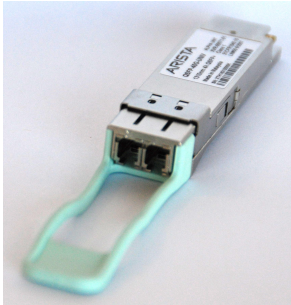# Arista QSFP-40G-UNIV Transceiver: Q&A

Product Overview

What is the Universal transceiver and why is it called Universal?

The Arista QSFP-40G-UNIV is a QSFP 40GbE transceiver with a duplex LC connector that can be used with both multi-mode (MM) and single-mode (SM) fiber. It has 4 channels of 10G multiplexed inside the module to transmit and receive an aggregate 40G signal over 2 strands of fiber.
It is called Universal because of its ability to operate with both MM and SM fiber without the need for any software/hardware changes to the module or any additional hardware in the network.

What are the benefits to using QSFP UNIV?

The Arista Universal transceiver addresses several challenges faced by today's data centers. The table below highlights the benefits of Universal transceiver.

Challenge	Why UNIVERSAL	Benefit
Migrating from 10G to 40G	Other 40GbE MM solutions require the use of 8 fibers for a 40G link. Since 10G MM connections only require 2 fibers, if they use these solutions customers have to limit their number of links to just 1/4th. However, with the Arista Universal transceiver customers have the same number of 40G links as 10G links without making any changes to their fiber infrastructure - No change to fiber termination - No upgrade to patch panels or trunks - Lifecycle of existing fiber plant can be extended - Supports over 95% of multi-mode fiber links	Upgrade to 40G with "ZERO" new CAPEX in fiber infrastructure

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Increase number of 40G links in the network	As the existing MM 40GbE solutions need the use of 8 fibers for a 40G link customers have to add additional fiber to increase the number of 40G links. By deploying the Arista Universal transceiver customers increase the number of 40G links by 4X without making any changes to their fiber infrastructure - Expand number of 40G links - Extend network scale and performance - No disruptive upgrades	Increase 40G links by 4X with "ZERO" investment in fiber infrastructure
Migrate from multi-mode to single mode fiber	The Universal transceiver is a cost effective solution for SM fiber infrastructure for distances up to 500m. As it interoperates with 1km QSFP-LR4L and 10km QSFP-LR4 optics, customers can deploy mixed connections without concerns - Migrate from multi to single mode - Mix and match UNIV and LR4 or LR4L - Supports over 75% of SM fiber link distances inside the data center	Cost effective solution for single-mode fiber infrastructure
Data Centers with a mix of multi-mode and single-mode fiber	The Universal transceiver offers the unique advantage of operating on both multi-mode and single-mode fiber without any requirement for additional hardware or software. Customers can consolidate their optics and use QSFP-UNIV in their network irrespective of the fiber type - Standardize on one transceiver type - Reduce cost of deployment and of support - Use existing cabling systems	Simplify purchasing and deployments

How is QSFP-40G-UNIV different from other Arista QSFP short reach transceivers?

Arista has a choice of QSFP transceivers that address the short reach requirement, for example QSFP-40G-SR4 (100m over OM3 fiber) and QSFP-40G-XSR4 (300m over OM3 fiber). These transceivers are based on the IEEE 40GBASE-SR4 standards and operate over parallel multimode fiber. They use an MPO-12 connector and use ribbon fiber infrastructure. As a result customers may have to deploy new fiber to upgrade from 10G to 40G or to install MTP/MPO fiber systems.
The Arista 40GbE QSFP-UNIV has LC connectors and works on existing OM3 and OM4 duplex multi-mode fiber infrastructure that is widely installed and used for 1 and 10GbE networks without modification or expansion.

What is the typical cost difference for fiber infrastructure for parallel transceivers and duplex transceiver?

A typical fiber infrastructure cost per 40G link with a parallel transceiver (based on list prices without any discount assumptions) is shown below.
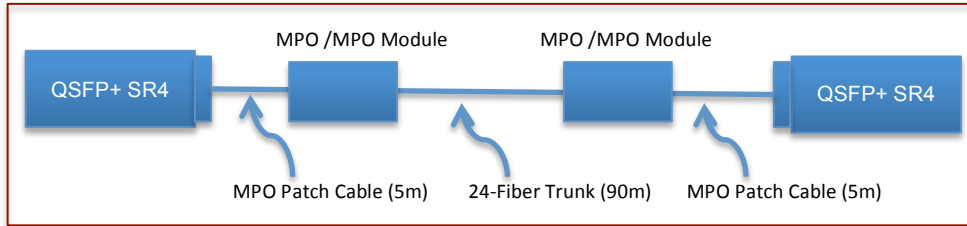
Item	Unit Price	Extended Price Per 40G Link	Notes
MPO patch cable (5m, OM3)	$448	$896	2 patch cables per link
MPO/MPO Module (OM3)	$1185	$790	Total 2 modules which can be used for 3 links. Per Link = $1185*2/3
24-Fiber Trunk (90m, OM3)	$3198	$1066	QSFP SR4 uses 8 fibers in the trunk per link
TOTAL		$2752	

A typical fiber infrastructure cost per 40G link for the Arista Universal transceiver (based on list prices without any discount assumptions) is shown below.
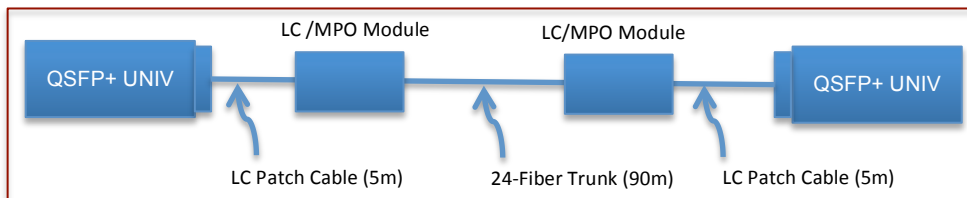
Item	Unit Price	Extended Price Per 40G Link	Notes
Duplex LC patch cable (5m, OM3)	$64	$128	2 patch cables per link
LC/MPO Module (OM3)	$482	$161	2 modules, which can be used for 6 links. Per Link = $482*2/6
24-Fiber Trunk (90m, OM3)	$3198	$267	QSFP UNIV uses 2 fibers in the trunk. Per link = $3198*2/24
TOTAL		$556	

A saving of over 75% on the cabling equipment alone is realized from the UNIV transceiver. The project management costs to upgrade existing duplex systems are entirely avoided resulting in even more significant savings.

Does the QSFP UNIV work with common cabling systems and standards

The Arista Universal transceiver is designed to work seamlessly with customers existing cabling systems installed to meet the TIA-942 and TIA-568 specifications.

Is there an industry standard for QSFP-40G-UNIV?

The electrical interface of QSFP-UNIV is fully compliant to IEEE 802.3ba so it can be plugged into any QSFP+ based switch port. In addition the optical interface is based on the IEEE 40GBASE-LR4 standard. As a result the QSFP-UNIV can interoperate with QSFP-40G-LR4 and QSFP-40G-LR4L for distances up to 500m. The UNIV transceiver is compliant to the QSFP+ MSA SFF-8436 which defines the specification for QSFP optics.

Is QSFP UNIV interoperable with any other QSFP transceivers?

Yes, QSFP-UNIV can interoperate with any 40GBASE-LR4 standard transceivers for distances up to 500m over single-mode fiber. This allows the use of 40G-LR4 optics in devices such as routers, storage systems, switches and other network appliances that do not use the QSFP form factor or that do not have support for the Arista 40G-UNIV QSFP.
The QSFP-UNIV interoperates with Arista QSFP-40G-LR4 and QSFP-40G-LR4L for distances up to 500m over single-mode fiber which covers the majority of single mode link distances inside data centers. This avoids the need to replace existing optics and provides a smooth migration path.

Does the QSFP UNIV interoperate with 40GBASE-SR4?

Unlike the 40GBASE-SR4 specification the 40G UNIV uses a single pair of fibers that makes it incompatible with parallel optics for multi-mode cable.

Does the QSFP UNIV interoperate with the Cisco duplex 40G optics?

The QSFP UNIV will interoperate with Cisco and other vendors standards based 40GbE LR4 optics. Unfortunately as the Cisco "BiDi" duplex optic is not based on an IEEE specification it is not interoperable with other multi-vendor optics.

Can the QSFP UNIV be used to break out 4x10G connections?

Both SM and MM duplex 40G optics are not capable of being broken into 4x10G. There are a wide range of 40G optics that do support break out options and each of these use parallel fiber with MTP/MPO connections.
40GBASE-SR4, 40GBASE-XSR4, 40GBASE-PLR4, 40GBASE-PLRL4 are all available for scenarios requiring four 10GbE ports from a single QSFP interface.

What is Digital Optical Monitoring and does the Universal transceiver support Digital Optical Monitoring?

Digital Optical Monitoring (DOM) provides access to real-time operating parameters of the transceiver through a digital interface. It enables pro-active monitoring of the key parameters of the transceiver and helps with link troubleshooting. DOM can help network engineers to be aware of degrading fiber paths, detect transceiver problems and test splicing/patching work remotely and in a non-intrusive

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way. The Arista Universal transceiver has full DOM support with access to transmit and receive power levels, temperature, voltage and bias current monitoring

Can passive network TAPs be used with Universal transceiver?

Yes, existing 1x2 TAPs that are used in both 1G and 10G networks can be re-used at 40G with the Universal transceiver. Customers have the benefit of using the industry standard 40GBASE LR4 on the monitor link if additional receiver sensitivity is needed due to the TAP insertion loss.

What are the common specifications for QSFP UNIV?

The Arista Universal transceiver operates on both MM and SM. The table below shows the specifications for both type of fiber.

PHY Type	Connector Type	Wavelength (nm)	Cable Type	Core Size (um)	Modal Bandwidth (MHz*Km)	Tx power (dBm)	Rx power (dBm)	Operating Distance (m)
40GBASE-UNIV	LC	1270 1290 1310 1330	OM3 OM4	50.0 50.0	2000 (OM3) 4700 (OM4)	-7 to +3.5 /lane	-10.0 to +3.5 /lane	150m
40GBASE-UNIV	LC	1270 1290 1310 1330	SMF	G.652	–	-7 to +3.5[1] /lane	-10.0 to +3.5 /lane	500m

Is QSFP UNIV an Arista specific transceiver or is it generally available in the market?

Arista has worked closely with the optics technology suppliers to both define and productize the QSFP-UNIV. However, this is not a proprietary product and does not have any associated exclusive lock-in that prevents the wider industry from leveraging the same innovations.

What cable type is needed for the QSFP UNIV transceiver?

The Arista QSFP UNIV uses an LC connector, and works on a wide range of fiber optic cables, including multi-mode OM3 and OM4 and single mode (OS1)

What is the reach on QSFP UNIV for various fiber types?

The Arista UNIV operates on both OM3 and OM4 MMF and SMF fibers, and the supported reach for each is shown below. The 150m for OM3 and OM4 covers approximately 95% of the installed links in data centers based on data presented at the IEEE (Flatman study [2]). The 500m link distance for single mode fiber covers approximately 75% of the single mode links installed inside the data center.

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[1] Max Tx Power with SMF launch is compatible with 40GBASE-LR4 and will not overload the receiver
[2] IEEE802.3ba, Jan. 2008, Flatman_01_0108

Cable Type	Core Size (Micron)	Modal Bandwidth (MHz*km)	Cable Distance
MMF	50.0	2000 (OM3)	150m
	50.0	4700 (OM4)	150m
SMF	9.0	-	500m

What is the fiber connector type for UNIV?

QSFP UNIV has a duplex LC Connector. When migrating from 10G to 40G existing fiber patch cords, panels, trunks and cabling systems can be used without modification. This avoids adding cost or complexity to the migration.

What is the power consumption of the QSFP UNIV?

The QSFP UNIV is compliant to the SFF-8436 MSA. Power draw of the transceiver is less than 3.5W, which is the maximum defined for a QSFP+.

Which Arista platforms support QSFP UNIV?

All Arista products with QSFP ports support the QSFP-UNIV transceiver. There are minimum EOS versions to get full support for DOM display and platform support. Refer to EOS release notes for details.

What is the minimum EOS software version for the Arista QSFP UNIV?

The minimum version of EOS that supports the Arista QSFP UNIV is published in the EOS release notes at Release Notes.

Where do I get additional information is available on QSFP UNIV?

More information on Arista transceivers including the QSFP UNIV is available at http://www.arista.com/en/products/transceivers-cables or contact us at sales@arista.com