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Multimode Fiber Connector for Automotive Applications

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Modified "MOST" ferrule for high-bandwidth MMF

Enables continued utilization of:

- Current manufacturing equipment, e.g., Laser welding
- Automated component placement
- Inline connector adapters
- Equipment termini

Familiarity:

- Same MOST fit and form factor
- Used by automotive harness manufacturers
- Automotive mechanics in dealerships
- No training required
- Ease of cleaning (wipe with clean cloth)

Differentiation:

- Ultra-low cost
- 2 molded plastic parts (lens & ferrule) + assembly
- Option for index matching gel (0.5 dB reduction in IL)

Expanded beam connector





MOST Connector Components









Gen I Lens – Polycarbonate



Can be modified for any fiber dimension



Component Assembly







Laser welding

- Harness maker requested laser welding for ferrule attachment
- A laser is used to melt the buffer material with the ferrule material
- In order to reach a high absorbance at the buffer material, carbon particles are blended in when the buffer is extruded
- Transparency of the ferrule must be highly homogeneous











Mated ferrules





Gen I Optical System Modeling

- Polycarbonate lens
- No index matching gel at fiber/lens interface
- Absorption due to polycarbonate lenses at 850 nm = 2x 0.34dB



Loss vs angle for separation: 2, 9, 16 mm



Sensitivity to Lateral misalignment with lens thickness (at optimum radius of curvature





Sensitivity to Radius of curvature



At 10 mm for n=1.5688



Launch fiber to receive fiber separation IL



Lens Separation



Loss Measurements Gen I Lens



Gen II Lens – new material system

- Negligible material attenuation at 850 nm
 - Absorption due to polycarbonate lenses = 2x 0.34dB
- Relative temperature index 170 °C
- Presently modeling optimum lens parameters (RC, L, Dia.)
- Fresnel Reflection (lens to air) = 0.237 dB
- Objective: 1.5 dB max. IL with no AR coating
- 4 connector pairs, worst-case IL = 6 dB







Questions

