

## ACION 3422 Optical Node

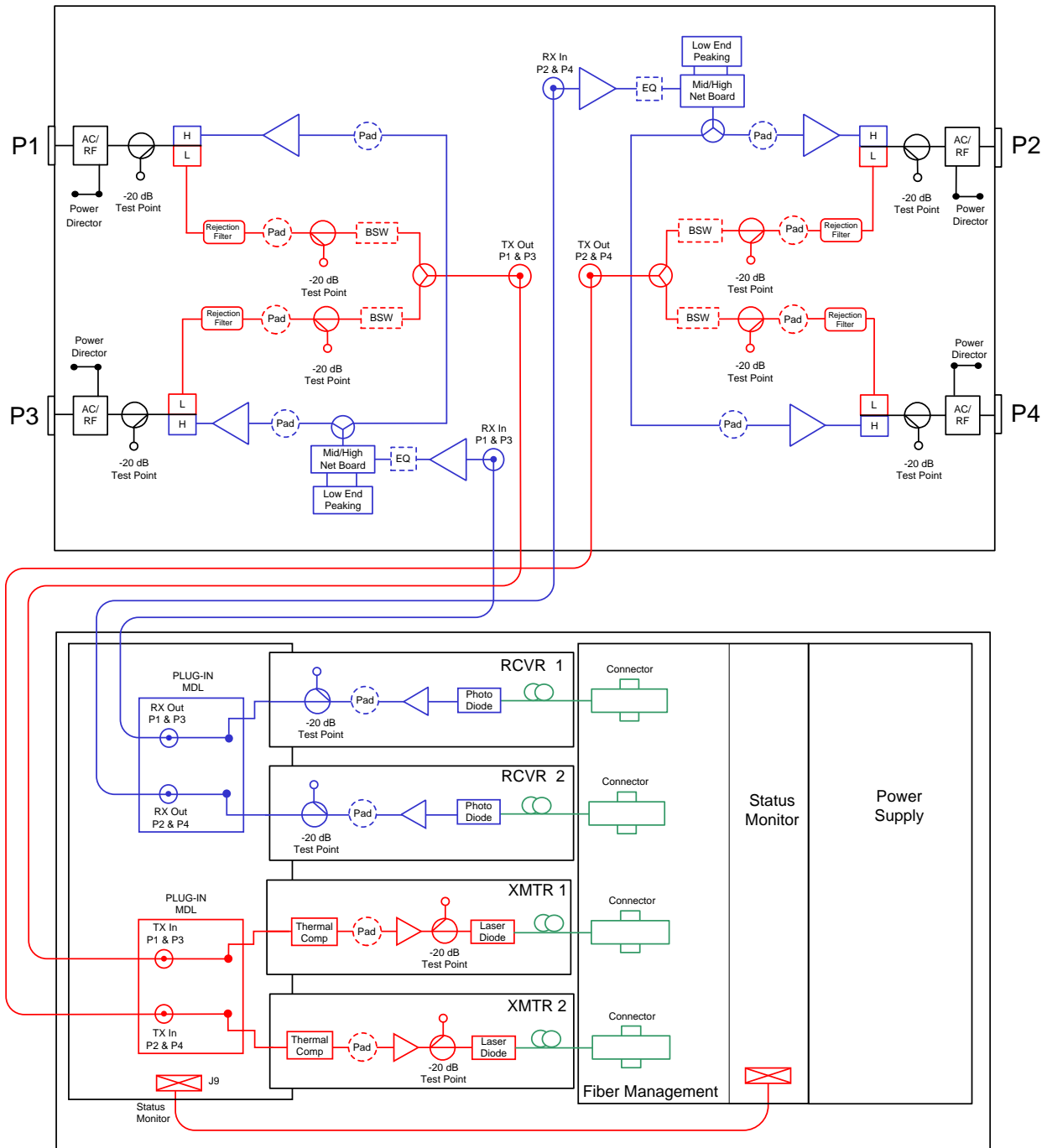
### 2x2 Fully Segmentable

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.

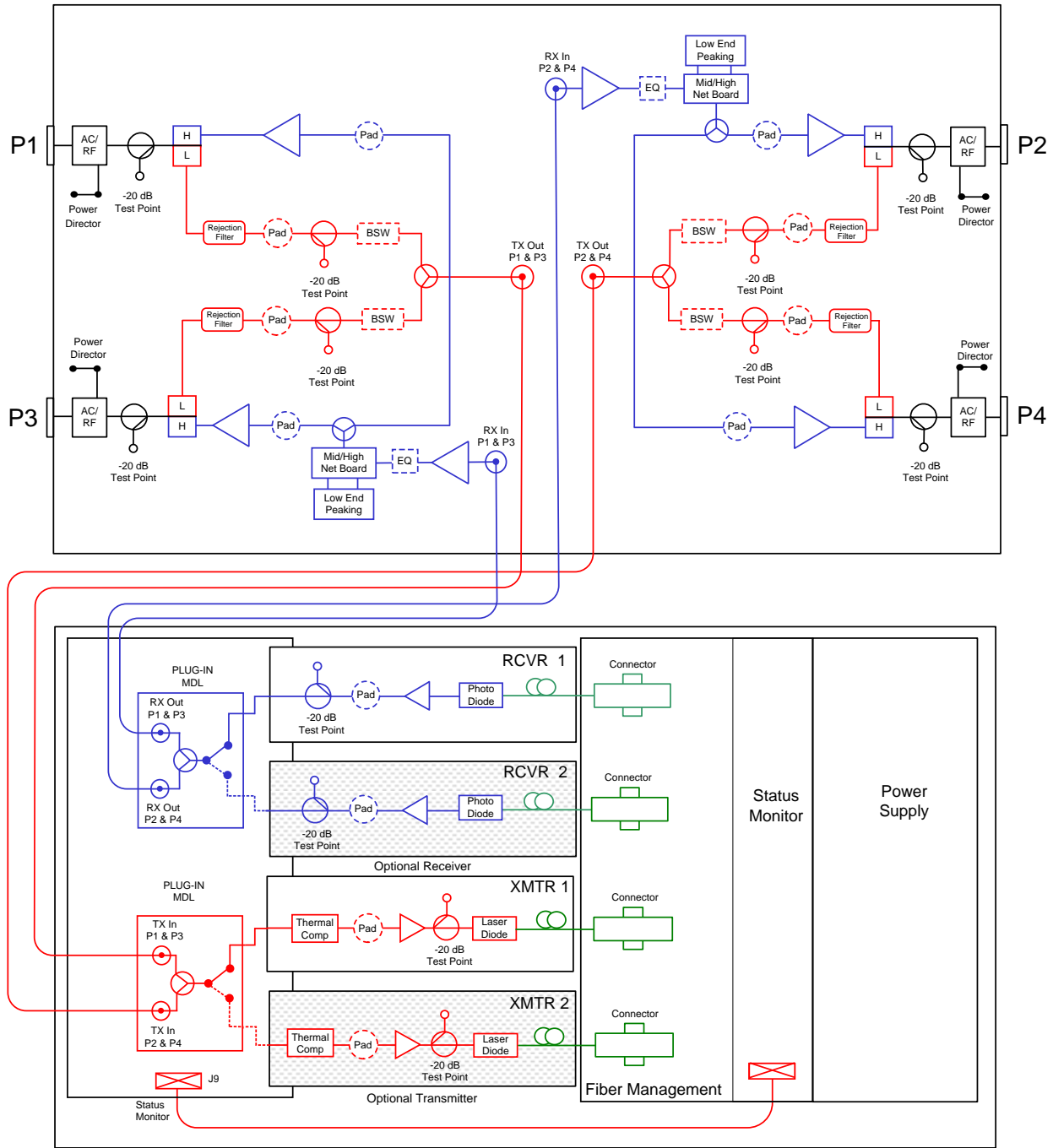
### Features

- ◆ Four driven output ports
- ◆ Compact size for a 2x2 segmentable node
- ◆ -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 & Digital transmitters available
- ◆ Redundant receiver & Transmitter (optional 1:4 only)
- ◆ 85/105 MHz split option
- ◆ 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 3422 4-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			

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ACION 3422 4-Output  
( Forward and Reverse Segmentable Optical Node 1002 MHz)

REVERSE SPECTRUM:					
	CONDITIONS	UNITS	SPECIFICATIONS		NOTES
<b>Reverse - General</b>					
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		
<b>Reverse - Station Gain (RF section only)</b>					
Configuration			4:1	2:1 (X2)	
Gain	Minimum	dB	*10.0	6.0	*for one TX Configuration
Gain control type		N / A	Plug-in pads		
Gain control steps	Pad value steps	dB	0.5		
<b>Reverse - Station Input Levels</b>					
RF station input to node for 40 dBmV @ Laser TP	Minimum	dBmV	17		
<b>Reverse - Noise Figure</b>					
Configuration			4:1	2:1 (X2)	
Station Noise Figure (w/EQ)		dB	16.5	12.0	
<b>Reverse - Station Distortions @ 23 dBmV</b>					
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		
Noise-to-Power Ratio (NPR)	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
<b>Reverse - Station Group Delay</b>					
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		
<b>Power Requirements:</b>					
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	
<b>AC Voltage</b>					
Input ranges		VAC	40 - 90		
<b>Current Draw</b>					
@ 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	
<b>Environmental</b>					
Operating temperature		°F (°C)	-40 to +140 (-40 to +60)		
RF output stability over temperature		±dB	0.5		
<b>Physical</b>					
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)		

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# Ordering Matrix

## ACION 3422 Configuration Sheet

Customer: \_\_\_\_\_

Created By: \_\_\_\_\_ Order Date: \_\_\_\_\_

### ORDERING MATRIX

July 15, 2020

Position	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
<b>PART NUMBER</b>	<b>3</b>	<b>N</b>																

3

#### 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

4

#### DIPLEX FREQUENCY SPLIT

4 = 42/53

5 = 55/70

6 = 65/85

8 = 85/105

5

#### OPTICAL CONNECTOR TYPE

1 = SC/APC (Standard)

2 = SC/UPC

3 = FC/APC

4 = FC/UPC

6

**TRANSMITTER 1 - Primary 4:1 or Ports 1 & 3 for 2:1 (X2)**

7

**TRANSMITTER 2 - Secondary 4:1 or Ports 2 & 4 for 2:1 (X2)**

#### 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

#### 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

#### 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)

#### 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)

#### TYPE DIGITAL RETURN TRANSMITTER MODULE

7 = Enter "7" in position 6 and "0" in position 7

See position #18 on following page for options

#### 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 on following page for wavelength options

8

#### RECEIVER REDUNDANCY (Basic configuration A or B only)

1 Not redundant

2 RX Redundant

9

#### CWDM/DWDM Mux/DeMux or WDM

(For a 1X2 Mux or WDM use positions 9 & 11)

10

CWDM or DWDM DeMux Downstream Wavelength # 1

11

CWDM or DWDM DeMux Downstream Wavelength # 2

12

CWDM Mux Upstream Wavelength #1

CWDM Mux Upstream Wavelength #2

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

#### DWDM O-Band: 1270nm to 1370nm (Downstream Only)

3 = 1290 nm

4 = 1291 nm

5 = 1293 nm

6 = 1295 nm

#### DWDM C-Band: 1531nm to 1570nm (Downstream Only)

1 = Channel 21 - 1560.61 nm

H = 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

13

#### HOUSING TYPE (See Note 1)

P = Powder Coated (Complete Station)

K = Powder Coated (Upgrade kit without housing base)

14

#### STATUS MONITORING

0 = None

M = Status Monitoring upgradeable (With Bridger switching)

D = Docsis HMS Transponder

15

#### 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

# Ordering Matrix (Continued)

16 <input type="checkbox"/> 17 <input type="checkbox"/>	<b>DWDM TRANSMITTER 1 Primary 4:1 or Ports 1 &amp; 3 for 2:1 (X2)</b> <b>DWDM TRANSMITTER 2: Secondary 4:1 or Ports 2 &amp; 4 for 2:1 (X2)</b> <b>DWDM: ITU Grid: C-Band, 100 GHz Spacing</b> Blank = No DWDM or Digital Return Transmitters 0 = For a Digital Return Transmitter use "0" for #16 & #17 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)	18 & 19 <input type="checkbox"/>	<b>DIGITAL RETURN TRANSMITTER MODULE</b> <b>18 &amp; 19 Blank = None</b> <b>Use 18 for Single RF</b> C = 45 MHz, Single RF, Single 1310 nm DFB, 40 km D = 45 MHz, Single RF, Single 1471 nm CWDM, 80 km E = 45 MHz, Single RF, Single 1491 nm CWDM, 80 km F = 45 MHz, Single RF, Single 1511 nm CWDM, 80 km G = 45 MHz, Single RF, Single 1531 nm CWDM, 80 km H = 45 MHz, Single RF, Single 1551 nm CWDM, 80 km J = 45 MHz, Single RF, Single 1571 nm CWDM, 80 km K = 45 MHz, Single RF, Single 1591 nm CWDM, 80 km L = 45 MHz, Single RF, Single 1611 nm CWDM, 80 km B = 45 MHz, Dual RF, Single 1310 nm DFB, 40 km M = 45 MHz, Dual RF, Single 1591 nm CWDM, 80 km  1 = 85 MHz, Single RF, Single 1310 nm DFB, 40 km 2 = 85 MHz, Single RF, Single 1471 nm CWDM, 80 km 3 = 85 MHz, Single RF, Single 1491 nm CWDM, 80 km 4 = 85 MHz, Single RF, Single 1511 nm CWDM, 80 km 5 = 85 MHz, Single RF, Single 1531 nm CWDM, 80 km 6 = 85 MHz, Single RF, Single 1551 nm CWDM, 80 km 7 = 85 MHz, Single RF, Single 1571 nm CWDM, 80 km 8 = 85 MHz, Single RF, Single 1591 nm CWDM, 80 km 9 = 85 MHz, Single RF, Single 1611 nm CWDM, 80 km  <b>Use 18 &amp; 19 for Dual RF</b> 1D = 85 MHz, Dual RF, Single 1310 nm DFB, 40 km 2D = 85 MHz, Dual RF, Single 1471 nm CWDM, 80 km 3D = 85 MHz, Dual RF, Single 1491 nm CWDM, 80 km 4D = 85 MHz, Dual RF, Single 1511 nm CWDM, 80 km 5D = 85 MHz, Dual RF, Single 1531 nm CWDM, 80 km 6D = 85 MHz, Dual RF, Single 1551 nm CWDM, 80 km 7D = 85 MHz, Dual RF, Single 1571 nm CWDM, 80 km 8D = 85 MHz, Dual RF, Single 1591 nm CWDM, 80 km 9D = 85 MHz, Dual RF, Single 1611 nm CWDM, 80 km
<b>NOTES:</b>			
1 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.			



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