

Select Comfort PFCS series RF Hand Control, Circuit Description.

Prepared 02/20/04

Power Supply: The Hand Control is powered by a 9 VDC battery. Pushing any button on the Hand Control turns on a transistor that allows voltage to enter the 4.7V regulator giving VCC to the board. A resistor divider off the emitter of the before mentioned transistor provides an enable state to another regulator for the receiver circuit.

Controller: A Motorola 68HC908JL3E is used, and is a FLASH based 8 bit processor that operates at a crystal controlled frequency of 4.9152 MHz. The microcomputer has software installed that is capable of operating different mattress configurations. Inputs from six push buttons facilitate an adjustment request that the controller manages.

RF Section: The serial communications between the Pump Control and Hand Control is based on a carrier frequency of 418 MHz, established with a SAW Resonator in the transmitter of each control. When an adjustment is initiated by the Hand Control, a packet of information that is 40 bits, and Manchester Coded at 833 Hz, is sent from the Hand Control Transmitter to the Pump Control Receiver. The receiver on the Hand Control is a Micrel MICRF022. This device is a true “antenna-in to data-out” monolithic IC that is run in a Fixed Mode with a 6.4983 IF crystal. While the instruction is in process and waiting for completion, the Pump Control continuously updates the pressure level by sampling the readings on the pressure sensor. As the levels change information is sent back to the Hand Control, at a rate of one packet of information per second. When the adjustment is completed and no further commands are sent the Hand Control enters a sleep mode (approximately 10 seconds after the completed task). The Hand Control stays in this state until a button is pushed to initiate an adjustment.

Display: The display is an LCD from Ocular that is customized to our needs. When initiating an adjustment the system is first awakened. The Hand Control by a button push and the Pump Control by receiving a RF prompt from the Hand Control asking for an update from the pressure sensor. The current setting is displayed and adjustments can then be requested. As an adjustment is in process the controller updates the LCD real time and tic marks increase/decrease as the pressure level changes. For every few tic marks changed the sleep number also tracks in increments/decrements of 5. The LCD has it's own internal clock that is running at 256 kHz.