Advantech eAutomation Group

Advantech

SNMP Subagent

User Guide

For Windows

Version <0.97>
## Revision History

<table>
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<tr>
<th>Date</th>
<th>Version</th>
<th>Description</th>
<th>Author</th>
</tr>
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<td>2016/10/05</td>
<td>0.97</td>
<td>Update Screenshot</td>
<td>Zhirong.Hsu</td>
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<tr>
<td>2016/02/16</td>
<td>0.96</td>
<td>Add powerObj to monitorGroup. Add trapPowerStatusChanged</td>
<td>Zhirong.Hsu</td>
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<tr>
<td>2015/12/23</td>
<td>0.95</td>
<td>Fix typo</td>
<td>Zhirong.Hsu</td>
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<tr>
<td>2015/12/21</td>
<td>0.94</td>
<td>Update monitorGroup to introduce the new thresholds and severity. Add memoryInfo, storageInfo, memory usage traps, and storage usage traps.</td>
<td>Zhirong.Hsu</td>
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<td>2015/08/20</td>
<td>0.93</td>
<td>ManageEngine Free SNMP MIB Browser</td>
<td>Zhirong.Hsu</td>
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<td>Add Supported MIB Browser</td>
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<td>2014/12/12</td>
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<td>Add Advantech SNMP Subagent Functions</td>
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1. Introduction

1.1 Advantech SNMP Subagent

The Advantech SNMP Subagent allows you to communicate Simple Network Management Protocol (SNMP) with the common or platform Subagent on the managed system. With the Advantech SNMP Subagent, you can use SNMP SETs, GETs, and TRAPs to manage supported platforms.

1.2 Supported Advantech Platforms

The current version of Advantech SNMP Subagent supports the Advantech IAG x86 hardware platform products. See the release notes to check the supported product list before using it.

1.3 Supported Operating Systems

The Advantech SNMP Subagent supports the following operating systems:

- Windows Embedded Standard 2009
- Windows Embedded Standard 7
- Windows Embedded 8 Standard
- Windows 7 SP1
- Windows 8
- Windows 8.1
- Windows 10

1.4 System Requirements

1.4.1 SNMP Master Agent

The Advantech SNMP Subagent is based on the Windows SNMP service. You must install the Windows SNMP service on the supported operating systems. You can check the service snap-in. Please refer to Figure 1-1 (found under Administrative Tools in Windows Control Panel).
If the SNMP service does not exist, you can turn on the Simple Network Management Protocol by the following steps. Here is a Windows 7 example.

1. Go to Control panel > Programs and Features. (Figure 1-2)
2. Click Turn Windows features on or off on the left panel.
3. In Windows Features window, check the checkbox Simple Network Management Protocol. (Figure 1-3)
4. Click OK.
Figure 1-2 Programs and Features
1.4.2 Latest Drivers

The Advantech SNMP Subagent requires the latest Advantech drivers including the following.

- Advantech Lmsensor Drivers
- Advantech Watchdog Drivers
- Advantech Multi-level Watchdog Drivers (If applicable)
- Advantech Brightness Drivers (If applicable)
- Advantech UNODIO Drivers for embedded IO (If applicable)
2. Advantech SNMP Subagents Overview

Advantech SNMP Subagents are SNMP extension agents that provide interfaces for retrieving Advantech x86 hardware and software information and monitoring the health status on the network using the SNMP protocol. Table 2-1 is the basic information of Advantech SNMP Subagents.

<table>
<thead>
<tr>
<th>Name</th>
<th>MIB file</th>
<th>Supported Region</th>
</tr>
</thead>
</table>

2.1 MIB and OID

SNMP works with basic components OIDs (Object Identifier) and MIBs (Management Information Base). User gets information by querying “Objects”. A MIB (Management Information Base) is a database including many objects and it is as a tree structure shown as Figure 2-1; each node is addressed through an object identifier (OID) and it maps to an entity in a communications network. OIDs are always written in a numerical form instead of a text one. Therefore, the top three object levels are written as “1.3.1” rather than “iso\org\dod” and the OIDs of Advantech is 1.3.6.1.4.1.10297.
### 2.2 Community Strings

Community Strings are similar to passwords. They are used to allow authorized you to access the SNMP agent on a device.

Community Strings can be configured as read-only (RO) or read-write (RW). As the name implies, read-only strings only allow information to be pulled from the agent. However, read-write strings are much more powerful and can allow re-configuration of many device properties. In general, the default community strings are set to be “public” for read-only (RO), and “private” for read-write (RW).
2.3 Architecture

Network Management Station (NMS) can communicate with subagents by the OIDs defined in the MIB files.

![Diagram of Architecture](image)

Figure 2-2 Architecture
2.4 Advantech SNMP Subagents

The Advantech SNMP Subagents provides the functions as shown in Figure 2-3.
2.4.1 Platform Information

You can get the system information of the managed device, such as model name, image version, image release date, system first boot time, system boot time, and boot count. If there are multiple identical devices, you can set an alias name or a description of each device.

![Platform Information Diagram](Figure 2-4 Platform Information)

2.4.2 PCI Information

You can get the PCI information (table) of the managed device, such as Vendor ID, Device ID, IRQ, Description, Base Address ... etc.

![PCI Information Diagram](Figure 2-5 PCI Information)
2.4.3 Trap Management

You can set the destination IP of NMS or trap management tool.

Figure 2-6 Trap Management

2.4.4 Software Group

You can get the EWF (Enhanced Write Filter) and FBWF (File Based Write Filter) current settings.

Figure 2-7 SW Group
2.4.5 Monitor Group

- You can get the Temperature, Voltage, Fan, and Current information which are handled by Advantech Driver.
- You can set high, low, high-high, and low-low threshold values of each Temperature, Voltage, Fan, and Current. You can also set a null value to disable the threshold. When the threshold has been set, the monitored value will be divided into 5 levels, cleared(1), critical-low(2), low(3), high(4), and critical-high(5).
  - If the Value is greater than high-high threshold and high-high threshold is not disabled (null), the level is critical-high(5).
  - If the Value is greater than high threshold and less than or equal to high-high threshold and high threshold is not disabled (null), the level is high(4).
  - If the Value is greater than low threshold and less than or equal to high threshold and low threshold is not disabled (null), the level is low(3). If the Value is less than low-low threshold and low-low threshold is not disabled (null), the level is critical-low(2).
  - Otherwise, the level is cleared(1).
- You can also enable monitoring state when the value is out of bound, it will send a trap to NMS.
- You can get the current CPU Loading, current CPU Speed, CPU Maximum Speed, memory size, memory usage percentage, and storage usage percentage of the managed device. There are 4 threshold values UsageTh1 ~ UsageTh4 which splits the usage into 5 severities, cleared(1), notice(2), warning(3), critical(4), and emergency(5) if the threshold value is not disabled (-1).
  - If the usage is greater than UsageTh1 and UsageTh1 is not disabled(-1), the severity is notice(2)
  - If the usage is greater than UsageTh2 and less than or equal to UsageTh1 and UsageTh2 is not disabled(-1), the severity is warning(3)
  - If the usage is greater than UsageTh3 and less than or equal to UsageTh2 and UsageTh3 is not disabled(-1), the severity is critical(4)
  - If the usage is greater than UsageTh4 and UsageTh4 is not disabled(-1), the severity is emergency(5)
  - Otherwise, the severity is cleared(1)
- You can get the power state pwr_normal(1) or pwr_redundancylost (2) and the power state severity including cleared(1), notice(2), warning(3), critical(4), and emergency(5) if the target platform support these features. You can also enable the power monitoring state when the power state changed, it will send a trap to the NMS.
Figure 2-8 Monitor Group
2.4.6 Peripheral Group

You can get the current Watchdog/Multilevel Watchdog configuration and the current state. You can get the current brightness level of the HMI device. (If applicable)

Figure 2-9 Peripheral Group

2.4.7 Peripheral Group – Hard Disk

You can get the hard disk information and the S.M.A.R.T. (Self-Monitoring, Analysis and Reporting Technology) information of it.

Figure 2-10 Peripheral Group – Hard Disk
2.4.8 Peripheral Group – Hardware Detection

If hardware is inserted or removed, the SNMP subagent will record the information. If the “hardware detect trap” is enabled, the SNMP subagent will also send a trap (alarm) to the NMS. The hardwareDetectObj supports the below types of hardware with related hwdClassGUID:

- USBRawDevice : {a5dcbf10-6530-11d2-901f-00c04fb951ed}
- DiskDevice : {53f56307-b6bf-11d0-94f2-00a0c91efb8b}
- NetworkCard : {ad498944-762f-11d0-8dcb-00c04fc3358c}
- HumanInterfaceDevice (HID) : {4d1e55b2-f16f-11cf-88cb-001111000030}

![Diagram of Peripheral Group – Hardware Detection](image)
2.4.9 Trap

The Advantech SNMP Subagents currently support 13 types of Traps.

- Temperature is out of range
- Temperature becomes normal
- Voltage is out of range
- Voltage becomes normal
- Hardware insertion and removal
- Fan Speed is out of range
- Fan Speed becomes normal
- Current is out of range
- Current becomes normal
- Memory Usage exceeds the threshold value
- Memory Usage becomes normal
- Storage Usage exceeds the threshold value
- Storage Usage becomes normal
- Power State is changed

Figure 2-12 Traps
3. Installation and Uninstallation

3.1 Installation

3.1.1 Launch installation package

Launch the Advantech SNMP Subagent Installation Package and you can see the following wizard. Click Next to start the installation.

![Advantech SNMP Subagent Installation Package](image)

Figure 3-1 Advantech SNMP Subagent Installation Package
You may see an error message below if the target platform has not installed SNMP service before.

![Error Message]

Figure 3-2 Please install SNMP service
3.1.2 Install Advantech Kernel Driver

The installation package will install the Advantech Kernel Driver which is needed by Advantech SNMP Subagent.

![Advantech Kernel Driver](image)

Figure 3-3 Advantech Kernel Driver
The Installation may display the following message, check *Always trust software from “Advantech Co., Ltd.”* and click **Install** to complete the driver installation.

![Figure 3-4 Windows Security of Driver](image)

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3.1.3 Install Advantech SNMP Subagent

To install the Advantech SNMP Subagent, the installation Wizard will display another installation wizard as shown in Figure 3-6.

![Figure 3-5 Advantech SNMP Subagent](image)
Click **Next** to start the installation and you will see a *SNMP configuration* page as shown in Figure 3-7.

![Figure 3-6 Advantech SNMP Subagent Setup Wizard](image)

Figure 3-6 Advantech SNMP Subagent Setup Wizard
3.1.4 SNMP Configuration

You can enter the Read-Only, Read-Write, and Trap Community which will be applied to the SNMP service. If you input an incorrect Community String, the installation wizard will show an error message as shown in Figure 3-8.

Figure 3-7 SNMP Configuration
After installation, the Read-Only and Read-Write community will be applied to the Security tab of SNMP Service Properties as shown in Figure 3-9.

Figure 3-9 Community for Security of SNMP service
The *Trap Community* will be applied to the *Traps* tab of *SNMP Service Properties* as shown in Figure 3-10. You can add more *Trap destinations* in the *Traps* tab of *SNMP Service Properties* if need.

![Figure 3-10 Community for Traps of SNMP service](image-url)
3.1.5 Install the SNMP Subagent

After finishing SNMP configuration, you can continue to install SNMP subagent. During installation, it will install subagents to the system and restart the SNMP service as shown in Figure 3-12.

![Figure 3-11 Ready to Install SNMP Subagent](image)

Figure 3-11 Ready to Install SNMP Subagent
Figure 3-12 Stop/Start Service

Figure 3-13 Installation Completed
3.1.6 Restart Computer

Figure 3-14 Restart Required
3.1.7 Security Settings

In order to communicate with Network Management Station (NMS), you need to add the NMS IP address to the Security tab of SNMP service properties as shown in Figure 3-15.

![SNMP Service Properties (Local Computer) window](image)

Figure 3-15 Add NMS IP address
3.1.8 Get MIB files

After the installation finished, you can find the MIB Files from Start menu > All Programs > Advantech > SNMP Subagent > SNMP Subagent MIB Files as shown in Figure 3-16 or from the installation folder of Advantech SNMP Subagent as shown in Figure 3-17.
Figure 3-17 MIB Files Location
3.2 Uninstallation

To uninstall the Advantech SNMP Subagent, you can follow the following steps.

3.2.1 Launch uninstallation wizard

Go to Control panel > Programs and Features and select the Advantech SNMP Subagent. Click Uninstall to launch uninstallation wizard as shown in Figure 3-19.

![Uninstall or change a program](image_url)
3.2.2 Uninstall the Advantech SNMP Subagent

Click **Uninstall** to continue the uninstallation process and wait the subagent has been uninstalled as shown in Figure 3-21.
Figure 3-20 Uninstall Advantech SNMP Subagent

Figure 3-21 Uninstall Successful
4. Appendix

4.1 Third-Party MIB Browser

The Advantech SNMP Subagent has been tested with the following MIB Browser.

- iReasoning MIB browser
  [http://ireasoning.com](http://ireasoning.com)

- ManageEngine Free SNMP MIB Browser

4.1.1 iReasoning MIB browser

Download Link: [http://ireasoning.com/mibbrowser.shtml](http://ireasoning.com/mibbrowser.shtml)

1. Once running iReasoning MIB browser in the client platform, please load MIB files first.

![Figure 4-1 Load MIbs](image)

2. Load ADVANTECH-PLATFORMS-MIB.mib and advantech-common-mib.mib. They are available after you installed the Advantech SNMP Subagent. (e.g., C:\program files\Advantech\AdvSNMPAgent\Mib). Copy these two files to your client platform in advance.

![Figure 4-2 Advantech MIbs](image)
3. Enter the IP address of the target platform where Advantech SNMP Subagent was installed.

4. For example, you can find `sysModuleID` as following Figure 4-4, and there is also a description at the bottom of window.
5. Double click on sysModuleID. *Target platform* will reply the module/product name message at the right side of window.

![Figure 4-6 SNMP GET sysModuleID](image)

6. You can also double click on sysBootCount to get reboot counter value from the *target platform*, for example.

![Figure 4-7 sysBootCount](image)

7. *Advantech SNMP Subagent* also provides TRAP functions which will notify the *client platform* if alarm events happened in the *target platform*. For example, if the voltage is abnormal, SNMP will automatically send a trap to notify user. Before start, click Advanced button and enter ‘private’ in the “Write Community” field.

![Figure 4-8 Write Community](image)
8. Find `snmpTrapSrvTable`, right-click on it then click **Table View**.

9. The Trap Server Table will show up at the right side of the window. There are **five** empty IP addresses `0.0.0.0` by default. You can update them with your client platforms or NMS IP addresses by **SNMP SET** command. You can also add/edit the `snmpTrapSrvIP` in the **Traps** tab of **SNMP Service Properties** as shown in Figure 3-10.
10. First, click one text field of `snmpTrapSrvIP`, and click "SNMP SET".

11. Enter the IP address of the client platform or NMS in the Value field.

12. This message box “SET succeeded” is supposed to be showed up.

Figure 4-14 Trap Receiver

Figure 4-15 Trap Receiver Window
Now client platform can receive Traps/Notifications if any device was changed on target platform. Please plug/remove a USB hard drive from SNMP server to verify if it works.

Figure 4-16 Receive Traps

14. In the example of the temperature trap, set tpMax to 20 and set tpState to be enabled.

Figure 4-17 Set tpMax and tpState (Zoom In)

Figure 4-18 Set tpMax and tpState (Zoom In)
15. Now you will receive a trap which notifies you that the temperature is abnormal.

Figure 4-19 trapTemperatureEvent
4.1.2 ManageEngine Free SNMP MIB Browser

Download Link: https://www.manageengine.com/products/mibbrowser-free-tool/download.html

1. Once running ManageEngine Free SNMP MIB Browser in the client platform, please load MIB files first.

2. Load the SNMP-FRAMEWORK-MIB file from the MIB folder of the ManageEngine Free SNMP MIB Browser installation path. (e.g., C:\Program Files\ManageEngine\MibBrowser Free Tool\mibs)
3. Load ADVANTECH-PLATFORMS-MIB.mib and advantech-common-mib.mib. They are available after you installed the Advantech SNMP Subagent. (e.g., C:\program files\Advantech\AdvSNMPAgent\Mib). Copy these two files to your client platform in advance.

4. Enter the IP address of the target platform where Advantech SNMP Subagent was installed in the Host field. Enter ‘public’ in the Community field and ‘private’ in the Write Community field.
5. For example, you can find **sysModuleID** as the following Figure 4-24. Find **sysModuleID**, right-click on it then click GET.

![Figure 4-25 GET sysModuleID](image)

6. The **target platform** will reply the module/product name message at the result window.

![Figure 4-26 sysModuleID.0](image)
7. You can also right-click on sysBootCount, and then click GET to get reboot counter value from target platform, for example.

![Figure 4-27 sysBootCount.0](image)

8. Advantech SNMP Subagent also has TRAP functions which will notify the client platform if alarm events occurred in the target platform. For example, if the voltage is abnormal, SNMP will automatically send a trap to notify user. Find snmpTrapSrvTable, click View SNMP Data Table on the toolbar.

![Figure 4-28 View SNMP Data Table](image)

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9. It will display a **SNMP Table** as below and then click **Start** to get the data.

![SNMP Table](image)

**Figure 4-29 SNMP Table**

10. The snmpTrapSrvTable will show up as below figure. There are five empty IP addresses **0.0.0.0** by default. You can update it with your client platform or NMS IP address by **SNMP SET** command. You can also add/edit the snmpTrapSrvIP in the **Traps** tab of **SNMP Service Properties** as shown in Figure 3-10.

![snmpTrapSrvTable data](image)

**Figure 4-30 snmpTrapSrvTable data**
11. Click on the each snmpTrapSrvIP text filed and enter the IP address of the client platform or NMS and then click the Refresh button to make sure the IP address has been updated.

![Figure 4-31 Set snmpTrapsrvIP](image)

**Figure 4-31 Set snmpTrapsrvIP**

12. Click Trap Viewer UI icon on the toolbar.

![Figure 4-32 Click Trap Viewer UI](image)

**Figure 4-32 Click Trap Viewer UI**
13. Now client platform can receive Traps/Notifications if any device was changed on target platform. Click Start to listen for Traps.

![Figure 4-33 TrapViewer](image1)

14. Please plug/remove a USB hard drive from SNMP server to verify if it works. Click Show Details

![Figure 4-34 USB hard driver removed](image2)
15. It will display a Trap Details window as Figure 4-35.

![Traps Details](image)

**Figure 4-36 Trap Details**

16. In the example of the temperature trap. Find **tpTable**, click **View SNMP Data Table** on the toolbar. In the SNMP Table set **tpMax** to 20 and set **tpState** to be **enabled**.

![SNMP Table](image)

**Figure 4-37 Set tpMax**
Figure 4-38 Set tpState

The image shows a window with a table that lists values in columns labeled `tpValue`, `tpMax`, `tpMin`, `tpGetTime`, and `tpState`. The table contains two rows with details for different entries, including timestamps and states such as `on(1)` and `off(2)`. The window also includes options for navigation and other functionalities related to SNMP management.
17. In the TrapViewer window, you can see a trap, click **Show Details** to get more information.

![Figure 4-39 TrapViewer](image-url)
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<th>0 hours, 4 minutes, 27 seconds.</th>
</tr>
</thead>
<tbody>
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</tr>
<tr>
<td>Generic Type</td>
<td>Enterprise Specific</td>
</tr>
<tr>
<td>Specific Type</td>
<td>1</td>
</tr>
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<tr>
<td>Entity</td>
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</tr>
<tr>
<td>RemotePort</td>
<td>55544</td>
</tr>
<tr>
<td>LocalPort</td>
<td>162</td>
</tr>
</tbody>
</table>

Figure 4-40 Trap Details