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Optoelectronic Assembly and Packaging Technology

Developed by the Optoelectronics Assembly Subcommittee (5-25) of the
Assembly & Joining Processes Committee (5-20) of IPC



Users of this publication are encouraged to participate in the
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Optoelectronic Assembly and Packaging Technology

1 SCOPE

This document addresses the implementation of optical and optoelectronic packaging technologies.

The areas discussed include: technology choices, design considerations, material properties, component mounting and interconnecting structures, assembly processes, testing, application, rework, and reliability of completed optoelectronic products. Optoelectronic packaging technologies include active and passive components and discrete fiber cable, their characteristics, and the manner that these parts will become an integral part of the functioning module, board or subassembly.

1.1 Purpose This document is intended to provide general information on implementing optical and optoelectronic packaging technologies, for creating component mounting structures and assemblies that may be exclusively optically oriented or that are to perform a combination of optical and electronic functions.

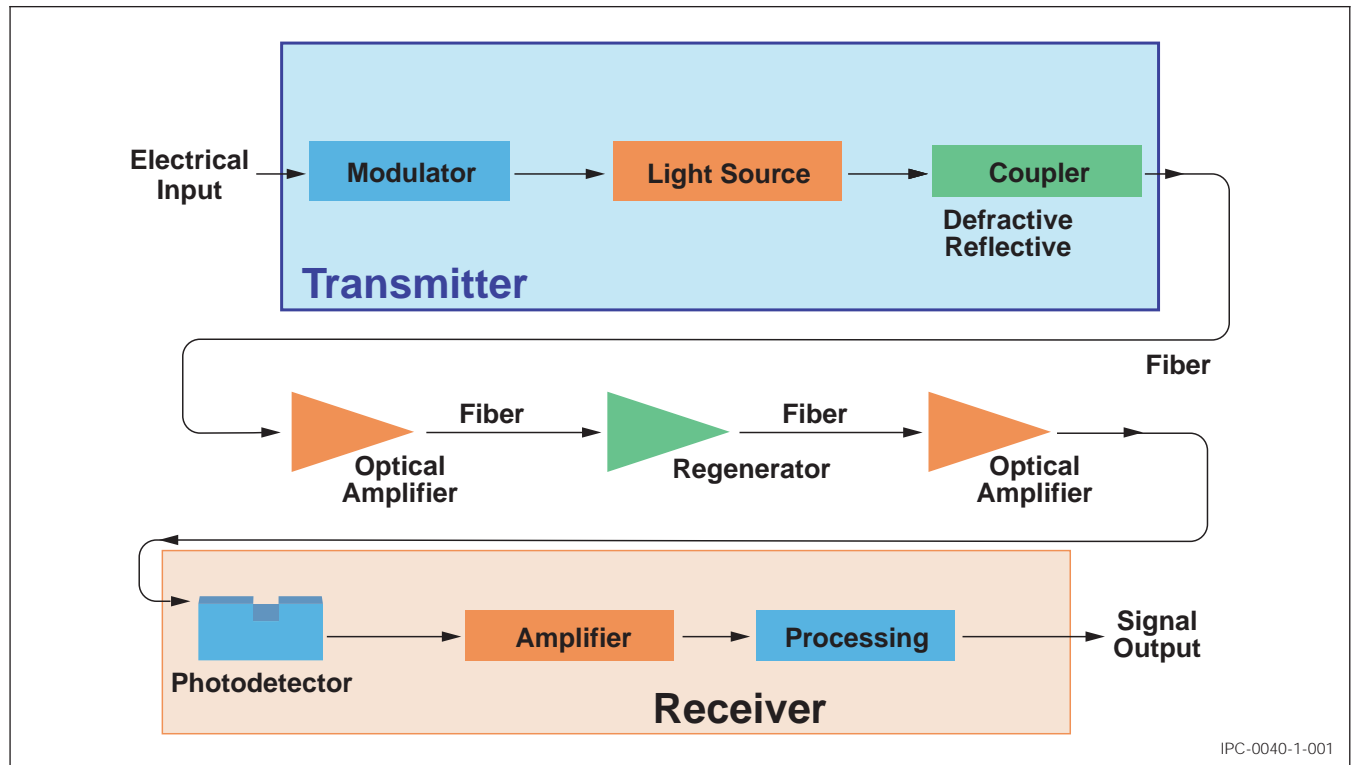
1.2 Categorization Optoelectronic components are categorized by function (i.e., modulators, lasers, switches, detectors); optoelectronic assemblies are categorized by higher level functions (i.e., transmitters, receivers, amplifiers, transponders). See Figures 1-1 through 1-3.

There are four levels of optoelectronic packaging. These levels have been established to mirror previous packaging levels assigned to electronic equipment. They are intended to make a clear demarcation between manufacturing products intended for the optoelectronic market. The four levels are:

- **OPTO Level 0:** Uncased device (e.g., lenses. Isolator, laser diode, waveguide beam splitters, etc.)
- **OPTO Level 1:** Single device or multiple devices in a package (Multi-Device Subassembly (MDS) - a package integrating optical, optoelectronic components and IC components)
- **OPTO Level 2:** Modules and product boards (Transponder on a daughter card)
- **OPTO Level 3:** Mother board with product boards or cabling (Transponder mounted on a mother board)

It should be recognized that there are also levels of complexity included in each of the levels of optoelectronic packages. Level 0 complexity deals with unpackaged devices complexity primarily relating to the complexity or difficulty in the manufacturing process.

Levels 1 through 3 complexities relate to the assembly process(s) necessary to produce a quality optoelectronic



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Figure 1-1 Optoelectronic Communication System Structure