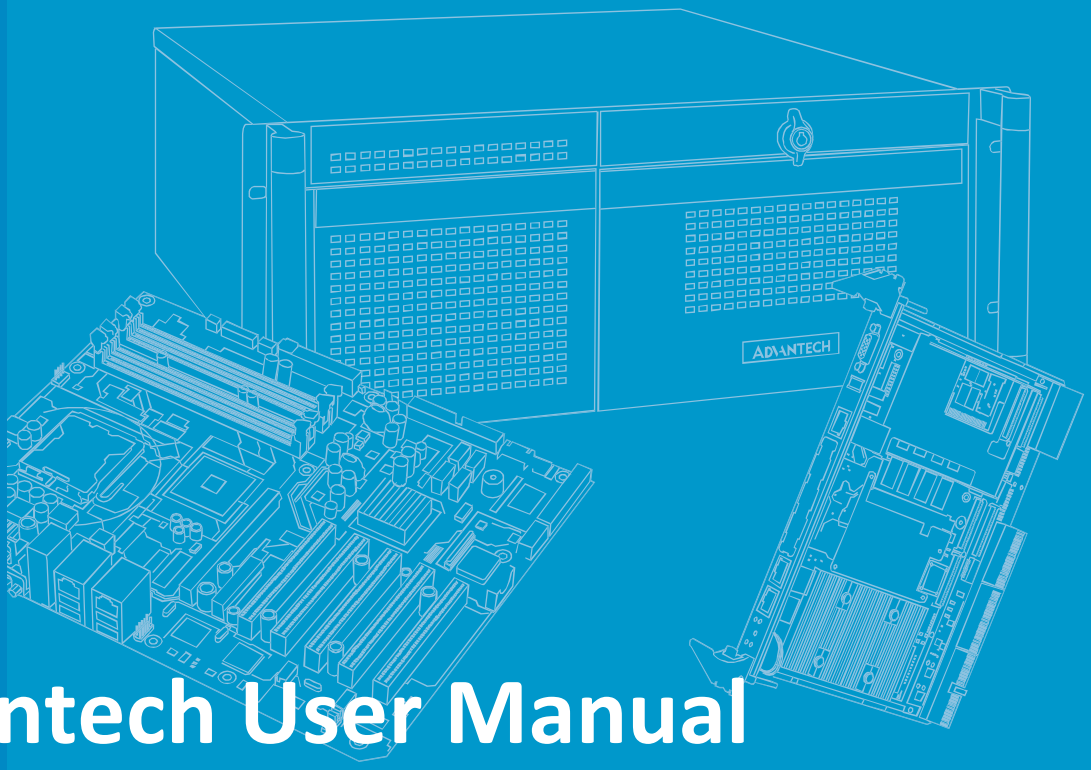

Advantech User Manual

SENSOR-READER

REVISION 5.00

Revision History

Date [mm/dd/yyyy]	Revision	Modifications
06/20/2023	5.00	Official release
06/20/2023	4.01	Update Revision History and Document
06/09/2023	4.00	Add –j parameter usage
03/29/2021	3.00	Official release
02/09/2021	2.01	Add the display of health status when user specifies -t/-f/-v/-m Change the format of configs to support multiple HWMon chips Unsupport mic-3328, mic-3328-8hp and odm-cpci1706
06/05/2020	2.0	Official release
05/06/2020	1.01	Show supported platforms list alphabetically with -l argument Add auto-detect platform Modify default.yaml to default.conf
04/08/2019	1.00	Official release
12/21/2018	0.12	Removed -i pin_num function
08/30/2018	0.11	Added introduction about accessing SMBus
08/29/2018	0.10	Updated Sensor-Reader, formerly APM
08/20/2018	0.9	Remove libapm, and related api descriptions, Removed supported platforms list, Modified APM usage follows new program
12/11/2017	0.8	Added uint info of sensor's value Changed memory sensor name from "Memory TSx" to "Memory_TSx-TEMP" mode
11/27/2017	0.6	Disabled scanning memory TS of Zhaoxin platform, and highlighted platform support in this document.
11/13/2017	0.5	Supports platform FWA-4000
11/09/2017	0.4	Supports platform FWA-4130
09/08/2017	0.3	Supports reading temperature in memory with thermal sensor.
07/31/2017	0.2	Initial version -draft-

Table of Contents

List of Figures

List of Tables

1. INTRODUCTION

1.1 Scope

This document describes Sensor-Reader and its usage.

For the latest version of the software, please contact your Advantech representative.

1.2 Overview

Most mainboards have sensor chips to monitor system health (like temperature, voltage, fan speeds etc.). They are often connected through an I2C bus, but some are also connected through the LPC bus. Also, some DDR4 memories have a thermal sensor chip which can provide current memory temperature.

As the name implies, Sensor-Reader monitors sensors based on HWMon or TS chips.

If the sensor chip is connected through I2C bus, Sensor-Reader accesses SMBus via drivers by default.

1.3 Terminology

Term	Description
HWMon	Hardware monitor
LPC	Low pin count
SMBus	System management bus
TS	Thermal sensor

Table 1: Terminology

2. SUPPORTED HARDWARE

Sensor-Reader supports the following chips and projects.

2.1 Supported HWMon Chips

Sensor-Reader supports the following HWMon chips: NCT7904D, NCT6116D, NCT6776D/F, NCT5523D, which have been verified.

2.2 Supported Thermal Sensor in Memory

Sensor-Reader supports the following memory thermal chips and sensor chip CAT34TS04, which has been verified.

Notice:

1. *Sensor-Reader supports (DDR4) memory which uses Thermal Sensor 'CAT34TS04'.*
2. *Memory Thermal Sensors are unsupported on FWA-4000, SYS_VT01.*

2.3 Supported Project List

For supported project list, please refer to the README which is released together with the utility.

3. USAGE

Advantech provides a CLI utility (apm) for Sensor-Reader. This chapter will specify its usage.

By default, Sensor-Reader accesses SMBus via a driver, so please confirm the drivers (i2c-i801 and i2c-dev) have been loaded. Otherwise you need to load them before using the utility.

```
[root@localhost ~]# lsmod | grep i2c
i2c_dev                 13985  0
i2c_i801                22418  0
i2c_algo_bit            13413  2 igb,i915
i2c_hid                 18821  0
i2c_core                40756  8 drm,igb,i915,i2c_i801,i2c_dev,i2c_hid,drm_kms_helper,i2c_algo_bit
```

3.1 Display

Platform Health Status (either **OK** or **WARNING**) is the health status of the Advantech platform. “OK” means all sensors are in a normal state, “WARNING” means some sensors are abnormal.

For sensor details, the utility displays the name of the sensor (SENSOR), the current value (VALUE), the lower limit (MIN), the upper limit (MAX), and the flag status (FLAG).

For the FLAG, it maybe is **ok, cr, nc** or **ns**. ”ok” means the sensor status is ok; “cr” is “critical”, means the sensor is out of range; “nc” is “non-critical”, which means the sensor is in a non-critical state; and “ns” is for “non-specified”, which means reading of the sensor has failed.

The following is an example:

```
[root@localhost test_apm]# ./apm -c fwa-3270vt
Sensor-Reader, version 0.42, platform fwa-3270vt

SENSOR              | VALUE      | UNIT       | MIN        | MAX        | FLAG
CPU-TMP             | 27.500     | degrees C  | 0.000      | 75.000     | ok
INLET-TMP           | 32.000     | degrees C  | 0.000      | 75.000     | ok
OUTLET-TMP          | 33.500     | degrees C  | 0.000      | 65.000     | ok
SYS_FAN1-SPEED      | 0          | RPM        | 1200       | 13000      | cr
SYS_FAN2-SPEED      | 0          | RPM        | 1200       | 13000      | cr
SYS_FAN3-SPEED      | 0          | RPM        | 1200       | 13000      | cr
SYS_FAN4-SPEED      | 0          | RPM        | 1200       | 13000      | cr
PAY_12-VOL          | 12.022     | Volts      | 11.400     | 12.600     | ok
PAY_5_0-VOL         | 4.960      | Volts      | 4.750      | 5.250      | ok
AVCC_3_3-VOL        | 3.360      | Volts      | 3.135      | 3.465      | ok
VBAT-VOL            | 3.152      | Volts      | 2.000      | 3.200      | ok
CPU_VCORE-VOL       | 0.776      | Volts      | 0.550      | 1.520      | ok
VTT-VOL             | 1.000      | Volts      | 0.950      | 1.050      | ok
VSB_3_3_SB-VOL      | 3.344      | Volts      | 3.135      | 3.465      | ok
VDD_3_3-VOL         | 3.296      | Volts      | 3.135      | 3.465      | ok
Memory_TS1-TMP      | 24.500     | degrees C  | 0.000      | 80.000     | ok

*** Platform Health Status: WARNING ***
```

Figure 1: Sensor-Reader Display Info

Here, the platform health status is **WARNING**, some fan sensors status is **cr** and others are **ok**.

3.2 ./apm -h

Display the usage.

 # ./apm -h

```
[root@localhost test_apm]# ./apm -h
Sensor-Reader, version 0.42
Usage: apm [OPTION]
           -h, help
           -c <CONF>, specify the platform
           -l, show all platforms
           -f, show all hwmon fan sensors
           -v, show all hwmon voltage sensors
           -m, show all thermal sensors in DIMM
           -t, show all hwmon temperature sensors
Example:
   If the platform is "fwa-3033", you can firstly run
       ./apm
   If failed, please specify the platform name with -c argument or default.conf
       ./apm -c fwa-3033
   or
       ./apm (after default.conf setted)
```

Figure 2: Usage of 'apm -h' Command

3.3 ./apm

When the utility is started without any parameters, default.conf is used. If there isn't a valid default.conf file, it will auto-detect platform name with DMI. If auto-detect platform failed, please specify the name of the Advantech platform (see Section 0). If default.conf is valid or auto-detect successfully, it will show the same result as "-c CONF" (see Section 0).

NOTE: See Section 4.1 for the description of default.conf.

 # ./apm

```
[root@localhost test_apm]# ./apm
Sensor-Reader, version 0.42, platform fwa-3270vt

SENSOR              | VALUE      | UNIT       | MIN        | MAX        | FLAG
CPU-TMP             | 27.000     | degrees C  | 0.000      | 75.000     | ok
INLET-TMP           | 32.000     | degrees C  | 0.000      | 75.000     | ok
OUTLET-TMP          | 33.000     | degrees C  | 0.000      | 65.000     | ok
SYS_FAN1-SPEED      | 0          | RPM        | 1200       | 13000      | cr
SYS_FAN2-SPEED      | 0          | RPM        | 1200       | 13000      | cr
SYS_FAN3-SPEED      | 0          | RPM        | 1200       | 13000      | cr
SYS_FAN4-SPEED      | 0          | RPM        | 1200       | 13000      | cr
PAY_12-VOL          | 12.022     | Volts      | 11.400     | 12.600     | ok
PAY_5_0-VOL         | 4.960      | Volts      | 4.750      | 5.250      | ok
AVCC_3_3-VOL        | 3.360      | Volts      | 3.135      | 3.465      | ok
VBAT-VOL            | 3.152      | Volts      | 2.000      | 3.200      | ok
CPU_VCORE-VOL       | 0.776      | Volts      | 0.550      | 1.520      | ok
VTT-VOL             | 1.000      | Volts      | 0.950      | 1.050      | ok
VSB_3_3_SB-VOL      | 3.344      | Volts      | 3.135      | 3.465      | ok
VDD_3_3-VOL         | 3.296      | Volts      | 3.135      | 3.465      | ok
Memory_TS1-TMP      | 24.500     | degrees C  | 0.000      | 80.000     | ok

*** Platform Health Status: WARNING ***
```

Figure 3: Usage of the 'apm' Command

3.4 ./apm -c Platform

Specifies the name of the Advantech platform, and display all sensors' status and platform health status (see Section 3.1).

 # ./apm -c fwa-xxxx

```
[root@localhost test_apm]# ./apm -c fwa-3270vt
Sensor-Reader, version 0.42, platform fwa-3270vt

SENSOR              | VALUE      | UNIT       | MIN        | MAX        | FLAG
CPU-TMP             | 27.500     | degrees C  | 0.000      | 75.000     | ok
INLET-TMP           | 32.000     | degrees C  | 0.000      | 75.000     | ok
OUTLET-TMP          | 33.500     | degrees C  | 0.000      | 65.000     | ok
SYS_FAN1-SPEED      | 0          | RPM        | 1200       | 13000      | cr
SYS_FAN2-SPEED      | 0          | RPM        | 1200       | 13000      | cr
SYS_FAN3-SPEED      | 0          | RPM        | 1200       | 13000      | cr
SYS_FAN4-SPEED      | 0          | RPM        | 1200       | 13000      | cr
PAY_12-VOL          | 12.022     | Volts      | 11.400     | 12.600     | ok
PAY_5_0-VOL         | 4.960      | Volts      | 4.750      | 5.250      | ok
AVCC_3_3-VOL        | 3.360      | Volts      | 3.135      | 3.465      | ok
VBAT-VOL            | 3.152      | Volts      | 2.000      | 3.200      | ok
CPU_VCORE-VOL       | 0.776      | Volts      | 0.550      | 1.520      | ok
VTT-VOL             | 1.000      | Volts      | 0.950      | 1.050      | ok
VSB_3_3_SB-VOL      | 3.344      | Volts      | 3.135      | 3.465      | ok
VDD_3_3-VOL         | 3.296      | Volts      | 3.135      | 3.465      | ok
Memory_TS1-TMP      | 24.500     | degrees C  | 0.000      | 80.000     | ok

*** Platform Health Status: WARNING ***
```

Figure 4: Usage of the 'apm -c conf' Command

3.5 ./apm -t

Displays all temperature sensors' status (see Section 3.1) in the hwmon chip.

 # ./apm -c fwa-xxxx -t

```
[root@localhost test_apm]# ./apm -c fwa-3270vt -t
Sensor-Reader, version 0.42, platform fwa-3270vt

SENSOR              | VALUE      | UNIT       | MIN        | MAX        | FLAG
CPU-TMP             | 26.500     | degrees C  | 0.000      | 75.000     | ok
INLET-TMP           | 31.000     | degrees C  | 0.000      | 75.000     | ok
OUTLET-TMP          | 32.500     | degrees C  | 0.000      | 65.000     | ok

*** Platform Health Status: OK ***
```

Figure 5: Usage of the 'apm -t' Command

3.6 ./apm -v

Displays all voltage sensors' status (see Section 3.1) in the hwmon chip.

 # ./apm -c fwa-xxxx -v

```
[root@localhost test_apm]# ./apm -c fwa-3270vt -v
Sensor-Reader, version 0.42, platform fwa-3270vt

SENSOR              | VALUE      | UNIT       | MIN        | MAX        | FLAG
PAY_12-VOL          | 12.022     | Volts      | 11.400     | 12.600     | ok
PAY_5_0-VOL         | 4.960      | Volts      | 4.750      | 5.250      | ok
AVCC_3_3-VOL        | 3.360      | Volts      | 3.135      | 3.465      | ok
VBAT-VOL            | 3.152      | Volts      | 2.000      | 3.200      | ok
CPU_VCORE-VOL       | 0.776      | Volts      | 0.550      | 1.520      | ok
VTT-VOL             | 1.000      | Volts      | 0.950      | 1.050      | ok
VSB_3_3_SB-VOL      | 3.344      | Volts      | 3.135      | 3.465      | ok
VDD_3_3-VOL         | 3.296      | Volts      | 3.135      | 3.465      | ok

*** Platform Health Status: OK ***
```

Figure 6: Usage of 'apm -v' Command

3.7 ./apm –j

Show json string instead of standard output

 # ./apm –c fwa-xxx –j

```
#> ./apm -c fwa-3270vt -j
{
        "platform":     "fwa-3270vt",
        "chips":        [{
                        "sensors":      [{
                                        "name": "CPU-TMP",
                                        "val":  "56.000",
                                        "min":  "0.000",
                                        "max":  "75.000",
                                        "unit": "degrees C",
                                        "sts":  "ok"
                                }, {
                                        "name": "VTT-VOL",
                                        "val":  "1.000",
                                        "min":  "0.950",
                                        "max":  "1.050",
                                        "unit": "Volts",
                                        "sts":  "ok"
                                }, {
                                        "name": "VSB_3_3_SB-VOL",
                                        "val":  "3.328",
                                        "min":  "3.135",
                                        "max":  "3.465",
                                        "unit": "Volts",
                                        "sts":  "ok"
                                }, {
                                        "name": "VDD_3_3-VOL",
                                        "val":  "3.344",
                                        "min":  "3.135",
                                        "max":  "3.465",
                                        "unit": "Volts",
                                        "sts":  "ok"
                                }]
                }]
}
```

3.8 ./apm -f

Display all fan sensors' status (see Section 3.1) in the hwmon chip.

 # ./apm -c fwa-xxxx -f


```
[root@localhost test_apm]# ./apm -c fwa-3270vt -f
Sensor-Reader, version 0.42, platform fwa-3270vt

SENSOR                | VALUE      | UNIT       | MIN        | MAX        | FLAG
SYS_FAN1-SPEED        | 0          | RPM        | 1200       | 13000      | cr
SYS_FAN2-SPEED        | 0          | RPM        | 1200       | 13000      | cr
SYS_FAN3-SPEED        | 0          | RPM        | 1200       | 13000      | cr
SYS_FAN4-SPEED        | 0          | RPM        | 1200       | 13000      | cr

*** Platform Health Status: WARNING ***
```

Figure 7: Usage of the 'apm -f' Command

3.9 ./apm -l

Show all supported platforms alphabetically.

```
[root@localhost test_apm]# ./apm -l
All platforms list:
  fwa-1011        fwa-1012vc      fwa-1112vc      fwa-1211
  fwa-1212vc      fwa-1330        fwa-2011        fwa-2012
  fwa-2112        fwa-2330        fwa-3033        fwa-3050
  fwa-3210        fwa-3231        fwa-3232        fwa-3270a
  fwa-3270b       fwa-3270vt      fwa-4000        fwa-4030_cfg1
  fwa-4030_cfg2   fwa-4030_cfg3   fwa-4030vt      fwa-4033
  fwa-4130        fwa-4210        fwa-4231        fwa-4232
  fwa-6070        fwa-6170        fwa-t011        sys-vt01
```

Figure 8: Usage of the 'apm -l' Command

4. APPENDIX

4.1 Platform Configuration File

A configuration file (default.conf) is used to get a valid platform name.

default.conf is in the same directory as apm.

Please create the default.conf file with vi or touch manually.

The content of default.conf as follows: platform=name.

The following figure is an example of default.conf for fwa-3270vt.

```
[root@localhost test_apm]# cat default.conf
platform=fwa-3270vt
```

Figure 9: default.conf for fwa-3270vt

