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ELECTRONIC DEVICE

Abstract

An electronic device includes an electronic unit including a fixed portion and a movable portion movable with respect to the fixed portion, a first conductive part having a first main surface and a second main surface provided on a side opposite to the first main surface, and a second conductive part having a third main surface and a fourth main surface provided on a side opposite to the third main surface. The first main surface is positioned between the fixed portion and the second main surface. The third main surface is positioned between the movable portion and the fourth main surface. The third main surface is positioned between the fourth main surface and a virtual plane extending along the first main surface. Part of the movable portion is capable of moving with respect to the first conductive part and the second conductive part and intersecting with the virtual plane.

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Background/Summary

BACKGROUND

Field of the Technology

[0001] The present disclosure relates to an electronic device.

Description of the Related Art

[0002] An electronic device including an electronic unit includes a conductive plate for the purpose of noise reduction and the like. International Publication WO 2011/129118 discloses an image pickup apparatus serving as an example of an electronic device. The image pickup apparatus disclosed in International Publication WO 2011/129118 includes a conductive shield member.

[0003] In addition, the electronic unit includes a fixed portion, a movable portion movable with respect to the fixed portion, and moves closer to and away from the conductive plate by movement of the movable portion. International Publication WO 2020/121541 discloses an image pickup apparatus serving as an example of an electronic device. The image pickup apparatus disclosed in International Publication WO 2020/121541 is configured to control image stabilization. The control of the image stabilization is performed by moving the movable portion including an image sensor such that shake of an optical image formed on the image sensor is reduced.

[0004] In recent years, miniaturization of electronic devices has been promoted. To advance miniaturization of electronic devices, an electronic unit needs to be accommodated in a small space inside an exterior of an electronic device. Further, a movable space for the movable portion of the electronic unit needs to be secured. In addition, for the electronic unit, a measure against a noise caused by electrostatic discharge (ESD) or the like is also needed.

SUMMARY

[0005] According to a first aspect of the present disclosure, an electronic device includes an electronic unit including a fixed portion and a movable portion movable with respect to the fixed portion, a first conductive part having a first main surface and a second main surface provided on a side opposite to the first main surface, and a second conductive part having a third main surface and a fourth main surface provided on a side opposite to the third main surface. The first main surface is positioned between the fixed portion and the second main surface. The third main surface is positioned between the movable portion and the fourth main surface. The third main surface is positioned between the fourth main surface and a virtual plane including the first main surface and extending along the first main surface. Part of the movable portion is capable of moving with respect to the first conductive part and the second conductive part and intersecting with the virtual plane.

[0006] According to a second aspect of the present disclosure, an electronic device includes an electronic unit including a fixed portion and a movable portion movable with respect to the fixed portion, a first conductive part having a first main surface and a second main surface provided on a side opposite to the first main surface, and a second conductive part having a third main surface and a fourth main surface provided on a side opposite to the third main surface. A virtual plane including the first main surface and extending along the first main surface has a first region overlapping with the first conductive part in a direction orthogonal to the virtual plane, a second region overlapping with the second conductive part in the direction orthogonal to the virtual plane, and a third region between the first region and the second region. A current is configured to flow from the first conductive part to the second conductive part. Part of the movable portion is capable of moving with respect to the first conductive part and the second conductive part and intersecting

with the third region.
[0007] Further features of the present disclosure will become apparent from the following description of exemplary embodiments with reference to the attached drawings.

Description

BRIEF DESCRIPTION OF THE DRAWINGS
[0008] FIG. **1** is a schematic perspective view of a camera that is an image pickup apparatus serving as an example of an electronic device according to a first embodiment.
[0009] FIG. **2**A is a schematic section view of the camera according to the first embodiment.
[0010] FIG. **2**B is an explanatory diagram of an image pickup module, a processing module, and a flexible printed circuit according to the first embodiment.
[0011] FIG. **3** is a perspective view of a configuration of part of the camera according to the first embodiment.
[0012] FIG. **4** is a bottom view of the camera according to the first embodiment.
[0013] FIG. **5** is a perspective view of an electronic unit according to the first embodiment.
[0014] FIG. **6** is an exploded perspective view of the electronic unit according to the first embodiment.
[0015] FIG. **7**A is a section view of part of the camera according to the first embodiment.
[0016] FIG. **7**B is a section view of the camera according to the first embodiment.
[0017] FIG. **8**A is an explanatory diagram of a camera of a comparative example.
[0018] FIG. **8**B is an explanatory diagram of the camera according to the first embodiment.
[0019] FIG. **9** is an explanatory diagram of a camera according to a first modification example.
[0020] FIG. **10**A is a graph illustrating a result of simulation.
[0021] FIG. **10**B is a graph illustrating a result of simulation.
[0022] FIG. **11**A is an explanatory diagram of a camera according to a second embodiment.
[0023] FIG. **11**B is an explanatory diagram of the camera according to the second embodiment.
[0024] FIG. **12**A is an explanatory diagram of a camera according to a second modification example.
[0025] FIG. **12**B is an explanatory diagram of the camera according to the second modification example.
[0026] FIG. **13**A is an explanatory diagram of a camera according to a third embodiment.
[0027] FIG. **13**B is an explanatory diagram of the camera according to the third embodiment.
[0028] FIG. **14**A is an explanatory diagram of a camera according to a third modification example.
[0029] FIG. **14**B is an explanatory diagram of a camera according to a fourth modification example.
DESCRIPTION OF THE EMBODIMENTS
[0030] Exemplary embodiments of the present disclosure will be described in detail below with reference to drawings. To be noted, in each drawing, the same members will be denoted by the same reference signs, and redundant description will be omitted. In the embodiments below, directions will be expressed in an XYZ coordinate system that is an orthogonal coordinate system. An X axis, a Y axis, and a Z axis are orthogonal to each other. In addition, the direction of the X axis, the direction of the Y axis, and the direction of the Z axis will be also respectively referred to as an X direction, a Y direction, and a Z direction. The Y direction is, for example, a direction along an optical axis (optical axis direction). In addition, a plane including the X axis and the Y axis will be referred to as an X-Y plane.
First Embodiment
[0031] FIG. **1** is a schematic perspective view of a camera **600** that is an image pickup apparatus serving as an example of an electronic device according to a first embodiment. FIG. **2**A is a

schematic section view of the camera **600** according to the first embodiment.

[0032] The camera **600** is a digital camera of a lens replacing type, and a lens unit (lens barrel) **650** including a lens is attachable to and detachable from the camera (camera body) **600**. The camera **600** includes an exterior **300**, and an image pickup module **6** and a processing module **10** disposed inside the exterior **300**. The image pickup module **6** and the processing module **10** are electrically interconnected by a flexible printed circuit **7**. An unillustrated battery is provided inside the exterior **300**. The flexible printed circuit **7** includes a flexible wiring member.

[0033] FIG. **2**B is an explanatory diagram of the image pickup module **6**, the processing module **10**, and the flexible printed circuit **7** according to the first embodiment. FIG. **2**B schematically illustrates the image pickup module **6**, the processing module **10**, and the flexible printed circuit **7** in the state of being out of the exterior **300** and laid out.

[0034] The image pickup module **6** includes an image sensor **601** that performs photoelectric conversion, an unillustrated communication circuit required for mutual communication with the processing module **10**, and a wiring board **602**. The image sensor **601** and the unillustrated communication circuit are mounted on the wiring board **602**. The wiring board **602** can be a rigid printed wiring board. The wiring board **602** is provided with an unillustrated circuit, unillustrated wiring, and an unillustrated part that are required for the operation of the image sensor **601**. The image sensor **601** is, for example, a complementary metal oxide semiconductor (CMOS) image sensor or a charge coupled device (CCD) image sensor. The image sensor **601** has a light receiving surface **611**. An optical path is secured on the light receiving surface **611** side of the image sensor **601** such that light is incident on the light receiving surface **611** of the image sensor **601** in a direction of an optical axis **4**. The incident direction of the light along the optical axis **4** is the +Y direction. The Y axis is an axis orthogonal to the light receiving surface **611**. The image sensor **601** converts an optical image (object light) focused on the light receiving surface **611** by the lens unit **650** into an electric signal (image signal). The electric signal is output to the processing module **10**.

[0035] The image sensor **601** can be formed in a package form as a semiconductor package. The image sensor **601** includes a semiconductor integrated circuit including a plurality of photoelectric conversion elements, and a ceramic substrate (interposer) on which the semiconductor integrated circuit is mounted. To be noted, in the image sensor **601**, the interposer may be omitted, and the semiconductor integrated circuit may be directly mounted on the wiring board **602**. Further, in the image pickup module **6**, the wiring board **602** may be omitted, and the flexible printed circuit **7** may be directly connected to the image sensor **601**.

[0036] The processing module **10** includes an image processing engine **101**, a power source circuit **102**, an unillustrated communication circuit required for mutual communication with the image pickup module **6**, and a wiring board **103**. The image processing engine **101**, the power source circuit **102**, and the unillustrated communication circuit are mounted on the wiring board **103**. The wiring board **103** may be a rigid printed wiring board. The image processing engine **101** is, for example, a digital signal processor, and is an image processing device having a function of obtaining an electric signal from the image sensor **601** via the flexible printed circuit **7**, performing processing of correcting the obtained electric signal, and generating image data. The image processing engine **101** receives input of an image signal from the image sensor **601** through a transmission path. The flexible printed circuit **7** serves as the transmission path in the first embodiment. The power source circuit **102** is connected to an unillustrated battery, and supplies power to the image processing engine **101**, the image pickup module **6**, and the like by applying a predetermined voltage to the image processing engine **101**, the image pickup module **6**, and the like.

[0037] The transmission of the image signal from the image pickup module **6** to the processing module **10** is performed via the flexible printed circuit **7**. One end of the flexible printed circuit **7** is connected to, for example, a mounting surface of the wiring board **602** on the opposite side to the mounting surface of the wiring board **602** on which the image sensor **601** is mounted. The other end of the flexible printed circuit **7** is connected to, for example, a mounting surface of the wiring board **103** on the opposite side to the mounting surface of the wiring board **103** on which the image processing engine **101** is mounted. The image pickup module **6** and the flexible printed circuit **7** are connected to each other via a connector, and the processing module **10** and the flexible printed circuit **7** are connected to each other via a connector. To be noted, a power source current, a control signal, and the like are also communicated between the image pickup module **6** and the processing module **10** via the flexible printed circuit **7** in addition to the image signal. That is, the flexible printed circuit **7** includes a differential signal line used for transmission of an image signal, a power supply line used for power supply, a ground line serving as a reference potential, and the like. The image signal transmitted from the image pickup module **6** to the processing module **10** via the flexible printed circuit **7** can be a digital signal, but may be an analog signal.

[0038] The exterior **300** illustrated in FIG. **1** includes a top exterior **301** positioned in an upper portion the camera **600**, a front exterior **302** positioned in a front portion (light incident side) of the camera **600**, a back exterior **303** positioned in a rear portion on the opposite side to the front exterior **302**, a right side surface exterior **304** positioned on the right side of the camera **600** in front view of the front exterior **302**, a left side surface exterior **305** positioned on the left side of the camera **600** in front view of the front exterior **302**, and a bottom exterior **306** positioned in a lower portion of the camera **600**.

[0039] The top exterior **301** is an exterior member formed from, for example, conductive resin. The front exterior **302** is an exterior member formed from, for example, metal such as a magnesium alloy. The front exterior **302** includes an annular mount portion **307** to which the lens unit **650** of FIG. **2**A is attached. A through hole **308** serving as a passage for object light irradiating the light receiving surface **611** of the image sensor **601** via the lens unit **650** is defined on the inner side of the mount portion **307**. The back exterior **303** is an exterior member positioned on the rear side of the exterior **300**. The back exterior **303** is formed from, for example, the same conductive resin as the top exterior **301**. The right side surface exterior **304** is an exterior member formed from, for example, an insulating resin, and provided with an unillustrated external interface connecting connector. In addition, the left side surface exterior **305** is connected to unillustrated bent portions respectively provided in the front exterior **302** and the back exterior **303**. The bottom exterior **306** is constituted by a plastic exterior member, for example, formed from an insulating resin, and has an insertion hole for an unillustrated battery required for driving the camera **600**. That is, the bottom exterior **306** is preferably not conductive to secure insulation from the battery. The exteriors **301** to **306** are mutually connected via unillustrated metal (conductive) screws.

[0040] FIG. **3** is a perspective view of part of elements of the camera **600** according to the first embodiment. The camera **600** includes an electronic unit **100**, a plate **11** disposed between the electronic unit **100** and the processing module **10** in the Y direction, and a bottom plate **21** disposed on the −Z side with respect to the electronic unit **100**. The electronic unit **100** includes the image pickup module **6** described above.

[0041] The plate **11** and the bottom plate **21** are fixed to the exterior **300** of FIG. **1** by using unillustrated screws or the like. The electronic unit **100** is fixed to the exterior **300** of FIG. **1** or the plate **11** by using unillustrated screws or the like. Here, “A” being fixed to “B” means the same thing as “B” being fixed to “A”. In addition, examples of viewing in the Z direction include seeing through something in the Z direction. The same applies to the X direction and the Y direction.

[0042] The plate **11** is a conductive plate having approximately the same area as the processing module **10** as viewed in the Y direction. The processing module **10** is fixed to the plate **11** by using conductive screws or the like at a plurality of positions, and is thus electrically connected to the plate **11**. As described above, since the processing module **10** is electrically connected to the plate **11** at a plurality of positions, the plate **11** functions as a heat dissipation member that dissipates heat from the processing module **10** to the outside, and as a ground serving as a reference of the potential. To be noted, the plate **11** may be configured to be electrically connected to the exterior

300.

[0043] The bottom plate **21** is a conductive plate, and is an example of a first conductive part. The bottom plate **21** is positioned at a lower portion of the camera **600**. As viewed in the Z direction, the bottom plate **21** is a conductive member of an approximate rectangular shape, and is fixed to the bottom exterior **306** of the exterior **300** illustrated in FIG. **1** by using conductive screws or the like. The bottom plate **21** has a main surface **211** and a main surface **212** on the opposite side to the main surface **211**. The main surface **211** is a main surface facing toward the electronic unit **100**, that is, a main surface facing inward, and the main surface **212** is a main surface facing toward the bottom exterior **306**, that is, a main surface facing outward. That is, the bottom plate **21** is disposed between the bottom exterior **306** and the electronic unit **100**. The main surface **211** is an example of a first main surface, and the main surface **212** is an example of a second main surface. The main surfaces **211** and **212** are, for example, flat surfaces parallel to the X-Y plane. The main surfaces **211** and **212** are substantially parallel to each other. Therefore, a direction orthogonal to the main surface **211** is substantially the same as a direction orthogonal to the main surface **212**.

[0044] FIG. **4** is a bottom view of the camera **600** according to the first embodiment. To be noted, in FIG. **4**, the bottom exterior **306** is indicated by a broken line for the sake of convenience of description. A screw receiving portion **22** that receives a screw of a tripod is fixed to the bottom plate **21**. For example, a cylindrical portion of the screw receiving portion **22** is inserted in an unillustrated hole provided at an approximate center portion of the bottom plate **21**, and is fixed to the bottom plate **21** by using screws **22***a*, **22***b*, and **24**. The screws **22***a*, **22***b*, and **24** can be formed from metal, that is, can be conductive screws. The screw receiving portion **22** includes a plurality of protrusion portions **26***a* and **26***b* for positioning. The plurality of protrusion portions **26***a* and **26***b* are fit in a plurality of holes provided in the bottom plate **21**, and thus the screw receiving portion **22** is positioned to the bottom plate **21**.

[0045] The screw receiving portion **22** is formed from metal, that is, is a conductive member. The cylindrical portion of the screw receiving portion **22** has a screw hole for receiving the screw of an unillustrated camera tripod. The camera tripod is screwed to and thus fixed to the screw receiving portion **22**, and thus the camera **600** as a whole including the bottom plate **21** and the electronic unit **100** can be fixed to the camera tripod.

[0046] To be noted, since the camera tripod is coupled to the screw receiving portion **22**, the screw hole of the screw receiving portion **22** is not covered by the bottom exterior **306**. However, part other than the screw hole may be covered by the bottom exterior **306**. Therefore, the bottom plate **21** and part of the screw receiving portion **22** are covered by the bottom exterior **306**.

[0047] The bottom exterior **306** and the bottom plate **21** are fixed to the front exterior **302** by using screws **14***a*, **16***a*, **16***b*, and **16***c*. The screws **14***a*, **16***a*, **16***b*, and **16***c* can be formed from metal, that is, can be conductive members. In addition, the bottom exterior **306** and the bottom plate **21** are fixed to the back exterior **303** by using screws **14***b*, **16***d*, and **16***e*. The screws **14***b*, **16***d*, and **16***e* can be formed from metal, that is, can be conductive members.

[0048] The bottom plate **21** has an effect of shielding a noise from the outside or the inside of the camera **600**. Further, in the case where the bottom plate **21** is supported by the tripod via the screw receiving portion **22**, since a force from the weight of the camera **600** can be act on the bottom plate **21**, the area and the thickness of the bottom plate **21** are set such that high strength can be achieved.

[0049] The electronic unit **100** includes a correction mechanism that moves the image pickup module **6** in a translational direction approximately orthogonal to the optical axis **4** and in a rotational direction about the optical axis **4**, and thus suppresses a situation in which shake of the camera **600** caused by shake of the hand of the user affects the captured image.

[0050] FIG. **5** is a perspective view of the electronic unit **100** according to the first embodiment. FIG. **6** is an exploded perspective view of the electronic unit **100** according to the first embodiment.

[0051] The electronic unit **100** includes a movable portion **50** including the image pickup module **6** described above, a fixed portion **80** fixed to the plate **11** or the exterior **300**, and an actuator **5**. The movable portion **50** is configured to be movable in a predetermined movable range with respect to the fixed portion **80**. The fixed portion **80** is also a support portion that supports the movable portion **50**.
[0052] The movable direction of the movable portion **50** includes a direction intersecting with the main surface **211**, which is a direction in a plane parallel to the X-Z plane orthogonal to the main surface **211** in the first embodiment. That is, the movable direction of the movable portion **50** includes a translational direction parallel to the X-Z plane, and a rotational direction of rotating within the X-Z plane. As described above, the movable portion **50** is configured to be movable in a plane parallel to the X-Z plane within a predetermined movable range.
[0053] The actuator **5** is configured to move the movable portion **50** with respect to the fixed portion **80**. The fixed portion **80** includes a fixed body **60** serving as a first fixed body, and a fixed body **70** serving as a second fixed body fixed to the fixed body **60**. The movable portion **50** is disposed between the fixed body **60** and the fixed body **70** in the Y direction.
[0054] The movable portion **50** moves with respect to the processing module **10**, and therefore the flexible printed circuit **7** is used as a transmission path for the image signal between the image sensor **601** and the image processing engine **101**. The movable portion **50** includes the image pickup module **6**, a movable frame **51**, and an unillustrated flexible printed circuit board. The actuator **5** is disposed in the movable frame **51**. The actuator **5** includes coils **53***a*, **53***b*, and **53***c*. The unillustrated flexible printed circuit board supplies power to the coils **53***a*, **53***b*, and **53***c*.
[0055] The fixed body **60** includes a first yoke **61**. The fixed body **70** includes a base plate **71**, spacers **73***a*, **73***b*, and **73***c*, a second yoke **75**, and magnets **76***a*, **76***b*, and **76***c* that are permanent magnets. The base plate **71** is an example of a base member. An unillustrated rotary ball that movably supports the movable portion **50** is disposed between the fixed body **70** and the movable portion **50**. One or both of the fixed body **60** and the fixed body **70** are fixed to the exterior **300** by using a screw or the like. The first yoke **61** and the second yoke **75** are each formed from a magnetic metal body. The first yoke **61**, the second yoke **75**, and the magnets **76***a*, **76***b*, and **76***c* constitute a magnetic circuit that is a closed magnetic path.
[0056] The magnets **76***a*, **76***b*, and **76***c* are fixed to the second yoke **75** by using an adhesive in a state of being attracted to the second yoke **75**. The spacers **73***a*, **73***b*, and **73***c* are disposed between the first yoke **61** and the second yoke **75**, and thus the distance between the first yoke **61** and the second yoke **75** is maintained at a predetermined value.
[0057] The movable portion **50** is disposed between the first yoke **61** and the second yoke **75**. A gap is provided between the movable portion **50** and the first yoke **61** and between the movable portion **50** and the second yoke **75**. The spacers **73***a*, **73***b*, and **73***c* are spacers defining the distance between the fixed bodies **60** and **70**. The spacers **73***a*, **73***b*, and **73***c* are each also a stopper for the movable portion **50**, and each include a cylindrical portion and rubber provided on a side surface of the cylindrical portion. That is, the spacers **73***a*, **73***b*, and **73***c* define the movable range of the movable portion **50**.
[0058] The base plate **71** is formed from a conductive metal, and is preferably formed from, for example, nonmagnetic stainless steel. The thickness of each of the magnets **76***a*, **76***b*, and **76***c* is larger than the thickness of the base plate **71**. The base plate **71** is provided with through holes in which the magnets **76***a*, **76***b*, and **76***c* are inserted. Further, the second yoke **75** is fixed to the base plate **71** by using an unillustrated screw, and thus the magnets **76***a*, **76***b*, and **76***c* protrude from the base plate **71**. In addition, a through hole **32** having an approximate rectangular shape penetrating in the direction of the optical axis **4** is provided at a center portion of the base plate **71**.
[0059] The image pickup module **6** and the unillustrated flexible printed circuit board are mounted on the movable frame **51**. Further, the coils **53***a*, **53***b*, and **53***c* are mounted on a mounting surface of the unillustrated flexible printed circuit board on the fixed body **70** side.

[0060] A through hole **33** having an approximate rectangular shape penetrating in the direction of the optical axis **4** is provided at a center portion of the movable frame **51**. In addition, through holes **23***a*, **23***b*, and **23***c* penetrating in the direction of the optical axis **4** are provided at an end portion of the movable frame **51**. The coil **53***a* is disposed in the through hole **23***a*, the coil **53***b* is disposed in the through hole **23***b*, and the coil **53***c* is disposed in the through hole **23***c*. An insulating positioning member for positioning and fixing the coil **53***a* is disposed in the through hole **23***a*. An insulating positioning member for positioning and fixing the coil **53***b* is disposed in the through hole **23***b*. An insulating positioning member for positioning and fixing the coil **53***c* is disposed in the through hole **23***c*.
[0061] In addition, since the through hole **33** is provided in the movable frame **51**, interference of mounted parts such as connector parts provided on the wiring board **602** of the image pickup module **6** with the movable frame **51** and the base plate **71** can be avoided. In addition, the flexible printed circuit **7** illustrated in FIG. **2**B is disposed to extend through the through hole **33** of the movable frame **51** and the through hole **32** of the base plate **71**, and electrically interconnects the image pickup module **6** and the processing module **10**.
[0062] The unillustrated flexible printed circuit board of the movable portion **50** is connected to an unillustrated driving circuit. The unillustrated driving circuit generates a force following the Fleming's left hand rule in each of the coils **53***a* to **53***c* by supplying a current to each of the coils **53***a* to **53***c* via the unillustrated flexible printed circuit board. As a result of this, the coils **53***a* to **53***c* can move the movable portion **50**.
[0063] In addition, an unillustrated magnetic sensor is disposed in the movable portion **50**. The unillustrated driving circuit detects a movement position of the movable portion **50** in a direction of a plane orthogonal to the optical axis **4** by using an unillustrated magnetic sensor, performs feedback control on the basis of the detection result, and thus performs control described above to correct the shake. For example, a hole element or the like can be used as the magnetic sensor, and the movement position of the movable portion **50** is detected by using a magnetic circuit including the magnets **76***a*, **76***b*, and **76***c*.
[0064] To be noted, the electronic unit **100** may include a magnet and a magnetic circuit for position detection instead of the magnetic sensor. In addition, the number of the magnets is not limited to three. For example, the magnets **76***a*, **76***b*, and **76***c* may each include two magnet pieces. Further, the two magnet pieces may be fixed to the second yoke **75** at magnetic polarities opposite to each other. According to such a configuration, the driving force for driving the movable portion **50** is improved. In addition, the magnets **76***a*, **76***b*, and **76***c* each may include three or more magnet pieces. The three magnet pieces may be arranged such that the direction of the magnetic poles are optimized, for example, such that the magnetic field intensity in a specific direction is maximized.
[0065] The image pickup operation by the image pickup module **6** and the shake correction operation by the actuator **5** are performed by known image pickup means, image processing means, record reproducing means, control means, and the like.
[0066] Accompanied by miniaturization of the camera **600**, the electronic unit **100** is accommodated in a small space inside the exterior **300**. To suppress interference between the movable portion **50** and the bottom plate **21** while securing a movable range of the movable portion **50** of the electronic unit **100**, the bottom plate **21** has a cutout **200** that part of the movable portion **50** can enter as illustrated in FIGS. **3** and **4**. The cutout **200** is a space defined by the bottom plate **21**. The shape of the cutout **200** is rectangular as viewed in the Z direction, but the shape thereof is not limited to this. For example, the cutout **200** may have a V shape or a U shape as viewed in the Z direction, and may be in any shape as long as the interference with the electronic unit **100** can be suppressed.
[0067] FIGS. **7**A and **7**B are each a section view of part of the camera **600** according to the first embodiment. FIG. **7**A schematically illustrates a cross-section of part of the camera **600** along a plane that is parallel to the Y-Z plane and that includes a line A-A′ of FIG. **3** as viewed in the −X

direction. Specifically, FIG. **7**A schematically illustrates a cross-section of the bottom plate **21** and members near the bottom plate **21**.

[0068] In addition, FIG. **7**B schematically illustrates a cross-section of part of the camera **600** along a plane that is parallel to the X-Z plane and that includes a center of the cutout **200** in the Y direction as viewed in the +Y direction. Specifically, FIG. **7**B schematically illustrates a cross-section of the bottom plate **21** and members near the bottom plate **21**.

[0069] In the bottom plate **21**, the cutout **200** is formed at a position where part of the movable portion **50** can enter. Part of the movable portion **50** is a conductive portion. In the first embodiment, the part of the movable portion **50** that can enter the cutout **200** is a protrusion portion **51***a* of the movable frame **51**. In the description below, the protrusion portion **51***a* will be also referred to as a part **51***a*. The cutout **200** is a cutout provided at an end portion of the bottom plate **21** in the X direction. The X direction is also a longitudinal direction of the bottom plate **21**. That is, the cutout **200** is formed to be recessed in the +X direction with respect to an end surface **213** of the bottom plate **21** that is on the distal end side in the −X direction. The protrusion portion **51***a* of the movable frame **51** enters the cutout **200** and retracts from the cutout **200** in accordance with the position and orientation of the movable frame **51**. That is, the movable portion **50** is movable in a space defined by the cutout **200** provided in the bottom plate **21**.

[0070] The movable frame **51** includes an end surface **51***b* that opposes the main surface **211** of the bottom plate **21** in the Z direction. The Z direction is a direction orthogonal to the main surfaces **211** and **212**. The protrusion portion **51***a* protrudes in the −Z direction (that is, toward the main surface **211**) with respect to the end surface **51***b*. To be noted, although no other member is disposed between the main surface **211** and the end surface **51***b*, another member may be disposed therebetween as long as the movement of the movable portion **50** is not interrupted.

[0071] In FIGS. **7**A and **7**B, the movable frame **51** having moved to a limit position in the −Z direction and a limit position in the −X direction in the movable range of the movable frame **51** is indicated by a one-dot chain line. That is, the movable frame **51** in a state in which the protrusion portion **51***a* of the movable frame **51** has entered the cutout **200** is indicated by a one-dot chain line. As illustrated in FIG. **7**B, in the case where the movable frame **51** has moved to the limit position in the −Z direction and the limit position in the −X direction, the movable frame **51** abuts the spacer **73***c*, and thus the movement thereof in the −X direction is restricted. In addition, although the illustration thereof is omitted, the movable frame **51** includes the protrusion portion **51***a* protruding in the −Z direction such that the movement of the movable frame **51** in the −X direction is restricted, that is, the movable frame **51** can abut the spacer **73***c*, even in a state in which the movable frame **51** has moved to a limit position in the +Z direction.

[0072] To be noted, the protrusion portion **51***a* of the movable portion **50** can be retracted from the cutout **200** depending on the position and orientation of the movable portion **50** in the movable range. In FIGS. **7**A and **7**B, the movable frame **51** in a state in which the protrusion portion **51***a* has retracted from the cutout **200** is indicated by a solid line.

[0073] Since the bottom plate **21** has the cutout **200** that part of the movable portion **50** can enter, the distance between the bottom plate **21** and the electronic unit **100** can be reduced, and thus the camera **600** can be miniaturized.

[0074] In addition, as illustrated in FIG. **7**A, part of the fixed portion **80** has entered the cutout **200**. That is, part of the fixed portion **80** is positioned at the cutout **200**. Part of the fixed portion **80** is a conductive portion. In the first embodiment, part of the fixed portion **80** is a part **31** of the base plate **71** of the fixed body **70** of the fixed portion **80**. The part **31** of the fixed portion **80** has entered the cutout **200**. That is, the part **31** of the fixed portion **80** is positioned in the cutout **200**. To be noted, although the part **31** of the base plate **71** has entered the cutout **200** as part of the fixed portion **80**, the configuration is not limited to this. For example, part of the fixed portion that enters the cutout **200** may be part of the fixed body **60**, or part of a member of the fixed body **70** other than the base plate **71**. As described above, since the fixed portion **80** is disposed inside the exterior

300 such that part of the fixed portion **80** is positioned in the cutout **200**, the distance between the bottom plate **21** and the electronic unit **100** can be reduced, and the camera **600** can be miniaturized.

[0075] Incidentally, an externally originated noise caused by electrostatic discharge (ESD) or the like may be applied to the bottom plate **21**. In the description below, a noise related to ESD will be referred to as an ESD noise. In the first embodiment, the electronic unit **100** includes a shield member **41** disposed at a position opposing the cutout **200**.

[0076] Here, a camera of a comparative example not including a shield member will be described. FIG. **8**A is an explanatory diagram of a camera of a comparative example. FIG. **8**A schematically illustrates part of an inner structure of the camera of the comparative example in which illustration of the bottom exterior **306** of the camera of the comparative example is omitted. Further, FIG. **8**A illustrates a perspective view of the inner structure of the camera as viewed in the +Z direction from below the camera of the comparative example.

[0077] The screw **14***a* is used for fixing the bottom exterior **306** and the bottom plate **21** to the front exterior **302**, and the screw **14***b* is used for fixing the bottom exterior **306** and the bottom plate **21** to the back exterior **303**. Since high rigidity is required for the screws **14***a* and **14***b*, the screws **14***a* and **14***b* are formed from metal. When the ESD noise is applied to the screw **14***b*, a current related to ESD flows along an edge of the bottom plate **21**. In the description below, a current related to ESD will be referred to as an ESD current.

[0078] Reference signs **92***a*, **92***b*, **92***c*, and **92***d* denote main ESD currents among ESD currents flowing in the bottom plate **21**. In FIG. **8**A, the directions in which the ESD currents **92***a*, **92***b*, **92***c*, and **92***d* flow are indicated by arrows. Reference signs **91***a*, **91***b*, **91***c*, and **91***d* denote main electromagnetic field noises among electromagnetic field noises that are spatially propagated. In FIG. **8**A, the directions in which the electromagnetic field noises **91***a*, **91***b*, **91***c*, and **91***d* are propagated are indicated by arrows. High electric charges are stored in an ESD application source **90**, and the charges are discharged all at once to the screw **14***b* when the ESD application source **90** comes into contact with the screw **14***b*. Therefore, a large electromagnetic field noise **91***a* is generated from the ESD application source **90**. The ESD application source **90** can be, for example, a user. The electromagnetic field noise **91***a* is propagated from the ESD application source **90** to the electronic unit **100** via the cutout **200**.

[0079] The ESD applied from the ESD application source **90** is propagated in the bottom plate **21** via the screw **14***b*. Since the ESD current has a high frequency characteristic, the ESD current has a characteristic of flowing more in the edge of a metal body to which the ESD current is applied. Therefore, the ESD applied to the screw **14***b* flows along the edge of the bottom plate **21** as the ESD currents **92***a*, **92***b*, **92***c*, and **92***d*.

[0080] The bottom plate **21** has the cutout **200**. Therefore, the ESD current **92***c* flows along the edge defining the cutout **200** in the bottom plate **21**. Then, the ESD current **92***d* having reached the screw **14***a* flows to the exterior **300**.

[0081] When the ESD current flows in the bottom plate **21**, an electromagnetic field noise is generated from the current path of the ESD current. Therefore, as a result of the ESD current **92***c* flowing along the edge defining the cutout **200**, the electromagnetic field noises **91***b*, **91***c*, and **91***d* are generated from the edge defining the cutout **200**. The electromagnetic field noises **91***b*, **91***c*, and **91***d* are propagated to the electronic unit **100** via the cutout **200**.

[0082] As illustrated in FIG. **8**A, in the case where part of the electronic unit **100** has entered the cutout **200**, most of the electromagnetic field noises **91***a* to **91***d* reach the part of the electronic unit **100**. As a result of the electromagnetic field noises **91***a* to **91***d* reaching the electronic unit **100**, an ESD noise enters the electronic unit **100**. The ESD noise having entered the electronic unit **100** reaches the image pickup module **6**, or reaches the processing module **10** via the flexible printed circuit **7** and the plate **11**. The ESD noise having entered the electronic unit **100** in this manner can lead to occurrence of disturbance of a captured image (image data) and occurrence of stoppage caused by an error. Particularly, in the case where the part **51***a* of the movable portion **50** is positioned in the cutout **200**, the electronic unit **100** is more likely to be affected by the electromagnetic field noises **91***a* to **91***d*.

[0083] To address this, as illustrated in FIGS. **7**A and **7**B, the electronic unit **100** of the first embodiment includes the shield member **41** that is conductive. The shield member **41** is an example of a second conductive part. At least part of the shield member **41** is positioned on the main surface **212** side with respect to the bottom plate **21** in the Z direction. That is, at least part of the shield member **41** is positioned between the bottom plate **21** and the bottom exterior **306** in the Z direction. To be noted, in the case where part of the shield member **41** is positioned between the bottom plate **21** and the bottom exterior **306** in the Z direction, the part of the shield member **41** serves as a second conductive part, and the shield member **41** as a whole serves as a second conductive member including the second conductive part. In the first embodiment, the entirety of the shield member **41** is positioned on the main surface **212** side in the Z direction with respect to the bottom plate **21**. That is, the entirety of the shield member **41** is positioned between the bottom plate **21** and the bottom exterior **306** in the Z direction. Therefore, in the first embodiment, the shield member **41** serves as a second conductive part and also a second conductive member. In addition, although the bottom plate **21** as a whole serves as a first conductive part and also a first conductive member in the first embodiment, part of the bottom plate **21** may serve as a first conductive part and the bottom plate **21** as a whole may serve as a first conductive member including the first conductive part.

[0084] The shield member **41** is a conductive member having a plate shape. The shield member **41** has a main surface **411** and a main surface **412** on the opposite side to the main surface **411**. The main surface **411** is an example of a third main surface, and the main surface **412** is an example of a fourth main surface. The shield member **41** may be, for example, a metal member formed from aluminum, stainless steel, or the like, or may be formed from a conductive resin imparted with conductivity obtained by mixing a conductive material in a resin material.

[0085] As illustrated in FIGS. **7**A and **7**B, a virtual plane V**1** including the main surface **211** and extending along the main surface **211** is defined. The main surface **411** is positioned between the virtual plane V**1** and the main surface **412**. In addition, the main surface **211** is positioned between the fixed portion **80** and the main surface **212**. In addition, the main surface **411** is positioned between the movable portion **50** and the main surface **412**. Further, part of the movable portion **50** is capable of moving with respect to the bottom plate **21** and the shield member **41** and intersecting with the virtual plane V**1**. As a result of this configuration, according to the first embodiment, a technique advantageous for miniaturization and noise reduction of the camera **600** can be provided.

[0086] Here, part of the movable portion **50** being capable of intersecting with the virtual plane V**1** can be also referred to as part of the movable portion **50** being capable of existing in the virtual plane V**1**. For example, part of the movable portion **50** does not have to retract from the cutout **200** by the movement of the movable portion **50**. That is, cases where part of the movable portion **50** is capable of intersecting with the virtual plane V**1** include Case 1 and Case 2 below. Case 1 is a case where part of the movable portion **50** is always in the state of intersecting with the virtual plane V**1**. Case 2 is a case where part of the movable portion **50** can be switched between a state of intersecting with the virtual plane V**1** and a state of not intersecting with the virtual plane V**1** by movement of the movable portion **50**. The example of the first embodiment is Case 2. To be noted, in a default state such as a state in which the power of the camera **600** is off, part of the movable portion **50** may intersect or not intersect with the virtual plane V**1**.

[0087] In addition, in the first embodiment, the part **31** of the base plate **71** that is part of the fixed portion **80** is present in the cutout **200**, and thus intersects with the plane V**1**. As a result of this, the camera **600** is miniaturized, and the noise is reduced by the shield member **41**.

[0088] In addition, in the Z direction orthogonal to the virtual plane V**1**, the shield member **41** preferably overlaps with the entirety of the movable range of the movable portion **50** in the virtual plane V**1**.

[0089] In the first embodiment, the shield member **41** is disposed to overlap with at least part of the cutout **200** in the Z direction. As viewed in the Z direction, the shield member **41** preferably covers a larger area in the area of the cutout **200**. Therefore, the shield member **41** is preferably disposed to overlap with the entirety of the cutout **200** in the Z direction.

[0090] In other words, in the Z direction (as viewed in the Z direction), the entirety of the cutout **200** overlaps with the shield member **41**. In the first embodiment, in the Z direction, the entirety of the cutout **200** overlaps with part of the shield member **41**. Here, although nothing is disposed between the cutout **200** and the shield member **41** in the Z direction in the first embodiment, the configuration is not limited to this. For example, an insulating member or a conductive member different from the shield member **41** may be disposed between the cutout **200** and the shield member **41** in the Z direction.

[0091] In the first embodiment, the shield member **41** does not have to be electrically connected to the bottom plate **21**, and may be, for example, at a floating potential. In this case, the shield member **41** may be fixed to the bottom plate **21** or the bottom exterior **306** by using a fixing member such as an adhesive or a screw.

[0092] By employing a configuration like this in which the bottom plate **21** has the cutout **200**, the electronic unit **100** and the bottom plate **21** can be brought closer to each other while suppressing interference between the movable portion **50** of the electronic unit **100** and the bottom plate **21**. Therefore, the camera **600** can be miniaturized.

[0093] FIG. **8**B is an explanatory diagram of the camera **600** according to the first embodiment. FIG. **8**B schematically illustrates part of the inner structure of the camera **600** in which illustration of the bottom exterior **306** in the camera **600** is omitted. Further, FIG. **8**B schematically illustrates a perspective view of the inner structure of the camera **600** as viewed in the +Z direction from below the camera **600**.

[0094] In the first embodiment, as illustrated in FIG. **8**B, the conductive shield member **41** is disposed to oppose the cutout **200**. As a result of this, the cutout **200** is covered by the shield member **41**. Therefore, the electromagnetic field noise **91***a* from the ESD application source **90** is shielded by the shield member **41**, and thus propagation of the electromagnetic field noise **91***a* to the cutout **200** can be suppressed.

[0095] In addition, the electromagnetic field noises **91***b* to **91***d* illustrated in FIG. **8**A generated from the ESD current **92***c* flowing in an end surface defining the cutout **200** are also shielded by the shield member **41**, and thus propagation thereof to the cutout **200** can be suppressed.

[0096] As described above, the shield member **41** is disposed in the vicinity of the cutout **200**, and thus entrance of the ESD noise via the cutout **200** to the image pickup module **6**, the processing module **10**, and the flexible printed circuit **7** interconnecting the image pickup module **6** and the processing module **10** can be suppressed. As a result of this, a noise induced in the image signal can be reduced, thus disturbance generated in the captured image can be reduced, and the captured image can be maintained at high quality. In addition, stoppage of the camera **600** caused by an error can be suppressed.

[0097] To be noted, although a case where the ESD noise is applied to the screw **14***b* has been described as an example, the ESD noise can be also applied to members other than the screw **14***b*. For example, the ESD noise can be also applied to the screws **14***a*, **16***a*, **16***b*, **16***c*, **16***d*, **16***e*, **22***a*, **22***b*, and **24**, the screw receiving portion **22**, or the other members. Also in a case like this, when the ESD current flows in the bottom plate **21**, propagation of an electromagnetic field noise to part of the electronic unit **100**, that is, part of the movable portion **50** and part of the fixed portion **80** can be suppressed. As a result of this, the noise propagated to the image pickup module **6** and the processing module **10** can be reduced, thus disturbance in the captured image can be reduced, and occurrence of a stoppage caused by an error can be reduced.

[0098] Next, a first modification example of the first embodiment will be described. Although a case where the shield member **41** is not electrically connected to the bottom plate **21** has been described as an example in the first embodiment described above, the configuration is not limited to this. FIG. **9** is an explanatory diagram of the camera **600** according to the first modification example of the first embodiment.

[0099] As illustrated in FIG. **9**, the shield member **41** may be electrically connected to the bottom plate **21** by being fixed to the bottom plate **21** by using the screws **14***a* and **14***b* and the like. That is, the shield member **41** is fixed to the bottom plate **21** by using the screws **14***a* and **14***b* arranged with the cutout **200** therebetween, and is thus electrically connected to the bottom plate **21**.

[0100] The shield member **41** of the first modification example includes a plate-like body, and two fastening portions fixed to the bottom plate **21** by using the screws **14***a* and **14***b*. To enhance the reliability of the electrical connection between the bottom plate **21** and the shield member **41**, a metal member such as a metal washer is preferably disposed between the bottom plate **21** and the shield member **41** at each of the fastening portion of the shield member **41**. To be noted, instead of disposing the washer between the bottom plate **21** and the shield member **41**, the fastening portion of the shield member **41** or a portion of the bottom plate **21** comes into contact with the fastening portion may be formed in a protruding shape or a bent shape. As described above, the bottom plate **21** and the shield member **41** are fixed to each other by using fixing members such as the screws **14***a* and **14***b*. To be noted, the bottom plate **21** can be a first conductive member including a first conductive part. In addition, the body of the shield member **41** can be a second conductive part. Further, the shield member **41** as a whole can be a second conductive member including a second conductive part.

[0101] As a result of the camera of the first modification example being configured as described above, the ESD noise applied to the screw **14***b* flows in the shield member **41** as the ESD current **93**. The ESD current **93** flows from the position of the screw **14***b* to the position of the screw **14***a* in an arrow direction in the shield member **41**. Further, the ESD current **93** having reached the screw **14***a* flows to the exterior **300**.

[0102] According to the first modification example, a bypass route for the ESD current **93** to flow in is formed by the shield member **41**, and thus the ESD current **92***c* along the cutout **200** can be suppressed. Therefore, the electromagnetic field noise entering the electronic unit **100** via the cutout **200** can be reduced. In addition, since the shield member **41** is disposed to cover the cutout **200**, the shield member **41** also has a shielding effect against the electromagnetic field noise **91***a* illustrated in FIG. **8**B.

[0103] To be noted, the screws **14***a* and **14***b* fixing the shield member **41** to the bottom plate **21** are also screws that fix the bottom plate **21** and the bottom exterior **306** to the front exterior **302** and the back exterior **303**. Therefore, the shield member **41**, the bottom plate **21**, and the exterior **300** are collectively fastened and fixed to each other by using the screws **14***a* and **14***b*. By employing such a configuration, the ESD current can be supplied from the shield member **41** to the exterior **300**, which serves as a more stable ground potential, without passing through other members, and therefore entrance of the ESD noise into the image pickup module **6** and the processing module **10** in the camera **600** can be reduced.

[0104] To be noted, as illustrated in FIG. **8**B of the first embodiment and FIG. **9** of the first modification example of the first embodiment, the ESD currents and electromagnetic field noises are described by using arrows. This is employed for the sake of convenience of description of the phenomenon, and the direction of the ESD current and the electromagnetic field noise changes in accordance with the difference in the application point of the ESD noise, voltage fluctuation caused by resonance or the like, and the like. Also in such a case, in the first embodiment and the first modification example, since the shield member **41** is disposed in the vicinity of the cutout **200**, the electromagnetic field noise reaching the cutout **200** and the electromagnetic field noise derived from the flow of the ESD current can be shielded.

[0105] Next, models and simulation results of electromagnetic field simulation performed using a

computer for the comparative example, the first embodiment, and the first modification example of the first embodiment will be described.
[0106] First, summary of a model used for the electromagnetic field simulation will be described. The bottom plate **21** was configured as a parallelepiped rectangular conductor having a length of 26.3 mm, a width of 81.1 mm, and a thickness of 1.2 mm, and provided with the cutout **200**. Here, the length direction was set to the Y direction, the width direction was set to the X direction, and the thickness direction was set to the Z direction. The length direction was also a short-side direction of the bottom plate **21**, and the width direction was also a longitudinal direction of the bottom plate **21**.
[0107] The cutout **200** was set to be obtained by cutting out part of the bottom plate **21** into a rectangular shape having a length of 8.4 mm and a width of 15.9 mm. The cutout **200** was provided at an end of the bottom plate **21** extending in the length direction. The center of the cutout **200** in the length direction was displaced toward the front exterior **302** side by 1.2 mm from the center of the bottom plate **21** in the length direction.
[0108] The part **31** of the base plate **71** was positioned in the cutout **200**. The width of the part **31** of the base plate **71** in the length direction of the bottom plate **21** was set to 5.9 mm. The height of the part **31** of the base plate **71** in the thickness direction of the bottom plate **21** was set to 0.35 mm, and the length of the part **31** of the base plate **71** in the width direction of the bottom plate **21** was set to 14 mm. The part **31** of the base plate **71** was positioned at a position away by 1 mm from the edge of the cutout **200** closer to the screw **14***b*.
[0109] In the present simulation model, a noise simulating ESD was applied to the screw **14***b*. In the description below, the positions of the screws **14***a* and **14***b* in the comparative example, the first embodiment, and the first modification example will be described. The screw **14***a* is a screw related to the propagation path of the ESD current, and the screw **14***b* is a screw serving as an ESD application point.
[0110] The screw **14***b* was disposed at a position that was away by 12.2 mm in the width direction from the end of the bottom plate **21** at which the cutout **200** is provided and that was near an end of the bottom plate **21** on the side closer to the back exterior **303**. The screw **14***a* was disposed at a position near an end of the bottom plate **21** where the cutout **200** was provided such that the cutout **200** was positioned between the screws **14***a* and **14***b*.
[0111] A rectangular plate material having a length of 10 mm, a width of 19.2 mm, and a thickness of 0.35 mm was used as the shield member **41** of the first embodiment. The material of the shield member **41** of the first embodiment was set to aluminum. The shield member **41** was disposed at a position where the shield member **41** covered the entirety of the cutout **200** as viewed in the Z direction and that was away from the bottom plate **21** by 0.2 mm in the −Z direction.
[0112] A plate material including a rectangular body having a length of 10 mm, a width of 19.2 mm, and a thickness of 0.35 mm and two fastening portions which protruded from the rectangular body and via which the shield member **41** was fixed to the bottom plate **21** by using the screws **14***a* and **14***b* was used as the shield member **41** of the first modification example. The material of the shield member **41** of the first modification example was set to aluminum.
[0113] A metal washer having a thickness of 0.2 mm was disposed between the bottom plate **21** and the shield member **41** at each of the fastening portions of the shield member **41** such that the bottom plate **21** and the shield member **41** were electrically connected to each other.
[0114] Next, a signal line observed in the simulation will be described. In the present simulation, a signal line used for transmission of an image signal connected from the image pickup module **6** to the processing module **10** via the flexible printed circuit **7** was used. The signal line was connected to a ground pattern that was a reference voltage pattern of the processing module **10** at a termination resistance set in consideration of a receiver IC of the image signal. In the present simulation, a noise voltage induced in the signal was observed at the termination resistance provided in the processing module **10**.

[0115] FIGS. **10**A and **10**B are graphs illustrating results of the simulation. FIG. **10**A illustrates a voltage waveform induced in the signal line in a period from 0 to 10 nsec in the comparative example not provided with the shield member **41**. It can be seen from FIG. **10**A that a voltage fluctuation of a large pulse width is induced in the signal line before 4 nsec.

[0116] FIG. **10**B illustrates the value of the noise voltage induced in the signal line for each of the comparative example, the first embodiment, and the first modification example of the first embodiment. In FIG. **10**B, "A" represents a simulation result of the comparative example not provided with the shield member **41**, "B" represents a simulation result of the first embodiment provided with the shield member **41**, and "C" represents a simulation result of the first modification example provided with the shield member **41**.

[0117] To be noted, the noise voltage mentioned herein is a 0-to-peak value of the first waveform of a large pulse width observed before the elapse of 4 nsec after a waveform simulating ESD is applied.

[0118] It can be seen from the simulation result illustrated in FIG. **10**B that the noise voltage induced in the signal line is reduced by the shield member **41**. In addition, it can be seen that the noise voltage is further reduced from the first embodiment in the first modification example.

[0119] As described above, according to the configuration of the first embodiment or the first modification example, the ESD noise entering the inside of the camera **600** can be reduced, and the voltage fluctuation induced in the signal line can be reduced. In addition, according to the first modification example, since the shield member **41** is electrically connected to the bottom plate **21**, the voltage fluctuation induced in the signal line can be further reduced. Therefore, a technique advantageous for miniaturization and noise reduction of the camera **600** can be provided.

[0120] To be noted, although a case where the shield member **41** is a flat plate has been described as an example in the first embodiment and the first modification example, the configuration is not limited to this. For example, the shield member **41** may have a bent portion following the shape of the exterior **300**.

[0121] In addition, although a case where the shield member **41** is disposed inside the exterior **300** has been described as an example in the first embodiment and the first modification example, the configuration is not limited to this. For example, the shield member **41** may be configured to constitute part of the exterior.

[0122] In addition, the shield member **41** is not limited to a plate shape as long as the shield member **41** is conductive. For example, the shield member **41** may be a metal member having a rectangular parallelepiped shape, a conductor having a sheet shape, a gasket formed from conductive cloth, or the like.

Second Embodiment

[0123] A second embodiment of the present disclosure will be described. In the description below, it is assumed that elements denoted by the same reference signs as in the first embodiment have substantially the same configurations and functions as those described in the first embodiment unless otherwise described, and parts different from the first embodiment will be mainly described.

[0124] FIGS. **11**A and **11**B are explanatory diagrams of a camera **600**A according to the second embodiment. FIG. **11**A schematically illustrates a perspective view of part of the inner structure of the camera **600**A in which illustration of the bottom exterior **306** of the camera **600**A is omitted. FIG. **11**B is an explanatory diagram of a positional relationship between a bottom plate **21**A and the movable portion **50**.

[0125] As illustrated in FIG. **11**A, the camera **600**A of the second embodiment includes the bottom plate **21**A and the electronic unit **100**. FIG. **11**A illustrates part of the electronic unit **100** and part of the bottom plate **21**A. The camera **600**A of the second embodiment has a configuration in which the bottom plate **21** of the camera **600** of the first embodiment is replaced by the bottom plate **21**A and in which the shield member **41** is omitted. That is, the bottom plate **21**A has a function as a shield member.

[0126] The bottom plate **21**A is a conductive plate. The bottom plate **21**A includes a plate body **25**, and a conductive part **43** integrated with the plate body **25**. In other words, the bottom plate **21**A integrally includes the plate body **25** and the conductive part **43**. That is, the plate body **25** and the conductive part **43** are each a part of the bottom plate **21**A. The bottom plate **21**A is an example of a conductive member. The plate body **25** is an example of a first conductive part, and the conductive part **43** is an example of a second conductive part.
[0127] A configuration in which a current flows from the plate body **25** to the conductive part **43** is employed. That is, the plate body **25** and the conductive part **43** are electrically connected to each other.
[0128] The bottom plate **21**A is disposed on the −Z side with respect to the electronic unit **100**. As viewed in the Z direction, the bottom plate **21**A is a conductive member having an approximate rectangular shape, and is fixed to the bottom exterior **306** of the exterior **300** illustrated in FIG. **1** by using a conductive screw or the like. The bottom plate **21**A is disposed between the bottom exterior **306** and the electronic unit **100**.
[0129] The plate body **25** has a main surface **251** and a main surface **252** on the opposite side to the main surface **251**. The main surface **251** is a main surface facing toward the electronic unit **100**, that is, a main surface facing inward, and the main surface **252** is a main surface facing toward the bottom exterior **306**, that is, a main surface facing outward. The main surface **251** is an example of a first main surface, and the main surface **252** is an example of a second main surface. The main surfaces **251** and **252** are, for example, flat surfaces parallel to the X-Y plane. The main surfaces **251** and **252** are substantially parallel to each other. Therefore, a direction orthogonal to the main surface **251** is substantially the same as a direction orthogonal to the main surface **252**.
[0130] To be noted, the screw receiving portion **22** illustrated in FIG. **3** is fixed to the bottom plate **21**A similarly to the first embodiment. In addition, similarly to the first embodiment, the bottom plate **21**A and the bottom exterior **306** of the first embodiment are fixed to the front exterior **302** and the back exterior **303** of FIG. **1** by using a plurality of metal screws. FIG. **11**A illustrates the two screws **14***a* and **14***b* among the plurality of screws.
[0131] Accompanied by miniaturization of the camera **600**A, the electronic unit **100** is accommodated in a small space inside the exterior **300** illustrated in FIG. **1**. To suppress interference between the movable portion **50** and the bottom plate **21**A while securing a movable range of the movable portion **50** of the electronic unit **100**, the bottom plate **21**A of the second embodiment has a hole **42** that part of the movable portion **50** can enter. That is, the bottom plate **21**A of the second embodiment has a hole **42** instead of the cutout **200** described in the first embodiment. The hole **42** is a space defined by the bottom plate **21**A. The position of the hole **42** in the bottom plate **21**A is approximately the same as the position of the cutout **200** in the bottom plate **21**. The part of the movable portion **50** is the protrusion portion **51***a* of the movable frame **51** similarly to the first embodiment. The movable portion **50** is movable in a space defined by the hole **42** provided in the bottom plate **21**A.
[0132] The hole **42** is a recess hole recessed in the −Z direction away from the electronic unit **100** with respect to the main surface **251**. That is, the hole **42** is a recess portion. The depth of the hole **42** in the Z direction is equal to or larger than the thickness of the plate body **25** in the Z direction. Therefore, the conductive part **43** includes a protrusion portion provided at a position corresponding to the hole **42** and protruding in the −Z direction away from the electronic unit **100** with respect to the main surface **252**. That is, the protrusion portion is disposed on the side of the bottom plate **21**A opposite to the hole **42** side.
[0133] In the second embodiment, the conductive part **43** has a main surface **431** and a main surface **432** on the opposite side to the main surface **431**. The main surface **431** is an example of a third main surface, and the main surface **432** is an example of a fourth main surface. The main surface **431** is a surface on the hole **42** side. The main surface **432** is a surface on the protrusion portion side.

[0134] In addition, the opening of the hole **42** may be provided on the end surface **253** side of the bottom plate **21**A so as to avoid the interference between the bottom plate **21**A and the movable frame **51** or the base plate **71**. The end surface **253** is, for example, an end surface of the bottom plate **21**A on the distal end side in the −X direction.

[0135] As illustrated in FIG. **11**B, a virtual plane V**2** including the main surface **251** and extending along the main surface **251** is defined. The main surface **431** is positioned between the virtual plane V**2** and the main surface **432**. In addition, the main surface **251** is positioned between the fixed portion **80** and the main surface **252**. In addition, the main surface **431** is positioned between the movable portion **50** and the main surface **432**. Further, part of the movable portion **50** is capable of moving with respect to the plate body **25** and the conductive part **43** and intersecting with the virtual plane V**2**. As a result of this configuration, according to the second embodiment, a technique advantageous for miniaturization and noise reduction of the camera **600**A can be provided.

[0136] Here, part of the movable portion **50** being capable of intersecting with the virtual plane V**2** can be also referred to as part of the movable portion **50** being capable of existing in the virtual plane V**2**. For example, part of the movable portion **50** does not have to retract from the hole **42** by the movement of the movable portion **50**. That is, cases where part of the movable portion **50** is capable of intersecting with the virtual plane V**2** include Case 1 and Case 2 below. Case 1 is a case where part of the movable portion **50** is always in the state of intersecting with the virtual plane V**2**. Case 2 is a case where part of the movable portion **50** can be switched between a state of intersecting with the virtual plane V**2** and a state of not intersecting with the virtual plane V**2** by movement of the movable portion **50**. The example of the second embodiment is Case 2. To be noted, in a default state such as a state in which the power of the camera **600**A is off, part of the movable portion **50** may intersect or not intersect with the virtual plane V**2**.

[0137] In the second embodiment, a distance D**2** between the main surface **431** and the main surface **432** is smaller than a distance D**1** between the main surface **251** and the main surface **252**. That is, the conductive part **43** is thinner than the plate body **25**. In addition, a distance D**3** between the main surface **432** and the virtual plane V**2** is larger than the distance D**1** between the main surface **251** and the main surface **252**. That is, the conductive part **43** protrudes in the −Z direction with respect to the plate body **25**.

[0138] As a result of the configuration described above, the ESD noise applied to the screw **14***a* flows from the screw **14***a* to the screw **14***b* as an ESD current **94** via an edge of the bottom plate **21**A, that is, via an edge of the plate body **25** and an edge of the conductive part **43**. The ESD current **94** having reached the screw **14***a* flows to the exterior **300** illustrated in FIG. **1** serving as a more stable ground potential. Therefore, entrance of the ESD noise to the image pickup module **6**, the processing module **10**, and the flexible printed circuit **7** interconnecting the image pickup module **6** and the processing module **10** can be suppressed. As a result of this, the noise induced in the image signal can be reduced, the disturbance occurring in the captured image can be reduced, and thus the quality of the captured image can be maintained high. In addition, stoppage of the camera **600**A caused by an error can be suppressed.

[0139] In addition, in the second embodiment, since part of the fixed portion **80** is present in the hole **42**, the fixed portion **80** intersects with the virtual plane V**2**. As a result of this, the camera **600**A is miniaturized, and the noise is reduced by the conductive part **43**.

[0140] Next, a second modification example of the second embodiment will be described. Although a case where the depth of the hole **42** in the Z direction is equal to or larger than the thickness of the plate body **25** in the Z direction has been described in the second embodiment described above, the configuration is not limited to this. FIGS. **12**A and **12**B are explanatory diagrams of the camera **600**A according to the second modification example of the second embodiment. FIG. **12**A schematically illustrates a perspective view of part of the inner structure of the camera **600**A in which illustration of the bottom exterior **306** of the camera **600**A is omitted. FIG. **12**B is an explanatory diagram of a positional relationship between the bottom plate **21**A and the movable portion **50**.

[0141] The depth of the hole **42** in the Z direction may be smaller than the thickness of the plate body **25** in the Z direction. In the case of the configuration of the second modification example, the distance D**2** between the main surface **431** and the main surface **432** is smaller than the distance D**1** between the main surface **251** and the main surface **252**. That is, the thickness of the conductive part **43** in the Z direction is smaller than the thickness of the plate body **25** in the Z direction. Further, in the second modification example, a protrusion portion as in the second embodiment does not need to be provided at a position corresponding to the hole **42**. That is, in the bottom plate **21**A, no protrusion portion is provided on the side opposite to the hole **42** side, and the main surface **252** and the main surface **432** are flush. By employing such a configuration, the noise reduction effect can be obtained similarly to the second embodiment, and the protrusion of the bottom plate **21**A in the thickness direction can be suppressed.

Third Embodiment

[0142] A third embodiment of the present disclosure will be described. In the description below, it is assumed that elements denoted by the same reference signs as in the first embodiment have substantially the same configurations and functions as those described in the first embodiment unless otherwise described, and parts different from the first embodiment will be mainly described.

[0143] Although a case where the hole **42** is a recess hole has been described in the second embodiment described above, the configuration is not limited to this. FIG. **13**A is an explanatory diagram of a camera **600**B according to the third embodiment. FIG. **13**A schematically illustrates a perspective view of part of the inner structure of the camera **600**B in which illustration of the bottom exterior **306** of the camera **600**B is omitted.

[0144] As illustrated in FIG. **13**A, the camera **600**B of the third embodiment includes a bottom plate **21**B and the electronic unit **100**. FIG. **13**A illustrates part of the electronic unit **100** and part of the bottom plate **21**B. The camera **600**B of the third embodiment has a configuration in which the bottom plate **21** of the camera **600** of the first embodiment is replaced by the bottom plate **21**B and in which the shield member **41** is omitted. That is, the bottom plate **21**B has a function as a shield member.

[0145] The bottom plate **21**B is a conductive plate. The bottom plate **21**B includes a plate body **25**, and a conductive part **44** integrated with the plate body **25**. In other words, the bottom plate **21**B integrally includes the plate body **25** and the conductive part **44**. That is, the plate body **25** and the conductive part **44** are each a part of the bottom plate **21**B. The bottom plate **21**B is an example of a conductive member. The plate body **25** is an example of a first conductive part, and the conductive part **44** is an example of a second conductive part.

[0146] The positional relationship and fixation relationship of the bottom plate **21**B, the electronic unit **100**, and the bottom exterior **306** are substantially the same as the positional relationship and fixation relationship of the bottom plate **21**, the electronic unit **100**, and the bottom exterior **306** described in the first embodiment, and therefore description thereof will be omitted.

[0147] In the third embodiment, the plate body **25** has a main surface **251** and a main surface **252** on the opposite side to the main surface **251** similarly to the first embodiment. The main surface **251** is an example of a first main surface, and the main surface **252** is an example of a second main surface. The conductive part **44** includes a main surface **441** and a main surface **442** on the opposite side to the main surface **441**. The main surface **441** is an example of a third main surface, and the main surface **442** is an example of a fourth main surface. The hole **42** is defined by the plate body **25** and the conductive part **44**. In the third embodiment, the main surface **251** and the main surface **441** are flush, and the main surface **252** and the main surface **442** are flush.

[0148] FIG. **13**B is an explanatory diagram of the bottom plate **21**B and the virtual plane V**2**. FIG. **13**B illustrates the bottom plate **21**B in the virtual plane V**2** as viewed in the Z direction orthogonal to the virtual plane V**2**. Similarly to the second embodiment, the virtual plane V**2** including the main surface **251** and extending along the main surface **251** is defined. The virtual plane V**2** includes a first region A**1** overlapping with the plate body **25** in the Z direction orthogonal to the virtual plane V**2**, a second region A**2** overlapping with the conductive part **44** in the Z direction orthogonal to the virtual plane V**2**, and a third region A**3** between the first region A**1** and the second region A**2**.

[0149] A configuration in which a current flows from the plate body **25** to the conductive part **44** is employed. That is, the plate body **25** and the conductive part **44** are electrically connected to each other. In the third embodiment, the plate body **25** and the conductive part **44** are integrally formed. In other words, the bottom plate **21**B integrally includes the plate body **25** and the conductive part **44**. That is, the plate body **25** and the conductive part **44** are each a part of the bottom plate **21**B.

[0150] Part of the movable portion **50** is capable of moving with respect to the plate body **25** and the conductive part **44** and intersecting with the third region A**3**. As a result of the configuration described above, according to the third embodiment, a technique advantageous for miniaturization and noise reduction of the camera **600**B can be provided.

[0151] As illustrated in FIG. **13**A, the hole **42** may be a through hole penetrating the bottom plate **21**B in the Z direction. In this case, most of the ESD current **94** flows in edges between the main surfaces **252** and **442** and the end surface **253**. Therefore, the ESD current **94** does not flow in a path bypassing the cutout **200** illustrated in FIG. **8**A, thus flows in a path away from the hole **42**, and the electromagnetic field noise passing through the hole **42** is reduced even in the case where an electromagnetic field noise is generated by the ESD current **94**.

[0152] In addition, in the comparative example illustrated in FIG. **8**A, the ESD current **92***c* bypasses the cutout **200**, thus the electromagnetic field noises **91***b*, **91***c*, and **91***d* pass through the cutout **200**, and therefore the intensity of the electromagnetic field noise is high.

[0153] In contrast, in the third embodiment, as illustrated in FIG. **13**A, the ESD current **94** hardly flows in the edge of the hole **42**, and dominantly flows in the edge of the conductive part **44** that is an edge between the main surface **442** and the end surface **253** without bypassing the hole **42**. As described above, generation of electromagnetic field noises that intensify each other such as the electromagnetic field noises **91***b*, **91***c*, and **91***d* of FIG. **8**A can be suppressed, and thus the electromagnetic field noise passing through the hole **42** can be reduced. Since the electromagnetic field noise passing through the hole **42** is reduced, occurrence of disturbance in the captured image can be effectively reduced.

[0154] In addition, since the thickness of the conductive part **44** that the ESD current **94** passes through is equal to that of the plate body **25**, the change in the sectional area that the ESD current **94** flows through is small. Since the change in the sectional area is small, the change in the electric resistance is also small. Therefore, the ESD current **94** is likely to flow in the edge of the conductive part **44** included in the edge of the bottom plate **21**B, and thus the electromagnetic field noise passing through the hole **42** can be suppressed more effectively.

[0155] In addition, in the third embodiment, since part of the fixed portion **80** is present in the hole **42**, the fixed portion **80** intersects with the virtual plane V**2**. As a result of this, the camera **600**B is miniaturized, and the noise is reduced by the conductive part **44**.

[0156] Next, a third modification example of the third embodiment will be described. Although a case where the hole **42** is a recess hole has been described in the second embodiment described above and a case where the hole **42** is a through hole has been described in the third embodiment described above, the configuration is not limited to this. FIG. **14**A is an explanatory diagram of the camera **600**B according to the third modification example of the third embodiment. FIG. **14**A schematically illustrates a perspective view of part of the inner structure of the camera **600**B in which illustration of the bottom exterior **306** of the camera **600**B is omitted.

[0157] As illustrated in FIG. **14**A, the bottom plate **21**B includes the plate body **25** and the conductive part **44** integrated with the plate body **25**. Further, the hole **42** defined by the plate body **25** and the conductive part **44** may include a through hole **421** and a recess hole **422** continuous with the through hole **421** in the X direction. The through hole **421** is a through hole penetrating the bottom plate **21**B in the Z direction. The recess hole **422** is a recess hole recessed in the −Z direction away from the electronic unit **100** with respect to the main surface **251**. That is, the recess hole **422** is a recess portion.

[0158] The recess hole **422** is defined by the conductive part **44**. The depth of the recess hole **422** in the Z direction is equal to or larger than the thickness of the plate body **25** in the Z direction. Therefore, the bottom plate **21**B includes a protrusion portion provided at a position corresponding to the recess hole **422** and protruding in the −Z direction away from the electronic unit **100** with respect to the main surface **252**. That is, the protrusion portion is disposed on the side of the bottom plate **21**B opposite to the recess hole **422** side. The conductive part **44** includes the protrusion portion. The thickness of the conductive part **44** in the Z direction is smaller than the thickness of the plate body **25** in the Z direction. That is, the bottom plate **21**B includes a thick portion for securing strength, and a thin portion serving as the conductive part **44** corresponding to the recess hole **422**.

[0159] The distance between the main surface **441** and the main surface **442** is smaller than the distance between the main surface **251** and the main surface **252**. That is, the conductive part **44** is thinner than the plate body **25**. In addition, the distance between the main surface **442** and the virtual plane V**2** is larger than the main surface **251** and the main surface **252**. That is, the conductive part **44** protrudes in the −Z direction with respect to the plate body **25**.

[0160] In addition, the opening of the recess hole **422** may be provided on the end surface **253** side of the bottom plate **21**B so as to avoid the interference between the bottom plate **21**B and the movable frame **51** or the base plate **71**. The end surface **253** is, for example, an end surface of the bottom plate **21**B on the distal end side in the −X direction.

[0161] Also in the configuration described above, according to the third modification example, the electromagnetic field noise passing through the through hole **421** is reduced, and therefore occurrence of disturbance in the captured image can be effectively reduced.

[0162] Next, a fourth modification example of the third embodiment will be described. Although a case where the hole **42** includes the through hole **421** and the recess hole **422** and a protrusion portion is provided on the side opposite to the recess hole **422** has been described in the third modification example described above, the configuration is not limited to this. FIG. **14**B is an explanatory diagram of the camera **600**B according to the fourth modification example of the third embodiment. FIG. **14**B schematically illustrates a perspective view of part of the inner structure of the camera **600**B in which illustration of the bottom exterior **306** of the camera **600**B is omitted.

[0163] The depth of the hole **422** in the Z direction may be smaller than the thickness of the plate body **25** in the Z direction. In the case of the configuration of the fourth modification example, the distance between the main surface **441** and the main surface **442** is smaller than the distance between the main surface **251** and the main surface **252**. That is, the thickness of the conductive part **44** in the Z direction is smaller than the thickness of the plate body **25** in the Z direction. Further, in the fourth modification example, as illustrated in FIG. **14**B, the side of the bottom plate **21**B opposite to the recess hole **422** side does not have to protrude as in the second modification example. That is, in the bottom plate **21**B, no protrusion portion is provided on the side opposite to the recess hole **422** side, and the main surface **252** and the main surface **442** are flush.

[0164] Also in the configuration described above, according to the fourth modification example, the electromagnetic field noise passing through the through hole **421** is reduced, and therefore occurrence of disturbance in the captured image can be effectively reduced. In addition, protrusion of the bottom plate **21**B in the thickness direction can be suppressed.

[0165] To be noted, in any of the third embodiment and the third and fourth modification examples of the third embodiment, a shield member may be provided at a position opposing the through hole similarly to the first embodiment and the first comparative example of the first embodiment. As described above, according to the third embodiment and the third and fourth modification examples of the third embodiment, a technique advantageous for miniaturization and noise reduction of the

camera **600**B can be provided.
OTHER MODIFICATION EXAMPLES
[0166] The present disclosure is not limited to the embodiments described above, and the embodiments can be modified in many ways within the technical concept of the present disclosure. For example, among the plurality of embodiments and plurality of modification examples described above, at least two may be combined. In addition, the effects described in the embodiments are merely enumeration of the most preferable effects that can be obtained from the embodiments of the present disclosure, and the effects of embodiments of the present disclosure are not limited to those described in the embodiments.
[0167] Although a case where the bottom plate is a conductive plate having a cutout or a hole has been described in the embodiments described above, the configuration is not limited to this. For example, another conductive plate in the camera may have the cutout or hole described above. In the case where the conductive plate has a cutout, the shield member described above may be disposed in the vicinity of the cutout.
[0168] In addition, although a case where the first main surface of the plate body of the bottom plate is parallel to the X-Y plane has been described in the embodiments described above, the configuration is not limited to this, and the first main surface of the plate body may be inclined with respect to the X-Y plane. In this case, the movable portion may be moved in a plane parallel to the X-Z plane intersecting with the first main surface of the plate body.
[0169] The electronic device to which the embodiments described above are applicable may be an information device such as a smartphone or a personal computer, or a communication device such as a modem or a router. Alternatively, the electronic device may be an office device such as a printer or a copier, a medical device such as an X-ray imaging apparatus or an endoscope, an industrial device such as a robot or a semiconductor manufacturing apparatus, or a transport device such as a car, an airplane, or a ship. In the electronic device of the present embodiment, the electronic unit and the conductive plate can be disposed in a limited space inside the exterior, which is advantageous for miniaturization of the electronic device and improvement in the performance thereof.
[0170] The disclosure of the present specification is not limited to what is explicitly described in the present specification, and includes all the matter that can be grasped from the present specification and the drawings attached to the present specification. In addition, the disclosure of the present specification includes a complementary set of each individual concept described in the present specification. That is, if the present specification includes a description of “A is B”, it can be said that the present disclosure discloses a concept of “A is not B” even if description of the concept of “A is not B” is omitted. This is because there is a premise that in the case where the concept of “A is B” is described, a case where “A is not B” has been already considered.
[0171] According to the present disclosure, a technique advantageous for miniaturization and noise reduction of an electronic device can be provided.
[0172] While the present disclosure has been described with reference to exemplary embodiments, it is to be understood that the disclosure is not limited to the disclosed exemplary embodiments. The scope of the following claims is to be accorded the broadest interpretation so as to encompass all such modifications and equivalent structures and functions.
[0173] This application claims the benefit of Japanese Patent Application No. 2024-018735, filed Feb. 9, 2024, which is hereby incorporated by reference herein in its entirety.

Claims

1. An electronic device comprising: an electronic unit including a fixed portion and a movable portion movable with respect to the fixed portion; a first conductive part having a first main surface and a second main surface provided on a side opposite to the first main surface; and a second conductive part having a third main surface and a fourth main surface provided on a side opposite to the third main surface, wherein the first main surface is positioned between the fixed portion and the second main surface, wherein the third main surface is positioned between the movable portion and the fourth main surface, wherein the third main surface is positioned between the fourth main surface and a virtual plane including the first main surface and extending along the first main surface, and wherein part of the movable portion is capable of moving with respect to the first conductive part and the second conductive part and intersecting with the virtual plane.

2. An electronic device comprising: an electronic unit including a fixed portion and a movable portion movable with respect to the fixed portion; a first conductive part having a first main surface and a second main surface provided on a side opposite to the first main surface; and a second conductive part having a third main surface and a fourth main surface provided on a side opposite to the third main surface, wherein a virtual plane including the first main surface and extending along the first main surface has a first region overlapping with the first conductive part in a direction orthogonal to the virtual plane, a second region overlapping with the second conductive part in the direction orthogonal to the virtual plane, and a third region between the first region and the second region, wherein a current is configured to flow from the first conductive part to the second conductive part, and wherein part of the movable portion is capable of moving with respect to the first conductive part and the second conductive part and intersecting with the third region.

3. The electronic device according to claim 1, wherein the part of the movable portion is a conductive portion.

4. The electronic device according to claim 1, wherein part of the fixed portion intersects with the virtual plane.

5. The electronic device according to claim 4, wherein the part of the fixed portion is a conductive portion.

6. The electronic device according to claim 1, wherein the first conductive part is part of a conductive member, and wherein the movable portion is movable in a space defined by a cutout or a hole provided in the conductive member.

7. The electronic device according to claim 6, wherein the hole is a through hole or a recess hole recessed with respect to the first main surface, or includes a through hole and a recess hole continuous with the through hole and recessed with respect to the first main surface.

8. The electronic device according to claim 7, wherein the recess hole has an opening on an end surface side of the conductive member.

9. The electronic device according to claim 1, wherein a distance between the third main surface and the fourth main surface is smaller than a distance between the first main surface and the second main surface, wherein a distance between the fourth main surface and the virtual plane is larger than the distance between the first main surface and the second main surface, and/or wherein a distance between the third main surface and the virtual plane is smaller than a distance between the second main surface and the virtual plane.

10. The electronic device according to claim 1, wherein in a direction orthogonal to the virtual plane, the second conductive part overlaps with entirety of a movable range of the movable portion in the virtual plane.

11. The electronic device according to claim 1, wherein the second conductive part is electrically connected to the first conductive part.

12. The electronic device according to claim 1, wherein a first conductive member including the first conducive part and a second conductive member including the second conductive part are fixed to each other by a fixing member.

13. The electronic device according to claim 1, wherein the first conductive part and the second conductive part are integrated in a conductive member.

14. The electronic device according to claim 1, wherein the electronic unit includes an actuator configured to move the movable portion.

15. The electronic device according to claim 1, further comprising: an exterior member disposed on the second main surface side of the first conductive part, wherein the exterior member is fixed to a conductive member including the first conductive part by using a metal screw.
16. The electronic device according to claim 15, wherein the exterior member is formed from plastics.
17. The electronic device according to claim 1, wherein the movable portion includes an image sensor.
18. The electronic device according to claim 1, wherein a screw receiving portion configured to receive a screw of a tripod is fixed to a conductive member including the first conductive part.
19. The electronic device according to claim 17, further comprising an image processing device configured to receive input of an image signal from the image sensor via a transmission path.
20. The electronic device according to claim 19, wherein the transmission path includes a flexible wiring member.
21. The electronic device according to claim 2, wherein the movable portion includes an image sensor.
