(19)中华人民共和国国家知识产权局

(12)发明专利申请

(10)申请公布号 CN 107907948 A
(43)申请公布日 2018.04.13

(21)申请号 201711384315.0

(22)申请日 2017.12.20

(71)申请人 武汉联特科技有限公司
地址 430000 湖北省武汉市东湖新技术开发区大学园路20号中国普天1号楼2楼

(72)发明人 彭峰 张健 杨现文 吴天书 李林科

(74)专利代理机构 北京汇泽知识产权代理有限公司 11228
代理人 胡建文

(51)Int.Cl.
G02B 6/42(2006.01)
H04B 10/40(2013.01)

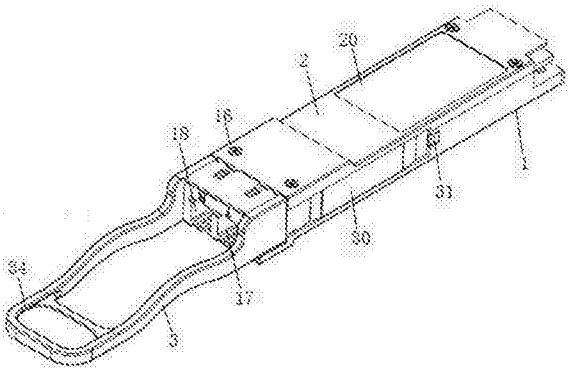
权利要求书1页 说明书4页 附图5页

(54)发明名称

光收发模块外壳及光收发模块

(57)摘要

本发明涉及光通讯技术领域，提供了一种光收发模块外壳，包括壳体，用于密封壳体的盖体，以及可套设于壳体上的把手，盖体可拆卸安装于壳体上，壳体具有供光发射器件以及光接收器件安置的腔体，壳体一侧开设有供光发射器件以及光接收器件分别插入的第一通孔和第二通孔；把手具有条状的两个锁片，两个锁片的端部均设有锁头，壳体两侧均设有供两个锁头分别卡入的第一凹槽。还提供一种光收发模块，包括光发射器件以及光接收器件，还包括上述的一种光收发模块外壳。本发明的光收发模块外壳及光收发模块，仅有两个通孔与外界连通，极大地减小了电磁波从其他缝隙处泄露出去的可能；通过锁片上的锁头卡入或退出第一凹槽的方式，能够轻易地实现锁紧和解锁。



CN 107907948 A

EOPTOLINK-1009
Eoptolink Tech. USA v. Applied Optoelectronics, IPR2026-00094

1.一种光收发模块外壳，包括壳体以及用于密封所述壳体的盖体，所述盖体可拆卸安装于所述壳体上，所述壳体具有供光发射器件以及光接收器件安置的腔体，其特征在于：所述壳体一侧开设有供所述光发射器件以及所述光接收器件分别插入的第一通孔和第二通孔；还包括可套设于所述壳体上的把手，所述把手具有条状的两个锁片，两个所述锁片的端部均设有锁头，所述壳体两侧均设有供两个所述锁头分别卡入的第一凹槽。

2.如权利要求1所述的一种光收发模块外壳，其特征在于：所述壳体两侧均设有供两个所述锁片滑行的导向槽，两个所述导向槽均位于所述第一凹槽与所述壳体靠近所述第一通孔的一端之间。

3.如权利要求2所述的一种光收发模块外壳，其特征在于：两个所述锁片上设有若干限位凸起，所述导向槽上设有供各所述限位凸起卡入的若干第二凹槽。

4.如权利要求2所述的一种光收发模块外壳，其特征在于：两个所述导向槽均为斜面，且两个所述导向槽靠近所述第一凹槽的一端均为倒角。

5.如权利要求1所述的一种光收发模块外壳，其特征在于：所述壳体具有沿所述锁片的长度方向设置的至少一个第三凹槽，所述第三凹槽于靠近所述腔体的一侧设有开口，所述第三凹槽内安装有弹簧，所述弹簧的一端与所述第三凹槽正对所述开口的侧面抵接，且另一端延伸至所述第三凹槽外；所述把手设有可与所述弹簧延伸至所述第三凹槽外的一端抵接的卡勾。

6.如权利要求1所述的一种光收发模块外壳，其特征在于：还包括用于卡紧所述光发射器件和所述光接收器件的M型卡块，所述壳体具有供所述M型卡块插入的第四凹槽。

7.如权利要求6所述的一种光收发模块外壳，其特征在于：所述M型卡块具有两个弧形槽，且所述两个弧形槽之间设有第一圆形通孔。

8.如权利要求1所述的一种光收发模块外壳，其特征在于：所述第一通孔和所述第二通孔均为第二圆形通孔，且所述第一通孔与所述光发射器件间隙配合，所述第二通孔与所述光接收器件间隙配合。

9.如权利要求1所述的一种光收发模块外壳，其特征在于：两个所述锁片远离所述锁头的一侧连接有拉环。

10.一种光收发模块，包括光发射器件以及光接收器件，其特征在于：还包括如权利要求1-9任一所述的一种光收发模块外壳，所述光发射器件以及所述光接收器件均安设于所述内腔内，且所述光发射器件的输出端插入所述第一通孔，所述光接收器件的输出端插入所述第二通孔；所述壳体上安装有PCBA，所述盖体覆盖于所述PCBA上。

光收发模块外壳及光收发模块

技术领域

[0001] 本发明涉及光通讯技术领域，具体为一种光收发模块外壳以及光收发模块。

背景技术

[0002] 光通信模块高集成度、高速率的发展趋势，势必会使得光模块向着高速率、小型化、高密集度方向不断发展，所以QSFP28可插拔100G高速率光收发一体模块应运而生。QSFP28光模块是专为光通信、数据中心和网络市场应用而设计的高密度、高速率的产品解决方案。数据中心的成本和功耗是其建造者需要考虑的重要因素之一，这也是光通信市场发展的重要动力。回顾100G光模块的发展历程，其封装样式(CFP、CFP2、CFP4、QSFP28)和标准的发展及改进也都主要围绕着低成本和低功耗两个方面进行，QSFP28光模块正好符合这些要求，目前得到市场的广泛认可，尤其受到了大多数数据中心的广泛青睐。

[0003] 而QSFP28目前又面临着两个问题，其一是：由于光通信模块在使用时经常需要进行插拔动作，因此通常要求模块自带一种解锁装置，使模块能够顺利地从设备的安装笼子里脱出；另外一个是：随着光模块的传输速率不断提高，高传输速率的光收发模块特别容易产生超标的EMI(电磁干扰)，解决EMI有效的方法是在产品外壳结构上做电磁屏蔽，对于导体材料的电磁屏蔽，用整体金属外壳来实现是效果最好的，但实际应用中，由于装配需要和加工精度问题，壳体与盖体、光器件适配器与壳体之间不可避免会出现间隙，从而大大影响整个光模块外壳的电磁屏蔽效果。

发明内容

[0004] 本发明的目的在于提供一种光收发模块外壳以及光收发模块，一方面仅通过第一通孔和第二通孔这两个单独的通孔，就能够使光发射器件以及光接收器件与光纤接口连通，壳体内部与光纤接口之间的间隙很小，可有效地减少电磁波从光纤接口处泄露出去，另一方面通过锁片上的锁头卡入或退出第一凹槽的方式，能够轻易地实现锁紧和解锁。

[0005] 为实现上述目的，本发明实施例提供如下技术方案：一种光收发模块外壳，包括壳体以及用于密封所述壳体的盖体，所述盖体可拆卸安装于所述壳体上，所述壳体具有供光发射器件以及光接收器件安置的腔体，所述壳体一侧开设有供所述光发射器件以及所述光接收器件分别插入的第一通孔和第二通孔；还包括可套设于所述壳体上的把手，所述把手具有条状的两个锁片，两个所述锁片的端部均设有锁头，所述壳体两侧均设有供两个所述锁头分别卡入的第一凹槽。

[0006] 进一步，所述壳体两侧均设有供两个所述锁片滑行的导向槽，两个所述导向槽均位于所述第一凹槽与所述壳体靠近所述第一通孔的一端之间。

[0007] 进一步，两个所述锁片上设有若干限位凸起，所述导向槽上设有供各所述限位凸起卡入的若干第二凹槽。

[0008] 进一步，两个所述导向槽均为斜面，且两个所述导向槽靠近所述第一凹槽的一端均为倒角。

[0009] 进一步，所述壳体具有沿所述锁片的长度方向设置的至少一个第三凹槽，所述第三凹槽于靠近所述腔体的一侧设有开口，所述第三凹槽内安装有弹簧，所述弹簧的一端与所述第三凹槽正对所述开口的侧面抵接，且另一端延伸至所述第三凹槽外；所述把手设有可与所述弹簧延伸至所述第三凹槽外的一端抵接的卡勾。

[0010] 进一步，还包括用于卡紧所述光发射器件和所述光接收器件的M型卡块，所述壳体具有供所述M型卡块插入的第四凹槽。

[0011] 进一步，所述M型卡块具有两个弧形槽，且所述两个弧形槽之间设有第一圆形通孔。

[0012] 进一步，所述第一通孔和所述第二通孔均为第二圆形通孔，且所述第一通孔与所述光发射器件间隙配合，所述第二通孔与所述光接收器件间隙配合。

[0013] 进一步，两个所述锁片远离所述锁头的一侧连接有拉环。

[0014] 本发明实施例提供另一种技术方案：一种光收发模块，包括光发射器件以及光接收器件，还包括上述的一种光收发模块外壳，所述光发射器件以及所述光接收器件均安设于所述内腔内，且所述光发射器件的输出端插入所述第一通孔，所述光接收器件的输出端插入所述第二通孔；所述壳体上安装有PCBA，所述盖体覆盖于所述PCBA上。

[0015] 与现有技术相比，本发明的有益效果是：

[0016] 1、盖体安装到壳体上后，仅有两个通孔能够供光发射器件和光接收器件与外界连通，极大地减小了电磁波从其他缝隙处泄露出去的可能；且通过锁片上的锁头卡入或退出第一凹槽的方式，能够轻易地实现锁紧和解锁。

[0017] 2、设导向槽能够便于锁片沿着该导向槽滑动至锁头卡入第一凹槽，起到了导向的作用。

[0018] 3、设若干凸起能够有效地限制锁片在宽度方向上的位移。

[0019] 4、导向槽设倒角能够方便锁头卡入第一凹槽。

[0020] 5、设弹簧能够便于解锁时把手自动弹回，以脱离壳体。

[0021] 6、设M型卡块能够防止光发射器件和光接收器件从腔体内脱离出来。

[0022] 7、设拉环便于推动或拉动锁片。

附图说明

[0023] 图1为本发明实施例提供的一种光收发模块外壳的结构示意图；

[0024] 图2为本发明实施例提供的一种光收发模块外壳的壳体的第一视角结构示意图；

[0025] 图3为本发明实施例提供的一种光收发模块外壳的壳体的第二视角结构示意图；

[0026] 图4为本发明实施例提供的一种光收发模块外壳的盖体的第一视角结构示意图；

[0027] 图5为本发明实施例提供的一种光收发模块外壳的盖体的第二视角结构示意图；

[0028] 图6为本发明实施例提供的一种光收发模块外壳的把手的第一视角结构示意图；

[0029] 图7为本发明实施例提供的一种光收发模块外壳的把手的第二视角结构示意图；

[0030] 图8为本发明实施例提供的一种光收发模块外壳的M型卡块的结构示意图；

[0031] 图9为本发明实施例提供的一种光收发模块的爆炸图；

[0032] 附图标记中：1-壳体；10-第一通孔；11-第二通孔；12-第一凹槽；13-导向槽；14-第三凹槽；15-第四凹槽；16-螺钉；160-螺钉孔；17-第一光纤接口；18-第二光纤接口；2-盖体；

20-标签槽;21-第五凹槽;3-把手;30-锁片;31-锁头;32-限位凸起;33-第二凹槽;34-拉环;35-方孔;4-弹簧;5-卡勾;6-M型卡块;60-弧形槽;61-第一圆形通孔;7-光发射器件;8-光接收器件;9-PCBA。

具体实施方式

[0033] 下面将结合本发明实施例中的附图,对本发明实施例中的技术方案进行清楚、完整地描述,显然,所描述的实施例仅仅是本发明一部分实施例,而不是全部的实施例。基于本发明中的实施例,本领域普通技术人员在没有做出创造性劳动前提下所获得的所有其它实施例,都属于本发明保护的范围。

[0034] 请参阅图1-图9,本发明实施例提供一种光收发模块外壳,其包括壳体1和盖体2,盖体2用来密封壳体1,尽可能地消除壳体1的腔体与外界的连通,可避免电磁波由壳体1内往外泄露。盖体2可拆卸地安装于壳体1上,如通过四颗螺钉16安装在壳体1上对应的螺钉孔160中,也可以通过绑带绑定,如此便能方便光发射器件7和光接收器件8的安装。壳体1一侧开设有供光发射器件7和光接收器件8分别插入的第一通孔10和第二通孔11,光发射器件7和光接收器件8仅通过这两个通孔与外界连通,具体的,与光纤接口连接,由于没有更多与外界连通之处,密封性好,电磁波只能通过两个器件与这两个通孔之间微小的间隙泄露到外界,比起现有技术中需通过过多的零件来阻止电磁波的泄露,要简单直接得多,极大地减小了电磁波泄露的可能,既减小了成本,又有效地解决了现有技术中由于装配需要和加工精度问题,壳体1与盖体2、光器件适配器与壳体1之间不可避免会出现间隙的缺陷,从而提升了整个光模块外壳的电磁屏蔽效果。把手3能够套设在壳体1上,而且它具有自解锁机构,具体的,把手3具有条状的两个锁片30,它们的端部均设有锁头31,在壳体1的两侧设置有能够供上述两锁头31分别卡入的第一凹槽12,在实际工作中,只需要将两个锁头31推到两个第一凹槽12处并卡进第一凹槽12,把手3就能够锁在壳体1上,而当需要解锁时,只需两个锁头31脱离第一凹槽12即可。解锁机构简单且使用,比起现有的繁杂解锁机构要容易实现,且成本低廉。

[0035] 优化上述方案,请参阅图2,壳体1两侧均设有供两个锁片30滑行的导向槽13,两个所述导向槽13均位于所述第一凹槽12与所述壳体1靠近所述第一通孔10的一端之间。两个锁片30能够沿着各自的导向槽13滑动,直至锁头31卡入第一凹槽12。优选的,两个导向槽13均为斜面,且靠紧第一凹槽12的一端均为倒角,使得插拔顺畅。

[0036] 作为本发明实施例的优化方案,请参阅图6和图7,两个所述锁片30上设有若干限位凸起32,所述导向槽13上设有供各所述限位凸起32卡入的若干第二凹槽33。各限位凸起32均位于锁片30的长边上,各第二凹槽33位于也位于导向槽13的长边上,第二凹槽33的数量大于等于限位凸起32的数量,确保每个限位凸起32都能够卡入第二凹槽33,从而能够有效地限制锁片30在宽度方向上的位移。

[0037] 作为本发明实施例的优化方案,请参阅图2,壳体1具有至少一个第三凹槽14,它沿锁片30的长度方向设置,且第三凹槽14靠近腔体的一侧设开口,第三凹槽14里面安装弹簧4,弹簧4的一端抵接第三凹槽14正对开口的侧面,另一端延伸至第三凹槽14外。把手3设有能够与弹簧4延伸至第三凹槽14外的一端抵接的卡勾5。当把手3锁在壳体1上时,弹簧4是被压缩的,当解锁的时候,弹簧4恢复原状,给把手3一个推力,可完成自动复位。第三凹槽14的

数量和弹簧4的数量设为两个或更多，只需将其并排设置。

[0038] 作为本发明实施例的优化方案，请参阅图1和图3，第一通孔10远离腔体处设有第一光纤接口17，第二通孔11远离腔体处设有第二光纤接口18，这两个光纤接口用来安装光纤，第一光纤接口17上贴有文字标识T，可指示光发射器件7，第二光纤接口18上贴有文字标识R，可指示光接收器件8，便于区分这两个接口的用途。

[0039] 作为本发明实施例的优化方案，请参阅图4，盖体2表面具有标签槽20，能够在此处粘贴该光收发模块的型号的标签，便于区分本模块的型号。

[0040] 作为本发明实施例的优化方案，请参阅图2、图8和图9，本外壳还包括有用于卡紧光发射器件7和所述光接收器件8的M型卡块6，所述壳体1具有供所述M型卡块6插入的第四凹槽15。M型卡块6的两个卡口正好能够卡住两个光器件，可有效地防止光发射器件7和光接收器件8从腔体内脱离出来。优选的，M型卡块6具有两个弧形槽60，且M型卡块6的两个弧形槽60之间设第一圆形通孔61。圆弧形的弧形槽60能够匹配光发射器件7和光接收器件8的形状，便于卡住它们，设置的第一圆形通孔61能够方便使用工具完成组装和拆卸。

[0041] 作为本发明实施例的优化方案，请参阅图2和图9，第一通孔10和第二通孔11均为第二圆形通孔，且第一通孔10与所述光发射器件7间隙配合，所述第二通孔11与所述光接收器件8间隙配合。两个通孔均为圆形通孔，并采用间隙配合，且此间隙尽可能地做小，可最大化地消除光器件与两个通孔之间的间隙，避免电磁波的泄露。

[0042] 作为本发明实施例的优化方案，请参阅图1、图6以及图7，两个锁片30远离锁头31的一侧连接有拉环34。拉环34便于人们手持，且拉环34采用手感舒适的柔性塑胶件，它与锁片30采用包胶注塑工艺一体成型，拉环34可做成不同颜色，用以区分不同型号的产品。

[0043] 作为本发明实施例的优化方案，请参阅图5，盖体2中部两侧各有一个限制把手3位移范围的第五凹槽21。

[0044] 作为本发明实施例的优化方案，请参阅图6，把手3上有两个方孔35，弹簧4可以从这两个方孔35安装进去。

[0045] 本发明实施例提供一种光收发模块，请参阅图9，包括光发射器件7、光接收器件8以及上述的光收发模块外壳，在安装时，先将光发射器件7以及所述光接收器件8置于所述内腔内，光发射器件7的输出端插入第一通孔10，光接收器件8的输出端插入第二通孔11，然后再壳体1上安装有PCBA 9(线路板)，最后再讲盖体2覆盖于所述PCBA 9上。如此就能够形成一个完整且密封性能良好的光模块。比起现有的模块，一方面，本模块的抗电磁干扰要更优秀，且结构简单，无需更多的零件来配合使用，使得成本低廉，适于推广。另一方面，采用的自解锁结构方便实用，结构简单，易于实现，成本低廉。

[0046] 尽管已经示出和描述了本发明的实施例，对于本领域的普通技术人员而言，可以理解在不脱离本发明的原理和精神的情况下可以对这些实施例进行多种变化、修改、替换和变型，本发明的范围由所附权利要求及其等同物限定。

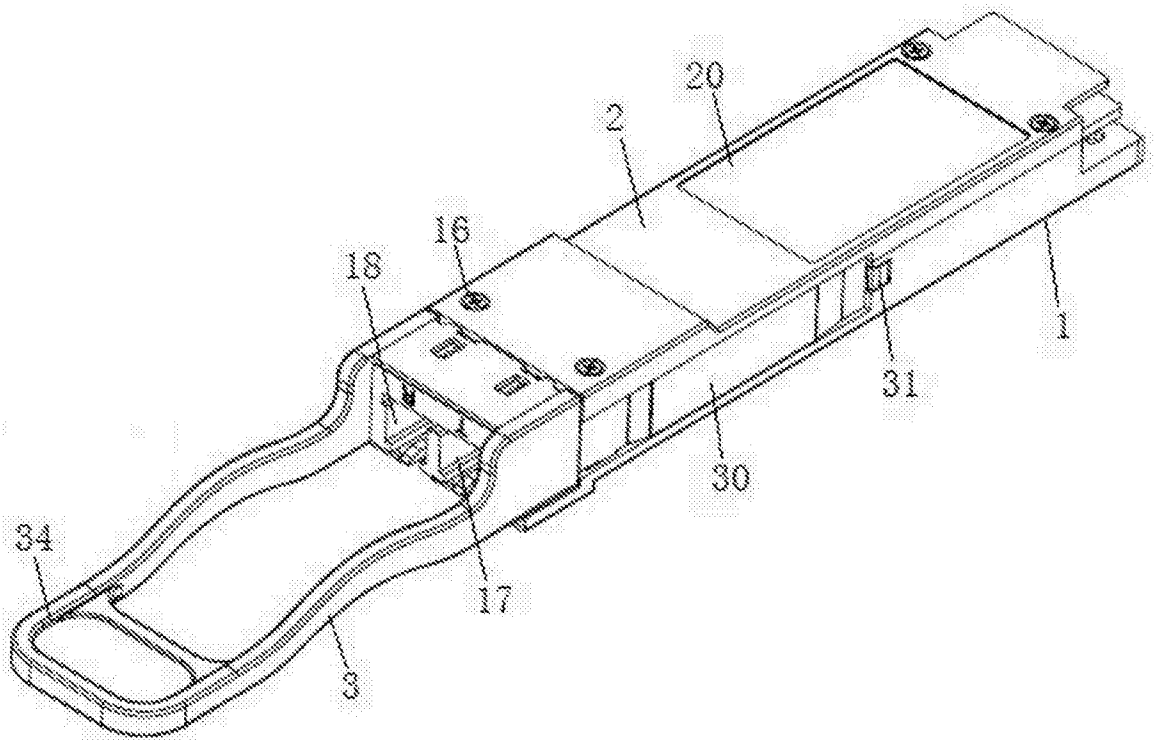


图1

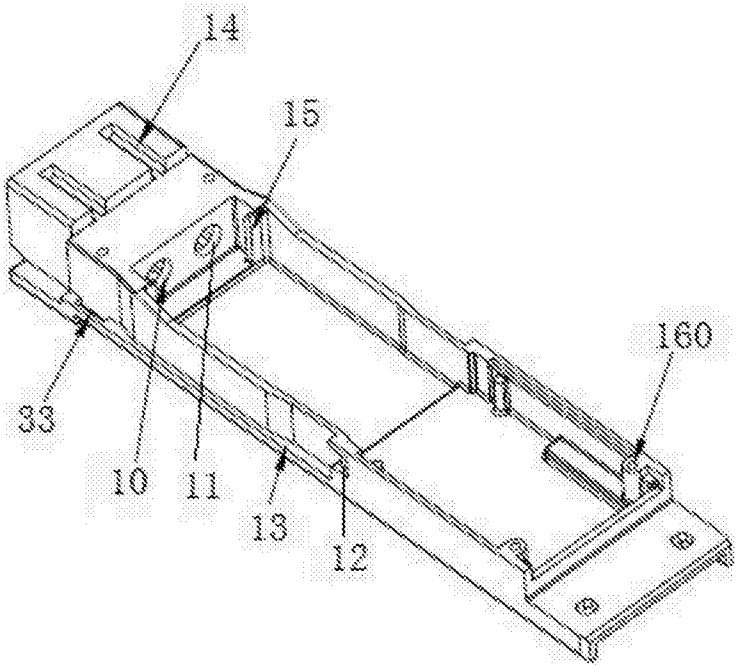


图2

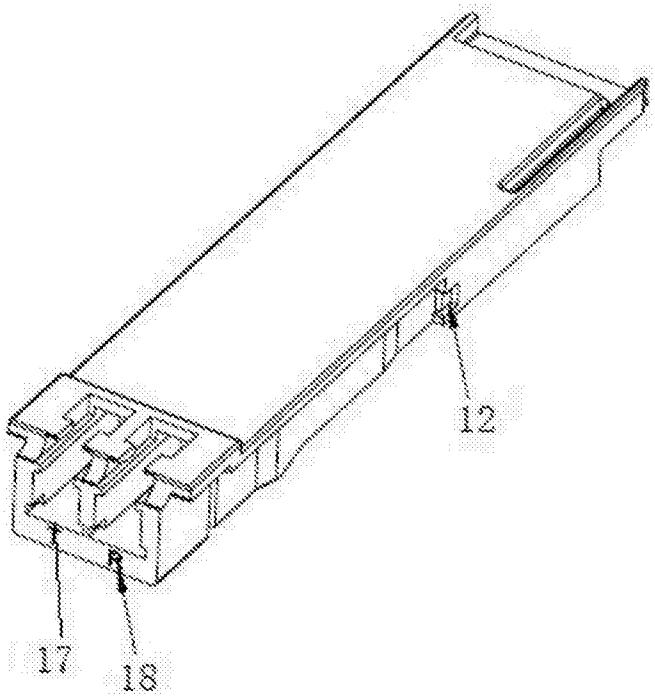


图3

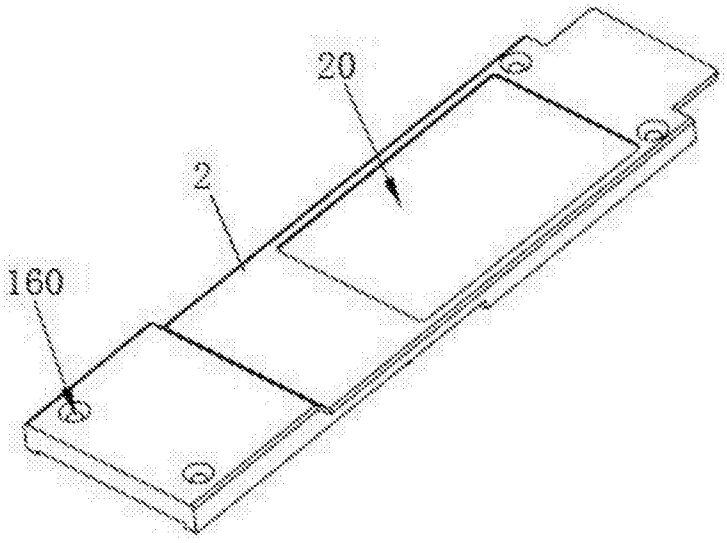


图4

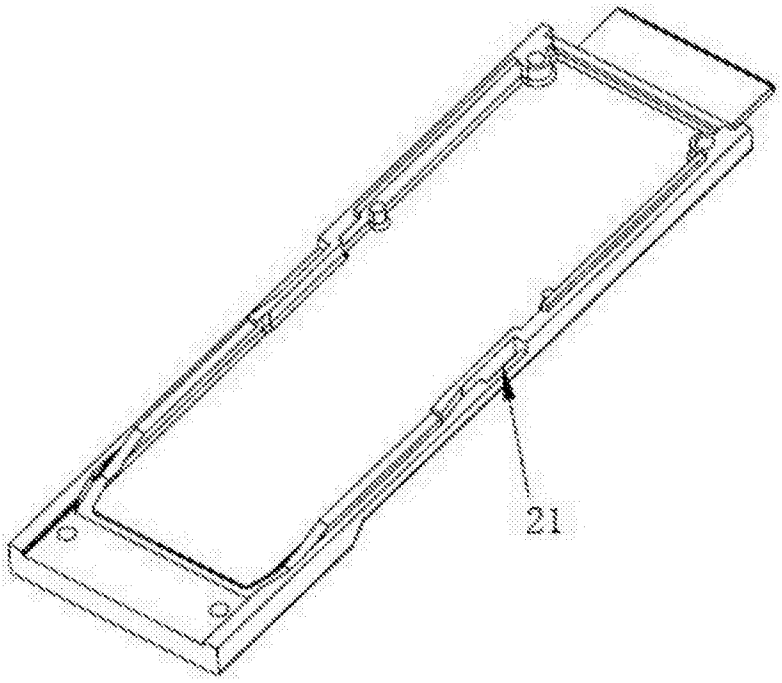


图5

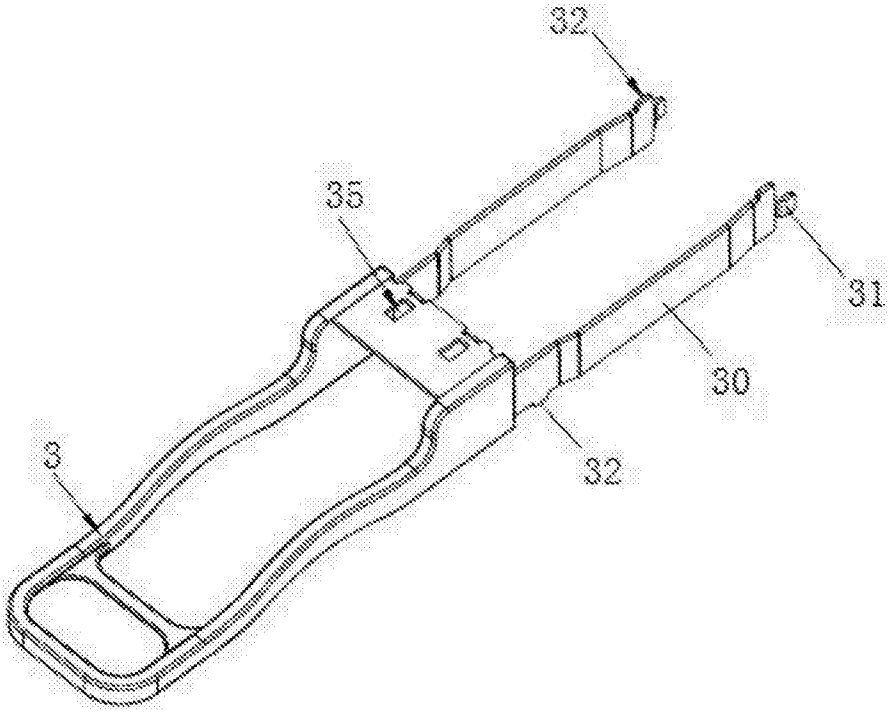


图6

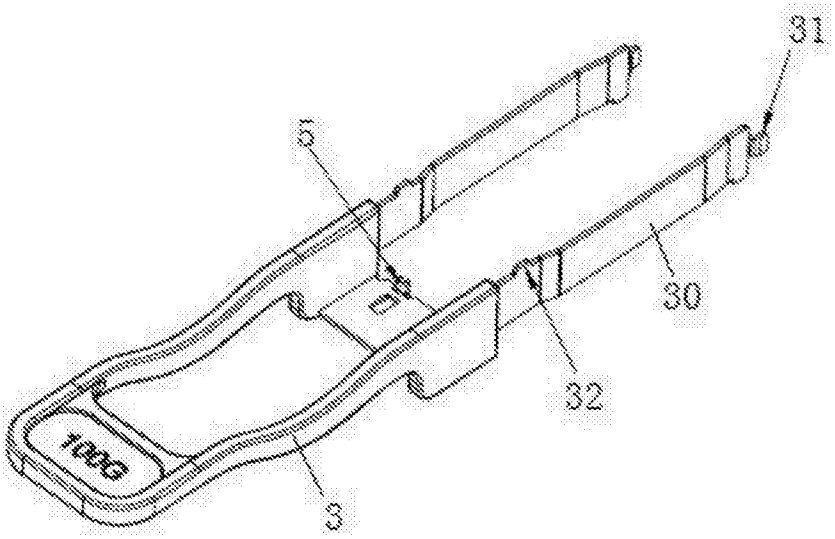


图7

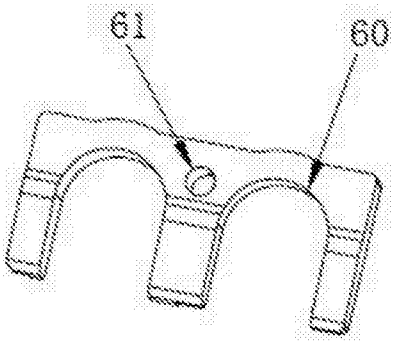


图8

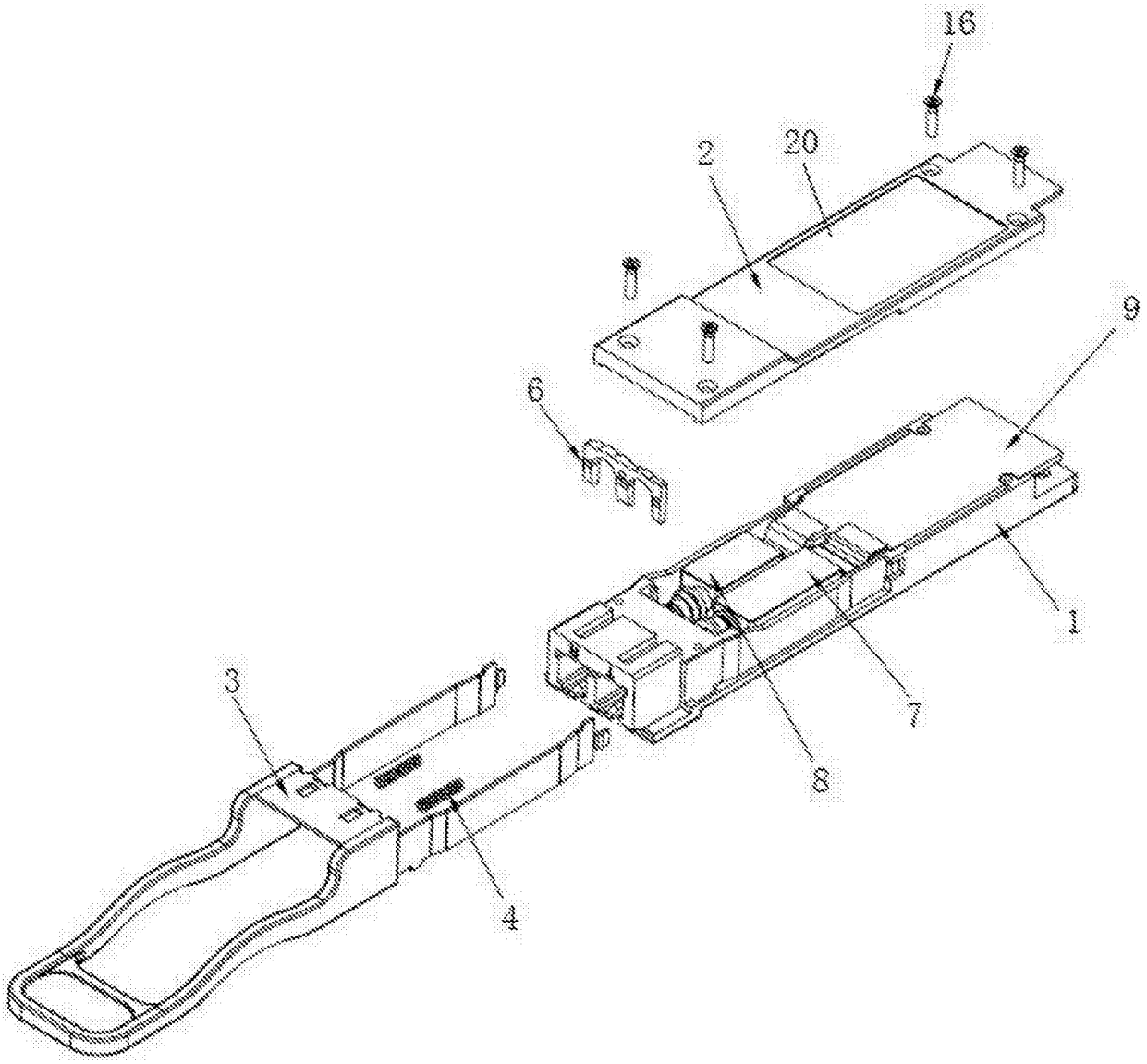


图9

(19) National Intellectual Property Administration of the People's Republic of China

(12) Invention Patent Application

(10) Application Publication No.: CN107907948A

(43) Application Publication Date: April 13, 2018

(21) Application No.: 201711384315.0

(22) Application Date: December 20, 2017

(71) Patentee: Wuhan Linktel Technologies Co Ltd

Address: Floor 2, Building 1, China Putian, No. 20, University Park Road, Donghu New Technology Development Zone, Wuhan, Hubei 430000, China

(72) Inventor: PENG FENG□ ZHANG JIAN□ YANG XIANWEN□ WU TIANSHU□ LI LINKE

(74) Patent Agency: Beijing Huize Intellectual Property Agency Co., Ltd. 11228

Agents: Hu Jianwen

(51) Int. Cl.

G02B 6/42 (January 2006)

H04B 10/40 (January 2013)

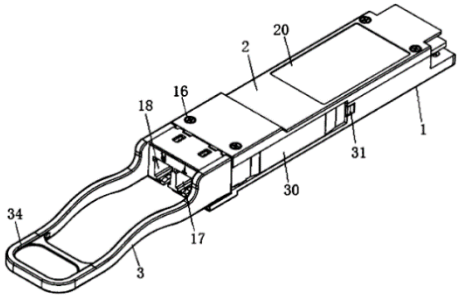
Claims: 1 pages Description: 4 pages Drawings: 5 pages

(54) Title of the Invention

Optical transceiver module housing and optical transceiver module

(57) Abstract

This invention relates to the field of optical communication technology and provides an optical transceiver module housing. The housing includes a shell, a detachable cover for sealing the shell, and a handle that can be mounted on the shell. The cover is detachably installed on the shell. The shell has a cavity for accommodating optical transmitter and receiver components. On one side of the shell, there are first and second through-holes for inserting the optical transmitter and receiver components, respectively. The handle has two strip-shaped locking plates, each of which has a locking head at its end. The shell has first recesses on both sides for the locking heads to be inserted. The invention also provides an optical transceiver module, which includes the optical transmitter and receiver components and the above-mentioned optical transceiver module housing. The optical transceiver module housing and the optical transceiver module of this invention have only two through-holes communicating with the outside, greatly reducing the possibility of electromagnetic waves leaking from other gaps. The locking and unlocking can be easily achieved by inserting or withdrawing the locking heads of the locking plates into or from the first recesses.



Claims

1. An optical transceiver module housing, comprising a shell and a cover for sealing the shell, wherein the cover is detachably installed on the shell, and the shell has a cavity for accommodating an optical transmitter component and an optical receiver component, characterized in that:
   the shell has a first through-hole and a second through-hole on one side for inserting the optical transmitter component and the optical receiver component, respectively; and further comprises a handle that can be mounted on the shell, the handle having two strip-shaped locking plates, each of which has a locking head at its end, and the shell has first recesses on both sides for the two locking heads to be inserted.
2. The optical transceiver module housing according to claim 1, characterized in that:
   the shell has guide grooves on both sides for the two locking plates to slide, and the two guide grooves are located between the first recesses and the end of the shell near the first through-hole.
3. The optical transceiver module housing according to claim 2, characterized in that:
   the two locking plates are provided with several limiting protrusions, and the guide grooves are provided with several second recesses for the limiting protrusions to be inserted.
4. The optical transceiver module housing according to claim 2, characterized in that:
   the two guide grooves are inclined surfaces, and the ends of the two guide grooves near the first recesses are chamfered.
5. The optical transceiver module housing according to claim 1, characterized in that:
   the shell has at least one third recess along the length direction of the locking plate, the third recess has an opening on the side close to the cavity, the third recess accommodates a spring, one end of the spring abuts against the side of the third recess opposite to the opening, and the other end extends outside the third recess; the handle has a hook that can abut against the end of the spring extending outside the third recess.
6. The optical transceiver module housing according to claim 1, characterized in that:
   it further comprises an M-shaped block for securing the optical transmitter component and the optical receiver component, and the shell has a fourth recess for inserting the M-shaped block.
7. The optical transceiver module housing according to claim 6, characterized in that:
   the M-shaped block has two arc-shaped grooves, and there is a first circular through-hole between the two arc-shaped grooves.
8. The optical transceiver module housing according to claim 1, characterized in that:
9. the first through-hole and the second through-hole are both second circular through-holes, and the first through-hole is a clearance fit with the optical transmitter

component, and the second through-hole is a clearance fit with the optical receiver component.

10. The optical transceiver module housing according to claim 1, characterized in that: the two locking plates have a pull ring on the side away from the locking head.
11. An optical transceiver module, comprising an optical transmitter component and an optical receiver component, characterized in that:
    it further comprises the optical transceiver module housing according to any one of claims 1 to 9, the optical transmitter component and the optical receiver component are both installed in the cavity, and the output end of the optical transmitter component is inserted into the first through-hole, and the output end of the optical receiver component is inserted into the second through-hole; the shell is provided with a PCBA, and the cover is mounted over the PCBA.

Optical transceiver module housing and optical transceiver module

Technical Field

[0001] This invention relates to the field of optical communication technology, specifically to an optical transceiver module housing and an optical transceiver module.

Background Technology

[0002] The trend of high integration and high speed in optical communication modules inevitably drives the development of optical modules toward high speed, miniaturization, and high density. Therefore, the QSFP28 pluggable 100G high-speed optical transceiver module has emerged. The QSFP28 optical module is designed for high-density and high-speed applications in optical communication, data centers, and network markets. The cost and power consumption of data centers are important factors for their builders, which are also key drivers in the optical communication market. Looking back at the development history of 100G optical modules, the evolution and improvement of their packaging styles (CFP, CFP2, CFP4, QSFP28) and standards have mainly focused on reducing costs and power consumption. The QSFP28 optical module meets these requirements and has gained widespread market recognition, especially in most data centers.

[0003] However, the QSFP28 currently faces two issues: first, since optical communication modules often require plugging and unplugging during use, they typically require a built-in unlocking device to allow the module to be smoothly removed from the installation cage of the equipment; second, as the transmission rate of optical modules continues to increase, high-speed optical transceiver modules are particularly prone to excessive electromagnetic interference (EMI). An effective method to address EMI is to implement electromagnetic shielding in the product housing structure. For conductive materials, the use of an all-metal housing provides the best shielding effect. However, in practical applications, due to assembly requirements and machining precision issues, gaps inevitably occur between the housing and the cover, as well as between the optical component adapter and the housing, which significantly affect the electromagnetic shielding performance of the entire optical module housing.

Invention Content

[0004] The purpose of this invention is to provide an optical transceiver module housing and an optical transceiver module. On one hand, only two separate through-holes, the first through-hole and the second through-hole, are used to allow the optical transmitter component and the optical receiver component to communicate with the optical fiber interface. The gap between the housing and the optical fiber interface is very small, effectively reducing the leakage of electromagnetic waves from the optical fiber interface. On the other hand, the locking and unlocking can be easily achieved by inserting or withdrawing the locking heads of the locking plates into or from the first recesses.

[0005] To achieve the above purpose, this invention provides the following technical solution: an optical transceiver module housing, comprising a shell and a cover for sealing the shell, wherein the cover is detachably installed on the shell, and the shell has a cavity for accommodating an optical transmitter component and an optical receiver component. The shell has a first through-hole and a second through-hole on one side for inserting the optical transmitter component and the optical receiver component, respectively. It further comprises a handle that can be mounted on the shell, the handle having two strip-shaped locking plates, each of which has a locking head at its end, and the shell has first recesses on both sides for the two locking heads to be inserted.

[0006] Further, the shell has guide grooves on both sides for the two locking plates to slide, and the two guide grooves are located between the first recesses and the end of the shell near the first through-hole.

[0007] Further, the two locking plates are provided with several limiting protrusions, and the guide grooves are provided with several second recesses for the limiting protrusions to be inserted.

[0008] Further, the two guide grooves are inclined surfaces, and the ends of the two guide grooves near the first recesses are chamfered.

[0009] Further, the shell has at least one third recess along the length direction of the locking plate, the third recess has an opening on the side close to the cavity, the third recess accommodates a spring, one end of the spring abuts against the side of the third recess opposite to the opening, and the other end extends outside the third recess; the handle has a hook that can abut against the end of the spring extending outside the third recess.

[0010] Further, it comprises an M-shaped block for securing the optical transmitter component and the optical receiver component, and the shell has a fourth recess for inserting the M-shaped block.

[0011] Further, the M-shaped block has two arc-shaped grooves, and there is a first circular through-hole between the two arc-shaped grooves.

[0012] Further, the first through-hole and the second through-hole are both second circular through-holes, and the first through-hole is a clearance fit with the optical transmitter component, and the second through-hole is a clearance fit with the optical receiver component.

[0013] Further, the two locking plates have a pull ring on the side away from the locking head.

[0014] This invention also provides another technical solution: an optical transceiver module, comprising an optical transmitter component and an optical receiver component, and further comprising the above-mentioned optical transceiver module

housing. The optical transmitter component and the optical receiver component are both installed in the cavity, and the output end of the optical transmitter component is inserted into the first through-hole, and the output end of the optical receiver component is inserted into the second through-hole. The shell is provided with a PCBA, and the cover is mounted over the PCBA.

[0015] Compared with the existing technology, the beneficial effects of this invention are:

[0016] 1. After the cover is installed on the shell, only two through-holes allow the optical transmitter component and the optical receiver component to communicate with the outside, greatly reducing the possibility of electromagnetic waves leaking from other gaps. Moreover, the locking and unlocking can be easily achieved by inserting or withdrawing the locking heads of the locking plates into or from the first recesses.

[0017] 2. The provision of guide grooves facilitates the sliding of the locking plates along the guide grooves until the locking heads are inserted into the first recesses, serving as a guiding function.

[0018] 3. The provision of several protrusions effectively limits the lateral movement of the locking plates.

[0019] 4. The guide grooves are chamfered to facilitate the insertion of the locking heads into the first recesses.

[0020] 5. The provision of springs facilitates the automatic return of the handle when unlocking, allowing it to disengage from the shell.

[0021] 6. The provision of an M-shaped block prevents the optical transmitter component and the optical receiver component from detaching from the cavity.

[0022] 7. The provision of a pull ring facilitates the pushing or pulling of the locking plates.

Brief Description of the Drawings

[0023] Figure 1 is a structural diagram of the optical transceiver module housing provided by this invention;

[0024] Figure 2 is a first perspective structural diagram of the shell of the optical transceiver module housing provided by this invention;

[0025] Figure 3 is a second perspective structural diagram of the shell of the optical transceiver module housing provided by this invention;

[0026] Figure 4 is a first perspective structural diagram of the cover of the optical transceiver module housing provided by this invention;

[0027] Figure 5 is a second perspective structural diagram of the cover of the optical transceiver module housing provided by this invention;

[0028] Figure 6 is a first perspective structural diagram of the handle of the optical transceiver module housing provided by this invention;

[0029] Figure 7 is a second perspective structural diagram of the handle of the optical transceiver module housing provided by this invention;

[0030] Figure 8 is a structural diagram of the M-shaped block of the optical transceiver module housing provided by this invention;

[0031] Figure 9 is an exploded view of the optical transceiver module provided by this invention;

[0032] In the drawings, 1-shell; 10-first through-hole; 11-second through-hole; 12-first recess; 13-guide groove; 14-third recess; 15-fourth recess; 16-screw; 160-screw hole; 17-first optical fiber interface; 18-second optical fiber interface; 2-cover; 20-label groove; 21-fifth recess; 3-handle; 30-locking plate; 31-locking head; 32-limiting protrusion; 33-second recess; 34-pull ring; 35-square hole; 4-spring; 5-hook; 6-M-shaped block; 60-arc-shaped groove; 61-first circular through-hole; 7-optical transmitter component; 8-optical receiver component; 9-PCBA.

Detailed Description of the Embodiments

[0033] Below, in combination with the drawings of the embodiments of this invention, the technical solution of this invention will be clearly and completely described. Obviously, the described embodiments are only part of the embodiments of this invention, not all of them. Based on the embodiments of this invention, all other embodiments obtained by those of ordinary skill in the art without making creative efforts are within the scope of protection of this invention.

[0034] Please refer to Figures 1-9. This invention provides an optical transceiver module housing, which includes a shell 1 and a cover 2. The cover 2 is used to seal the shell 1, minimizing the communication between the cavity of the shell 1 and the outside as much as possible, thereby preventing electromagnetic waves from leaking out of the shell 1. The cover 2 is detachably installed on the shell 1, such as through four screws 16 installed in the corresponding screw holes 160 of the shell 1, or by using a binding strap, which facilitates the installation of the optical transmitter component 7 and the optical receiver component 8. The shell 1 has a first through-hole 10 and a second through-hole 11 on one side for inserting the optical transmitter component 7 and the optical receiver component 8. These two components communicate with the outside only through these two through-holes, specifically connecting to optical fibers. Since there are no more passages communicating with the outside, the sealing is excellent, and electromagnetic waves can only leak to the outside through the tiny gaps between the two components and the two through-holes. Compared with the existing technology, which requires too many parts to prevent electromagnetic wave leakage, this design is much simpler and more direct, greatly reducing the possibility of electromagnetic wave leakage. It not only reduces costs but also effectively addresses the defects in the existing technology, such as gaps inevitably occurring between the

shell 1 and the cover 2, as well as between the optical component adapter and the shell 1 due to assembly requirements and machining precision issues, thereby enhancing the electromagnetic shielding effect of the entire optical module housing. The handle 3 can be mounted on the shell 1 and has a self-unlocking mechanism. Specifically, the handle 3 has two strip-shaped locking plates 30, each of which has a locking head 31 at its end. The shell 1 has first recesses 12 on both sides for the two locking heads 31 to be inserted. In actual use, simply push the two locking heads 31 to the two first recesses 12 and insert them, and the handle 3 can be locked on the shell 1. When unlocking is required, simply detach the two locking heads 31 from the first recesses 12. The unlocking mechanism is simple and easy to use, more straightforward than existing complex unlocking mechanisms, and cost-effective.

[0035] Optimizing the above scheme, please refer to Figure 2. The shell 1 has guide grooves 13 on both sides for the two locking plates 30 to slide. The two guide grooves 13 are located between the first recesses 12 and the end of the shell 1 near the first through-hole 10. The two locking plates 30 can slide along their respective guide grooves 13 until the locking heads 31 are inserted into the first recesses 12. Preferably, the two guide grooves 13 are inclined surfaces, and the ends near the first recesses 12 are chamfered for smooth insertion and removal.

[0036] As an optimized scheme of this invention, please refer to Figures 6 and 7. The two locking plates 30 are provided with several limiting protrusions 32, and the guide grooves 13 are provided with several second recesses 33 for the limiting protrusions 32 to be inserted. The limiting protrusions 32 are located on the long edges of the locking plates 30, and the second recesses 33 are also located on the long edges of the guide grooves 13. The number of second recesses 33 is greater than or equal to the number of limiting protrusions 32 to ensure that each limiting protrusion 32 can be inserted into a second recess 33, thereby effectively limiting the lateral movement of the locking plates 30.

[0037] As an optimized scheme of this invention, please refer to Figure 2. The shell 1 has at least one third recess 14, which is arranged along the length direction of the locking plate 30, and the third recess 14 has an opening on the side close to the cavity. The third recess 14 accommodates a spring 4, one end of which abuts against the side of the third recess 14 opposite to the opening, and the other end extends outside the third recess 14. The handle 3 has a hook 5 that can abut against the end of the spring 4 extending outside the third recess 14. When the handle 3 is locked on the shell 1, the spring 4 is compressed. When unlocking, the spring 4 returns to its original state, providing a thrust to the handle 3 to complete automatic reset. The number of third recesses 14 and springs 4 can be two or more, arranged side by side.

[0038] As an optimized scheme of this invention, please refer to Figures 1 and 3. The first through-hole 10 has a first optical fiber interface 17 away from the cavity, and the second through-hole 11 has a second optical fiber interface 18 away from the cavity. These two optical fiber interfaces are used to install optical fibers. The first optical fiber interface 17 is labeled with the text "T" to indicate the optical transmitter component 7, and the second optical fiber interface 18 is labeled with the text "R" to indicate the optical receiver component 8, facilitating the distinction between the two interfaces.

[0039] As an optimized scheme of this invention, please refer to Figure 4. The cover 2 has a label groove 20 on its surface, where a label indicating the model of the optical transceiver module can be attached, facilitating the distinction of the module's model.

[0040] As an optimized scheme of this invention, please refer to Figures 2, 8, and 9. This housing further comprises an M-shaped block 6 for securing the optical transmitter component 7 and the optical receiver component 8. The shell 1 has a fourth recess 15 for inserting the M-shaped block 6. The two notches of the M-shaped block 6 can exactly secure the two optical components, effectively preventing the optical transmitter component 7 and the optical receiver component 8 from detaching from the cavity. Preferably, the M-shaped block 6 has two arc-shaped grooves 60, and there is a first circular through-hole 61 between the two arc-shaped grooves 60. The arc-shaped grooves 60 match the shape of the optical transmitter component 7 and the optical receiver component 8, facilitating their securement, and the first circular through-hole 61 facilitates assembly and disassembly using tools.

[0041] As an optimized scheme of this invention, please refer to Figures 2 and 9. The first through-hole 10 and the second through-hole 11 are both second circular through-holes, and the first through-hole 10 is a clearance fit with the optical transmitter component 7, and the second through-hole 11 is a clearance fit with the optical receiver component 8. Both through-holes are circular and use a clearance fit, with the clearance minimized as much as possible to maximize the elimination of gaps between the optical components and the two through-holes, thereby preventing electromagnetic wave leakage.

[0042] As an optimized scheme of this invention, please refer to Figures 1, 6, and 7. The two locking plates 30 have a pull ring 34 on the side away from the locking head 31. The pull ring 34 is easy to hold and is made of a flexible plastic material for comfort. It is integrally formed with the locking plates 30 using a overmolding process. The pull ring 34 can be made in different colors to distinguish between different product models.

[0043] As an optimized scheme of this invention, please refer to Figure 5. The cover 2 has two fifth recesses 21 on both sides of its center to limit the movement range of the handle 3.

[0044] As an optimized scheme of this invention, please refer to Figure 6. The handle 3 has two square holes 35, through which the spring 4 can be installed.

[0045] This invention provides an optical transceiver module, as shown in Figure 9, which includes an optical transmitter component 7, an optical receiver component 8, and the above-mentioned optical transceiver module housing. During installation, first place the optical transmitter component 7 and the optical receiver component 8 in the cavity, insert the output end of the optical transmitter component 7 into the first through-hole 10, and insert the output end of the optical receiver component 8 into the second through-hole 11. Then install the PCBA 9 on the shell 1 and cover it with the cover 2. This forms a complete and well-sealed optical module. Compared with existing modules, this module has superior electromagnetic interference resistance and a simple structure, requiring no additional parts, thus reducing costs and making it suitable for promotion. Additionally, the self-unlocking structure is convenient, simple, and cost-effective.

[0046] Despite the embodiments of the invention having been illustrated and described, it should be understood that various changes, modifications, substitutions, and variations can be made to these embodiments without departing from the principle and spirit of the invention, the scope of which is defined by the appended claims and their equivalents.

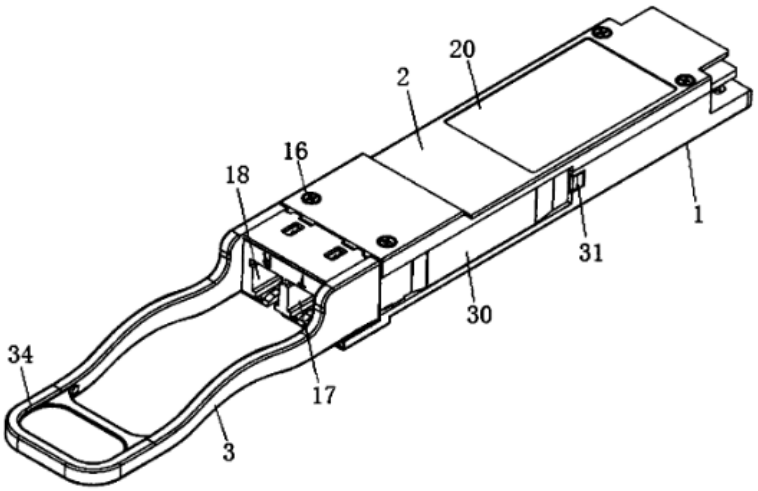


Figure 1

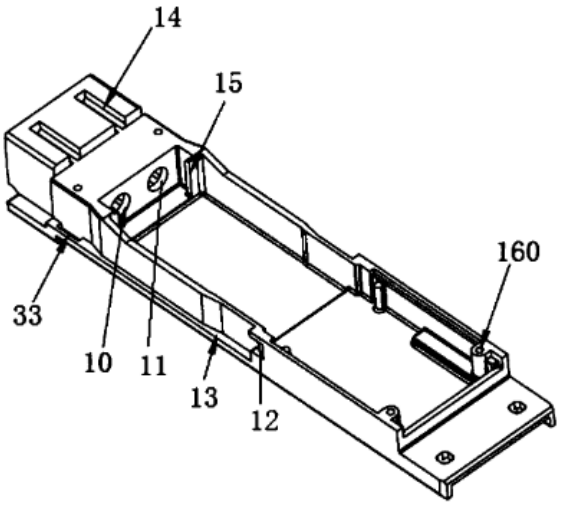


Figure 2

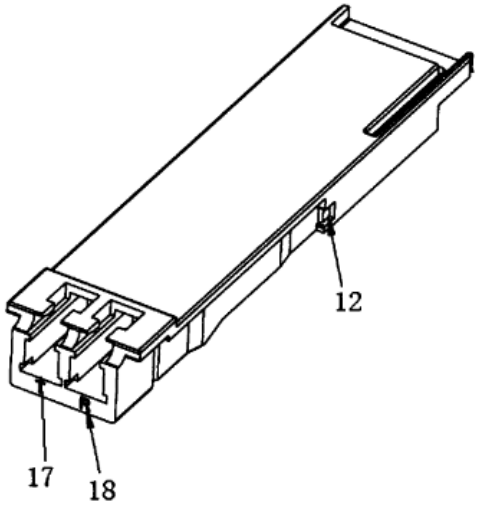


Figure 3

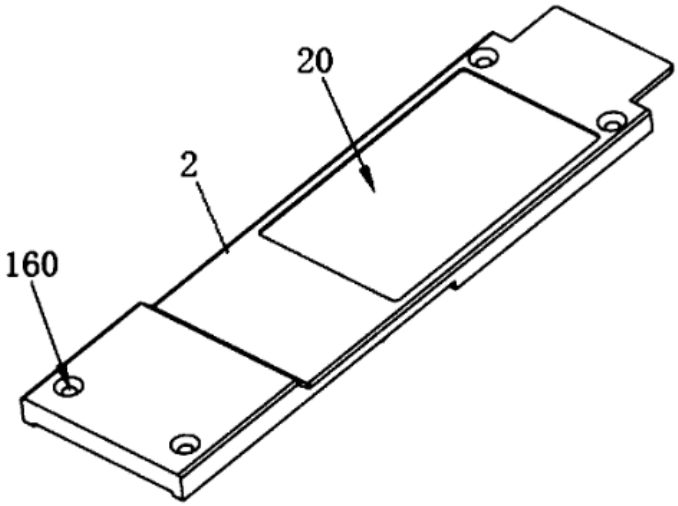


Figure 4

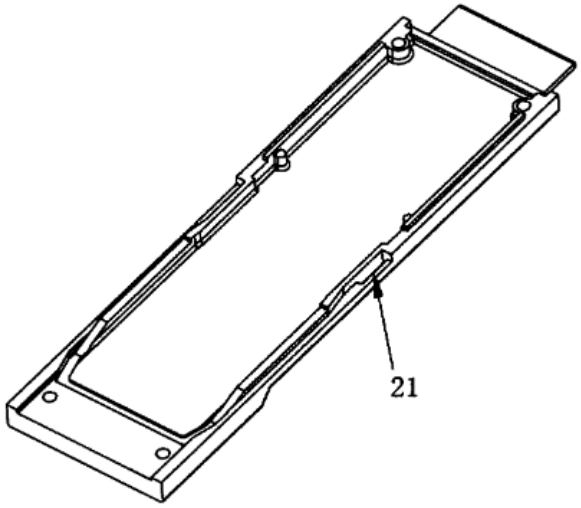


Figure 5

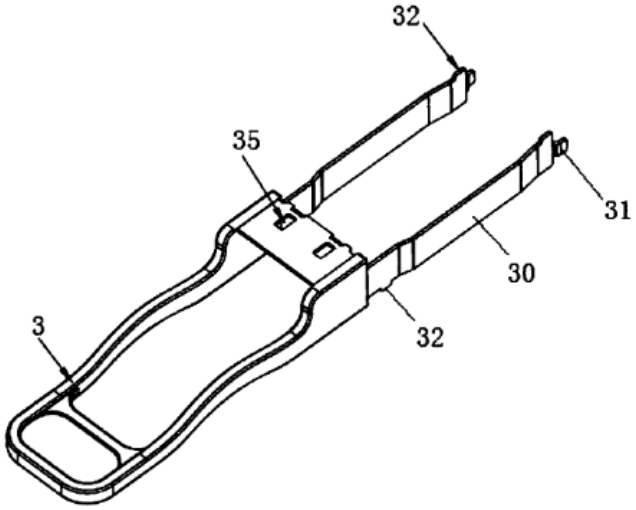


Figure 6

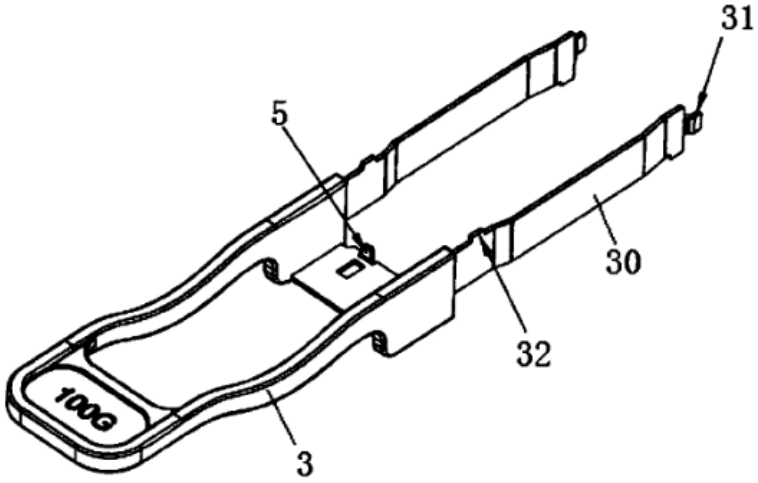


Figure 7

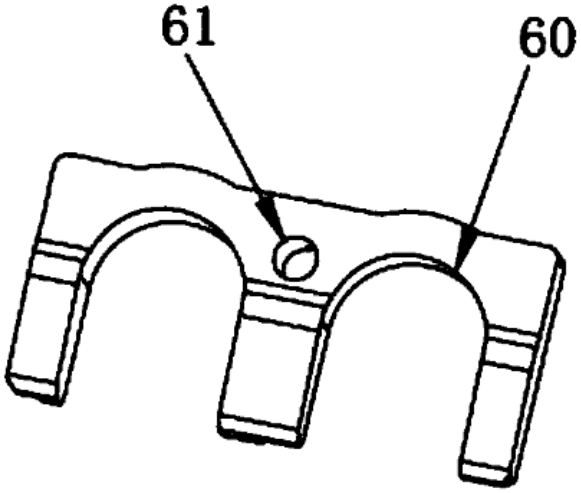


Figure 8

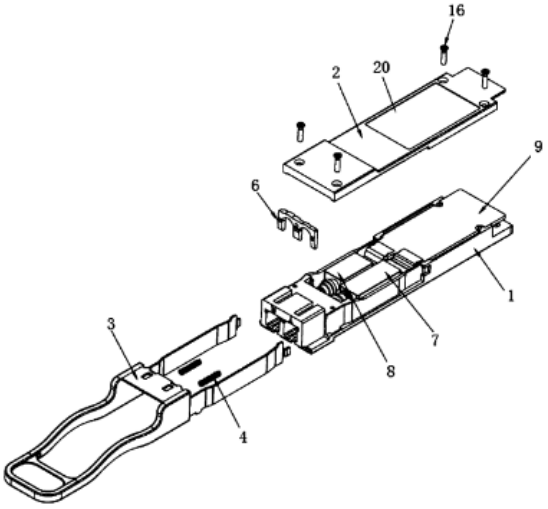


Figure 9