# Fiber Optic 2D Arrays

## DESCRIPTION

In the 1990's Fiberguide developed 2-dimensional arrays of single mode fibers to meet extraordinarily demanding specifications of Lucent Technologies' Bell Laboratories. They needed the centerlines of 361 fibers in a 19 x 19 array to be positioned to an **absolute** accuracy of ± 2.0 microns over the entire array. This required a positioning accuracy beyond that possible with conventional machining methods.

The solution developed and patented by the technical staff at Fiberguide is to use an alignment plate with holes in it to guide the fibers into position. The plate is made from a wafer of silicon and the position of each hole is established by the same photolithographic and etching methods that are used to make electronic integrated circuits. The following is an exploded view of the entire assembly:

Fiberguide can adapt this technology to make both linear (1-dimensional) and 2-dimensional arrays to specific customer needs.

## FEATURES & BENEFITS

<table>
<thead>
<tr>
<th>Features</th>
<th>Benefits</th>
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<tbody>
<tr>
<td>• Meets or exceeds Telcordia GR-1221-CORE-Reliability Qualification Requirements for Passive Devices.</td>
<td>• Detailed test documentation provided with each array on:</td>
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<tr>
<td></td>
<td>• Fiber position.</td>
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<td></td>
<td>• Insertion loss.</td>
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<td>• Flatness.</td>
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<td>• Return loss.</td>
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<td>• Fiber “Z” axis position.</td>
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<td>• RMS for fiber roughness.</td>
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<td>• Fiber-to fiber angularity.</td>
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<td></td>
<td>• Fiber-to-substrate angularity.</td>
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<tr>
<td>• Designed and manufactured to customer application and/or specification. Designs utilize either single mode or multimode fibers. Distal ends can be provided cleaved, polished, or terminated with a wide variety of standard connectors or customized endfittings.</td>
<td>• A product specific to your individual application and tailored to your specific technical and economic requisites.</td>
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<td>• Exact positioning of fibers.</td>
<td>• Precision high performance.</td>
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<td>• Center-to-center pitch from 150µ to 5mm.</td>
<td>• Guaranteed accuracy.</td>
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<td>• Strain relief packaging.</td>
<td>• Limits breakage during handling/installation.</td>
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</table>
Fiber Optic 2D Arrays

APPLICABLES

- 3D MEMS switch
- Optical crossbar switch
- Control of a wideband array transmitter
- Fiber optic switch
- Space and wavelength multiplexed data channels
- Signal processing
- Free space parallel interconnects
- Astronomical analysis
- Military mapping
- DNA micro-array technology
- Multiplexed screening and analysis for biosensors
- Optical tomography

REFERENCE SUMMARY

Product Category: Arrays
Trade Name: Fiber Optic 2D Arrays

TYPICAL APPLICATIONS

- Astrological Mapping
- Free Space Parallel Interconnect
- Optical Coherence Tomography
- 3D MEMS Switch
- DNA Micro-Arry
- Fiber Optic Signal Processing
- Fiber Optic Switch
- Optical Crossbar Switch

TYPICAL SPECIFICATIONS FOR PRODUCTION ARRAYS

- Fiber position (core-to-core non-cumulative): ≤0.5µm
- Insertion loss with LC (connector dependent): ≤0.09dB
- Flatness (PV) for 25mm x 25mm area: ≤1.0µm
- Return loss @ 1310nm and 1550nm: ≤33.0dB
- Fiber protrusion/recession: ≤0.1µm
- RMS fiber roughness: ≤10nm
- Fiber angularity (fiber-to-fiber non-cumulative): ≤2.5mrad
- Fiber angularity relative to substrate normal: ≤5mrad
- Fiber yield: ≥99%

Note: Typical specifications do not necessarily reflect those specifications for custom, one-of-a-kind arrays.
## TWO DIMENSIONAL ARRAY QUESTIONNAIRE

Contact Information

Name: ________________________________

Company Name: ________________________________

Address: ____________________________________________

Qty: ____________________________________________

State/Province: ________________________________

Zip Code: ________________________________

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1. Fiber type: 
   - Single Mode
   - Multimode
   - Macro Bend
   - Other (please specify)

2. Number of fibers: ________ x ________

3. Fiber pitch: ________ μm

4. Fiber configuration:
   - Parallel: ________ μm
   - Flatness: ________ μm

5. Surface Quality: ________ μm

6. Insertion Loss: ________ dB

7. Return Loss: ________ dB

8. Angularity: ________ mrad

9. Fiber Yield: ________%

10. Connectors:
    - LC
    - SC
    - FC
    - Other (please specify)

11. Sheathing:
    - Standard-PVC w/Kevlar strands 900μm O.D.

12. Pigtail length: ________ meters

13. Housing:
    - Material: ____________________________
    - Size: ________________________________

14. AR coating:
    - Yes (Wavelength: ________ nm)
    - No

15. Environment: ________ °C

16. Labeling Required:
    - Yes
    - No

17. Serialization Scheme: ________________________________

18. Certifications: ________________________________

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**Technical Data**

**REFERENCE SUMMARY**

Product Category: Arrays

Trade Name: Fiber Optic 2D Arrays

Fiberguide Industries Customization Program

Fiberguide Industries is a full service custom fiber and value-added assembly provider. If you have unique requirements, please contact us to discuss tailoring a product or design to optimize optical performance for your specific application.

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