



### Applications

- Radar testing/calibration
- Signal processing
- Phased antenna array
- Phase noise testing
- Antenna remoting
- Cellular and PCS networks
- Military triband communications
- Tracking Telemetry & Control TT&C

### Features

- Bandwidth to 18 GHz
- High dynamic range
- Built-in optical isolator
- 1310 nm

## 5016-Series Fiber-Transceiver

The 5016-Series transceiver line delivers unmatched performance for radar testing, signal processing, phased antenna array, and phase noise testing when used in conjunction with the 355A Fiber-optic Delay Line and when used as a standalone product it serves as a high dynamic range transceiver for Microwave applications. These rugged devices eliminate many of the problems that are inherent in alternative delay line technologies including acoustic wave devices and coaxial delay lines.

Ortel's fiber-optic transceivers provide bandwidth that is essentially independent of fiber length, loss or delay, and triple transit signals that are immeasurable. In addition to enhanced electrical performance, the delay lines provide several mechanical advantages. Ortel's technology takes advantage of the rigid yet flexible properties of fiber-optic cable to provide repeatable enhanced phase and group delay characteristics.

The small size of these components allows for a long delay in a compact package with the superior temperature stability of fiber.

### Performance Highlights

|                    | Min  | Typical | Max     | Units |
|--------------------|------|---------|---------|-------|
| Wavelength Options | 1290 |         | 1340    | nm    |
| Temperature Range  | -25  | -       | +65     | °C    |
| Frequency Range    | 0.1  | -       | 10 - 18 | GHz   |

See following pages for complete specifications and conditions.

## 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           | Condition                     | Min  | Max | Units |
|---|------------------|-------------------------------|------|-----|-------|
| Operating Temperature Range of Baseplate: | T <sub>OP</sub>  | continuous                    | -40  | +65 | °C    |
| Storage Temperature                       | T <sub>STG</sub> | -                             | -55  | +85 | °C    |
| RF Input Power                            | P <sub>IN</sub>  | 60 seconds                    | -    | 20  | dBm   |
| ESD, module                               | -                | HBM: R = 1500 Ohm, C = 100 pF | -500 | 500 | V     |

## dc Interface Characteristics

| Pin Number | Min  | Typ | Max  | Max Ripple | Current   |
|------------|------|-----|------|------------|-----------|
| 1          | 14V  | 15V | 16V  | 100 mV p-p | 0.3 A max |
| 2          | 4.5V | 5V  | 5.5V | 200 mV p-p | 1.6 A max |

## Pin/Package Information

Nine-Pin D-sub Connector

| Pin | Description                               |
|-----|---|
| 1   | +15 Vdc                                   |
| 2   | +5 Vdc                                    |
| 3   | NC  |
| 4   | Power Ground                              |
| 5   | Reference Ground                          |
| 6   | Laser Photodiode Current Monitor          |
| 7   | Received Optical Power                    |
| 8   | Laser Current Monitor                     |
| 9   | Laser Over-temperature Alarm <sup>1</sup> |

1: Open collector outputs

## Ordering Information

| Option | Connector/Pigtail                           |
|--------|---|
| -020   | FC/APC Bulkhead Optical Connector           |
| -022   | FC/APC Optical Connector/ 3mm Fiber Pigtail |

## Front Panel LEDs

- Power on

## dc Monitor Voltages

- Laser Photodiode current, pin6
  - 1V/100mA  $\pm$ 2% accuracy (into 1 M $\Omega$  load). Proportional to laser optical power
- Photodiode current, pin7
  - 1V/mA  $\pm$ 2% accuracy (into 1 M $\Omega$  load). Proportional to photodiode input power
- Laser dc current, pin 8:
  - 1V/100mA  $\pm$ 2% accuracy (into 1 M $\Omega$  load). Alarm Circuits

## Alarm Circuits

The alarms are open-collector outputs capable of sinking 20 mA to ground when active and withstanding 15V when off.

- Laser temperature, pin 9
  - Sinks current when laser internal temperature exceeds  $\pm$  2 °C of set-point (nominally 25°C).

**For more information on this and other products:**

Contact Sales at Emcore 626-293-3400, or visit [www.emcore.com](http://www.emcore.com).

## Electrical/Optical Characteristics

### Optical

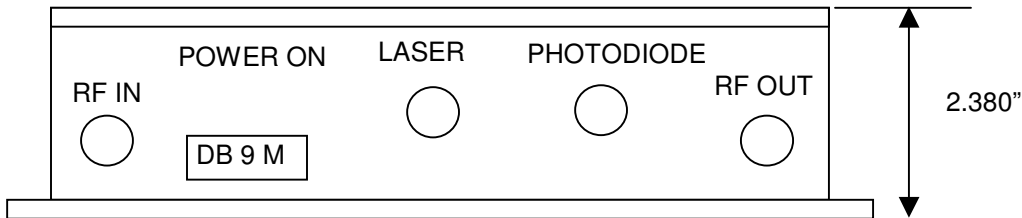
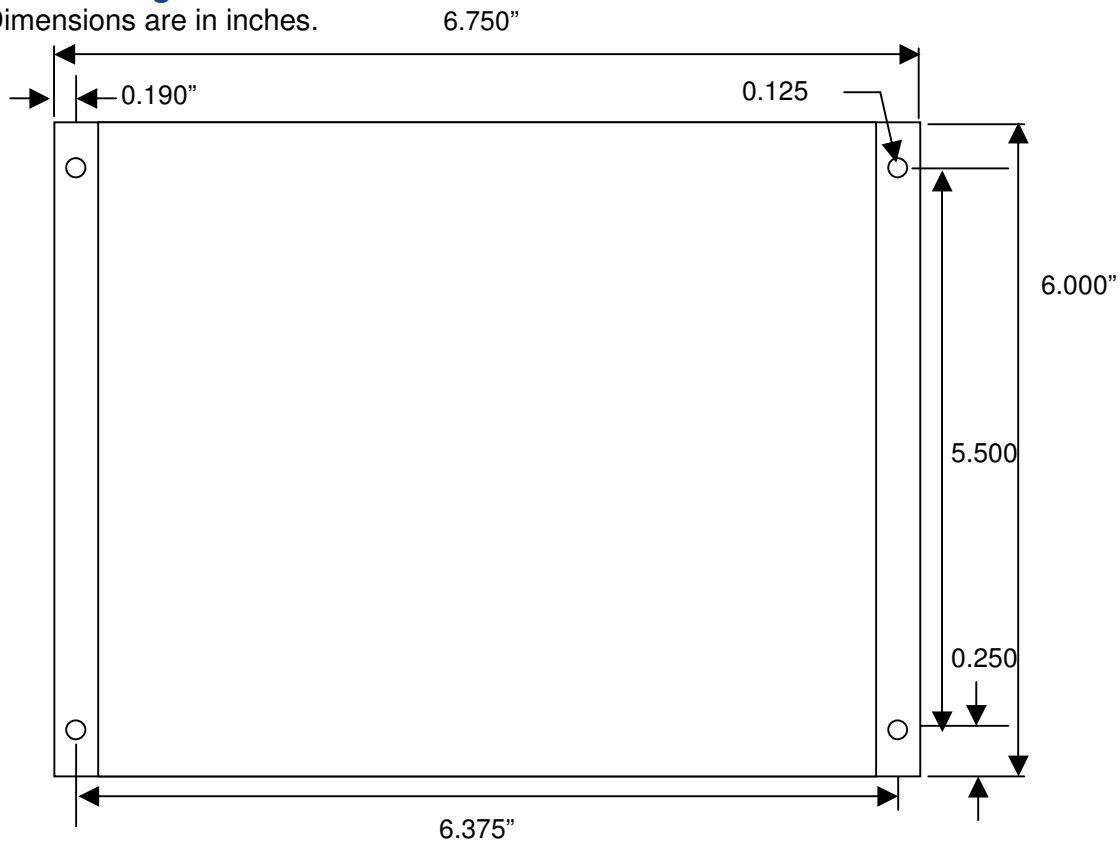
| Parameter                              | Specifications      | Unit          |
|--|---------------------|---------------|
| Fiber                                  | Single mode (9/125) | μm            |
| Optical Connectors                     | FC/APC              | -             |
| Optical Transmitter Output Power       |                     |               |
| 5016A,B,C only                         | 8 (+9)              | mW (dBm), min |
| 5016D only                             | 2 (+3)              | mW (dBm), max |
| 5016A,B,C,D used with 355A delay spool | 5 (+7)              | mW (dBm), max |
| Optical Receiver Input Power           |                     |               |
| Low Power System, 5016D                | 2 (+3)              | mW (dBm), max |
| High Power System, 5016A,B,C           | 15 (+12)            | mW (dBm), max |

### RF Characteristics

| Parameter                     | 5016A | 5016B | 5016C | 5016D | Unit |
|-------------------------------|-------|-------|-------|-------|------|
| RF Connectors                 | SMA   |       |       |       | -    |
| Upper Band Edge Frequency     | 4     | 10    | 15    | 18    | GHz  |
| Lower Band Edge Frequency     | 0.1   | 0.1   | 0.1   | 0.1   | GHz  |
| Insertion Loss (0 dB Optical) | 28    |       |       | 34    | dB   |
| Amplitude Flatness            | ± 1.5 | ± 2.0 | ± 2.5 | ± 3.0 | dB   |
| Input / Output RF Return Loss | 9.5   | 9.5   | 6     | 6     | dB   |
| Impedance                     | 50    |       |       |       | Ω    |
| Input 1 dB Compression        | +20   |       |       |       | dBm  |
| Input Third Order Intercept   |       |       |       |       |      |
| 0.01 GHz – 2.5 GHz            | 35    | -     | -     | -     | dBm  |
| 2.5 GHz – 6.0 GHz             | 30    | -     | -     | -     | dBm  |
| 6.0 GHz – 10.0 GHz            | -     | 25    | 25    | 25    | dBm  |
| 10.0 GHz – 18.0 GHz           | -     | -     | -     | 20    | dBm  |
| Noise Figure                  |       |       |       |       |      |
| 0.01 GHz – 10.0 GHz           | 46    | 46    | 46    | 46    | dB   |
| 10.0 GHz – 15.0 GHz           | 51    | 51    | 51    | 51    | dB   |
| 15.0 GHz – 18.0 GHz           | 57    | 57    | 57    | 57    | dB   |

**Outline Diagram**

Dimensions are in inches.



## Laser Safety

### Class IIIb Laser Product

FDA/CDRH Class IIIb laser product. All versions are Class IIIb laser products per CDHR 1040 Laser Safety Requirements. All versions are class 3B laser products per *IEC*<sup>®</sup> 60825-1:1993. The device has been classified with the FDA under accession number 220191.

This product complies with 21 CFR 1040.10 and 1040.11.

Single-mode fiber pigtail

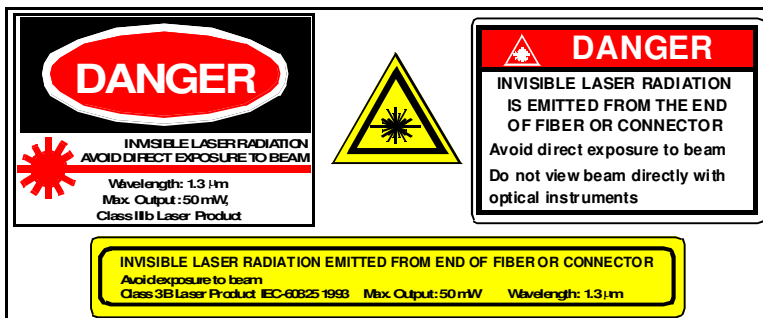
Wavelength = 1.3  $\mu\text{m}$

Maximum power = 30 mW

Because of size constraints, laser safety labeling (including an FDA class IIIb label) is not affixed to the module but attached to the outside of the shipping carton.

Product is not shipped with power supply.

**Caution: Use of controls, adjustments and procedures other than those specified herein may result in hazardous laser radiation exposure.**



Information contained herein is deemed to be reliable and accurate as of issue date. EMCORE reserves the right to change the design or specifications of the product at any time without notice. Ortel, the Ortel logo, EMCORE, and the EMCORE logo are trademarks of EMCORE Corporation.



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