



## 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

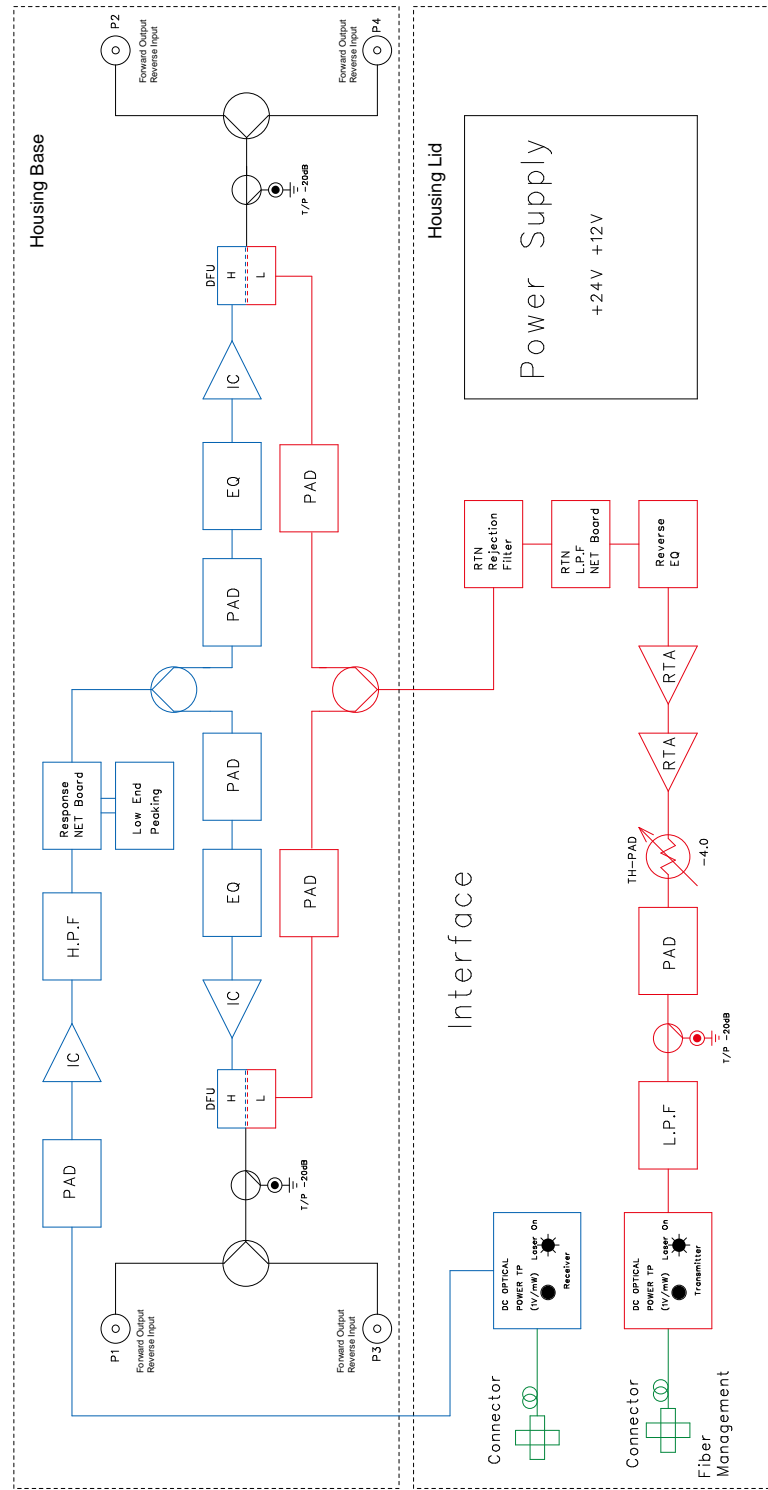
- ◆ 4 outputs
- ◆ Modular RF / optics section
- ◆ Plug-in pads and equalizers
- ◆ -20 dB directional coupler test points
- ◆ FP, DFB and CWDM transmitters available
- ◆ 40 to 90 VAC (cable)
- ◆ 90 to 240 VAC (mains)
- ◆ 15 Amp power passing capacity (40 to 90 VAC only)

#### 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			ACION 1042 Optical Node 1002 MHz DFB & FP Transmitter Specifications						NOTES
GENERAL	CONDITIONS	UNITS	TRANSMITTER SPECIFICATIONS						NOTES
TRANSMITTER MODEL NUMBER			090607-01XXX 3.0 mW	090607-02XXX 2.0 mW	090607-03XXX 1.0 mW	090606-02XXX 2.0 mW W/Isolator	090606-04XXX 1.0 mW	090606-05XXX 1.0 mW W/Isolator	WHERE XXX= CONNECTOR TYPE
Laser type		N/A	Uncooled DFB	Uncooled DFB	Uncooled DFB	Fabry-Perot FP	Fabry-Perot FP	Fabry-Perot FP	
Optical connector		N/A	SC/APC, SC/UPC, FC/APC, FC/UPC						
Operating bandwidth		MHz	5-200						
Optical wave length		nm	1310 ±20	1550 ±20	1310 ±20	1310 ±20	1310 ±20	1310 ±20	
Optical power test point		V/mW	1.0 / 1.0						
Optical power range		mW	2.8-3.2	2.0 min	1.0 Min	2.0 min	1.0 Min	1.0 Min	At 25 °C
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		°F (°C)	-40 to +140 (-40 to +60)						
<b>DISTORTIONS</b>									
Input level		dBmV	40						
Level repeatability		±dB	1.0						Maximum receiver RF level variation between transmitters
Return loss	Worst Case	-dB	10.0	10.0	10.0	9.0	9.0	9.0	
Single tone CNR		dB	60	55	55	50	45	45	CNR in 4 MHz bandwidth 19 dBmV @ input to station, using A8KQRR receiver
DTO (FP) CTB (DFB)	Worst Case	-dBc	53	55	55	51	65	65	Test uses 2T channels T12-T13 (FP) or 4T channels T9-T13 (DFB), using A8KQRR receiver
DSO (FP) CSO (DFB)	Worst Case	-dBc	54	51	51	53	65	65	Test uses 2T channels T12-T13 (FP) or 4T channels T9-T13 (DFB), using A8KQRR receiver

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

# Part Number Matrix

## ACION 1042 Configuration Sheet

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

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

### ORDERING MATRIX

November 28, 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</b><br/>C = 40 to 90 VAC (Cable powering)<br/>M = 90 to 240 VAC (Mains Power)</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</p> <p>13 <input type="checkbox"/> <b>HOUSING TYPE</b><br/>0 = No Housing or Power supply<br/>N = Normal</p> <p>14 <input type="checkbox"/> <b>SURGE PROTECTION (See Note 1)</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 optional surge protecting Sidactor is only offered on the 40-90 VAC cable powered node.

## Accessory & Spare Part Ordering Information:

The ACION 1042 ordering matrix provides the part number information to order the configured stations. This page contains the ordering information for the optional accessories and replacement or spare parts that can be ordered separately.

Part Number	Description
<b>ACION 1042 Transmitters &amp; Receivers (one Rx included with unit)</b>	
XXX = Optical Connector Type (FC/UPC, SC/APC & SC/UPC)	
090667-01XXX	ACION 1002/1042 Receiver 1002 MHz (One included with base unit)
090606-06XXX	ACION 1002/1042 FP Transmitter 0.5 mW
090606-02XXX	ACION 1002/1042 FP Transmitter 2.0 mW with Isolator
090607-03XXX	ACION 1002/1042 DFB Uncooled, Isolated 1310 nm Transmitter 1.0 mW
090607-05XXX	ACION 1002/1042 DFB Uncooled, Isolated 1310 nm Transmitter 2.0 mW
090607-01XXX	ACION 1002/1042 DFB Uncooled, Isolated 1310 nm Transmitter 3.0 mW
090607-02XXX	ACION 1002/1042 DFB Uncooled, Isolated 1550 nm Transmitter 2.0 mW
090646-01XXX	ACION 1002/1042 DFB CWDM Uncooled, Isolated 1471 nm Transmitter 2.0 mW
090646-02XXX	ACION 1002/1042 DFB CWDM Uncooled, Isolated 1491 nm Transmitter 2.0 mW
090646-03XXX	ACION 1002/1042 DFB CWDM Uncooled, Isolated 1511 nm Transmitter 2.0 mW
090646-04XXX	ACION 1002/1042 DFB CWDM Uncooled, Isolated 1531 nm Transmitter 2.0 mW
090646-05XXX	ACION 1002/1042 DFB CWDM Uncooled, Isolated 1551 nm Transmitter 2.0 mW
090646-06XXX	ACION 1002/1042 DFB CWDM Uncooled, Isolated 1571 nm Transmitter 2.0 mW
090646-07XXX	ACION 1002/1042 DFB CWDM Uncooled, Isolated 1591 nm Transmitter 2.0 mW
090646-08XXX	ACION 1002/1042 DFB CWDM Uncooled, Isolated 1611 nm Transmitter 2.0 mW
WDM-01XXX	ACION 1002/1042 WDM option
<b>Attenuators/Pads * = dB values</b>	
JXP100-*	JXP Style Attenuators/Pads 1.0" long 0 to 20 in 0.5 dB steps
<b>Plug-in Jumper, Splitter &amp; Directional Couplers</b>	
100355-01	Jumper (for single output port)
SDASPLTR3.5	Splitter, 3.5 dB, 1 GHz
SDADC7	Directional Coupler, 7 dB, 1 GHz
SDADC12	Directional Coupler, 12 dB, 1 GHz
<b>AC Power Directors (For Cable 40-90 VAC version only)</b>	
100818-01	AC Power Director
<b>Reverse Path Rejection Filter</b>	
RPRFLTR-8	Filter Reverse Rejection 8 MHz
RPRFLTR-14	Filter Reverse Rejection 14 MHz
<b>Seizure Screw / RF Connector</b>	
100633-01	Seizure Screw / RF Connector 15A
<b>Power Supplies</b>	
A1K-40-90PS-2	ACION 1K 40-90 VAC power supply (Version 2)
A1-90-240PSV2-1	ACION 1K 90-240 VAC external power supply (Version 2) North American Plug
<b>RF Test Probes</b>	
100685-01	RF Test Probe 5.5"
TP-7504	RF Test Probe 1.57" (4 cm) Long
<b>RF Test Adapter</b>	
100677	Test Adapter for Test Probe to Seizure Screw (RF Connector)



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