



## ACION 1042 Optical Node

### 4 Output Optical Node 1002 MHz

The ACION 1042 is a compact economically priced 4 outputs node that is ideal for use in HFC, fiber deep, MDU or commercial class services architectures. The node can be configured with either a FP, DFB or CWDM DFB reverse path transmitter.

#### Features

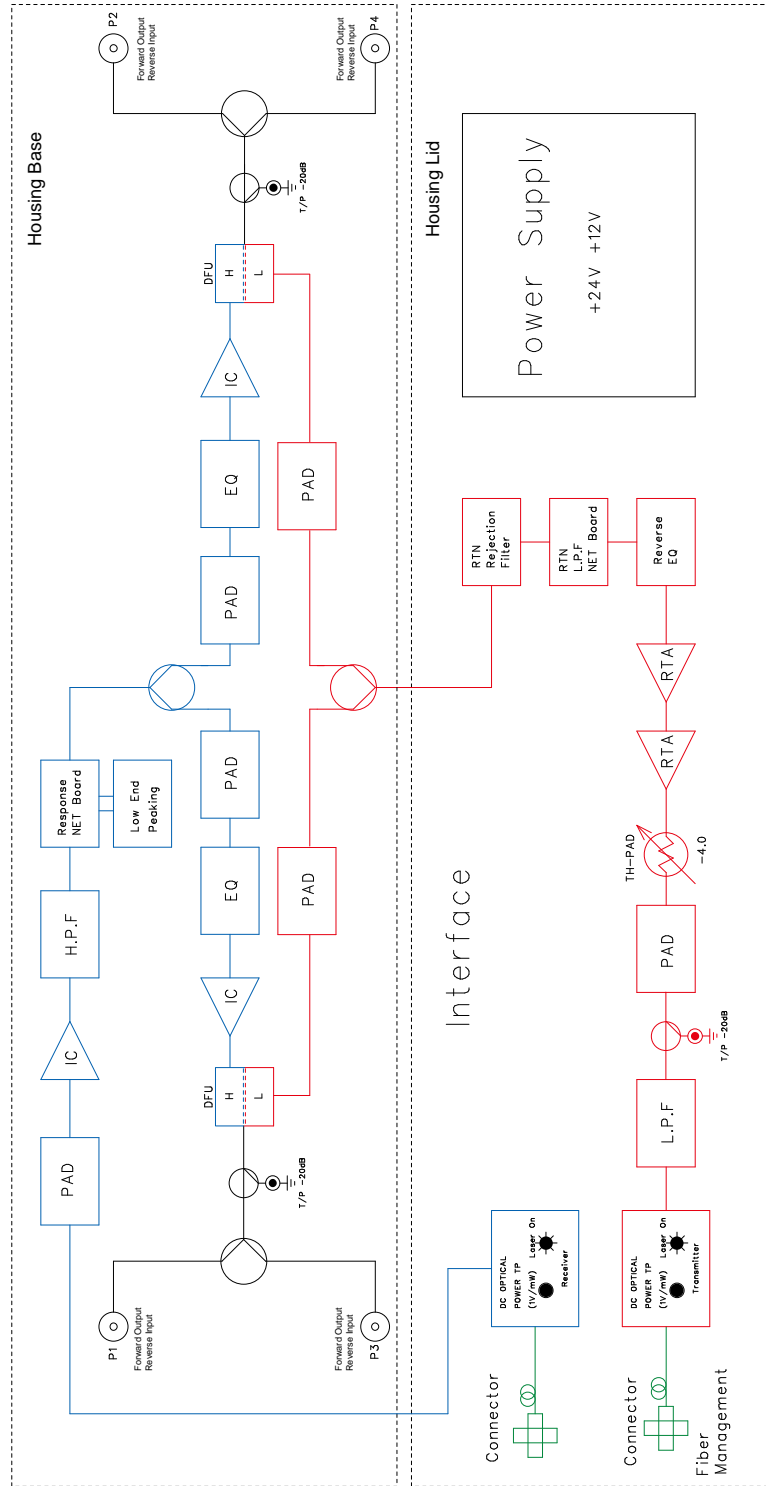
- ◆ 4 outputs
- ◆ Modular RF / optics section
- ◆ Plug-in pads and equalizers
- ◆ -20 dB directional coupler test points
- ◆ FP, DFB and CWDM transmitters available
- ◆ 40 to 90 VAC (cable)
- ◆ 90 to 240 VAC (mains)
- ◆ 15 Amp power passing capacity (40 to 90 VAC only)

#### Benefits

- ◆ Compact size
- ◆ Up to 46.0 dBmV out at 1002 MHz on each output port
- ◆ Ideal for HFC and passive architectures, or MDU and commercial class applications
- ◆ 85/105 MHz frequency option that doubles the reverse bandwidth
- ◆ Pad adjustable linear equalizers standard

# Block Diagram

## ACION 1042 1002 MHz Four Outputs Optical Nodes Block Diagram



# Station Parameters

ACI		ACION 1042 Optical Node 1002 MHz Four Outputs			
STATION PARAMETERS:					
	CONDITIONS	UNITS	SPECIFICATION	NOTES	
Housing passband		MHz	5 to 1002		
Input current capacity	Any port, worst case	Amperes	10	Cable power only (40-90 VAC)	
Frequency range		MHz	50 - 1002		
Hum modulation	Time domain @ 0 AMPS	dBc	- 70	Cable power only (40-90 VAC)	
Hum modulation	Time domain @ 12 AMPS	dBc	- 70	Cable power only (40-90 VAC)	
Hum modulation	Time domain @ 15 AMPS	dBc	- 65	Cable power only (40-90 VAC)	
Test Points					
Test point type	Directional coupler	N/A	DC		
Test point level(s)		dB	- 20		
Test point accuracy	Forward TP	dB	± 0.75		
Test point accuracy	Reverse TP	dB	± 0.75		
RF Station					
Station passband		MHz	54 to 1002		
Return loss	Worst case	dB	- 16		
Station flatness - feeder out		dB	± 1.0		
Gain: 4 outputs	@ 1002 MHz Minimum	dB	40.0		
Output stability		dB	1.5		
Gain control type			Plug-in pads		
Gain control range		dB	15		
Gain control steps	Pad value steps	dB	0.5		
Slope control type	Linear equalizers	dB	Plug-in EQ's		
Slope control range		dB	- 9.0 to + 18.0		
Slope control steps	Equalizer value steps	dB	1.0		
Operational Specifications with a 0 dBm optical input for 4 port					
Operational level	@ 1002 MHz	dBmV	46.0		
Operational slope	@ 54 / 550 / 750 / 870 / 1002 MHz	dB	28.8 / 37.8 / 41.4 / 43.6 / 46.0		
Optical input range	Typical	dBmV	- 3 to + 2		
Station Output Levels					
Distribution out	@ 54 / 550 / 750 / 870 / 1002 MHz	dBmV	28.8 / 37.8 / 41.4 / 43.6 / 46.0		
Station Noise Figure - values for RF portion of node only. Complete values dependent upon link.					
Noise figure (NF)	@ 54 MHz	dB	4.1		
Noise figure (NF)	@ 550 MHz	dB	5.1		
Noise figure (NF)	@ 1002 MHz	dB	6.2		
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					
			Worst Case	Typical	
Composite Triple Beat (CTB)		-dBc	65	67	
Composite Second Order (CSO -)	(Vc +0.75 & -1.25 MHz)	-dBc	60	62	
Composite Second Order (CSO +)	(Vc +1.25 MHz only)	-dBc	60	62	
Station Group Delay					
Group delay	Channel 2 (Std)	nSec / 3.58 MHz	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		

# Reverse Spectrum

ACI		ACION 1042 Optical Node 1002 MHz Four Outputs			
REVERSE SPECTRUM:					
Reverse - General		CONDITIONS	UNITS	SPECIFICATION	NOTES
Station passband			MHz	5 to 42	
Output stability			dB	1.0	
Station flatness	Peak-to-valley		dB	± 0.75	
Return loss	Worst case		dB	- 16	
Reverse - Station Gain					
Gain			dB	18 +1 / -0	
Gain control type			N / A	Plug-in pads	
Gain control range			dB	12	
Gain control steps	Pad value steps		dB	0.5	
Reverse - Station Output Levels					
@ Input to transmitter	Typical		dBmV	35	With 17 dBmV at housing port
Reverse - Noise Figure					
Station noise figure			dB	10.5	
Reverse - Bit Error Rate					
Bit error rate	QPSK (1.5 Mbps)		BER	≤ 10 <sup>-6</sup>	
Reverse - NPR					
Noise-to-Power Ratio (NPR)	Noise loading		dB	Typical >35 / 18	@ 10.0 dB optical loss (6.0 dB fiber +4.0 dB flat loss) @ -46.0 dBmV/Hz
Reverse - Station Group Delay					
Group delay	5.5 MHz	nSec / 1.5 MHz		36	
Group delay	10.0 MHz	nSec / 1.5 MHz		16	
Group delay	33.5 MHz	nSec / 1.5 MHz		7	
Group delay	38.5 MHz	nSec / 1.5 MHz		10	
Power Requirements: For cable powered 40-90 VAC					
Station configuration	1RX + 1TX over temperature range of -40 to +140 °F (-40 to +60 °C)				
Power requirements	Worst case		W	38.9	
AC Voltage					
Input ranges			VAC	40 - 90	
Current Draw (Cable powered 40-90 VAC)					
@ 40 VAC	Maximum		A	1.09	
@ 50 VAC	Maximum		A	0.92	
@ 60 VAC	Maximum		A	0.81	
@ 70 VAC	Maximum		A	0.74	
@ 80 VAC	Maximum		A	0.68	
@ 90 VAC	Maximum		A	0.62	
Environmental					
Operating temperature			°F (°C)	- 40 to + 140 (- 40 to + 60)	
Physical					
Dimensions (H X W X D)			in. (cm)	5.8 X 9.25 X 5.94 (14.73 X 23.50 X 15.10)	
Weight			lbs (kg)	8.7 (3.95)	

# Transmitter Specifications

ACI Communications, Inc.			ACION 1002 Optical Node 1002 MHz DFB CWDM Transmitter Specifications									
GENERAL	CONDITIONS	UNITS	TRANSMITTER SPECIFICATIONS									NOTES
TRANSMITTER MODEL NUMBER			090646-01XXX	090646-02XXX	090646-03XXX	090646-04XXX	090646-05XXX	090646-06XXX	090646-07XXX	090646-08XXX	WHERE XXX= CONNECTOR TYPE	
Optical wave length		nm	1471	1491	1511	1531	1551	1571	1591	1611	±1.5 nm @ 25° C	
Optical power range	Minimum	mW	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		
Laser type		N/A	Uncooled DFB (CWDM)									
Optical connector		N/A	SC/APC, SC/UPC, FC/APC, FC/UPC									
Operating bandwidth		MHz	5-200									
Optical power test point		V/mW	1.0 / 1.0									
Laser ON/OFF status indicator		-dBmV	3									Relative to initial optical power at 25° C
RF impedance		Ohms	75									
Peak-to-valley frequency response		dB	1.0									Over operating bandwidth
Operational temperature range		°F (°C)	-40 to +140 (-40 to +60)									
<b>DISTORTIONS</b>												
Input level		dBmV	40.0									
Level repeatability		±dB	1.0									Maximum receiver RF level variation between transmitters
Return loss	Worst Case	-dB	10.0									
Single tone CNR		dB	50.0									CNR in 4 MHz bandwidth 9 dBmV @ input to station, using A8KQRR receiver
CTB	Worst Case	-dBc	64.0									Test uses 4T channels (T9-T13), using A8KQRR receiver
CSO	Worst Case	-dBc	62.0									Test uses 4T channels (T9-T13), using A8KQRR receiver

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 Revision Date: 11/24/14

# Part Number Matrix

## ACION 1042 Configuration Sheet

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

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

### ORDERING MATRIX

June 8, 2018

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

- |   |  |
|---|--|
| <p>3 <input checked="" type="checkbox"/> <b>BASIC CONFIGURATION</b><br/>Q = 4 RF Output Ports</p> <p>4 <input type="checkbox"/> <b>RECEIVERS</b><br/>0 = No Receiver<br/>1 = Single Receiver</p> <p>5 <input type="checkbox"/> <b>TRANSMITTERS</b><br/>0 = No Transmitters<br/>1 = Single Transmitter</p> <p>6 <input type="checkbox"/> <b>DIPLEX FREQUENCY SPLIT</b><br/>4 = 42/53<br/>5 = 55/70<br/>6 = 65/85<br/>7 = 40/50<br/>8 = 85/105</p> <p>7 <input type="checkbox"/> <b>OPTICAL CONNECTOR TYPE</b><br/>1 = SC/APC (Standard)<br/>2 = SC/UPC<br/>3 = FC/APC<br/>4 = FC/UPC</p> <p>8 <input type="checkbox"/> <b>TRANSMITTER TYPE FP &amp; DFB</b><br/>0 = None<br/>D = Uncooled 1310 nm 1.0 mW FP<br/>Y= Uncooled 1310 nm 1.0 mW FP W/ISOLATOR<br/>H = Uncooled 1310 nm 2.0 mW FP W/ISOLATOR<br/>B = Uncooled 1310 nm 3.0 mW DFB<br/>R = Uncooled 1310 nm 2.0 mW DFB<br/>J = Uncooled 1310 nm 1.0 mW DFB<br/>C = Uncooled 1550 nm 2.0 mW DFB<br/>E = Uncooled 1550 nm 2.0 mW DFB with WDM<br/>F = Uncooled 1550 nm 3.0 mW DFB with WDM</p> <p><b>TRANSMITTER TYPE CWDM</b><br/>A = Uncooled 1471 nm DFB CWDM (2.0 mW)<br/>G = Uncooled 1491 nm DFB CWDM (2.0 mW)<br/>V = Uncooled 1511 nm DFB CWDM (2.0 mW)<br/>L = Uncooled 1531 nm DFB CWDM (2.0 mW)<br/>W = Uncooled 1551 nm DFB CWDM (2.0 mW)<br/>M = Uncooled 1571 nm DFB CWDM (2.0 mW)<br/>N= Uncooled 1591 nm DFB CWDM (2.0 mW)<br/>T = Uncooled 1611 nm DFB CWDM (2.0 mW)<br/>U = Uncooled 1551 nm DFB CWDM (2.0 mW) with WDM 1310/1550 nm</p> | <p>9 <input type="checkbox"/> <b>STATION SLOPE</b><br/>0 = 0 dB @ 1002 MHz<br/>1 = 17.2 dB @ 1002 MHz<br/>2 = 15.0 dB @ 1002 MHz</p> <p>10 <input type="checkbox"/> <b>POWER SUPPLY INPUT TYPE (See Note 1)</b><br/>C = 40 to 90 VAC (Cable powering)<br/>M = 90 to 240 VAC (Mains Power UL)</p> <p>11 <input type="checkbox"/> <b>POWER SUPPLY MAINS</b><br/>0 = None<br/>1 = North America<br/>2 = International/Europe<br/>3 = Japan<br/>4 = Australia<br/>5 = Argentina<br/>X = Custom (Contact Product Management)</p> <p>12 <input type="checkbox"/> <b>STATUS MONITORING</b><br/>N = None (Standard)</p> <p>13 <input type="checkbox"/> <b>HOUSING TYPE</b><br/>0 = No Housing or Power supply<br/>N = Normal (Standard)<br/>C = Chromate Finish</p> <p>14 <input type="checkbox"/> <b>SURGE PROTECTION (See Note 2)</b><br/>A = Built-in Sidactor<br/>N = None</p> <p>15 <input type="checkbox"/> <b>Output Level</b><br/>H = 46.0 dBmV Output Level / 4 Output Ports</p> <p>16 <input type="checkbox"/> <b>CUSTOM</b><br/>Blank = Not custom<br/>X = Determined by Product Management</p> |
|---|--|

### NOTES:

- The "M" version of the AC powered unit has an external UL listed 90-240 VAC to 24 VDC external transformer.
- The optional surge protecting Sidactor or gas tube is only offered on the 40-90 VAC cable powered node.



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