Technology Solution Guide

Deploying Omnitron PoE Media Converters with Aruba Access Points and AirMesh Routers

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Introduction

This document describes the Omnitron products that are interoperable with Aruba wireless LAN and mesh solutions, and is intended to supplement Aruba and Omnitron product documentation. Please contact the Aruba Partner Solution Engineering team at pse@arubanetworks.com should additional information be required.

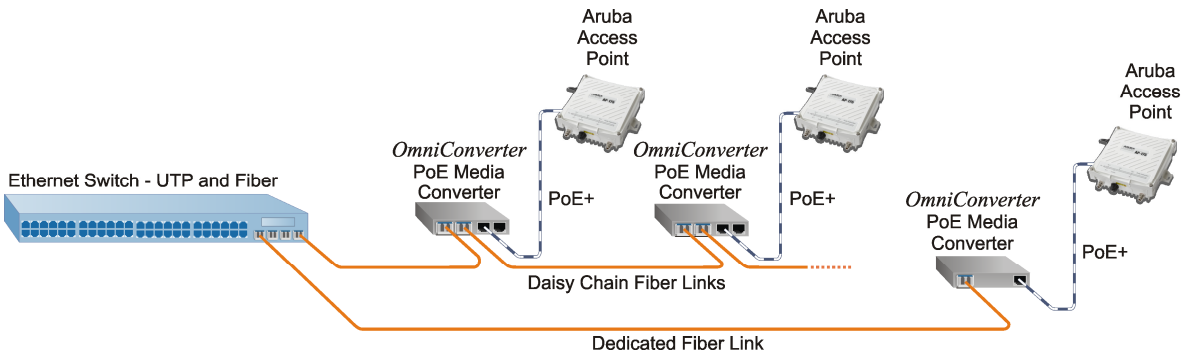
Solution Components

Enterprise networks must support a wide range of installation environments, located indoors and out, that leverage wireless, wired, and remote access infrastructure. Since installation scenarios vary widely, it's important for integrators to have a wide range of media converters and power supply options available. If fiber optic cabling is used to minimize the effects of lightning and electrical noise – or to traverse long distances – then fiber-to-Ethernet media converters will be needed at the access points, switches, and remote locations. Similarly, if Power-over-Ethernet (PoE) is needed to power access points and client devices then PoE supplies or injectors will be required.

The primary benefit of PoE is the elimination of power supplies, power cables, and power outlets that would otherwise be required for the remote device. As such, PoE lowers costs and saves money when deploying remote devices. This is especially relevant when these devices are installed in locations that are otherwise difficult and/or expensive to wire with AC power, such as ceilings, rooftops, and outdoors.

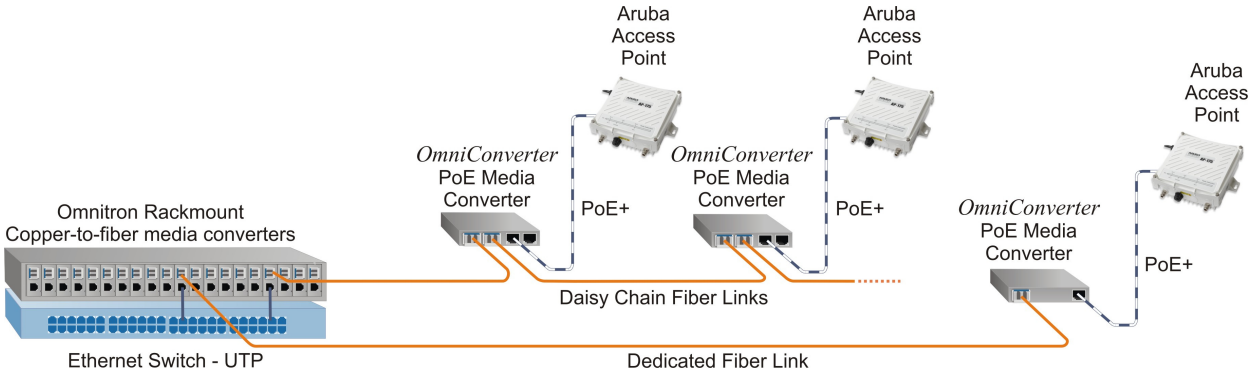
The maximum reach of Power-over-Ethernet is 100 meters using Ethernet on unshielded twisted pair (UTP) LAN cabling. This distance limitation challenges network engineers to find alternate solutions when access points and mesh routers must be located more than 100 meters from the Ethernet switch.

Omnitron's *OmniConverter*™ power sourcing media converters with integrated PoE overcome this distance limitation by combining the benefits of fiber optic data cabling (long distances) with power-over-Ethernet. An example application is shown in the diagram below.



In this application, fiber optic cabling originates from a fiber port on the Ethernet switch, and connects to a fiber port on an AC or DC powered *OmniConverter* media converter, located near the access point or mesh router. The *OmniConverter's* 10/100 or 10/100/1000 UTP ports are connected to access points or mesh routers using up to 100 meters of Cat5 or better LAN cabling, as required, and provide both power and an Ethernet link across this single medium.

In applications where the Ethernet switch has no fiber port(s) available, low-cost standalone or rack mounted media converters can be used to convert copper switch ports into fiber, as shown in the diagram below.



In this example, no fiber ports are available at the Ethernet switch. Rack mounted copper-to-fiber media converters are used to create the fiber interface. Rack mounted media converters can provide up to 19 media conversion ports in less than 2U of rack space. For low density applications, standalone media converters may also be used.

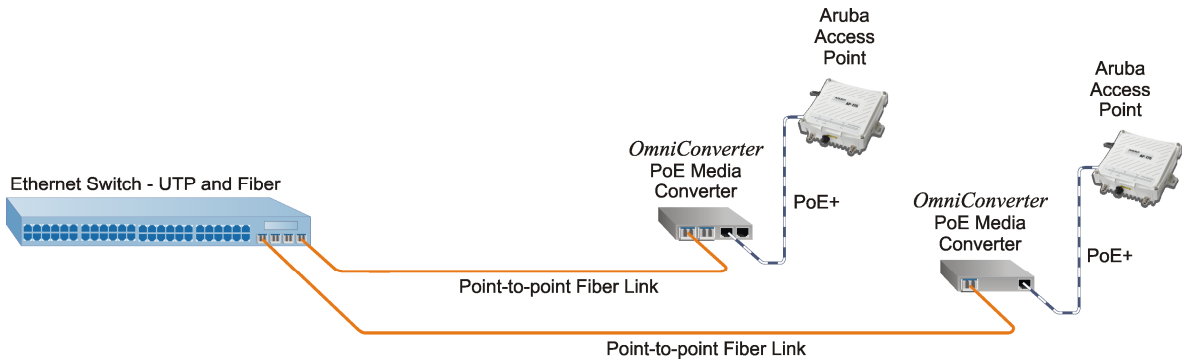
OmniConverter power sourcing media converters are available with fixed fiber (SC, ST) and SFP (LC) interfaces. The 10/100 and 10/100/1000 UTP ports support both 802.3af (PoE) and 802.3at (PoE+) standards. Commercial temperature *OmniConverters* operate from 0 to +50 degrees C. Wide (-40 to +60 degrees C) and extended temperature (-40 to +75 degrees C) models are also available.

Omnitron Deployment Scenarios

The *OmniConverter* power sourcing media converters support multiple network architectures, including point-to-point, daisy-chain, ring, and redundant layouts.

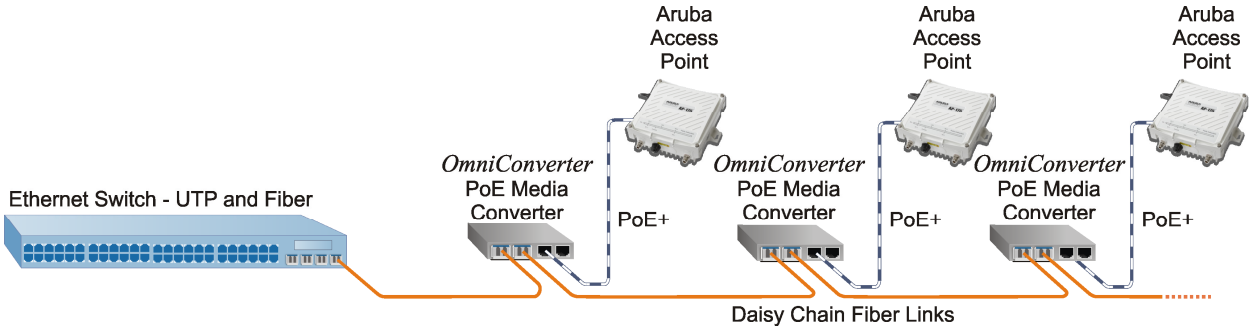
Point-to-point Fiber

A point-to-point architecture uses dedicated fiber links from the Ethernet switch to each power sourcing media converter, and is best suited for applications where the Ethernet switch resides in a central wiring closet, data center, or monitoring station and the fiber connections fan out radially.



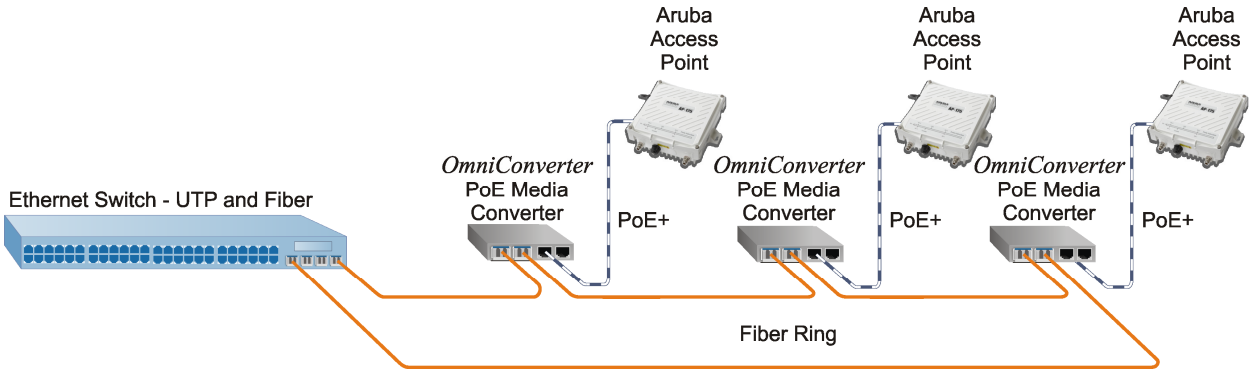
Daisy-chain

Daisy-chain fiber uses dual fiber ports to support connections in a linear chain. This architecture can be used to support long-haul applications along pipelines, subways, and rail lines.



Fiber Ring

Fiber ring architecture forms a complete fiber ring in which traffic can flow in both directions. Fiber ring architecture is used when the Ethernet switch supports a redundancy protocol such as Spanning Tree. In the event of a break in the fiber, the Spanning Tree protocol recognizes the failure and re-directs traffic in the opposite direction around the ring. The protocol also prevents looping.



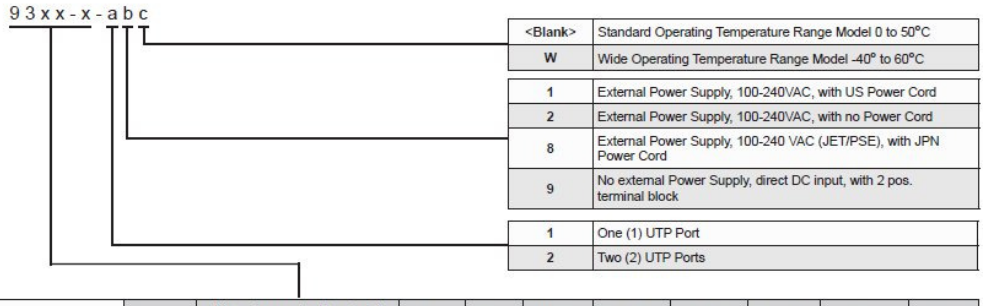
Redundant Fiber

Redundant fiber architecture uses two fiber connections. One is active and carries the data traffic. The other is in standby mode. In the event of a failure in the primary link, the *OmniConverter* will switch traffic to the back-up in less than 50mS. Typically the two fibers are routed in "geo-diverse" paths that are widely separated so that a physical disturbance to one cable will not affect the other.

ArubaEdge Certified Products

Additional information on *OmniConverter* power sourcing media converters can be found at Omnitron's Web site: http://www.omnitron-systems.com/omniconverter-poe-and-poe-plus-power-sourcing-media-converters.php. The list of ArubaEdge certified products is shown below.

Fast Ethernet (10/100) w/PoE:



<Blank>	Standard Operating Temperature Range Model 0 to 50°C
W	Wide Operating Temperature Range Model -40° to 60°C

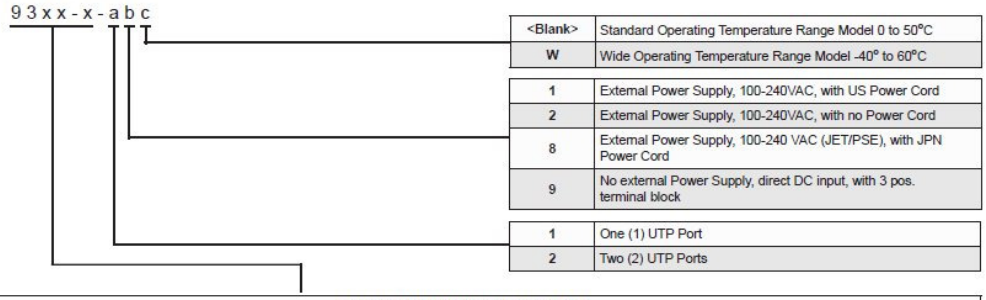
1	External Power Supply, 100-240VAC, with US Power Cord
2	External Power Supply, 100-240VAC, with no Power Cord
8	External Power Supply, 100-240 VAC (JET/PSE), with JPN Power Cord
9	No external Power Supply, direct DC input, with 2 pos. terminal block

1	One (1) UTP Port
2	Two (2) UTP Ports

Type	Distance	Fiber Connector Type (qty) ST (1)	SC (1)	SFP (1 or 2)	Tx λ [nm]	Rx λ [nm]	Min. Tx Power [dBm]	Max. Tx Power [dBm]	Min. Rx Power [dBm]	Max. Rx Power [dBm]	Min Attenuation [dB]	Link Budget [dB]
FPoE/SL Media Converter (IEEE 802.3aF)												
MM	5km	9340-0	9342-0	-	1310	1310	-24	-14	-31	-14	-	7
SM	30km	9341-1	9343-1	-	1310	1310	-15	-8	-31	-8	-	16
SM	60km	9341-2	9343-2	-	1310	1310	-5	0	-31	-3	3	26
SM	120km	-	9343-3	-	1550	1550	-5	0	-31	-3	3	26
SM-SF	20km	-	9350-1•	-	1310	1550	-15	-5	-30	-3	-	15
SM-SF	20km	-	9351-1•	-	1550	1310	-15	-5	-30	-3	-	15
SM-SF	40km	-	9350-2•	-	1310	1550	-8	0	-30	-3	3	22
SM-SF	40km	-	9351-2•	-	1550	1310	-8	0	-30	-3	3	22
100BASE-FX SFP (1)	-	-	-	9359-0	-	-	-	-	-	-	-	-
100BASE-FX SFP (2)	-	-	-	9359-1	-	-	-	-	-	-	-	-
• When using single-fiber (SF) media converter models, the Tx wavelength on one end has to match the Rx wavelength on the other.												

[1]Consult factory for availability of extended temperature models and other fiber options.

Fast Ethernet (10/100) w/PoE+:



<Blank>	Standard Operating Temperature Range Model 0 to 50°C
W	Wide Operating Temperature Range Model -40° to 60°C

1	External Power Supply, 100-240VAC, with US Power Cord
2	External Power Supply, 100-240VAC, with no Power Cord
8	External Power Supply, 100-240 VAC (JET/PSE), with JPN Power Cord
9	No external Power Supply, direct DC input, with 3 pos. terminal block

1	One (1) UTP Port
2	Two (2) UTP Ports

FPoE+/S Media Converter (IEEE 802.3at)												
MM	5km	9320-0	9322-0	-	1310	1310	-24	-14	-31	-14	-	7
SM	30km	9321-1	9323-1	-	1310	1310	-15	-8	-31	-8	-	16
SM	60km	9321-2	9323-2	-	1310	1310	-5	0	-31	-3	3	26
SM	120km	-	9323-3	-	1550	1550	-5	0	-31	-3	3	26
SM-SF	20km	-	9330-1•	-	1310	1550	-15	-5	-30	-3	-	15
SM-SF	20km	-	9331-1•	-	1550	1310	-15	-5	-30	-3	-	15
SM-SF	40km	-	9330-2•	-	1310	1550	-8	0	-30	-3	3	22
SM-SF	40km	-	9331-2•	-	1550	1310	-8	0	-30	-3	3	22
100BASE-FX SFP (1)	-	-	-	9339-0	-	-	-	-	-	-	-	-
100BASE-FX SFP (2)	-	-	-	9339-1	-	-	-	-	-	-	-	-
• When using single-fiber (SF) media converter models, the Tx wavelength on one end has to match the Rx wavelength on the other.												

Consult factory for availability of extended temperature models and other fiber options.

Gigabit Ethernet (10/100/1000) w/PoE:

94xx-x-abc

<Blank>	Standard Operating Temperature Range Model 0 to 50°C
W	Wide Operating Temperature Range Model -40° to 60°C

1	External Power Supply, 100-240VAC, with US Power Cord
2	External Power Supply, 100-240VAC, with no Power Cord
8	External Power Supply, 100-240 VAC (JET/PSE), with JPN Power Cord
9	No external Power Supply, direct DC input, with 3 pos. terminal block

1	One (1) UTP Port
2	Two (2) UTP Ports

Type	Distance	Fiber Connector Type (qty)			Tx λ [nm]	Rx λ [nm]	Min. Tx Power [dBm]	Max. Tx Power [dBm]	Min. Rx Power [dBm]	Max. Rx Power [dBm]	Min Attenuation [dB]	Link Budget [dB]
		ST (1)	SC (1)	SFP (1 or 2)								
GPoE/S Media Converter IEEE (802.3af)												
MM	220/550m	9400-0	9402-0	-	850	850	-10	-4	-17	-3	-	7
SM	12km	9401-1	9403-1	-	1310	1310	-9.5	-3	-19.5	-3	-	10
SM	34km	-	9403-2	-	1310	1310	-5	0	-23	-3	3	18
SM	80km	-	9403-3	-	1550	1550	-5	0	-23	-3	3	18
SM	110km	-	9403-4	-	1550	1550	0	5	-24	-3	8	24
SM	140km	-	9403-5	-	1550	1550	2	5	-28	-8	13	30
SM-SF	20km	-	9410-1•	-	1310	1550	-9.5	-3	-20	-3	-	10.5
SM-SF	20km	-	9411-1•	-	1550	1310	-9.5	-3	-20	-3	-	10.5
SM-SF	40km	-	9410-2•	-	1310	1550	-3	0	-20	-3	3	17
SM-SF	40km	-	9411-2•	-	1550	1310	-3	0	-20	-3	3	17
100/1000BASE-X SFP (1)	-	-	-	9419-0	-	-	-	-	-	-	-	-
100/1000BASE-X SFP (2)	-	-	-	9419-1	-	-	-	-	-	-	-	-

• When using single-fiber (SF) media converter models, the Tx wavelength on one end has to match the Rx wavelength on the other.

[1]Consult factory for availability of extended temperature models and other fiber options.

Gigabit Ethernet (10/100/1000) w/PoE+:

94xx-x-abc

<Blank>	Standard Operating Temperature Range Model 0 to 50°C
W	Wide Operating Temperature Range Model -40° to 60°C

1	External Power Supply, 100-240VAC, with US Power Cord
2	External Power Supply, 100-240VAC, with no Power Cord
8	External Power Supply, 100-240 VAC (JET/PSE), with JPN Power Cord
9	No external Power Supply, direct DC input, with 3 pos. terminal block

1	One (1) UTP Port
2	Two (2) UTP Ports

Type	Distance	Fiber Connector Type (qty)			Tx λ [nm]	Rx λ [nm]	Min. Tx Power [dBm]	Max. Tx Power [dBm]	Min. Rx Power [dBm]	Max. Rx Power [dBm]	Min Attenuation [dB]	Link Budget [dB]
		ST (1)	SC (1)	SFP (1 or 2)								
GPoE+/S Media Converter (IEEE 802.3at)												
MM	220/550m	9420-0	9422-0	-	850	850	-10	-4	-17	-3	-	7
SM	12km	9421-1	9423-1	-	1310	1310	-9.5	-3	-19.5	-3	-	10
SM	34km	-	9423-2	-	1310	1310	-5	0	-23	-3	3	18
SM	80km	-	9423-3	-	1550	1550	-5	0	-23	-3	3	18
SM	110km	-	9423-4	-	1550	1550	0	5	-24	-3	8	24
SM	140km	-	9423-5	-	1550	1550	2	5	-28	-8	13	30
SM-SF	20km	-	9430-1•	-	1310	1550	-9.5	-3	-20	-3	-	10.5
SM-SF	20km	-	9431-1•	-	1550	1310	-9.5	-3	-20	-3	-	10.5
SM-SF	40km	-	9430-2•	-	1310	1550	-3	0	-20	-3	3	17
SM-SF	40km	-	9431-2•	-	1550	1310	-3	0	-20	-3	3	17
100/1000BASE-X SFP (1)	-	-	-	9439-0	-	-	-	-	-	-	-	-
100/1000BASE-X SFP (2)	-	-	-	9439-1	-	-	-	-	-	-	-	-

• When using single-fiber (SF) media converter models, the Tx wavelength on one end has to match the Rx wavelength on the other.

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