CLAIMS

1. An optical system comprising:

- an optical circuit board (1) having:
  - . a top face,
  - . a bottom face (1b;23), opposed to the top face,
  - . at least one optical layer (11), embedded between the top and bottom faces, and having a first optical interface (1a),
  - . at least one cut-out (17) formed in the top face, and having a bottom reference layer (20) defining an X-Y plane,
- an optical coupling device (8) having:
  - . at least one positioning member (19) extending in a said cut-out, and having a bottom face (30) placed on the reference layer of the optical circuit board,
  - . at least one optical path adapted to transmit light between a first optical interface (25), optically coupled to the first optical interface (1a) of the optical board, and a second interface (26),
- a mechanical fixation system (31) adapted to attach optical coupling device to the optical circuit board, and comprising a fixation pin (32) extending through at least part of the optical circuit board (1) at the positioning member (19).

2. System according to claim 1, wherein the positioning member (19) has a central area, and wherein the pin extends in the central area.

3. System according to claim 1 or 2, wherein the optical coupling device has a top face (8a), opposed to the bottom face, and wherein the pin (32) extends from the top face of the optical coupling device, to the bottom face (1b) of the optical circuit board (1).

4. System according to any of claims 1 to 3,

wherein the mechanical fixation system (31) comprises a bearing surface (35) bearing on at least one of the bottom face (1b) of the optical circuit board and of a top face (8a) of the optical coupling device, which is opposed to the bottom face (30) of the positioning member.

5. System according to any of claims 1 to 4, wherein the optical circuit board comprises a through hole (34) and wherein the pin (32) extends through the through hole of the optical circuit board.

6. System according to any of claims 1 to 5, wherein the optical coupling device comprises a through hole (33) extending from the bottom face of the positioning member to an opposed top face (8a) of the optical coupling device, and wherein the pin extends through the through hole (33) of the optical coupling device.

7. System according to any of claims 1 to 6, wherein the optical circuit board comprises a through hole having an internal cylindrical face (42), and wherein the pin (32) cooperates with the internal cylindrical face by friction.

8. System according to any of claims 1 to 7, wherein the pin (32) is integral with the optical coupling device.

9. System according to any of claims 1 to 8, wherein the mechanical fixation system (31) is releasable.

10. An optical system comprising:

- an optical circuit board (1) having:
  - . a top face,
  - . a bottom face (1b), opposed to the top face,
  - . at least one optical layer (11), embedded between the top and bottom faces, and having a first optical interface (1a),
  - . at least one cut-out (17) formed in the top face, and having a bottom reference layer (20) defining an X-Y plane,

- an optical coupling device (8) having:

. at least one positioning member (19) extending in a said cut-out, and having a bottom face (30) placed on the reference layer of the optical circuit board,

. at least one optical path adapted to transmit light between a first optical interface (25), optically coupled to the first optical interface (1a) of the optical board, and a second interface (26),

- a releasable mechanical fixation system (31) adapted to attach the optical circuit board to the optical coupling device, and comprising a fixation pin (32) extending through the optical circuit board (1) at the positioning member (19).

11. System according to any of claims 1 to 10, further comprising:

- a MT-ferrule (4) having a first optical interface (22a),

- an alignment system (43) adapted to align the MT-ferrule (4) on the optical circuit board (1), so that the first optical interface (22a) of the MT-ferrule is optically coupled to the second optical interface (26) of the optical coupling device (8).

12. System according to claim 11, wherein the alignment system comprises at least one recess (47) in the MT-ferrule, and at least one respective pin (147), complementary with the recess and integrally formed with the optical coupling device (8).

13. System according to claim 12, wherein the MT-ferrule has a guided surface (50) extending along a mating axis prependicular to the X-Y plane, and wherein the optical coupling device (8) has a bend-resistant system (48) having a guiding surface (49) complementary to the guided surface (50), and adapted to guide the MT-ferrule along the mating axis.

14. An optical system comprising:

- a MT-ferrule (4) having a first optical interface (22a),
- an optical circuit board (1) having:
  . a top face,
  . a bottom face (1b), opposed to the top face,
  . at least one optical layer (11), embedded between the top and bottom faces, and having a first optical interface (1a),
  . at least one cut-out (17) formed in the top face, and having a bottom reference layer (20) defining an X-Y plane,
- an optical coupling device (8) having:
  . at least one positioning member (19) extending in said cut-out, and having a bottom face (30) placed on the reference layer of the optical circuit board,
  . at least one optical path adapted to transmit light between a first optical interface (25), optically coupled to the first optical interface (1a) of the optical board, and a second interface (26), optically coupled to the first optical interface (22a) of the MT-ferrule,
- a releasable mechanical fixation system (31) adapted to attach the optical circuit board to the optical coupling device, and comprising a fixation pin (32) extending through the optical circuit board (1) at the positioning member (19),
- an alignment system (43) adapted to align the MT-ferrule (4) on the optical circuit board (1), wherein the MT-ferrule has a guided surface (50) extending along a mating axis normal to the X-Y plane, and wherein the optical coupling device (8) has a bend-resistant system (48) having a guiding surface (49) complementary to the guided surface (50), and adapted to guide the MT-ferrule along the mating axis.

15. A system comprising:

- an optical coupling device (8) having at least one optical path adapted to propagate light between a first optical interface (25), adapted to be optically coupled to a first optical interface (1a) of an optical circuit board, and a second interface (26),

- a MT-ferrule (4) having a first optical interface (22a) optically coupled to the second optical interface (26) of the optical coupling device ,

- an alignment system (43) adapted to align the MT-ferrule on the optical circuit board, and comprising:

. at least one recess (47) in the MT-ferrule, and

. at least one respective pin (147), complementary with the recess, and integrally formed with the optical coupling device,

- a protection system (51) comprising:

. a guided surface (50) of the MT-ferrule (4), extending along a mating axis, and

. a bend-resistant system (48) having a guiding surface (49) complementary to the guided surface, and adapted to guide the MT-ferrule along the mating axis.

16. System according to any of claims 13 or 15, wherein the guided surface (50) is an outer surface of the MT-ferrule, and wherein the protection system (51) comprises an inner wall (48) surrounding the outer surface of the ferrule.

CLAIMS

1. An invention not claimed in any divisional application.