
MICROWEB SNMP Adapter for MICROLAN temperature sensors

User's Guide



M-TECH
P.O.BOX 45

820 13 BRATISLAVA 213
Fax: ++421 2 45640812
<http://www.dcf.sk>
Email: snmp@mtechba.sk

Description

- MICROWEB SNMP Adapter is designed for measurement and monitoring of temperature
- Digital temperature sensors are interconnected via MICROLAN (MICROWIRE) bus
- In total 16 DS 1822 temperature sensors could be connected
- MICROWEB is connected to standard 10BaseT Ethernet bus.
- TCP/IP and UDP software are implemented in the adapter.
- Uses SNMP V1 protocol to communicate with superior system
SNMP protocol is embedded in IP/UDP layer.
- MICROWEB is equipped with RS 232 interface to configure the adapter.

Front panel:

Front panel indication LEDs:

- POWER power on
- MEASURE must blink in 1 second intervals; measured temperatures from table of sensors are downloaded each second.
- LAN indicates incoming UDP telegram at port 161

The front panel is equipped with RJ45 socket to connect 10BaseT Ethernet dos network.

Used signals:

1-2 TXD+ / TXD-
3-6 RXD+ / RXD-

Rear panel:



- Powered through DC connector, middle contact: + pole.
Use certified network adapters with stabilised unidirectional 9V/300mA output
- MICROLAN RJ4-4 connector.
- RS 232 connector, CANON DSUB 9 - socket
Protocol: ASCII
Parameters: 9600,N,8,1

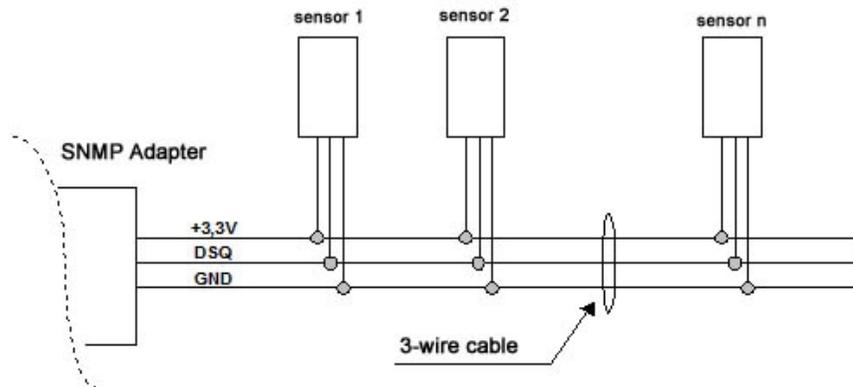
How to connect temperature sensors

Digital temperature sensors are connected to MICROWEB. The adapter is using a program to communicate through MICROLAN bus.

The adapter is also equipped with software designed for DS1822 temperature sensors. Each temperature sensor has its own; factory defined 48-bit address. The manufacturer guarantees a unique address to be assigned to each sensor.

MICROLAN bus is connected to the rear panel via RJ 4-4 connector labelled as MICROLAN.

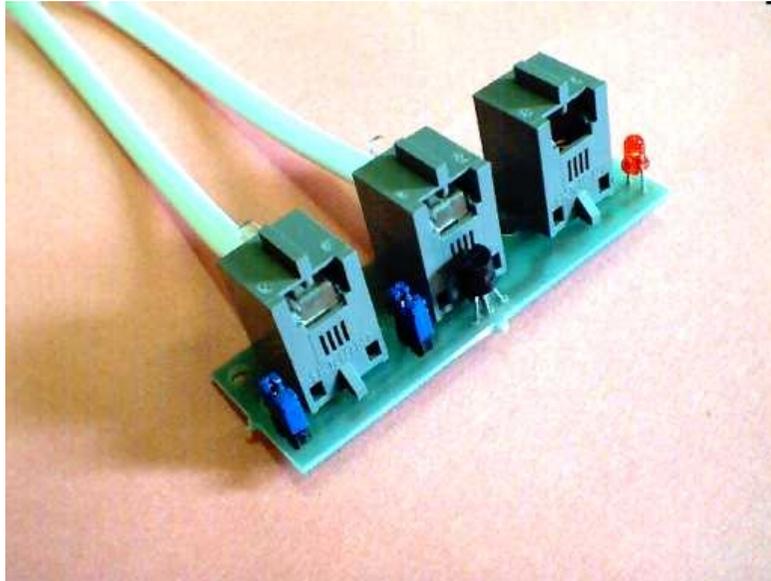
Bus topology:



The bus consists of three wires:

GND signal & supply earthing wire
+3.3V supply of temperature sensors
DSQ data wire

The hubs with standard RJ 4-4 connectors are used for easy connection of the sensors.



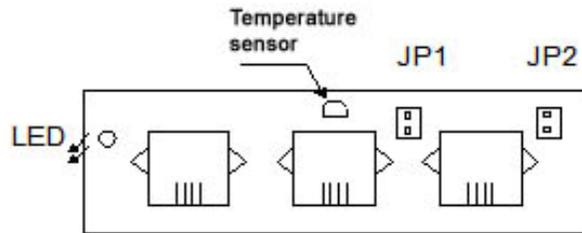
The hubs are linked with 4-wire cable, and the remaining wire is used as GND.

The standard telephone 4-wire cable is used and crimped as in most telephone devices.

Bus colours:

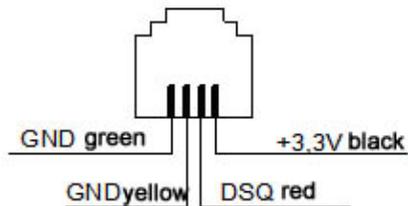
yellow, green	GND
red	DSQ data wire
black	+3.3V supply

Hub description:



There are three RJ4-4 connectors located at the hub. The connectors are linked with each other in parallel connection.

The orientation of bus wires is shown in the figure below, front view.



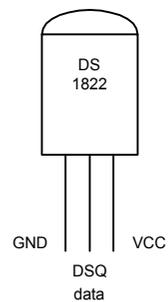
The temperature sensor may be installed at the hub. JP1 bridge is then used to disconnect the sensor from the bus.

JP2 connects the terminal resistance to the bus, between +3,3V and DSQ wires. We recommend connecting the bridge. With more than 10 sensors connected to the bus some sensors may not be able to activate the bus with its signal wire. In that case, some JP2 bridges must be disconnected. However, without any terminal resistance at the bus (JP2 disconnected), communication, especially with long cables, may be troublesome.

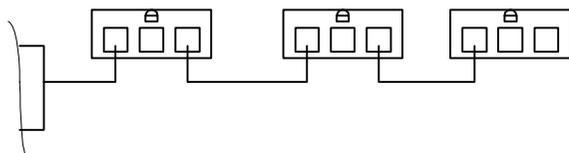
LED indicates 3.3 V power supply is on.

For hubs with no sensors, a sensor can be connected to the hub by a cable with sensor at one end and crimped RJ4-4 at the other one.

View of temperature sensor and wire description.



MICROLAN bus can be modified as necessary. Most often the sensors are installed in a line.



The above configuration uses three hubs with installed sensor.

Maximum length of one wire must not exceed 5m. The overall bus length should not exceed 50m.

MICROWEB configuration

MICROWEB is equipped with RS 232 interface. We use DSUB 9 connector with a socket.

CANON DSUB9 signals:

5	GND
3	TXD
2	RXD

The cable to connect MICROWEB and PC is included.

Use any communication software in the configuration, such as Hyperterminal.exe under MS WINDOWS 9x.

Use the following parameters in Hyperterminal configuration: *9600, N, 8, 1* set up the respective COM port where MICROWEB is connected.

Press ENTER in Hyperterminal to display MENU:

---- SNMP HOST for DS MICROWIRE---

```
Ver 1.60 M-TECH, http://dcf.sk
1) My IP Address: 011.001.001.022.
m) Subnet Mask : 255.255.255.000.
g) Default Gateway:011.001.001.001.
2) DEST IP Address:011.001.001.001.
a) MAC address: :0 3 100 0 1 35
HEAP:1260/1724
3) Num sensors:2
4) DIAG Temp ID
5) Save TempID
8) Temperatures status
Cmd >
```

Push respective character and ENTER to select a menu item.

1) MICROWEB IP address

Select by pushing 1 and ENTER. The device will request IP address in the aaa.bbb.ccc.ddd format, for example: 10.1.1.12

Each MICROWEB must have its own unique IP address which must be different from that of any PC machine.

MICROWEB has been configured for local networks where subnet mask is set to: 255.255.255.0 and the first number of IP addresses is smaller than 127.

In the given example, each PC must be set to 10.1.1.xxx with subnet set to 255.255.255.0

m) Subnet Mask

The mask is defined for the local network with SNMP adapter installed. For extensive networks, we normally use 255.255.0.0.

For small office networks, 255.255.255.0 is normally used.

g) Default Gateway

After pressing "g" the device will request default gateway IP address. The address is entered when the adapter is accessed through GateWay from different network, for example ROUTER.

If the adapter is not accessed from different network, enter **0.0.0.0**

2) DEST IP ADDRESS

IP address of the device (PC, server), with SNMP manager running.

MICROWEB will send the so-called SNMP TRAP messages to this address when the limit temperature is exceeded.

a) MAC address:

Machine Ethernet address. There must be no devices with the same address in one local network. MAC address consists of six byte values.

After pressing "a" the device will request MAC address starting from the highest value byte, down to the lowest one. Each Byte is entered as a number from 0 to 255 and is confirmed with ENTER.

3) Num Temp sensors

The number of connected temperature sensors, enter values from 1 to 16. MICROWEB measures temperature by reading the values from one sensor at each second. The start of measuring is indicated by shining *MEASURE* LED at the front panel.

4) DIAG TEMP

Temperature sensor diagnostics.

To use this menu, only one temperature sensor may be connected at the MICROLAN bus. This means that all JP1 bridges at the hubs must be disconnected and only one sensor may be connected. Push "4" and ENTER to display sensor address at the terminal window:

```
22 71 25 x2 x0 x0 x0 17
```

8 bytes in one line, with first 6 bytes being the sensor address, last byte is CRC byte.

If MICROWEB displays CRC Error, either there are more sensors connected to the bus, or the cable is too long.

If MICROWEB displays NO DEVICE, there is no sensor connected to the bus.

5) Save TempID

In the above procedure, only one sensor was connected to the bus. Now we will store the sensor address to the position in MICROWEB memory. In total, there are 16 positions available, labelled from 0 to 15.

By pushing "5" and ENTER, MICROWEB will request the position number and by pressing ENTER again, the address of connected sensor will be stored in the selected position.

Each second MICROWEB requests the temperature from sensor with the address stored at n position (n=0..15). In each step, the "n" value is increased by 1, until it reaches the number of sensors defined in menu 3. The temperature values are stored in memory table, to the positions 0..16. SNMP Manager may use PDU GET command to request the selected temperature value. For example, it will request MIB OID temperature 1.3.6.1.4.1316.2.2.0 for the sensor with position 2.

When configuring sensors, always connect one sensor at a time and test it by using the command 4= DIAG TEMP. Use command 5 to store the sensor address in selected position. Disconnect the sensor and proceed to configuration of the next one. Finally, set up the number of sensors.

6) Print saved TEMPID

By selecting menu you can read the sensor address stored at a selected position. MICROWEB will request the position number.

8) Temp Status

MICROWEB is continuously measuring temperature in one-second intervals. The temperature status may be requested by selecting this MENU. Microweb displays

```
---TEMPERATURE STATUS ----  
00) CRC Error +22.0
```

```
01) CRC Error +21.6
02) O.K. +20.7
03) CRC Error +21.7
```

the position number is given before the parenthesis, followed by O.K message if the sensor is connected properly.

CRC Error is displayed if no sensor is connected at a given position, i.e. the address of sensor does not match with stored position.

The status message is followed by temperature. The value of temperature is only correct if the O.K message is displayed in the same line.

TELNET

SNMP adapter includes TELNET implementation

After establishing communication with the device the status of temperature sensors is displayed, as follows:

```
----TEMPERATURE STATUS ----
HOST: SnmpName
00) Sensor0 +23.0 OK LO=20 HI=25
01) Sensor1 +0.0 No device LO=15 HI=35
```

Explanation of data displayed in one line:

ii) sensor's serial number
sensor's name
temperature value

STATUS OK || No device || CRC Error

LO=tt bottom temperature limit for the given sensor,

HI=tt upper temperature limit

Press ENTER to request the sensors' status.

**MICROWEB does not echo characters,
in TELNET application, set up local echo = ON.**

TELNET device settings

Some settings may be modified in telnet. The user displays the settings menu by using the command:

```
passw <actual_password>
```

E.g.: passw snmphost22

In this example, the current password is set to *snmphost22*

Note: The device is supplied with password preset to **238868**

The device will display MENU:

```
==== SNMP Temperature Adapter====
```

```
Ver: 1.60 (c) Mtech
```

```
MyIP= 011.001.001.022.
```

```
Mask= 255.255.255.000.
```

```
Gateway= 011.001.001.001.
```

```
TrapIP= 011.001.001.001.
```

```
Num Sens= 2
```

```
Trap per[min]= 1
```

```
Type help for available commands
```

```
cmd >
```

The *help* command will display a list of available commands:

```
---Available Commands---
```

```
myip <ip.ip.ip>
```

```
mask <255.255.255.255>
```

```
gate <ip.ip...>
```

```
trap <ip> destination for SNMP traps
```

```
reset
```

```
stat ;print temperatures
```

```
tnames ;print sensor names
```

```
tname x ;x=0..15 input name
```

```
nums x ;enter num sensors
```

```
lotemp id value
```

```

hitemp id value
tper min
comname [name]
sysname [name]
newpwd [new_password]

```

Command description:

Help	displays a list of commands
myip <ip.ip.ip.ip>	<p>Sets up new IP address of the device, for example: <i>myip 10.22.11.25</i></p> <p>After setting up new IP address, you need to use <i>reset</i> command.</p>
Mask <ip.ip.ip.ip>	<p>setup subnet mask. <i>E.g.:</i> <i>mask 255.255.255.0</i></p>
Gate <ip.ip.ip.ip>	<p>Setup Default Gateway to access the adapter from different network through router. Setup IP router address.</p>
trap <ip.ip.ip.ip>	<p>IP address where TRAP messages are sent when the limit temperature is exceeded.</p>
Reset	<p>This command will reset the device, all changes in IP address will be written to device EEPROM.</p>
Stat	<p>Displays status of temperature sensors, as described in establishing communication through TELNET without logon</p>

<i>tnames</i>	displays all names assigned to temperature sensors
<i>tname <id> <sensor_name></i>	assign temperature sensor's name, maximum 15 characters. <i>E.g.:</i> <i>tname 0 Sensor1</i> <i>tname 15 Sensor15</i>
<i>nums <pocet></i>	Number of sensors connected to MICROLAN bus. Max: 16 <i>E.g.:</i> <i>nums 10</i>
<i>lotemp <id> <temp></i>	Bottom temperature limit for id sensor. With the temperature reaching below this limit, the device will send a TRAP message to port 162. <i>E.g.:</i> <i>lotemp 0 15</i>
<i>hitemp <id> <temp></i>	Ceiling temperature limit for id sensor. When this temperature is exceeded, the device will send TRAP message.
<i>tper <period_min></i>	Interval of sending TRAP messages, in minutes. <i>E.g. for 10 minutes:</i> <i>tper 10</i>
<i>comname [community_name]</i>	Setup community name for SNMP messages. Without any input parameters the command will display current name.

	<i>E.g.:</i> <i>comname public</i>
<i>sysname [devicename]</i>	Set up device name. The name (device ID in the heading) will be used to establish communication through TELNET. The name will be sent in MIB RFC1213 .sysLocation
<i>newpwd [novypassword]</i>	Definition of new password. Without input parameter the command will display current password. After setting up new password you must use reset command.

SNMP implementation

MICROWEB communicates with superior system via SNMP Protocol V1.00 transferred in UDP layer at port 161.

SNMP V1 TRAP messages are sent to the network via UDP Protocol at port 162.

Standard MIBs:

The following standard MIBs from RFC1213-MIB are implemented:

Definition	OID	Value being sent
iso.org.dod.internet.mgmt.mib-2.system.sysDescr	1.3.6.1.2.1.1.1.0	MICROLAN Temperature OCT_STRING
iso.org.dod.internet.mgmt.mib-2.system.sysObjectID	1.3.6.1.2.1.1.2.0	NULL
iso.org.dod.internet.mgmt.mib-2.system.sysUpTime	1.3.6.1.2.1.1.3.0	upTime [TimeTicks]
iso.org.dod.internet.mgmt.mib-2.system.sysContact	1.3.6.1.2.1.1.4.0	M-TECH www.dcf.sk
iso.org.dod.internet.mgmt.mib-2.system.sysName	1.3.6.1.2.1.1.5.0	NULL
iso.org.dod.internet.mgmt.mib-2.system.sysLocation	1.3.6.1.2.1.1.6.0	depends on the setting in TELNET sysname

Defined MIBs – MTECH

iso.org.dod.internet.private.enterprises.mtech.dstemp =
1.3.6.1.4.1.1316.55

Definition	OID	Value being sent
.numsensors	.1316.55.1.0	Returns INT 32, number of connected sensors READ ONLY
.intTemperature	.1316.55.2.1.1.x	x=1..16 Returns temperature in INTEGER format, in 0.1C units E.g.: 241 means temperature of 24.1C
.stringTemperature	.1316.55.2.1.2.x	x=1..16 Returns temperature in OCTET STRING format, e.g.: +24.1C
.statusSensor	.1316.55.2.1.3.x	Temperature sensor status. INT32 0 = OK 1= no devices 2= CRC error, no sensor connected
.nameSensor	.1316.55.2.1.4.x	x= 1..16 x sensor temperature name READ ONLY

.tempLOLimits	.1316.55.2.1.5.x	x= 1..16 Bottom temperature limit for x sensor. READ ONLY
.tempHILimits	.1316.55.2.1.6.x	Ceiling temperature limit for sensor x=1..16

TRAP messages:

Trap message will be sent to port UDP.162

Trap message will be sent under following conditions:

- sensor temperature is higher than HItemp limit
- sensor temperature is lower than Lotemp limit
- sensor failure, sensor disconnected or transfer error at LAN bus (CRC Error)

TRAP message value: *Specific Trap*

Enterprise OID: 1.3.6.1.4.1.1316.55

There will be four OIDs packed in the message, as OID bindings

1.3.6.1.4.1.1316.55.3.T

Meaning of T	OID number	Value being sent
.devlocation	.1	Octet String - device name defined by <i>sysname</i> command in telnet
.sensorName	.2	Octet String = sensor name assigned in telnet by command
.tempValue	.3	INTEGER temperature

		value, in 0,1C units <i>E.g.: 141 means temperature of 14.1C</i>
.sensorStatus	.4	Integer sensor Status 0 = OK 1 = CRC ERROR 2= No device

Notes

- The length of received and sent SNMP messages must not exceed 256 bytes.
For this reason, do not use BINDING of more than 8 OIDs in GET command.
For instance, in statistical data collection in HP OPENVIEW, select Instances manually and no more than 8.
NEVER SELECT ALL INSTANCES In this case OPENVIEW will request 17 OIDs by GET command, with the first OID being sysUptime

For instance, the length of sent OID for one Integer temperature:
20 byte. The message will look like as follows:
0x30, LENSEQ, 06, LENOID, 0x2B, 06, 01,04,01,8A, 24, 55, 2 , 1, 1, id, 2, 2, thi, tlo