

Optical Passives (OSP)

OP9xxx

Overview of ARRIS's Field Passives

FIBER SIZES, TYPES, AND CONNECTOR OPTIONS FOR AVAILABLE PACKAGES

	Package Style				
	N-Case	C-Case	S-Case	F-Case	
	Connectors				
Product Type	<i>None</i>	<i>None</i>	SC/APC	<i>None</i>	SC/APC
Splitters/Couplers	0.25 mm bare fiber	2 mm fiber jacket	2 mm fiber jacket	0.9 mm or 2 mm fiber jacket	2 mm fiber jacket
Single-wavelength Filters	0.25 mm bare fiber	2 mm fiber jacket	2 mm fiber jacket	<i>N/A</i>	<i>N/A</i>
Mux/Demux Modules	<i>N/A</i>	<i>N/A</i>	<i>N/A</i>	0.9 mm or 2 mm fiber jacket	2 mm fiber jacket
Custom Optics (e.g., Light-Plex™)	0.25 mm bare fiber	2 mm fiber jacket	<i>N/A</i>	0.9 mm or 2 mm fiber jacket	2 mm fiber jacket
Band Filters	0.25 mm bare fiber	2 mm fiber jacket	2 mm fiber jacket	<i>N/A</i>	<i>N/A</i>

MODEL NUMBER PREFIXES AND MEANING

OP91	Devices operating at 1310 and/or 1550 nm
OP93	Devices operating at LcWDM® wavelengths
OP94	Devices operating at CWDM wavelengths (ITU-T G.694.2)
OP95	Devices operating at DWDM wavelengths (ITU-T G.694.1)

Refer to individual product data sheets for specific ordering information.

PACKAGE STYLES

All packages shown at 50% of actual size.

N-Case

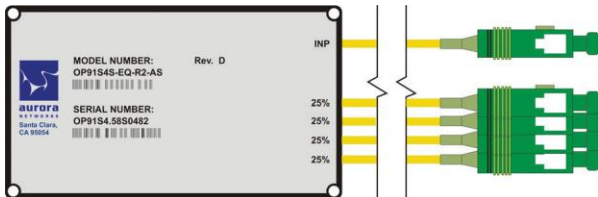
Max 60 x 5.5 (diameter) mm Package
 Example: OP91S3S-EQ-N0-00 1x3 Splitter



Available products:
 Splitters/Couplers, Single-wavelength Filters,
 Custom Optics, Band Filters

S-Case

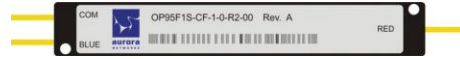
Ruggedized 89 x 51 x 9.2 mm Package
 Example: OP91S4S-EQ-R2-AS 1x4 Splitter



Available products:
 Splitters/Couplers, Single-wavelength Filters, Band Filters

C-Case

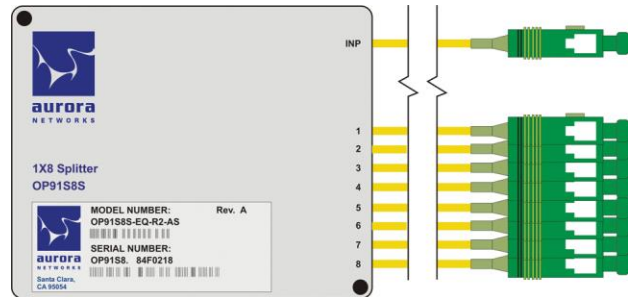
Ruggedized 98 x 14 x 8.5 mm Package
 Example: OP95F1S-CF-1-0-R2-00 Red/Blue Bands Filter



Available products:
 Splitters/Couplers, Single-wavelength Filters, Custom Optics,
 Band Filters

F-Case

Ruggedized 95 x 78 x 8 mm Package
 Example: OP91S8S-EQ-R2-AS 1x8 Splitter



Available products:
 Splitters/Couplers, Custom Optics (Light-Plex), Mux/Demux

RELATED PRODUCTS

Optical Transmitters	Optical Passives
Digital Return	Optical Patch Cords
Optical Nodes	Installation Services

OPTICAL SPECTRUM OVERVIEW

MODULE PASSTHROUGH RANGES

For all input and output ports except ports that are wavelength- or channel-specific.

Only 1263.5 – 1357.5 Passthrough

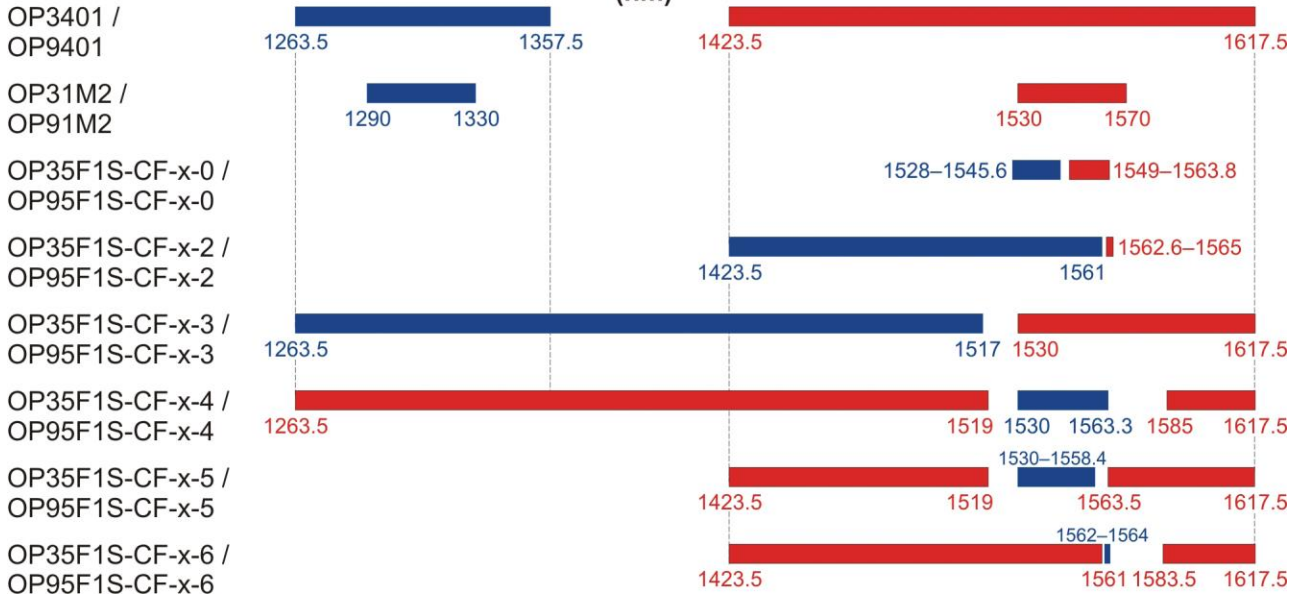
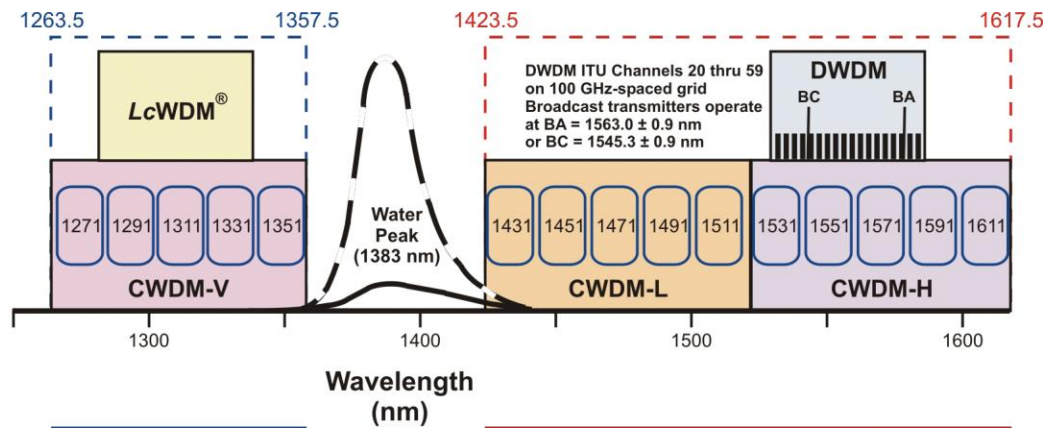
LcWDM™: Mux/Demux/Filters (OP33xxx, OP93xxx)

CWDM-V: Mux/Demux Modules (OP34x5V and OP94x5V) and Filters (OP34F1x and OP94F1x)

Only 1423.5 – 1617.5 Passthrough

DWDM: Light-Plex™ Modules (OP3514, OP3524, OP3534, OP4528, OP4538, OP9534)

CWDM-L and CWDM-H: Mux/Demux Modules (OP34x5L, OP34x5H, OP34x10, OP94x5L, OP94x5H, and OP94x10) and Filters (OP34F1x and OP94F1x)



Note: Specifications are subject to change without notice.

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- United States: 866-36-ARRIS
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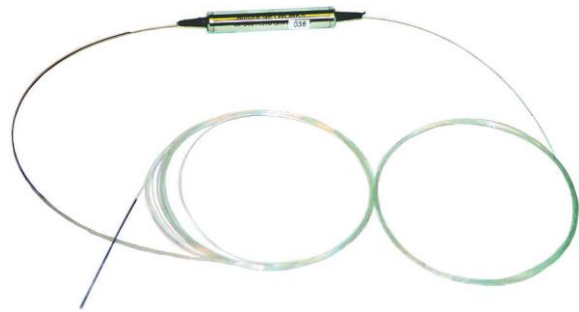
Optical Passives (OSP)

CO9501

BC/NC Combining Filter

FEATURES

- Drops one of several DWDM channels (on 100 GHz-spaced DWDM grid, ITU-T G.694.1) and adds the dropped channel to a 1550 nm broadcast signal (passing through the remaining DWDM channels)
- Low polarization dependent loss (PDL)
- Telcordia GR-1209 and GR-1221 qualified, providing excellent environmental and mechanical stability
- Variety of options for module body robustness, fiber buffer and connector types
- Epoxy-free on optical path

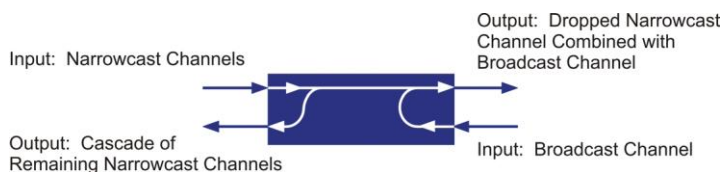


PRODUCT OVERVIEW

The ARRIS CO9501 is a four-port filter that is used to combine a 1550 nm broadcast signal with a DWDM narrowcast optical wavelength.

The CO9501 is ideal for distributed DWDM (D2WDM) architectures and is well suited for delivery of unique services in remote locations. Narrowcast DWDM channels are input to one port while a 1550 nm broadcast signal enters a second port; one of the DWDM channels is dropped and then added to the broadcast signal, and the combined BC+NC signal is output on a third port. Remaining DWDM channels are passed through on a fourth port.

The filter is available in two versions of packaging for outdoor use, one version ruggedized for easy handling and the second version, though not ruggedized, being smaller and easier to fit in a splice enclosure. Both versions are designed for use in an outdoor environment within a temperature range of -40° to +85°C.



SPECIFICATIONS

Characteristics	Specification
Physical	
Dimensions (without connectors)	<i>(See Ordering Information)</i>
Weight, max	0.2 lbs (0.09 kg)
Environmental	
Operating Temperature Range	-40°C to +85°C (-40°F to +185°F)
Storage Temperature Range	-40°C to +85°C (-40°F to +185°F)
Humidity	5% to 95% non-condensing
Optical Interface	
Input/output ports	<ul style="list-style-type: none"> • NC INP (input of DWDM narrowcast wavelengths) • BC INP (input of 1550nm broadcast wavelength) • NC OUT (passthrough output of all DWDM narrowcast wavelengths except that one dropped for combining with broadcast signal) • NC + BC OUT (combined output of dropped DWDM channel and 1550 nm)
Optical	
Return loss, min	45 dB
Polarization dependent loss, max	0.07 dB
Directivity, min	50 dB
Narrowcast	
DWDM channel spacing	100 GHz (ITU-T G.694.1)
DWDM channel dropped	20, 21, . . . , or 59
Passband @ 0.5 dB	± 0.125 (centered on ITU grid)
Insertion loss, max, no connectors	<ul style="list-style-type: none"> • NC INP to BC + NC OUT: 1.1 dB • NC INP to NC OUT: 0.3 dB
Transmission port isolation	<ul style="list-style-type: none"> • Adjacent channel, min: 55 dB • Other channels, min: 55 dB
Reflect port isolation, min	15 dB
Ripple within passband	0.3 dB
Broadcast	
Center wavelength	1545.315 nm or 1563.047 nm
Passband @ 0.5 dB	Allows all wavelengths within FA gain band with the exceptions of its added narrowcast channel at the corresponding port
Insertion loss, max, no connectors	<ul style="list-style-type: none"> • BC INP to BC+NC OUT: 0.3 dB
DWDM ITU Channel Plans	
	ARRIS supports DWDM network architectures with a variety of products on the standard DWDM ITU Grid (ITU-T G.694.1). For more complete description of available DWDM ITU Grid channels, please refer to the ARRIS DWDM ITU Grid Channel Plan data sheet.
	When ordering CO9501 filters on the ITU grid please note, for network planning purposes, that AT3550 "BA" series broadcast transmitters operate at 1563.0 nm ± 0.9 nm, occupying the approximate region of DWDM ITU Grid channels 17 through 19. Similarly, AT3550 "BC" series broadcast transmitters operate at 1545.3 ± 0.9 nm, occupying the approximate region of DWDM ITU Grid channels 39 through 41.

PACKAGE OPTIONS

Two examples are shown below approximately full scale. For non-ruggedized tubes, the fiber optic leads are color-coded as shown.

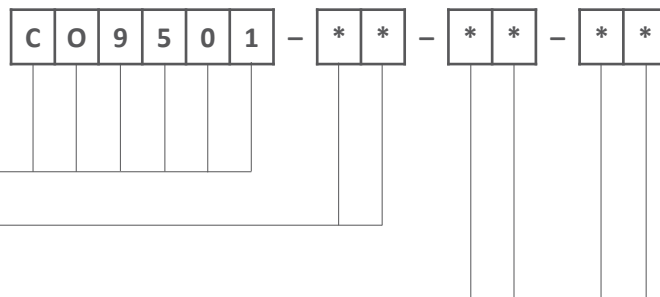


CO9501-xx-R3-00 in Ruggedized Package (8.5 mm x 14 mm x 98 mm)



CO9501-xx-N0-00 in Non-ruggedized Tube (34 mm x 5.5 mm)

ORDERING INFORMATION



- BC/NC Combining Filter
- ** = DWDM ITU Channel Number (20, 17, 18, ... or 59)
(Reference ARRIS DWDM ITU Channel Plan Data Sheet)
- **.** = Packaging, Fiber and Connector Type
N0-00 = 250 μm bare fiber in 34 x 5.5 mm Non-ruggedized Tube,
R3-00 = 3 mm fiber in 8.5 x 14 x 98 mm Ruggedized Package

Note: Minimum fiber length for all models is 1 ± 0.15 meters.

RELATED PRODUCTS

Optical Transmitters	Optical Passives
Digital Return	Optical Patch Cords
Optical Nodes	Installation Services

Customer Care

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Optical Passives (OSP)

DP94D08 (B-Series)

8-channel OSP CWDM Demultiplexer

FEATURES

- 8-channel optical demultiplexer cassette
- Temperature hardened (-40° to $+85^{\circ}\text{C}$) S-case Field Enclosures for OSP outside plant mounting
- Wide operating passband on CWDM ITU grid (20 nm spacing)
- Type A: Skip 1551/1571 nm
- Type B: Skip 1431/1451 nm
- Type C: Skip 1531/1551 nm
- EXP express port for future services expansion via DWDM
- Separate TP -20 dB line monitoring taps (SC/APC) for Tx and Rx signal paths
- LC/APC, LC/UPC or NO connectors options for all other optical ports
- Epoxy-free on optical path for higher reliability
- Pigtailed are "B-series" color-coded and individually labeled



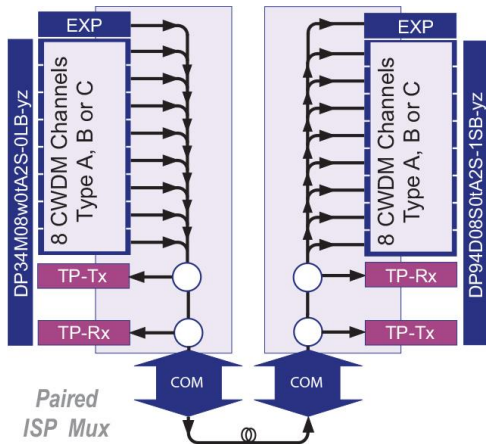
PRODUCT OVERVIEW

ARRIS's DP94D08S0t eight-channel CWDM optical demux cassette is intended for applications in non-controlled outdoor environments.

DP94D08S0t is designed to demultiplex 8 of 10 CWDM ITU-grid optical wavelengths, with individual wavelengths ranging from 1430 to 1610 nm, and 20 nm spacing between channels. Two separate -20 dB TP test ports monitor Tx path and Rx path signals.

It also has an EXP express port for future deployment of DWDM filters to accommodate the addition of DWDM ITU wavelengths for commercial services expansion into the “skipped” spectrum. There are three options for the 2 of 10 CWDM wavelengths which are “skipped”: Type A (skip 1551/1571 nm); Type B (1431/1451 nm); and Type C (skip 1531/1551 nm).

This ruggedized, anodized aluminum cassette has been designed for use in an OSP outside plant environment, with a temperature range of -40° to +85°C. All pigtail fibers are B-series color-coded and individually labeled to ensure proper installation and wavelength management.



FIBER PIGTAIL COLOR CODES		
Port	Fiber Color Codes	Color
COM		White
EXP		Black
TP Rx		Aqua
TP Tx		Rose
1431	Black Stripe	Green with Black Stripe
1451	Black Stripe	Yellow with Black Stripe
1471		Slate
1491		Violet
1511		Blue
1531		Green
1551		Yellow
1571		Orange
1591		Red
1611		Brown

SPECIFICATIONS

Characteristics	Specification
Physical	
Dimensions	3.5" L x 2.0" W x 0.3" H (8.9 cm x 5.1 cm x 0.8 cm)
Weight	0.8 lbs (0.36 kg)
Environmental	
Operating Temperature Range (outdoor)	-40° to +85°C (-40° to +185°F)
Storage Temperature Range	-40° to +85°C (-40° to +185°F)
Humidity	5% to 95% non-condensing
Optical Interface	
Optical ports	xxxx: 8 CWDM channel input ports (see Channel Passband) COM: Output to fiber network EXP: Express or bypass channel I/O from previous MUX TP Tx: Unidirectional -20 dB tap off COM from xxxx channels TP Rx: Unidirectional -20 dB tap off COM from fiber network
Optical Connectors	TP "Tx" and TP "Rx": SC/APC All other optical ports: LC/APC or no connector options
Fiber labels	COM fiber: RED label All other fibers: YELLOW labels

SPECIFICATIONS CONTINUED

Characteristics	Specification
Optical	
Channel Spacing	20 nm
Channel Passband	COM to xxxx: Center wavelength +/- 6.5 nm t = A: 1431, 1451, 1471, 1491, 1511, 1531, 1591, 1611 nm t = B: 1471, 1491, 1511, 1531, 1551, 1571, 1591, 1611 nm t = C: 1431, 1451, 1471, 1491, 1511, 1571, 1591, 1611 nm COM to EXP: t = A: 1260-1421 nm; 1541-1581 nm; 1621-1635 nm t = B: 1260-1461 nm; 1621-1635 nm t = C: 1260-1421 nm; 1521-1561 nm; 1621-1635 nm
Insertion Loss, max (not including/including connectors)	COM to xxxx: 3.1/3.4 dB COM to EXP: 2.9/3.2 dB COM to TP: 2.0/2/0.4 dB Paired: 3.9/4.2 dB (from DP34M08 xxxx to DP94D08 xxxx)
Module Uniformity, max	2 dB
Paired Uniformity, max	1 dB
Return loss, min	45 dB
Polarization dependent loss, max	0.15 dB (< 0.1 dB typ)
Polarization mode dispersion, max	0.1 ps
Ripple within passband	0.15 dB
Adjacent channel isolation, min	35 dB
Non-adjacent channel isolation, min	45 dB
Directivity, min	xxxx CWDM port: 55 dB EXP Express port: 65 dB
Power handling, max (any port)	21.8 dBm

ORDERING INFORMATION

Part Number	Description
DP94D08S0tA2S-15B-yz	t = Type A, B, or C (A = skip 1551/1571; B = skip 1431/1451; C = skip 1531/1551) yz = Connector options (00 = NO connectors; AL = LC/APC; UL = LC/UPC)

RELATED PRODUCTS

Optical Transmitters	Optical Passives
Digital Return	Optical Patch Cords
Optical Nodes	Installation Services

Customer Care

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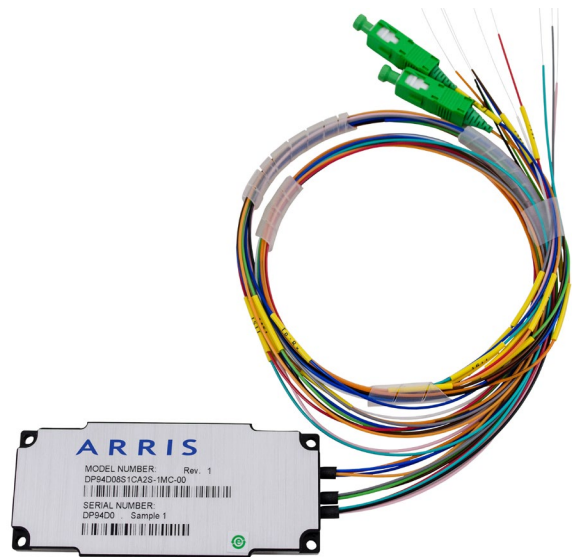
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Optical Passives (OSP)

DP94M08/DP94D08 (C-Series) 8-channel OSP CWDM Mux/Demux

FEATURES

- 8-channel optical multiplexer and demultiplexer cassettes
- Temperature hardened (-40° to $+85^{\circ}\text{C}$) M-case Field Enclosures for OSP outside plant mounting in existing splice trays like Tyco FOSC, etc.
- Wide operating passband on CWDM ITU grid (20 nm spacing)
- EXP express port for future services expansion via DWDM
- Separate TP -20 dB line monitoring taps (SC/APC) for Tx and Rx signal paths
- LC/APC or LC/UPC connectors or no connectors options for all other optical ports
- Epoxy-free on optical path for higher reliability
- Pigtailed are "C-series" color-coded and individually labeled



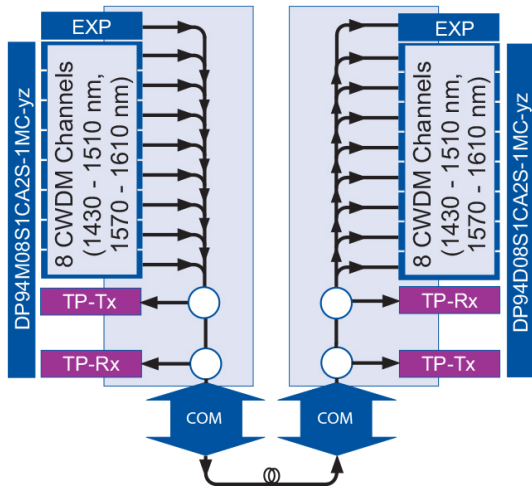
PRODUCT OVERVIEW

ARRIS's DP94M08 and DP94D08 eight-channel CWDM optical mux and demux cassettes are intended for applications in non-controlled outdoor environments.

DP94M08 and DP94D08 are respectively designed to multiplex and demultiplex 8 of 10 CWDM ITU-grid optical wavelengths, with individual wavelengths ranging from 1430 to 1610 nm, and 20 nm spacing between channels. Two separate -20 dB TP test ports monitor Tx path and Rx path signals.

It also has an EXP express port where traditional 1531 nm and 1551 nm CWDM wavelengths are “skipped” through the Mux/Demux pair for future deployment of DWDM filters to accommodate up to 40 additional DWDM ITU wavelengths for commercial services expansion.

These ruggedized, anodized aluminum cassettes have been designed for use in an OSP outside plant environment, with a temperature range of -40° to +85°C, for mounting into existing splice trays, like the Tyco FOSC-series. All pigtail fibers are “C-series” color-coded and individually labeled to ensure proper installation and wavelength management.



FIBER PIGTAIL COLOR CODES		
Port	Fiber Color Codes	Color
COM	Black Stripe	Blue with black stripe
EXP	Black Stripe	Orange with black stripe
TP Rx		Blue
TP Tx		Orange
1431		Green
1451		Brown
1471		Slate
1491		White
1511		Red
1571		Violet
1591		Rose
1611		Aqua

SPECIFICATIONS	
Characteristics	Specification
Physical	
Dimensions	3.5" L x 1.6" W x 0.3" H (8.9 cm x 4.1 cm x 0.8 cm)
Weight	0.8 lbs (0.36 kg)
Environmental	
Operating Temperature Range (outdoor)	-40° to +85°C (-40° to +185°F)
Storage Temperature Range	-40° to +85°C (-40° to +185°F)
Humidity	5% to 95% non-condensing
Optical Interface	
Optical ports (Mux/Demux Input/Output)	xxxx: 8 CWDM channel I/O ports (Skip 1531 and 1551 nm) (1431, 1451, 1471, 1491, 1511, 1571, 1591, and 1611 nm) COM: Output/Input to/from fiber network EXP: Express or bypass channel I/O from previous MUX/DEMUX TP Tx: Unidirectional -20 dB tap off COM from xxxx channels TP Rx: Unidirectional -20 dB tap off COM from fiber network
Optical Connectors	TP "Tx" and TP "Rx": SC/APC All other optical ports: LC/APC or no-connector
Fiber length	For models with no optical connectors: 1.5-meter on all ports except test ports; 0.75-meter on test ports; For DP94D08S1CA2S-1MC-AL and DP94M08S1CA2S-1MC-AL with LC/APC connectors: 0.75-meter on all ports
Fiber labels	COM fiber: RED labels All other fibers: YELLOW labels

SPECIFICATIONS (CONTINUED)

Characteristics	Specification
Optical	
Channel Spacing	20 nm
Channel Passband	COM to xxxx: Center wavelength +/- 6.5 nm COM to EXP: 1260-1421 nm; 1521-1561 nm; 1621-1635 nm
Insertion Loss, max (not including/including connectors)	COM to xxxx: 3.1/3.4 dB COM to EXP: 2.9/3.2 dB COM to TP: 20.2/20.4 dB Paired: 3.9/4.2 dB (Paired IL is from DP95M08 input xxxx to DP95D08 output xxxx)
Module Uniformity, max	2 dB
Paired Uniformity, max	1 dB
Return loss, min	45 dB
Polarization dependent loss, max	0.15 dB (< 0.1 dB typ)
Polarization mode dispersion, max	0.1 ps
Ripple within passband	0.15 dB
Adjacent channel isolation, min	35 dB
Non-adjacent channel isolation, min	45 dB
Directivity, min	xxxx CWDM port: 55 dB EXP express port: 65 dB
Power handling, max (any port)	21.8 dBm

ORDERING INFORMATION

Model Name	Description
DP94v08S1CA2S-1MC-yz	v = Module type (M = Mux; D = Demux) yz = Connector options (00 = no connectors; AL = LC/APC;)

RELATED PRODUCTS

Optical Transmitters	Optical Passives
Digital Return	Optical Patch Cords
Optical Nodes	Installation Services

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87-10884-RevF_DP94M08-D08_CWDM-8ch-Mx-Dx

10/2018 EA-29028

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OSP-DP94M08/D08

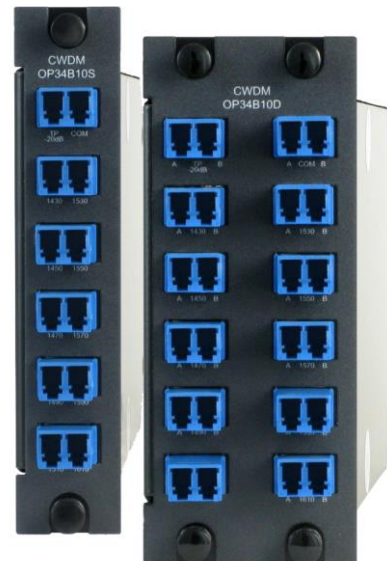
Optical Passives (ISP)

OP34B10x

10-channel CWDM Filters for Cellular Backhaul

FEATURES

- Two different models to support single-fiber or dual-fiber network architectures
- Flat and wide operating passband on CWDM ITU grid (20 nm spacing)
- High channel isolation to minimize crosstalk
- Low polarization dependent loss (PDL)
- Duplex LC/UPC connectors
- Telcordia GR-1209 and GR-1221 qualified, providing excellent environmental and mechanical stability
- -20 dB line monitoring tap



PRODUCT OVERVIEW

OP34B10x 10-channel CWDM filters for cellular backhaul are part of ARRIS' optimized passive solutions for cell tower backhaul applications.

The single-width, half-depth OP34B10S-0-99-UL transmits 5 multiplexed CWDM wavelengths (1430, 1450, ... and 1510 nm) to the cell tower and demultiplexes 5 different CWDM wavelengths (1530, 1550, ... and 1610 nm) received from the cell tower, all on a single network fiber.

The dual-width, half-depth OP34B10D-0-99-UL transmits 10 multiplexed CWDM wavelengths (1430, 1450, ... and 1610 nm) to the cell tower on one network fiber and demultiplexes the same 10 wavelengths received from the cell tower on a second fiber.

Duplex LC/UPC connector ports are keyed to ensure correct orientation for Tx/Rx connectors when using fiber jumpers to connect to SFP (or other) modules in Headend/Hub equipment (e.g., media converters).

SPECIFICATIONS

Characteristics	Specification	
Physical		
Dimensions	<ul style="list-style-type: none"> OP34B10S-0-99-UL: 6.5" D x 4.3" H x 1.0" W (16.5 cm x 11 cm x 2.5 cm) OP34B10D-0-99-UL: 6.5" D x 4.3" H x 2.0" W (16.5 cm x 11 cm x 5.1 cm) 	
Weight	1.5 lbs (0.7 kg)	
Environmental		
Operating temperature range	-20° to +65°C (-4° to +149°F)	
Storage temperature range	-40° to +85°C (-40° to +185°F)	
Humidity	5% to 95% non-condensing	
Optical Interface		
Optical connectors	duplex LC/UPC	
Model OP34B10S-0-99-UL	<ul style="list-style-type: none"> COM (faces the network and carries the combined CWDM signal in both forward and reverse directions) Wavelength xxxx (5 channel adds for xxxx = 1430, 1450, 1470, 1490 and 1510 nm in the forward direction, and 5 channel drops for xxxx = 1530, 1550, 1570, 1590 and 1610 nm in the reverse direction) TP (-20 dB, 1% bi-directional tap from COM allows monitoring of signals flowing in either direction) 	
Model OP34B10D-0-99-UL	<ul style="list-style-type: none"> COM A (faces the network and carries the combined signal for 10 CWDM wavelengths in the forward direction to the cell tower) COM B (faces the network and carries the combined signal for 10 CWDM wavelengths from the cell tower in the reverse direction) Wavelength xxxx "A" (10 channel adds for xxxx = 1430–1610 nm in the forward direction) Wavelength xxxx "B" (10 channel drops for xxxx = 1430–1610 nm in the reverse direction) TP "A" (-20 dB, 1% bi-directional tap from COM A allows monitoring of signals flowing in the forward direction) TP "B" (-20 dB, 1% bi-directional tap from COM A allows monitoring of signals from the reverse direction) 	
Optical		
Channel spacing	20 nm	
Channel plan (CWDM wavelengths)	Model OP34B10S-0-99-UL <ul style="list-style-type: none"> Forward: 5 wavelengths (1430–1510 nm) Reverse: 5 wavelengths (1530–1610 nm) 	Model OP34B10D-0-99-UL 10 wavelengths (1430–1610 nm) in both forward and reverse directions
Passband @ 0.15 dB (COM-Ch xxxx)	± 6.5 nm	
Ripple within passband	0.5 dB	
Return loss, min	45 dB	
Polarization dependent loss, max	0.15 dB (< 0.1 dB typ)	
Insertion losses (including connectors), max	COM to Ch. xxxx I/O: 3.8 dB max (3.1 dB typ)	
Isolation, COM–Ch. xxxx, min	35 dB	
Directivity, min	50 dB	
Power handling, max (any input port)	21.8 dBm	

ORDERING INFORMATION



- 10-channel CWDM Filter for Wireless Backhaul
- S = Filter for single fiber network design;
D = Filter for dual fiber network design
- (Reserved field)
- 99 = -20 dB Test Port
- UL = LC/UPC Connectors

RELATED PRODUCTS

- SFP modules
- Headend/Hub equipment

Customer Care

Contact Customer Care for product information and sales:

- United States: 866-36-ARRIS
- International: +1-678-473-5656

Note: Specifications are subject to change without notice.

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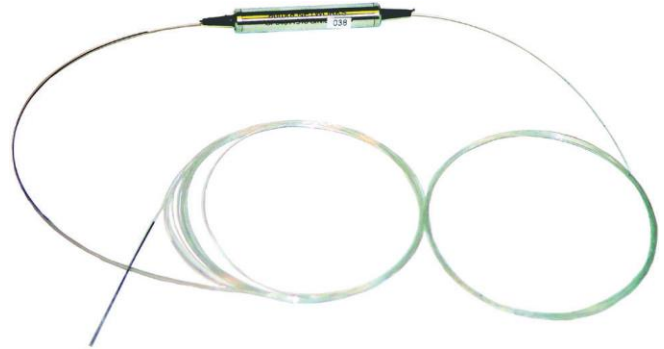
Optical Passives (OSP)

OP9401

CWDM/1310 Optical Filter

FEATURES

- Flat and wide operating passband
- Unique design achieves high channel isolation to minimize crosstalk
- Low polarization dependent loss (PDL)
- Combine or split 1310 nm and CWDM-band channels
- Telcordia GR-1209 and GR-1221 qualified, providing excellent environmental and mechanical stability
- Variety of options for module body robustness, fiber buffer and connector types
- Epoxy-free on optical path



PRODUCT OVERVIEW

The ARRIS OP9401 CWDM/1310 Optical Filter is a three-port filter that is used to combine (or separate) a 1310 nm wavelength with (or from) ten (10) CWDM optical wavelengths, where the ten wavelengths range from 1430 nm to 1610 nm on the CWDM ITU grid. The filter is available in three versions of packaging for outdoor use, two versions ruggedized for easy handling and the third version, though not ruggedized, being smaller and easier to fit in a splice enclosure. All versions are designed for use in an outdoor environment within a temperature range of -40° to +85°C.

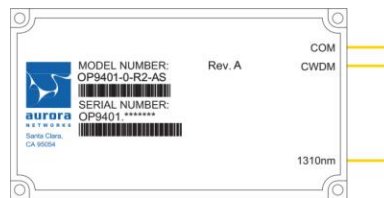
The filter may also be used to combine (or separate) five 1270–1350 nm CWDM wavelengths with (or from) the ten 1430–1610 nm CWDM wavelengths.

SPECIFICATIONS

Characteristics	Specification
Physical	
Dimensions	See Ordering Information
Weight	0.2 lbs (0.09 kg)
Environmental	
Operating Temperature Range	-40°C to +85°C (-40°F to +185°F)
Storage Temperature Range	-40°C to +85°C (-40°F to +185°F)
Humidity	5% to 95% non-condensing
Optical Interface	
Optical connectors	See Ordering Information
Mux input/output ports	<ul style="list-style-type: none"> • COM (combined CWDM and 1310 nm input/output) • CWDM (input/output; CWDM channels from 1423.5 nm to 1617.5 nm) • 1310 (input/output from 1263.5 nm to 1357.5 nm)
Optical	
Passband @ 0.5 dB for 1310	1263.5 – 1357.5 nm
Passband @ 0.5 dB for CWDM	1423.5 – 1617.5 nm
Ripple within passband, max	0.5 dB
Return loss, min	45 dB
Polarization dependent loss, max	0.1 dB (< 0.05 dB typ)
Power handling, max (any input port)	21.8 dBm
Insertion losses, max	with connector without connector
1310 nm to COM	1.4 dB 1.2 dB
CWDM to COM	1.1 dB 0.9 dB
Adjacent channel isolation, min	
1310 nm	60 dB
CWDM	18 dB
Directivity, min	
1310 nm	65 dB
CWDM	55 dB

PACKAGE OPTIONS

Two examples are shown below approximately full scale, while the “S-case” option (with SC/APC connectors) is shown below at a approximately half scale. For non-ruggedized tubes, the fiber optic leads are color-coded as shown.



OP9401-0-R2-AS CWDM/1310 Optical Filter in “S-case” Ruggedized Package (9.2 mm x 51 mm x 89 mm), (shown above approximately half-scale)

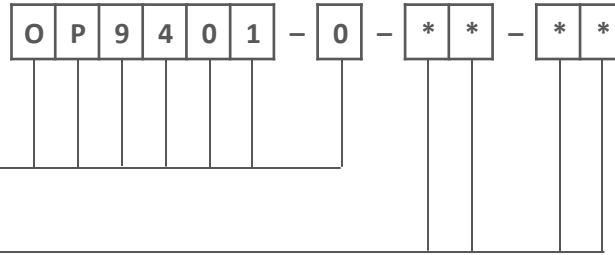


OP9401-0-R2-00 CWDM/1310 Optical Filter in Ruggedized Package (8.5 mm x 14 mm x 98 mm)



OP9401-0-N0-00 CWDM/1310 Optical Filter in Non-ruggedized Tube (34 mm x 5.5 mm)

ORDERING INFORMATION



CWDM/1310 Filter

. = Packaging, Fiber and Connector Type
 N0-00 = 250 μm bare fiber in 34 x 5.5 mm Non-ruggedized Tube
 R2-00 = 2 mm fiber in 8.5 x 14 x 98 mm Ruggedized Package
 R2-AS = 2 mm fiber with SC/APC Connectors in 9.2 x 51 x 89 mm Ruggedized Package

Note: Fiber length for all models is 1 ± 0.15 meters; other lengths are available upon request.

RELATED PRODUCTS

Optical Transmitters	Optical Passives
Digital Return	Optical Patch Cords
Optical Nodes	Installation Services

Customer Care

Contact Customer Care for product information and sales:

- United States: 866-36-ARRIS
- International: +1-678-473-5656

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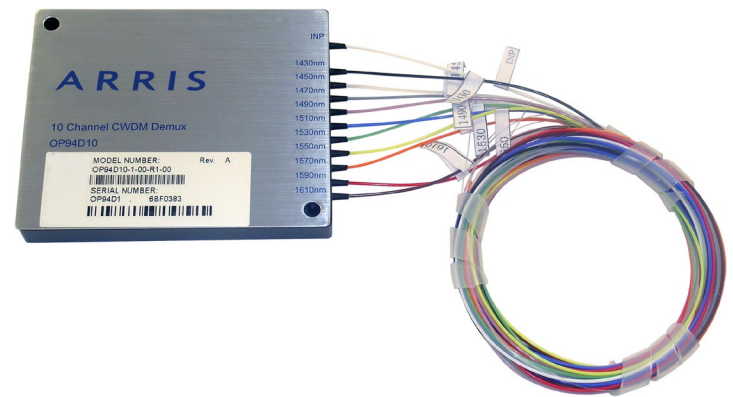
Optical Passives (OSP)

OP94M10, OP94D10

10-channel CWDM Multiplexer and Demultiplexer Field Passives

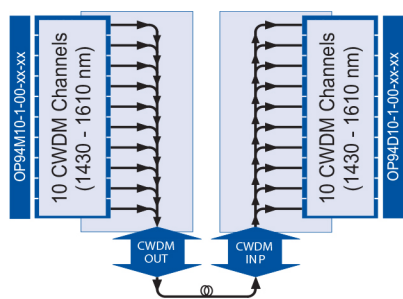
FEATURES

- Designed for use with uncooled lasers based on 20 nm channel spacing
- Flat and wide operating passband on CWDM ITU grid (20 nm spacing)
- High channel isolation to minimize crosstalk
- Low polarization dependent loss (PDL)
- Operating temperature range -40° to $+85^{\circ}\text{C}$
- Telcordia GR-1209 and GR-1221 qualified, providing excellent environmental and mechanical stability
- Variety of options for fiber and connector types
- Epoxy-free on optical path
- Optional integrated 1310 nm combiner/splitter

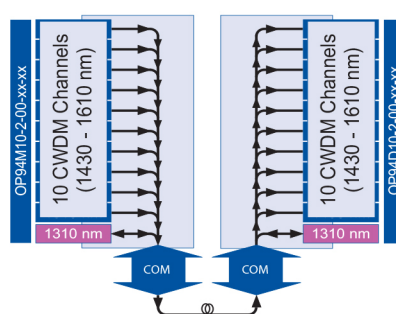


PRODUCT OVERVIEW

ARRIS's OP94M10 and OP94D10 series 10-channel CWDM field passives are designed to multiplex and demultiplex 10 CWDM ITU-grid optical wavelengths, with individual wavelengths ranging from 1430 to 1610 nm (20 nm spacing between channels). OP94M10 modules multiplex 10 channels onto a single fiber output, with corresponding OP94D10 modules demultiplexing a single fiber input to produce 10 individual wavelengths. All of these ruggedized modules have been designed for use in an outdoor environment within a temperature range of -40° to $+85^{\circ}\text{C}$.



10-channel Mux and Demux Modules
(1430 - 1610 nm)



10-channel Mux and Demux Modules
(1430 - 1610 nm) with integrated 1310 nm
combiner/splitter

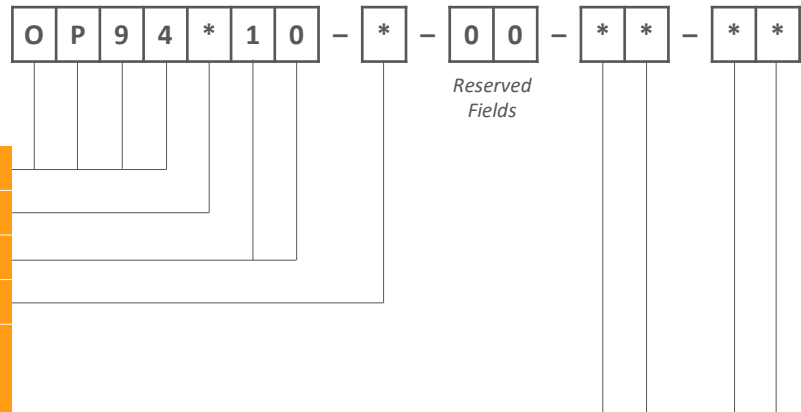
SPECIFICATIONS

Characteristics	Specification	
Physical		
Dimensions	3.8" L x 3.0" W x 0.4" H (9.7 cm x 7.6 cm x 1.1 cm)	
Weight	1.0 lb (0.5 kg)	
Environmental		
Operating Temperature Range	-40° to +85°C (-40° to +185°F)	
Storage Temperature Range	-40° to +85°C (-40° to +185°F)	
Humidity	5% to 95% non-condensing	
Optical		
Channel spacing	20 nm	
Return loss, min	45 dB	
Passband @ 0.5 dB	± 6.5 nm	
Ripple within passband	0.5 dB	
Polarization dependent loss, max	0.15 dB (< 0.1 dB typ)	
Power handling, max (any input port)	21.8 dBm	
Insertion losses ¹ , max (dB)	OP94M10 (10-channel Mux)	OP94D10 (10-channel Demux)
Ch xxxx INP to COM	3.1 (3.3)	N/A
COM to Ch xxxx OUT	N/A	3.1 (3.3)
1310 to COM	1.1 (1.3)	1.1 (1.3)
Paired insertion loss ²	4.0 (4.4)	4.0 (4.4)
Directivity, min (dB)	55	55
Channel isolation, min (dB)		
Adjacent channels	N/A	35
Non-adjacent channels	N/A	45
Passband for 1310 nm @ 0.5 dB (nm)	1263.5–1357.5	
1310 Directivity, min (dB)	65	65
1310-COM isolation, min (dB)	60	60
Optical Interface		
Optical connectors	SC/APC or none (See Ordering Information)	
Model OP94M10-1-00-yy-zz (10-channel mux module)	<ul style="list-style-type: none"> CWDM OUT (output to fiber network) Ch xxxx INP (10 channel adds) 	
Model OP94M10-2-00-yy-zz (10-channel mux module with 1310 combiner)	<ul style="list-style-type: none"> COM (output to fiber network, I/O to/from network for 1310) Ch xxxx INP (10 channel adds) 1310 (input/output to/from fiber network for 1310 nm) 	
Model OP94D10-1-00-yy-zz (10-channel demux module)	<ul style="list-style-type: none"> CWDM INP (input from fiber network) Ch xxxx OUT (10 channel drops) 	
Model OP94D10-2-00-yy-zz (10-channel demux module with 1310 splitter)	<ul style="list-style-type: none"> COM (input from fiber network, I/O to/from network for 1310) Ch xxxx OUT (10 channel drops) 1310 (input/output to/from fiber network for 1310 nm) 	

NOTES:

1. Insertion losses shown without (and with) connectors, and assuming optional 1310 nm I/O Port is present.
2. Paired insertion loss when combined with corresponding applicable 10-wavelength demux module (from Ch xxxx INP to Ch xxxx OUT)

ORDERING INFORMATION



CWDM Field Passives

* = M (mux) or D (demux)

10-channel Module

* = 1310 nm I/O Port (1 = not present, 2 = present)

****.** = Packaging, Fiber, and Connector type**
 R1-00 = Ruggedized package with 1.5-meter pigtail of 900 μm tight buffered fiber and no connectors
 R2-00 = Ruggedized package with 1.5-meter pigtail of 2 mm loose tube fiber and no connectors
 R2-AS = Ruggedized package with 1-meter pigtail of 2 mm loose tube fiber and SC/APC connectors

RELATED PRODUCTS

Optical Transmitters	Optical Passives
Digital Return	Optical Patch Cords
Optical Nodes	Installation Services

Customer Care

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- International: +1-678-473-5656

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87-10355-RevE_OP94M10-D10_CWDM_Mux-Demux_Field

10/2018 EA-29028

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OSP-OP94M10/D10

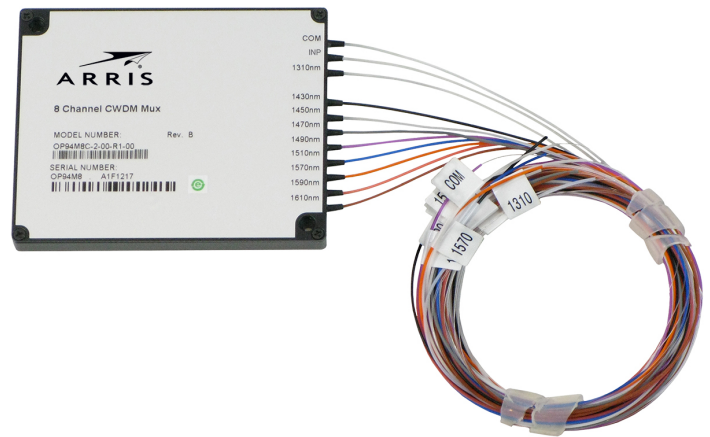
Optical Passives (OSP)

OP94M8C

8-channel CWDM Multiplexer Field Passives

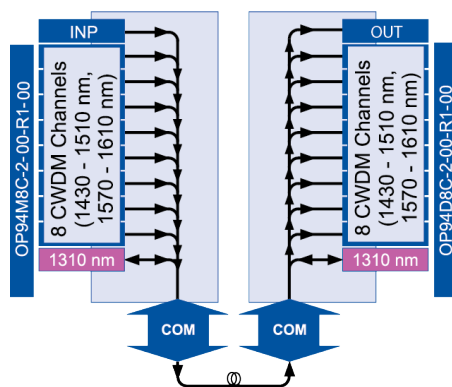
FEATURES

- Flat and wide operating passband on CWDM ITU grid (20 nm spacing)
- Low polarization dependent loss (PDL)
- Operating temperature range -40° to $+85^{\circ}\text{C}$
- Telcordia GR-1209 and GR-1221 qualified, providing excellent environmental and mechanical stability
- Epoxy-free on optical path
- Optional integrated 1310 nm combiner/splitter



PRODUCT OVERVIEW

ARRIS's OP94M8C series 8-channel CWDM field passives are designed to multiplex 8 CWDM ITU-grid optical wavelengths, with individual wavelengths ranging from 1430 to 1510 nm and from 1570 to 1610 nm (with 20 nm spacing between adjacent channels). Two different models are offered, with and without an integrated 1310 nm combiner/splitter. Both of these ruggedized modules have been designed for use in an outdoor environment within a temperature range of -40° to $+85^{\circ}\text{C}$.



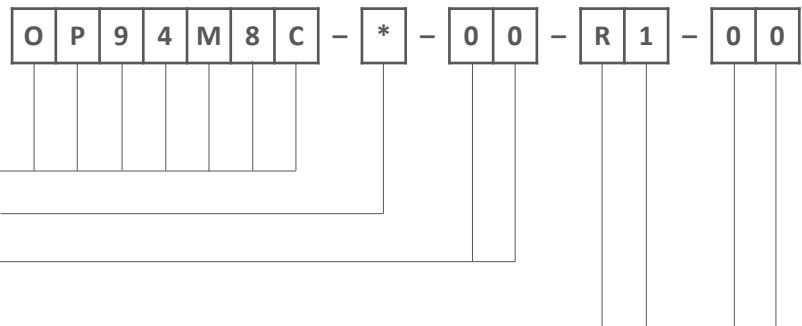
SPECIFICATIONS

Characteristics	Specification
Physical	
Dimensions	3.8" L x 3.1" W x 0.3" H (9.6 cm x 7.8 cm x 0.8 cm)
Weight	1.0 lb (0.5 kg)
Environmental	
Operating Temperature Range	-40° to +85°C (-40° to +185°F)
Storage Temperature Range	-40° to +85°C (-40° to +185°F)
Humidity	5% to 95% non-condensing
Optical Interface	
Optical connectors	none (See Ordering Information)
Model OP94M8C-1-00-R1-00 (8-channel mux module)	<ul style="list-style-type: none"> • COM (output to fiber network) • INP (input for cascaded group) • Ch. xxxx IN (8 channel inputs)
Model OP94M8C-2-00-R1-00 (8-channel mux module with 1310 splitter)	<ul style="list-style-type: none"> • COM (output to fiber network, I/O to/from network for 1310) • INP (input for cascaded group) • Ch. xxxx IN (8 channel inputs) • 1310 (input/output to/from fiber network for 1310 nm)
Center wavelengths of multiplexed channels	1430, 1450, 1470, 1490, 1510, 1570, 1590, 1610 nm
Wavelength passband between INP (cascade input) and COM ports	1423-1617 nm (with eight 13-nm-wide notches at 1430, 1450, 1470, 1490, 1510, 1570, 1590, 1610 nm)
Optical	
Insertion losses, max (dB)	OP94M8C-1-00-R1-00 OP94M8C-2-00-R1-00
Ch. xxxx IN to COM	2.5 2.7
INP to COM	2.0 2.3
1310 to COM	N/A 0.9
Paired insertion loss ¹	3.3 3.9
Directivity, min (dB)	55 55
Return loss, min	45 dB 45 dB
Passband @ 0.15 dB	± 6.5 nm ± 6.5 nm
Ripple within passband	0.15 dB 0.15 dB
Polarization dependent loss, max	0.15 dB (< 0.1 dB typ) 0.15 dB (< 0.1 dB typ)
Passband for 1310 @ 0.5 dB	N/A 1263.5-1357.5 nm
Power handling, max (any input port)	21.8 dBm 21.8 dBm

NOTE:

1. Paired insertion loss when combined with corresponding applicable 8-wavelength OP94D8C demux module (from Ch. xxxx INP to Ch. xxxx OUT)

ORDERING INFORMATION



8-channel CWDM Demultiplexer, Field Passive

* = 1310 nm I/O Port (1 = not present, 2 = present)

(Reserved Fields)

Packaging, Fiber, and Connector Type
R1-00 = Ruggedized package with 1.5 meter pigtail of 900 μm tight buffered fiber and no connectors

RELATED PRODUCTS

Optical Transmitters	Optical Passives
Digital Return	Optical Patch Cords
Optical Nodes	Installation Services

Customer Care

Contact Customer Care for product information and sales:

- United States: 866-36-ARRIS
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Optical Passives (OSP)

OP95M8x, OP95D8x

DWDM Mux and Demux Field Passives

FEATURES

- 8-channel optical mux and demux modules in field hardened enclosures
- Channels spaced on standard 100-GHz-spaced DWDM ITU grid
- Flat-top passband
- High optical isolation
- Supports both forward and return path transmission of analog and digital signals
- Mux and demux pairs optimized for minimum combined insertion loss across all channels
- Options available for fiber and connector types
- Epoxy-free on optical path

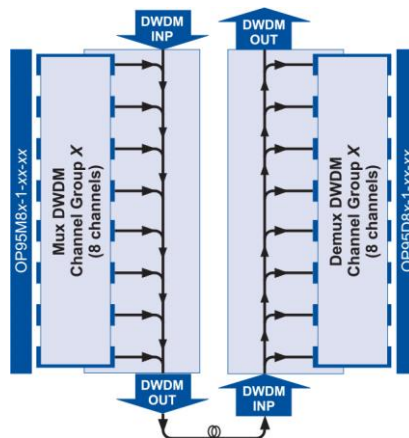


PRODUCT OVERVIEW

ARRIS's OP95M8x and OP95D8x series 8-channel DWDM multiplexers and demultiplexers facilitate DWDM architectures. DWDM technology can dramatically increase network capacity without requiring additional fiber be deployed for super-trunking or narrowcasting applications.

ARRIS supports DWDM architectures with a variety of products having center frequency spacing on the standard DWDM ITU Grid (ITU-T G.694.1). In many of ARRIS's products, these frequencies are logically partitioned into groups of 4, 8, or 16 channels (with letters used to designate channel groups). That concept is employed in the OP95M8x and OP95D8x series of 8-channel mux and demux modules, where five channel group configurations are available for 40 channels (20 to 59) on a DWDM grid with 100 GHz channel spacing.

These ruggedized modules have been designed for use in an outdoor environment with a temperature range of -40° to +85°C.



SPECIFICATIONS

Characteristics	Specification	
Physical		
Dimensions	3.78" L x 3.07" W x 0.31" H (9.6 cm x 7.8 cm x 0.8 cm)	
Weight	1.0 lb (0.45 kg)	
Environmental		
Operating Temperature Range	-40°C to +85°C (-40°F to +185°F)	
Storage Temperature Range	-40°C to +85°C (-40°F to +185°F)	
Humidity	5% to 95% non-condensing	
Optical		
Return loss, min	45 dB	
Polarization dependent loss, max	0.15 dB (< 0.1 dB typ)	
Insertion losses, max ¹ (dB)	Mux Modules OP95M8x-1-00-zz-zz	Demux Modules OP95D8x-1-00-zz-zz
Ch. yy INP to DWDM OUT	2.6	N/A
DWDM INP to DWDM OUT	2.2	2.2
DWDM INP to Ch. yy OUT	N/A	2.6
Paired insertion loss ²	3.2	3.2
Uniformity, max ¹ (dB)		
Module	1.5	1.5
Paired	1.0	1.0
Passband @ 0.5 dB (nm)		
Ch. yy INP to DWDM OUT	± 0.125	± 0.125
DWDM INP to DWDM OUT	See Note 3	See Note 3
Directivity, min (dB)	55	N/A
Isolation, adjacent channel, min (dB)	N/A	32
Isolation, non-adjacent channel, min (dB)	N/A	45
Power handling, any input port, max (dBm)	21.8	21.8
Ripple within passband	0.5 dB	0.5 dB
Channel spacing	100 GHz	100 GHz
Optical Interface		
Optical connectors	See Ordering Information for available options	
Model OP95M8x-1-00-zz-zz	<ul style="list-style-type: none"> • Ch. yy INP (8 channel add inputs for Channel Group x) • DWDM INP (input from previous mux in a cascade) • DWDM OUT (output to fiber network) 	
Model OP95D8x-1-00-zz-zz	<ul style="list-style-type: none"> • Ch. yy (8 channel drop outputs for Channel Group x) • DWDM INP (input from fiber network) • DWDM OUT (output to next demux in a cascade) 	

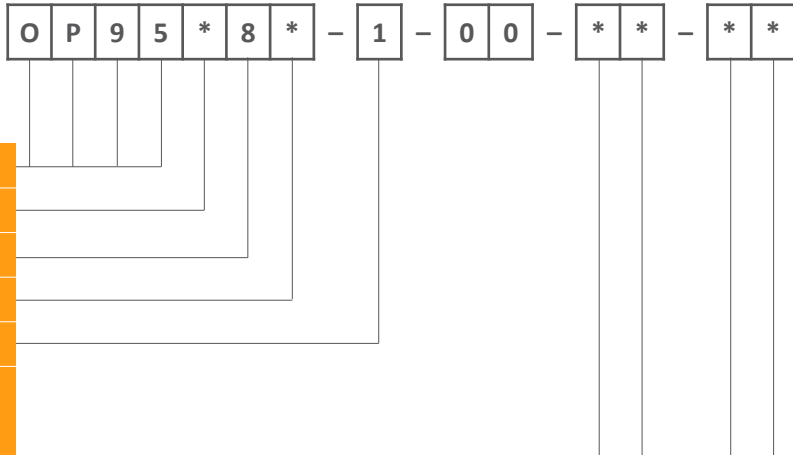
NOTES:

¹ Including connectors;

² Paired insertion loss when combined with 8-ch demux module from Ch. yy INP to Ch. yy OUT, and vice-versa;

³ Passes 1420-1620 nm with a notch at the channel add/drop band and WDL within ± 0.15 dB.

ORDERING INFORMATION



- DWDM Optical Field Passive**
- * = Module Type (M = Mux, D = Demux)**
- 8-channel Module**
- * = DWDM ITU Channel Group (See Note.)**
- (Reserved Field)**
- **.** = Packaging, Fiber, and Connector Type (All ports are identically connectorized.)**
- R1-00 = Ruggedized package with 1 meter pigtail of 900 μm tight buffered fiber and no connector**
- R2-00 = Ruggedized package with 1 meter pigtail of 2 mm loose tube fiber and no connector**
- R2-AS = Ruggedized package with 1 meter pigtail of 2 mm loose tube fiber and SC/APC connectors**

Note:

8-channel mux and demux modules are available for Channel Groups K, M, P, S, and U on a 100 GHz-spaced ITU grid. Please refer to the ARRIS DWDM ITU Grid Channel Plan data sheet for a complete description of the channels included in these groups..

RELATED PRODUCTS

Optical Transmitters	Optical Passives
Digital Return	Optical Patch Cords
Optical Nodes	Installation Services

Customer Care

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