

# GainMaker 1 GHz High Output 4-Port Node with 42/54 MHz Split

The Cisco GainMaker<sup>®</sup> High Output 4-Port Node with 42/54 MHz Split is designed to serve as an integral part of today's network architectures. The node combines the proven Cisco<sup>®</sup> technologies of both the Cisco GainMaker RF Amplifier and Cisco Prisma<sup>®</sup> 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-coaxial (HFC) networks.

Reverse traffic can be segmented and routed to Fabry-Perot (FP), distributed feedback (DFB), coarse wavelength-division multiplexing (CWDM), dense wavelength-division multiplexing (DWDM), or 2:1 baseband digital reverse (bdr) I reverse transmitters. The Cisco GainMaker High Output 4-Port Node (Figure 1) is also available with an optional custom status-monitoring Hybrid Management System (HMS) transponder for use with all HMS-compliant monitoring and control element management systems. Onboard temperature, RF switch position (wink switch), power supply condition, as well as other features and parameters can be monitored through this module.

**Figure 1.** Cisco GainMaker High Output 4-Port Node with 42/54 MHz Split



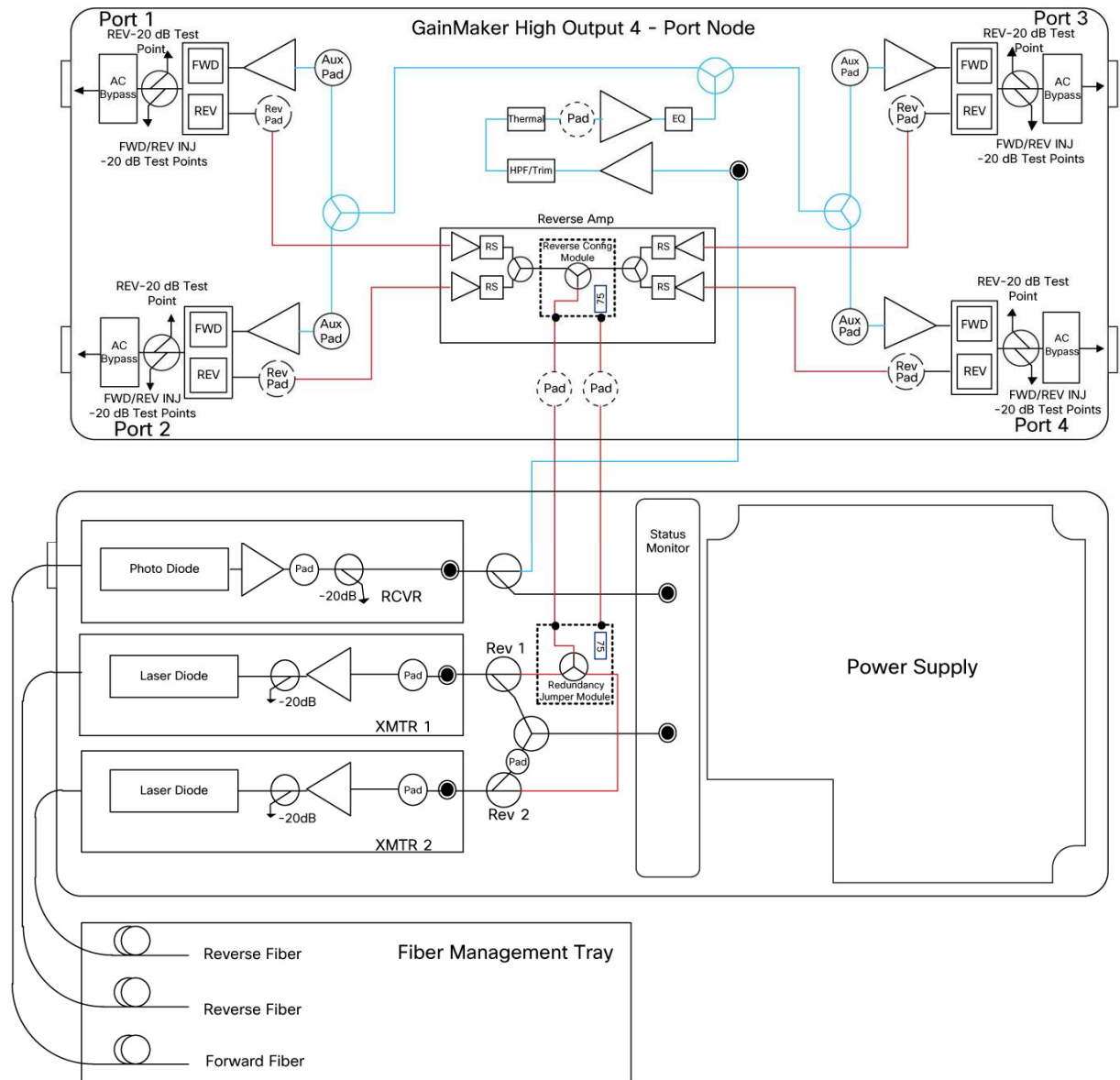
## Features

- Use of plug-in accessories common to all Cisco GainMaker products
- Two optical transmitters and one receiver positioned in the lid
- Optional plug-in status monitoring
- Optional transmitter redundancy (with nonsegmented option)
- Fiber entry and management tray that provides easy access to fiber connections and folds back to provide access to optical transmitter and receivers
- Reverse input pad and RF test point for each reverse port, which allow optimum reverse path design and alignment
- Optional dual redundant receiver that provides the ability to switch to redundant optical power in case of a fiber cut

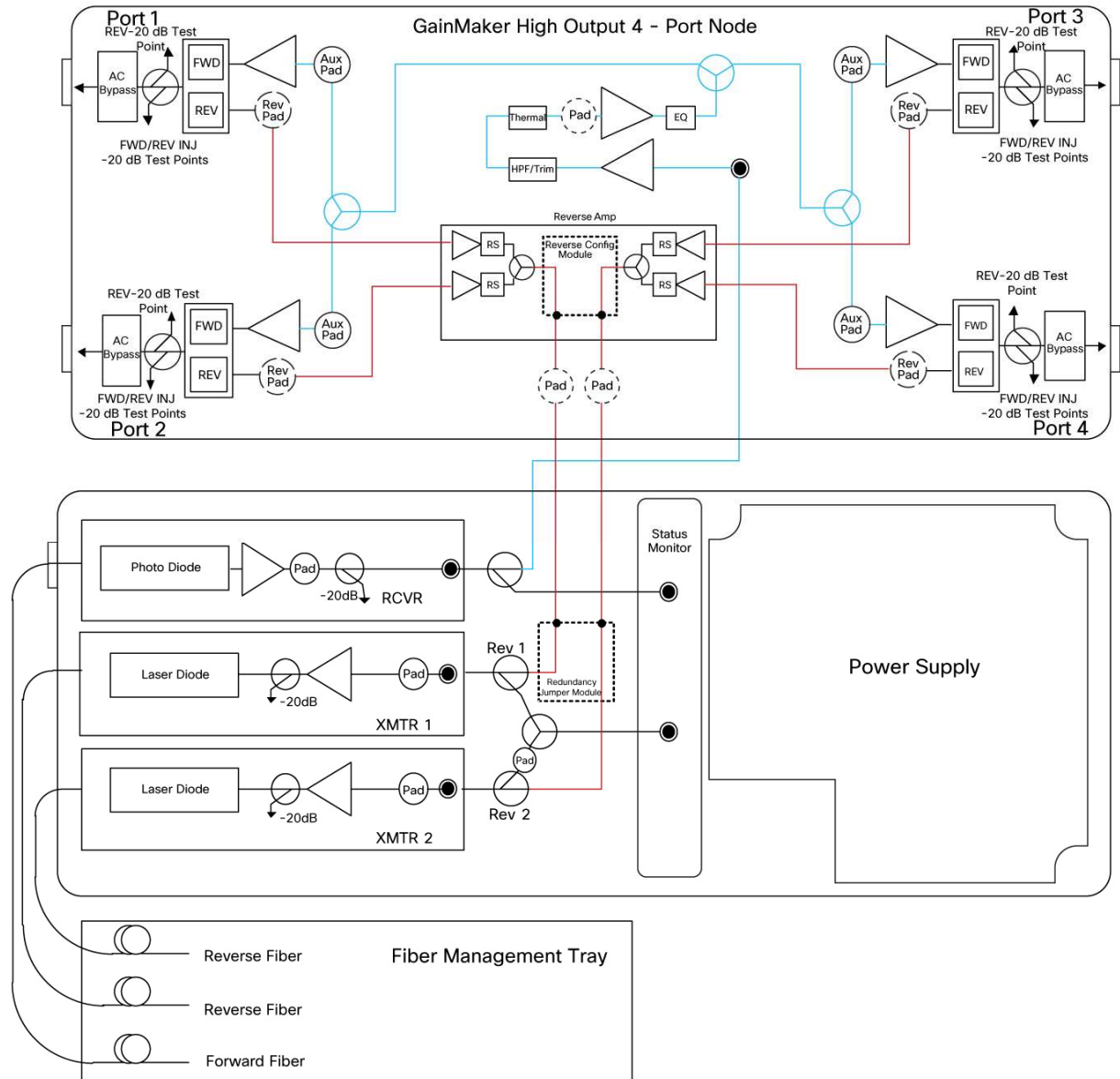
## Block Diagrams

Figures 2 through 5 provide block diagrams of configuration options for the Cisco GainMaker High Output 4-Port Node with 42/54 MHz Split.

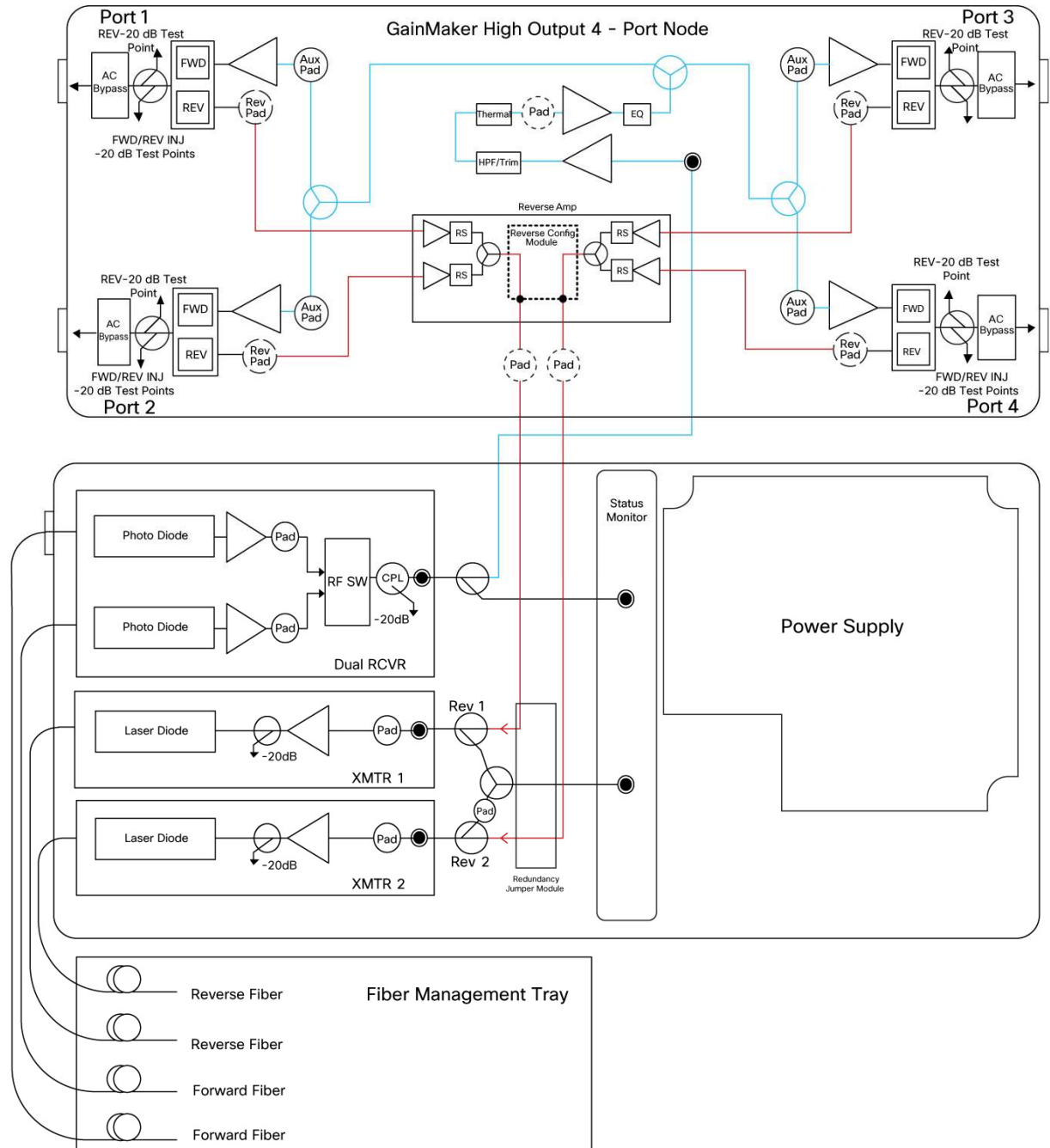
**Figure 2.** Combined Reverse Path with Redundant Transmitter Block Diagram



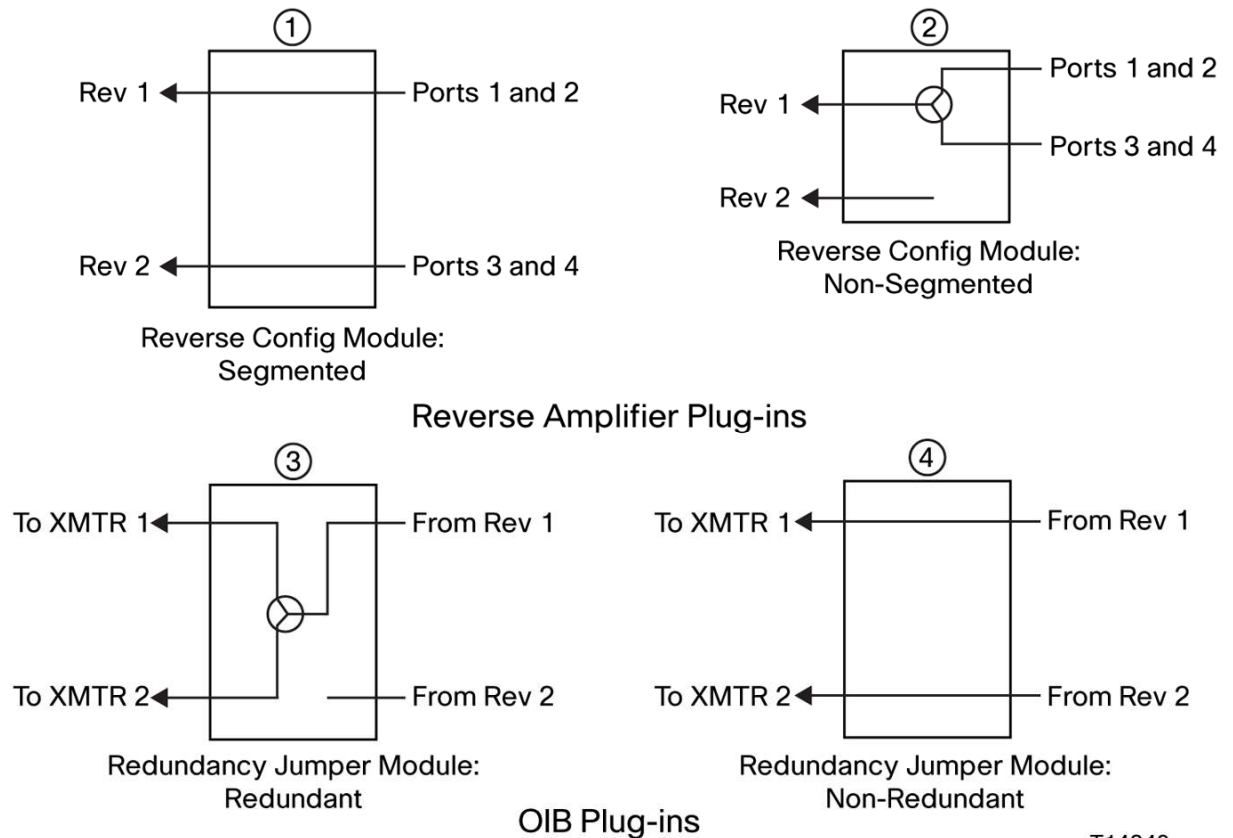
**Figure 3.** Segmented Reverse Path Block Diagram



**Figure 4.** Dual Redundant Receiver Block Diagram



**Figure 5.** Configuration Module Block Diagram



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Table 1 lists all possible reverse amplifier plug-in and Optical Interface Board (OIB) plug-in combinations. Each circled number references the plug-ins shown in Figure 5.

**Table 1.** Reverse Amplifier and Optical Interface Board Plug-in Combinations

| Transmitters                   | Reverse Amplifier Plug-in | OIB Plug-in |
|--------------------------------|---------------------------|-------------|
| Segmented XMTRS (nonredundant) | ①                         | ④           |
| Redundant XMTR (nonsegmented)  | ②                         | ③           |
| Nonsegmented and nonredundant  | ②                         | ④           |

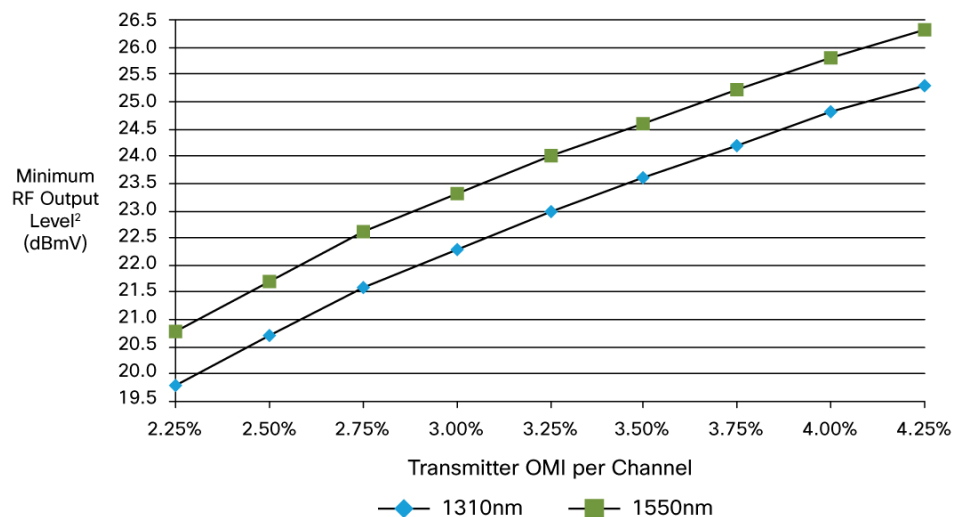
## Optical Specifications

Table 2 lists optical section specifications for the forward receiver module, and Figure 6 compares receiver RF output levels with the transmitter Optical Modulation Index (OMI). The notes following Figure 6 also apply to Table 2.

**Table 2.** 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        | ± 0.75                | 1     |
| Tilt (±1.0 dB)                           | dB        | 0                     |       |
| Optical input test point (±10%)          | VDC       | 1V per mW             |       |
| RF output level at 0 dBm optical input   | dBmV      | Refer to Figure 6     | 2     |
| RF output test point (±1.0 dB)           | dB        | -20                   |       |

**Figure 6.** Receiver RF Output Level and 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 per channel, with receiver optical input power of 0 dBm. To determine RF output levels at other optical input power levels, 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.

## Other Product Specifications

Tables 3 through 9 provide additional specifications for the Cisco GainMaker GainMaker High Output 4-Port Node with 42/54 MHz Split.

**Table 3.** RF Section Specifications

| General Station Performance | Units | Forward                              | Reverse                         | Notes |
|-----------------------------|-------|--------------------------------------|---------------------------------|-------|
| Pass band                   | MHz   | 54-1002                              | 5-42                            |       |
| Return loss                 | dB    | 16                                   | 16                              |       |
| Hum modulation at 12A       | dB    | 70 (54-870 MHz)<br>60 (870-1002 MHz) | 60 (5-10 MHz)<br>70 (11-42 MHz) |       |
| Hum modulation at 15A       | 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 4.** Launch Amplifier Performance: Forward

| Launch Amplifier Performance: Forward | Units | GainMaker 4-Port | Notes |
|---------------------------------------|-------|------------------|-------|
| Operational gain (minimum)            | dB    | 41               |       |
| Frequency response                    | dB    | $\pm 0.5$        |       |
| Internal tilt ( $\pm 1$ dB)           | dB    | 14.5             | 1, 2  |
| Noise figure at: 54 MHz               | dB    | 8.5              |       |
| 1002 MHz                              |       | 8.0              |       |
| Reference output levels at: 1002 MHz  | dBmV  | 56.0             |       |
| 870 MHz                               |       | 54.0             |       |
| 750 MHz                               |       | 52.2             |       |
| 650 MHz                               |       | 50.5             |       |
| 550 MHz                               |       | 49.0             |       |
| 55 MHz                                |       | 41.5             |       |
| Reference output tilt (55-1002 MHz)   | dB    | 14.5             | 1, 3  |
| 78 NTSC Channels (CW) with Digital    |       |                  | 5     |
| Composite triple beat                 | dB    | 65               | 4     |
| Cross modulation                      | dB    | 59               | 4, 6  |
| Composite second order (high side)    | dB    | 64               | 4     |
| Composite intermodulation noise (CIN) | dB    | 57               | 4, 7  |

**Notes:**

1. Reference output tilt and internal tilt are both "linear" tilts.
2. Forward internal tilt specified is primarily due to an on-board equalizer and a factory configured linear interstage equalizer (ISEQ).
3. The forward reference output tilt specified is achieved through field installation of appropriate input equalizer, in conjunction with the internal tilt of the launch amplifier and the tilt associated with the optical link (transmitter and receiver combination).
4. 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.
5. "Digital" refers to 550 to 1002 MHz loading with QAM carriers at -6 dB relative to analog video carrier levels.
6. X-mod (at 15.75 kHz) specified using 100% synchronous modulation and frequency selective measurement device.
7. Composite Intermodulation Noise (CIN) is a broadband noise-like distortion product associated with QAM loading.

**Table 5.** Launch Amplifier Performance - Reverse

| Reverse Station Performance | Units | Reverse  | Notes |
|-----------------------------|-------|----------|-------|
| Amplifier type              | -     | GaAs FET |       |
| Operational gain (minimum)  | dB    | -2       | 1, 2  |
| Frequency response          | dB    | ± 0.5    |       |
| Internal tilt (±1 dB)       | dB    | 0        |       |
| Path to path isolation      | dB    | 50       |       |
| Noise figure                | dB    | 13.5     | 2     |

**Notes:**

1. 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.
2. Reverse gain and noise figure for launch amplifier with 0 dB reverse input pad and 0 dB output pad.

**Table 6.** RF Delay Specifications

| Station Delay Characteristics            |            |                                     |            |
|------------------------------------------|------------|-------------------------------------|------------|
| 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         |

**Table 7.** Electrical Specifications

| Electrical                               | Units | Value      |            |           | Notes |
|------------------------------------------|-------|------------|------------|-----------|-------|
| Maximum AC through current (continuous)  | A     | 15         |            |           |       |
| Maximum AC through current (surge)       | A     | 25         |            |           |       |
| Component DC Power Consumption (Typical) |       | at +24 VDC | at +15 VDC | at -6 VDC | 1     |
| Launch amplifier                         | A     | 2.60       |            |           |       |
| Status monitoring transponder            | A     | 0.15       |            |           |       |
| Standard optical receiver                | A     | 0.25       | 0.01       | 0.035     |       |
| Reverse transmitter: high gain FP        | A     | 0.09       | -          | 0.07      |       |
| Reverse transmitter: high gain DFB       | A     | 0.11       | -          | 0.09      |       |
| Power supply DC current rating           | A     | 3.5        | 0.05       | 0.35      | 1     |

**Note:**

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

**Table 8.** Electrical Specifications

| GainMaker 4-Port Node, 2 Transmitters, 1 Receiver, 1 Status Monitor, 1 Launch Amplifier |                                                       |       |       |       |       |      |
|-----------------------------------------------------------------------------------------|-------------------------------------------------------|-------|-------|-------|-------|------|
| DC current                                                                              | 24 VDC at 3.2A, 15 VDC at 0.01A, and -6 VDC at 0.215A |       |       |       |       |      |
| AC voltage                                                                              | 90                                                    | 80    | 70    | 60    | 50    | 40   |
| AC current (A)                                                                          | 1.21                                                  | 1.26  | 1.45  | 1.69  | 1.97  | 2.47 |
| AC power (W)                                                                            | 92.31                                                 | 91.67 | 90.91 | 90.49 | 90.22 | 90.5 |



**Table 9.** Environmental and Mechanical Specifications

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

## Ordering Information

The Cisco GainMaker High Output 4-Port Node with 42/54 MHz Split is available in a wide variety of configurations. The GainMaker Ordering Matrix provides ordering information for configured node stations and launch amplifiers. Tables 10 and 11 contain ordering information for required and optional accessories, and Tables 12 and 13 give information for transmitters and receivers and for related equipment. Please consult with your Account Representative, Customer Service Representative, or Applications Engineer to determine the best configuration for your particular application.

**Table 10.** 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 interstage (if 0 dB value installed in the node when shipped does not fit the system design)</li><li>• 6 required for reverse (4 input, 2 output)</li></ul> | 589693 (0 dB) sequentially through 589734 (20.5 dB)                 |
| Plug-in Forward Linear 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>                                                                                                                   | See Table 10                                                        |
| 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 each required for transmitter and receiver(s)</li></ul>                                                                                                                | 279500 (0 dB) sequentially through 279513 (13 dB) in 1-dB steps     |
|                                                                                                                                                                                                                                                                                          | 504151 (14 dB) sequentially through 504157 (20 dB) in 1-dB steps    |
|                                                                                                                                                                                                                                                                                          | 565231 (0.5 dB) sequentially through 565251 (20.5 dB) in 1-dB steps |

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

**Table 11.** Optional Accessories

| Reverse Amplifier Segmentation Module                                | Part Number           |                          |
|----------------------------------------------------------------------|-----------------------|--------------------------|
| Reverse Configuration Module: Nonsegmented (box of 5)                | 4018565               |                          |
| Reverse Configuration Module: Segmented (box of 5)                   | 4018564               |                          |
| OIB Redundancy Module                                                | Part Number           |                          |
| Redundancy Jumper Module Plug-in: Redundant (box of 5)               | 4018565               |                          |
| Redundancy Jumper Module Plug-in: Nonredundant (combined) (box of 5) | 4018564               |                          |
| Launch Amplifier Module                                              | Part Number on Module | Part Number for Ordering |
| GainMaker High Output 4-Port Launch Amplifier 42/54 MHz              | 4030929               | 4030924                  |
| Forward Linear Equalizers                                            | Part Number on Module | Part Number for Ordering |
| 0 dB 1GHz Forward Linear Equalizer                                   | -                     | 4007228                  |
| 1.5 dB 1GHz Forward Linear Equalizer                                 | -                     | 4008778                  |
| 3.0 dB 1GHz Forward Linear Equalizer                                 | -                     | 4008779                  |
| 4.5 dB 1GHz Forward Linear Equalizer                                 | -                     | 4008780                  |
| 6.0 dB 1GHz Forward Linear Equalizer                                 | -                     | 4008781                  |
| 7.5 dB 1GHz Forward Linear Equalizer                                 | -                     | 4008782                  |
| 9.0 dB 1GHz Forward Linear Equalizer                                 | -                     | 4008783                  |
| 10.5 dB 1GHz Forward Linear Equalizer                                | -                     | 4008784                  |
| 12.0 dB 1GHz Forward Linear Equalizer                                | -                     | 4008785                  |
| 13.5 dB 1GHz Forward Linear Equalizer                                | -                     | 4008786                  |
| Forward Linear Equalizers                                            | Part Number on Module | Part Number for Ordering |
| 16.5 dB 1GHz Forward Linear Equalizer                                | -                     | 4019258                  |
| 18.0 dB 1GHz Forward Linear Equalizer                                | -                     | 4019259                  |
| 19.5 dB 1GHz Forward Linear Equalizer                                | -                     | 4019260                  |
| 21.0 dB 1GHz Forward Linear Equalizer                                | -                     | 4019261                  |

**Table 12.** Transmitters and 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                   |
| <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                   |

| Optical Transmitters and Receivers (available as part of configuration or separately) | Part Number on Module | Part Number for Ordering |
|---------------------------------------------------------------------------------------|-----------------------|--------------------------|
| <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               |
| 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               |

| Optical Transmitters and Receivers (available as part of configuration or separately) | Part Number on Module | Part Number for Ordering |
|---------------------------------------------------------------------------------------|-----------------------|--------------------------|
| 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 connector        | 4018916.1470          | 4018915.1470             |
| CWDM 2.5, 2:1 bdr-I Transmitter, GainMaker Node, 1490 nm with SC/APC connector        | 4018916.1490          | 4018915.1490             |
| CWDM 2.5, 2:1 bdr-I Transmitter, GainMaker Node, 1510 nm with SC/APC connector        | 4018916.1510          | 4018915.1510             |
| CWDM 2.5, 2:1 bdr-I Transmitter, GainMaker Node, 1530 nm with SC/APC connector        | 4018916.1530          | 4018915.1530             |
| CWDM 2.5, 2:1 bdr-I Transmitter, GainMaker Node, 1550 nm with SC/APC connector        | 4018916.1550          | 4018915.1550             |
| CWDM 2.5, 2:1 bdr-I Transmitter, GainMaker Node, 1570 nm with SC/APC connector        | 4018916.1570          | 4018915.1570             |
| CWDM 2.5, 2:1 bdr-I Transmitter, GainMaker Node, 1590 nm with SC/APC connector        | 4018916.1590          | 4018915.1590             |
| CWDM 2.5, 2:1 bdr-I Transmitter, GainMaker Node, 1610 nm with SC/APC connector        | 4018916.1610          | 4018915.1610             |
| <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               |

| Optical Transmitters and Receivers (available as part of configuration or separately) | Part Number on Module | Part Number for Ordering |
|---------------------------------------------------------------------------------------|-----------------------|--------------------------|
| 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 13.** Related Equipment

| Related Equipment (available as part of configuration or separately)                                                                               | Part Number on Module | Part Number for Ordering |
|----------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|--------------------------|
| High Output 4-Port GainMaker Node: Standard DC Power Supply 40-90 VAC                                                                              | 4027978               | 4027962                  |
| High Output 4-Port GainMaker Node Status Monitoring Transponder: See Transponder for GainMaker Optoelectronic Node data sheet, part number 7000087 | 4027979               | 4027963                  |

**Table 14.** Cisco GM EDR CWDM Reverse Optical Transmitters

| GM EDR CWDM Reverse Optical Transmitters | Part Number on Tx Module | Part Number of OPM | Part Number for Ordering |
|------------------------------------------|--------------------------|--------------------|--------------------------|
| <b>Digital 1:1 EDR CWDM Transmitters</b> |                          |                    |                          |
| EDR GM1185 Tx module                     | 800-4042187-01           | N/A                | 4042881                  |
| EDR GM1185 Tx w/ OPM CWDM-1270           | 800-4042187-01           | 10-1022072-01      | 4042883.1270             |
| EDR GM1185 Tx w/ OPM CWDM-1290           | 800-4042187-01           | 10-1022073-01      | 4042883.1290             |
| EDR GM1185 Tx w/ OPM CWDM-1310           | 800-4042187-01           | 10-1022074-01      | 4042883.1310             |
| EDR GM1185 Tx w/ OPM CWDM-1330           | 800-4042187-01           | 10-1022075-01      | 4042883.1330             |
| EDR GM1185 Tx w/ OPM CWDM-1350           | 800-4042187-01           | 10-1022076-01      | 4042883.1350             |
| EDR GM1185 Tx w/ OPM CWDM-1370           | 800-4042187-01           | 10-1022077-01      | 4042883.1370             |
| EDR GM1185 Tx w/ OPM CWDM-1390           | 800-4042187-01           | 10-1022078-01      | 4042883.1390             |
| EDR GM1185 Tx w/ OPM CWDM-1410           | 800-4042187-01           | 10-1022079-01      | 4042883.1410             |
| EDR GM1185 Tx w/ OPM CWDM-1430           | 800-4042187-01           | 10-1022080-01      | 4042883.1430             |
| EDR GM1185 Tx w/ OPM CWDM-1450           | 800-4042187-01           | 10-1022081-01      | 4042883.1450             |
| EDR GM1185 Tx w/ OPM CWDM-1470           | 800-4042187-01           | 10-1022082-01      | 4042883.1470             |
| EDR GM1185 Tx w/ OPM CWDM-1490           | 800-4042187-01           | 10-1022083-01      | 4042883.1490             |
| EDR GM1185 Tx w/ OPM CWDM-1510           | 800-4042187-01           | 10-1022084-01      | 4042883.1510             |
| EDR GM1185 Tx w/ OPM CWDM-1530           | 800-4042187-01           | 10-1022085-01      | 4042883.1530             |
| EDR GM1185 Tx w/ OPM CWDM-1550           | 800-4042187-01           | 10-1022086-01      | 4042883.1550             |
| EDR GM1185 Tx w/ OPM CWDM-1570           | 800-4042187-01           | 10-1022087-01      | 4042883.1570             |
| EDR GM1185 Tx w/ OPM CWDM-1590           | 800-4042187-01           | 10-1022088-01      | 4042883.1590             |
| EDR GM1185 Tx w/ OPM CWDM-1610           | 800-4042187-01           | 10-1022089-01      | 4042883.1610             |
| <b>Digital 2:1 EDR CWDM Transmitters</b> |                          |                    |                          |
| EDR GM2185 Tx module                     | 4041274                  | N/A                | 4042885                  |
| EDR GM2185 Tx w/ OPM CWDM-1270           | 4041274                  | 10-1022058-01      | 4042887.1270             |
| EDR GM2185 Tx w/ OPM CWDM-1290           | 4041274                  | 10-1022059-01      | 4042887.1290             |
| EDR GM2185 Tx w/ OPM CWDM-1310           | 4041274                  | 10-1022060-01      | 4042887.1310             |
| EDR GM2185 Tx w/ OPM CWDM-1330           | 4041274                  | 10-1022061-01      | 4042887.1330             |
| EDR GM2185 Tx w/ OPM CWDM-1350           | 4041274                  | 10-1022062-01      | 4042887.1350             |
| EDR GM2185 Tx w/ OPM CWDM-1370           | 4041274                  | 10-1022008-01      | 4042887.1370             |
| EDR GM2185 Tx w/ OPM CWDM-1390           | 4041274                  | 10-1022063-01      | 4042887.1390             |
| EDR GM2185 Tx w/ OPM CWDM-1410           | 4041274                  | 10-1022064-01      | 4042887.1410             |
| EDR GM2185 Tx w/ OPM CWDM-1430           | 4041274                  | 10-1022065-01      | 4042887.1430             |
| EDR GM2185 Tx w/ OPM CWDM-1450           | 4041274                  | 10-1022066-01      | 4042887.1450             |
| EDR GM2185 Tx w/ OPM CWDM-1470           | 4041274                  | 10-1022067-01      | 4042887.1470             |
| EDR GM2185 Tx w/ OPM CWDM-1490           | 4041274                  | 10-1022009-01      | 4042887.1490             |
| EDR GM2185 Tx w/ OPM CWDM-1510           | 4041274                  | 10-1022010-01      | 4042887.1510             |

| GM EDR CWDM Reverse Optical Transmitters | Part Number on Tx Module | Part Number of OPM | Part Number for Ordering |
|------------------------------------------|--------------------------|--------------------|--------------------------|
| EDR GM2185 Tx w/ OPM CWDM-1530           | 4041274                  | 10-1022068-01      | 4042887.1530             |
| EDR GM2185 Tx w/ OPM CWDM-1550           | 4041274                  | 10-1022011-01      | 4042887.1550             |
| EDR GM2185 Tx w/ OPM CWDM-1570           | 4041274                  | 10-1022069-01      | 4042887.1570             |
| EDR GM2185 Tx w/ OPM CWDM-1590           | 4041274                  | 10-1022012-01      | 4042887.1590             |
| EDR GM2185 Tx w/ OPM CWDM-1610           | 4041274                  | 10-1022070-01      | 4042887.1610             |

**Table 15.** Cisco GM EDR DWDM Reverse Optical Transmitters

| GM EDR DWDM Reverse Optical Transmitters | Part Number on Tx Module | Part Number of OPM | Part Number for Ordering |
|------------------------------------------|--------------------------|--------------------|--------------------------|
| <b>Digital 1:1 EDR DWDM Transmitters</b> |                          |                    |                          |
| EDR GM1185 Tx w/ OPM DWDM-17             | 800-4042187-01           | 10-1022090-01      | 4042884.17               |
| EDR GM1185 Tx w/ OPM DWDM-18             | 800-4042187-01           | 10-1022091-01      | 4042884.18               |
| EDR GM1185 Tx w/ OPM DWDM-19             | 800-4042187-01           | 10-1022092-01      | 4042884.19               |
| EDR GM1185 Tx w/ OPM DWDM-20             | 800-4042187-01           | 10-1022093-01      | 4042884.20               |
| EDR GM1185 Tx w/ OPM DWDM-21             | 800-4042187-01           | 10-1022094-01      | 4042884.21               |
| EDR GM1185 Tx w/ OPM DWDM-22             | 800-4042187-01           | 10-1022095-01      | 4042884.22               |
| EDR GM1185 Tx w/ OPM DWDM-23             | 800-4042187-01           | 10-1022096-01      | 4042884.23               |
| EDR GM1185 Tx w/ OPM DWDM-24             | 800-4042187-01           | 10-1022097-01      | 4042884.24               |
| EDR GM1185 Tx w/ OPM DWDM-25             | 800-4042187-01           | 10-1022098-01      | 4042884.25               |
| EDR GM1185 Tx w/ OPM DWDM-26             | 800-4042187-01           | 10-1022099-01      | 4042884.26               |
| EDR GM1185 Tx w/ OPM DWDM-27             | 800-4042187-01           | 10-1022100-01      | 4042884.27               |
| EDR GM1185 Tx w/ OPM DWDM-28             | 800-4042187-01           | 10-1022101-01      | 4042884.28               |
| EDR GM1185 Tx w/ OPM DWDM-29             | 800-4042187-01           | 10-1022102-01      | 4042884.29               |
| EDR GM1185 Tx w/ OPM DWDM-30             | 800-4042187-01           | 10-1022103-01      | 4042884.30               |
| EDR GM1185 Tx w/ OPM DWDM-31             | 800-4042187-01           | 10-1022104-01      | 4042884.31               |
| EDR GM1185 Tx w/ OPM DWDM-32             | 800-4042187-01           | 10-1022105-01      | 4042884.32               |
| EDR GM1185 Tx w/ OPM DWDM-33             | 800-4042187-01           | 10-1022106-01      | 4042884.33               |
| EDR GM1185 Tx w/ OPM DWDM-34             | 800-4042187-01           | 10-1022107-01      | 4042884.34               |
| EDR GM1185 Tx w/ OPM DWDM-35             | 800-4042187-01           | 10-1022108-01      | 4042884.35               |
| EDR GM1185 Tx w/ OPM DWDM-36             | 800-4042187-01           | 10-1022109-01      | 4042884.36               |
| EDR GM1185 Tx w/ OPM DWDM-37             | 800-4042187-01           | 10-1022110-01      | 4042884.37               |
| EDR GM1185 Tx w/ OPM DWDM-38             | 800-4042187-01           | 10-1022111-01      | 4042884.38               |
| EDR GM1185 Tx w/ OPM DWDM-39             | 800-4042187-01           | 10-1022112-01      | 4042884.39               |
| EDR GM1185 Tx w/ OPM DWDM-40             | 800-4042187-01           | 10-1022113-01      | 4042884.40               |
| EDR GM1185 Tx w/ OPM DWDM-41             | 800-4042187-01           | 10-1022114-01      | 4042884.41               |
| EDR GM1185 Tx w/ OPM DWDM-42             | 800-4042187-01           | 10-1022115-01      | 4042884.42               |
| EDR GM1185 Tx w/ OPM DWDM-43             | 800-4042187-01           | 10-1022116-01      | 4042884.43               |
| EDR GM1185 Tx w/ OPM DWDM-44             | 800-4042187-01           | 10-1022117-01      | 4042884.44               |
| EDR GM1185 Tx w/ OPM DWDM-45             | 800-4042187-01           | 10-1022118-01      | 4042884.45               |
| EDR GM1185 Tx w/ OPM DWDM-46             | 800-4042187-01           | 10-1022119-01      | 4042884.46               |
| EDR GM1185 Tx w/ OPM DWDM-47             | 800-4042187-01           | 10-1022120-01      | 4042884.47               |
| EDR GM1185 Tx w/ OPM DWDM-48             | 800-4042187-01           | 10-1022121-01      | 4042884.48               |
| EDR GM1185 Tx w/ OPM DWDM-49             | 800-4042187-01           | 10-1022122-01      | 4042884.49               |
| EDR GM1185 Tx w/ OPM DWDM-50             | 800-4042187-01           | 10-1022123-01      | 4042884.50               |



| GM EDR DWDM Reverse Optical Transmitters | Part Number on Tx Module | Part Number of OPM | Part Number for Ordering |
|------------------------------------------|--------------------------|--------------------|--------------------------|
| EDR GM1185 Tx w/ OPM DWDM-51             | 800-4042187-01           | 10-1022124-01      | 4042884.51               |
| EDR GM1185 Tx w/ OPM DWDM-52             | 800-4042187-01           | 10-1022125-01      | 4042884.52               |
| EDR GM1185 Tx w/ OPM DWDM-53             | 800-4042187-01           | 10-1022126-01      | 4042884.53               |
| EDR GM1185 Tx w/ OPM DWDM-54             | 800-4042187-01           | 10-1022127-01      | 4042884.54               |
| EDR GM1185 Tx w/ OPM DWDM-55             | 800-4042187-01           | 10-1022128-01      | 4042884.55               |
| EDR GM1185 Tx w/ OPM DWDM-56             | 800-4042187-01           | 10-1022129-01      | 4042884.56               |
| EDR GM1185 Tx w/ OPM DWDM-57             | 800-4042187-01           | 10-1022130-01      | 4042884.57               |
| EDR GM1185 Tx w/ OPM DWDM-58             | 800-4042187-01           | 10-1022131-01      | 4042884.58               |
| EDR GM1185 Tx w/ OPM DWDM-59             | 800-4042187-01           | 10-1022132-01      | 4042884.59               |
| EDR GM1185 Tx w/ OPM DWDM-60             | 800-4042187-01           | 10-1022133-01      | 4042884.60               |
| EDR GM1185 Tx w/ OPM DWDM-61             | 800-4042187-01           | 10-1022134-01      | 4042884.61               |
| <b>Digital 2:1 EDR DWDM Transmitters</b> |                          |                    |                          |
| EDR GM2185 Tx w/ OPM DWDM-17             | 4041274                  | 10-1022013-01      | 4042888.17               |
| EDR GM2185 Tx w/ OPM DWDM-18             | 4041274                  | 10-1022014-01      | 4042888.18               |
| EDR GM2185 Tx w/ OPM DWDM-19             | 4041274                  | 10-1022015-01      | 4042888.19               |
| EDR GM2185 Tx w/ OPM DWDM-20             | 4041274                  | 10-1022016-01      | 4042888.20               |
| EDR GM2185 Tx w/ OPM DWDM-21             | 4041274                  | 10-1022017-01      | 4042888.21               |
| EDR GM2185 Tx w/ OPM DWDM-22             | 4041274                  | 10-1022018-01      | 4042888.22               |
| EDR GM2185 Tx w/ OPM DWDM-23             | 4041274                  | 10-1022019-01      | 4042888.23               |
| EDR GM2185 Tx w/ OPM DWDM-24             | 4041274                  | 10-1022020-01      | 4042888.24               |
| EDR GM2185 Tx w/ OPM DWDM-25             | 4041274                  | 10-1022021-01      | 4042888.25               |
| EDR GM2185 Tx w/ OPM DWDM-26             | 4041274                  | 10-1022022-01      | 4042888.26               |
| EDR GM2185 Tx w/ OPM DWDM-27             | 4041274                  | 10-1022023-01      | 4042888.27               |
| EDR GM2185 Tx w/ OPM DWDM-28             | 4041274                  | 10-1022024-01      | 4042888.28               |
| EDR GM2185 Tx w/ OPM DWDM-29             | 4041274                  | 10-1022025-01      | 4042888.29               |
| EDR GM2185 Tx w/ OPM DWDM-30             | 4041274                  | 10-1022026-01      | 4042888.30               |
| EDR GM2185 Tx w/ OPM DWDM-31             | 4041274                  | 10-1022027-01      | 4042888.31               |
| EDR GM2185 Tx w/ OPM DWDM-32             | 4041274                  | 10-1022028-01      | 4042888.32               |
| EDR GM2185 Tx w/ OPM DWDM-33             | 4041274                  | 10-1022029-01      | 4042888.33               |
| EDR GM2185 Tx w/ OPM DWDM-34             | 4041274                  | 10-1022030-01      | 4042888.34               |
| EDR GM2185 Tx w/ OPM DWDM-35             | 4041274                  | 10-1022031-01      | 4042888.35               |
| EDR GM2185 Tx w/ OPM DWDM-36             | 4041274                  | 10-1022032-01      | 4042888.36               |
| EDR GM2185 Tx w/ OPM DWDM-37             | 4041274                  | 10-1022033-01      | 4042888.37               |
| EDR GM2185 Tx w/ OPM DWDM-38             | 4041274                  | 10-1022034-01      | 4042888.38               |
| EDR GM2185 Tx w/ OPM DWDM-39             | 4041274                  | 10-1022035-01      | 4042888.39               |
| EDR GM2185 Tx w/ OPM DWDM-40             | 4041274                  | 10-1022036-01      | 4042888.40               |
| EDR GM2185 Tx w/ OPM DWDM-41             | 4041274                  | 10-1022037-01      | 4042888.41               |
| EDR GM2185 Tx w/ OPM DWDM-42             | 4041274                  | 10-1022038-01      | 4042888.42               |
| EDR GM2185 Tx w/ OPM DWDM-43             | 4041274                  | 10-1022039-01      | 4042888.43               |
| EDR GM2185 Tx w/ OPM DWDM-44             | 4041274                  | 10-1022040-01      | 4042888.44               |
| EDR GM2185 Tx w/ OPM DWDM-45             | 4041274                  | 10-1022041-01      | 4042888.45               |
| EDR GM2185 Tx w/ OPM DWDM-46             | 4041274                  | 10-1022042-01      | 4042888.46               |
| EDR GM2185 Tx w/ OPM DWDM-47             | 4041274                  | 10-1022043-01      | 4042888.47               |



| GM EDR DWDM Reverse Optical Transmitters | Part Number on Tx Module | Part Number of OPM | Part Number for Ordering |
|------------------------------------------|--------------------------|--------------------|--------------------------|
| EDR GM2185 Tx w/ OPM DWDM-48             | 4041274                  | 10-1022044-01      | 4042888.48               |
| EDR GM2185 Tx w/ OPM DWDM-49             | 4041274                  | 10-1022045-01      | 4042888.49               |
| EDR GM2185 Tx w/ OPM DWDM-50             | 4041274                  | 10-1022046-01      | 4042888.50               |
| EDR GM2185 Tx w/ OPM DWDM-51             | 4041274                  | 10-1022047-01      | 4042888.51               |
| EDR GM2185 Tx w/ OPM DWDM-52             | 4041274                  | 10-1022048-01      | 4042888.52               |
| EDR GM2185 Tx w/ OPM DWDM-53             | 4041274                  | 10-1022049-01      | 4042888.53               |
| EDR GM2185 Tx w/ OPM DWDM-54             | 4041274                  | 10-1022050-01      | 4042888.54               |
| EDR GM2185 Tx w/ OPM DWDM-55             | 4041274                  | 10-1022051-01      | 4042888.55               |
| EDR GM2185 Tx w/ OPM DWDM-56             | 4041274                  | 10-1022052-01      | 4042888.56               |
| EDR GM2185 Tx w/ OPM DWDM-57             | 4041274                  | 10-1022053-01      | 4042888.57               |
| EDR GM2185 Tx w/ OPM DWDM-58             | 4041274                  | 10-1022054-01      | 4042888.58               |
| EDR GM2185 Tx w/ OPM DWDM-59             | 4041274                  | 10-1022055-01      | 4042888.59               |
| EDR GM2185 Tx w/ OPM DWDM-60             | 4041274                  | 10-1022056-01      | 4042888.60               |
| EDR GM2185 Tx w/ OPM DWDM-61             | 4041274                  | 10-1022057-01      | 4042888.61               |

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