The differential signal can be transferred at a high speed of about several hundred Mbps to several Gbps such as USB and PCIe, and is suitable to transfer a large data amount between devices. On the other hand, no differential signal may be used depending on the type of the accessory 200. The accessory that uses no differential signal needs no contacts assigned to the differential signal, so the accessory cost can be reduced by deleting the contact.

[0167]

FIG. 12 illustrates a configuration variation of the accessory 200 illustrated in FIG. 1. More specifically, it has such a configuration that the contacts TA01 to TA03 and TA19 to TA21 and signals and circuits connected to them are omitted. That is, the accessory 200 in FIG. 12 has 15 contacts. In the configuration in FIG. 12, a differential signal is assigned to the contacts TC01 to TC03 and TC19 to TC21 located at both ends of the camera connector 141. On the other hand, the accessory 200 that needs no differential signal adopts a contact arrangement that eliminates a contact for the differential signal from the accessory connector 211, and includes only the contact necessary for the accessory 200.

[0168]

The accessory 200 in FIG. 12 sets to the GND contacts the contacts TC04 and TA04 and the contacts TC18 and TA18 near both ends of the camera connector 141 and the accessory connector 211. With such a contact arrangement, even in the accessory 200 connected to a part of the contacts of the camera connector 141, the contacts at both ends of the accessory connector 211 can be set to the GND contacts. This configuration can prevent the GND contacts from being disconnected even when an excessive static pressure or impact is applied to the accessory 200.

[0169]

A direct attachment of the accessory 200 to the camera 100 has been described. Referring now to FIG. 13, a description will be given of an intermediate accessory 400 attached between the camera 100 and the accessory 200. The camera 100 and the accessory 200 have the above-described configurations. The intermediate accessory 400 includes an extension cable for extending a distance between the camera 100 and the accessory 200, an adapter used to simultaneously attach a plurality of accessories to the camera 100, and the like. This embodiment will describe the intermediate accessory 400 as an extension cable. In the configuration in FIG. 13, the intermediate accessory 400 corresponds to an accessory, and the accessory 200 corresponds to another accessory.

[0170]

The intermediate accessory 400 has a camera shoe and an accessory shoe that are attachable to the camera 100 and the accessory 200, respectively, and each is provided with a camera-side intermediate connector 311 and an accessory-side intermediate connector 312. The camera-side intermediate connector 311 has 21 contacts TM01 to TM21 arranged in a row, and is a connector for making an electrical connection with the camera 100. The contacts TM01 to TM21 each make a one-to-one contact with the contacts TC01 to TC21 in the camera connector 141.

[0171]

On the other hand, the accessory-side intermediate connector 312 has 21 contacts TN01 to TN21 arranged in a row, and is a connector for making an electrical connection with the accessory 200. The contacts TN01 to TN21 each make a one-to-one contact with the contacts TA01 to TA21 in the accessory connector 211.

[0172]

The intermediate accessory 400 having this contact arrangement can provide the power supply and the communication in the same manner as those when the accessory 200 is directly attached to the camera 100. At this time, the intermediate accessory 400 may receive the power supply from the camera 100, or the power supply from the camera 100 may be directly transmitted to the accessory 200. The power supply in this embodiment includes a case where the power supply from the camera 100 is transmitted to the accessory 200 as it is and no power is supplied to the accessory 400.

[0173]

In FIG. 13, the number of contacts of the camera-side intermediate connector 311 is the same as the number of contacts of the camera connector 141, and the number of contacts of the accessory-side intermediate connector 312 is the same as the number of contacts of the accessory connector 211, but they may not necessarily be equal to each other.

[0174]

FIG. 14 illustrates a variation of the configuration of FIG. 13 about the accessory 200 and the intermediate accessory 400. Although differential signals are connected to the contacts TC01 to TC03 and TC19 to TC21 on both ends of the camera connector 141, the differential signal may not be required depending on the function of the accessory 200. The configuration of FIG. 14 eliminates the contact to which the differential signal is connected, from the camera-side intermediate connector 311 and the accessory-side intermediate connector 312 and the accessory connector 211. That is, the intermediate accessory 400 and the accessory 200 in FIG. 14 each have 15 contacts. Thereby, a contact arrangement including only the contacts required for the intermediate accessory

400 and the accessory 200 is adopted.

[0175]

A detailed description will now be given of the connection configuration between the camera 100 and the external flash unit 120, which is an example of the accessory 200.

[0176]

FIG. 16(a) illustrates the camera 100 viewed from the diagonally rear side. FIG. 16(b) illustrates how to attach the external flash unit 120 to the accessory shoe 1123 of the camera 100. FIG. 16(c) illustrates the external flash unit 120 attached to the camera 100 viewed from the oblique rear side.

[0177]

The imaging optical system is provided on the front side (field side) of the camera 100, and the image display unit 107 is provided on the rear side of the camera 100. A top cover 150 as an exterior member is provided on the top surface of the camera 100, and an accessory shoe 1123 is provided to the top cover 150. On the other hand, in the external flash unit 120, the camera connector 216 is provided at the bottom of the external flash unit 120.

As illustrated in FIG. 16(b), the external flash unit 120 is slid in a direction parallel to the front side in the Z direction (attachment side in the first direction) relative to the camera 100 to engage the camera connector 216 and the accessory shoe 1123 with each other. Thereby, the external flash unit 120 can be attached to the camera 100. The front side in the Z direction is a direction from the rear side to the front side of the camera 100, that is, a direction from the image display unit 107 side toward the imaging optical system side. An X direction (second direction), a Y direction (third direction), and the Z direction (front-back direction) illustrated in FIG. 16 and subsequent figures are commonly used. The X direction is a direction orthogonal to the Z direction in the horizontal plane when the Z direction is parallel to the horizontal direction, and is the width direction of the camera 100. The Y direction is a direction orthogonal to the Z direction and the X direction, and is the height direction of the camera 100.

[0178]

A detailed description will now be given of the accessory shoe 1123 of the camera 100. FIG. 17(a) illustrates the top cover 150 and the exploded accessory shoe 1123. FIG. 17(b) illustrates the assembled accessory shoe 1123. The assembly direction of the accessory shoe 1123 onto the top cover 150 is the Y direction.

[0179]

The accessory shoe 1123 includes an engagement member 151, a connection terminal connector 152, a shoe stage 153, and an accessory shoe spring 154. The engagement

connector 152 on the top surface side. FIG. 24 illustrates the accessory shoe 1123 viewed from the insertion direction of the external flash unit 120.

[0184]

The engagement member 151 is formed by bending a metal plate in a loop shape so that the end surfaces of the bent ends face and contact each other at a seam 151a. The engagement member 151 has a pair of engagement portions 151b, and a coupler 151c that couples the pair of engagement portions 151b together. The engagement member 151 has a pair of first screw hole portions 151d used for fastening the screws 157 and a pair of second screw hole portions 151e. The engagement member 151 has engagement hole portions 156 to be engaged with the lock pins 252 of the external flash unit 120.

[0185]

As illustrated in FIGs. 18(a) and 12, the pair of engagement portions 151b are separated by a first width (referred to as engagement portion interval hereinafter) 151aa in the X direction. A holding member 254 of the external flash unit 120, which will be described later, illustrated in FIG. 19(b) is inserted into the engagement portion interval 151aa. The pair of first screw hole portions 151d are provided at a predetermined interval in the X direction, and serve as a pair of first fastening hole portions provided apart from each other in the X direction at the back (on the rear side) in the Z direction. The pair of second screw hole portions 151e are provided at a predetermined interval in the X direction, and serve as a pair of second fastening hole portions provided apart from each other in the X direction at the front in the Z direction. The engagement hole portion 156 is formed at a position engageable with the lock pin 252 of the external flash unit 120 in an area sandwiched between the pair of first screw hole portions 151d.

[0186]

In the connection terminal connector 152, as illustrated in FIGs. 17(b) and 18(c), a plurality of connection terminals 152a are exposed. In the pitch direction (X direction) in which the plurality of connection terminals 152a are aligned, the position of the camera connector 216 is determined by the engagement portion interval 151aa of the engagement member 151. Therefore, the holding member 254 of the external flash unit 120 is positioned relative to the connection terminal connector 152 by the engagement member 151.

[0187]

A contact surface and a groove portion illustrated in FIG. 24 are formed on both sides of the connection terminal connector 152 (connector base member 152e) as one example of the camera connector 141 illustrated in FIG. 1 sandwiching the plurality of connection terminals 152a in the X direction on the front side in the Z direction. That

is, there are formed contact surfaces 152b that contact and position the accessory shoe 1123 in the Z direction when the external flash unit 120 is attached, and groove portions 152c into which the accessory shoe 1123 is inserted. Each groove portion 152c is formed so as to extend from the contact surface 152b to the front side (attachment side) in the Z direction, and has a slope portion 152d so as to face inwardly and diagonally upwardly (so as to have a tilt to the X direction). Part of the groove portion 152c above the slope portion 152d extends outwardly in the X direction from the position of the top end of the slope portion 152d. This is to prevent a dent (sink) from being generated in the slope portion 152d during resin molding if the slope portion 152d is formed up to the top end of the groove portion 152c.

[0188]

As illustrated in FIG. 24, in the X direction, an outermost inner surface 152ccc of the groove portion 152c in the connector base member 152e of the accessory shoe 1123 is located outside of the inner end surfaces of the pair of engagement portions 151b of the engagement member 151 (engagement portion interval 151aa) and is located inside of the outermost inner surface 151bb of the engagement member 151.

[0189]

A slope start position 152cc, which is the end (lower end) of the slope portion 152d on the bottom surface side of the groove portion 152c, is provided inside the engagement portion interval 151aa. Thereby, it is possible to secure an area for providing the contact surface 152b that comes into contact with a contact portion 251b described later of the camera connector 216 and positions it in the Z direction. Providing the slope shape starting from the slope start position 152cc can expand a space into which the shoe apparatus (camera connector 216 described later) of the external flash unit 120 is inserted, and can secure the degree of freedom in the shape of the shoe apparatus. As a result, the shoe apparatus of the external flash unit 120 can be sufficiently formed with a shape that protects the connection terminals.

[0190]

A description will now be given of the external flash unit 120. FIG. 19(a) illustrates the external flash unit 120 viewed from the camera connector 216 side (bottom side in the Y direction). FIG. 19(b) is a section taken along a line A-A in FIG. 19(a) and illustrates the internal structure of the camera connector 216. FIG. 20(a) illustrates the camera connector 216. However, a base portion 250 and a lock lever 253, which will be described later, are omitted. FIG. 20(b) illustrates the camera connector 216 viewed from the front in the Z direction.

[0191]

The camera connector 216 is provided on the bottom side in the Y direction (top side in FIG. 19(a)) of the base portion 250 of the external flash unit 120 as illustrated in FIG. 19(b) when it is attached to the accessory shoe 1123 of the camera 100. The camera connector 216 includes a shoe attachment leg (engagement member, shoe plate) 251, the lock pins 252, a lock lever 253, a holding member 254, a connection plug 256, and a Y-direction holding member 258.

[0192]

The shoe attachment leg 251 is an engagement member that engages the external flash unit 120 with the accessory shoe 1123 of the camera 100 and holds it. That is, the shoe attachment leg 251 is an engagement member on the external flash unit 120 side attachable to and detachable from the engagement member 151 of the accessory shoe 1123.

[0193]

A large stress is applied to the accessory shoe 1123 and the camera connector 216 due to the pressure for maintaining the attachment state and the external force (impact, etc.) acting on the external flash unit 120. The shoe attachment leg 251 is manufactured by processing a metal plate (sheet metal) in order to secure a high mechanical strength against such a large stress.

[0194]

The lock pin 252 is a member for preventing the external flash unit 120 from falling off while the camera connector 216 (shoe attachment leg 251) is attached to the accessory shoe 1123, and is held on the shoe attachment leg 251 movable in the Y direction. More specifically, the lock pin 252 is slidably held in the Y direction by the Y-direction holding member 258. The lock lever 253 and the Y-direction holding member 258 are held by the holding member 254.

[0195]

When the external flash unit 120 is attached to the accessory shoe 1123 and the lock lever 253 is rotated, the Y-direction holding member 258 is moved downwardly in the Y-direction in FIG.19(b) by an unillustrated cam portion. At that time, the lock pin 252 also moves downwardly in the Y direction in FIG. 19(b) together with the Y-direction holding member 258. Thereby, the lock pin 252 projects from the shoe attachment leg 251 and is engaged with the engaging hole portion 156 provided in the engagement member 151 of the accessory shoe 1123. The lock pin 252 and the engagement hole 156 serve as a positioning member in the Z direction for ensuring an electrical connection between the external flash unit 120 and the camera 100.

[0196]

The connection plug 256 as one example of an accessory connector 211 illustrated in FIG. 1 is provided on the front side in the Z direction of the camera connector 216, made of a nonconductive material (dielectric material) such as a resin material, and integrated with the holding member 254. An outermost width T of the connection plug 256 in the X direction is narrower than a width W of the shoe attachment leg 251 in the X direction. Thereby, an area for providing the contact portion 251b on the shoe attachment leg 251 is secured. The connection plug 256 has a plurality of connection terminals 257 for contacting and communicating with the plurality of connection terminals 152a of the accessory shoe 1123 illustrated in FIG. 18(c). The connection terminals 257 correspond to the contacts TA01 to TA21 of the accessory connector 211 illustrated in FIG. 1.

[0197]

The plurality of connection terminals 257 are provided so as to have a one-to-one correspondence with the plurality of connection terminals 152a, and held by the holding member 254 so as to extend in the Z direction and to line up in the X direction. Each connection terminal 257 has a tip portion 257a that comes into contact with the corresponding connection terminal 152a. Each connection terminal 257 has a shape extending backwardly in the Z direction from a tip portion 257a, and has an extension portion 257b that displaces the tip portion 257a upwardly in the Y direction in FIG. 19(b) by an elastic deformation when the tip portion 257a comes into contact with the connection terminal 152a. A vertical extension portion 257c extending upwardly in the Y direction is formed at the back end of the extension portion 257b in the Z direction. Provided at the upper end of the vertical extension portion 257c is a flexible substrate connector 257d to be connected to an unillustrated main substrate of the external flash unit 120 and connected to a flexible substrate 259 inserted into the holding member 254 from the top side in the Y direction.

[0198]

The extension portion 257b has a step portion 257e having a step in the Y direction in the middle of the Z direction. As described above, the extension portion 257b can be elastically deformed in the Y direction. However, when the distance L in the Z direction of the extension portion 257b is short, a sufficient deformation amount cannot be obtained, and the durability is lowered. As a result, the connection terminal 152a and the tip portion 257a are repeatedly attached and detached, and the extension portion 257b may easily get damaged. Accordingly, providing the step portion 257e to the extension portion 257b can secure a sufficient distance L without causing the extension portion 257b to interfere with the shoe attachment leg 251.

Since the component force F_2 escapes in the direction along the slope portion 256b, the component force F_3 is the only force that affects the connection plug 256. As described above, since the component force F_3 is smaller than the external force F_1, the connection plug 256 can be prevented from getting damaged even if an external force that is large to some extent is applied.

[0203]

By forming the slope portions 256b on both sides in the X direction so that its width in the X direction becomes narrower toward the lower side in the Y direction, not only the external force from the X direction but also the external force from the bottom side in the Y direction can be partially released.

[0204]

FIG. 25 illustrates the partially enlarged connection plug 256 viewed from the Z direction. In the Y direction, assume that B is a height from the lower tip portion 256d of the protrusion portion 256a to the top surface of the connection plug 256 (a height of the connection plug including the protrusion portion), and A is a height of the slope portion 256b from the lower tip portion 256d (slope start position 256c) to the upper end of the slope portion 256b. At this time, A is preferably one-fifth or more of B, more preferably one-fourth or more, one-third or more, or half or more as illustrated in FIG. 13. That is, the slope portion 256b is formed to have a significant size for the function of releasing the external force from the X direction, and is different from a chamfered shape generally provided at the corner of the protrusion portion. The tilt angle θ of the slope portion 256b to the X direction is preferably set in a range of $45° \pm 20°$ for the above function of releasing the external force.

[0205]

In order to secure a sufficient area for the contact portion 251b on the shoe attachment leg 251 relative to the contact surface 152b of the accessory shoe 1123 as the positioning portion in the Z direction, it is preferable to make as short as possible the width in the X direction between slope start positions 256c at the lower tip portions 256d of the slope portions 256b on both sides. This embodiment sets the width between the slope start positions 256c in the X direction inside the width V of the holding member 254 in the X direction, and thereby secures a sufficient area of the contact portion 251b.

[0206]

The camera connector 216 has such a structure that the shoe attachment leg 251 and the holding member 254 are fastened. The details of this fastening structure will be described later.

[0207]
The holding member 254 can be inserted into the engagement portion interval 151aa of the engagement member 151 of the accessory shoe 1123 illustrated in FIG. 18(a), and has a coupler 254a having a width V shorter than the width W of the shoe attachment leg 251 in the X direction. The widths W and V are defined by the Japanese Industrial Standards (JIS) B7101-1975 "camera accessory attachment seat and attachment foot." When the coupler 254a is engaged with the engagement member 151, the position of the external flash unit 120 relative to the camera 100 is determined in the X direction. The shoe attachment leg 251 is urged upwardly in the Y direction when it comes into contact with the elastic deformer 154a of the accessory shoe spring 154 as the urging member illustrated in FIGs. 17(a) and 17(b). Thereby, the top surface of the shoe engagement portion 251a is brought into contact (pressure contact) with the bottom surface of the engagement member 151, and the position of the external flash unit 120 relative to the camera 100 is determined in the Y direction.
[0208]
When the contact portion 251b of the shoe attachment leg 251 contacts the contact surface 152b on the front side in the Z direction of the connection terminal connector 152, the position of the external flash unit 120 relative to the camera 100 is determined in the Z direction.
[0209]
The holding member 254 is also a structure for coupling the shoe attachment leg 251 and the base portion 250, and the lock pins 252 and the connection terminals 257 are arranged inside the coupler 254a.
[0210]
Next follows a description of the fastening structure between the holding member 254 and the shoe attachment leg 251. FIG. 21(a) illustrates the camera connector 216 viewed from the upper side in the Y direction, and FIG. 21(b) illustrates a section taken along a line B-B in FIG. 21(a).
[0211]
A pair of first screw 260a and a pair of second screws 260b, which are fastening members for fastening the shoe attachment leg 251 to the holding member 254, penetrate the holding member 254 and are fastened to the shoe attachment leg 251. At this time, by disposing one screw in each of the four areas that are substantially equally divided in the X direction and the Z direction in a well-balanced manner, the shoe attachment leg 251 is stably held by the holding member 254. As described above, the shoe attachment leg 251 is a component to which a large stress is applicable. Therefore,

a required mechanical strength can be ensured by fastening the metal shoe attachment legs 251 to the holding member 254 with a pair of first screws 260a and a pair of second screws 260b arranged in a well-balanced manner.

[0212]

As illustrated in FIG. 21(b), a plurality of connection terminals 257 are arranged in an area S sandwiched by the pair of first screws 260a and the pair of second screws 260b. The widths between the pair of first screws 260a and between the pair of second screws 260b are narrower than the width between the lower tip portions 256d of the protrusion portions 256a of the connection plug 256, the width V of the holding member 254, the outermost width T of the connection plug 256, and the width W of the shoe attachment leg 251.

[0213]

FIG. 26 illustrates a section of the accessory shoe 1123 viewed from the Z direction while the camera connector 216 is attached to the accessory shoe 1123. This figure illustrates the sizes T and V of the camera connector 216 and the positional relationship between each component of the camera connector 216 and each component of the accessory shoe 1123.

[0214]

In FIG. 26, as described above, the top surface of the shoe engagement portion 251a of the camera connector 216 contacts the bottom (ceiling surface) of the engagement member 151 of the accessory shoe 1123 for positioning in the Y direction.

[0215]

On the other hand, none of the lower tip portion 256d and the slope portion 256b of the protrusion portion 256a of the connection plug 256 in the camera connector 216 contact the bottom surface and the slope portion 152d of the groove portion 152c of the accessory shoe 1123, respectively. A gap between the lower tip portion 256d of the protrusion portion 256a and the bottom surface of the groove portion 152c of the accessory shoe 1123 is set as small as possible. Thereby, when an external force in the X direction is applied to the external flash unit 120, the lower tip portion 256d of the protrusion portion 256a can come into contact with the bottom surface of the groove portion 152c of the accessory shoe 1123, and a floating amount of the connection plug 256 (a tilt to the accessory shoe 1123) can be reduced.

[0216]

Each of a gap between the slope portions 256b and 152d and a gap between the inner end surface 152ccc of the groove portion 152c and the outer end surface of the connection plug 256 is set to be large to some extent. Thereby, when an external force

in the X direction is applied to the external flash unit 120, the connection terminals 257 and 152a can be prevented from getting loaded.

[0217]

In the groove portion 152c of the accessory shoe 1123, a relationship between a height of the groove portion 152c in the Y direction (a height from the bottom surface of the groove portion 152c to a ceiling surface of the engagement member 151) and a height of the slope portion 152d in the Y direction is similar to a relationship between the height B of the connection plug 256 and the height A of the slope portion 256b in the camera connector 216. It is also preferable that the tilt angle of the slope portion 256b to the X direction is also set in the range of 45°±20°, similarly to the tilt angle θ of the slope portion 256b in the camera connector 216.

[0218]

Each embodiment described above has described a surface shape of the slope portion 256b provided on the protrusion portion 256a being flat, but the slope portion 256b may be a curved surface having a curvature. That is, the slope portion 256b may have a surface with a tilt to the X direction.

[0219]

This embodiment can secure an area for providing a larger number of connection terminals than ever and a shape for protecting them and an area for positioning between components, in the compact camera connector 216 and accessory shoe 1123.

[0220]

A description will now be given of a variation of an external flash unit 120. FIG. 22(a) illustrates the external flash unit 120 viewed from the camera connector 216 side (lower side in the Y direction). FIG. 22(b) illustrates a section taken along a line A-A in FIG. 22(a) and illustrates the internal structure of the camera connector 216. FIG. 23(a) illustrates the camera connector 216. However, the base portion 250 and the lock lever 253 are omitted. FIG. 23(b) illustrates the camera connector 216 viewed from the front in the Z direction.

[0221]

The camera connector 216 is provided on the lower side in the Y direction (upper side in FIG. 22(a)) of the base portion 250 of the external flash unit 120 as illustrated in FIG. 22(b) while it is attached to the accessory shoe 1123 of the camera 100. The camera connector 216 has a shoe attachment leg 300a, lock pins 252, a lock lever 253, a holding member 300, a connection plug 300b, a Y-direction holding member 258, and a shoe cover 301.

[0222]

The shoe attachment leg 300a is an engagement member for engaging the external flash unit 120 with the accessory shoe 1123 of the camera 100, similar to the shoe attachment leg 251 of the above-described embodiment. That is, the shoe attachment leg 300a is an engagement member on the external flash unit 120 side attachable to and detachable from the engagement member 151 of the accessory shoe 1123.

[0223]

In the above-described embodiment, the shoe attachment leg 251 as a metal shoe plate and the resin holding member 254 are formed as separate members in order to give priority to the mechanical strength. On the other hand, in this variation, the shoe attachment leg 300a and the holding member 300 are formed as an integrated member by a resin material (nonconductive material). Thereby, the pair of first screws 260a and the pair of second screws 260b described in the previous embodiment are not required, a space for arranging the connection terminals 257 becomes wider, and thus a larger number of connection terminals 257 can be arranged. As a result, the external flash unit 120 can communicate more information with the camera 100 via the camera connector 216 and the accessory shoe 1123.

[0224]

The connection plug 300b is provided on the front side in the Z direction of the camera connector 216, and formed as an integrated member with the holding member 300 made of a nonconductive resin material in this embodiment. Similar to the above-described embodiment, the outermost width T of the connection plug 300b in the X direction is made narrower than the width W of the shoe attachment leg 300a in the X direction, so that the area for providing the contact portion 300e is secured in the shoe attachment leg 300a. The connection plug 300b has a plurality of connection terminals 257 for contacting and communicating with the plurality of connection terminals 152a of the accessory shoe 1123 illustrated in FIG. 18(c). The shoe cover 301 is an enclosure attached to the holding member 300, and is a member that protects a plurality of connection terminals 257. The shape of the connection terminal 257 is similar to that of the above embodiment, and the step portion 257e is provided to secure a sufficient distance L in the Z direction of the extension portion 257b without interfering with the shoe cover 301.

[0225]

The shape of the connection plug 300b is also similar to that of the connection plug 256 of the previous embodiment, and a pair of protrusion portions 300c that project downwardly in the Y direction are provided so as to sandwich the plurality of connection terminals 257 at both ends of the connection plug 300b in the X direction.

As illustrated in FIG. 23(b), a lower tip portion 300k of each protrusion portion 300c projects below a line made by connecting the lower ends of the tip portions 257a of the connection terminals 257 in order to protect the connection terminal 257 from the external force such as the pressure and the impact. That is, the tip portion 257a of the connection terminal 257 is provided above (inside) a line made by connecting the lower tip portions 300k of the pair of protrusion portions 300c.

[0226]

Even in this embodiment, provided on the outer side of each protrusion portion 300c in the X direction is a slope portion 300f that extends diagonally upwardly from the lower tip portion 300k and faces diagonally downwardly. Each protrusion portion 300c having such a shape enables the connection plug 300b to be inserted into the groove portion 152c having the slope portion 152d in the connection terminal connector 152 described in the previous embodiment. As described in the previous embodiment, the slope portion 300c has a role of releasing the external force such as the pressure and the impact on the connection plug 300b to prevent the connection plug from getting damaged.

[0227]

Similar to the previous embodiment, it is desirable to make as short as possible a distance in the X direction between the slope start positions 300g at the lower tip portion 300k of the slope portions 300c on both sides. Therefore, the slope start positions 300g on both sides are provided inside the width V of the holding member 254 in the X direction to sufficiently secure the area of the contact portion 300e of the shoe attachment leg 300a.

[0228]

The holding member 300 is formed so that it can be inserted into and engaged with the engagement portion interval 151aa of the engagement member 151 illustrated in FIG. 18(a), and has a coupler 300h having a width V shorter than the width W of the shoe attachment leg 300a in the X direction. The width W and the width V are defined by the Japanese Industrial Standards (JIS) B7101-1975 "camera accessory attachment seat and attachment foot" as in the previous embodiment. When the coupler 300h is engaged with the engagement member 151, the position of the external flash unit 120 relative to the camera 100 is determined in the X direction. The shoe attachment leg 300a is urged upwardly in the Y direction when it contacts the elastic deformer 154a of the accessory shoe spring 154 illustrated in FIGs. 17(a) and 17(b), and thereby the top surface of the shoe engagement portion 300d contacts the bottom surface of the

engagement member 151. Thereby, the position of the external flash unit 120 relative to the camera 100 is determined in the Y direction.

[0229]

When the contact portion 300e of the shoe attachment leg 300a contacts the contact surface 152b on the front side in the Z direction of the connection terminal connector 152, the position of the external flash unit 120 relative to the camera 100 is determined in the Z direction. The holding member 300 is also a structure for coupling the shoe attachment legs 300a and the base portion 250, and the lock pin 252 and the connection terminal 257 are arranged inside the coupler 300h.

[0230]

In this embodiment, the case where the camera 100, the accessory 200, and the intermediate accessory 400 have 21 or 15 contacts has been described, but the number of contacts may be other numbers.

[0231]

In this embodiment, the microphone device and the strobe device have been described as the accessory 200, but the accessory according to the present invention includes various devices, such as the electronic viewfinder unit, other than the microphone device and the strobe device. This embodiment has described the camera as an electronic apparatus, but the electronic apparatus according to the present invention also includes various electronic apparatuses other than the camera.

(OTHER EMBODIMENTS)

The present invention can supply a program that implements one or more functions of the above embodiments to a system or apparatus via a network or a storage medium, and can be implemented by one or more processors in a computer of the system or apparatus configured to read and execute the program. It can also be implemented by a circuit (*e.g.*, an ASIC) that implements one or more functions.

[0232]

Each embodiment described above is merely a typical example, and various modifications and changes can be made to each embodiment in implementing the present invention.