

EMC Technical Construction File.

From the detail below, it is believed that the Foetal Heart Simulator complies with the requirements of the EMC regulations. Because of this it was decided not to electrically screen the inside of the case.

- 1 The overall layout of the PCB has been kept compact to avoid long radiating tracks.
- 2 Ground planes with vias are used on both sides of the PCB to keep the ground impedance low and to provide shielding.
- 3 The fastest clock in the system is the processor's clock, running at 4 MHz. The leads from the crystal (XTAL1) to the processor (IC3) are kept short. The power in this high frequency circuit is very low.
- 4 The processor (IC3) is designed, by the manufacturer, for low emissions and susceptibility. Power supply decoupling close to the processor's pins is used to filter noise.
- 5 The switching (IC1) and linear (IC2) regulators are compactly laid out with short, thick tracks. The theoretical maximum load current is about 17 mA – in practice it is typically about 12 mA. The load is mainly DC with a small AC component.
- 6 The 3-volt power supply has separate feeds from a common point to each of the load devices so that the loads (ICs 3, 4 and 5) do not share tracks.
- 7 The relatively high frequency tracks from the processor (IC3) to the analogue-to-digital integrated circuit (IC4) are kept short and direct. The converter is also well decoupled.
- 8 The tracks around IC5, the headphone amplifier, are kept short, especially the connections to the power converter capacitors, Cs 14, 16 and 17. This device is also well decoupled. A ground plane surrounds the amplifier. Inductor L2 and resistor R14 prevent instability and radiation.
- 9 The membrane keypad is not polled to detect key a press. Instead, an interrupt is generated on a key press. This keeps high frequency waveforms off the membrane.
- 10 The flashing LEDs on the membrane have a maximum frequency of 210 Hz at a peak current of approximately 3 mA.
- 11 According to the membrane manufacturer, the circuitry on the membrane is not susceptible to EMC ingress.
- 12 The piezo speaker and battery connecting leads are kept short.