# Brief

This EMS firmware utilize mbed timer interrupt. These are the major functions that construct EMS firmware.

# Major Functions

LCD Display

|  |
| --- |
| Update Display |
| Update available interface |
| Update energy consumption |
| Update switch state |
| Update IR remote and temperature |
|  |
| Period: 5 sec |

Connectivity

|  |  |
| --- | --- |
| Check Connectivity | Connect to Network |
| Check ETH link | Connect to ETH |
| Check WiFi link | Connect to WiFi (optional) |
| Check GPRS link | Connect to GPRS (optional) |
|  |  |
| Period: 30 sec | Period: 5 sec |

Energy Measurement

|  |
| --- |
| Measure Energy |
| Measure energy |
| Backup data to SD card |
|  |
| Period: 1 sec |

Switch Control

|  |  |
| --- | --- |
| Get Control Command | Control Switch |
| Get control command from server | Read command from SD card |
| Save command to SD card | Execute command |
|  |  |
| Period: 10 sec | Period: 10 sec |

# Procedural Firmware

The firmware consist of three mode:

1. Registration
2. Operational
3. WiFi Setting
4. Remote Setting

## Operational Mode

Initialization:

1. Parameter (e.g. SSID, PASS, IP Server)
2. Peripheral and Interface (e.g. TFT)
3. Connection

Loop:

1. Update LCD display
   1. Interface
   2. Energy data
2. Check connection
3. Connect to network
4. Get command from server
5. Execute command
   1. Parse command
   2. Exec command
6. Send execution status to server
7. Send energy data to server

Notes:

1. Command types:
   1. Remote Control
      * Example: **[{“type”:0},{"id":”234”,"mac":"00262903424E","cmd":1},{"id":”345”,"mac":"00262903424F","cmd":2}]**
      * Means run CMD1 file to device with mac = 00262903424E…
   2. Switch Control
      * Example:

**[{“type”:1},{"id":”234”,"sw":”1”,"cmd":1},{"id":345,"sw":”2”,"cmd":0}]**

* + - Means switch sw 1 to 1 (ON) and sw 2 to 0 (OFF)
  1. Notes
     + Command service should be consumed only once