Optribution Alpha 1 RU Indoor Chassis

The final products may vary from the above images depending on the options selected.

THE ART OF ENGINEERING

Features

- 1 RU Chassis for up to 32 Optical Channels
- Optical Transmitter and Receiver Modules with four Channels each
- Different CWDM Transmitter Modules and De-/Multiplexer
- Variable Gain
- LNB Powering, switchable 13/18 V and 22 kHz Tone
- 1+1 Redundancy Options
- Local User Interface
- SNMP Support
- DEV Web Interface
- Signal Recording Option
- Power Supply Redundancy
- Interoperability with the DEV Optribution Series

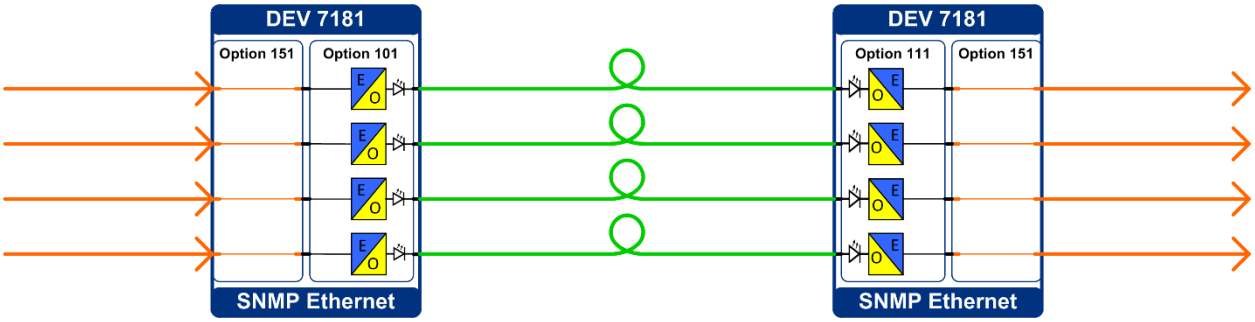
DEV 7181 Intelligent Optribution Chassis Alpha; 1 RU

The 1 RU chassis can be equipped at the front side with up to eight optical modules, i.e. up to 32 optical channels. The RF ports (with and without redundancy functionality) installed at the rear side are assigned to the opposite optical module at the front side. In addition, the chassis is equipped with a redundant power supply, provides a local user interface, the DEV Web Interface, and SNMP support.		
Technical Data		
	Value	**Condition**
Capacity		
Slots for Optical Modules	8	
Local Operation		
Display	2.2" Full Color (18 Bits)	
Controls	Control Knob & Push Buttons	
Remote Communication		
Interface (Connector)	Ethernet (RJ-45)	
Remote Control & Surveillance	via Web Interface and via SNMP	
Redundant Power Supply		
Supply Voltage	100…240 V AC supplied by two different Lines	
Power Consumption	<200 VA	
General Specifications		
Size	19" (483 mm) Width, 1 RU (44 mm) Height, 18.5" (470 mm) Depth	Maximum Depth
Weight	~4.7 kg	Without Modules
Operating Temperature	-30…+60 °C (-22…+140 °F)	
Environmental Conditions	ETS 300019 Part 1-3 Class 3.1E	Except Temperature

1:1 Optical Link Specification

The link specifications apply for an optical link realized via an optical 1:1 connection of the single channels of the Alpha Optical Transmitter (Option 101) and of the Alpha Optical Receiver (Option 111). For the RF connection, Alpha Input/Output RF Ports (Option 151 or Option 152) are applied on both sides of the optical link.		
	Value	**Condition**
Frequency Range	850…2450 MHz	
Link Gain	0±3 dB	@ +25 °C / 77 °F
Variable Gain	-15…+13 dB ±0.5 dB; Step Size 0.5 dB	
Gain Stability vs. Temperature	±0.2 dB per 10 °C change	-30…+60 °C (-22…+140 °F)
Return Loss all Ports	>16 dB typ. >12 dB min.	
Flatness	±1.5 dB ±0.2 dB	850…2450 MHz @ +25 °C In any 36 MHz Window
Group Delay Distortion	<0.2 ns	In any 36 MHz Window
Nominal RF Input Level	-30 dBm	Aggregated Power
Input Power dynamic Range	-50…-20 dBm	Aggregated Power, Note 1
Damage RF Input Level	+10 dBm	Aggregated Power
Noise Figure	≤30 dB	
CNR	>30 dB	Notes 1, 2
Output IP3	+7 dBm	Notes 2, 3
OP1dB	-5 dBm	Notes 2, 3
IM3	>40 dBc	@ 2 Tones, -28 dBm each
Transmission Distance	<3 km	
Optical Budget	1 dB	Note 4

Note 1: Pin = -30 dBm, IM3 = 48 dBc
Note 2: fiber connection 2m
Note 3: Gain set to +13 dB
Note 4: including 2 * SC/APC connector loss



1:1 High Power Optical Link Specification

The link specifications apply for an optical link realized via an optical 1:1 connection of the single channels of the Alpha Optical Transmitter (Option 107) and of the Alpha Optical Receiver (Option 112).
For the RF connection, Alpha Input/Output RF Ports (Option 151 or Option 152) are applied on both sides of the optical link with 50 Ohms or 75 Ohms impedance.

	Value	**Condition**
Frequency Range	850…2450 MHz	
Link Gain	0±3 dB	@ +25 °C / 77 °F
Variable Gain Tx	0…31.5 dB ±0.5 dB; Step Size 0.5 dB	setting 12...14dB for 0dB Link
Variable Gain Rx	-15…+13 dB ±0.5 dB; Step Size 0.5 dB	setting 10dB for 0dB Link
Gain Stability vs. Temperature	±0.2 dB per 10 °C change	-30…+60 °C (-22…+140 °F)
Return Loss all Ports	>16 dB typ. >12 dB min.	
Flatness	±1.5 dB ±0.2 dB	850…2450 MHz @ +25 °C In any 36 MHz Window
Group Delay Distortion	<0.2 ns	In any 36 MHz Window
Nominal RF Input Level	-10 dBm	Aggregated Power
Input Power dynamic Range	-50…-5 dBm	Aggregated Power, Note 1
Damage RF Input Level	+20 dBm	Aggregated Power
Noise Figure	≤38 dB	
CNR	>30 dB	Notes 1, 2
Output IP3	+7 dBm	Notes 2, 3
OP1dB	-5 dBm	Notes 2, 3
IM3	>40 dBc	@ 2 Tones, -18 dBm each
Transmission Distance	<3 km	
Optical Budget	1 dB	Note 4

Note 1: Pin = -20 dBm, IM3 = 48 dBc
Note 2: fiber connection 2m
Note 3: Gain set to +13 dB
Note 4: including 2 * SC/APC connector loss

10 MHz Optical Link Specification

The following link specifications apply for the fourth channel of an optical link realized via an optical 1:1 connection of the fourth channel of an Alpha Optical Transmitter (Option 106) and an Alpha Optical Receiver (Option 113). Alternative with Single channel Alpha Optical Transmitter (Option 106-1) and an Alpha Optical Receiver (Option 113-1).

For the other three optical link channels, please refer to the "1:1 Optical Link Specification" above.

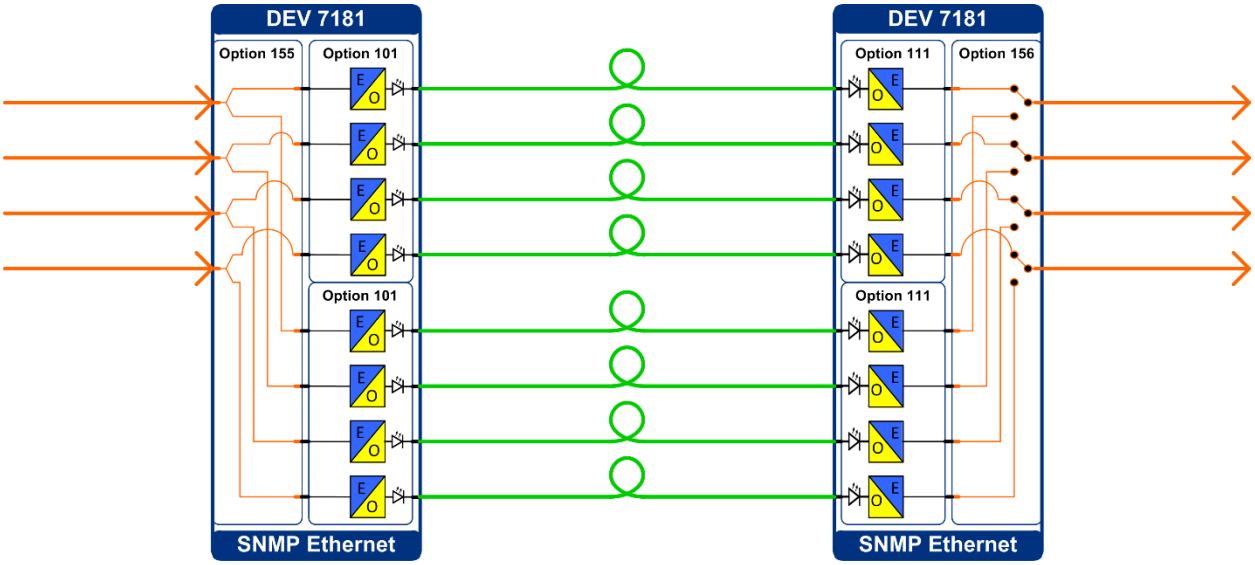
	Value	**Condition**
Frequency Range	10 MHz	
Link Gain	0±3 dB	
Variable Gain	-7…+6 dB; Step Size 0.5 dB	
Gain Stability vs. Temperature	±0.2 dB per 10 °C change	-30…+60 °C (-22…+140 °F)
Return Loss all Ports	>10 dB min.	
Group Delay Distortion	<0.2 ns	
Nominal RF Input Level	-3 dBm	Aggregated Power
Input Power dynamic Range	-40…0 dBm	Aggregated Power
Damage RF Input Level	+10 dBm	Aggregated Power
Noise Figure	≤30 dB	
OP1dB	3 dBm	
Transmission Distance	<3 km	
Optical Budget	1 dB	

1+1 Redundancy Optical Link Specification

The link specifications apply for an optical link realized via an optical 1+1 redundancy connection of the single channels of the Alpha Optical Transmitter (Option 101) connected to the Alpha 1+1 Tx Redundancy (Option 155) and of the Alpha Optical Receiver (Option 111) connected to the Alpha 1+1 Rx Redundancy (Option 156).

	Value	Condition
Frequency Range	850…2450 MHz	
Link Gain	2 dB ±3 dB; 50 Ohm 0 dB ±3 dB; 75 Ohm	@ +25 °C / 77 °F
Variable Gain	-15…+13 dB ±0.5 dB; Step Size 0.5 dB	
Gain Stability vs. Temperature	±0.2 dB per 10 °C change	-30…+60 °C (-22…+140 °F)
Return Loss all Ports	>16 dB typ. >12 dB min.	
Flatness	±2.0 dB ±0.2 dB	850…2450 MHz @ +25 °C In any 36 MHz Window
Group Delay Distortion	<0.2 ns	In any 36 MHz Window
Nominal RF Input Level	-30 dBm	Aggregated Power
Input Power dynamic Range	-50…-20 dBm	Aggregated Power, Note 1
Damage RF Input Level	+10 dBm	Aggregated Power
Noise Figure	≤34 dB	
CNR	>30 dB	Notes 1, 2
Output IP3	+7 dBm	Notes 2, 3
OP1dB	-5 dBm	Notes 2, 3
IM3	>44 dBc	@ 2 Tones, -28 dBm each
Transmission Distance	<3 km	
Optical Budget	1 dB	Note 4

Note 1: Pin = -30dBm, IM3= 48dBc
Note 2: fiber connection 2m
Note 3: Gain set to +13dB
Note 4: including 2*SC/APC connector loss

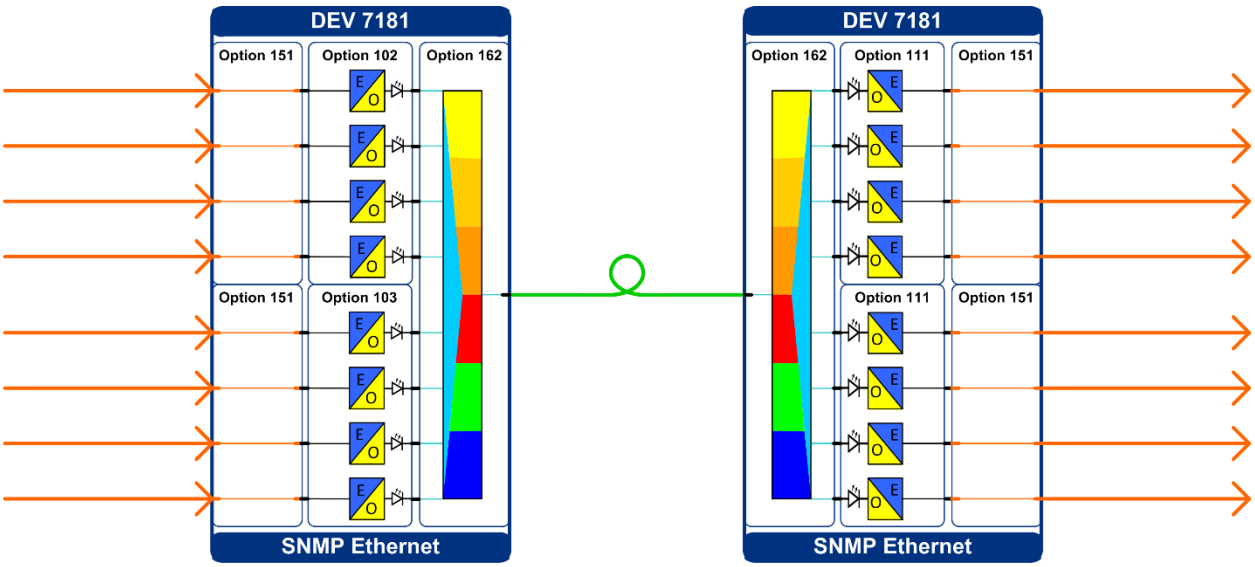


CWDM Optical Link Specification

The link specifications apply for an optical link realized via an optical 1:1 connection of the single channels of the Alpha Optical CWDM Transmitter (Option 102, Option 103, Option 104, or Option 105) and of the Alpha Optical Receiver (Option 111). For combining the optical signals at the transmitter side, and to split the optical signal at the receiver side, Alpha CWDM De-/Multiplexers (Option 161, Option 162, or Option 163) are used.
For the RF connection, Alpha Input/Output RF Ports (Option 151 or Option 152) are applied on both sides of the optical link.

	Value	**Condition**
Frequency Range	850…2450 MHz	
Link Gain	0±3 dB	@ +25 °C / 77 °F
Variable Gain	-15…+13 dB ±0.5 dB; Step Size 0.5 dB	
Gain Stability vs. Temperature	±0.3 dB per 10 °C change	-30…+50 °C (-22…+122 °F)
Return Loss all Ports	>16 dB typ. >12 dB min.	
Flatness	±1.5 dB ±0.2 dB	850…2450 MHz @ +25 °C In any 36 MHz Window
Group Delay Distortion	<0.2 ns	In any 36 MHz Window
Nominal RF Input Level	-30 dBm	Aggregated Power
Input Power dynamic Range	-50…-20 dBm	Aggregated Power, Note 1
Damage RF Input Level	+10 dBm	Aggregated Power
Noise Figure	≤30 dB	
CNR	>30 dB	Notes 1, 2
Output IP3	+7 dBm	Notes 2, 3
OP1dB	-5 dBm	Notes 2, 3
IM3	>40 dBc	@ 2 Tones, -28 dBm each
Transmission Distance	<15 km	
Optical Budget	5 dB	Note 4

Note 1: Pin = -30dBm, IM3= 48dBc
Note 2: fiber connection 2m
Note 3: Gain set to +13dB
Note 4: including 2*SC/APC connector loss



Option 101 - Alpha Optical Transmitter; 4*Tx; 850…2450 MHz
Option 101-1 - Alpha Optical Transmitter; 1*Tx; 850…2450 MHz
Option 106 - Alpha Optical Transmitter; 3*Tx; 850…2450 MHz plus 1*Tx;10 MHz
Option 106-1 - Alpha Optical Transmitter; 1*Tx;10 MHz
Option 107 - Alpha Optical Transmitter; 4*Tx; 850…2450 MHz; High Power

The standard Alpha Optical Transmitter (Option 101) provides 4 optical output channels for the frequency range 850…2450 MHz.
The Alpha Optical Transmitter (Option 101-1) provide 1 optical output channels for the frequency range 850…2450 MHz.
The Alpha Optical Transmitter (Option 106) provides 3 optical output channels for the frequency range 850…2450 MHz, the fourth channel is realized as a 10 MHz output channel. Alternatively, a single Alpha Optical Transmitter (Option 106-1) for 10 MHz.
The Alpha Optical Transmitter (Option 107) provide 4 optical output channels for the frequency range 850…2450 MHz capable of handling high RF input power.

	Value	**Condition**
Optical Specifications		
Optical Output Channels	4	Note 1, 2, 3
Fiber Type	Single Mode 9/125 µm	
Optical Connectors	SC/APC	
Laser Class (according to IEC 60 825-1)	Class 1M (low Risk to Eyes, no Risk to Skin)	
Wavelength	1310 nm nominal	
Optical Output Power	0.5 mW / -3 dBm	
RF Sensing		
Adjustable Threshold Level	-15 dBm > Threshold Level > -55 dBm	
Threshold Repeatability	<±0.1 dB	
LNB Power		
Voltage and Tone Control	13 V, 18 V and 0 Hz, 22 kHz	Individually selectable per Channel
LNB Power	up to 450 mA per channel max. 1 A per module	
General Specifications		
Power Consumption Module	12 V; ~250 mA	Without LNB Power
Size	2.75" (70 mm) Width (one slot)	
Weight	~0.2 kg	
Operating Temperature	-30…+60 °C (-22…+140 °F)	
Environmental Conditions	ETS 300019 Part 1-3 Class 3.1E	Except Temperature

Note 1: Option 101-1 - Alpha Optical Transmitter has 1 optical output only
Note 2: Option 106 - Alpha Optical Transmitter has 3 optical outputs for 850…2450 MHz and 1 optical output for 10 MHz reference
Note 3: Option 106-1 – Single channel Alpha Optical Transmitter for 10 MHz reference.

Option 102 - Alpha Optical CWDM Transmitter; 4*Tx; 850…2450 MHz; CWDM Channels 1…4
Option 103 - Alpha Optical CWDM Transmitter; 4*Tx; 850…2450 MHz; CWDM Channels 5…8
Option 104 - Alpha Optical CWDM Transmitter; 4*Tx; 850…2450 MHz; CWDM Channels 9…12
Option 105 - Alpha Optical CWDM Transmitter; 4*Tx; 850…2450 MHz; CWDM Channels 13…16

The Alpha Optical CWDM Transmitters provide the same specifications as the standard Alpha Optical Transmitter (Option 101), except:				
	Value			
Optical Specifications	**Option 102**	**Option 103**	**Option 104**	**Option 105**
CWDM Wavelengths	Channels 1…4: 1510 nm ±10 nm 1530 nm ±10 nm 1550 nm ±10 nm 1570 nm ±10 nm	Channels 5…8: 1470 nm ±10 nm 1490 nm ±10 nm 1590 nm ±10 nm 1610 nm ±10 nm	Channels 9…12: 1310 nm ±10 nm 1330 nm ±10 nm 1350 nm ±10 nm 1370 nm ±10 nm	Channels 13…16: 1270 nm ±10 nm 1290 nm ±10 nm 1430 nm ±10 nm 1450 nm ±10 nm
Optical Output Power	1 mW / 0 dBm			

Option 111 - Alpha Optical Receiver; 4*Rx; 850…2450 MHz
Option 111-1 - Alpha Optical Receiver; 1*Rx; 850…2450 MHz
Option 112 - Alpha Optical Receiver; 4*Rx; 850…2450 MHz; High Power
Option 113 - Alpha Optical Receiver; 3*Rx; 850…2450 MHz plus 1*Rx; 10 MHz
Option 113-1 - Alpha Optical Receiver; 1*Rx; 10 MHz

The standard Alpha Optical Receiver (Option 111) provides 4 optical input channels for the frequency range 850…2450 MHz.
The Alpha Optical Receiver (Option 111-1) provide 1 optical input channels for the frequency range 850…2450 MHz.
The Alpha Optical Receiver (Option 112) provides 4 optical high input power channels for the frequency range 850…2450 MHz.
The Alpha Optical Receiver (Option 113) provides 3 optical input channels for the frequency range 850…2450 MHz, the fourth channel is realized as a 10 MHz input channel.

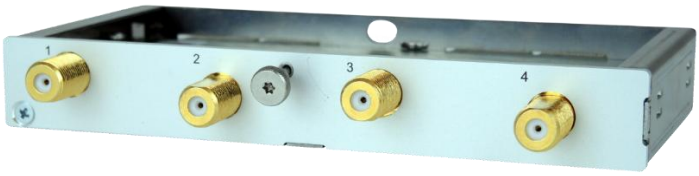
	Value		Condition
Optical Specifications			
Optical Input Channels	4		Note 1, 2, 3
Fiber Type	Single Mode 9/125 µm		
Optical Connectors	SC/APC		
Max. Optical Input Power	2 mW / 3 dBm	6 mW / 8 dBm	
Wavelength Range	1270…1610 nm		
RF Sensing			
Adjustable Threshold Level	-15 dBm > Threshold Level > -55 dBm		
Threshold Repeatability	<±0.1 dB		
General Specifications			
Power Consumption Module	12 V; ~180 mA		
Size	2.75" (70 mm) Width (one slot)		
Weight	~0.2 kg		
Operating Temperature	-30…+60 °C (-22…+140 °F)		
Environmental Conditions	ETS 300019 Part 1-3 Class 3.1E		Except Temperature

Note 1: Option 111-1 - Alpha Optical Receiver has 1 optical input only
Note 2: Option 113 - Alpha Optical Receiver provides 3 optical inputs for 850…2450 MHz and 1 optical input for 10 MHz reference
Note 3: Option 113-1 – Single channel Alpha Optical Receiver for 10 MHz reference.

Option 151 - Alpha Input/Output; 4*RF Port; 75 Ohm, F (f)
Option 151-1 - Alpha Input/Output; 1*RF Port; 75 Ohm, F (f)
Option 152 - Alpha Input/Output; 4*RF Port; 50 Ohm, SMA (f)
Option 152-1 - Alpha Input/Output; 1*RF Port; 50 Ohm, SMA (f)

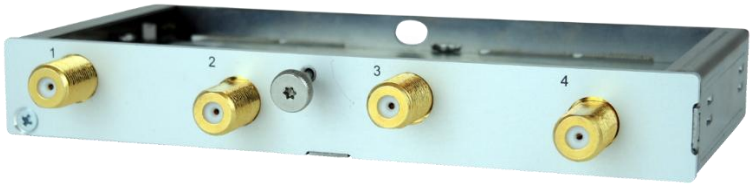
The Alpha Input/Output RF Ports provides direct RF access to the one or four channels of the related optical module.		
	Value	**Condition**
RF Specifications		
Input/Output Ports	4 (Option 151, Option 152) 1 (Option 151-1, Option 152-1)	
Impedance, Connectors	75 Ohm, F (f) (Option 151, Option 151-1) 50 Ohm, SMA (f) (Option 152, Option 152-1)	
DC blocked	No	
General Specifications		
Size	2.75" (70 mm) Width (one slot)	
Weight	~0.1 kg	

Option 155 - Alpha 1+1 Tx Redundancy; 4*RF Splitter; 75 Ohm, F (f)
Option 155-1 - Alpha 1+1 Tx Redundancy; 1*RF Splitter; 75 Ohm, F (f)
Option 157 - Alpha 1+1 Tx Redundancy; 4*RF Splitter; 50 Ohm, SMA (f)
Option 157-1 - Alpha 1+1 Tx Redundancy; 1*RF Splitter; 50 Ohm, SMA (f)



The Alpha 1+1 Tx Redundancy options are used for the RF connection to two optical transmitter modules in 1+1 redundancy applications.		
	Value	**Condition**
RF Specifications		
Input/Output Ports	4 (Option 155, Option 157) 1 (Option 155-1, Option 157-1)	
Impedance, Connectors	75 Ohm, F (f) (Option 155, Option 155-1) 50 Ohm, SMA (f) (Option 157, Option 157-1)	
DC blocked	No	
General Specifications		
Size	5.55" (141 mm) Width (two slots)	
Weight	~0.2 kg	

Option 156 - Alpha 1+1 Rx Redundancy; 4*RF Switch; 75 Ohm, F (f)
Option 156-1 - Alpha 1+1 Rx Redundancy; 1*RF Switch; 75 Ohm, F (f)
Option 158 - Alpha 1+1 Rx Redundancy; 4*RF Switch; 50 Ohm, SMA (f)
Option 158-1 - Alpha 1+1 Rx Redundancy; 1*RF Switch; 50 Ohm, SMA (f)



The Alpha 1+1 Rx Redundancy option is used for the RF connection to two optical receiver modules in 1+1 redundancy applications.		
	Value	**Condition**
RF Specifications		
Input/Output Ports	4 (Option 156, Option 158) 1 (Option 156-1, Option 158-1)	
Impedance, Connectors	75 Ohm, F (f) (Option 156, Option 156-1) 50 Ohm, SMA (f) (Option 158, Option 158-1)	
DC blocked	Yes	
General Specifications		
Size	5.55" (141 mm) Width (two slots)	
Weight	~0.2 kg	

Option 161 - Alpha 1:4 CWDM De-/Multiplexer; CWDM Channels 1…4
Option 162 - Alpha 1:8 CWDM De-/Multiplexer; CWDM Channels 1…8
Option 163 - Alpha 1:16 CWDM De-/Multiplexer; CWDM Channels 1…16

The Alpha CWDM De-/Multiplexer provide four, eight, or sixteen optical ports for CWDM applications.				
	Value		**Condition**	
Optical Specifications				
Optical Connectors Common Port / Patch Cables De-/Mux Ports / Patch Cables	 SC/APC / SC/APC SC/APC / LC/APC			
	Option 161	**Option 162**	**Option 163**	
Number of De-/Mux Ports	4	8	16	
CWDM Wavelengths	Channels 1…4: 1510 nm ±10 nm 1530 nm ±10 nm 1550 nm ±10 nm 1570 nm ±10 nm	Channels 1…8: 1510 nm ±10 nm 1530 nm ±10 nm 1550 nm ±10 nm 1570 nm ±10 nm 1470 nm ±10 nm 1490 nm ±10 nm 1590 nm ±10 nm 1610 nm ±10 nm	Channels 1…16: 1510 nm ±10 nm 1530 nm ±10 nm 1550 nm ±10 nm 1570 nm ±10 nm 1470 nm ±10 nm 1490 nm ±10 nm 1590 nm ±10 nm 1610 nm ±10 nm 1310 nm ±10 nm 1330 nm ±10 nm 1350 nm ±10 nm 1370 nm ±10 nm 1270 nm ±10 nm 1290 nm ±10 nm 1430 nm ±10 nm 1450 nm ±10 nm	
General Specifications				
Size	2.75" (70 mm) Width (one slot)		5.55" (141 mm) Width (two slots)	
Weight	~0.1 kg			
Operating Temperature	-30…+50 °C (-22…+122 °F)			
Environmental Conditions	ETS 300019 Part 1-3 Class 3.1E		Except Temperature	

Option 55 - Change Ethernet to optical Ethernet Interface SC/APC
Option 56 - Change Ethernet to optical Ethernet Interface SC/PC

With applied Option 55 (or Option 56), the DEV 7181 provides a 100Base FX Ethernet interface with SC/APC (or SC/PC) connectors (instead of the standard 100Base-TX Ethernet interface with RJ-45 connector) for the optical transmission of Ethernet signals.

Option 77 - Signal Recording

With applied Option 77, the Web Interface additionally provides the Recording Window that permits the visualization and the external storage of transmitter and receiver signal data.

Order Information

Product and Options

DEV 7181	Intelligent Optribution Chassis Alpha; 1 RU
Option 101	Alpha Optical Transmitter; 4*Tx; 850…2450 MHz; SC/APC
Option 101-1	Alpha Optical Transmitter; 1*Tx; 850…2450 MHz; SC/APC
Option 102	Alpha Optical CWDM Transmitter; CWDM Channels 1…4; 850…2450 MHz; SC/APC
Option 103	Alpha Optical CWDM Transmitter; CWDM Channels 5…8; 850…2450 MHz; SC/APC
Option 104	Alpha Optical CWDM Transmitter; CWDM Channels 9…12; 850…2450 MHz; SC/APC
Option 105	Alpha Optical CWDM Transmitter; CWDM Channels 3…16; 850…2450 MHz; SC/APC
Option 106	Alpha Optical Transmitter; 3*Tx; 850…2450 MHz plus 1*Tx; 10 MHz; SC/APC
Option 106-1	Alpha Optical Transmitter; 1*Tx; 10 MHz; SC/APC
Option 107	Alpha Optical Transmitter; 4*Tx; 850…2450 MHz; High Power; SC/APC
Option 111	Alpha Optical Receiver; 4*Rx; 850…2450 MHz; SC/APC
Option 111-1	Alpha Optical Receiver; 1*Rx; 850…2450 MHz; SC/APC
Option 112	Alpha Optical Receiver; 4*Rx; 850…2450 MHz; High Power; SC/APC
Option 113	Alpha Optical Receiver; 3*Rx; 850…2450 MHz plus 1*Rx; 10 MHz; SC/APC
Option 113-1	Alpha Optical Receiver; 1*Rx; 10 MHz; SC/APC
Option 151	Alpha Input/Output; 4*RF Port; 75 Ohm, F (f)
Option 151-1	Alpha Input/Output; 1*RF Port; 75 Ohm, F (f)
Option 152	Alpha Input/Output; 4*RF Port; 50 Ohm, SMA (f)
Option 152-1	Alpha Input/Output; 1*RF Port; 50 Ohm, SMA (f)
Option 155	Alpha 1+1 Tx Redundancy; 4*RF Splitter; 75 Ohm, F (f)
Option 155-1	Alpha 1+1 Tx Redundancy; 1*RF Splitter; 75 Ohm, F (f)
Option 156	Alpha 1+1 Rx Redundancy; 4*RF Switch; 75 Ohm, F (f)
Option 156-1	Alpha 1+1 Rx Redundancy; 1*RF Switch; 75 Ohm, F (f)
Option 157	Alpha 1+1 Tx Redundancy; 4*RF Splitter; 50 Ohm, SMA (f)
Option 157-1	Alpha 1+1 Tx Redundancy; 1*RF Splitter; 50 Ohm, SMA (f)
Option 158	Alpha 1+1 Rx Redundancy; 4*RF Switch; 50 Ohm, SMA (f)
Option 158-1	Alpha 1+1 Rx Redundancy; 1*RF Switch; 50 Ohm, SMA (f)
Option 161	Alpha 1:4 CWDM De-/Multiplexer; CWDM Channels 1…4
Option 162	Alpha 1:8 CWDM De-/Multiplexer; CWDM Channels 1…8
Option 163	Alpha 1:16 CWDM De-/Multiplexer; CWDM Channels 1…16
Option 55	Change Ethernet to optical Ethernet Interface SC/APC
Option 56	Change Ethernet to optical Ethernet Interface SC/PC
Option 77	Signal Recording

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