single/multiple sessions • Supports IGMP-RADIUS based 802.1X • Dynamic VLAN assignment
Private VLAN Edge	PVE (also known as protected ports) provides L2 isolation between clients in the same VLAN. Supports multiple uplinks
Port Security	Locks MAC addresses to ports, and limits the number of learned MAC address
IP Source Guard	Prevents illegal IP address from accessing specific port in the switch. Only IP-MAC address bindings that are verified are allowed
Dynamic ARP Inspection	The switch compares the ARP request received dynamically against the IP-MAC address bindings that are allowed and discards any illegal ARP requests.
RADIUS/TACACS+	The switch act as a RADIUS/TACACS+ client
Storm Control	Prevents traffic on a LAN from being disrupted by a broadcast, multicast, or unicast storm of unknown MAC addresses on a port
DHCP Snooping	The switch can snoop DHCP requests so it knows the responses from a trusted DHCP server and can use it to build IP-MAC bindings to enforce security policies
ACLs	Supports up to 64 entries. Drop or rate limitation based on: <ul style="list-style-type: none"> • Source-Destination MAC, VLAN ID or IP address, protocol, port, • Differentiated services code point (DSCP) / IP precedence • TCP/ UDP source and destination ports • 802.1p priority • Ethernet type • Internet Control Message Protocol (ICMP) packets • TCP flag
Loop Protection	Prevents unknown unicast, broadcast and multicast loops in Layer2 switching configurations.

Quality of Service	
Queuing Hardware	Supports 8 Queues per Port
Scheduling Disciplines	<ul style="list-style-type: none"> • Strict Priority • Weighted Round Robin (WRR)
Congestion Control	Weighted Random Early Discard (WRED) on per Queue basis
Classification	Queue assignment based on <ul style="list-style-type: none"> • Port based • 802.1p VLAN priority based • IPv4/IPv6 precedence / DSCP based • Differentiated Services (DiffServ) • Classification and re-marking ACLs
Bandwidth Control	<ul style="list-style-type: none"> • Ingress Policer and marking (per port, and per Queue) • Egress Shaper and Rate Control (per port, and per Queue)
Management	
HW Monitoring	High Temperature Detection and Alarm
HW Watchdog	CPU Hang events are detected and SW restarted
DHCP Server	The built-in DHCP Server can be enabled to give out IP addresses to connected hosts.
Remote Monitoring (RMON)	Embedded RMON agent supports RMON groups 1,2,3,9 (history, statistics, alarms, and events) for enhanced traffic management, monitoring and analysis
Port Mirroring	Traffic on a port (Ingress, Egress, Both) can be mirrored to another port for analysis with a network analyzer or RMON probe. Up to N-1 (N is Switch's Ports) ports can be mirrored to single destination port.
S-Flow	The switch allows traffic to be sampled and sent to a server for monitoring.
Auto Discovery (LLDP)	Using IEEE 802.1an, the network devices advertise their identities, capabilities, and neighbors on an IEEE 802ab local area network. The switch support LLDP-MED extensions for client capabilities
SW Upgrades	Dual Images are supported. Independent primary and secondary images for backup while upgrading. Software upgrade via Web Browser (HTTP/HTTPS) and via File transfer (TFTP/FTP)
Firmware Upgrade	Firmware is upgradable via Web Browser or local console port
SNMP	SNMP version 1, 2c and 3 with support for traps. For enhanced security, SNMP version 3 user-based security model (USM)

Syslog	The events generated by the switch can be selected to be sent to a syslog server for further analysis and persistent storage
CLI	An Industry standard (Cisco-like) Command Line Interface (CLI) is available to configure and operate the switches. Configuration rollback to saved configuration is supported.
GUI – Graphical User Interface	A Web-server is embedded in the device and the switch can also be operated from a use-friendly Browser based User Interface
NTP	The switch does not have a persistent Real-time Clock (RTC) and hence it uses Network Time Protocol (NTP) as per RFC 1305 to get clock information
Cable Diagnostics	The Electrical interfaces support cable diagnostics to identify the location of the fault
Optical Port Monitoring	The Optical characteristics of the SFP modules can be monitored
TraceRoute	Layer3 and Layer2 Trace Route capability
IPv6 Management	The Management interface and utilities are IPv6 compliant. The Node IP address and Management traffic can be IPv6.
Power over Ethernet (PoE) for models where applicable	
Port Configuration	Supports per-Port PoE configuration
PoE Scheduling	Allows the PoE Devices (PDs) to be turned on/off as required
Auto Checking	Allows the PoE Devices (PDs) to be rebooted if the do not respond to a ping from the switch
Power Delay	The switch allows the PD's to be switched on following a programmable delay after rebooting. This allows the network to be established prior to powering the PoE Devices.
Persistent Power	This feature allows the PD's to retain power in case the switch undergoes a reboot.
Carrier Ethernet Features (for TJ1400P-M1-24SD-M)	
Linear Protection	Supports ITU-T G.8031 Ethernet Linear Protection Switching
Ring Protection	Supports ITU-T G.8032 Ethernet Ring Protection Switching
Ethernet OAM	Supports Operations, Administration & Management on the link
Service OAM	Supports IEEE 802.1ag Ethernet CFM (Connectivity Fault Management)
Perf. Monitoring	Supports ITU-T Y.1731 Performance Monitoring
Precision Timing	IEEE 1588v2 PTP

Standards Support

Ethernet	IEEE 802.3
Physical Layer	IEEE 802.3u, 802.3.z, 802.3ab, 802.3ac, 802.3ae
Flow Control	IEEE 802.3x
Framing/QoS	IEEE 802.1Q, 802.1ad, 802.1p, 802.1ac, 802.1v
Discovery	IEEE 802.1b
Bonding/Trunking	IEEE 802.3ad
PoE	IEEE 802.3af, 802.3at
Energy Efficient	IEEE 802.3az
STP	IEEE 802.1d, 802.1w, 802.1s, 802.1D-2004
Security	IEEE 802.1X
OAM (-M models)	IEEE 802.3ah, 802.3ag
EVC Protection	ITU-T G.8031, G.8032

Ordering Information

TJ1400P-M1-24TD-LS	24 port L2+ Managed GbE Switch with 4 SFP/SFP+ uplink ports and AC input
TJ1400P-M1-24PD-LS	24 port L2+ Managed GbE PoE+ Switch with 4 SFP/SFP+ uplink ports and AC input
TJ1400P-M1-24LPD-LS	24 port L2+ Managed GbE Low wattage PoE+ Switch with 4 SFP/SFP+ uplink ports and AC input
TJ1400P-M1-24SD-LS	24 port L2+ Managed GbE Fiber Switch with 4 SFP/SFP+ uplink ports and redundant AC inputs
TJ1400P-M1-24SD-LS-AD	24 port L2+ Managed GbE Fiber Switch with 4 SFP/SFP+ uplink ports and AC and DC inputs
TJ1400P-M1-24SD-M-AD	24 port L2+ Managed GbE Carrier Ethernet Fiber Switch with 4 SFP/SFP+ uplink ports and AC and DC inputs
TJ1400P-M1-48TD-LS	48 port L2+ Managed GbE Switch with 4 SFP/SFP+ uplink ports and AC input
TJ1400P-M1-48PD-LS	48 port L2+ Managed GbE PoE+ Switch with 4 SFP/SFP+ uplink ports and AC input
TJ1400P-M1-48LPD-LS	48 port L2+ Managed GbE Low wattage PoE+ Switch with 4 SFP/SFP+ uplink ports and AC input

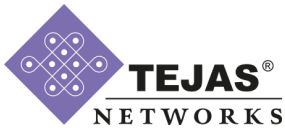
All switches ship with Mounting Kit for 19" racks and 3-pin (India) power cable(s) of 3meter length. A Console Cable for the switch is also supplied as part of the orderable part.

Pluggable Interface Modules

The Optical Interfaces use Pluggable Optical modules compliant with IEEE Standards and the Multi Source Agreements (MSA). However, Tejas recommends that the Optical modules be ordered from Tejas as this ensures that the modules have been tested for Quality and functionality in Tejas equipment and their operation and performance is guaranteed. When a customer sources and installs optical modules without the consent of Tejas Networks, any network failure is not supported by Tejas.

The following pluggable Interface modules may be ordered

Gigabit Ethernet Pluggable SFP Modules	
TJ-SFP-1GE-T	IEEE 1000BASE-T, Cat 6 cable, RJ45
TJ-SFP-1GE-SX	IEEE 1000BASE-SX, 850nm, Multi-Mode OM3, 550m, 2xLC
TJ-SFP-1GE-LX	IEEE 1000BASE-LX, 1310nm, Single Mode, 10Km, 2xLC
TJ-SFP-1GE-LX-BI-U	IEEE 1000BASE-BX10, 1310nm-TX/1490nm-RX, 10Km, LC
TJ-SFP-1GE-LX-BI-D	IEEE 1000BASE-BX10, 1490nm-TX/1310nm-RX, 10Km, LC
TJ-SFP-1GE-LH	IEEE 1000BASE-LH, 1310nm, Single Mode, 40Km, 2xLC
TJ-SFP-1GE-ZX	IEEE 1000BASE-ZX, 1550nm, Single Mode, 80Km, 2xLC
10 Gigabit Ethernet Pluggable SFP+ Modules	
TJ-SFP-10GE-SX	IEEE 10GBASE-SR, Multi-Mode OM3, 300m, 2xLC
TJ-SFP-10GE-LX	IEEE 10GBASE-LR, Single Mode, 10Km, 2xLC
TJ-SFP-10GE-LH	IEEE 10GBASE-ER, Single Mode, 40Km, 2xLC



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