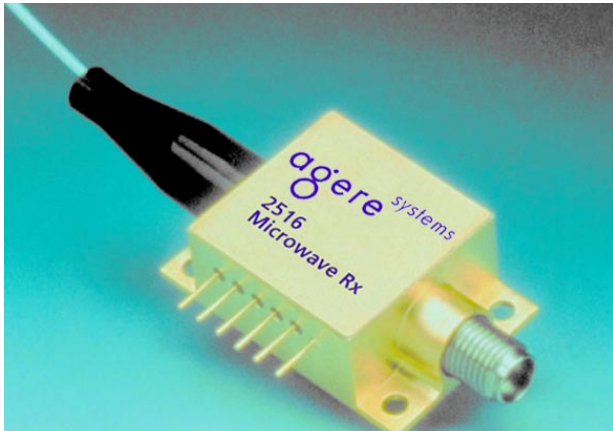
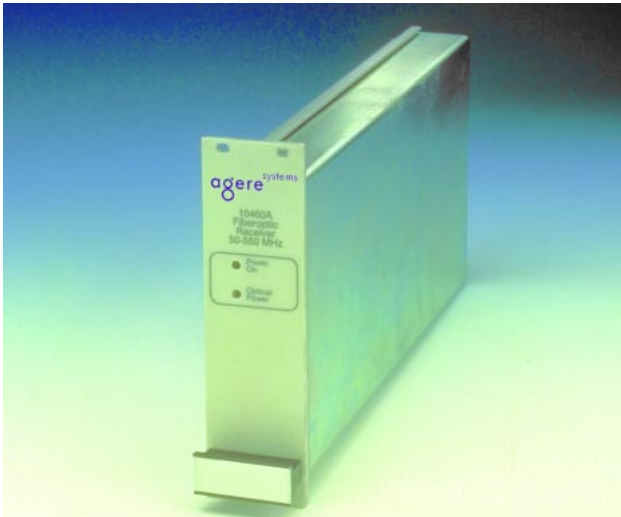


Wideband Photodiode Receivers



Features

- Wide-band analog signal reception
- Single-mode fiber pigtail
- High optical return loss
- Up to 20 GHz bandwidth
- 1310 nm and 1550 nm sensitivity

Applications

- Antenna remoting
- Cellular and PCS networks
- Military triband communications
- TT and C

Description

The family of wideband photodiode receivers are ideally suited for use in analog fiber-optic communications. With their wide bandwidth and flat response, these devices are used in a wide array of applications, including antenna remoting, timing and reference signal distribution, measurement, delay lines, and two-way communications.

Several packaging styles are available for these wideband photodiodes. The most basic package, the photodiode module, contains the photodiode chip, optical fiber pigtail, and impedance-matched electrical connections in a hermetically sealed unit. Of particular note is the high optical return loss, which enables high-quality noise performance for sensitive optical links.

Description (continued)

In most cases, the basic photodiode module is integrated into a complete receiver, packaged either as a flange-mount for extreme environments, or as a plug-in

for integration with Agere Systems Inc.'s System 10000 rack-mountable chassis and power supplies. Electronics within flange-mount and plug-in receivers provide a reverse bias for the photodiodes and monitor the dc level of the optical input power, thus providing a fully integrated wideband product.

Absolute Maximum Ratings

Stresses in excess of the absolute maximum ratings can cause permanent damage to the device. These are absolute stress ratings only. Functional operation of the device is not implied at these or any other conditions in excess of those given in the operational sections of the data sheet. Exposure to absolute maximum ratings for extended periods can adversely affect device reliability.

| Parameter | Symbol | Min | Max | Unit |
|--|------------------|-----------------|-----------|----------|
| Operating Temperature Range: Modules and Flange-mount Plug-ins | TOP | -40 0 | 70 50 | °C °C |
| Storage Temperature Range: Modules and Flange-mount Plug-ins | Tstg | -40 -20 | 85 65 | °C °C |
| Input Power: 2510A/B, 2515A.B, 1516A/B/C 2518A/B | PIN | 2.0 (typ) 15 | 2.5 16 | mW mW |
| Maximum Power for 60 s: 2510A/B, 2515A.B, 1516A/B/C 2518A/B | P _{MAX} | — — | 4 16 | mW mW |
| dc Current: 2510A/B, 2515A/B, 1516A/B/C 2518A/B | I _{dc} | — — | 2 12 | mA mA |

Characteristics**Table 1. Optical Characteristics**

| Package Type | Device Code | | | |
|---|---|-----------------------|-------------------------|-----------|
| Module | 2510A/B ¹ | 2515A/B ¹ | 2516A/B/C ¹ | 2518A/B |
| Flange-Mount Receiver | 4510A/B ¹ | 4515A/B ¹ | 4516A/B/C ¹ | 4518A/B |
| Plug-in Receiver, for 19 in. rack system | 10450A/B ¹ | 10455A/B ¹ | 10456A/B/C ¹ | 10458A/B |
| Parameters | Specifications | | | |
| dc Photodiode Responsivity at 1310 nm, 25 °C | >0.75 A/W | >0.75 A/W | >0.65 A/W | >0.70 A/W |
| RF Receiver Efficiency (typ) at 1 GHz ² | >0.38 | >0.38 | >0.33 | >0.35 |
| Optical Return Loss ³ | >45 dB | | | |
| Pigtail Fiber Type (where applicable) | >1 m, 9 μm/125 μm single-mode SMF-28 ⁴ or equivalent | | | |

1. Specified for <2 mW optical power, <50% modulation depth.

2. The photodiode RF current splits evenly between the internal matching resistor and the external load. (See Agere Systems' *System Designer's Guide to RF and Wideband Fiber Optics*.)

3. Optical return loss specified for FC-APC connectors or fusion splices only. Other connection methods can degrade optical return loss.

4. SMF-28 is a trademark of Corning Incorporated.

Characteristics (continued)

Table 2. RF Characteristics

| Package Type | Device Code | | | |
|---|----------------|----------------|---------------------------------|---------------------------------|
| Module | 2510A/B | 2515A/B | 2516A/B/C | 2518A/B |
| Flange-Mount Receiver | 4510A/B | 4515A/B | 4516A/B/C | 4518A/B |
| Plug-in Receiver (for 19 in. rack system) | 10450A/B | 10455A/B | 10456A/B/C | 10458A/B |
| Parameters | Specifications | | | |
| Maximum Frequency: | | | | |
| A Version | 3 GHz | 10 GHz | 20 GHz | 15 GHz |
| B Version | 6 GHz | 12 GHz | 18 GHz | 10 GHz |
| C Version | — | — | 15 GHz | — |
| Minimum Frequency | 0.1 GHz | 0.1 GHz | 1 GHz | 0.5 GHz |
| Output Coupling | dc | ac | ac | ac |
| Amplitude Flatness ¹ | ±2.0 dB | ±2.0 dB | ±2.0 dB | ±2.0 dB |
| Output VSWR, Max | | | | |
| 2.0:1 | 0.1—6 GHz | 0.1 GHz—10 GHz | 1 GHz—18 GHz | 0.5 GHz—15 GHz |
| 2.5:1 | — | 10 GHz—12 GHz | 18 GHz—20 GHz | — |
| Output Impedance | 50 Ω | | | |
| RF Connector for Module | SMA (F) | SMA (F) | <i>K-connector</i> ² | <i>K-connector</i> ² |
| RF Connector for Flange-Mount and Plug-in | SMA (F) | | | |

1. Relative to value at 1 GHz.

2. *K-connector* is a trademark of Anritsu Company. It is a high-speed and SMA-compatible connector.

Table 3. dc Power for Flange-mount and Plug-ins (45xx and 104xx Receivers)

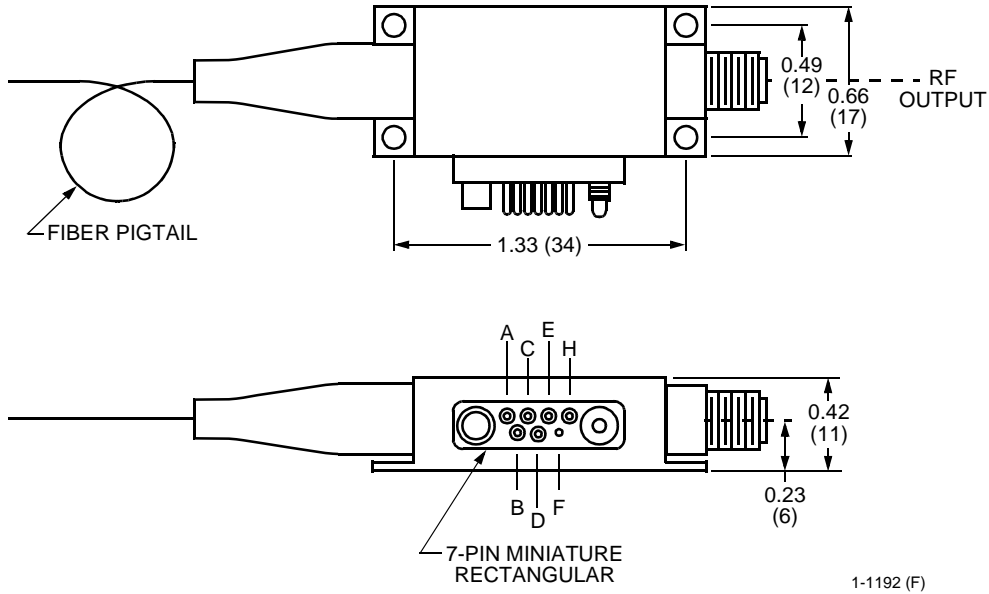
| Parameter | Symbol | Min | Typ | Max | Unit |
|---|-----------------|-----|-------------------------|-----|------|
| dc Power for Flange-mount and Plug-ins (Models 45xx and 104xx) ¹ : Pin 1 | P _{dc} | — | 15 nominal at 0.2 A max | — | V |

1. For photodiode module CDC requirements, contact an Agere Systems' account manager for OEM data sheet.

2510A/B, 2515A/B Wideband Photodiode Receivers

Outline Diagram

Dimensions are in inches and (millimeters).



Pin Information

Table 4. Seven-pin Connector

| Pin No. | Description |
|---------|-------------|
| A | NC |
| B | NC |
| C | NC |
| D | NC |
| E | Bias |
| F | Ground |
| H | NC |

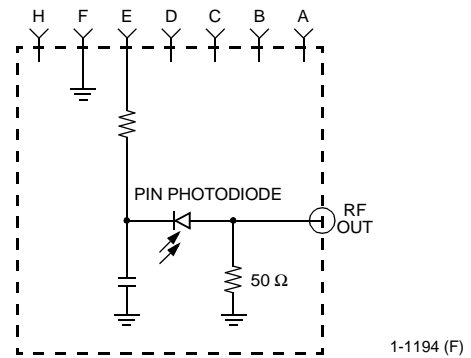


Figure 1. 2510A/B Electrical Schematic

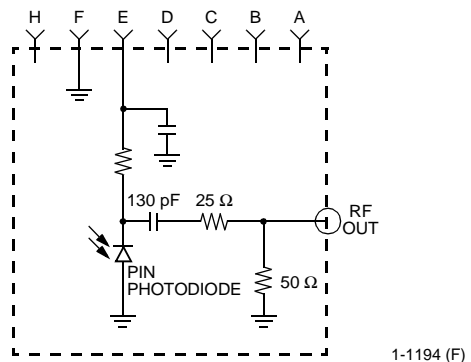
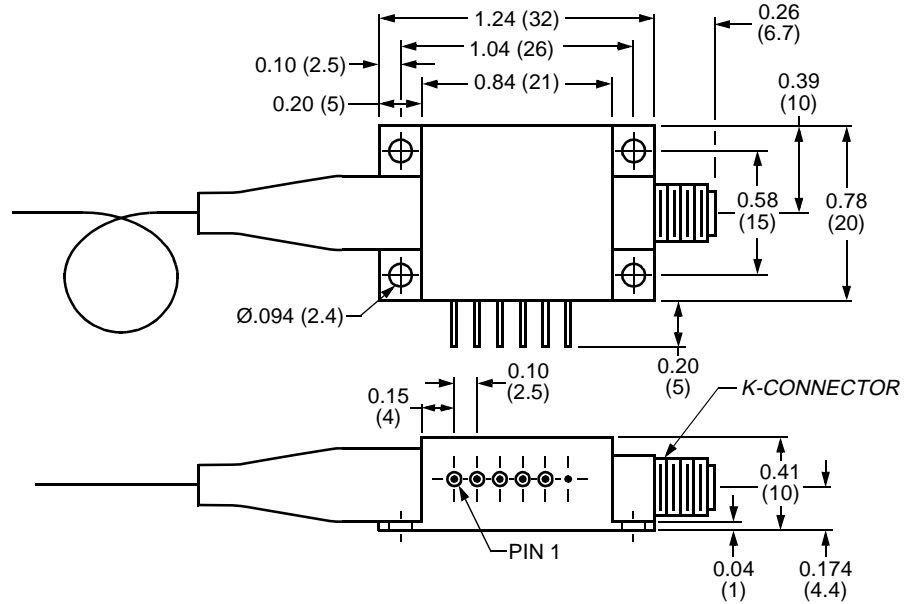


Figure 2. 2515A/B Electrical Schematic

2516A/B, 2518A/B Wideband Photodiode Receivers

Outline Diagram

Dimensions are in inches and (millimeters).

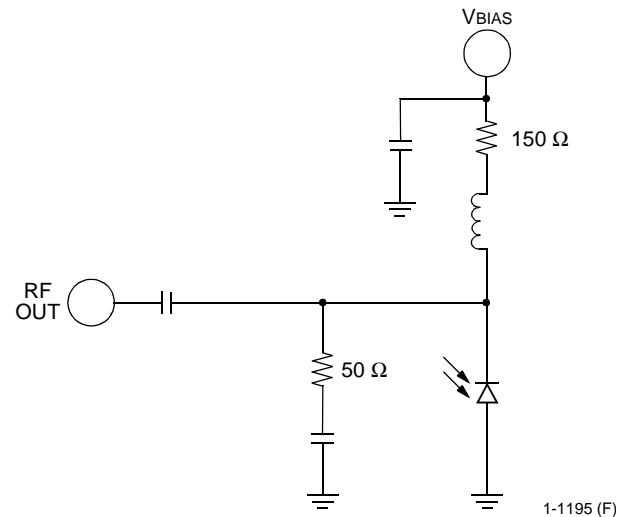


1-1193 (F)

Pin Information

Table 5. Six-pin Connector

| Pin No. | Description |
|---------|-------------|
| 1 | NC |
| 2 | NC |
| 3 | NC |
| 4 | Bias |
| 5 | NC |
| 6 | Ground |

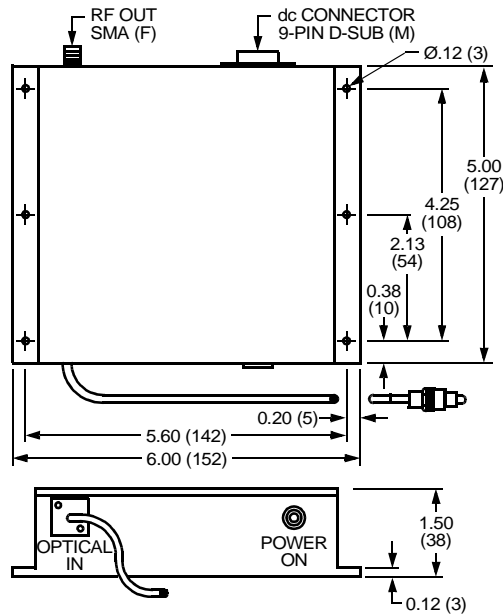


1-1195 (F)

Figure 3. 2516A/B, 2518A/B Electrical Schematic

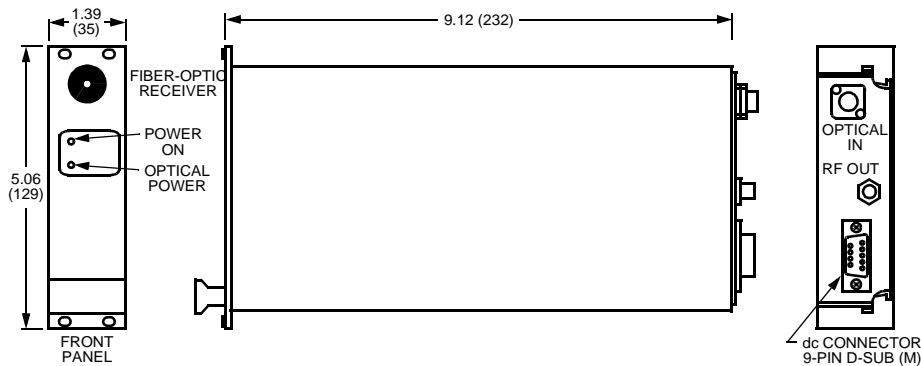
45xx, 104xx Wideband Photodiode Receivers

45xx Outline Diagram (Dimensions are in inches and (millimeters).)



1-1191 (F)

104xx Outline Diagram (Dimensions are in inches and (millimeters).)



1-1189 (F)c

Pin Information

Table 6. Nine-Pin D-sub Connector

| Pin No. | Description |
|---------|--------------------------------------|
| 1 | 15 Vdc |
| 2 | NC |
| 3 | NC |
| 4 | Power Ground |
| 5 | Ref. Ground |
| 6 | Optical Current Monitor |
| 7 | Low Optical Power Alarm ¹ |
| 8 | NC |
| 9 | NC |

1. Open collector outputs.

Front Panel LEDs

- Power on
- Optical power received (plug-ins only)

dc Monitor Voltages

- dc photocurrent (Pin 6): 1 V/mA

Alarm Circuits

The alarm is an open collector output capable of sinking 20 mA when active and withstanding 15 V when off. It can be used for remote drive of relays or LEDs.

Ordering Information

Table 7. Wideband Photodiode Receiver Options

| Option No. | Connector/Pigtail | Package Type | | |
|------------|--|--------------|--------|---------|
| | | Module | Flange | Plug-in |
| -020 | FC/APC Bulkhead Optical Connector | — | x | x |
| -021 | FC/SPC Bulkhead Optical Connector ¹ | — | x | x |
| -022 | FC/APC Optical Connector/3 mm Fiber Cable Pigtail | — | x | — |
| -023 | FC/SPC Optical Connector/3 mm Fiber Cable Pigtail | — | x | — |
| -026 | FC/PC Bulkhead Optical Connector | — | x | x |
| -028 | FC/PC Optical Connector/3 mm Fiber Cable Pigtail | — | x | — |
| -030 | No Optical Connector/900 μm Buffered Fiber Pigtail | x | — | — |
| -031 | FC/PC Optical Connector/900 μm Buffered Fiber Pigtail | x | — | — |
| -032 | FC/APC Optical Connector/900 μm Buffered Fiber Pigtail | x | — | — |

1. FC/SPC connectors are a higher grade version of FC/PC connectors and are compatible with them.

Table 8. Ordering Information¹

| Device Code | Description | Package Type | Comcode |
|-------------|------------------------------|---------------------------------|---------|
| 2510A | Wideband Photodiode Receiver | Module | TBD |
| 2510B | | Module | TBD |
| 2515A | | Module | TBD |
| 2515B | | Module | TBD |
| 2516A | | Module | TBD |
| 2516B | | Module | TBD |
| 2516C | | Module | TBD |
| 2518A | | Module | TBD |
| 2518B | | Module | TBD |
| 4510A | | Flange-Mount | TBD |
| 4510B | | Flange-Mount | TBD |
| 4515A | | Flange-Mount | TBD |
| 4515B | | Flange-Mount | TBD |
| 4516A | | Flange-Mount | TBD |
| 4516B | | Flange-Mount | TBD |
| 4516C | | Flange-Mount | TBD |
| 4518A | | Flange-Mount | TBD |
| 4518B | | Flange-Mount | TBD |
| 10450A | | Plug-in, for 19 in. Rack System | TBD |
| 10450B | | Plug-in, for 19 in. Rack System | TBD |
| 10455A | | Plug-in, for 19 in. Rack System | TBD |
| 10455B | | Plug-in, for 19 in. Rack System | TBD |
| 10456A | | Plug-in, for 19 in. Rack System | TBD |
| 10456B | | Plug-in, for 19 in. Rack System | TBD |
| 10456C | | Plug-in, for 19 in. Rack System | TBD |
| 10458A | | Plug-in, for 19 in. Rack System | TBD |
| 10458B | | Plug-in, for 19 in. Rack System | TBD |

1. For additional ordering information, please contact an account manager at OPTO West, Agere Systems Inc., 1-800-362-3891 (for sales staff, please press option 2).

For additional information, contact your Agere Systems Account Manager or the following:

INTERNET: <http://www.agere.com>

E-MAIL: docmaster@micro.lucent.com

N. AMERICA: Agere Systems Inc., 555 Union Boulevard, Room 30L-15P-BA, Allentown, PA 18109-3286
1-800-372-2447, FAX 610-712-4106 (In CANADA: **1-800-553-2448**, FAX 610-712-4106)

ASIA PACIFIC: Agere Systems Singapore Pte. Ltd., 77 Science Park Drive, #03-18 Cintech III, Singapore 118256
Tel. (65) 778 8833, FAX (65) 777 7495

CHINA: Agere Systems (Shanghai) Co., Ltd., 33/F Jin Mao Tower, 88 Century Boulevard Pudong, Shanghai 200121 PRC
Tel. (86) 21 50471212, FAX (86) 21 50472266

JAPAN: Agere Systems Japan Ltd., 7-18, Higashi-Gotanda 2-chome, Shinagawa-ku, Tokyo 141, Japan
Tel. (81) 3 5421 1600, FAX (81) 3 5421 1700

EUROPE: Data Requests: DATALINE: **Tel. (44) 7000 582 368**, FAX (44) 1189 328 148
Technical Inquiries: OPTOELECTRONICS MARKETING: **(44) 1344 865 900** (Ascot UK)

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