By considering washing machine example explain the power, features and comfort by using embedded systems.

(Nov./Dec.-14, Set-1, Q2(b) | Nov./Dec.-14, Set-3, Q2(b) | Dec.-13, Set-1, Q2(b))

(or)

With the help of an example, explain the working of application specific embedded system.

Ans:

Application specific embedded system is an embedded system which is designed for a specific application. A common example for such application-specific system is 'washing machine'.

Washing Machine

Figure depicts the block schematic of a washing machine,

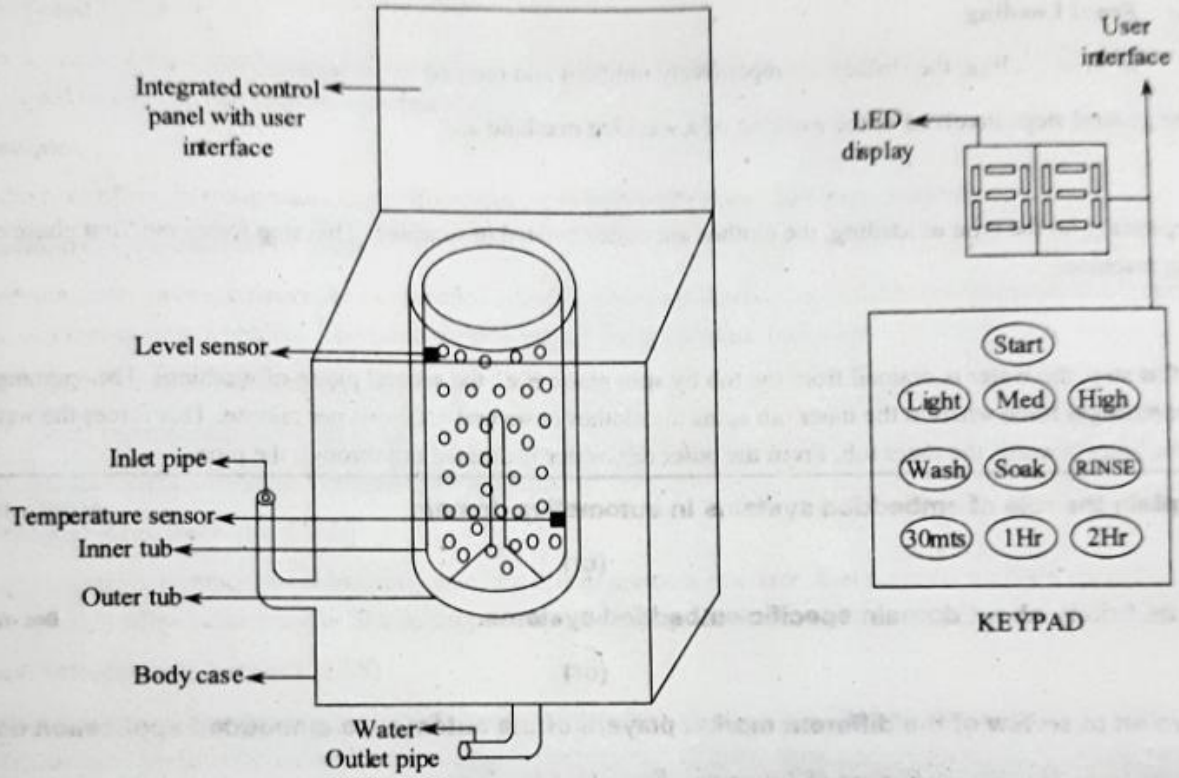

Figure: Block Schematic of Washing Machine

The major components of a washing machine are,

1. Sensors
2. Actuators
3. Control unit and application specific user interfaces.

1. Sensors

A sensor is a transducer device that converts one form of energy (pressure) into another (electrical) form.

The two common sensors used in washing machine are temperature sensor and water level sensor.

2. Actuators

An actuator is a transducer device which converts an electrical signal into its equivalent physical action and serves as an output device.

Actuators in washing machine include motorized agitator, tumble tub, water drawing pump and inlet valve.

3. Control Unit and User Interface

The control unit of a washing machine consists of micro processor or controller based board which is connected to the sensors and actuators. This control board is also connected to the user interface devices such as keypad and LEDs.

The control unit receives the data from sensor and produces the desired output at actuator.

The keypad is used for setting the washing time and also selecting the type of material to be washed i.e., light, medium, heavy etc. LEDs which are connected to the control board helps in displaying the time of washing.

Models

There are two models in washing machine namely top loading model and front loading model.

(i) Top Loading

In this type of loading, the clothes are twisted back and forth while simultaneously pulling them towards the bottom of the tub. The clothes are again moved at the top of the tub by the repeated twisting action. The agitator then holds the clothes again and repeats the same procedure.

(ii) Front Loading

In front loading, the clothes are repetitively tumbled and merged in the water.

The general steps involved in the working of a washing machine are,

Step 1

Depending on the type of loading, the clothes are either twisted or tumbled. This step forms the 'first phase of washing' in washing machine.

Step 2

In this step, the water is drained from the tub by spin phase (i.e., the second phase of washing). The spinning procedure involves centrifugal force wherein the inner tub spins the clothes at several rotations per minute. This forces the water to pump out from the holes towards the outer tub. From the outer tub, water is drained out through the pipe.