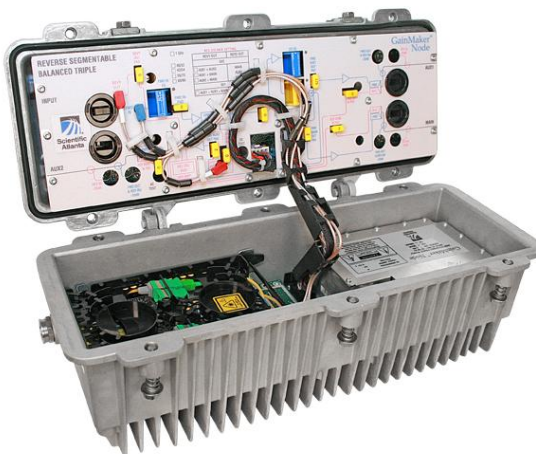


## GainMaker 1 GHz Reverse Segmentable Node with 42/54 MHz Split

The GainMaker® Reverse Segmentable (RS) Node is designed to serve as an integral part of today's network architectures. The GainMaker RS Node combines the proven technologies of both the GainMaker RF Amplifier and Prisma® Optical components. Featuring four high level RF output ports and a segmentable reverse path, it is an ideal platform for delivering video (digital and analog) as well as high-speed data services over advanced hybrid fiber/coax (HFC) networks. With its modular design of fiber receiver, reverse transmitters, and RF amplifier electronics, the GainMaker RS Node station can provide a variety of functions required by advanced networks.

Reverse traffic can be segmented and routed to analog FP, DFB, or CWDM, DWDM, or 2:1 bdr-I reverse transmitters. The GainMaker RS Node is available with an optional custom status monitoring HMS transponder for use with all HMS compliant monitoring and control element management systems. On-board temperature, RF switch position (wink switch), power supply condition, as well as other features and parameters can be monitored through this module.

**Figure 1.** GainMaker Reverse Segmentable Node



## Features

- GainMaker RS Node uses plug-in accessories common to all GainMaker products
- Cable to Linear EQ in amplifiers
- Interstage Equalizer (ISEQ) provides 14.5 dB of Linear tilt
- RF interface board in the main input port diplex filter location provides access to forward and reverse paths in order to route the RF signals to the lid
- Amplifier cover provides access to RF interface board RF ports
- Two optical transmitter positions in the lid
- One optical receiver position in the lid
- Optional plug-in Status Monitoring
- Optional redundancy transmitters (with non-segmented option)
- Fiber entry ports on one end of the lid
- Fiber management tray provides easy access to fiber connections and folds back to provide access to optical transmitter and receivers
- Power supply mounted in housing lid for efficient thermal dissipation
- Reverse input pad and RF test point for each reverse input port on GainMaker launch amplifier allow optimum reverse path design and alignment
- Optional Dual Redundant Receiver provides ability to switch to redundant optical power in case of fiber cut

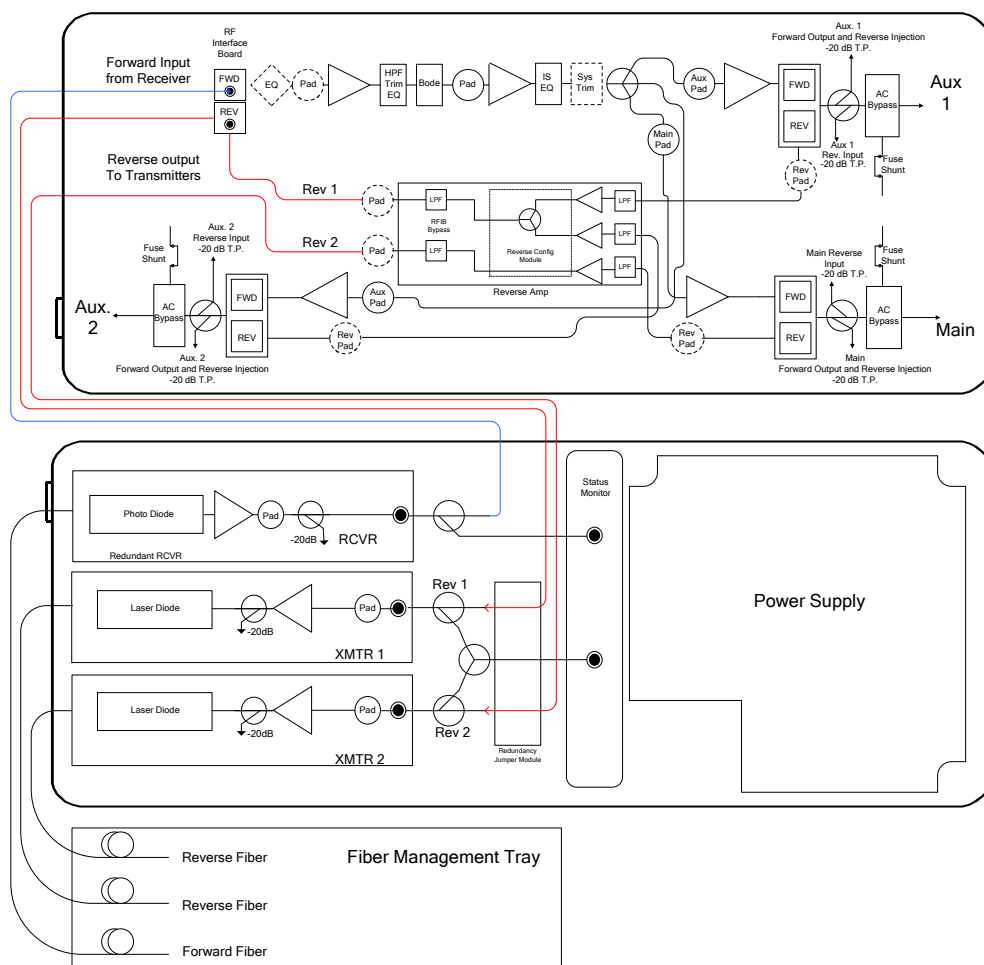
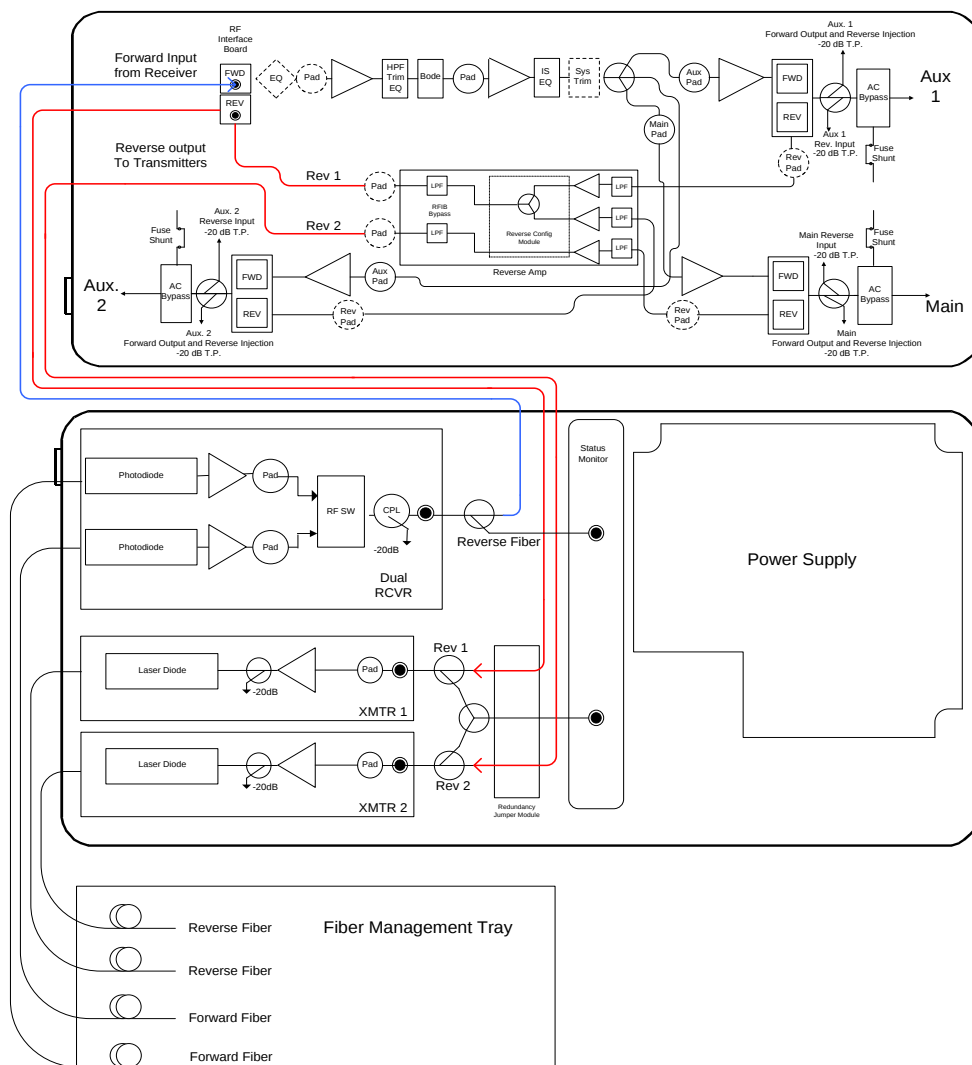
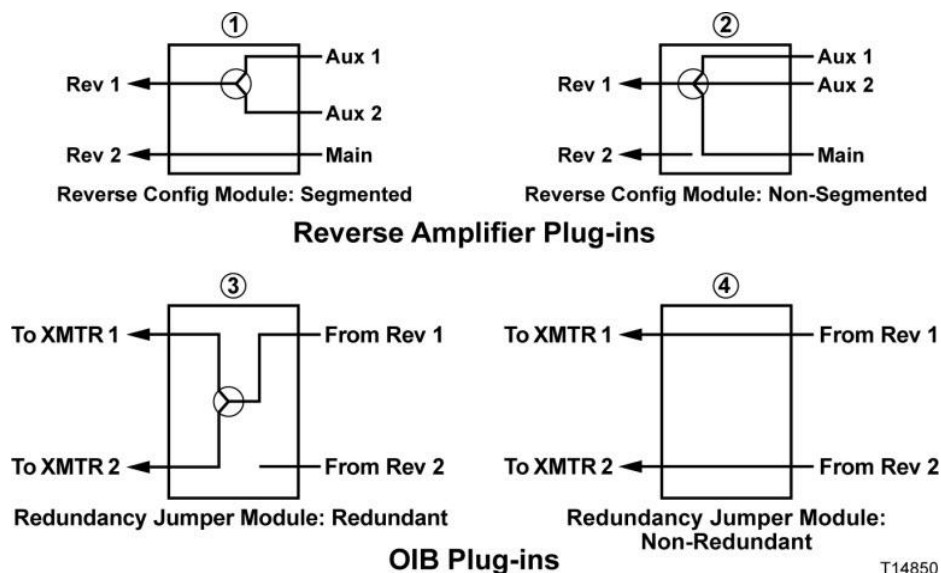
**Figure 2.** Single Receiver Block Diagram

Figure 3. Dual Redundant Receiver Block Diagram



**Figure 4.** Reverse Configuration Module Block Diagram**Reverse Amplifier/OIB Plug-in Combinations**

See the table below for all possible reverse amplifier plug-in and OIB plug-in combinations. Each number callout references the plug-ins shown in Figure 4.

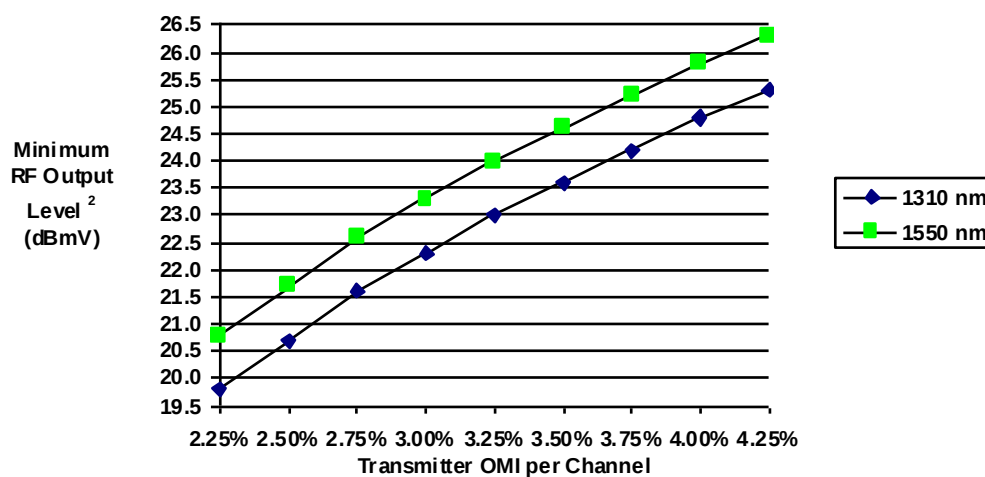
| Transmitters                       | Reverse Amplifier Plug-in | OIB Plug-in |
|------------------------------------|---------------------------|-------------|
| Segmented XMTRS<br>(Non-Redundant) | ①                         | ④           |
| Redundant XMTR (Non-Segmented)     | ②                         | ③           |
| Non-Segmented/Non-Redundant        | ②                         | ④           |

## Product Specifications

**Table 1.** Optical Section

| Optical Section - Forward Receiver Module | Units     | GainMaker Standard RX | Notes |
|-------------------------------------------|-----------|-----------------------|-------|
| Wavelength                                | nm        | 1310 and 1550         |       |
| Optical Input Range                       | mW<br>dBm | 0.5 -1.6<br>-3 -+2    |       |
| Pass Band                                 | MHz       | 52-1002               |       |
| Frequency Response                        | dB        | $\pm 0.75$            | 1     |
| Tilt ( $\pm 1.0$ dB)                      | dB        | 0                     |       |
| Optical Input Test Point ( $\pm 10\%$ )   | VDC       | 1V/mW                 |       |
| RF Output Level @ 0 dBm Optical Input     | dBmV      | Refer to Figure 5     | 2     |
| RF Output Test Point ( $\pm 1.0$ dB)      | dB        | -20                   |       |

**Figure 5.** Receiver RF Output Level Vs Transmitter OMI



**Notes:**

1. For forward receiver module only. Does not include frequency response contributions from forward optical transmitter.
2. Minimum receiver RF output level for the stated transmitter percent OMI/ch. (Optical Modulation Index per channel), with receiver optical input power of 0 dBm. To determine RF output levels at other optical input power, add (or subtract) 2 dB in RF level for each 1 dB increase (or decrease) in receiver optical input power.

*For reverse optical transmitter and link performance, see the "Analog Reverse Optical Transmitters for Model 6940/6944 and GainMaker Optoelectronic Stations" data sheet, part number 750874.*

Unless otherwise noted all specifications reflect typical performance and are referenced to 68°F (20°C). Specifications are based upon measurements made in accordance with SCTE/ANSI standards (where applicable), using standard frequency assignments.

## Product Specifications

**Table 2.** RF Section Specifications

| General Station Performance | Units | Forward                              | Reverse                         | Notes |
|-----------------------------|-------|--------------------------------------|---------------------------------|-------|
| Pass Band                   | MHz   | 54-1002                              | 5-42                            |       |
| Return Loss                 | dB    | 16                                   | 16                              | 6     |
| Hum Modulation @ 12 A       | dB    | 70 (54-870 MHz)<br>60 (870-1002 MHz) | 60 (5-10 MHz)<br>70 (11-42 MHz) |       |
| Hum Modulation @ 15 A       | dB    | 65 (54-870 MHz)<br>60 (870-1002 MHz) | 60 (5-10 MHz)<br>65 (11-42 MHz) |       |
| Test Points ( $\pm 0.5$ dB) | dB    | -20                                  | -20                             |       |

**Table 3.** Launch Amplifier Performance - Forward

| Launch Amplifier Performance - Forward                                                   | Units | HGBT                                         | Notes    |
|------------------------------------------------------------------------------------------|-------|----------------------------------------------|----------|
| Operational Gain (minimum)                                                               | dB    | 41                                           | 2        |
| Frequency Response                                                                       | dB    | $\pm 0.5$                                    |          |
| Internal Tilt ( $\pm 1$ dB)                                                              | dB    | 14.5                                         | 1,3      |
| Noise Figure @ 54 MHz<br>1002 MHz                                                        | dB    | 8.5<br>8.0                                   | 2        |
| Reference Output Levels @ 1002 MHz<br>870 MHz<br>750 MHz<br>650 MHz<br>550 MHz<br>55 MHz | dBmV  | 49.5<br>47.5<br>45.7<br>44.0<br>42.5<br>35.0 |          |
| Reference Output Tilt (55-1002 MHz)                                                      | dB    | 14.5                                         | 1,4      |
| <b>78 NTSC Channels (CW) with Digital</b>                                                |       |                                              | <b>7</b> |
| Composite Triple Beat                                                                    | dB    | 78                                           | 5        |
| Cross Modulation                                                                         | dB    | 69                                           | 5,10     |
| Composite Second Order (high side)                                                       | dB    | 70                                           | 5        |
| <b>94 NTSC Channels (CW) with Digital</b>                                                |       |                                              | <b>8</b> |
| Composite Triple Beat                                                                    | dB    | 73                                           | 5        |
| Cross Modulation                                                                         | dB    | 65                                           | 5,10     |
| Composite Second Order (high side)                                                       | dB    | 67                                           | 5        |

**Table 4.** Launch Amplifier Performance - Reverse

| Reverse Station Performance | Units | Reverse   | Notes |
|-----------------------------|-------|-----------|-------|
| Amplifier Type              | -     | GaAs FET  |       |
| Operational Gain (minimum)  | dB    | -2        | 6,9   |
| Frequency Response          | dB    | $\pm 0.5$ |       |
| Internal Tilt ( $\pm 1$ dB) | dB    | 0         |       |
| Path to Path Isolation      | dB    | 50        |       |
| Noise Figure                | dB    | 13.5      | 6,9   |

## Product Specifications

**Table 5.** RF Delay Specifications

| Station Delay Characteristics 42/54 Split |            |                                     |            |
|-------------------------------------------|------------|-------------------------------------|------------|
| Forward (Chrominance to Luminance Delay)  |            | Reverse (Group Delay in 1.5 MHz BW) |            |
| Frequency (MHz)                           | Delay (nS) | Frequency (MHz)                     | Delay (nS) |
| 55.25 - 58.83                             | 22         | 5.0 - 6.5                           | 33         |
| 61.25 - 64.83                             | 9          | 6.5 - 8.0                           | 15         |
| 67.25 - 70.83                             | 6          | 8.0 - 9.5                           | 8          |
|                                           |            | 37.5 - 39.0                         | 8          |
|                                           |            | 39.0 - 40.5                         | 14         |
|                                           |            | 40.5 - 42.0                         | 21         |

**Notes:**

1. Reference output tilt and internal tilt are both "Linear" tilt.
2. Forward Gain and Noise Figure measured with 0 dB input EQ and 1 dB input pad.
3. Forward internal tilt specified is primarily due to an on-board equalizer and a factory configured linear ISEQ.
4. The forward reference output tilt specified is achieved via field installation of appropriate input EQ, in conjunction with the internal tilt of the launch amplifier and the tilt associated with the optical link (transmitter/receiver combination).
5. Station performance can be determined by combining optic performance and launch amplifier performance. Stated distortion performance is for launch amplifier section operated at reference output levels and tilt.
6. Reverse Operational Gain is measured from the reverse RF input port to the RF input to the reverse transmitter and includes optical interface board losses.
7. "Digital" refers to 550 to 1002 MHz loading with QAM carriers at -6 dB relative to analog video carrier levels.
8. "Digital" refers to 650 to 1002 MHz loading with QAM carriers at -6 dB relative to analog video carrier levels.
9. Reverse Gain and Noise Figure for launch amp with 0 dB reverse input pad and 0 dB output pad.
10. X-mod (@ 15.75 kHz) specified using 100% synchronous modulation and frequency selective measurement device.

**Table 6.** Electrical Specifications

| Electrical                                      | Units | Value            |                  |                 | Notes    |
|-------------------------------------------------|-------|------------------|------------------|-----------------|----------|
| Max. AC Through Current (continuous)            | Amps  | 15               |                  |                 |          |
| Max. AC Through Current (surge)                 | Amps  | 25               |                  |                 |          |
| <b>Component DC Power Consumption (typical)</b> |       | <b>@ +24 VDC</b> | <b>@ +15 VDC</b> | <b>@ -6 VDC</b> | <b>1</b> |
| Launch Amplifier HGBT                           | Amps  | 1.94             |                  |                 |          |
| Status Monitoring Transponder                   | Amps  | 0.15             |                  |                 |          |
| Standard Optical Receiver                       | Amps  | 0.25             | 0.01             | 0.035           |          |
| Reverse Transmitter – High Gain FP              | Amps  | 0.09             | -                | 0.07            |          |
| Reverse Transmitter – High Gain DFB             | Amps  | 0.11             | -                | 0.09            |          |
|                                                 |       |                  |                  |                 |          |
| Power Supply DC Current Rating                  | Amps  | 3.0              | 0.05             | 0.3             | 1        |

**Note:**

1. The total DC Power consumption of installed components should not exceed the power supply DC current rating.

## Product Specifications

**Table 7.** Electrical Specifications

| GainMaker HGBT Node, 2 Transmitters, 1 Receiver, 1 Status Monitor |                |      |      |      |      |      |      |      |      |      |      |
|-------------------------------------------------------------------|----------------|------|------|------|------|------|------|------|------|------|------|
| <b>DC Current</b>                                                 | 24 VDC @ 2.5 A |      |      |      |      |      |      |      |      |      |      |
| <b>AC Voltage</b>                                                 | 90             | 85   | 80   | 75   | 70   | 65   | 60   | 55   | 50   | 45   | 40   |
| <b>AC (A) Current</b>                                             | 0.99           | 1.02 | 1.03 | 1.06 | 1.11 | 1.18 | 1.34 | 1.42 | 1.57 | 1.73 | 1.94 |
| <b>AC (W) Power</b>                                               | 71.7           | 71.6 | 71.4 | 71.3 | 71.2 | 71.1 | 71.4 | 71.4 | 71.4 | 71.6 | 71.8 |

**Notes:**

1. Data is based on stations configured for 2-way operation with status monitoring transponder. AC currents specified are based on measurements made with typical CATV type ferroresonant AC power supply (quasi-square wave), and standard version DC power supply.
2. DC supply has a user configurable 40 V or 50 VAC under-voltage lockout circuit.

**Table 8.** Environmental Specifications

| Environmental                                      | Units  | Value                                                      |
|----------------------------------------------------|--------|------------------------------------------------------------|
| Operating Temperature Range                        | °F/°C  | -40 to 140°F (-40 to 60°C)                                 |
| Relative Humidity Range                            | %      | 5 to 95%                                                   |
| <b>Mechanical</b>                                  |        |                                                            |
| Housing Dimensions (L x H x D)                     | in./mm | 17.6 in. x 7.5 in. x 7.9 in.<br>(447 mm x 191 mm x 201 mm) |
| Weight (Station with 1 RX, 1 TX, and power supply) | lb/kg  | 22.5 lb (10.2 kg)                                          |

## Ordering Information

The GainMaker Reverse Segmentable Node is available in a wide variety of configurations. The GainMaker Ordering Matrix provides ordering information for configured node stations, existing amplifier to node upgrade kits, and launch amplifiers. This page contains ordering information for required and optional accessories. Please consult with your Account Representative, Customer Service Representative, or Applications Engineer to determine the best configuration for your particular application.

**Table 9.** Required Accessories

| Required Accessories for RF Module                                                                                                                                                                        | Part Number                                                          |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|
| Plug-in Pads (attenuators) - Available in 0.5 dB steps from 0 to 20 dB <ul style="list-style-type: none"> <li>1 required for forward input</li> <li>5 required for reverse (3 input, 2 output)</li> </ul> | 589693 (0 dB) sequentially thru 589734 (20.5 dB)                     |
| Plug-in Forward Equalizer - Available in 1.5 dB steps from 0 to 30 dB at 1002 MHz <ul style="list-style-type: none"> <li>1 required for forward input</li> </ul>                                          | 4007228 (0 dB) sequentially thru 4009261 (21.0 dB), 4008778 (1.5 dB) |
| Required Accessories for Optical Components                                                                                                                                                               | Part Number                                                          |
| Plug-in Pads (attenuators) - Available in 0.5 dB steps from 0 to 20.5 dB <ul style="list-style-type: none"> <li>1 ea required for Transmitter and Receiver(s)</li> </ul>                                  | 279500 (0 dB) sequentially thru 279513 (13 dB) in 1 dB steps         |
|                                                                                                                                                                                                           | 504151 (14 dB) sequentially thru 504157 (20 dB) in 1 dB steps        |
|                                                                                                                                                                                                           | 565231 (0.5 dB) sequentially thru 565251 (20.5 dB) in 1 dB steps     |

**Note:** Configured Nodes ship without reverse input pads, input pads, or EQ. All other accessories are shipped from the factory. Forward launch amplifier attenuator pads, interstage EQ, and system trim are shipped with every configured node.

**Table 10.** Optional Accessories

| Reverse Amplifier Segmentation Module                        | Part Number |
|--------------------------------------------------------------|-------------|
| Reverse Configuration Module – Non-Segmented (box of 5)      | 4018563     |
| Reverse Configuration Module – Segmented (box of 5)          | 4018562     |
| Optical Interface Board (OIB) Redundancy Module              | Part Number |
| OIB Redundancy Plug-in – Redundant (box of 5)                | 4018565     |
| OIB Redundancy Plug-in – Non-Redundant (Combined) (box of 5) | 4018564     |

**Table 11.** Transmitters & Receivers

| Optical Transmitters and Receivers (available as part of configuration or separately) | Part Number on Module | Part Number for Ordering |
|---------------------------------------------------------------------------------------|-----------------------|--------------------------|
| <b>Receivers</b>                                                                      |                       |                          |
| GainMaker Node Optical Receiver with SC/APC connector                                 | 4007501               | 4007671                  |
| GainMaker Node Optical Receiver with SC/UPC connector                                 | 4007502               | 4007672                  |
| GainMaker Node Optical Receiver with FC/APC connector                                 | 4007503               | 4007673                  |
| GainMaker Node Dual Redundant Receiver with SC/APC connector                          | 4030121               | 4030121                  |
| <b>Analog FP Transmitters</b>                                                         |                       |                          |
| FP Optical Transmitter – High Gain 1310 nm with SC/APC connector                      | 717908                | 590942                   |
| FP Optical Transmitter – High Gain 1310 nm with SC/UPC connector                      | 717909                | 590943                   |
| FP Optical Transmitter – High Gain 1310 nm with FC/APC connector                      | 717906                | 590940                   |

| Optical Transmitters and Receivers (available as part of configuration or separately) | Part Number on Module | Part Number for Ordering |
|---------------------------------------------------------------------------------------|-----------------------|--------------------------|
| <b>Analog DFB Transmitters</b>                                                        |                       |                          |
| DFB Optical Transmitter – High Gain 1310 nm with SC/APC connector                     | 4013906.1310          | 590938                   |
| DFB Optical Transmitter – High Gain 1310 nm with SC/UPC connector                     | 4013907.1310          | 590939                   |
| DFB Optical Transmitter – High Gain 1310 nm with FC/APC connector                     | 4013896.1310          | 590936                   |
| <b>Analog CWDM Transmitters</b>                                                       |                       |                          |
| CWDM DFB Optical Transmitter – High Gain 1470 nm with SC/APC connector                | 4013906.1470          | 4007003                  |
| CWDM DFB Optical Transmitter – High Gain 1490 nm with SC/APC connector                | 4013906.1490          | 4007004                  |
| CWDM DFB Optical Transmitter – High Gain 1510 nm with SC/APC connector                | 4013906.1510          | 4007005                  |
| CWDM DFB Optical Transmitter – High Gain 1530 nm with SC/APC connector                | 4013906.1530          | 4007006                  |
| CWDM DFB Optical Transmitter – High Gain 1550 nm with SC/APC connector                | 4013906.1550          | 4007007                  |
| CWDM DFB Optical Transmitter – High Gain 1570 nm with SC/APC connector                | 4013906.1570          | 4007008                  |
| CWDM DFB Optical Transmitter – High Gain 1590 nm with SC/APC connector                | 4013906.1590          | 4007009                  |
| CWDM DFB Optical Transmitter – High Gain 1610 nm with SC/APC connector                | 4013906.1610          | 4007010                  |
| CWDM DFB Optical Transmitter – High Gain 1470 nm with SC/UPC connector                | 4013907.1470          | 4007011                  |
| CWDM DFB Optical Transmitter – High Gain 1490 nm with SC/UPC connector                | 4013907.1490          | 4007012                  |
| CWDM DFB Optical Transmitter – High Gain 1510 nm with SC/UPC connector                | 4013907.1510          | 4007013                  |
| CWDM DFB Optical Transmitter – High Gain 1530 nm with SC/UPC connector                | 4013907.1530          | 4007014                  |
| CWDM DFB Optical Transmitter – High Gain 1550 nm with SC/UPC connector                | 4013907.1550          | 4007015                  |
| CWDM DFB Optical Transmitter – High Gain 1570 nm with SC/UPC connector                | 4013907.1570          | 4007016                  |
| CWDM DFB Optical Transmitter – High Gain 1590 nm with SC/UPC connector                | 4013907.1590          | 4007017                  |
| CWDM DFB Optical Transmitter – High Gain 1610 nm with SC/UPC connector                | 4013907.1610          | 4007018                  |
| CWDM DFB Optical Transmitter – High Gain 1470 nm with FC/APC connector                | 4013908.1470          | 4007019                  |
| CWDM DFB Optical Transmitter – High Gain 1490 nm with FC/APC connector                | 4013908.1490          | 4007020                  |
| CWDM DFB Optical Transmitter – High Gain 1510 nm with FC/APC connector                | 4013908.1510          | 4007021                  |
| CWDM DFB Optical Transmitter – High Gain 1530 nm with FC/APC connector                | 4013908.1530          | 4007022                  |
| CWDM DFB Optical Transmitter – High Gain 1550 nm with FC/APC connector                | 4013908.1550          | 4007023                  |
| CWDM DFB Optical Transmitter – High Gain 1570 nm with FC/APC connector                | 4013908.1570          | 4007024                  |
| CWDM DFB Optical Transmitter – High Gain 1590 nm with FC/APC connector                | 4013908.1590          | 4007025                  |
| CWDM DFB Optical Transmitter – High Gain 1610 nm with FC/APC connector                | 4013908.1610          | 4007026                  |
| <b>Analog DWDM TX</b>                                                                 |                       |                          |
| DWDM Analog Optical Transmitter, CH. 20, 1561.42 nm with SC/APC connector             | 4023375.20            | 4023375.20               |
| DWDM Analog Optical Transmitter, CH. 21, 1560.61 nm with SC/APC connector             | 4023375.21            | 4023375.21               |
| DWDM Analog Optical Transmitter, CH. 22, 1559.79 nm with SC/APC connector             | 4023375.22            | 4023375.22               |
| DWDM Analog Optical Transmitter, CH. 23, 1558.98 nm with SC/APC connector             | 4023375.23            | 4023375.23               |
| DWDM Analog Optical Transmitter, CH. 24, 1558.17 nm with SC/APC connector             | 4023375.24            | 4023375.24               |
| DWDM Analog Optical Transmitter, CH. 25, 1557.36 nm with SC/APC connector             | 4023375.25            | 4023375.25               |
| DWDM Analog Optical Transmitter, CH. 26, 1556.55 nm with SC/APC connector             | 4023375.26            | 4023375.26               |

| Optical Transmitters and Receivers (available as part of configuration or separately) | Part Number on Module | Part Number for Ordering |
|---------------------------------------------------------------------------------------|-----------------------|--------------------------|
| <b>Analog DWDM TX</b>                                                                 |                       |                          |
| DWDM Analog Optical Transmitter, CH. 27, 1555.75 nm with SC/APC connector             | 4023375.27            | 4023375.27               |
| DWDM Analog Optical Transmitter, CH. 28, 1554.94 nm with SC/APC connector             | 4023375.28            | 4023375.28               |
| DWDM Analog Optical Transmitter, CH. 29, 1554.13 nm with SC/APC connector             | 4023375.29            | 4023375.29               |
| DWDM Analog Optical Transmitter, CH. 30, 1553.33 nm with SC/APC connector             | 4023375.30            | 4023375.30               |
| DWDM Analog Optical Transmitter, CH. 31, 1552.52 nm with SC/APC connector             | 4023375.31            | 4023375.31               |
| DWDM Analog Optical Transmitter, CH. 32, 1551.72 nm with SC/APC connector             | 4023375.32            | 4023375.32               |
| DWDM Analog Optical Transmitter, CH. 33, 1550.92 nm with SC/APC connector             | 4023375.33            | 4023375.33               |
| DWDM Analog Optical Transmitter, CH. 34, 1550.12 nm with SC/APC connector             | 4023375.34            | 4023375.34               |
| DWDM Analog Optical Transmitter, CH. 35, 1549.32 nm with SC/APC connector             | 4023375.35            | 4023375.35               |
| DWDM Analog Optical Transmitter, CH. 36, 1548.51 nm with SC/APC connector             | 4023375.36            | 4023375.36               |
| DWDM Analog Optical Transmitter, CH. 37, 1547.72 nm with SC/APC connector             | 4023375.37            | 4023375.37               |
| DWDM Analog Optical Transmitter, CH. 38, 1546.92 nm with SC/APC connector             | 4023375.38            | 4023375.38               |
| DWDM Analog Optical Transmitter, CH. 39, 1546.12 nm with SC/APC connector             | 4023375.39            | 4023375.39               |
| DWDM Analog Optical Transmitter, CH. 40, 1545.32 nm with SC/APC connector             | 4023375.40            | 4023375.40               |
| DWDM Analog Optical Transmitter, CH. 41, 1544.53 nm with SC/APC connector             | 4023375.41            | 4023375.41               |
| DWDM Analog Optical Transmitter, CH. 42, 1543.73 nm with SC/APC connector             | 4023375.42            | 4023375.42               |
| DWDM Analog Optical Transmitter, CH. 43, 1542.94 nm with SC/APC connector             | 4023375.43            | 4023375.43               |
| DWDM Analog Optical Transmitter, CH. 44, 1542.14 nm with SC/APC connector             | 4023375.44            | 4023375.44               |
| DWDM Analog Optical Transmitter, CH. 45, 1541.35 nm with SC/APC connector             | 4023375.45            | 4023375.45               |
| DWDM Analog Optical Transmitter, CH. 46, 1540.56 nm with SC/APC connector             | 4023375.46            | 4023375.46               |
| DWDM Analog Optical Transmitter, CH. 47, 1539.77 nm with SC/APC connector             | 4023375.47            | 4023375.47               |
| DWDM Analog Optical Transmitter, CH. 48, 1538.98 nm with SC/APC connector             | 4023375.48            | 4023375.48               |
| DWDM Analog Optical Transmitter, CH. 49, 1538.19 nm with SC/APC connector             | 4023375.49            | 4023375.49               |
| DWDM Analog Optical Transmitter, CH. 50, 1537.40 nm with SC/APC connector             | 4023375.50            | 4023375.50               |
| DWDM Analog Optical Transmitter, CH. 51, 1536.61 nm with SC/APC connector             | 4023375.51            | 4023375.51               |
| DWDM Analog Optical Transmitter, CH. 52, 1535.82 nm with SC/APC connector             | 4023375.52            | 4023375.52               |
| DWDM Analog Optical Transmitter, CH. 53, 1535.04 nm with SC/APC connector             | 4023375.53            | 4023375.53               |
| DWDM Analog Optical Transmitter, CH. 54, 1534.25 nm with SC/APC connector             | 4023375.54            | 4023375.54               |
| DWDM Analog Optical Transmitter, CH. 55, 1533.47 nm with SC/APC connector             | 4023375.55            | 4023375.55               |
| DWDM Analog Optical Transmitter, CH. 56, 1532.68 nm with SC/APC connector             | 4023375.56            | 4023375.56               |
| DWDM Analog Optical Transmitter, CH. 57, 1531.90 nm with SC/APC connector             | 4023375.57            | 4023375.57               |
| DWDM Analog Optical Transmitter, CH. 58, 1531.12 nm with SC/APC connector             | 4023375.58            | 4023375.58               |
| DWDM Analog Optical Transmitter, CH. 59, 1530.33 nm with SC/APC connector             | 4023375.59            | 4023375.59               |
| <b>Digital DFB 2:1 bdr-I Transmitters</b>                                             |                       |                          |
| DFB 2.5,2:1 bdr-I Transmitter, GainMaker Node,1310 nm with SC/APC connector           | 4018916.1310          | 4018915.1310             |
| <b>Digital CWDM 2:1 bdr-I Transmitters</b>                                            |                       |                          |
| CWDM 2.5,2:1 bdr-I Transmitter, GainMaker Node,1470 nm with SC/APC                    | 4018916.1470          | 4018915.1470             |
| CWDM 2.5,2:1 bdr-I Transmitter, GainMaker Node,1490 nm with SC/APC                    | 4018916.1490          | 4018915.1490             |
| CWDM 2.5,2:1 bdr-I Transmitter, GainMaker Node,1510 nm with SC/APC                    | 4018916.1510          | 4018915.1510             |
| CWDM 2.5,2:1 bdr-I Transmitter, GainMaker Node,1530 nm with SC/APC                    | 4018916.1530          | 4018915.1530             |
| CWDM 2.5,2:1 bdr-I Transmitter, GainMaker Node,1550 nm with SC/APC                    | 4018916.1550          | 4018915.1550             |
| CWDM 2.5,2:1 bdr-I Transmitter, GainMaker Node,1570 nm with SC/APC                    | 4018916.1570          | 4018915.1570             |
| CWDM 2.5,2:1 bdr-I Transmitter, GainMaker Node,1590 nm with SC/APC                    | 4018916.1590          | 4018915.1590             |
| CWDM 2.5,2:1 bdr-I Transmitter, GainMaker Node,1610 nm with SC/APC                    | 4018916.1610          | 4018915.1610             |

| Optical Transmitters and Receivers (available as part of configuration or separately) | Part Number on Module | Part Number for Ordering |
|---------------------------------------------------------------------------------------|-----------------------|--------------------------|
| <b>Digital DWDM 2:1 bdr-I Transmitters</b>                                            |                       |                          |
| DWDM 2.5,2:1 bdr-I Transmitter, GainMaker Node, 1563.86 nm with SC/APC                | 4018916.17            | 4018915.17               |
| DWDM 2.5,2:1 bdr-I Transmitter, GainMaker Node, 1563.05 nm with SC/APC                | 4018916.18            | 4018915.18               |
| DWDM 2.5,2:1 bdr-I Transmitter, GainMaker Node, 1562.23 nm with SC/APC                | 4018916.19            | 4018915.19               |
| DWDM 2.5,2:1 bdr-I Transmitter, GainMaker Node, 1561.42 nm with SC/APC                | 4018916.20            | 4018915.20               |
| DWDM 2.5,2:1 bdr-I Transmitter, GainMaker Node, 1560.61 nm with SC/APC                | 4018916.21            | 4018915.21               |
| DWDM 2.5,2:1 bdr-I Transmitter, GainMaker Node, 1559.79 nm with SC/APC                | 4018916.22            | 4018915.22               |
| DWDM 2.5,2:1 bdr-I Transmitter, GainMaker Node, 1558.98 nm with SC/APC                | 4018916.23            | 4018915.23               |
| DWDM 2.5,2:1 bdr-I Transmitter, GainMaker Node, 1558.17 nm with SC/APC                | 4018916.24            | 4018915.24               |
| DWDM 2.5,2:1 bdr-I Transmitter, GainMaker Node, 1557.36 nm with SC/APC                | 4018916.25            | 4018915.25               |
| DWDM 2.5,2:1 bdr-I Transmitter, GainMaker Node, 1556.55 nm with SC/APC                | 4018916.26            | 4018915.26               |
| DWDM 2.5,2:1 bdr-I Transmitter, GainMaker Node, 1555.75 nm with SC/APC                | 4018916.27            | 4018915.27               |
| DWDM 2.5,2:1 bdr-I Transmitter, GainMaker Node, 1554.94 nm with SC/APC                | 4018916.28            | 4018915.28               |
| DWDM 2.5,2:1 bdr-I Transmitter, GainMaker Node, 1554.13 nm with SC/APC                | 4018916.29            | 4018915.29               |
| DWDM 2.5,2:1 bdr-I Transmitter, GainMaker Node, 1553.33 nm with SC/APC                | 4018916.30            | 4018915.30               |
| DWDM 2.5,2:1 bdr-I Transmitter, GainMaker Node, 1552.52 nm with SC/APC                | 4018916.31            | 4018915.31               |
| DWDM 2.5,2:1 bdr-I Transmitter, GainMaker Node, 1551.72 nm with SC/APC                | 4018916.32            | 4018915.32               |
| DWDM 2.5,2:1 bdr-I Transmitter, GainMaker Node, 1550.92 nm with SC/APC                | 4018916.33            | 4018915.33               |
| DWDM 2.5,2:1 bdr-I Transmitter, GainMaker Node, 1550.12 nm with SC/APC                | 4018916.34            | 4018915.34               |
| DWDM 2.5,2:1 bdr-I Transmitter, GainMaker Node, 1549.32 nm with SC/APC                | 4018916.35            | 4018915.35               |
| DWDM 2.5,2:1 bdr-I Transmitter, GainMaker Node, 1548.51 nm with SC/APC                | 4018916.36            | 4018915.36               |
| DWDM 2.5,2:1 bdr-I Transmitter, GainMaker Node, 1547.72 nm with SC/APC                | 4018916.37            | 4018915.37               |
| DWDM 2.5,2:1 bdr-I Transmitter, GainMaker Node, 1546.92 nm with SC/APC                | 4018916.38            | 4018915.38               |
| DWDM 2.5,2:1 bdr-I Transmitter, GainMaker Node, 1546.12 nm with SC/APC                | 4018916.39            | 4018915.39               |
| DWDM 2.5,2:1 bdr-I Transmitter, GainMaker Node, 1545.32 nm with SC/APC                | 4018916.40            | 4018915.40               |
| DWDM 2.5,2:1 bdr-I Transmitter, GainMaker Node, 1544.53 nm with SC/APC                | 4018916.41            | 4018915.41               |
| DWDM 2.5,2:1 bdr-I Transmitter, GainMaker Node, 1543.73 nm with SC/APC                | 4018916.42            | 4018915.42               |
| DWDM 2.5,2:1 bdr-I Transmitter, GainMaker Node, 1542.94 nm with SC/APC                | 4018916.43            | 4018915.43               |
| DWDM 2.5,2:1 bdr-I Transmitter, GainMaker Node, 1542.14 nm with SC/APC                | 4018916.44            | 4018915.44               |
| DWDM 2.5,2:1 bdr-I Transmitter, GainMaker Node, 1541.35 nm with SC/APC                | 4018916.45            | 4018915.45               |
| DWDM 2.5,2:1 bdr-I Transmitter, GainMaker Node, 1540.56 nm with SC/APC                | 4018916.46            | 4018915.46               |
| DWDM 2.5,2:1 bdr-I Transmitter, GainMaker Node, 1539.77 nm with SC/APC                | 4018916.47            | 4018915.47               |
| DWDM 2.5,2:1 bdr-I Transmitter, GainMaker Node, 1538.98 nm with SC/APC                | 4018916.48            | 4018915.48               |
| DWDM 2.5,2:1 bdr-I Transmitter, GainMaker Node, 1538.19 nm with SC/APC                | 4018916.49            | 4018915.49               |
| DWDM 2.5,2:1 bdr-I Transmitter, GainMaker Node, 1537.40 nm with SC/APC                | 4018916.50            | 4018915.50               |
| DWDM 2.5,2:1 bdr-I Transmitter, GainMaker Node, 1536.61 nm with SC/APC                | 4018916.51            | 4018915.51               |
| DWDM 2.5,2:1 bdr-I Transmitter, GainMaker Node, 1535.82 nm with SC/APC                | 4018916.52            | 4018915.52               |
| DWDM 2.5,2:1 bdr-I Transmitter, GainMaker Node, 1535.04 nm with SC/APC                | 4018916.53            | 4018915.53               |
| DWDM 2.5,2:1 bdr-I Transmitter, GainMaker Node, 1534.25 nm with SC/APC                | 4018916.54            | 4018915.54               |
| DWDM 2.5,2:1 bdr-I Transmitter, GainMaker Node, 1533.47 nm with SC/APC                | 4018916.55            | 4018915.55               |
| DWDM 2.5,2:1 bdr-I Transmitter, GainMaker Node, 1532.68 nm with SC/APC                | 4018916.56            | 4018915.56               |
| DWDM 2.5,2:1 bdr-I Transmitter, GainMaker Node, 1531.90 nm with SC/APC                | 4018916.57            | 4018915.57               |
| DWDM 2.5,2:1 bdr-I Transmitter, GainMaker Node, 1531.12 nm with SC/APC                | 4018916.58            | 4018915.58               |
| DWDM 2.5,2:1 bdr-I Transmitter, GainMaker Node, 1530.33 nm with SC/APC                | 4018916.59            | 4018915.59               |
| DWDM 2.5,2:1 bdr-I Transmitter, GainMaker Node, 1529.55 nm with SC/APC                | 4018916.60            | 4018915.60               |
| DWDM 2.5,2:1 bdr-I Transmitter, GainMaker Node, 1528.77 nm with SC/APC                | 4018916.61            | 4018915.61               |
| <b>Digital 2:1 bdr-I Receivers</b>                                                    |                       |                          |
| 2.5,2:1 bdr-I P2 Receiver, STD RNG                                                    | 4018936               | 4018935                  |
| 2.5,2:1 bdr-I P2 Receiver, EXT RNG                                                    | 4018939               | 4018938                  |

**Table 12.** Related Equipment

| Related Equipment (available as part of configuration or separately)                                                                                          | Part Number on Module | Part Number for Ordering |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|--------------------------|
| GainMaker Node – Standard DC Power Supply 40 - 90 VAC                                                                                                         | 744160                | 4018686                  |
| GainMaker – Crowbar Surge Protector                                                                                                                           | 715973                | 4007682                  |
| High Output 4-Port GainMaker Node Status Monitoring Transponder<br>(See <i>Transponder for GainMaker Optoelectronic Node</i> data sheet, part number 7000087) | 744234                | 4018687                  |



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