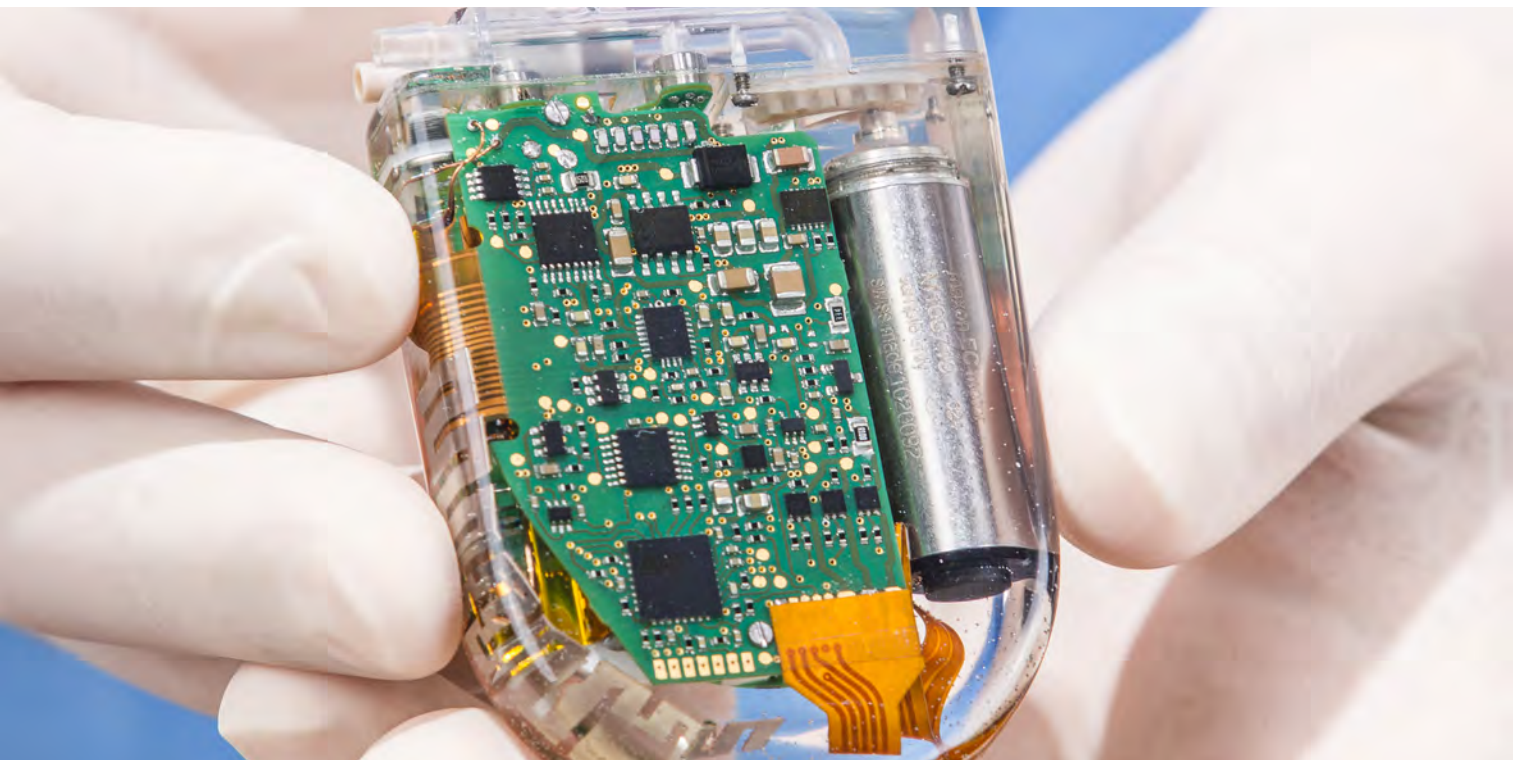




DEVELOPED FOR: Sequana Medical AG  
Implantable Fluid Pump



**ELECTRONIC DESIGN AND DEVELOPMENT SERVICES**

Re-design and optimisation of an existing prototype from pre-clinical status, through clinical trials to a fully CE certified medical implant.

# Automatic and continuous removal of ascites

## Implantable, battery-operated fluid pump

Patients with liver disease, congestive heart failure and certain cancers can suffer from an extreme accumulation of excess fluid in the abdominal cavity, known as refractory ascites.

alphapump® is a battery-powered implantable pump designed to move ascites continuously throughout the day from the abdominal cavity into the bladder, where it is excreted from the body naturally.

## Our contribution

Re-design of a prototype from pre-clinical status to a device suitable for human clinical trials and subsequent ongoing design, development and optimisation to a fully CE certified medical implant.

### Alphapump®

- system analysis & specification
- re-design of hardware & firmware
- improved functionality of hardware & software
- optimisation of thermal management
- adaptation of motor controller firmware
- intelligent failure tolerant design (motor controller)
- design optimised for production & test
- support during clinical trials
- support with documentation and CE certification

### Smart charger

- firmware for smart charger
- intelligent failure tolerant design
- design & implementation of GSM (GPRS / 3G) capability (enabling data transfer to doctor for analysis)
- support during clinical trials
- support with documentation and CE certification

## Features of the alphapump® system

- one rigid-flex print, no connectors (maximum reliability)
- motion and pressure sensors, brush-less DC-motor
- integrated data collection from pump (during charging)
- wireless data transfer (via smart charger)
- wireless charging (with smart charger)
  
- 2 year design life, fully sterilisable
- pump configuration (via smart charger)
- pump capacity: up to 20 litres per week
- battery life: up to 2 weeks between charges
- size: 75 x 52 x 18 mm<sup>3</sup>
- weight: < 100 grams



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