

manner based on the vibration generation signal Sout2. The speaker 36b gives the vibration to the operation surface of the display unit 29 based on the position detection signal S1 obtained from the input detection unit 45. It is needless to say that the speaker 36b receives an audio signal Sout3 and amplifies the partner's voice or the like.

[0179] To the image-and-audio-processing unit 44, a microphone 13 constituting a telephone transmitter is connected, other than the speakers 36a, 36b, and outputs an audio signal Sin by collecting the operator's voice 30d. When transmitting calls, the image-and-audio-processing unit 44 outputs digital audio data by analog-to-digital converting the analog audio signal Sin to be transmitted to the partner and/or outputs digital image data by analog-to-digital converting the analog image signal Sv.

[0180] The CPU 32 is connected, other than the receiving unit 18, to the transmitting unit 22 which performs modulation-process on the image and audio data Dout or the like to be transmitting to the partner and supplies the modulated transmission data to the antenna 16 through the antenna diplexer 23. The antenna 16 radiates a radio wave supplied from the antenna diplexer 23 toward a base station or the like.

[0181] To the above-mentioned CPU 32, other than the transmitting unit 22, the camera 34 is connected which shoots a subject and transmits, for example, still image information or operation information to the partner through the transmitting unit 22. The camera 34 is provided on the rear surface side of housing. The power supply unit 33 includes a battery 94 which supplies a DC power to the receiving unit 18, the transmitting unit 22, the display unit 29, the CPU 32, the camera 34, the memory unit 35, the storage unit 37, the image-and-audio-processing unit 44, the input detection unit 45 and the touch-sensitive variable sheet unit 103. It should be noted that although, in this embodiment, a case in which the storage unit 37 is provided separately from the image-and-audio-processing unit 44 has been described, a memory device which is included in the image-and-audio-processing unit 44 may be concurrently used. This enables the number of the parts to be reduced.

[0182] The following will describe a function example of the input detection unit 45. FIGS. 21A to 21E and FIGS. 22A to 22E show slide and press operation examples (No. 1 and No. 2 thereof) in the mobile phone 600. FIG. 21A and FIG. 22A show operation examples of the operator's finger 30a. FIG. 21B and FIG. 22B show position detection examples obtained from the input detection unit 45. FIG. 21C and FIG. 22C show press detection examples obtained from the input detection unit 45. FIG. 21D and FIG. 22D show driving examples of the piezoelectric unit 315 of the air-circulation unit 3. FIG. 21E and FIG. 22E show reactive force examples that are given to the operator's finger 30a. Each shows transition from a state-I to a state-XI.

[0183] In this embodiment, it is assumed that the piezoelectric unit 315 of the air-circulation unit 3 of the touch-sensitive variable sheet unit 103 supplies the air to the element bag portions E1 to E25 which swell. Also, the element bag portion E1 shown in FIG. 21A indicates the sense-of-touch-representing unit for representing the sense of touch generated on the display region of, for example, the key K1 of numeral "1" in the touch-sensitive variable sheet unit 103. In this element bag portion E1, a x1 indicates a position in the X-axis direction in the XYZ coordinates system and is a position of a protrusion edge portion of the left side of the element bag portion E1 in FIG. 21A, a x2 indicates a position of the

protrusion center portion thereof and a x3 indicates a position of a protrusion edge portion of the right side thereof.

[0184] By setting these as the input detection condition, the state-I shown in FIG. 21A is a case in which the operator's finger 30a does not touch the element bag portion E1 of the touch-sensitive variable sheet unit 103. In this case, according to the position detection example shown in FIG. 21B, the position detection signal S1 is not outputted from the input detection unit 45. Also, according to the press detection example shown in FIG. 21C, the press detection signal S2 is not obtained from the input detection unit 45. According to the driving example of the piezoelectric unit 315 shown in FIG. 21D, it is a state in which the air is supplied to the twenty five element bag portions E1 to E25 which swell in order to present the concave and convex touch feeling. According to the reactive force example given to the operator's finger 30a shown in FIG. 21E, the finger 30a does not touch the element bag portion E1, so that the reactive force does not occur.

[0185] The state-II shown in FIG. 21A is a case in which the operator's finger 30a is slid and operated (sliding) on the touch-sensitive variable sheet unit 103. In this case, according to the position detection example shown in FIG. 21B, the position detection by the input detection unit 45 is continued and some of the position detection signal S1 is outputted. Also, according to the press detection example shown in FIG. 21C, the press detection by the input detection unit 45 is continued, but the pressing force F exceeding the judgment threshold has not yet detected. According to the driving example of the piezoelectric unit 315 shown in FIG. 21D, a state is maintained in which the air is supplied to the twenty five element bag portions E1 to E25 which swell in order to present the concave and convex touch feeling. According to the reactive force example given to the operator's finger 30a shown in FIG. 21E, the finger 30a touches the touch-sensitive variable sheet unit 103, but the element bag portion E1 is not pressed, so that the reactive force does not occur.

[0186] The state-IV shown in FIG. 21A is a case in which the operator's finger 30a is slid and operated (sliding) on the touch-sensitive variable sheet unit 103 and thereafter, reaches to the protrusion edge portion of the left side of the element bag portion E1. In this case, according to the position detection example shown in FIG. 21B, the position detection signal S1 showing the position x1 of the protrusion edge portion of the left side of the element bag portion E1 is outputted from the input detection unit 45. Also, according to the press detection example shown in FIG. 21C, the press detection by the input detection unit 45 is continued, but the pressing force F exceeding the judgment threshold has not yet detected. According to the driving example of the piezoelectric unit 315 shown in FIG. 21D, it is a state in which the air is further supplied to the twenty five element bag portions E1 to E25 which further swell in order to present the concave and convex touch feeling. According to the reactive force example given to the operator's finger 30a shown in FIG. 21E, the finger 30a touches the touch-sensitive variable sheet unit 103 but does not press it, so that the reactive force does not occur.

[0187] The state-V shown in FIG. 21A is a case in which the operator's finger 30a reaches to the protrusion center portion of the element bag portion E1 of the touch-sensitive variable sheet unit 103. In this case, according to the position detection example shown in FIG. 21B, the position detection signal S1 showing the position x2 of the protrusion center portion of the element bag portion E1 is outputted from the input detection unit 45. Also, according to the press detection example shown