



ACION™ 3422 Optical Node

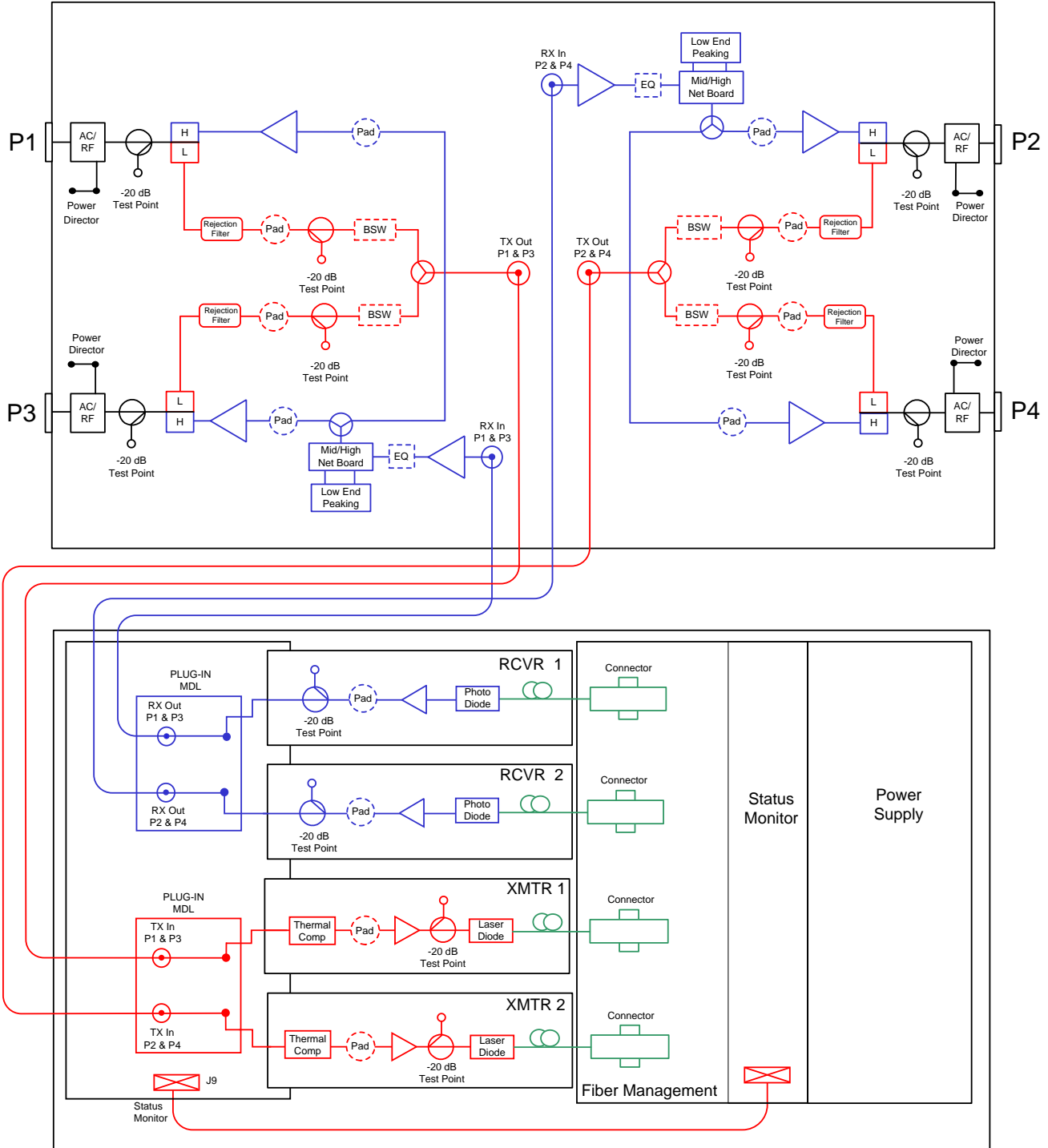
2x2 Fully Segmentable

The ACI Communications' ACION 3422 1GHz is a 4-output 2x2 fully segmentable optical node that is capable of providing up to 52.2 dBmV output at 1002 MHz and has an optical input level range from -3 dBm to +2 dBm. The node can have up to two optical receivers and two optical transmitters.

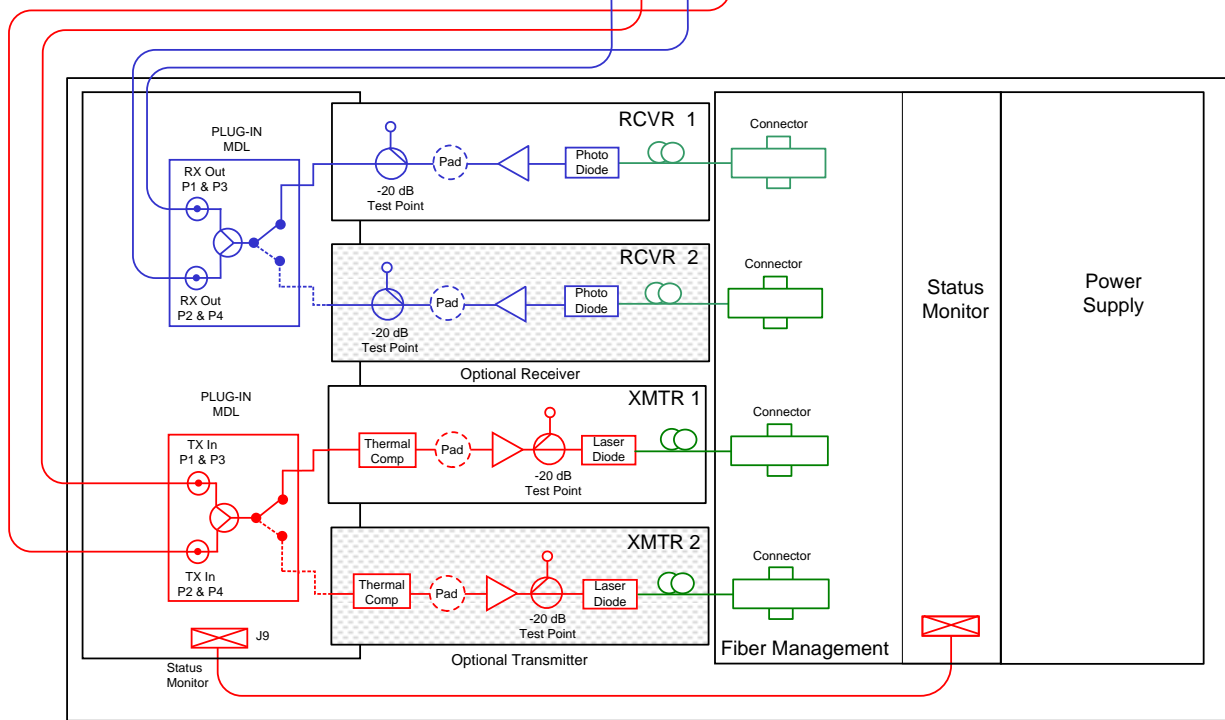
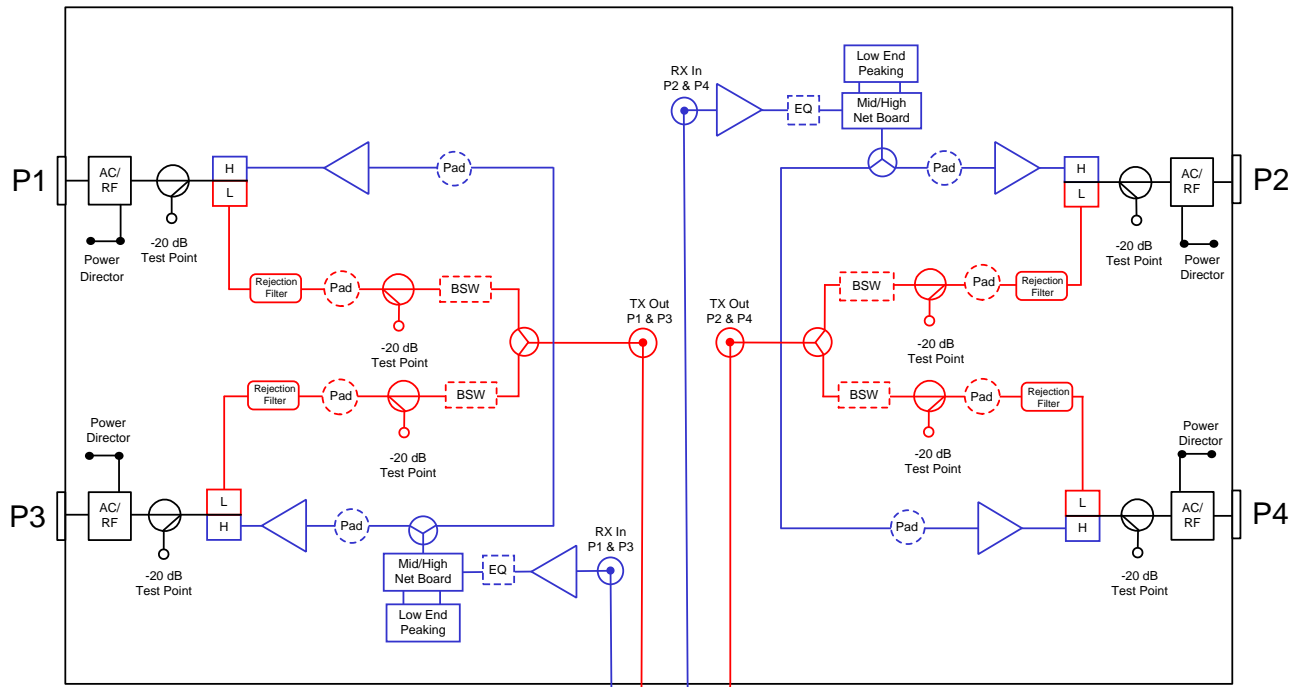
Features

- ◆ Four driven output ports
- ◆ Up to 52.2 dBmV output at 1002MHz
- ◆ -20.0 dB directional coupler test points
- ◆ 15 amp power passing
- ◆ Plug-in bridger switching for managing the reverse path @ 0, -3.0, -6.0, -12.0 dB and open with active status monitoring (optional)
- ◆ Standard push on "F" connectors can be used on all test points
- ◆ FP, DFB, CWDM, & DWDM & transmitters available
- ◆ Redundant receiver & Transmitter (optional 1:4 only)
- ◆ Compact size for a 2x2 segmentable node
- ◆ Plug-in forward and reverse configuration modules allows for easy field reconfiguration to add or remove segmentation as needed
- ◆ 85% efficient 40/90 VAC switch-mode power supply with built-in Triac surge protection
- ◆ Internal Mux / De-Mux (Optional)
- ◆ Pad adjustable linear equalizers (Optional)
- ◆ Powder coated housing for extra corrosion protection

Block Diagrams



ACION 3422 Block Diagram (Forward and Reverse Segmented Optical Node 1002 MHz)



ACION 3422 Block Diagram (Non-Segmented Optical Node 1002 MHz)

Specifications

ACION 34224-Output (Forward and Reverse Segmentable Optical Node 1002 MHz)						
STATION PARAMETERS						
	CONDITIONS	UNITS	SPECIFICATION			NOTES
Housing passband		MHz	5 to 1002			
Input current capacity	Any port, worst case	Amperes	15			
Frequency range		MHz	5 - 10	11-750	751 - 1002	
Hum modulation	Time domain @ rated current above	-dBc	55	70	65	
Station passband		MHz	54 to 1002			
Return loss- Ports 1 to 4	Worst case	-dB	16.5			Typical 18.0
Frequency range		MHz	54-870	871-1002		
Port to Port Isolation	Typical	-dB	70	60		
Test Points						
Test point type	Directional coupler	N / A	DC			
Test point level(s)		-dB	20.0			
Test point accuracy	Forward TP	±dB	0.5			
Frequency range	Reverse TP	MHz	5 to 40			
Test point accuracy	Reverse TP	±dB	0.5			
Frequency Range						
Station passband		MHz	54 to 1002			
Station flatness - feeder out		±dB	0.75			
Station Gain						
			Minimum	Minimum		
Configuration			1:4	1:2 (X2)		
Gain - feeder	@ 1002 MHz	dB	33	37		
Gain control type		N / A	Plug-in pads			
Gain control range		dB	15.0			
Gain control steps	Pad value steps	dB	0.5			
Station Slope						
Slope control type	Linear equalizers	dB	Plug-in Equalizers			
Slope control range		dB	-12.0 to +13.0			
Slope control steps	Equalizer value steps	dB	1.0 linear steps			
Operational Specifications						
Operational level - feeders	@ 1002 MHz	dBmV	52.2			
Operational slope	@ 54 / 550 / 750 / 870 / 1002 MHz	dB	0 / 9.0 / 12.6 / 14.8 / 17.2			
Operational optical input range		dBm	-3 to +2			Recommended optical input level 0 dBm
Station Output Levels with a -3 dBm optical input						
Distribution out	@ 54 / 550 / 750 / 870 / 1002 MHz	dBmV	35.0 / 44.0 / 47.6 / 49.8 / 52.2			
Station Noise Figure - values for RF portion of node only. Complete values dependent on optical link.						
			* No slope	17.2 dB slope	* LEQ1= 0 dB	
Noise figure (NF)	@ 54 MHz	dB	9.5	16.0		
Noise figure (NF)	@ 550 MHz	dB	9.5	11.0		
Noise figure (NF)	@ 1002 MHz	dB	9.5	11.0		
Station Distortions - values for RF Portion of node only. Complete values dependent on optical link.						
550 MHz analog channel loading, 79 channels + 450 MHz digital channel loading, 256 QAM at -6 dBc relative to its associated visual carrier						
Reference levels	@ 54 / 550 / 650 / 870 / 1002 MHz	dBmV	35.0 / 44.0 / 47.6 / 49.8 / 52.2			
		N / A	Worst Case	Typical		
Composite Triple Beat (CTB)		-dBc	70	72		
Cross Modulation (XMOD)		-dBc	64	66		
Composite Second Order (CSO -)	(Vc +0.75 & -1.25 MHz only)	-dBc	69	71		
Composite Second Order (CSO +)	(Vc +1.25 MHz only)	-dBc	69	71		
CIN		-dBc	65	67		
Station Group Delay						
Group delay	Channel 2 (std)	nSec / 3.58 MHz	30		Typical 25	
Group delay	Channel 3	nSec / 3.58 MHz	16			
Group delay	Channel 4	nSec / 3.58 MHz	10			
Group delay	Channel 5 & >	nSec / 3.58 MHz	3			

ACION 3422 4-Output (Forward and Reverse Segmentable Optical Node 1002 MHz)					
REVERSE SPECTRUM:					
	CONDITIONS	UNITS	SPECIFICATIONS		NOTES
Reverse - General					
Station passband		MHz	5 to 42		
Station flatness		±dB	1.0		
Bridger switch control (optional)		-dB	0, 3.0, 6.0, 12.0 & open		
Port to Port Isolation	Typical	-dB	65		
Reverse - Station Gain (RF section only)					
Configuration			4:1	2:1 (X2)	
Gain	Minimum	dB	6.0	5.0	
Gain control type		N / A	Plug-in pads		
Gain control steps	Pad value steps	dB	0.5		
Reverse - Station Input Levels					
RF station input to node for 40 dBmV @ Laser TP	Minimum	dBmV	17		
Reverse - Noise Figure					
Configuration			4:1	2:1 (X2)	
Station Noise Figure (w/EQ)		dB	16.5	12.0	
Reverse - Station Distortions @ 23 dBmV					
Composite Second Order (CSO)	6 NTSC channel loading	-dBc	75		
Composite Triple Beat (CTB)	6 NTSC channel loading	-dBc	80		
Cross Modulation (XMOD)	6 NTSC channel loading	-dBc	80		
Reverse - Noise-to-Power Ratio (NPR/Dynamic Range)					
Analog OTX	Noise loading	dB	Typical >40.0 / 13.0		@ 10.0 dB optical loss (6.0 dB fiber +4.0 dB flat loss) @ -51 dBmV/Hz
Digital Return TDR			Typical >40.0 / 18.0		
MER	6 NTSC Channel Loading	dB	≥ 38.0		QAM 64 or QAM 256
BER	6 NTSC Channel Loading	dB	≤1x10 ⁻⁹		QAM 64 or QAM 256
Reverse - Station Group Delay					
Group delay	5 MHz	nSec / 1.5 MHz	36		
Group delay	7 MHz	nSec / 1.5 MHz	16		
Group delay	10 MHz	nSec / 1.5 MHz	4		
Group delay	35 MHz	nSec / 1.5 MHz	8		
Group delay	38.5 MHz	nSec / 1.5 MHz	25		
Power Requirements:					
Station configuration (Over temperature range of -40°F to +140°F (-40°C to +60°C) @ 90 VAC)			1X4 (1RX & 1TX)	2X2 (2RX & 2TX)	
Power requirements	Worst case	W	67.5	79.8	
AC Voltage					
Input ranges		VAC	40 - 90		
Current Draw					
@ 40 VAC	Maximum	A	1.97	2.28	
@ 50 VAC	Maximum	A	1.66	1.90	
@ 60 VAC	Maximum	A	1.43	1.64	
@ 70 VAC	Maximum	A	1.30	1.48	
@ 80 VAC	Maximum	A	1.18	1.33	
@ 90 VAC	Maximum	A	1.05	1.22	
Environmental					
Operating temperature		°F (°C)	-40 to +140 (-40 to +60)		
RF output stability over temperature		±dB	0.5		
Physical					
Dimensions (H X W X D)		In. (cm)	6.75 X 14.25 X 9 (17.15 X 36.20 X 22.86)		
Weight		lbs. (kg)	18.25 (8.28)		

Ordering Matrix

ACION 3422 Configuration Sheet

Customer: _____

Created By: _____ Order Date: _____

ORDERING MATRIX

November 10, 2023

Position	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
PART NUMBER	3	N															

<p>3 <input type="checkbox"/> BASIC CONFIGURATION A = FWD 1:4 REV 4:1 nonsegmented 1 Transmitter installed 1 Receiver installed TX and RX redundancy capable B = FWD 1:4 REV 2:1 (X2) Reverse segmented 2 Analog or 1 Digital Dual Transmitter installed 1 Receiver installed RX redundancy capable C = FWD 1:2 (X2) REV 4:1 Forward segmented 1 Transmitter installed 2 Receivers installed TX redundancy capable D = FWD 1:2 (2X) REV 2:1 (X2) Forward & Return segmented 2 Analog or 1 Digital Dual Transmitter installed 2 Receivers installed Not TX or RX redundancy capable</p> <p>4 <input type="checkbox"/> DIPLEX FREQUENCY SPLIT 4 = 42/53 5 = 55/70 6 = 65/85 8 = 85/105</p> <p>5 <input type="checkbox"/> OPTICAL CONNECTOR TYPE 1 = SC/APC (Standard) 2 = SC/UPC 3 = FC/APC 4 = FC/UPC</p> <p>6 <input type="checkbox"/> TRANSMITTER 1 - Primary 4:1 or Ports 1 & 3 for 2:1 (X2) 7 <input type="checkbox"/> TRANSMITTER 2 - Secondary 4:1 or Ports 2 & 4 for 2:1 (X2)</p> <p>TYPE FP & DFB 0 = None D = Uncooled 1310 nm 1.0 mW FP H = Uncooled 1310 nm 2.0 mW FP W/ISOLATOR J = Uncooled 1310 nm 1.0 mW DFB R = Uncooled 1310 nm 2.0 mW DFB B = Uncooled 1310 nm 3.0 mW DFB C = Uncooled 1550 nm 2.0 mW DFB Z = Uncooled 1550 nm 4.0 mW DFB</p> <p>TYPE DFB CWDM 2.0 mW A = Uncooled 1471 nm DFB CWDM (2.0 mW) G = Uncooled 1491 nm DFB CWDM (2.0 mW) V = Uncooled 1511 nm DFB CWDM (2.0 mW) L = Uncooled 1531 nm DFB CWDM (2.0 mW) W = Uncooled 1551 nm DFB CWDM (2.0 mW) M = Uncooled 1571 nm DFB CWDM (2.0 mW) N = Uncooled 1591 nm DFB CWDM (2.0 mW) T = Uncooled 1611 nm DFB CWDM (2.0 mW) U = Uncooled 1431 nm DFB CWDM (2.0 mW) E-Band Y = Uncooled 1451 nm DFB CWDM (2.0 mW) E-Band</p> <p>TYPE DFB CWDM 3.0 mW F = Uncooled 1471 nm DFB CWDM (3.0 mW) I = Uncooled 1491 nm DFB CWDM (3.0 mW) Q = Uncooled 1551 nm DFB CWDM (3.0 mW) K = Uncooled 1591 nm DFB CWDM (3.0 mW) P = Uncooled 1611 nm DFB CWDM (3.0 mW)</p> <p>TYPE DFB CWDM 4.0, 5.0 & 6.0 mW 9 = Uncooled 1551 nm DFB CWDM (4.0 mW) 8 = Uncooled 1551 nm DFB CWDM (5.0 mW) 5 = Uncooled 1591 nm DFB CWDM (5.0 mW) 6 = Uncooled 1611 nm DFB CWDM (5.0 mW) 3 = Uncooled 1471 nm DFB CWDM (6.0 mW) 4 = Uncooled 1491 nm DFB CWDM (6.0 mW)</p> <p>TYPE ANALOG DWDM: ITU Grid: C-Band, 100 GHz Spacing 2 = Enter "2" in position 6 and "0" in position 7 See positions 16 & 17 for wavelength options</p>	<p>8 <input type="checkbox"/> RECEIVER REDUNDANCY (Basic configuration A or B only) 1 Not redundant 2 RX Redundant</p> <p>9 <input type="checkbox"/> CWDM/DWDM Mux/DeMux or WDM (For a 1X2 Mux or WDM use positions 9 & 11) 10 <input type="checkbox"/> CWDM or DWDM DeMux Downstream Wavelength # 1 11 <input type="checkbox"/> CWDM or DWDM DeMux Downstream Wavelength # 2 12 <input type="checkbox"/> CWDM Mux Upstream Wavelength #1 CWDM Mux Upstream Wavelength #2</p> <p>0 = None A = 1271 nm K = 1451 nm W = 1310 nm B = 1291 nm L = 1471 nm Y = 1550 nm C = 1311 nm M = 1491 nm D = 1331 nm N = 1511 nm E = 1351 nm P = 1531 nm F = 1371 nm R = 1551 nm G = 1391 nm T = 1571 nm H = 1411 nm U = 1591 nm J = 1431 nm V = 1611 nm</p> <p>DWDM O-Band: 1270nm to 1370nm (Downstream Only) 3 = 1290 nm 4 = 1291 nm 5 = 1293 nm 6 = 1295 nm</p> <p>DWDM C-Band: 1531nm to 1570nm (Downstream Only) 1 = Channel 21 - 1560.61 nm 2 = Channel 22 - 1559.79 nm 7 = Channel 24 - 1558.17 nm 8 = Channel 26 - 1556.56 nm 9 = Channel 28 - 1554.94 nm I = Channel 33 - 1550.92 nm Q = Channel 36 - 1548.52 nm S = Channel 39 - 1546.12 nm</p> <p>13 <input type="checkbox"/> HOUSING TYPE (See Note 1) P = Powder Coated (Complete Station) K = Powder Coated (Upgrade kit without housing base)</p> <p>14 <input type="checkbox"/> STATUS MONITORING 0 = None M = Status Monitoring upgradeable (With Bridger switching) D = Dccsis HMS Transponder</p> <p>15 <input type="checkbox"/> CUSTOM 0 = None 2 = Port 1 bypassed, Port 2 forward gain lowered by 10 dB 5 = 15 dB Slope at 1002 MHz (Fixed Value LEQ's) A = 15.0 dB Slope at 1002 MHz (Pad Adjustable LEQ's) B = 17.2 dB Slope at 1002 MHz (Pad Adjustable LEQ's) X = Determined by Product Management</p> <p>16 <input type="checkbox"/> DWDM TRANSMITTER 1 Primary 4:1 or Ports 1 & 3 for 2:1 (X2) 17 <input type="checkbox"/> DWDM TRANSMITTER 2: Secondary 4:1 or Ports 2 & 4 for 2:1 (X2) DWDM: ITU Grid: C-Band, 100 GHz Spacing Blank = No DWDM Transmitters H = Channel 21 - 1560.61 nm (10.0 mW) R = Channel 22 - 1559.79 nm (10.0 mW) J = Channel 23 - 1558.98 nm (10.0 mW) P = Channel 24 - 1558.17 nm (10.0 mW) K = Channel 25 - 1557.36 nm (10.0 mW) C = Channel 26 - 1556.56 nm (10.0 mW) D = Channel 28 - 1554.94 nm (10.0 mW) L = Channel 29 - 1554.13 nm (10.0 mW) E = Channel 30 - 1553.33 nm (10.0 mW) M = Channel 31 - 1552.52 nm (10.0 mW) F = Channel 32 - 1551.72 nm (10.0 mW) N = Channel 33 - 1550.92 nm (10.0 mW) G = Channel 34 - 1550.12 nm (10.0 mW)</p>
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NOTES:

- The ACION 3422 upgrade kit (option # 13 selection K) will include a fully configured optical top housing assembly and the RF module tray. The upgrade Kit will allow field upgrades of legacy ACION 3000 & ACION 3410 nodes or it can be used as a conversion kit to convert an existing SDA RF amplifier into a fully 2X2 segmentable optical node.

Spare or Replacement Part Numbers

ACION 3422 Optional Accessories	
Part Number	Description
ALEQ1G	Linear Equalizers JXP Platform 0-18 dB 1002 MHz
090717-01	A3422 Non-Segmented Forward Configuration Module 1:4
090718-01	A3422 Segmented Forward Configuration Module 1:2 (X2)
090716-01D	A3422 Non-Segmented 5-42 MHz Reverse Configuration Module 4:1 V3
090716-04D	A3422 Non-Segmented 5-85 MHz Reverse Configuration Module 4:1 V3
090715-01D	A3410/22 Segmented Reverse 5-42 MHz Configuration Module 2:1 (X2) V3
090715-04D	A3410/22 Segmented Reverse 5-85 MHz Configuration Module 2:1 (X2) V3
WDM-01XXX	WDM 1310/1550 nm (XXX = Optical Connector Type)
120560-01	ACION 3422 Replacement RF Module 1002 MHz
ACION 3422 Analog Transmitters & Receivers (XXX = Optical Connector Type)	
090685-01XXX	A3410/22 Receiver 1002 MHz
090705-01XXX	A3422 DFB Uncooled, Isolated 1310 nm Transmitter 1.0 mW
090705-02XXX	A3422 DFB Uncooled, Isolated 1310 nm Transmitter 2.0 mW
090705-03XXX	A3422 DFB Uncooled, Isolated 1310 nm Transmitter 3.0 mW
090706-02XXX	A3422 DFB Uncooled, Isolated 1550 nm Transmitter 2.0 mW
090706-04XXX	A3422 DFB Uncooled, Isolated 1550 nm Transmitter 4.0 mW
090707-01XXX	A3422 DFB CWDM Uncooled, Isolated 1471 nm Transmitter 2.0 mW
090707-02XXX	A3422 DFB CWDM Uncooled, Isolated 1491 nm Transmitter 2.0 mW
090707-03XXX	A3422 DFB CWDM Uncooled, Isolated 1511 nm Transmitter 2.0 mW
090707-04XXX	A3422 DFB CWDM Uncooled, Isolated 1531 nm Transmitter 2.0 mW
090707-05XXX	A3422 DFB CWDM Uncooled, Isolated 1551 nm Transmitter 2.0 mW
090707-06XXX	A3422 DFB CWDM Uncooled, Isolated 1571 nm Transmitter 2.0 mW
090707-07XXX	A3422 DFB CWDM Uncooled, Isolated 1591 nm Transmitter 2.0 mW
090707-08XXX	A3422 DFB CWDM Uncooled, Isolated 1611 nm Transmitter 2.0 mW
090714-01XXX	A3422 DFB CWDM Uncooled, Isolated 1471 nm Transmitter 3.0 mW
090714-02XXX	A3422 DFB CWDM Uncooled, Isolated 1491 nm Transmitter 3.0 mW
090714-03XXX	A3422 DFB CWDM Uncooled, Isolated 1511 nm Transmitter 3.0 mW
090714-04XXX	A3422 DFB CWDM Uncooled, Isolated 1531 nm Transmitter 3.0 mW
090714-05XXX	A3422 DFB CWDM Uncooled, Isolated 1551 nm Transmitter 3.0 mW
090714-06XXX	A3422 DFB CWDM Uncooled, Isolated 1571 nm Transmitter 3.0 mW
090714-07XXX	A3422 DFB CWDM Uncooled, Isolated 1591 nm Transmitter 3.0 mW
090714-08XXX	A3422 DFB CWDM Uncooled, Isolated 1611 nm Transmitter 3.0 mW
090788-05XXX	A3422 DFB CWDM Uncooled, Isolated 1551 nm Transmitter 4.0 mW
090788-06XXX	A3422 DFB CWDM Uncooled, Isolated 1571 nm Transmitter 4.0 mW
090788-07XXX	A3422 DFB CWDM Uncooled, Isolated 1591 nm Transmitter 4.0 mW
090788-08XXX	A3422 DFB CWDM Uncooled, Isolated 1611 nm Transmitter 4.0 mW
090793-05XXX	A3422 DFB CWDM Uncooled, Isolated 1551 nm Transmitter 5.0 mW
090793-07XXX	A3422 DFB CWDM Uncooled, Isolated 1591 nm Transmitter 5.0 mW
090793-08XXX	A3422 DFB CWDM Uncooled, Isolated 1611 nm Transmitter 5.0 mW
090792-01XXX	A3422 DFB CWDM Uncooled, Isolated 1471 nm Transmitter 6.0 mW
090792-02XXX	A3422 DFB CWDM Uncooled, Isolated 1491 nm Transmitter 6.0 mW
090792-07XXX	A3422 DFB CWDM Uncooled, Isolated 1591 nm Transmitter 6.0 mW
090792-08XXX	A3422 DFB CWDM Uncooled, Isolated 1611 nm Transmitter 6.0 mW
090807-XXXXX	A3422, DWDM ITU CHXX XXXX.XX nm Transmitter 10.0 mW



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