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United States Patent [19]

[11] Patent Number: **5,722,412**

Pflugrath et al.

[45] Date of Patent: **Mar. 3, 1998**

[54] **HAND HELD ULTRASONIC DIAGNOSTIC INSTRUMENT**

5,590,658 1/1997 Chiang et al. 128/661.01

OTHER PUBLICATIONS

[75] Inventors: **Lauren S. Pflugrath**, Seattle; **Jacques Souquet**, Issaquah, both of Wash.

Minivisor Service Manual from Organon Teknika (Sep. 1979).

[73] Assignee: **Advanced Technology Laboratories, Inc.**, Bothell, Wash.

Ultra PCI System Specifications from Advanced Medical Products of Columbia, South Carolina (date unknown).

[21] Appl. No.: **672,782**

Primary Examiner—George Manuel

[22] Filed: **Jun. 28, 1996**

Attorney, Agent, or Firm—W. Brinton Yorks, Jr.

[51] Int. Cl.⁶ **A61B 8/00**

[57] ABSTRACT

[52] U.S. Cl. **128/662.03**

A hand held ultrasonic instrument is provided in a portable unit which performs both B mode and Doppler imaging. In a preferred embodiment an array transducer, digital beamformer, digital filter, and image processor are packaged in one or more enclosures weighing ten pounds (4.5 kilograms) or less.

[58] Field of Search 128/660.07, 660.08, 128/660.01, 661.1, 660.09, 662.03, 660.04, 660.05, 661.08, 661.09

[56] References Cited

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24 Claims, 19 Drawing Sheets

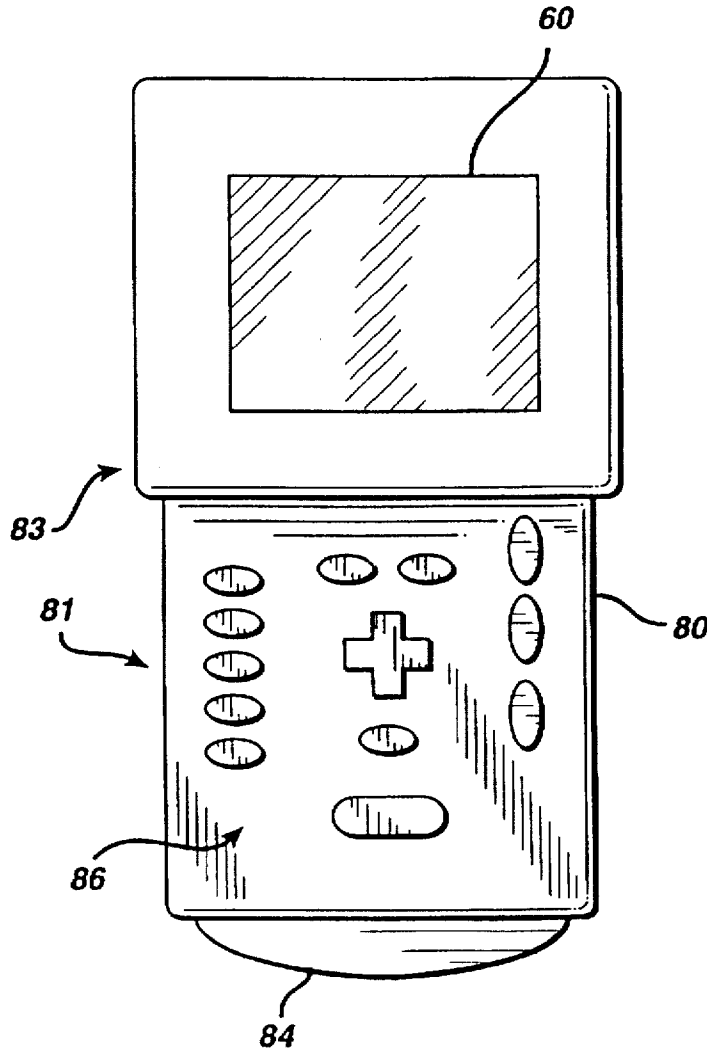


FIG. 1

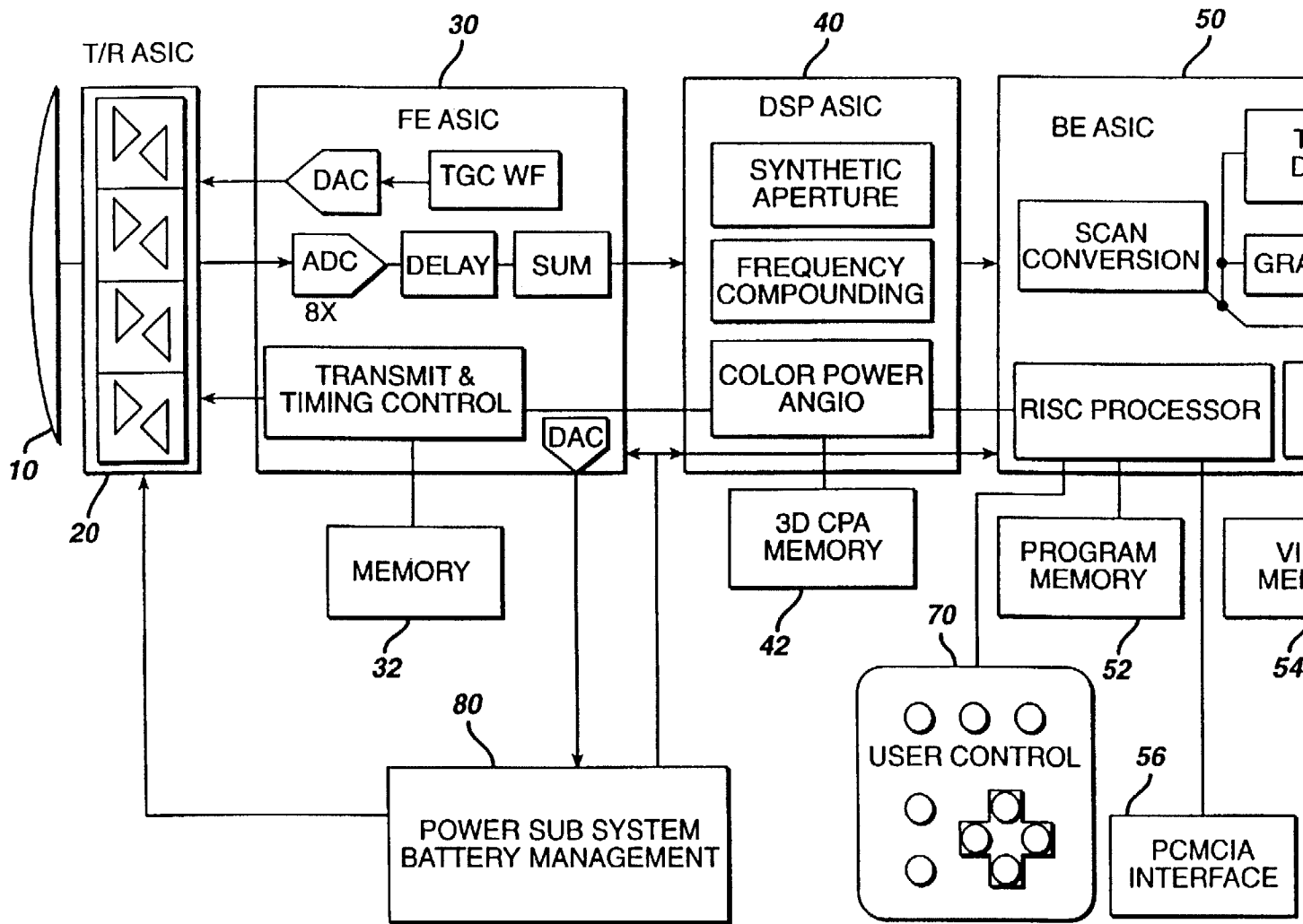


FIG. 2a

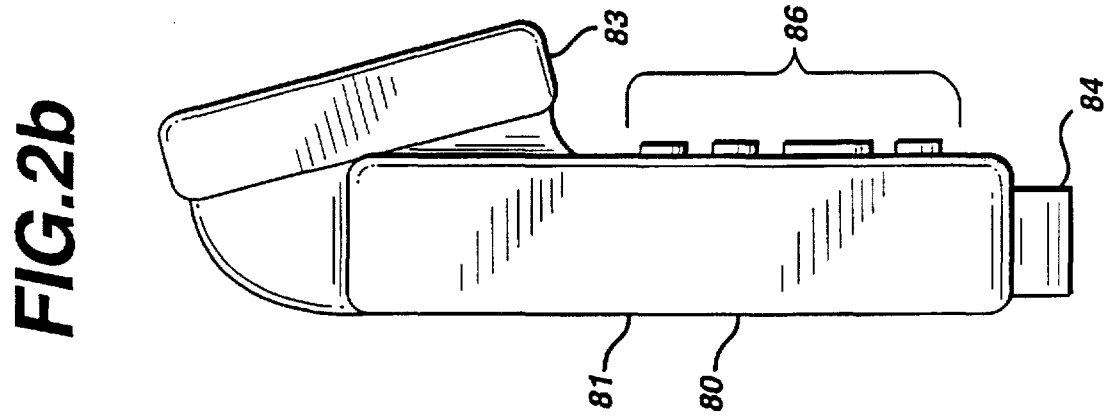
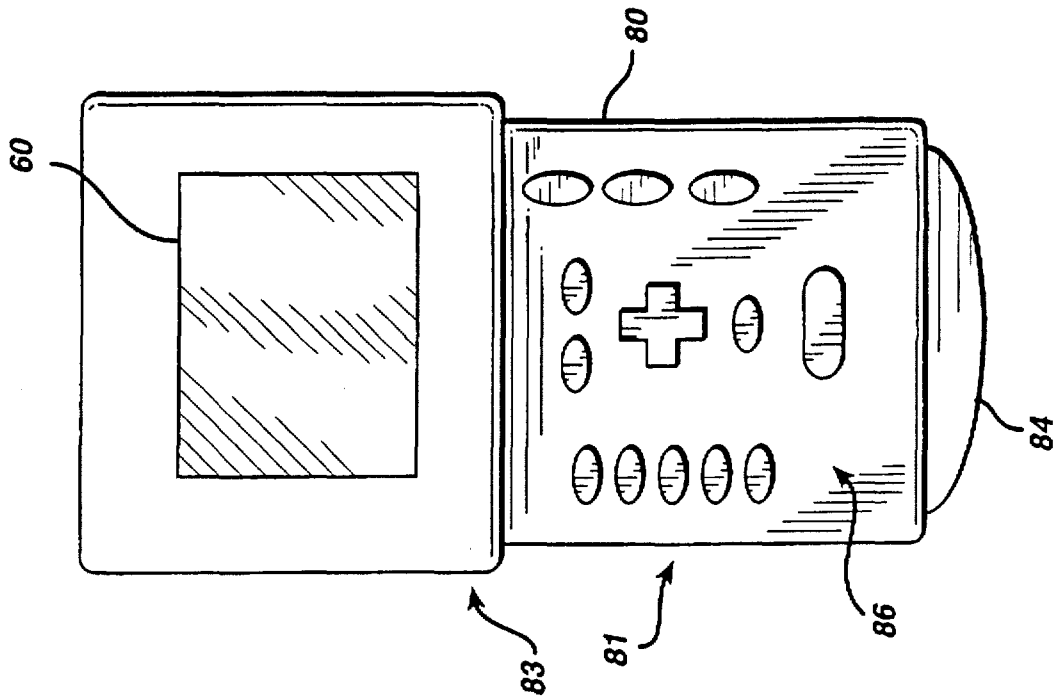


FIG.4

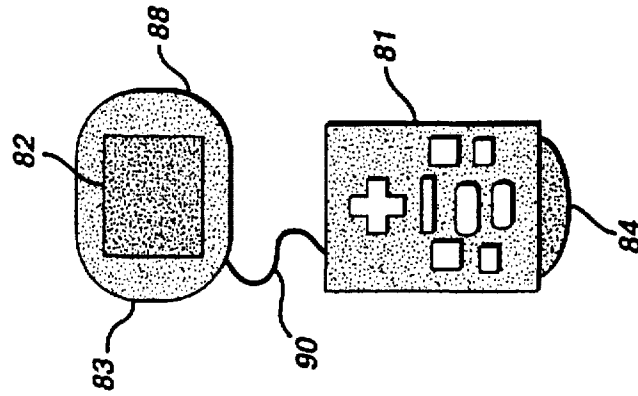


FIG.3b

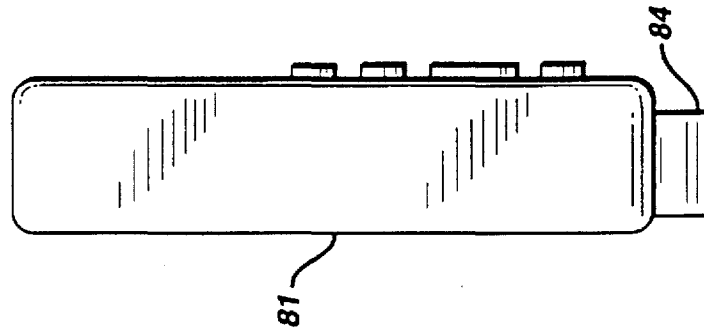


FIG.3a

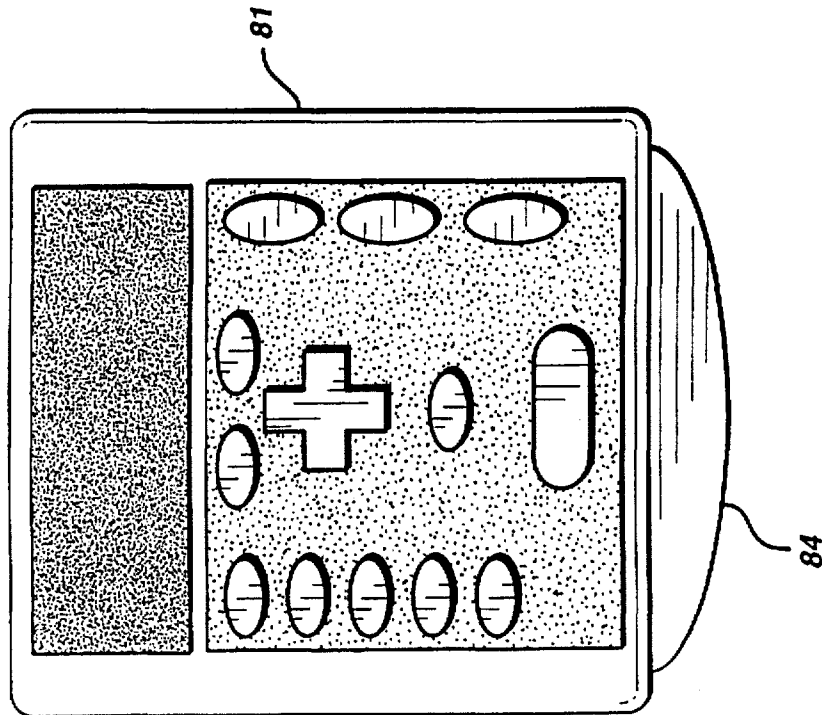
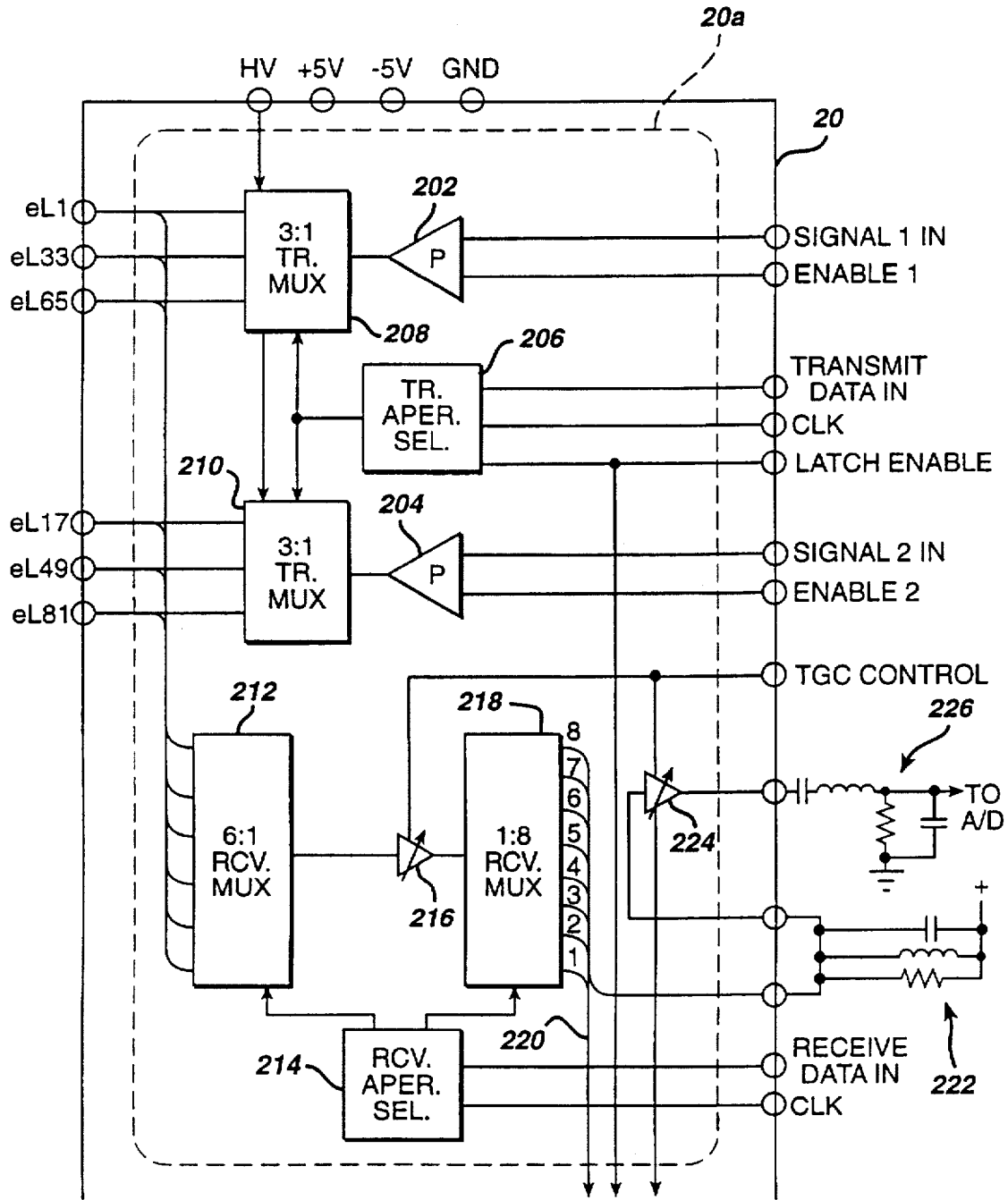


FIG. 5



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