PIKKERTON

LabCon

SNMP Trap Documentation

1 History

DVers.:	Date	Modified by	Changes	State
01	20.07.2015	PI-FG	Born	Release
02	22.09.2015	PI-FG	Update of alarm codes (chapter 7)	Release

2 Table of Contents

3 Legal

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4 Definition of Symbols

The attention symbol refers to actions, which can cause damage to material or equipment.

The notice indicates necessary conditions for error-free operation. It picks out important details, makes the job easier, and gives tips and advice on the optimal use of hardware and software.

5 General Information

The **Engine-ID** (structure): Enterprise-ID (4 Bytes) + FORMAT-Byte + ZBG-MAC-Bytes (6 Bytes)

The **Format-Byte:** is **03 (HEX)** always, which means that the MAC address bytes will follow

The **Enterprise ID**: first bit (MSB if big endian) is "1" for SNMPv3, "0" for SNMPv1/2. The SNMP engine ID is not relevant for security when using SNMP v1/2, therefore this bit has been tied to "1". The enterprise OID for pikkerton is: **5c2c (HEX) = 23595 (DEZ)**

Example for the engine ID:
A ZBG device with MAC: F0:AD:4E:00:C1:17 owns following SNMP Engine ID:
80005C2C03F0AD4E00C117

6 Basic Trap Types

There are three basic types of SNMP trap messages existing:

- ➔ **Cold-start-Trap (OID: 1.3.6.1.4.1.23596.51.100)**: is sent once during application start, indicates that LabCon service has started (OctetString-VB-content: „SNMP Agent Ready")

- ➔ **Warm-start-Traps (OID: 1.3.6.1.4.1.23596.51.101)**: trap messages which indicate configuration changes of the LabCon SNMP agent

- ➔ **Enterprise-Specific Traps (OID: 1.3.6.1.4.1.23596.51.102)**: trap messages which hold specific information, e.g. about existing alarm situations

All informational variable bindings (VB) must be assigned to the OIDs of the associated MIB objects. If no appropriate MIB object exists for an event/alarm, the following standard OID is used: **1.3.6.1.4.1.23596.50.1.10.1**, respectively:
(iso.org.dod.internet.private.enterprises.pikkerton.pikZbs.zbsAdmin.zbsLogging.zbsTrapInformation).

6.1 Warm-Start Traps

All warm-start traps contain one VB of type 'OctetString' which holds the relevant trap information as plaintext (see following overview):

Content of octet-string	Meaning
SNMP Version change request to: SnmpV …	Agent's SNMP version has been changed to …
SNMP Trap Version change request to: SnmpV …	Agent's SNMP trap version has been changed to …
Trap Target Installed	Indicates successful update of the new trap target IP address to the new trap destination
Trap Target(s) Update: *"IP" / "List of IPs"*	Indicates new trap target address(es) as *"IP"/"List of IPs"* to the old trap destination
SNMP Read Community change request to: …	Read Community has been changed to …
SNMP Write Community change request to: …	Write Community has been changed to …
SNMP Trap Community change request to: …	Trap Community has been changed to …
"Devicetype" –device (MAC/ID: *"MAC"*) online!	Indicates that a device of type *"Devicetype"* owning ID/MAC *"MAC"* is reachable via SNMP now
"Devicetype" –device (MAC/ID: *"MAC"*) offline!	Indicates that a device of type *"Devicetype"* owning ID/MAC *"MAC"* is not reachable via SNMP anymore
"Devicetype" –device (MAC/ID: *"MAC"*) refreshed!	Indicates that the parameters of a device of type *"Devicetype"* which owns ID/MAC *"MAC"* have been updated
Parameter "Param" removed from *"Devicetype"* –device with MAC/: *"MAC"*	Indicates that the parameter "Param" has been removed from device with ID/MAC "MAC" (parameter is not available via SNMP anymore)
Parameters removed : „list of parameters"	Shows the list of parameters which have been removed from MIB successfully (parameters are not available via SNMP anymore)
Remove Parameter Fail @: „list of parameters"	Shows the list of parameters which failed to be removed from MIB
All ZBS devices offline!	Indicates that all ZBS devices have been removed from MIB (devices are not available via SNMP anymore)
All virtual devices offline!	Indicates that all virtual devices have been removed from MIB (devices are not available via SNMP anymore)
All devices offline, MIB cleared!	Indicates that all devices have been removed from MIB (no devices are available via SNMP)
CSV Push Destination: "IP/Url" Installed	Indicates that the destination IP address for CSV-Push data has been changed to "IP/Url"
CSV Push Port: "Port" Installed	Indicates that the TCP port number for CSV-Push data has been changed to "Port"
CSV Push Interval changed to "Time" seconds	Indicates that the interval wherein CSV-Push data will be sent, has been changed to "Time" seconds

MQTT Publish Interval changed to “Time” seconds	Indicates that the interval wherein MQTT data will be published, has been changed to “Time“ seconds
System Ready after Restart	Indicates that LabCon and its SNMP agent are ready again after re-initialization
System Reboot ...	Indicates that ZBG gateway is going to reboot its OS

6.2 Enterprise-Specific Traps

All enterprise specific traps contain one VB of type ‘OctetString’ which holds the relevant trap information as plaintext. The ‚OctetString‘-VB gets the OID of the MIB object where the appropriate alarm/ event is associated to. If no related MIB object exists, the standard OID will be used (1.3.6.1.4.1.23596.50.1.10.1). The data string itself contains a set of informations, which are separated by double bars:

„Code“ – unique alarm code, which identifies the type of alrm/event of the appropriate ZBS devices or virtual devices (see following chapter 7 for details)

„Alarm Type“ – textual description of the alarm, with regard to the appropriate alarm code

„Alarm Value“ – value of the MIB object which raises the alarm/event

„Alarm Value Type“ – datatype of the value of the MIB object which raises the alarm/event

„Alarm Source“ – device type and MAC address aof alarm/event source

„ID“ – name of the device where the alarm/event has been detected

6.3 Extensions to Manage Enterprise-Specific Traps in LabCon MIB

In addition to the OctetString-VB, a maximum of four additional VBs will be sent, which carry important information from the LabCon MIB. Following informations will be added:

VB 1 (*Integer32*): OID and value of the LabCon MIB object/sensor measurement, which raises the alarm

VB 2 (*Integer32*): OID and value of the exponent dedicated to VB 1

VB 3 (*TimeTicks*): OID and value of the time stamp dedicated to VB 1 (as time interval)

VB 4 (*Integer32*): OID and value of the sensor state dedicated to VB 1

Not all of alarms/events own an integer value and/or exponent (e.g. ‘*MOVE*‘ when movement has been detected). If so, these VBs will be omitted.

7 Alarm Codes

The following table shows all existing alarm codes:

Alarm Code	Meaning
0x000	General Information
0xAA9	Virtual Time Drift Alarm (temporal drift exceeded at a virtual device)
0xAAA	Virtual Sensor Alarm (alarm appeared at a virtual device)
0xAAB	DEV-Message (device specific alarm code, see ICD of device for details)
0xAAC	Function Button (function button has been pressed)
0xAAD	Button Down Alarm (button has been pressed)
0xAAE	Button Up Alarm (button has been released)
0xAAF	Door/Window Alarm (Door/Window openings detected)
0xAB0	Water Contact (contact for water detection opened/closed)
0xAB1	Move Detection (movement detected)
0xAB2	Presence Detection (presence of person detected)
0xD54	Low Battery Alarm (threshold for minimum battery voltage violated)
0xD55	Work Threshold (work threshold violated)
0xD56	Load Threshold (load threshold violated)
0xD57	Temperature Threshold (temperature threshold violated)
0xD58	Temperature Delta (temperature delta threshold violated)
0xD59	Brightness Threshold (brightness threshold violated)
0xD5A	Brightness Delta (brightness delta threshold violated)
0xD5B	Humidity Threshold (humidity threshold violated)
0xD5C	Humidity Delta (humidity delta threshold violated)
0xD5D	Pressure Threshold (pressure threshold violated)
0xD5E	Pressure Delta (pressure delta threshold violated)
0xD5F	CO2 Threshold (carbon dioxide threshold violated)
0xD60	CO2 Delta (carbon dioxide delta threshold violated)

7.1 Prioritization of Alarm Codes

The value of the alarm codes indicate different severity levels and alarm types:

0x000 (0_{dez}) : no priority (no alarm/event, info message)
0x001 (1_{dez}) up to 0x2AB (683_{dez}) : low priority events
0x2AC (684_{dez}) up to 0x555 (1365_{dez}) : low priority alarms
0x556 (1366_{dez}) up to 0x800 (2048_{dez}) : medium priority events
0x801 (2049_{dez}) up to 0xAAA (2730_{dez}) : medium priority alarms
0xAAB (2731_{dez}) up to 0xD54 (3412_{dez}) : high priority events
0xD55 (3413_{dez}) up to 0xFFD (4093_{dez}) : high priority alarms
0xFFE (4094_{dez}), 0xFFF (4095_{dez}) : preserved (currently unused)

8 Trap Example

Let's assume a ZBS-121 device with MAC: 0013A200407C58A7 and name/ID "Heating" raises a temperature alarm because of a measurement value of 41.6°C while a threshold value of 40°C has been configured. The resulting content of the trap's OctetString-VB looks like the following:

"Code: 2736 || Priority: high || AlarmType: Temperature Threshold || Alarm Value: 41.6 || Alarm Value Type: FLOAT || Alarm Source: ZBS-121 (0013A200407C58A7) || ID: Heating"