



TEJAS[®]
NETWORKS

TJ1400P-M3

L2/L3 10G Stackable Switches



TJ1400P-M3-24TD-LS/S/E
TJ1400P-M3-24HPD-LS/S/E

TJ1400P-M3-48TD-LS/S/E
TJ1400P-M3-48PD-LS/S/E



TJ1400P-M3-24SD-LS/S/E
TJ1400P-M3-48SD-LS/S/E
TJ1400P-M3-24T24SD-LS/S/E

Overview

The TJ1400P-M3 Modular Multi-layer Stackable switch series is designed to provide a wide range of capabilities to meet diverse deployment requirements that value continuous operation. The comprehensive Layer2, Carrier Ethernet, and Layer3 features, flexibility of PoE, non-PoE and Optical Interfaces, and management capabilities make it valuable.

Switches run TejNOS-EN software that provides flexible licensing options for Enterprise and Service Provider offerings and interconnect of multiple switches into a single virtual chassis. Carrier Ethernet and IP-Routing are enabled via the -S license while advanced IP-routing features and Data Center features are enabled by the -E license. The software on a stand alone -E feature switch can be upgraded to deliver an IP/MPLS PE router.

Network Security is paramount today and 1400P-M3 ensures that with features like ACLs

based on L2-L4 headers, Storm Control, Denial of Service (DoS) mitigation the network security is not compromised. In addition, at Layer2 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.

The switches support line-rate, non-blocking switching for predictable performance. Dedicated 100G stacking links provide 400Gbps of stacking bandwidth with fast-failover and high utilization. Quality of Service is important in the distribution switches and the TJ1400P-M3 provides this as well.

The switch construction allows for redundant, field replaceable, hot-swap power supplies and fan modules. The Power supply units can be tailored to the deployment needs and higher Operating Temperature. The switches are 19" rack mountable and the PoE configurations support 30W on all ports.

Key Features and Benefits

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. With the -E license VxLAN support and other Datacentre L2 features are enabled.

Layer3 Switching

The switches support Routing protocols like RIP and OSPF in addition to static routing. For Multicast the switch supports PIM. As with all modern switches, both IPv4 and IPv6 traffic is supported. A built in DHCP server allows the switch to assign IP-addresses to endpoints and build a standalone IP-network. With the -E license BGP, Virtual router and Datacenter services are enabled.

IP/MPLS Routing

The IP/MPLS PE Router software upgrade enables MPLS based signalling and network protection, FRR. It also enables VRF support to create Layer2 services - Ethernet PseudoWires and VPLS, as well as Layer3 Services - L3 VPN.

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.

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.

Power over Ethernet

Specific models offer Power over Ethernet (PoE) capability. The PoE capable switches can act as the Power Source Equipment (PSE) and deliver 15.4W (IEEE 802.3af) / 30W (IEEE 802.3at) of power to connected Powered Devices (PD). With LLDP-MED capability the PD's can negotiate the power with the switch. Scheduling the powering of the devices is a feature that allows you to turn off the devices when not required.

Flexible Deployments

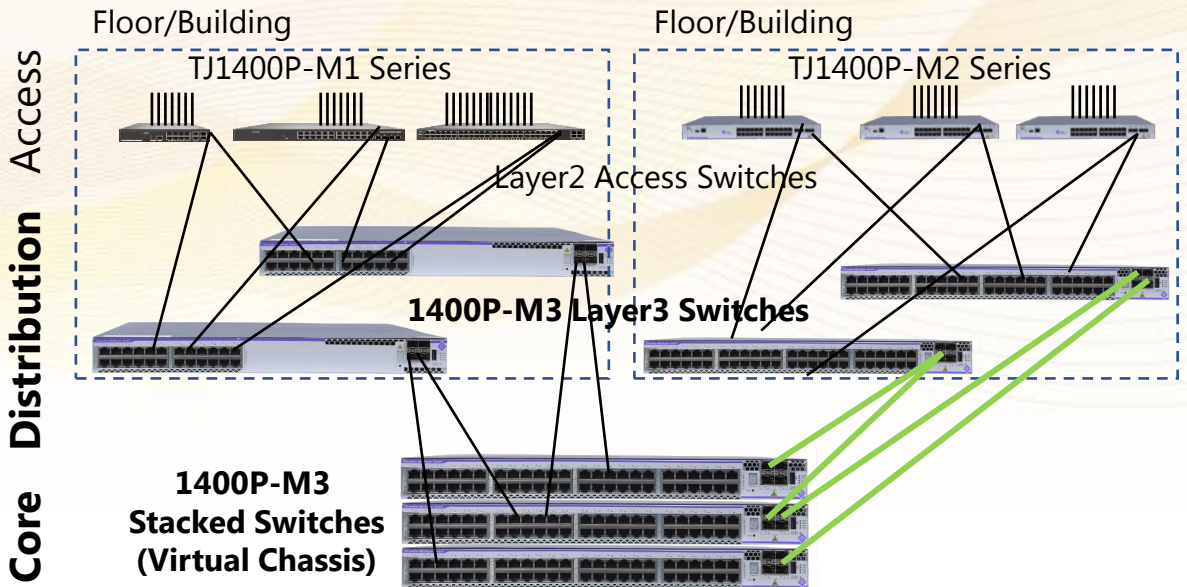
All ports are Gigabit Ethernet ports with Auto Negotiation and MDIX support allowing for seamless interconnectivity of new and old equipment. Support of multiple uplinks allows for ring configurations for redundancy. Line rate forwarding allows high-capacity access equipment like 802.11ac Access Points. 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

With High Bandwidth stacking, TJ1400P-M3 is ideal to scale your Layer3 core as with a pay-as-you-grow model aligned to your switching capacity requirements.

Secure Management

Management of the switch can be done locally using the RS232 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 of 1400P-M3



Product models in this series

Aligned to the Naming convention followed in Tejas Ethernet Switches the Gigabit Switches fit the nomenclature TJ1400P-M3-XXXXXX. The "Model-Type" is the identifier XXXXXXX used to indicate the specific orderable switch which is a combination of port capabilities and software.

There are software options for each of the Hardware configurations. Stackable switches can be upgraded in the field with a license upgrade. The License options are

- LS: Layer2 Managed switch with Static Route and DHCP server capability
- S: Carrier Ethernet and standard IPv4/IPv6 unicast and multicast Routing protocols
- E: Enhanced services license with BGP, Data Center Bridging and VRF-Lite support

Model-ID XXXXXXX	RJ45 Ports 10/100/1000	PoE+ Capable	PoE Budget	SFP Ports	SFP/SFP+ Port	QSFP Port
24TD-LS/S/E	24	-	-	-	4/0	1/2
24HPD-LS/S/E	24	24	740W	-	4/0	1/2
24SD-LS/S/E	-	-	-	24	4/0	1/2
48TD-LS/S/E	48	-	-	-	4/0	1/2
48PD-LS/S/E	48	48	740W	-	4/0	1/2
48SD-LS/S/E	-	-	-	48	4/0	1/2
24T24SD-LS/S/E	24	-	-	24	4/0	1/2

The QSFP uplink port can be used as a 40G port or as a 4x10G port for short reach, or as a 10G port for long reach using the QSFP to SFP adaptor module. The 4 SFP+ ports in the front can be bonded into a 40G interface using the right cable assembly for providing an second QSFP MPO port.

Power Supply

The switch models have redundant, hot-swappable wide range (90-240V, 50-60Hz) AC Power Supply Units (PSU) that are accessible from the rear. These provide dual voltage outputs, to provide the power for internal switch operation and up to 740W of PoE power to power external devices.

In the product roadmap there is a plan to introduce -48V DC PSU and lower wattage AC supply to cater to the non-PoE configurations that will work for greater operating temperatures. Please check the availability with Tejas sales if your deployment needs these.

Hardware Characteristics

The switches are 19" rack mountable with dedicated 100G stacking ports in the rear. A Console port (DIAG) and NMS port is also available at the back. For upgrades and downloading logs there is a USB 2.0 port in the front and a recessed Hardware button to recover systems in case of an unforeseen event. Per-port LED indications are provided along with a seven segment display to identify the ID of a stack member.

Dimension (HxWxD) mm	Weight	MTBF hours	Processor	DRAM	Flash
44x443x471	<9 Kg	>250,000	1 GHz MIPS	2 GB	512MB+

Adjustable rear mount angles are provided for 640mm and 740mm depth racks.

Switch Scalability

Models with 24 client ports have the following switch scalability characteristics.

Switching Capacity	Forwarding Rate (64B)	MAC Table	Packet Buffer	VLAN support	Max Frame Size
608 Gbps	426 Mpps	128K	12 MB	4096	9K Bytes

Models with 48 client ports have the following switching characteristics .

Switching Capacity	Forwarding Rate (64B)	MAC Table	Packet Buffer	VLAN support	Max Frame Size
656 Gbps	462 Mpps	128K	12MB	4096	9K Bytes

The switching capacity also includes the traffic on the 100G stacking links and the QSFP port.

Virtual Chassis and High Bandwidth Stacking Datapath

TJ1400P-M3 switches can be interconnected using high-bandwidth dedicated Stacking ports to form a single Virtual Chassis with single IP address for managing the multiple switches and a single control plane running on one switch member to control the ports across all the stack members. The Stack controllers are redundant with the high-availability features associated with a traditional chassis switches. Up to 15 switches can be supported in a stack.

TJ1400P-M3 has high-bandwidth connectivity with 2 links of 100Gbps full-duplex to carry traffic between the switches and is a major departure from the historical view of Stacked switches as being heavily blocking due to the limited interconnect bandwidth. Redundant 100G links allow for uninterrupted traffic in case of a need to expand the stack. The stack members can be any of the TJ1400P-M3 models and this provides a very efficient way of scaling the interfaces and capacity in the core network.

System LED Indicators

LED	Color	State	Description
PWR (Power)	Green	On	PSU's are providing output voltage
		Off	Absence of power of the node
STS (Status)	Green	On	The switch is Operational
	Red	On	Node rebooting continuously, software crash
FAN	Green	On	All fans operating normal
	Red	On	Fan failure in Fans or PSU, reduced operating temperature range
PoE		Off	PoE is not enabled
	Amber	On	No Power Device (PD) is connected
	Green	On	PoE enabled, supplying power to the connected Power Device within Limit
	Red	On	Power drawn by PDs exceeds PSU limit
Stack Master	Green	On	Primary Stack Member
	Amber	On	Backup Stack Master

Electrical Port LEDs

LED	Color	State	Description
Port Link/Act /Status LED	Green	On	Port is connected and speed is 1000 Mbps
	Amber	On	Port is connected and speed is 10 Mbps
	-	Blinking	Port is transmitting and receiving packets
		Off	Port is disconnected or disabled
Port PoE LED	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 1000 Mbps
	Amber	On	Port is connected and speed is 10 Mbps
	-	Blinking	Port is transmitting and receiving packets
		Off	Port is disconnected or disabled

Optical Port LEDs

LED	Color	State	Description
Tx LED	Green	On	SFP Laser is ON
		Off	SFP Laser is off
Rx LED	Amber	On	Module is Not present, or present with LOS
	Green	On	Module is present with no LOS
	Red	On	There is a fault in the SFP

Environmental Range

Operating Temperature	0 degC to +50 degC; Margin of 5 degC at both ends
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
Environmental	RoHS Directive 2011/65/EU

Networking Software Feature Licenses

-LS Feature License (Layer2 Switching and Static Routes, DHCP Server)	
<i>Layer3 Features available under -LS License</i>	
Static Routing	<ul style="list-style-type: none"> IPv4 and IPv6 Static Routing capable Policy Based Static Routes based on Classification rules Up to 1K Static Route entries
DHCP Server	The built-in DHCP Server gives IP addresses to connected hosts
<i>Layer2 Features available under -LS License</i>	
Bridging	<ul style="list-style-type: none"> Dynamic Learning of MAC addresses; 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 64 MSTP instances BPDU Filter, Root Guard, Loop Guard, BPDU Guard Standard SNMP Spanning Tree MIB support
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 32 link aggregation groups each with up to 8 members

VLAN support	<ul style="list-style-type: none"> • 4K VLAN supported • 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
IGMP Snooping	Supports snooping of IGMP v1/v2/v3 requests to deliver the bandwidth intensive IPv4 multicast traffic only to the requesters. Supports 1K IGMP groups
MLD Snooping	Delivers IPv6 multicast packets only to the required receivers. Supports 1K MLD groups
IGMP/MLD Querier	IGMP/MLD querier is used to support a Layer 2 multicast domain of snooping switches in the absence of a multicast router
IGMP/MLD Proxy	IGMP/MLD snooping with proxy reporting actively filters IGMP/MLD 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 to clients
DHCP Relay	<ul style="list-style-type: none"> • Relay of DHCP traffic to DHCP server in different VLAN • Works with DHCP Option 82
-S Feature License (CE and IP-BASE feature set upgrade over -LS)	
Ring Protection	50-ms protection, ERPS as per ITU-T G.8032
Ethernet OAM	Link OAM with Ethernet in First Mile (EFM) IEEE 802.3ah
Service OAM	Connectivity Fault Management (CFM) IEEE 802.1ag with 64 MEP
Perf. Monitoring	Delay and Loss Measurement (DM, LM) as per ITU-T Y.1731
L2TP	Specific L2 protocols on CVLAN can be tunneled in SVLAN
MEF Services	4K Ethernet Flow Points for E-Line and E-LAN Services with CVLAN to SVLAN mapping, Translation and Transparent LAN Service
RIP	<ul style="list-style-type: none"> • Routing Information Protocol (RIP) as per RFC 2453 is supported along with Authentication as per RFC 4822. • IPv4 and IPv6 addresses are supported
OSPFv2	<ul style="list-style-type: none"> • Open Shortest Path First Version 2(OSPFv2) for IPv4 is supported as per RFC 1583 and RFC 2328 • Stub Areas are supported along with NSSA option RFC 3101 • Opaque LSA as per RFC 2371/RFC 5250 are supported • MD5 based OSPF authentication as per RFC 2154

OSPFv3	<ul style="list-style-type: none"> Open Shortest Path First Version 3 (OSPFv3) for IPv6 is supported as per RFC 2740 / RFC 5340 Supports OSPFv3 Authentication and encryption via RFC 4552
PIM	Protocol Independent Multicast – Sparse Mode (PIM-SM) and Source-Specific Multicast (PIM-SSM)
ECMP	Equal Cost Multi-path for Load balancing/protection to be used in conjunction with Routing Protocols like OSPF
VRRP	Virtual Router Redundancy Protocol for node failover
Scalability	Unicast Routes: 32K IPv4 / 8K IPv6 Multicast Groups: 2K ECMP: 16-way
-E Feature License (IP-Enhanced feature set upgrade over –S)	
BGP	<ul style="list-style-type: none"> Border Gateway Protocol version 4 (BGP-4) as per RFC 4271 Multiple BGP sessions are supported with multiple peers and any session can be reset if desired. Interior and Exterior sessions (iBGP/eBGP).
VXLAN	Virtual Networks in multi-tenant environment
DCBX	Lossless connectivity using priority-based flow control (PFC) and enhanced transmission selection (ETS)
VRF-Lite	Virtual Router support using VRF-Lite; Up to 4 instances.
IP/MPLS PE Router Features (IP/MPLS feature set upgrade over –E)	
IS-IS	Intermediate System to Intermediate System (IS-IS) Protocol as standardized in ISO/IEC 10589 Standard
LDP	<ul style="list-style-type: none"> MPLS Label Distribution Protocol as per RFC 5036 and Graceful restart for LDP 32K MPLS labels
RSVP-TE	MPLS LSP setup with Traffic engineering using RSVP-TE as per RFC 3209, and applicable extensions as per RFC 3210
BFD	<ul style="list-style-type: none"> Bidirectional Forwarding Detection (BFD) as per RFC 5880 allows fast detection of network failures and aids convergence Single hop BFD (RFC 5881), multi-hop BFD (RFC 5883), and LSP BFD (RFC 5884)
Fast Reroute (FRR)	LDP based Fast reroute (LDP-FRR) as well as Remote-Loop free Alternate (R-LFA) FRR is supported
MPLS OAM	LSP Ping and Trace utilities
L2VPN	2K Virtual Forwarding Instances (VFI) over LDP signaled connections to remote PE nodes for VPLS service
L3VPN	256 VRF instances signaled via RFC 3107 for L3VPN services

Stacking (for Software licenses : -LS, -S, -E)	
Single Mgmt. IP	Single IP address and management port for all members
Redundancy	Automatic Master election with redundant standby master to take over if master unit fails
Load sharing	Use of both stack ports to reach destination is supported
Hot Plug support	Ability to add members to an active stack
Security (for all Software licenses : -LS, -S, -E)	
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 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 8K 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

Denial of Service Mitigation	<ul style="list-style-type: none"> • Hardware support for various DoS attacks like: illegal address check (IPv4, IPv6), Land packets (SIP = DIP), NullScan (TCP sequence number = 0, control bits = 0), Ping flood (flood of IPMC packets), SYN/SYN-ACK flooding, SYN with sPort < 1024, Smurf attack, Individual control over handling of DoS packet • Fine Control of CPU bound traffic using 48 queues
Quality of Service (for all Software licenses : -LS, -S, -E)	
Queuing Hardware	Supports 8 Queues per Port
Scheduling Disciplines	<ul style="list-style-type: none"> • Strict Priority • Weighted Round Robin (WRR)
Congestion	<ul style="list-style-type: none"> • Random Early Detection (RED) and Weighted Random Early Detection (WRED) active queue management • Explicit Congestion Notification (ECN) support
Classification	<p>Queue assignment based on</p> <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 (for all Software licenses : -LS, -S, -E)	
HW Monitoring	High Temperature and Hardware failure Detection and Alarms
HW Watchdog	CPU Hang events are detected and SW restarted
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 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. A single session is supported.
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
Stack Configuration	Configurations made on the master are replicated and stored across the stack members so that any other member can take over when master fails or is removed
SNMP	SNMP version1, 2c and 3 with support for traps and access to ALL device information and Standard MIBS For enhanced security, SNMPv3 user-based security model (USM)
Local Logging	Switch supports local store of Logs in NVRAM for debugging and forensics of failures and events
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
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 supports Network Time Protocol (NTP) as per RFC 1305 to sync to network clock information
SyncE	Synchronous Ethernet supported
Cable Diagnostics	The Electrical interfaces support cable diagnostics to identify the location of the fault
Optical Port Monitoring	Monitoring of Optical characteristics of the pluggable modules
IPv6 Management	The Management interface and utilities are IPv6 compliant. The Node IP address can be IPv6 and the Management traffic can be IPv6 based.
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 they 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. This allows PoE Devices with built in storage to continue operation and sync up on network availability.

Standards Support

Ethernet	IEEE 802.3
Physical Layer	IEEE 802.3u, 802.3z, 802.3ab, 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
Carrier Ethernet	ITU-T G.8032 v2, IEEE 802.3ah, IEEE 802.1ag, ITU-T Y.1731
MEF	MEF-9 and MEF-14
System Support	RFC 768 UDP RFC 783 RFC 791 IP RFC 792 ICMP RFC 793 TCP RFC 826 ARP RFC 903 RARP RFC 854Telnet RFC 906 TFTP Bootstrap RFC 951, 1542 BootP , RFC 1027 Proxy ARP, RFC 1519 CIDR RFC 1591 DNS RFC 1256 IPv4 ICMP Router Discovery (IRDP) RFC 2131 DHCP RFC 2131, 2132 DHCP Server RFC 2068 HTTP server RFC 2030 SNTP Simple Network Time Protocol RFC 2131 BOOTP/DHCP relay agent and DHCP server RFC 1492 TACACS+ RFC 2138 RADIUS Authentication RFC 2139 RADIUS Accounting RFC 3579 RADIUS EAP support for 802.1x RFC 5176 Dynamic Authorization Extensions to RADIUS RFC 1591 DNS
RIP	RFC 1058 RIP v1 RFC 2453 RIP v2
OSPF	RFC 2328 OSPF v2 (Edge-mode) RFC 1587 / RFC 3101 OSPF NSSA Option RFC 2154 OSPF w/Digital Signatures (Password, MD-5) RFC 2370 OSPF Opaque LSA Option RFC 5340 OSPFv3
Multicast Related	RFC 1112 IGMP v1 RFC 2236 IGMP v2 RFC 3376 IGMP v3 RFC 3618 MSDP - Multicast Source Discovery Protocol RFC 2362 PIM-SM (Edge-mode) draft-ietf-ssm-arch-06.txt PIM-SSM PIM Source Specific Multicast

Ordering Information*

* Stacking Cables and Optical Modules have to be ordered as per deployment requirements

TJ1400P-M3-24TD-LS	TJ1400P-M3-24TD-LS : 24 Port 10/100/1000BaseT RJ45 and 4 x 1/10G SFP+ Stackable switch with Layer2+ software, redundant PSUs, and Installation Kit
TJ1400P-M3-24TD-S	TJ1400P-M3-24TD-S : 24 Port 10/100/1000BaseT RJ45 and 4 x 1/10G SFP+ Stackable switch with Layer2/Layer3 software, redundant PSUs, and Installation Kit
TJ1400P-M3-24TD-E	TJ1400P-M3-24TD-E : 24 Port 10/100/1000BaseT RJ45 and 4 x 1/10G SFP+ Stackable switch with Enhanced Layer2/Layer3 software, redundant PSUs, and Installation Kit
TJ1400P-M3-24HPD-LS	TJ1400P-M3-24HPD-LS : 24 Port 10/100/1000BaseT RJ45 PoE+ and 4 x 1/10G SFP+ Stackable switch with Layer2+ software, redundant 740W PoE PSUs, and Installation Kit
TJ1400P-M3-24HPD-S	TJ1400P-M3-24HPD-S : 24 Port 10/100/1000BaseT RJ45 PoE+ and 4 x 1/10G SFP+ Stackable switch with Layer2/Layer3 software, redundant 740W PoE PSUs, and Installation Kit
TJ1400P-M3-24HPD-E	TJ1400P-M3-24HPD-E : 24 Port 10/100/1000BaseT RJ45 PoE+ and 4 x 1/10G SFP+ Stackable switch Enhanced Layer2/Layer3 software, redundant 740W PoE PSUs, and Installation Kit
TJ1400P-M3-24SD-LS	TJ1400P-M3-24SD-LS : 24 Port 1000BaseX SFP and 4 x 1/10G SFP+ Stackable switch with Layer2+ software, redundant PSUs, and Installation Kit
TJ1400P-M3-24SD-S	TJ1400P-M3-24SD-S : 24 Port 1000BaseX SFP and 4 x 1/10G SFP+ Stackable switch with Layer2/Layer3 software, redundant PSUs, and Installation Kit
TJ1400P-M3-24SD-E	TJ1400P-M3-24SD-E : 24 Port 1000BaseX SFP and 4 x 1/10G SFP+ Stackable switch with Enhanced Layer2/Layer3 software, redundant PSUs, and Installation Kit
TJ1400P-M3-48TD-LS	TJ1400P-M3-48TD-LS : 48 Port 10/100/1000BaseT RJ45 and 4 x 1/10G SFP+ Stackable switch with Layer2+ software, redundant PSUs, and Installation Kit
TJ1400P-M3-48TD-S	TJ1400P-M3-48TD-S : 48 Port 10/100/1000BaseT RJ45 and 4 x 1/10G SFP+ Stackable switch with Layer2/Layer3 software, redundant PSUs, and Installation Kit
TJ1400P-M3-48TD-E	TJ1400P-M3-48TD-E : 48 Port 10/100/1000BaseT RJ45 and 4 x 1/10G SFP+ Stackable switch with Enhanced Layer2/Layer3 software, redundant PSUs, and Installation Kit
TJ1400P-M3-48PD-LS	TJ1400P-M3-48PD-LS : 48 Port 10/100/1000BaseT RJ45 PoE+ and 4 x 1/10G SFP+ Stackable switch with Layer2+ software, redundant 740W PoE PSUs, and Installation Kit
TJ1400P-M3-48PD-S	TJ1400P-M3-48PD-S : 48 Port 10/100/1000BaseT RJ45 PoE+ and 4 x 1/10G SFP+ Stackable switch with Layer2/Layer3 software, redundant 740W PoE PSUs, and Installation Kit
TJ1400P-M3-48PD-E	TJ1400P-M3-48PD-E : 48 Port 10/100/1000BaseT RJ45 PoE+ and 4 x 1/10G SFP+ Stackable switch Enhanced Layer2/Layer3 software, redundant 740W PoE PSUs, and Installation Kit

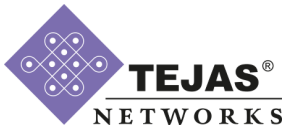
TJ1400P-M3-48SD-LS	TJ1400P-M3-48SD-LS : 48 Port 1000BaseX SFP and 4 x 1/10G SFP+ Stackable switch with Layer2+ software, redundant PSUs, and Installation Kit
TJ1400P-M3-48SD-S	TJ1400P-M3-48SD-S : 48 Port 1000BaseX SFP and 4 x 1/10G SFP+ Stackable switch with Layer2/Layer3 software, redundant PSUs, and Installation Kit
TJ1400P-M3-48SD-E	TJ1400P-M3-48SD-E : 48 Port 1000BaseX SFP and 4 x 1/10G SFP+ Stackable switch with Enhanced Layer2/Layer3 software, redundant PSUs, and Installation Kit
TJ1400P-M3-24T24SD-LS	TJ1400P-M3-24T24SD-LS : 48 GigE Port (24 10/100/1000BaseT RJ45 + 24 1000BaseX SFP) and 4 x 1/10G SFP+ Stackable switch Layer2+ software, redundant PSUs, and Installation Kit
TJ1400P-M3-24T24SD-S	TJ1400P-M3-24T24SD-S : 48 GigE Port (24 10/100/1000BaseT RJ45 + 24 1000BaseX SFP) and 4 x 1/10G SFP+ Stackable switch with Layer2/Layer3 software, redundant PSUs, and Installation Kit
TJ1400P-M3-24T24SD-E	TJ1400P-M3-24T24SD-E : 48 GigE Port (24 10/100/1000BaseT RJ45 + 24 1000BaseX SFP) and 4 x 1/10G SFP+ Stackable switch with Enhanced Layer2/Layer3 software, redundant PSUs, and Installation Kit
TJ1400P-M3-SW-UPG-LIC-S	TJ1400P-M3 CE and IP License: Upgrade Layer2+ to CE and IP Base for Stacked switches
TJ1400P-M3-SW-UPG-LIC-E	TJ1400P-M3 Enhanced License: Upgrade CE and IP-Base to IP-Enhanced for Stacked switches
TJ1400P-M3-SW-UPG-LIC-R	TJ1400P-M3 IP/MPLS PE Router License: Upgrade IP-Enhanced to IP/MPLS Router. Only applies to stand alone 1 switch configuration running –E software feature set
TJ1400P-M2M3-AC-POE-740W-PSU	TJ1400P-M2M3-AC-POE-740W-PSU : Stand alone AC PSU for TJ1400P-M2/M3 switches delivering internal 12V and 740W of PoE power along with 5 foot Power cord for India for sparing
TJ1400P-M2M3-AC-PSU	TJ1400P-M2M3-AC-PSU: Stand alone AC PSU unit for TJ1400P-M2/M3 switches delivering internal 12V power along with 5 ft Power cord for India for sparing. Roadmap.
TJ1400P-M2M3-DC-PSU	TJ1400P-M2M3-DC-PSU: Stand alone -48V DC input PSU unit for TJ1400P-M2/M3 switches delivering internal 12V power. Roadmap.
TJ1400P-M3-FTU	TJ1400P-M3-FTU: Stand alone Fan Module for the TJ1400P-M3 for sparing
TJ1400P-M3-STACK-50CM	TJ1400P-M3-STACK-50CM: Short (50cm) 100G Stacking Cable
TJ1400P-M3-STACK-1M	TJ1400P-M3-STACK-1M: Medium (1m) 100G Stacking Cable
TJ1400P-M3-STACK-3M	TJ1400P-M3-STACK-3M: Long (3m) 100G Stacking Cable
TJ1400P-M3-INS	TJ1400P-M3-INS: Stand alone Installation Kit for TJ1400P-M3 switches for sparing. Includes Mounting Kit, Diag Cable, 5 ft. NMS Ethernet cable, 5 ft. AC Power cord for India.

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
40 Gigabit Ethernet Pluggable QSFP Modules	
TJ-QSFP-40GE-SR4	40G, IEEE 40GBASE-SR4, Multi Mode. 150 m, MPO
TJ-BRK-MPO-8LC	Breakout Cable from MPO Male to 8 separate LC Male Connectors
TJ-QSFP-40GE-LR4	40G, IEEE 40GBASE-LR4, WDM, Single Mode. 10 Km, 2xLC
TJ-QSFP-40GE-ER4	40G, IEEE 40GBASE-ER4, WDM, Single Mode. 40 Km, 2xLC



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