# Test Procedures

## Definitions

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| <TOOLS\_DIR> | Thermal-Profiler Tools directory containing shell scripts:  \ThermalProfiler-Tools\shell\_scripts\  Download ThermalProfiler-Tools from Github: <https://github.com/BU-PCM-Testbed/ThermalProfiler-Tools> |
| <LOG\_DIR> | A directory on your PC to store experimental results data |
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## Idle Power Experiments

### Hardware Setup

1. Devices connected to IFC6410:
   1. DC power input
   2. HDMI video output to monitor
   3. USB serial cable to Agilent U1252A
   4. Micro-USB cable to PC
   5. **NOTE:** no Ethernet cable connected, no audio devices connected, no other USB peripheral devices should be plugged in
2. Agilent U1252A is turned on to **mV** setting
3. Thermocouple wires should be connected to Agilent U1252A input plugs
4. Ambient temperature sensor device is turned on (RadioShack Indoor/Outdoor thermometer)
5. Set the switch on the Agilent 34134A current sensor to **1 V/A**
6. Agilent 34134A current sensor should be clamped to **one** strand of the DC power input cable
7. Agilent 34134A current sensor should be connected to Agilent 34410A multimeter input plugs
8. Agilent 34410A multimeter should be turned on and set to measure **DC Voltage**
9. Boot up the IFC6410 (should turn on as soon as DC power is plugged in)

### Hardware Calibration

Perform these steps once before performing any tests on the IFC6410 (at least once per day).

1. Unclamp the current sensor from the IFC6410 power cable
2. Turn the **ZERO** knob on the current sensor in either direction until the voltage reading on the Agilent 34410A multimeter is approximately zero Volts (to within ±2mV)
3. Re-clamp the current sensor on the IFC6410 power cable

### Software Setup

Replace instances of **<TOOLS\_DIR>** with paths named above.

1. Once the IFC6410 has booted the Android OS, open up a terminal on the PC
   1. Windows: [MobaXterm](http://mobaxterm.mobatek.net/download-home-edition.html)
   2. Linux: bash shell
2. Perform initial setup
   1. **$ cd <TOOLS\_DIR>**
   2. **$ ./android\_setup.sh**
3. Set active cores to **1** and CPU frequency to **384 MHz**
   1. **$ ./android\_activate\_cores.sh 1**
   2. **$ ./android\_frequency.sh 384**
4. Set the current ambient temperature **<AMBIENT>**, indicated by the thermometer
   1. **$ ./android\_thermal\_profiler.sh ambient <AMBIENT>**
   2. **ADJUST THE TEMPERATURE EVERY 2 TO 4 MINUTES**
5. On the PC, start the Agilent BenchVue application
   1. Open the Agilent 34410A device
   2. Under **Measurement** tab:
      1. **Measurement: DC Voltage**
      2. **Range: Auto**
      3. **Integration Time: NPLC: 0.2**
      4. **Input Impedance: 10 MΩ**
      5. **Auto Zero: Off**
      6. **Null State: Off**
   3. Under **Data Logger** tab
      1. **Start Data Logging: Immediately with Start Button**
      2. **Sample Interval: Minimum**
      3. **Stop Data Logging: Immediately with Stop Button**
6. On the PC, start Android Studio with the ThermalProfiler project
   1. Open **Executive.java**
   2. Edit the following constants:
      1. **TIMED\_BENCHMARK = true;**
      2. **BENCHMARK\_SETS\_FREQUENCY = false;**
      3. **THERMAL\_MANAGEMENT\_ENABLED = false;**
      4. **BENCHMARK\_APP = Benchmark.SOR;**
      5. **ENABLE\_GUI\_DEBUG = false;**
   3. Run the program
7. On the IFC6410, make sure the ThermalProfiler app is showing on screen
8. On the BenchVue application, press **Start** to start recording
9. In the terminal, start the test executive
   1. **$ ./android\_test\_run\_idle\_ordered.sh <LOG\_DIR> test\_list\_full\_power\_ramp.csv 1**

## Steady-state experiments

1. On the PC, start Android Studio with the ThermalProfiler project
   1. Open **Executive.java**
   2. Edit the following constants:
      1. **TIMED\_BENCHMARK = false;**
      2. **BENCHMARK\_SETS\_FREQUENCY = false;**
      3. **THERMAL\_MANAGEMENT\_ENABLED = false;**
      4. **BENCHMARK\_APP = Benchmark.SOR;**
      5. **ENABLE\_GUI\_DEBUG = false;**