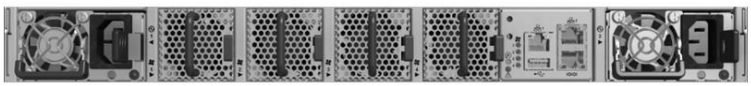
TJ1400P-M4 Leaf and Spine Switches

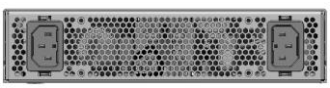
TJ1400P-M4-48DU-E
TJ1400P-M4-48EU-E



TJ1400P-M4-32Q-E
TJ1400P-M4-32U-E

1RU Leaf, Spine switches with Redundant, Hot Swap Power Supplies and Fans

TJ1400P-M4-16Q-E
TJ1400P-M4-16U-E



½ RU Compact Spine switches with Redundant Internal Power Supplies

Overview

The TJ1400P-M4 series of switches are all based on the same high-performance switching ASIC to provide Terabit capacity switching capacity for today's Data Center and Enterprise Network requirements.

Line rate forwarding, zero packet loss and low latency are the highlights of the offerings. Different models target the 10G/40G/100G market and the 25G/100G market.

Layer2 switching and inter VLAN routing using Layer3 protocols for Unicast and Multicast IPv4 and IPv6 traffic is available as the default feature set that supports VxLAN and Priority Flow Control requirements of today's virtualized infrastructure.

The switch construction allows for redundant, field replaceable power supplies. The Fan modules are also field-replaceable providing for enhanced availability. While redundancy is available in the compact Spine switches, the fans and power supplies are not field replaceable.

Network Security and QoS are paramount today and 1400P-M4 ensures that with features like ACLs based on L2-L4 headers and arbitrary packet fields, 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.

Key Features and Benefits

Low Latency, High Performance

The switches use an ASIC that has 6.4 Tbps of switching throughput and Line rate switching on all ports. In addition the silicon provides very low latency of switching (300ns, independent of packet size) and an architecture that ensures no packet loss. The different models access varying amount of this capacity and are targeted towards different markets. Low power dissipation and high throughput make these switches best in class in price performance.

Layer2 Switching

Comprehensive Layer2 feature set with various flavors of Spanning Tree Protocols, 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 and applications. Virtualization support in the form of VxLAN, a large MAC address limit make the switches suitable for large scale Data Centers that prefer a Layer2 operation.

Layer3 Switching

Data Centers who prefer to operate as an IP routed network, the switches support Unicast Routing protocols like Static Routes, OSPF, and BGP. For Multicast routing there is PIM and IGMP Snooping Querier support. VRRP and ECMP are available to add resiliency to the network. Furthermore, ACL based forwarding can be employed to meet specific traffic requirements.

Flexible Deployments

The Optical Ports on the switches have the ability to support a number of different optics and Electrical interconnect. Furthermore the QSFP form-factor ports can support breakout into corresponding lower-speed ports. Within the constraints of the Power dissipation of the QSFP module, breakout of 100G ports into 4x25G, 2x50G are possible. The 40G ports can support a breakout into 4x10G.

The uplinks of the switches can be interconnected in a number of configurations to deliver the capacity and blocking performance required for a deployment.

ACLs and Quality of Service

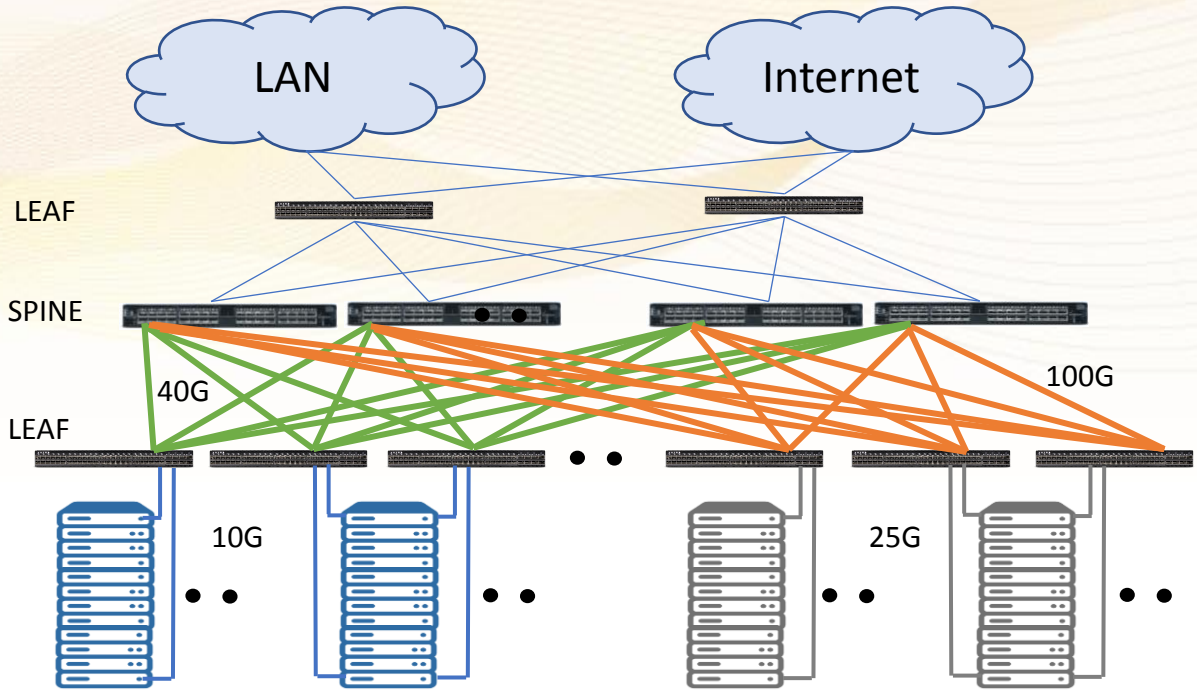
The flexibility of creating Access Control Lists and a very large set of consequent actions is available. This ensures that future customer requirement can be easily provided as an upgrade. QoS techniques like Policing, Shaping and Scheduling are available.

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.

The Hardware is fully compatible with the OpenFlow requirements and is SDN ready. It also has the ONIE layer and ability to support different Network Operating Systems.

Sample Deployment



Product models in this series

Aligned to the naming convention followed in Tejas Ethernet Switch Portfolio, the 1400P-M4 series of Leaf and Spine switches are named **TJ1400P-M4-XXXXXX**.

The "Model-Type" is the identifier XXXXXXX used to indicate the specific orderable switch which is a combination of port capabilities and software described here

Type	Model-ID XXXXXXX	SFP+ 1/10G	SFP28 1/10/25G	QSFP 40G	QSFP28 40/100G
10G LEAF	48DU-E	48			8
25G LEAF	48EU-E		48		8
40G SPINE	16Q-E			16	
100G SPINE	16U-E				16
40G SPINE	32Q-E			32	
100G SPINE	32U-E				32

Note: The 25G SFP28 ports also support 1/10G SFP+ modules and similarly the QSFP28 ports also support 40G modules allowing flexibility of mixed port speed deployments.

Note: QSFP ports can also support breakout cables and be converted to 4 lower-speed ports compatible with the bandwidth.

Power Supply

All switches operate on AC power with voltage ranges 100V-127V and 200-240V with 50-60Hz single-phase feeds accessible from the rear.

The 1RU switch models have redundant, hot-swappable Power Supply Modules while the 1/2RU switches have dual redundant internal AC Power Units.

Hardware Characteristics

Model-ID XXXXXXX	Dimension (HxWxD) mm	Weight	Acoustic	Processor/DRAM /Flash	MAX Power
48DU-E 48EU-E	44x438x436	8.5 Kg	70.9 dB(A)	1.4 GHz Dual Core / 8GB/ 32GB	360W
16Q-E 16Q-U	44x200x508	4.6 Kg	73.7 dB(a)	2.4 GHz Quad Core / 8GB/ 32GB	250W
32Q-E 32Q-U	44x428x687	11.1 Kg	71.6 dB(A)	1.4 GHz Dual Core / 8GB/32GB	400W

Noise level measured as per ISO 7779 / 3744. with fan speed of 60% which is the level in standard operation

Switch Scalability

Switches use a 3.2Tbps full-duplex switching ASIC. Interface configurations limit the demonstrable capacity.

Model-ID XXXXXXX	Full Duplex Switching	Forwarding Rate	MAC Table	Packet Buffer	Max Frame Size
48DU-E	1280Gbps	1.90 Bpps	64K-128K	16MB	9216 Bytes
48EU-E	2 Tbps	2.97 Bpps	64K-128K	16MB	9216 Bytes
16Q-E	640 Gbps	952 Mpps	64K-128K	16MB	9216 Bytes
16U-E	1.6 Tbps	2.38 Bpps	64K-128K	16MB	9216 Bytes
32Q-E	1.28 Tbps	1.90 Bpps	64K-128K	16MB	9216 Bytes
32U-E	3.2 Tbps	4.76 Bpps	64K-128K	16MB	9216 Bytes

The switching ASIC supports Cloud Scale deployment scalability. By using profiles, the Software allows the flexible use of the ASIC hardware resources optimized towards specific applications.

Model-ID XXXXXXX	Max Support	Default Profile	IPv4 Multicast Profile	IPv6 Profile
IPv4 Hosts	512K	25K	8K	8K
IPv6 Hosts	256K	8K	8K	24K
IPv4 Routes	512K	100K	100K	50K
IPv6 Routes	512K	20K	20K	50K
IPv4 MC /IGMP Routes	128K	10K	14K	10K
VRF	256	64	8	64
ACL Entries (9B/54B Key)	36K/6K	4K	4K	4K

System LED Indicators

LED	Color	State	Description
Power	Green	On	PSU's are providing output voltage. Plugged in and working normally
		Off	PSU is faulty or disconnected
Status	Green	On	The switch is Operational
	Green	Flashing	Node is booting, Can be up to 5 minutes
	Red	On	Major Issue. Software corrupted, Overheating
FAN	-	Off	System is Booting
	Green	On	Fan is operatonal
	Red	On	Fan failure or Fan missing. Replace Fan. Reduced operating temperature range
Bad Port		Off	All ports receiving data correctly
	Amber	Flashing	Symbol errors on one or more ports (bad cable, connection, conenctor)

Optical Port LEDs

LED assignment to the 40G/100G ports depends on whether ports are split or not. Details of the LED assignment for the specific models can be found in the Hardware Guide.

LED	Color	State	Description
Port LED	-	Off	Link is down (check the cable)
	Green	Solid	Link is up with no Traffic
	Green	Flashing	Link is up with traffic
	Amber	Flashing	There is a problem in the link (check cable)

Environmental Range

Operating Temperature	0 degC to +40 degC
Storage Temperature	-40 degC to +70 degC
Operating Altitude	Up to 3000 meters
Operating Humidity	10% to 85% 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

Software Features

Layer2 Switching Features	
Bridging	• Dynamic Learning of MAC addresses with configurable Aging Timers • Hardware support for 128K MAC addresses • Static MAC addresses that are not subject to aging

Spanning Tree Protocol (STP)	• Standard Spanning Tree 802.1d
	• Rapid Spanning Tree (RSTP) 802.1w
	• Multiple Spanning Tree (MSTP) 802.1s
	• Rapid Per VLAN Spanning Tree+ (PVRST+)
	  • BPDU Filter
	  • BPDU Guard
	  • Loop Guard
	  • Root Guard

Link Aggregation	• Link bonding using statically defined Link Aggregation Groups • Dynamic bonding using Link Aggregation Control Protocol (LACP) IEEE 802.3ad • Up to 64 link aggregation groups each with up to 32 members • Multi-Chassis Link-Aggregation Group (MLAG/MC-LAG)
VLAN support	• 802.1Q tag-based VLAN – 4096 VLAN • Q-in-Q (double tag) VLAN • Voice VLAN • Management VLAN
IGMP Snooping	• Supports snooping of IGMP v1/v2/v3 requests to deliver IPv4 multicast traffic only to the requesters. • 256 Groups supported
MLD Snooping	Delivers IPv6 multicast packets only to the required receivers
IGMP Proxy	IGMP snooping with proxy reporting or report suppression actively filters IGMP packets in order to reduce load on the multicast router
DHCP Relay	• Relay of DHCP traffic to DHCP server in different VLAN • Works with DHCP Option 82
IGMP Snooping Querier	IGMP snooping querier is used to support a Layer 2 multicast domain of in the absence of a multicast router
VXLAN	Support for Virtual Networks in multi-tenant environment
DCBX	Enables Lossless connectivity using priority-based flow control and enhanced transmission selection

Layer3 Switching Support	
Static Routes	IPv4 and IPv6 Static Routing capability
IPv6	IPv6 forwarding, Protocols, QoS and Management access
RIP	Routing Information Protocol RIPv1/v2
OSPFv2, OSPFv3	Open Shortest Path First (OSPF) for IPv4 and IPv6
BGP	Exterior Gateway Protocol to transfer routes between routers
PIM	Protocol Independent Multicast (PIM), PIM-SM, PIM-SSM
ECMP	Equal Cost Multi-path for Load balancing/protection
BFD	Infrastructure to detect connectivity failures on routed interfaces to aid in sub-second detection
VRRP	Virtual Router Redundancy Protocol for node failover
MAGP	Multi-Active Gateway Protocol in conjunction of MLAG
PBR	Policy Based Routing
Security	
Secure Shell (SSH)	SSHv1 and SSHv2 are supported for secure remote access
Secure Socket Layer (SSL)	The browser based access to the switch is secured by encrypting the http traffic using SSL
802.1X	• 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
Port Security	Locks MAC addresses to ports
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 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
ACLs	Supports up to 18K entries. Drop or rate limitation based on: • 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

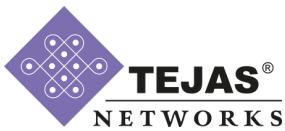
Quality of Service	
Flow Control	802.3x Port based Flow control 802.1Qbb Per Priority Flow Control (PFC)
Queuing	8 Queues per Port (extendable to 16 per Port)
Scheduling Disciplines	• Strict Priority • Deficit Weighted Round Robin (DWRR)/Deficit Round Robin (DRR) • Enhanced Transmission Selection (ETS) 802.1Qaz
Congestion	• Random Early Detection (RED) and Weighted Random Early Detection (WRED) active queue management • Explicit Congestion Notification (ECN) support
Classification	Queue assignment based on • Port based • 802.1p VLAN priority based • IPv4/IPv6 precedence / DSCP based • Differentiated Services (DiffServ) • Classification and re-marking ACLs
Bandwidth Control	• Ingress Policer and marking (per port, and per Queue) • Egress Shaper and Rate Control (per port, and per Queue)
Management	
Device Access	Telnet and SSH access from Console and Management VLAN
System Monitoring	Monitoring of system Temperature, Input Voltages, Power Modules, Fans, Memory utilization
Logging	Extensive capability to log events to local files and to syslog servers
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.
Telemetry	Histograms, Thresholds, Flow recording to enable administrators to understand complex networks
Auto Discovery (LLDP)	Using IEEE 802.1ab, the network devices advertise their identities, capabilities, and neighbors on a 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
User Management	Security and control of User accounts
Job Management	Ability to define and execute periodic jobs/scripts/commands
Remote Control	Support of Open Flow and Puppet Client to aid in automation
Firmware Upgrade	Firmware is upgradable via Browser or local console/USB port
SNMP	SNMP version1, 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
NTP	The switch has Network Time Protocol (NTP) Client to sync to network clock information
Link Diagnostics	Per port diagnostics of the connectivity on a port
Optical Port Monitoring	The Optical characteristics of the SFP modules can be monitored
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.

Ordering Information

TJ1400P-M4-48DU-E	TJ1400P-M4-48DU-E : 1RU switch 48 SFP/SFP+ (10G) and 8 x QSFP28 ports (40G/100G) with dual field-replaceable PSUs
TJ1400P-M4-48EU-E	TJ1400P-M4-48EU-E : 1RU switch 48 SFP/SFP+/SFP28 (25G) and 8 x QSFP28 (40/100G) ports with dual field-replaceable PSU
TJ1400P-M4-32Q-E	TJ1400P-M4-32Q-E : 1 RU swtitch32 x QSFP ports (40G) with dual field-replaceable PSUs
TJ1400P-M4-32U-E	TJ1400P-M4-32U-E : 1RU switch 32 x QSFP28 ports (40/100G) with dual field-replaceable PSUs
TJ1400P-M4-16Q-E	TJ1400P-M4-16Q-E : ½ RU switch 16 x QSFP ports (40G) with dual AC inputs
TJ1400P-M4-16U-E	TJ1400P-M4-16U-E : ½ RU switch 16 x QSFP28 ports (40/100G) with dual AC inputs
TJ1400P-M4-AC-PSU	Replacement AC Power Supply unit for the 1RU switches
TJ1400P-M4-FAN	Replacement Fan module for the 1RU switches

Please contact Tejas Networks for the Optical modules, Direct-Attach-Cables and Breakout Cables compatible with the switches.



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