

MIC-3000 Series

USER'S Manual

MIC-3924

**Intelligent Chassis
Management Module**

Advantech CompactPCI™

Modular Industrial Comp

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Advantech customer services

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We want you to get the maximum performance from your products. So if you run into technical difficulties, we are here to help. For the most frequently asked questions, you can easily find answers in your product documentation. These answers are normally a lot more detailed than the ones we can give over the phone. So please consult this manual first. If you still cannot find the answer, gather all the information or questions that apply to your problem, and with the product close at hand, call your dealer. Our dealers are well trained and ready to give you the support you need to get the most from your Advantech products. In fact, most problems reported are minor and are able to be easily solved over the phone. In addition, free technical support is available from Advantech engineers every business day. We are always ready to give advice on application requirements or specific information on the installation and operation of any of our products.

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Advantech warrants to you, the original purchaser, that each of its products will be free from defects in materials and workmanship for two years from the date of purchase.

This warranty does not apply to any products which have been repaired or altered by persons other than repair personnel authorized by Advantech, or which have been subject to misuse, abuse, accident or improper installation. Advantech assumes no liability under the terms of this warranty as a consequence of such events. If an Advantech product is defective, it will be repaired or replaced at no charge during the warranty period. For out-of-warranty repairs, you will be billed according to the cost of replacement materials, service time and freight. Please consult your dealer for more details.

If you think you have a defective product, follow these steps:

1. Collect all the information about the problem encountered. (For example, type of PC, CPU speed, Advantech products used, other hardware and software used, etc.) Note anything abnormal and list any on-screen messages you get when the problem occurs.
2. Call your dealer and describe the problem. Please have your manual, product, and any helpful information readily available.
3. If your product is diagnosed as defective, obtain an RMA (return material authorization) number from your dealer. This allows us to process your return more quickly.
4. Carefully pack the defective product, a fully-completed Repair and Replacement Order Card and a photocopy proof of purchase date (such as your sales receipt) in a shippable container. A product returned without proof of the purchase date is not eligible for warranty service.
5. Write the RMA number visibly on the outside of the package and ship it prepaid to your dealer.

Initial Inspection

Before you begin installing your card, please make sure materials listed in the packing list have been shipped:

- One SNMP/HTTP system manager (MIC-3924) kernel board mounted on a MIC-3924 carrier board
- One MIC-3924 startup manual
- One CD contains utility program, SNMP MIB file and User's manual (in pdf format)
- Two brackets for use on Advantech MIC-3038/MIC-3056 series chassis
- One RJ-45 cable with bracket for external LAN connection
- One 9-pin RS-232 null-modem cable for MIC-3924 connection (P/N: 1700091801)

If any of those items are missing or damaged, contact your distributor or sales representative immediately.

We have carefully inspected the product mechanically and electrically before shipment. It should be free of marks and scratches and in perfect working order upon receipt.

As you unpack the product, check it for signs of shipping damage. (For example: damaged box, scratches, dents, etc.) If it is damaged or it fails to meet the specifications, notify our service department or your local sales representative immediately. Also notify the carrier. Retain the shipping carton and packing material for inspection by the carrier. After inspection, we will make arrangements to repair or replace the unit.

1

Introduction

1.1 Introduction

The MIC-3924 is an independent platform system management module that can detect a system's operating conditions, and notify users to take necessary actions to avert system failure through multiple communication protocols. With the MIC-3924 installed, a system's monitor and management can be integrated with an existing SNMP-based network management environment. The MIC-3924 also has a built-in Web-based administration interface which allows users to monitor the system's operation from any place with Internet connectivity. The MIC-3924 adds another dimension of reliability to your most critical applications.

Powerful yet Easy to Use

The MIC-3924 can detect a wide variety of internal system conditions, including temperature, voltage, fan rotation, power supply or CPU operations such as watchdog timer output. Through its I²C interface it can even monitor CPU temperature and voltages of Advantech's CompactPCI CPU boards. Depending on the alarm severity or user setup, it can generate several different alarm outputs, including SNMP trap, e-mail, page, acoustic signal, system reset, or digital signal output. The web-based user interface allows users to set the alarm criteria, and select alarm outputs for each sensor input independently to meet users requirements. The onboard backup battery enables the MIC-3924 to perform its alarm function even during total system power failure.

Web-enabled, No Driver Needed

The onboard 10/100 Mbps Fast Ethernet interface enables the MIC-3924 to be connected to existing network, independent from the system's connection. It supports multiple network protocols such as TCP/IP, SNMP, HTTP and Telnet, allowing users to manage their systems simply with a web browser. No special software driver is needed thus eliminating compatibility issues with different operating systems.

Flexible Integration through Hot-swap

The MIC-3924 series provides flexible integration with Advantech's CompactPCI enclosures, such as MIC-3038, MIC-3056 series and also new upcoming enclosures. With its hot-swappable capability, users can upgrade the system easily for advance environment monitoring. The system can be value added for high-end chassis management.

On-line Upgrade and Console Mode

The firmware can be upgraded on-line by using the included setup utility. There is no need to go to a remote site and disassemble the enclosures to the MIC-3924 module for firmware upgrade. The COM port can be another interface for the administrator management, especially for those applications need higher security.

1.2 Specification

1.2.1 Hardware Specification

Kernel board (SNMP-1000, P/N: 9692100051)

- CPU: 80188 compatible
- Embedded Flash ROM and SRAM
- Embedded 10/100 Mbps Ethernet adapter
- 1 RS-232 serial port up to 9600 baud rate
- 1 SM bus interface for system healthy status monitoring
- 1 SM bus interface for up to 8 external temperature sensors
- 4 fan tachometer inputs (up to 6)
- 1 on-board temperature sensor (on extension module)
- 4 power good signals
- 8 digital inputs (reserved for option)
- 4 digital outputs (reserved for option)

- Buzzer support

Dimension

- Kernel module: 40.5 x 93 mm
- Extension module: 100 x 95 mm (Front panel is not included)

On-line Upgrade and Batch Setup

You can upgrade the firmware on-line by using the setup utility. There is no need to go to a remote site and disassemble the chassis to collect each MIC-3924 module for firmware upgrade. The setup utility also supports "batch setup" function, which allows you to save a configuration and duplicate it to other modules. This function saves your time when you setup a number of MIC-3924 modules.

1.2.2 Sensor Input Specification**Voltage Inputs:**

+5VDC, -5VDC, 5VSB, +3.3VDC, +12VDC, -12VDC

Temperature Sensors:

LM75 digital temperature sensor, I2C interface, -30 ~ +125 °C (-22 ~ +257 °F)

Fan Speed Monitor:

Up to 6 fans, 700 ~ 10000 RPM

Power Good Input:

High: > 2.4VDC

Low: < 0.8VDC

CPU Card Healthy:

- CPU Vcore, CPU fan, CPU temperature (up to 2 CPUs), +5VDC, -5VDC, VI/O, +12VDC, -12VDC
- Supported SBC: MIC-3366 series, MIC-3368 series

1.2.3 Firmware Specification**System Status Monitoring and Management**

- Real-time healthy status monitoring: Provides real-time status display in HTTP/Java graphical format
- History log up to 600 records. Data can be down loaded through network or sent by e-mail
- Alarm event record display

Alarm Notification

- E-mail: Can set up to 4 addresses to receive e-mails
- SNMP trap: Notify up to 8 SNMP administrators
- Pager notification: Dial out through external modem to send messages to up to 8 pagers
- Audible alarm sound.

Supported Protocols

TCP, UDP, IP, ICMP, DHCP, BOOTP, ARP, SNMP, HTTP, Telnet

Management Function

- Web-based remote configure, control and monitor
- Remote reset, power down and power up.
- Remote digital output signal control
- Remote message display control
- Firmware upgrade from serial port and Ethernet port
- Modem dial in (console mode only)

Backup battery:

- Charge time: 24 hr
- Battery type: Ni-MH
- Battery capacity: 1500 mA-H (full charged, for 15~20 minutes operation, depends on the system configuration)
- Battery life: 80% capacity @20°C after 1000 cycles of charge and discharge

Power Consumption

- 5V @ 550 mA

1.2.4 Environmental Specifications

Storage temperature: -20 ~ 70 °C (4 ~ 158 °F)

Operating temperature: 0 ~ 60 °C (32 ~ 140 °F)

Relative humidity: 5 ~ 95% RH non-condensing.

2

Hardware Installation

2.1 Kernel Module Installation

The MIC-3924 modular design eases the I/O connection. The kernel module is to be mounted on an I/O extension/carrier module. There are several available extension modules designed for specific application needs. If your extension module is not identical as the one depicted in this section, please refer to the user's note of your extension module for the detail.

The kernel module has two 32-pin connectors, named as CN1 and CN2. The extension module has two 32-pin connectors, named as CN11 and CN12. CN1 of kernel module is to be mounted on CN 11 of extension module, and CN2 of kernel module is to be mounted on CN12 of extension module. After mounting the kernel module, secure it to the extension module with stud and screws

-- J1: Short this jumper to bypass the password protection. It should be left open under normal operation.

-- CN1 and CN2: Sensor and I/O interface

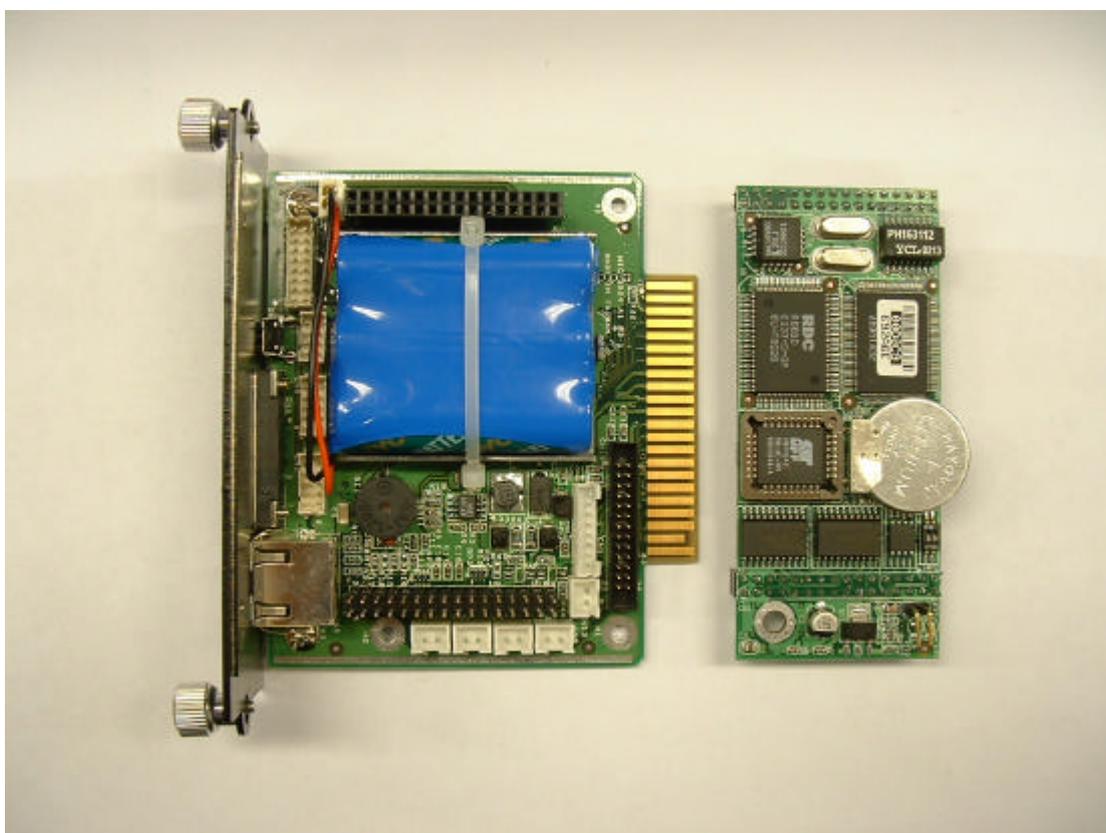


Figure 2-1: MIC-3924 component outlook

2.2 Connecting sensors and I/O ports

The MIC-3924 carrier module is designed to have an ISA-like edge which supports hot-swap function. Another adaptor module works as the interface between MIC-3924 and the system, to detect the bus voltages and other parameters relevant. However, the MIC-3924 does not communicate with the system through any of system bus, therefore no driver is required.

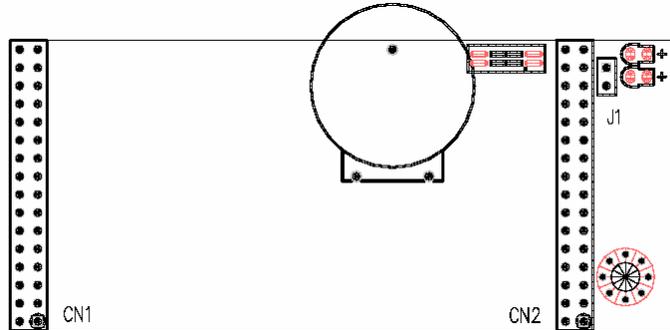


Figure 2-2: Location of the connectors on the kernel module

2.3 Jumper and Connector Locations

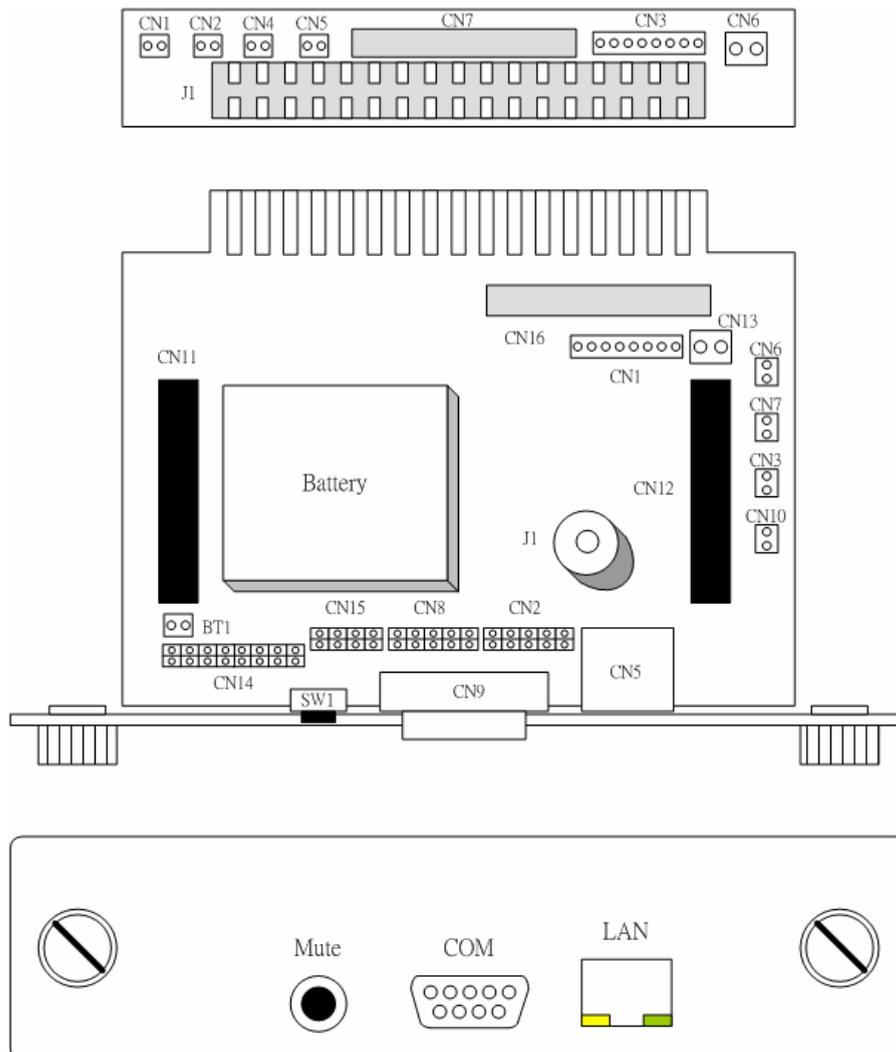


Figure 2-3: MIC-3924 jumper and connector location

External Buzzer (J1)

This connector connects to an external buzzer.

10/100-BaseT LAN Connector (CN2 & CN5)

CN5 is a standard RJ-45 connector for Ethernet connection. A box header (CN2) is also available for internal connection. The chassis carrier board comes with a special cable (P/N 1703120900). This cable has a box header at one end and an RJ-45 at the other end. An adaptor bracket allows users to fix the RJ-45 at chassis by using an existing DB-9 COM port opening.

RS-232 Serial Port (CN8 & CN9)

The serial port can be used as a console port or connected to an external modem for phone line connection. CN9 is a standard DB-9 connector for external wiring; CN8 is a box header for internal wiring.

Notice: You will need a "null modem cable" for direct connection to a PC. The TX pin of MIC-3924 has to connect to RX pin of PC, and vice versa. You can order this cable from Advantech (P/N: 1700091801, null modem cable with female DB-9 connectors on both ends, 1.8 M long).

Kernel Module Interface (CN11 & CN12)

CN11 & CN12 are used to piggyback the kernel module.

Backplane Connector (CN16)

This connector is used by collecting the parameters include the voltages, fans from the system backplane. One 26-pin connector on Advantech's backplane can be cabled to CN16 directly to simplify the wiring. This connector also provides +12 V power to fans and receive tachometer signals from fans. Notice that the MIC-3924 can only detect fans with tachometer output. This kind of fan generates two pulses per revolution.

Digital Input (CN14)

Up to 8 TTL-level digital signals can be monitored by MIC-3924. You can use these digital inputs to detect external devices or other healthy status such as chassis intrusion. This connector is not available on the carrier board for chassis.

Digital Output (CN15)

Four digital output signals can be triggered by any of the alarm event independently. They can be used to control external devices to recover the system health or notify users about the alarm. This connector is not available on the carrier board for chassis.

LED Connector (CN1)

System status can be shown through LED indicators. CN1 is connected to a LED indicator board.

Power Fail Signal Input (CN6/CN7/CN3/CN10)

Up to four power fail signals can be detected. The MIC-3924 can detect the power good or power fail signal if the power supply unit provides this output signal to be detected.

External Backup Battery (BT1)

MIC-3924 supports an external backup battery to allow the alarm notification under a total system power failure.

2.4. Interface Backplane

MIC-3924 needs an interface backplane to support MIC-3924 w/kernel board hot-swappable. This interface backplane is provided in Advantech chassis like MIC-3038 or MIC-3056. Please see above and below figures for the backplane illustration.



Figure 2-4: MIC-3924 interface backplane outlook

3

Getting Started

3.1 Configuring the MIC-3924

Before using your MIC-3924 SNMP/HTTP intelligent system manager, you will need to configure it. Configuration can be done through a PC serial port with terminal emulator software such as Hyperterminal of Windows 98/NT. You can also configure it from the Ethernet port by using Telnet or using a browser such as Netscape Communicator or Microsoft Internet Explorer. Due to security reasons, some parameters can only be set through the serial port.

Before you can configure your MIC-3924 module, you need first install your MIC-3924 and power it up. Connect it to a network through its LAN port, or connect its serial port to your PC using a "null modem" cable with reversed Tx & Rx signals at one end. This cable is available from Advantech. (Part number: 1700091801)

When all the cables are well connected, you can power up the MIC-3924. A green LED on the kernel module indicates that 5V power is supplied to MIC-3924. Then it starts a self-testing procedure. It takes around 5 seconds, then it is ready to work.

3.2 Configuration through the serial port

Take the following Hyperterminal of Windows (95, 98, Me, NT, 2000 or XP) as an example.

1. Start Hyperterminal by clicking on "Accessories" program group.
2. Enter a name and choose an icon for the connection.
3. In the "Connect using" box, select "Direct to COMx". Here x is the number of COM port you are using to connect to the MIC-3924.
4. Set the serial port of your PC to be 9600 bps, 8 data bits, no parity, 1 stop bit with no flow control.



5. Press "Enter" key of your PC then the MIC-3924 will prompt you for entering administrator user name and password. The default administrator user name is "advantech" and password is "admin".

Note:

(1) How to know the factory default IP address?

The IP address is dynamic in factory default. Please refer to the MAC address sticker on the LAN chip on the MIC-3924 kernel module. And if user doesn't know the default IP address, please convert the IP address as below example:



Example: Please refer to above figure, the second line of MAC address sticker 705290, just look at the last four numbers. And the first two address of IP is **"172.17.xxx.yyy"** as Advantech factory default, then the "xxx" and "yyy" turn to Hex are:

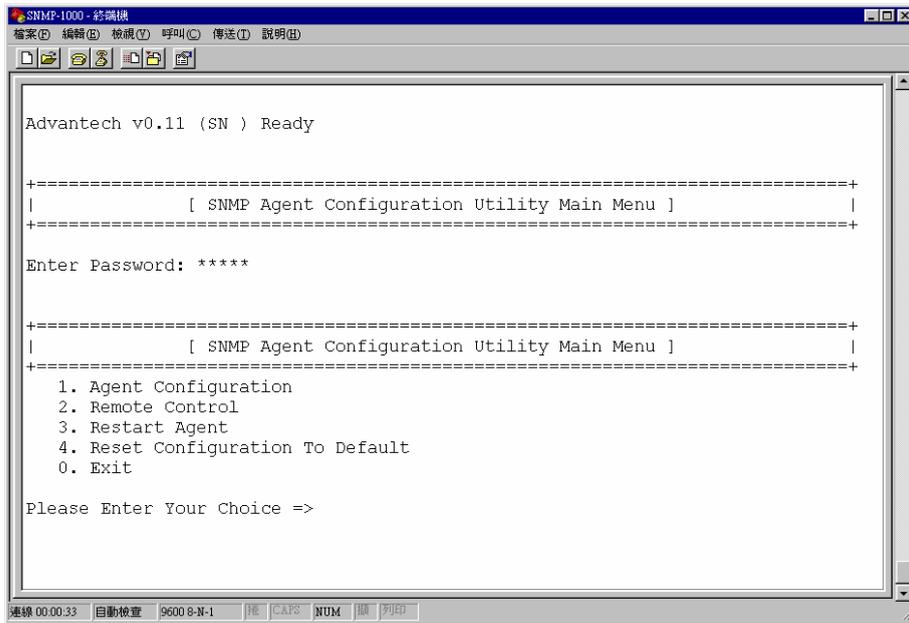
(52) => 82 (xxx)
(90) => 144 (yyy)

Thus the default IP address for this alarm module is: 172.17.82.144

Enter the "Agent Configuration", user is able to change all the IP as user's application requirement.

(2) Access through Telnet or serial port is permitted only with the "Admin User"

Name" and "Admin User Password" set in Control Group.



After entering password, you can choose one of following items:

```
+-----+
| [ SNMP Agent Configuration Utility Main Menu ] |
+-----+
1. Agent Configuration
2. Remote Control
3. Restart Agent
4. Reset Configuration To Default
5. Access Agent Command
0. Exit
Please Enter Your Choice => 1
```

(3) Trouble shooting of COM connection:

- a. During Hyperterminal connection staying stage, do NOT unplug the null-modem cable or turn off the system power (when the battery is not connected) or close the "terminal" WITHOUT "disconnect" process. Such improper process would coz the connection invalid and the firmware of the kernel board would keep the last failure stage until the host computer restart and re-run the "Hyperterminal".
- b. The MIC-3924 kernel module will need few seconds to process its firmware, so be patient once the power up and doing the COM connection right after that. Usually when the connection is no response over 30 seconds, please take some actions below to diagnostic:
 1. Turn off the chassis power => disconnect the battery on MIC-3924 => Turn on the chassis power => Restart host computer => Execute "Terminal"
 2. If step#1 doesn't work, please adjust the DIP-SW1 & SW2 on kernel module to "ON" position to enter the self-test mode as below.

3.2 Agent Configuration

Select "1" to enter the Agent Configuration function.

```
+-----+
|                                     [ Agent Configuration Menu ]                                     |
+-----+
  1. Agent Group
  2. Control Group
  3. Parameter Group
  4. Access Control Table
  5. Trap Receiver Table
  6. Email Notification
  0. Return to previous menu

Please Enter Your Choice => 1
```

3.2.1 Agent group:

The following items can be set under this command:

- . SNMP Agent Model Name: The model name of the SNMP controller.
Default value is MIC-3924. It is advisable not to change the default model name.
- . Ip Address: The IP address of the MIC-3924.
- . Gateway Address: The network default gateway address.
- . Network Mask: The sub-net mask setting
- . SNMP Agent Date: The internal date of MIC-3924. Format: mm/dd/yyyy
- . SNMP Agent Time: The internal time of MIC-3924. Format: hh:mm:ss

Enter the number you desire to change and follow the instruction to enter the changed value

```
+-----+
|                                     [ Agent Group Menu ]                                     |
+-----+
  SNMP Agent F/W Version : v0.17
  Ethernet address       : 00 E0 D0 F1 00 07
  1. SNMP Agent Model Name : SNMP-1000
  2. Ip Address           : 172.17.0.7
  3. Gateway Address      : 0.0.0.0
  4. Network Mask         : 255.255.0.0
  5. SNMP Agent Date      : 11/28/2001
  6. SNMP Agent Time      : 13:37:21
  0. Return to previous menu

Please Enter Your Choice => 1
Enter SNMP Agent Model Name : [SNMP-1000] SNMP-1000
```

3.2.2 Control Group:

The following items can be set under this command:

- . *Admin User Name*: The user name of MIC-3924 administrator. Only the administrator is allowed to enter the console mode. Default user name is "**advantech**".
- . *Admin User Password*: The administrator password. With this password a user is allowed to read and write to MIC-3924. Default password is "**admin**".
- . *Community Read-Only*: A general password for read-only access. Default read only password is "**public**".
- . *BOOTP/DHCP Control*: Enables/disables the BOOTP/DHCP protocol.
- . *Telnet Control*: Enables/Disables the Telnet protocol.
- . *TFTP Upgrade Control*: Enables/disables the TFTP protocol for firmware upgrade through the local network
- . *HTTP Security Control*: Enables/disables the HTTP login password request.

```
+-----+
|                                     [ Control Group Menu ]                                     |
+-----+
  1. Admin User Name      : advantech
  2. Admin User Password  : *
  3. Community Read-Only  : public
  4. BOOTP/DHCP Control   : Disable
  5. Telnet Control       : Enable
  6. TFTP Upgrade Control : Disable
  7. HTTP Security Control : Enable
  8. Return to previous menu

Please Enter Your Choice =>
```

3.2.3 Parameter Group:

The following items can be set under this command:

- . *sysDescription*: A description to this system. This is an alphanumeric string up to 31 bytes. Default is empty.
- . *sysContact*: The contact information of the entity that manages the system. This is an alphanumeric string up to 15 bytes. Default is empty.
- . *sysName*: The name of this system. This is an alphanumeric string up to 15 bytes. Default name is "**Advantech**".
- . *sysLocation*: The location of this system. This is an alphanumeric string up to 15 bytes. Default is empty.

```
+-----+
|                                     [ Parameter Group Menu ]                                     |
+-----+
  1. sysDescription :
  2. sysContact     :
  3. sysName        : Advantech
  4. sysLocation    : TPE01
  8. Return to previous menu

Please Enter Your Choice => 1
Enter System Description : []
```

3.2.4 Access Control Table

This table allows you to set restrictions to some IP addresses to access the MIC-3924 (MIC-3924 Kernel board). You can add IP addresses and set an access control. Available choices are: *NotAccess*, *Read Only*, or *Read/Write*. A workstation will not be able to display any information when its IP address is set as "NotAccess". Press "1" to modify a line in the table. Press "2" to delete data on a line. Note this table is used for the access using SNMP and HTTP. Access through Telnet or serial port is permitted only with the "Admin User Name" and "Admin User Password" in Control Group.

```

+-----+
| IP Address      | Community String | Access |
+-----+
[1] 0.0.0.0      | public           | NotAccess
[2] 0.0.0.0      | public           | NotAccess
[3] 0.0.0.0      | public           | NotAccess
[4] 0.0.0.0      | public           | NotAccess
[5] 0.0.0.0      | public           | NotAccess
[6] 0.0.0.0      | public           | NotAccess
[7] 0.0.0.0      | public           | NotAccess
[8] 0.0.0.0      | public           | NotAccess

```

```

COMMANDS -
1. Modify - Modify an entry of table
2. Reset - Reset an entry to default from table
0. Return to previous menu

```

```

Please Enter Your Choice => 1
Entry Number : 1
Enter IP address : [0.0.0.0] 192.168.11.219
Enter Community String : [public] admin
Select Access Type - [NotAccess]
  1. Not Access
  2. Read Only
  3. Read/Write

```

```

Please Enter Your Choice => 3

```

3.2.5 Trap Receiver Table

The MIC-3924 can be managed by a SNMP compatible software from a remote server connected to the network. The IP addresses of SNMP trap receivers can be added in this list if SNMP compatible management software is available at these addresses. Press "1" to modify a line in the table. Press "2" to delete data on a line. The "Severity Level" allow you to specify an alarm level. Trap will not be sent if the alarm severity is lower than specified level.

```

+-----+
| IP Address      Community String  NMS-Severity  |
+-----+
[1] 0.0.0.0       public           Disable
[2] 0.0.0.0       public           Disable
[3] 0.0.0.0       public           Disable
[4] 0.0.0.0       public           Disable
[5] 0.0.0.0       public           Disable
[6] 0.0.0.0       public           Disable
[7] 0.0.0.0       public           Disable
[8] 0.0.0.0       public           Disable

```

COMMANDS -

- 1. Modify - Modify an entry of table
- 2. Reset - Reset an entry to default from table
- 0. Return to previous menu

Please Enter Your Choice => 1

Entry Number : 1

Enter IP address : [0.0.0.0] 192.168.11.219

Enter Community String : [public] admin

Select Severity Level : [Disable]

- 1. Disable
- 2. Critical
- 3. Major
- 4. Minor

Please Enter Your Choice => 2

3.2.6 E-mail Notification Menu

The MIC-3924 can send e-mail to specified mail addresses daily at a fixed time or upon an alarm.

```

+-----+
| [ Email Notification Menu ] |
+-----+
1. DNS Address      :
2. Mail Server      :
3. Mail Account     :
4. Password         :
5. Mail Status Daily at : 00:00
6. Mail Receivers Table
7. Test Email Configuration
0. Return to previous menu

```

Please Enter Your Choice => 1

Enter DNS Address : [] 168.95.192.1

Under this menu you can set the following items:

- . DNS Address: The IP address of the network domain name server in dotted format.
- . Mail Server: The IP address of the mail server is in dotted format.

```

+-----+
|                                     [ Email Notification Menu ]                                     |
+-----+
1. DNS Address           : 168.95.192.1
2. Mail Server          :
3. Mail Account         :
4. Password             :
5. Mail Status Daily at : 00:00
6. Mail Receivers Table
7. Test Email Configuration
0. Return to previous menu

Please Enter Your Choice => 2
Enter Mail Server : [ ] pop.mail.yahoo.com.tw

```

- . Mail Account: The account name for the MIC-3924 is to log into the mail server.

```

+-----+
|                                     [ Email Notification Menu ]                                     |
+-----+
1. DNS Address           : 168.95.192.1
2. Mail Server          : pop.mail.yahoo.com.tw
3. Mail Account         :
4. Password             :
5. Mail Status Daily at : 00:00
6. Mail Receivers Table
7. Test Email Configuration
0. Return to previous menu

Please Enter Your Choice => 3
Enter Mail Account : [ ] guest

```

- . Mail Status Daily at: By pressing 5, users can specify the time for the MIC-3924 to send out daily log in e-mail to the specified accounts.
- . Mail Receivers Table: Press 6, users can set the e-mail addresses under this entry.

```

+=====+
| Mail Receiver          Mail Condition Alarm Level Status |
+=====+
[1]                    Alarm          Major      Disable
[2]                    Alarm          Major      Disable
[3]                    Alarm          Major      Disable
[4]                    Alarm          Major      Disable

```

- COMMANDS -
1. Modify - Modify a table entry
 2. Reset - Reset a table entry to default
 0. Return to previous menu

```

Please Enter Your Choice => 1
Entry Number : 1
Enter Mail Account : [ ] support@advantech.com
Select Mail Condition - [Alarm]
  1. Alarm
  2. Daily Logs
  3. Alarm and Log

```

```

Please Enter Your Choice => 1
Select Alarm Level - [Major]
  1. Critical
  2. Major
  3. Minor

```

```

Please Enter Your Choice => 2
Select Status - [Disable]
  1. Enable
  2. Disable

```

```

Please Enter Your Choice => 1

```

Mail condition: The condition to send e-mail. Choices are:

- . Alarm: Send e-mail when there is an alarm.
- . Daily Logs: Send daily log at specified time.
- . Alarm and Log: Send both alarm notification and daily log.
- . Alarm Level: The severity to send alarm notification. This item is useful when the Mail Condition is set as "Alarm" or "Alarm and Log"
- . Status: The status of this mail address. You can set it as Disable when this address is temporarily not in use.

3.3 Communication through Ethernet

To communicate with the MIC-3924 through Ethernet, you need a computer with an Ethernet and a TCP/IP network installed. You need to know the IP address of the MIC-3924 before you can communicate with it through the Ethernet.

You have four ways to know current IP address:

- A. The default IP address is 172.20.x.x, where x.x comes from last four digits of the Ethernet MAC address. The MAC address is labeled on the kernel module. For example, if the MAC address is 00 E0 d8 03 15 36 (hexadecimal), the IP address is then 172.20.21.54.
- B. You can read the IP address in the console mode under "Agent Configuration" as described in 3.2.1.
- C. You can find out all MIC-3924s connected in the same network by using the setup utility.

3.4 Configuration using Telnet

Configuration using Telnet is basically same as using serial port connection. First make sure your computer has a TCP/IP network and a web browser installed. In the address line type in "Telnet xxx.xxx.xxx.xxx", here xxx.xxx.xxx.xxx is the IP address of the MIC-3924. Then the MIC-3924 will prompt you for entering user name and password, same as described in section 5.8.10.

3.5 Configuration using a Web Browser

Before using web browser to manage the system, user will need a cross-over CAT-5 Ethernet cable (when doing the peer to peer control) or just use a regular standard CAT-5 Ethernet cable uplink to a hub or switch for other host computer to monitoring.

Using a web browser is the easiest way to configure the MIC-3924. Type in the URL "http://xxx.xxx.xxx.xxx", here xxx.xxx.xxx.xxx is the IP address of the MIC-3924. Then the MIC-3924 will prompt you for entering user name and password.



Note:

1. If the LAN connection is failed, then please check:
 - a. If the LAN LED is active or not when a cable is plug-in.
 - b. If the IP address given is correct. (Check the IP by COM as above)
 - c. If the cable using (cross over or cable quality) in properly.
2. When the changes in all web-base management items by submitted, user may find some change doesn't update but refresh the page then new setting come out, this is lead by the IE "Temporary Internet files", please change the setting to "Every time when review homepage" (The default is "Automatic")

3.5.1 System Information

After log into the web browser, a main display includes seven items for users programming and monitoring in the left of screen. System information shows the brief environment information and also the last current alarm record.

The screenshot shows the Advantech SNMP/HTTP System Manager web interface in Microsoft Internet Explorer. The browser address bar shows 'http://172.16.6.127/'. The page title is 'SNMP/HTTP System Manager'. On the left, there is a navigation menu with options: System Information, System Status, History, Alarm Configuration, Agent Configuration, Notification Setup, and Remote Control. The main content area is divided into two sections:

SNMP/HTTP System Manager

| | |
|--------------------------------|---------------|
| Model | SNMP-1000 |
| Firmware Rev. | Beta v0.93 |
| System Name | Advantech |
| System Location | |
| System Up Time (days hh:mm:ss) | 0day 00:47:41 |

Current Alarm

| Number of Active Alarms | 1 | |
|-------------------------|----------------------------------|-----------------------|
| Last Alarm | 05/10/2002 15:26:02 Fan 1 Low | |
| Alarm | Alarm Time | Alarm Description |
| 1 | 05/10/2002 15:26:03 | Fan 1 Low -- Critical |

3.5.2 System Status

System status displays the real-time parameters that users sets up in the alarm configuration, includes Fans, Temperature, Voltages, CPUs, Power Supplies, Digital Inputs and Watchdog timers. Note MIC-3924 kernel firmware follows up the SNMP-1000, except the CPUs has different format/setting, the "WDT" is no functions in this board.

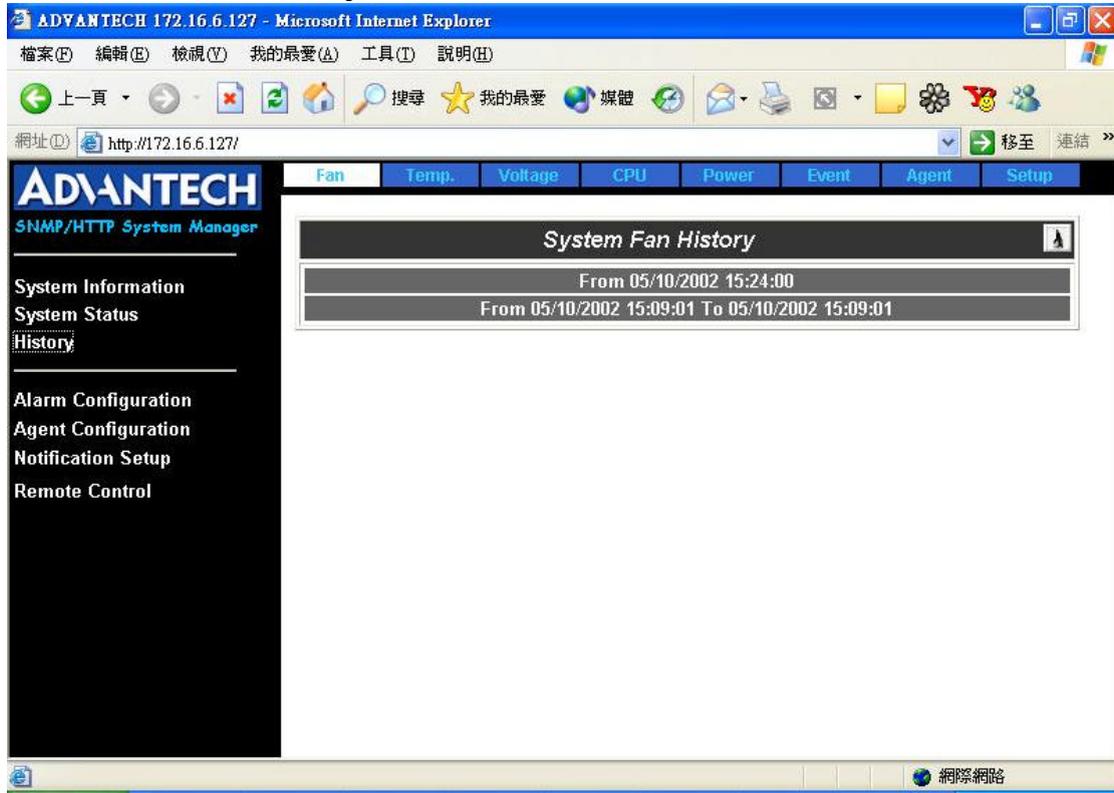
The screenshot shows the Advantech SNMP/HTTP System Manager web interface with the 'System Fan Status' page selected. The browser address bar shows 'http://172.16.6.127/'. The page title is 'SNMP/HTTP System Manager'. On the left, there is a navigation menu with options: System Information, System Status, History, Alarm Configuration, Agent Configuration, Notification Setup, and Remote Control. The main content area is divided into two sections:

System Fan Status (rpm)

| Index | Alarm Level | Current Speed | Low Limit |
|-------|-------------|---------------|-----------|
| FAN 1 | Critical | 0 | 1000 |
| FAN 2 | No Alarm | 0 | 1000 |
| FAN 3 | No Alarm | 0 | 1000 |
| FAN 4 | No Alarm | 0 | 1000 |
| FAN 5 | No Alarm | 0 | 1000 |
| FAN 6 | No Alarm | 0 | 1000 |
| FAN 7 | No Alarm | 0 | 1000 |
| FAN 8 | No Alarm | 0 | 1000 |
| FAN 9 | No Alarm | 0 | 1000 |

3.5.3 History

The history has the records of Fans, Temperatures, Voltages, CPUs, and Power supplies, all of them in different pages for user's reference. Click on the event user can see the details of alarm record. Note the "Setup" page allow users to clean up or save/download the history file.



3.5.4 Alarm Configuration

This function is the main page for user to configure all the environment parameters for monitoring. There are seven pages for setting up as well as "System Status" shows accordingly. Please set the alarm level (Four levels: None, Minor, Major, Critical) in properly. And Note that to click on the "Submit" for upload after each parameter is set.

There are only 4x D/O for relay output control or LED lighting. However, for MIC-3924 applied on CompactPCI chassis would use 3 D/O for LED lighting (Power, Temp, and FAN) in most of platforms, therefore, only one D/O left for user's application.

When then event is occurred, user can choose in either D/O control or commands the system to be power off. These setting are in the "Event output" in each setting page.

Note: WDT is no function either in MIC-3924 series.

-- **Fan:** To monitor chassis fans status. Totally up to 9 fans for users' setting, but only up to 6 fans can be used for CompactPCI chassis.

ADVANTECH 172.16.6.127 - Microsoft Internet Explorer

檔案(F) 編輯(E) 檢視(V) 我的最愛(A) 工具(T) 說明(H)

http://172.16.6.127/

ADVANTECH
SNMP/HTTP System Manager

System Information
System Status
History

Alarm Configuration
Agent Configuration
Notification Setup
Remote Control

System Fan Configuration (rpm)

| Index | Low Limit | Alarm Level | Event Output |
|-------|-----------|-------------|--------------|
| FAN 1 | 1000 | Critical | DO 0 |
| FAN 2 | 1000 | No Alarm | None |
| FAN 3 | 1000 | No Alarm | None |
| FAN 4 | 1000 | No Alarm | None |
| FAN 5 | 1000 | No Alarm | None |
| FAN 6 | 1000 | No Alarm | None |
| FAN 7 | 1000 | No Alarm | None |
| FAN 8 | 1000 | No Alarm | None |
| FAN 9 | 1000 | No Alarm | None |

Submit

-- **Temp:** To monitor the chassis temp. Totally up to 9 Temps for users' setting, but only since there is only one on board temp sensor on the MIC-3924, thus there is no other extend temp sensor can be used.

ADVANTECH 172.16.6.127 - Microsoft Internet Explorer

檔案(F) 編輯(E) 檢視(V) 我的最愛(A) 工具(T) 說明(H)

http://172.16.6.127/

ADVANTECH
SNMP/HTTP System Manager

System Information
System Status
History

Alarm Configuration
Agent Configuration
Notification Setup
Remote Control

System Temperature Configuration (deg. C)

| Index | High | | | Low | | |
|---------|-------|-------------|-------|-------|-------------|-------|
| | Limit | Alarm Level | Event | Limit | Alarm Level | Event |
| TEMP. 1 | 55.0 | No Alarm | None | 5.0 | No Alarm | None |
| TEMP. 2 | 55.0 | No Alarm | None | 5.0 | No Alarm | None |
| TEMP. 3 | 55.0 | No Alarm | None | 5.0 | No Alarm | None |
| TEMP. 4 | 55.0 | No Alarm | None | 5.0 | No Alarm | None |
| TEMP. 5 | 55.0 | No Alarm | None | 5.0 | No Alarm | None |
| TEMP. 6 | 55.0 | No Alarm | None | 5.0 | No Alarm | None |
| TEMP. 7 | 55.0 | No Alarm | None | 5.0 | No Alarm | None |
| TEMP. 8 | 55.0 | No Alarm | None | 5.0 | No Alarm | None |
| TEMP. 9 | 55.0 | No Alarm | None | 5.0 | No Alarm | None |

Submit

Not Used
No Alarm
Critical
Major
Minor

-- **Voltage:** To monitor the system DC output status. Totally up to 6x different DC outputs can be users' setting. Note there are high and low limit setting in this page.

ADVANTECH 172.16.6.127 - Microsoft Internet Explorer

http://172.16.6.127/

System Voltage Configuration (V)

| Index | High Limit | Low Limit | Alarm Level | Event Output |
|-------|------------|-----------|-------------|--------------|
| 3.3 V | 3.60 | 3.30 | No Alarm | None |
| 5 V | 5.50 | 4.50 | No Alarm | None |
| -5 V | -4.50 | -5.50 | No Alarm | None |
| 5 Vsb | 5.50 | 4.50 | No Alarm | None |
| 12 V | 13.20 | 10.80 | No Alarm | None |
| -12 V | -10.80 | -13.20 | No Alarm | None |

Submit

-- **CPU:** To monitor the CPU card status, include CPU Voltages and Fans on CPU board.

ADVANTECH 172.16.6.127 - Microsoft Internet Explorer

http://172.16.6.127/

System CPU Configuration

CPU Fan Configuration (rpm)

| Index | Low Limit | Alarm Level | Event Output |
|-------|-----------|-------------|--------------|
| CPU 1 | 4000 | No Alarm | None |
| CPU 2 | 4000 | Not Used | None |

CPU Temperature Configuration (deg. C)

| Index | High | | | Low | | |
|-------|-------|-------------|-------|-------|-------------|-------|
| | Limit | Alarm Level | Event | Limit | Alarm Level | Event |
| CPU 1 | 75.0 | No Alarm | None | 5.0 | No Alarm | None |
| CPU 2 | 75.0 | Not Used | None | 5.0 | Not Used | None |

CPU Voltage Configuration (V)

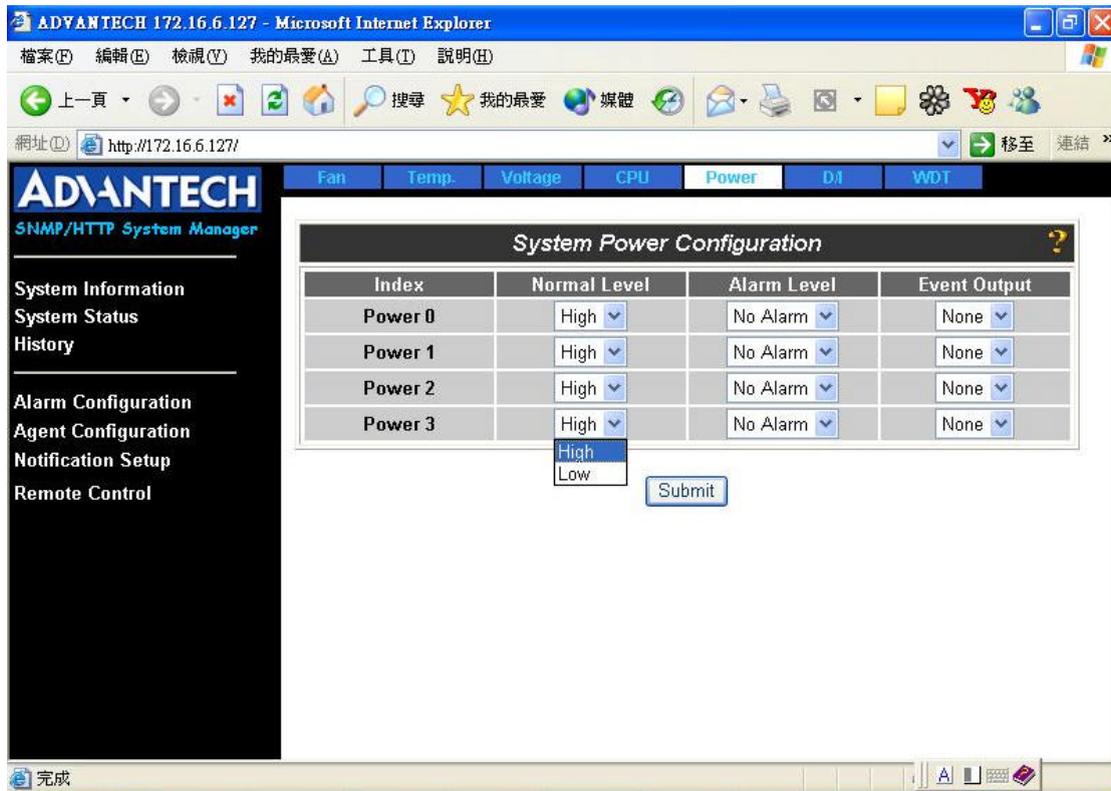
| Index | High Limit | Low Limit | Alarm Level | Event Output |
|-------------|------------|-----------|-------------|--------------|
| CPU 1 Vcore | 1.70 | 1.30 | No Alarm | None |
| CPU 2 Vcore | 1.70 | 1.30 | Not Used | None |
| Vi/o | 3.60 | 3.00 | No Alarm | None |

Note:

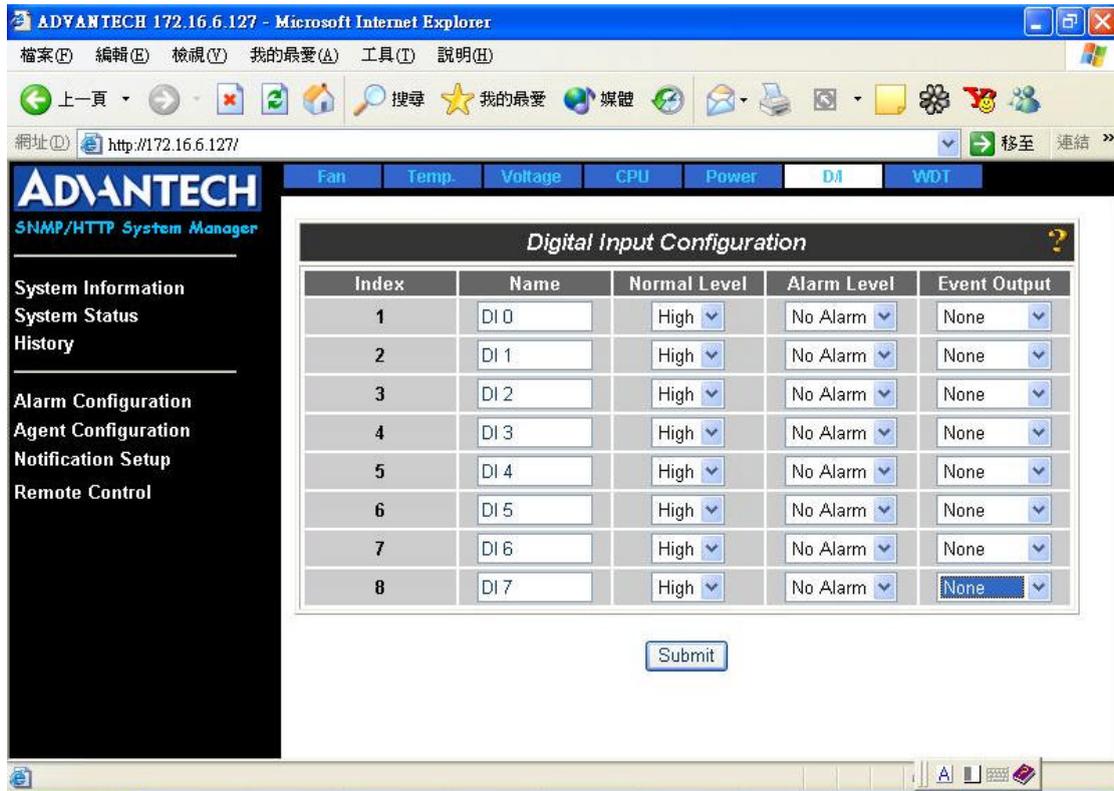
For MIC-3924A, this page setting is the complete the same as SNMP-1000 series, CPU fans, temp and voltages which are directly monitor by Winbond controller can be set for monitoring as well as for full-size PICMG CPU card application. However, CompactPCI CPU boards usually use passive cooling design by chassis fan, so there will be no function on the CPU fan monitoring.

For MIC-3924B, this page is in different by up to 19 CPU cards monitoring setting up. This function can let user to configure advance system monitoring like blade servers (SF-400, SF-420... etc) or any other system that compliant with Advantech system management design.

Power: To monitor the chassis power supplies. Totally is up to 4 Powers for users' setting.



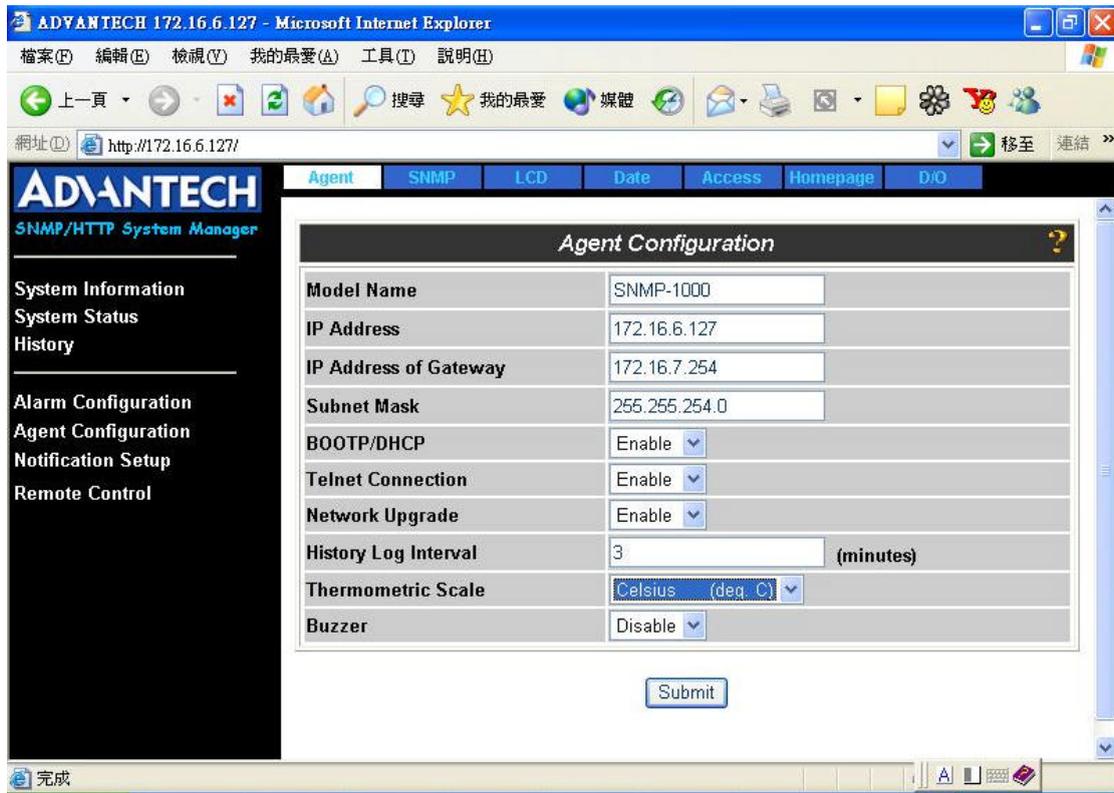
D/I: To monitor the external Digital Input event. Totally up to 8 Temps for users' setting, but default is reserved for optional.



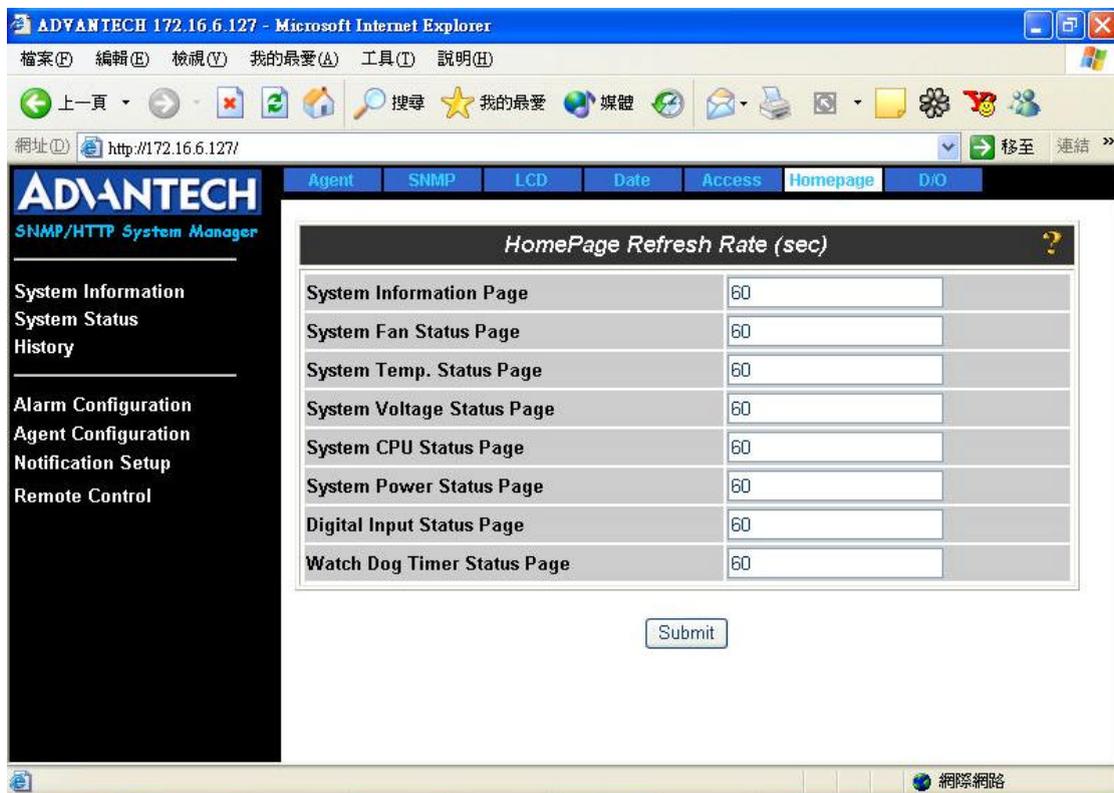
3.5.5 Agent Configuration

This function is for alarm agent parameter setting includes IP address, Date, Browser configurations. Note the LCD page is no function due to no LCD connection is available.

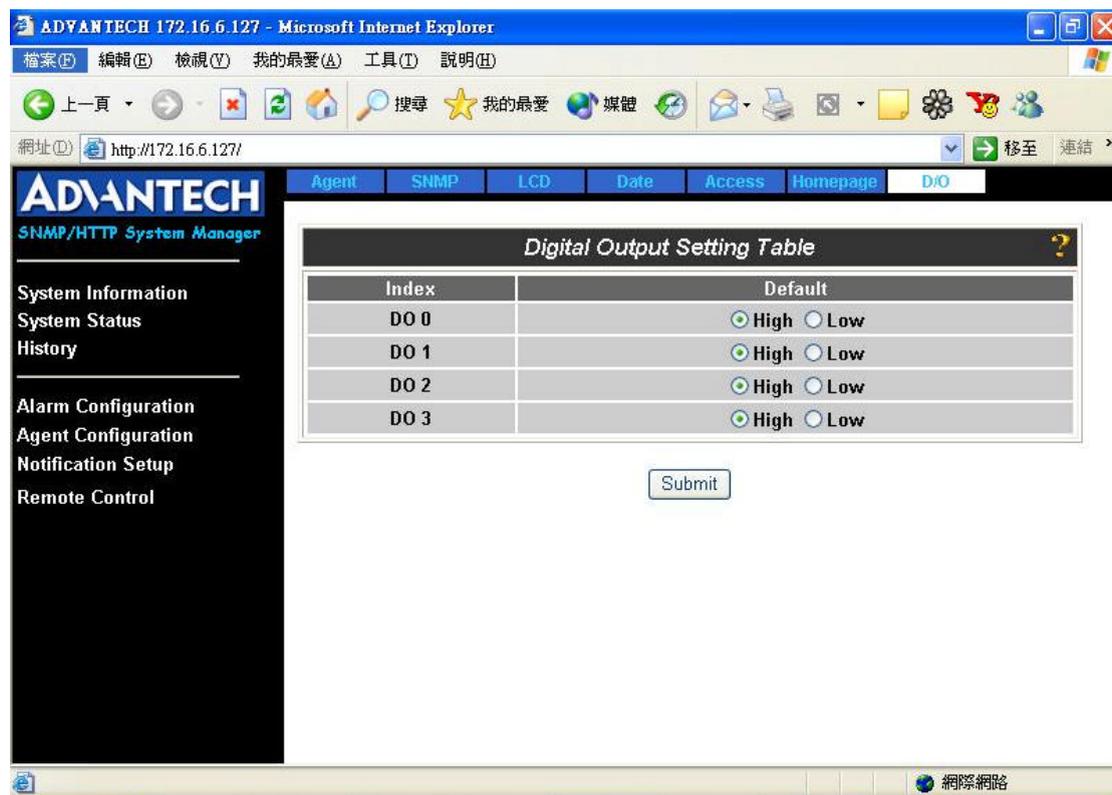
-- **Agent:** To set up the IP address and connection enable/disable. The IP address can be also configure by Telnet (RS-232) connection.



Homepage: To set up the homepage refresh time for each alarm configuration.



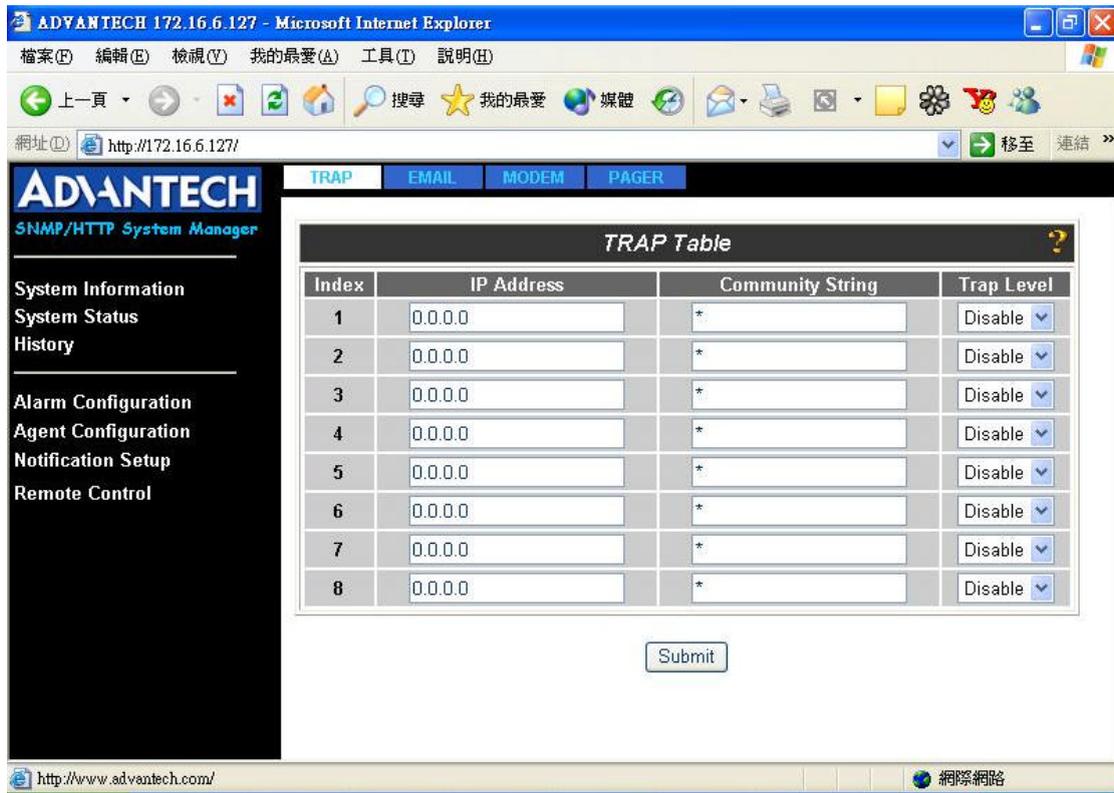
-- **D/O**: To set up each Digital Output level (High/Low).



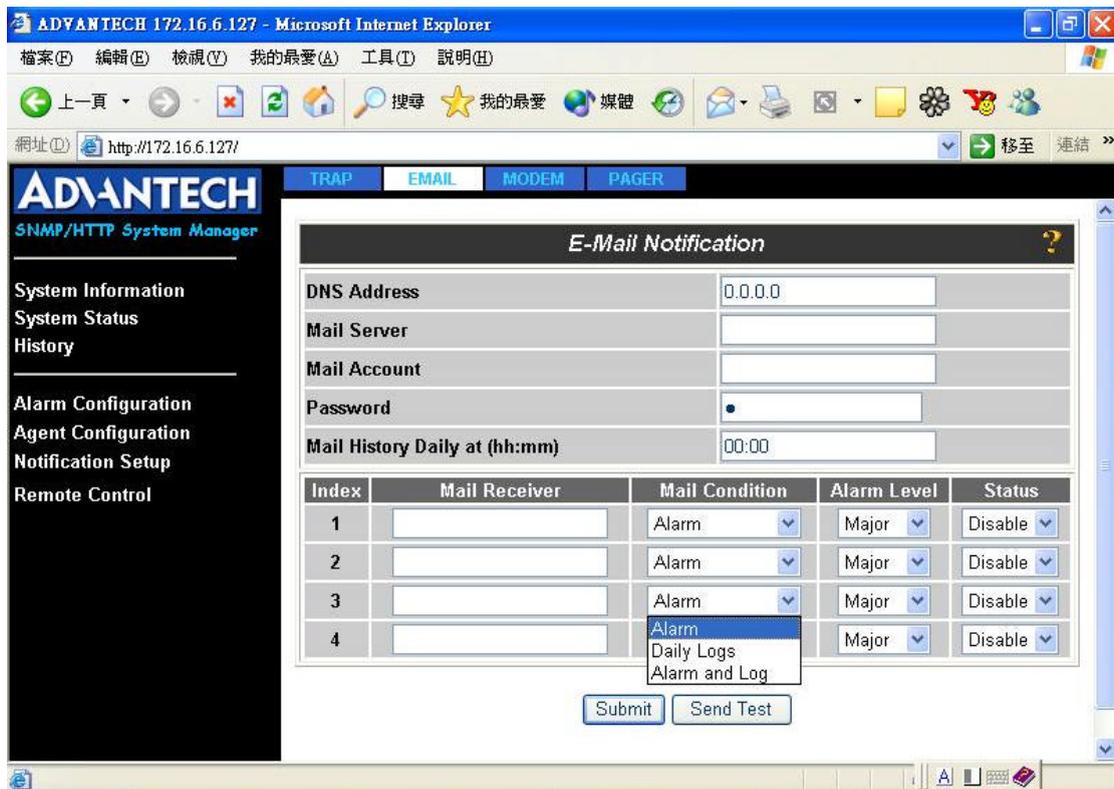
3.5.6 Notification Setup

This function is for alarm notification setting includes traps, emails, modem parameters and pagers. Note the modem has to via the RS-232 port that independent from system.

-- **Trap:** To set up traps for event output, users can be notified by remote terminal immediately with alarm string on screen.



-- **Email:** To set up email for event output, users can be notified by automatic email immediately by up to four receivers (administrators).



Note:

The email notification would act by the alarm level setting priority. In each page of "Alarm Configuration" user can set the alarm level for all the monitoring objects. When those priority in "Alarm Configuration" are higher or equal to the level in this page, then the email would be send. For example:

| Alarm Configuration | Alarm Level | Email Receiver | Alarm Condition | Alarm Level |
|---------------------|-------------|---------------------|-----------------|-------------|
| FAN1 | Major | 192.168.1.5 (IP#1) | Alarm | Minor |
| FAN2 | Minor | 202.16.7.23 (IP#2) | Alarm | Major |
| POWER1 | Critical | 172.20.5.143 (IP#3) | Alarm | Critical |

When FAN1 fails: Only IP#1 and IP#2 will be notified.

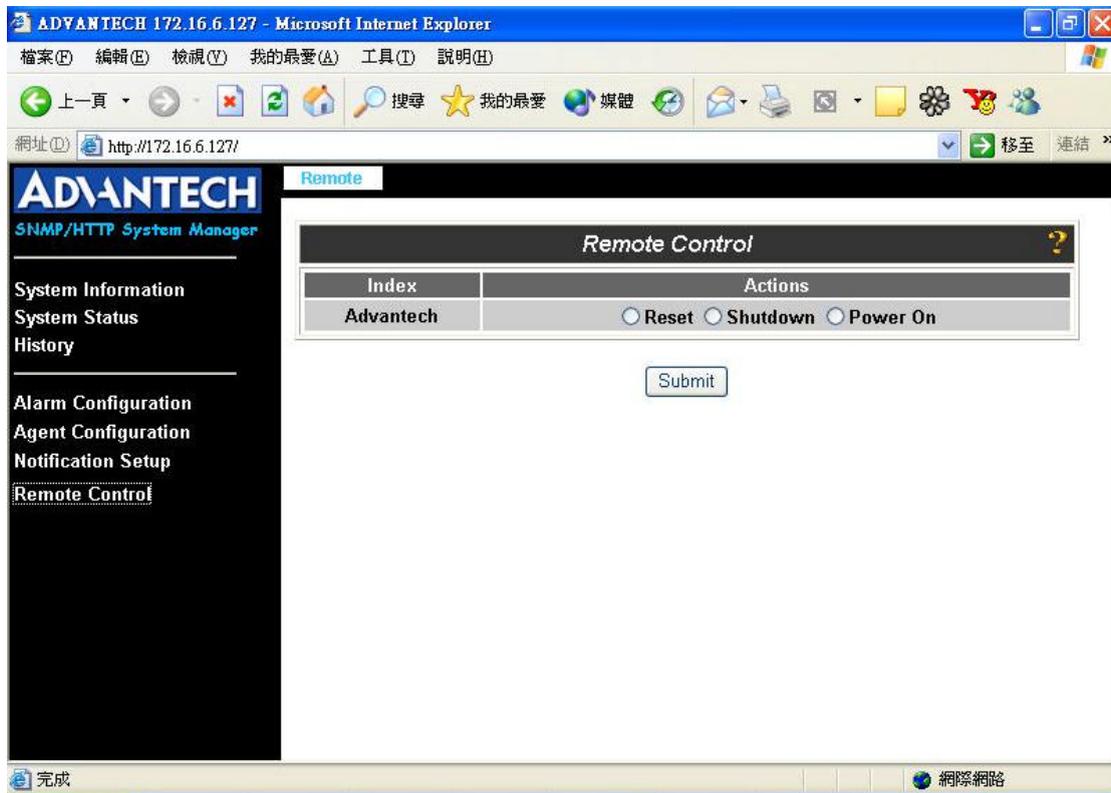
When FAN2 fails: Only IP#1 will be notified.

When POWER1 fails: All IP#1, IP#2, and IP#3 will be notified

-- **Modem & Pagers:** To set up the modem parameters and also the pager receivers. Up to 8 pager receivers can be added in this page.

3.5.7 Remote Control

This function is for remote management of system shutdown and power on. Note for MIC-3924A, the "Reset" is no function, but user can still via "shutdown" and "power on" to control the system reset in here. MIC-3924B has no reset selection in this page due to the reset is for all the CPU boards at once, however, the reset doesn't support individual control on multi system boards application like blade server like SF-420



3.6 Remote access through a phone line

MIC-3924's command mode can be accessed remotely through a phone line. The

MIC-3924 has to be connected to a phone line through a modem. And your PC has to be connected to a phone line through a modem, too. You can use HyperTerminal of Windows system or other dialing software tools. Please refer to the user's manual of your dialing program for the setting details.

4

Programming the MIC-3924

4.1 Introduction

The MIC-3924 kernel board (SNMP-1000) can be accessed and controlled by direct command input. With this function, SNMP-1000 can be easily controlled and integrated into user's system by user's program.

4.2 Entering the pass through command mode

Before you can program the SNMP-1000 you need first to set up a connection from the host computer to the SNMP-1000 through serial port or Telnet. Follow below steps to enter the pass through command mode.

1. Turn on SNMP-1000 then SNMP-1000 will send identify string `^nAdvantech v0.xx (SNxxxxxx) Ready \n` to the host computer through COM port.
2. On host computer side, send a carriage return (enter).
3. SNMP-1000 will response by sending main menu title and a message to request for entering user name.

`^n\n`

```
+=====+
|                [ SNMP Agent Configuration Utility Main Menu ]                |
+=====+
\n
```

Enter User Name: "

4. On host computer side, send user name `\r` then SNMP-1000 will response user name `\n\n` and request for entering password: .

Host computer sends:

`"advantech\r"`

SNMP-1000 responses:

`"advantech\n\n Enter Password: "`

5. On host computer side send password `\r` then SNMP-1000 will response password `\n\n\n` and main menu.

EX.

Host computer side sends:

`"admin\r"`

SNMP-1000 responses:

`"*****\n\n`

```
+=====+
|                [ SNMP Agent Configuration Utility Main Menu ]                |
+=====+
 1. Agent Configuration
 2. Remote Control
 3. Restart Agent
 4. Reset Configuration To Default
 5. Access Agent Command
 0. Exit
```

Please Enter Your Choice => "

6. On host computer side send `5\r` then SNMP-1000 responses `5\n\n` and SNMP-1000 will enter pass through command mode.

Host computer side sends

`"5\r"`

SNMP-1000 responses

"5\n"

Command :"

Now you've entered pass through command mode and SNMP-1000 is ready to receive command.

4.3 Syntax of command and response

The format of command and response is shown as follows:

- Write command: **w!!&xxx**
- Read command: **r!!&**
- Response: **[repeat received command]\n Response: xxx\n Command:**

w : write command

r : read command

!!: device code

&: device sub-code

xxx: value in ASCII code, it could be "Done" or "Invalid" in the response from SNMP-1000.

Examples:

1. Write low limit of Fan 0 to "1000" rpm

EX.

Host computer side sends

"w1011000\r"

SNMP-1000: responses

"w1011000\n Response: Done\n Command:"

1. Read low limit of Fan 0

EX.

Host computer side sends

"r101\r"

SNMP-1000: responses

"r101\n Response: 1000\n Command:"

3. If input command is incorrect then SNMP-1000 will response invalid message.

EX.

Host computer side sends

"r905\r"

Here the sub-device code is over range.

SNMP-1000: response

"r905\n Response: Invalid\n Command:"

4.4 List of Device Code and Device Sub-Code

| Device Code | | | | | | | | | |
|-------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Code | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| Device | Fan 0 | Fan 1 | Fan 2 | Fan 3 | Fan 4 | Fan 5 | Fan 6 | Fan 7 | Fan 8 |
| | | | | | | | | | |
| Code | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 |
| Device | Temp.0 | Temp.1 | Temp.2 | Temp.3 | Temp.4 | Temp.5 | Temp.6 | Temp.7 | Temp.8 |
| | | | | | | | | | |
| Code | 30 | 31 | 32 | 33 | 34 | 35 | | | |
| Device | 3.3 V | 5 V | -5 V | 5 Vsb | 12 V | -12 V | | | |

| | | | | | | | | | |
|--------|-------------|-------------|-----------|---------|------|------|-------|------|----|
| Code | 40 | 41 | | | | | | | |
| Device | CPU Fan1 | CPU Fan2 | | | | | | | |
| Code | 50 | | 51 | | | | | | |
| Device | CPU Temp 1 | | CPU Temp2 | | | | | | |
| Code | 60 | | 61 | | 62 | 63 | 64 | 65 | 66 |
| Device | CPU 1 Vcore | CPU 2 Vcore | VI/O | 5 V | -5 V | 12 V | -12 V | | |
| Code | 70 | 71 | 72 | 73 | | | | | |
| Device | Power 0 | Power 1 | Power 2 | Power 3 | | | | | |
| Code | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | |
| Device | DI 0 | DI 1 | DI 2 | DI 3 | DI 4 | DI 5 | DI 6 | DI 7 | |
| Code | 90 | | | | | | | | |
| Device | WDT | | | | | | | | |

| | Device Sub-Code | | | | | | |
|-------------|-----------------|------------------|-------------------|----------------|-----------------|------------------|---------------|
| Device Code | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Fan | Low Limit | Alarm Level | Event Out | Current Speed | | | |
| Temp. | High Limit | High Alarm Level | High Event Output | Low Limit | Low Alarm Level | Low Event Output | Current Temp. |
| Voltage | High Limit | Low Limit | Alarm Level | Event Out | Current Voltage | | |
| Power | Normal Level | Alarm Level | Event Output | Current Status | | | |
| DI | Normal Level | Alarm Level | Event Output | Current Status | | | |
| WDT | Alarm Level | Event Output | Current Status | | | | |

4.5 Summary of Command Set

4.5.1 Fan

Read

| Command | Device | Device Code | Device Sub-Item | Device Sub-Code |
|---------|--------|-------------|-----------------|-----------------|
| r101 | Fan 0 | 10 | Low Limit | 1 |
| r111 | Fan 1 | 11 | | |
| ~ | ~ | ~ | | |
| r181 | Fan 8 | 18 | | |
| r102 | Fan 0 | 10 | Alarm Level | 2 |
| r112 | Fan 1 | 11 | | |
| ~ | ~ | ~ | | |
| r182 | Fan 8 | 18 | | |
| r103 | Fan 0 | 10 | Event Output | 3 |
| r113 | Fan 1 | 11 | | |
| ~ | ~ | ~ | | |
| r183 | Fan 8 | 18 | | |
| r104 | Fan 0 | 10 | Current Speed | 4 |
| r114 | Fan 1 | 11 | | |
| ~ | ~ | ~ | | |
| r184 | Fan 8 | 18 | | |

Write

| Command | Device | Device Code | Device Sub-Item | Device Sub-Code | Value (xxxx) | Remark |
|----------|--------|-------------|-----------------|-----------------|--------------|-------------------|
| w101xxxx | Fan 0 | 10 | Low Limit | 1 | 1000~9999 | RPM in ASCII code |
| w111xxxx | Fan 1 | 11 | | | | |
| ~ | ~ | ~ | | | | |
| w181xxxx | Fan 8 | 18 | | | | |
| w102x | Fan 0 | 10 | Alarm Level | 2 | 1 | Not used |
| w112x | Fan 1 | 11 | | | 2 | No Alarm |
| ~ | ~ | ~ | | | 3 | Critical |
| w172x | Fan 7 | 17 | | | 4 | Major |
| w182x | Fan 8 | 18 | | | 5 | Minor |
| ~ | ~ | ~ | | | ~ | ~ |
| w103x | Fan 0 | 10 | Event Output | 3 | 1 | None |
| w113x | Fan 1 | 11 | | | 2 | Power Off |
| ~ | ~ | ~ | | | 3 | DO 0 |
| w163x | Fan 6 | 16 | | | 4 | DO 1 |

| | | | | | | |
|-------|-------|----|--|--|---|------|
| w173x | Fan 7 | 17 | | | 5 | DO 2 |
| w183x | Fan 8 | 18 | | | 6 | DO 3 |

4.5.2 Temperature

Read

| Command | Device | Device Code | Device Sub-Item | Device Sub-Code |
|---------|---------|-------------|-------------------|-----------------|
| r201 | Temp. 0 | 20 | High Limit | 1 |
| r211 | Temp. 1 | 21 | | |
| ~ | ~ | ~ | | |
| r281 | Temp. 8 | 28 | | |
| r202 | Temp. 0 | 20 | High Alarm Level | 2 |
| r212 | Temp. 1 | 21 | | |
| ~ | ~ | ~ | | |
| r282 | Temp. 8 | 28 | | |
| r203 | Temp. 0 | 20 | High Event Output | 3 |
| r213 | Temp. 1 | 21 | | |
| ~ | ~ | ~ | | |
| r283 | Temp. 8 | 28 | | |
| r204 | Temp. 0 | 20 | Low Limit | 4 |
| r214 | Temp. 1 | 21 | | |
| ~ | ~ | ~ | | |
| r284 | Temp. 8 | 28 | | |
| r205 | Temp. 0 | 20 | Low Alarm Level | 5 |
| r215 | Temp. 1 | 21 | | |
| ~ | ~ | ~ | | |
| r285 | Temp. 8 | 28 | | |
| r206 | Temp. 0 | 20 | Low Event Output | 6 |
| r216 | Temp. 1 | 21 | | |
| ~ | ~ | ~ | | |
| r286 | Temp. 8 | 28 | | |
| r207 | Temp. 0 | 20 | Current Temp. | 7 |
| r217 | Temp. 1 | 21 | | |
| ~ | ~ | ~ | | |
| r287 | Temp. 8 | 28 | | |

Write

| Command | Device | Device Code | Device Sub-Item | Device Sub-Code | Value (xxxx) | Remark |
|-----------|------------|-------------|-------------------|-----------------|--|--|
| w201xxxxx | Temp. 0 | 20 | High Limit | 1 | -55~125 (°C) or -67 ~ 257 (°F) | Temperature value in ASCII, degree C or F depends on system setting, max. 5 characters, incl. "-", "." |
| w211xxxxx | Temp. 1 | 21 | | | | |
| ~ | ~ | ~ | | | | |
| w281xxxxx | Temp. 8 | 28 | | | | |
| w202x | Temp. 0 | 20 | High Alarm Level | 2 | 1 | Not used |
| w212x | Temp. 1 | 21 | | | 2 | No Alarm |
| ~ | ~ | ~ | | | 3 | Critical |
| w272x | Temp. 7 | 27 | | | 4 | Major |
| w282x | Temp. 8 | 28 | | | 5 | Minor |
| w203x | Temp. 0 | 20 | High Event Output | 3 | 1 | None |
| w213x | Temp. 1 | 21 | | | 2 | Power Off |
| ~ | ~ | ~ | | | 3 | DO 0 |
| w263x | Temp. 6 | 26 | | | 4 | DO 1 |
| w273x | Temp. 7 | 27 | | | 5 | DO 2 |
| w283x | Temp. 8 | 28 | | | 6 | DO 3 |
| w204xxxxx | Temp. 0 | 20 | Low Limit | 4 | -55~125 (°C) or -67 ~ 257 (°F) | Temperature value in ASCII, degree C or F depends on system setting, max. 5 characters, incl. "-", "." |
| w214xxxxx | Temp. 1 | 21 | | | | |
| ~ | ~ | ~ | | | | |
| w284xxxxx | Temp. 8 | 28 | | | | |

| | | | | | | |
|-------|------------|----|---------------------|---|---|-----------|
| w205x | Temp. 0 | 20 | Low Alarm Level | 5 | 1 | Not used |
| w215x | Temp. 1 | 21 | | | 2 | No Alarm |
| ~ | ~ | ~ | | | 3 | Critical |
| w275x | Temp. 7 | 27 | | | 4 | Major |
| w285x | Temp. 8 | 28 | | | 5 | Minor |
| w206x | Temp. 0 | 20 | Low Event Output | 6 | 1 | None |
| w216x | Temp. 1 | 21 | | | 2 | Power Off |
| ~ | ~ | ~ | | | 3 | DO 0 |
| w266x | Temp. 6 | 26 | | | 4 | DO 1 |
| w276x | Temp. 7 | 27 | | | 5 | DO 2 |
| w286x | Temp. 8 | 28 | | | 6 | DO 3 |

4.5.3 Voltage

Read

| Command | Device | Device Code | Device Sub-Item | Device Sub-Code |
|---------|--------|-------------|-----------------|-----------------|
| r301 | 3.3V | 30 | High Limit | 1 |
| r311 | 5V | 31 | | |
| r321 | -5V | 32 | | |
| r331 | 5VSB | 33 | | |
| r341 | 12V | 34 | | |
| r351 | -12V | 35 | | |
| r302 | 3.3V | 30 | Low Limit | 2 |
| r312 | 5V | 31 | | |
| r322 | -5V | 32 | | |
| r332 | 5VSB | 33 | | |
| r342 | 12V | 34 | | |
| r352 | -12V | 35 | | |

| | | | | |
|------|------|----|-----------------|---|
| r303 | 3.3V | 30 | Alarm Level | 3 |
| r313 | 5V | 31 | | |
| r323 | -5V | 32 | | |
| r333 | 5VSB | 33 | | |
| r343 | 12V | 34 | | |
| r353 | -12V | 35 | | |
| r304 | 3.3V | 30 | Event Output | 4 |
| r314 | 5V | 31 | | |
| r324 | -5V | 32 | | |
| r334 | 5VSB | 33 | | |
| r344 | 12V | 34 | | |
| r354 | -12V | 35 | | |
| r305 | 3.3V | 30 | Current Voltage | 5 |
| r315 | 5V | 31 | | |
| r325 | -5V | 32 | | |
| r335 | 5VSB | 33 | | |
| r345 | 12V | 34 | | |
| r355 | -12V | 35 | | |

Write

| Command | Device | Device Code | Device Sub-Item | Device Sub-Code | Value (xxxx) | Remark |
|------------|--------|-------------|-----------------|-----------------|----------------|--|
| w301xxxxxx | 3.3V | 30 | High Limit | 1 | -15.0 ~15.0 | Voltage value in ASCII code, max. 6 characters, incl. "-", "." ex.: 0 3.53 -12.55 -13 |
| w311xxxxxx | 5V | 31 | | | | |
| w321xxxxxx | -5V | 32 | | | | |
| w331xxxxxx | 5VSB | 33 | | | | |
| w341xxxxxx | 12V | 34 | | | | |
| w351xxxxxx | -12V | 35 | | | | |
| w302xxxxxx | 3.3V | 30 | Low Limit | 2 | -15.0 ~15.0 | |
| w312xxxxxx | 5V | 31 | | | | |
| w322xxxxxx | -5V | 32 | | | | |
| w332xxxxxx | 5VSB | 33 | | | | |
| w342xxxxxx | 12V | 34 | | | | |
| w352xxxxxx | -12V | 35 | | | | |
| w303x | 3.3V | 30 | Alarm Level | 3 | 1 | Not used |
| w313x | 5V | 31 | | | 2 | No Alarm |
| w323x | -5V | 32 | | | 3 | Critical |
| w333x | 5VSB | 33 | | | | |
| w343x | 12V | 34 | | | | |

| | | | | | | |
|-------|------|----|-----------------|---|---|-----------|
| w353x | -12V | 35 | | | 4 | Major |
| w304x | 3.3V | 30 | | | 5 | Minor |
| w314x | 5V | 31 | Event Output | 4 | 1 | None |
| w324x | -5V | 32 | | | 2 | Power Off |
| w334x | 5Vsb | 33 | | | 3 | DO 0 |
| w344x | 12V | 34 | | | 4 | DO 1 |
| w354x | -12V | 35 | | | 5 | DO 2 |
| | | | | | 6 | DO 3 |

4.5.4 CPU Card

Read (Fan)

| Command | Device | Device Code | Device Sub-Item | Device Sub-Code |
|---------|--------|-------------|-----------------|-----------------|
| r401 | CPU 1 | 40 | Low Limit | 1 |
| r411 | CPU 2 | 41 | | |
| r402 | CPU 1 | 40 | Alarm Level | 2 |
| r412 | CPU 2 | 41 | | |
| r403 | CPU 1 | 40 | Event Output | 3 |
| r413 | CPU 2 | 41 | | |
| r404 | CPU 1 | 40 | Current Speed | 4 |
| r414 | CPU 2 | 41 | | |

Read (Temp.)

| Command | Device | Device Code | Device Sub-Item | Device Sub-Code |
|---------|--------|-------------|-------------------|-----------------|
| r501 | CPU 1 | 50 | High Limit | 1 |
| r511 | CPU 2 | 51 | | |
| r502 | CPU 1 | 50 | High Alarm Level | 2 |
| r512 | CPU 2 | 51 | | |
| r503 | CPU 1 | 50 | High Event Output | 3 |
| r513 | CPU 2 | 51 | | |
| r504 | CPU 1 | 50 | Low Limit | 4 |
| r514 | CPU 2 | 51 | | |
| r505 | CPU 1 | 50 | Low Alarm Level | 5 |
| r515 | CPU 2 | 51 | | |
| r506 | CPU 1 | 50 | | 6 |

| | | | | |
|------|-------|----|------------------|---|
| r516 | CPU 2 | 51 | Low Event Output | |
| r507 | CPU 1 | 50 | Current Temp. | 7 |
| r517 | CPU 2 | 51 | | |

Read (Voltage)

| Command | Device | Device Code | Device Sub-Item | Device Sub-Code |
|---------|---------------|-------------|-----------------|-----------------|
| r601 | CPU 1 Vcore | 60 | High Limit | 1 |
| r611 | CPU 2 Vcore | 61 | | |
| r621 | CPU VI/O | 62 | | |
| r631 | CPU card +5V | 63 | | |
| r641 | CPU card -5V | 64 | | |
| r651 | CPU card +12V | 65 | | |
| r661 | CPU card -12V | 66 | | |
| r602 | CPU 1 Vcore | 60 | Low Limit | 2 |
| r612 | CPU 2 Vcore | 61 | | |
| r622 | CPU VI/O | 62 | | |
| r632 | CPU card +5V | 63 | | |
| r642 | CPU card -5V | 64 | | |
| r652 | CPU card +12V | 65 | | |
| r662 | CPU card -12V | 66 | | |
| r603 | CPU 1 Vcore | 60 | Alarm Level | 3 |
| r613 | CPU 2 Vcore | 61 | | |
| r623 | CPU VI/O | 62 | | |
| r633 | CPU card +5V | 63 | | |
| r643 | CPU card -5V | 64 | | |
| r653 | CPU card +12V | 65 | | |
| r663 | CPU card -12V | 66 | | |
| r604 | CPU 1 Vcore | 60 | Event Output | 4 |
| r614 | CPU 2 Vcore | 61 | | |
| r624 | CPU VI/O | 62 | | |
| r634 | CPU card +5V | 63 | | |
| r644 | CPU card -5V | 64 | | |
| r654 | CPU card +12V | 65 | | |

| | | | | |
|------|---------------|----|-----------------|---|
| r664 | CPU card -12V | 66 | Current Voltage | 5 |
| r605 | CPU 1 Vcore | 60 | | |
| r615 | CPU 2 Vcore | 61 | | |
| r625 | CPU VI/O | 62 | | |
| r635 | CPU card +5V | 63 | | |
| r645 | CPU card -5V | 64 | | |
| r655 | CPU card +12V | 65 | | |
| r665 | CPU card -12V | 66 | | |

Write (Fan)

| Command | Device | Device Code | Device Sub-Item | Device Sub-Code | Value (xxxx) | Remark |
|----------|--------|-------------|-----------------|-----------------|--------------|--------------|
| w401xxxx | CPU 1 | 40 | Low Limit | 1 | 1000~9999 | RPM in ASCII |
| w411xxxx | CPU 2 | 41 | | | | |
| w402x | CPU 1 | 40 | Alarm Level | 2 | 1 | Not used |
| | | | | | 2 | No Alarm |
| w412x | CPU 2 | 41 | | | 3 | Critical |
| | | | | | 4 | Major |
| | | | | | 5 | Minor |
| w403x | CPU 1 | 40 | Event Output | 3 | 1 | None |
| | | | | | 2 | Power Off |
| | | | | | 3 | DO 0 |
| w413x | CPU 2 | 41 | | | 4 | DO 1 |
| | | | | | 5 | DO 2 |
| | | | | | 6 | DO 3 |

Write (Temp.)

| Command | Device | Device Code | Device Sub-Item | Device Sub-Code | Value (xxxx) | Remark |
|-----------|--------|-------------|-----------------|-----------------|--------------|--------|
| w501xxxxx | CPU 1 | 50 | High Limit | 1 | | |

| | | | | | | |
|-----------|-------|----|-------------------------|---|--|---|
| w511xxxxx | CPU 2 | 51 | | | -55~125 (°C) or -67 ~ 257 (°F) | |
| w502x | CPU 1 | 50 | High Alarm Level | 2 | 1 | Not used |
| | | | | | 2 | No Alarm |
| w512x | CPU 2 | 51 | | | 3 | Critical |
| | | | | | 4 | Major |
| | | | | | 5 | Minor |
| w503x | CPU 1 | 50 | High Event Output | 3 | 1 | None |
| | | | | | 2 | Power Off |
| w513x | CPU 2 | 51 | | | 3 | DO 0 |
| | | | | | 4 | DO 1 |
| | | | | | 5 | DO 2 |
| | | | | | 6 | DO 3 |
| w504xxxxx | CPU 1 | 50 | Low Limit | 4 | -55~125 (°C) or -67 ~ 257 (°F) | Temperature value in ASCII, degree C or F depends on system setting max. 5 characters, incl. "-", "." |
| w514xxxxx | CPU 2 | 51 | | | | |
| w505x | CPU 1 | 50 | Low Alarm Level | 5 | 1 | Not used |
| | | | | | 2 | No Alarm |
| w515x | CPU 2 | 51 | | | 3 | Critical |
| | | | | | 4 | Major |
| | | | | | 5 | Minor |
| w506x | CPU 1 | 50 | High Event Output | 6 | 1 | None |
| | | | | | 2 | Power Off |
| w516x | CPU 2 | 51 | | | 3 | DO 0 |
| | | | | | 4 | DO 1 |
| | | | | | 5 | DO 2 |
| | | | | | 6 | DO 3 |

Write (Voltage)

| Command | Device | Device Code | Device Sub-Item | Device Sub-Code | Value (xxxx) | Remark |
|------------|---------------------|-------------|-----------------|-----------------|--------------|--|
| w601xxxxxx | CPU 1 Vcore | 60 | High Limit | 1 | -15 ~ 15 | Voltage value in ASCII code, max. 6 characters, incl. "-", "." |
| w611xxxxxx | CPU 2 Vcore | 61 | | | | |
| w621xxxxxx | CPU VI/O | 62 | | | | |
| w631xxxxxx | CPU card +5V | 63 | | | | |
| w641xxxxxx | CPU card -5V | 64 | | | | |
| w651xxxxxx | CPU card +12V | 65 | | | | |
| w661xxxxxx | CPU card -12V | 66 | | | | |
| w602xxxxxx | CPU 1 Vcore | 60 | Low Limit | 2 | | |
| w612xxxxxx | CPU 2 Vcore | 61 | | | | |
| w622xxxxxx | CPU VI/O | 62 | | | | |
| w632xxxxxx | CPU card +5V | 63 | | | | |
| w642xxxxxx | CPU card -5V | 64 | | | | |
| w652xxxxxx | CPU card +12V | 65 | | | | |
| w662xxxxxx | -12V | 66 | | | | |
| w603x | CPU 1 Vcore | 60 | Alarm Level | 3 | 1 | Not used |

| | | | | | | |
|-------|---------------------|----|-----------------|---|---|-----------|
| w613x | CPU 2 Vcore | 61 | | | 2 | No Alarm |
| w623x | CPU VI/O | | | | 3 | Critical |
| w633x | CPU card +5V | | | | | |
| w643x | CPU card -5V | | | | | |
| w653x | CPU card +12V | 65 | | | 4 | Major |
| w663x | CPU card -12V | 66 | | | 5 | Minor |
| w604x | CPU 1 Vcore | 60 | Event Output | 4 | 1 | None |
| w614x | CPU 2 Vcore | 61 | | | 2 | Power Off |
| w624x | CPU VI/O | 62 | | | 3 | DO 0 |
| w634x | CPU card +5V | 63 | | | 4 | DO 1 |
| w644x | CPU card -5V | 64 | | | 5 | DO 2 |
| w654x | CPU card +12V | 65 | | | 6 | DO 3 |
| w664x | CPU card -12V | 66 | | | | |

4.5.5 Power Read

| Command | Device | Device Code | Device Sub-Item | Device Sub-Code |
|---------|---------|-------------|-----------------|-----------------|
| r701 | Power 1 | 70 | Normal Level | 1 |
| r711 | Power 2 | 71 | | |
| r721 | Power 3 | 72 | | |
| r731 | Power 4 | 73 | | |
| r702 | Power 1 | 70 | Alarm Level | 2 |
| r712 | Power 2 | 71 | | |
| r722 | Power 3 | 72 | | |
| r732 | Power 4 | 73 | | |
| r703 | Power 1 | 70 | Event Output | 3 |
| r713 | Power 2 | 71 | | |
| r723 | Power 3 | 72 | | |
| r733 | Power 4 | 73 | | |
| r704 | Power 1 | 70 | Current Status | 4 |
| r714 | Power 2 | 71 | | |
| r724 | Power 3 | 72 | | |
| r734 | Power 4 | 73 | | |

Write

| Command | Device | Device Code | Device Sub-Item | Device Sub-Code | Value (x) | Remark |
|---------|---------|-------------|-----------------|-----------------|-----------|----------|
| w701x | Power 1 | 70 | Normal Level | 1 | 1 | High |
| w711x | Power 2 | 71 | | | 2 | Low |
| w721x | Power 3 | 72 | | | | |
| w731x | Power 4 | 73 | | | | |
| w702x | Power 1 | 70 | Alarm Level | 2 | 1 | Not used |
| w712x | Power 2 | 71 | | | 2 | No Alarm |
| w722x | Power 3 | 72 | | | 3 | Critical |
| w732x | Power 4 | 73 | | | 4 | Major |
| | | | | | 5 | Minor |
| w703x | Power 1 | 70 | Event Output | 3 | 1 | None |
| w713x | Power 2 | 71 | | | 2 | DO 0 |
| w723x | Power 3 | 72 | | | 3 | DO 1 |
| w733x | Power 4 | 73 | | | 4 | DO 2 |
| | | | | | 5 | DO 3 |

4.5.6 Digital Input

Read

| Command | Device | Device Code | Device Sub-Item | Device Sub-Code |
|---------|--------|-------------|-----------------|-----------------|
| r801 | DI 1 | 80 | Normal Level | 1 |
| r811 | DI 2 | 81 | | |
| ~ | ~ | ~ | | |
| r871 | DI 7 | 87 | | |
| r802 | DI 1 | 80 | Alarm Level | 2 |
| r812 | DI 2 | 81 | | |
| ~ | ~ | ~ | | |
| r872 | DI 7 | 87 | | |
| r803 | DI 1 | 80 | Event Output | 3 |
| r813 | DI 2 | 81 | | |
| ~ | ~ | ~ | | |
| r873 | DI 7 | 87 | | |
| r804 | DI 1 | 80 | Current Status | 4 |
| r814 | DI 2 | 81 | | |
| ~ | ~ | ~ | | |
| r874 | DI 7 | 87 | | |

Write

| Command | Device | Device Code | Device Sub-Item | Device Sub-Code | Value (x) | Remark |
|---------|--------|-------------|-----------------|-----------------|-----------|-----------|
| w801x | DI 1 | 80 | Normal Level | 1 | 1 | High |
| w811x | DI 2 | 81 | | | 2 | Low |
| ~ | ~ | ~ | | | | |
| w871x | DI 7 | 87 | | | | |
| w802x | DI 1 | 80 | Alarm Level | 2 | 1 | Not used |
| w812x | DI 2 | 81 | | | 2 | No Alarm |
| ~ | ~ | ~ | | | 3 | Critical |
| w862x | DI 6 | 86 | | | 4 | Major |
| w872x | DI 7 | 87 | | | 5 | Minor |
| | | | | | | |
| w803x | DI 1 | 80 | Event Output | 3 | 1 | None |
| w813x | DI 2 | 81 | | | 2 | Reset |
| ~ | ~ | ~ | | | 3 | Power Off |
| w843x | DI 4 | 84 | | | 4 | DO 0 |
| w853x | DI 5 | 85 | | | 5 | DO 1 |
| | | | | | | |

| | | | | | | |
|-------|------|----|--|--|---|------|
| w863x | DI 6 | 86 | | | 6 | DO 2 |
| w873x | DI 7 | 87 | | | 7 | DO 3 |

A

Connector Pin Assignments

A.1 External Buzzer (J1)

| Pin | Signal |
|-----|-----------------|
| 1 | Buzzer |
| 2 | V _{CC} |

A.2 10/100-BaseT LAN Connector (CN2 & CN5)

| Pin | Signal | Pin | Signal |
|-----|------------------------|-----|----------|
| 1 | SPLLED (LAN speed LED) | 2 | TERMPANE |
| 3 | RX+ | 4 | RX- |
| 5 | GND | 6 | GND |
| 7 | TX+ | 8 | TX- |
| 9 | LILED (LAN link LED) | 10 | TERMPANE |

A.3 RS-232 Serial Port (CN8 & CN9)

| Pin | Signal | Pin | Signal |
|-----|--------|-----|--------|
| 1 | DCD | 2 | RX |
| 3 | TX | 4 | DTR |
| 5 | GND | 6 | DSR |
| 7 | RTS | 8 | CTS |
| 9 | RI | 10 | NC |

A.4 Kernel Module Interface (CN11)

| Pin | Signal | Pin | Signal |
|-----|------------------------|-----|--------|
| 1 | SIN | 2 | SOUT |
| 3 | CTS# | 4 | DCD# |
| 5 | RTS# | 6 | DTR# |
| 7 | DSR# | 8 | ID 0 |
| 9 | ATX ON | 10 | DO 4 |
| 11 | GND | 12 | DO 3 |
| 13 | Watchdog IN | 14 | DO 2 |
| 15 | Watchdog OUT | 16 | DO 1 |
| 17 | SPLLED (LAN speed LED) | 18 | DI 1 |
| 19 | LILED (LAN link LED) | 20 | DI 2 |
| 21 | GND | 22 | DI 3 |
| 23 | TX+ (LAN) | 24 | DI 4 |
| 25 | TX- (LAN) | 26 | DI 5 |
| 27 | RX+ (LAN) | 28 | DI 6 |
| 29 | RX- (LAN) | 30 | DI 7 |
| 31 | TERMPANE | 32 | DI 8 |

A.5 Kernel Module Interface (CN12)

| Pin | Signal | Pin | Signal |
|-----|--------------|-----|--|
| 1 | Select 1 | 2 | Select 2 |
| 3 | Power Good A | 4 | Power Good B |
| 5 | Power Good C | 6 | Power Good D |
| 7 | Alarm LED | 8 | FAN 1 |
| 9 | GND | 10 | FAN 2 |
| 11 | GND | 12 | FAN 3 |
| 13 | VCC | 14 | FAN 4 |
| 15 | VCC | 16 | FAN 5 |
| 17 | VCC | 18 | FAN 6 |
| 19 | BEEP | 20 | FAN 7 |
| 21 | 5VSB | 22 | FAN 8 |
| 23 | -5V | 24 | FAN 9 |
| 25 | +5V | 26 | B_SCLK (Clock of I ² C bus to system) |
| 27 | +3.3V | 28 | B_SDAT (Data of I ² C bus to system) |
| 29 | -12V | 30 | T_SCLK (Clock of I ² C bus to sensor) |
| 31 | +12V | 32 | T_SDAT (Data of I ² C bus to sensor) |

A.6 Backplane Connector (CN16 on MIC-3924 carrier, and CN7 on MIC-3924 interface backplane)

| Pin | Signal | Pin | Signal |
|-----|----------|-----|---------------|
| 1 | +5V | 2 | +5V |
| 3 | +5V | 4 | NC |
| 5 | +5V | 6 | +3.3V |
| 7 | FAN1 | 8 | NC |
| 9 | FAN2 | 10 | -12V |
| 11 | FAN3 | 12 | NC |
| 13 | FAN4 | 14 | +12V |
| 15 | +5VSB | 16 | NC |
| 17 | NC | 18 | LM75_SDA |
| 19 | WDG_IN | 20 | LM75_SCL |
| 21 | IPMB_SCL | 22 | POWER_ATX_ON# |
| 23 | IPMB_SDA | 24 | WDG_OUT |
| 25 | GND | 26 | GND |

A.7 SW_ATX_ON (CN3 on MIC-3924 carrier and CN6 on MIC-3924 interface backplane)

| Pin | Signal |
|-----|------------|
| 1 | SW_ATX_ON# |
| 2 | GND |

A.8 Digital Input (CN14)

| Pin | Signal | Pin | Signal |
|-----|--------|-----|--------|
| 1 | DI 1 | 2 | GND |
| 3 | DI 2 | 4 | GND |
| 5 | DI 3 | 6 | GND |
| 7 | DI 4 | 8 | GND |
| 9 | DI 5 | 10 | GND |
| 11 | DI 6 | 12 | GND |
| 13 | DI 7 | 14 | GND |
| 15 | DI 8 | 16 | GND |

A.9 Digital Output (CN15)

| Pin | Signal | Pin | Signal |
|-----|--------|-----|--------|
| 1 | DO 1 | 2 | GND |
| 3 | DO 2 | 4 | GND |
| 5 | DO 3 | 6 | GND |
| 7 | DO 4 | 8 | GND |

A.10 LED Connector (CN1 on MIC-3924 carrier and CN3 on MIC-3924 interface backplane)

| Pin | Signal | Pin | Signal |
|-----|-----------------|-----|---------------|
| 1 | +3.3V | 2 | FAN_ALARM |
| 3 | +5V | 4 | THERMAL_ALARM |
| 5 | REDUNDANT_ALARM | 6 | GND |
| 7 | GND | 8 | NC |

A.11 Power Fail Signal Input (CN6/CN7/CN3/CN10 on MIC-3924 carrier, and CN1/CN2/CN4/CN5 on MIC-3924 interface backplane)

| | Pin | Signal | Pin | Signal |
|------|-----|--------------|-----|--------|
| CN21 | 1 | Power Good A | 2 | GND |
| CN22 | 1 | Power Good B | 2 | GND |
| CN23 | 1 | Power Good C | 2 | GND |
| CN24 | 1 | Power Good D | 2 | GND |

A.12 Interface Connector (J1 on MIC - 3924 interface backplane)

| Pin | Signal | Pin | Signal |
|-----|-----------------|-----|---------------|
| 1 | GND | 2 | GND |
| 3 | GND | 4 | GND |
| 5 | GND | 6 | NC |
| 7 | PG_A | 8 | POWER_STATE |
| 9 | PG_B | 10 | POWER_ATX_ON# |
| 11 | PG_C | 12 | NC |
| 13 | PG_D | 14 | NC |
| 15 | FAN1 | 16 | +3.3V |
| 17 | FAN2 | 18 | NC |
| 19 | FAN3 | 20 | -12V |
| 21 | FAN4 | 22 | NC |
| 23 | LM75_SDA | 24 | +12V |
| 25 | LM75_SCL | 26 | NC |
| 27 | IPMB_SCL | 28 | +5V |
| 29 | IPMB_SDA | 30 | +5V |
| 31 | REDUNDANT_ALARM | 32 | +5V |
| 33 | THERMAL_ALARM | 34 | +5V |
| 35 | FAN_ALARM | 36 | +5VSB |
| 37 | WDG_OUT | 38 | NC |
| 39 | WDG_IN | 40 | GND |
| 41 | RELAYS_STATE | 42 | GND |
| 43 | SW_ATX_ON# | 44 | GND |