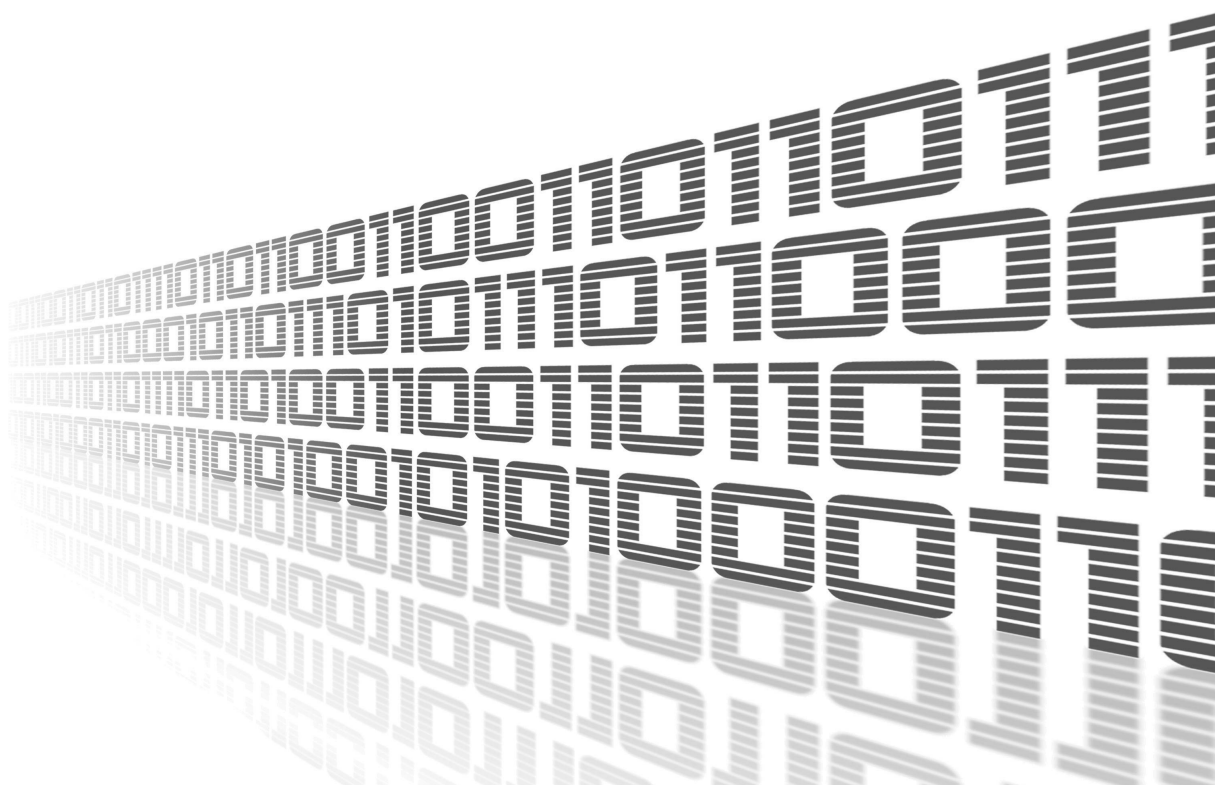




User Module

GPS

APPLICATION NOTE



ADVANTECH

Used symbols



Danger – Information regarding user safety or potential damage to the router.



Attention – Problems that may arise in specific situations.



Information or notice – Useful tips or information of special interest.



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Contents

1	Description of user module	1
2	Web interface	2
2.1	Location	2
2.2	System Log	3
2.3	Global	4
2.4	GPSD	5
2.5	SNMP	5
2.6	Time synchronization	6
3	Licenses	7
4	Related Documents	8

List of Figures

1	GPS Status – Location	3
2	System Log	3
3	Global Configuration	4
4	GPSD Configuration	5
5	SNMP Configuration	6
6	Time synchronization	6
1	Licences	7

List of Tables

1	Location	2
2	Forwarding data to a remote socket	4
3	GPSD Configuration	5
4	SNMP Configuration	5
5	GPS OID	6

1. Description of user module

User module *GPS* (Global Positioning System) allows your v2 or v3 router to provide location and time information in all weather, anywhere on or near the Earth, where there is an unobstructed line of sight to four or more GPS satellites.



This module is not contained in the standard router firmware. Uploading of this user module is described in the Configuration manual (see [1, 2, 3, 4]).

This user module is compatible with all the routers equipped with one of the following GSM modules:

- Gobi 3000,
- SW MC8705,
- SW MC7710,
- SW MC7304,
- PLS8,
- PHS8,
- Quectel EC25,
- SIM7070E-PCIE.

Type of the GSM module installed in the router can be found in the *Mobile WAN* status in the *Mobile Network Information* part.

For the SW MC8705 module it is necessary to update the firmware of this module to version 3.5.2.1. Update must be done externally, which means that it is necessary to take out the module from the router and update firmware via corresponding tool. If firmware version is incompatible, warning in log will be displayed.



Warning! For routers with two antennas is not functional diversity reception when using GPS! In case that router has three antennas, GPS and diversity reception can be used simultaneously.



GPS Rollover issue, related to firmware of the cellular module, resulted in incorrect display of date in the GPS user module. This issue was fixed in user module of version 1.6.6.

2. Web interface

The left part of the web interface contains the menu with pages for monitoring (*Status*), *Configuration*, *Information* and *Customization* of the router. *Information* block contains *Licences* item, where used Licences are displayed. *Customization* block contains only the *Return* item, which switches the GPS web interface to the interface of the router.

2.1 Location

If the device has an unobstructed line of sight to four or more GPS satellites, there are available detailed information about accurate location of the device (router).

Item	Description
Current time (UTC)	Current time in hhmmss.0 format (it's patterned on Coordinated Universal Time)
Latitude	Geographic coordinate that specifies the north-south position (in ddmm.mmmmmmmG format where <i>d</i> stands for degrees, <i>m</i> for minutes and <i>G</i> for geographical direction [N, S])
Longitude	Geographic coordinate that specifies the east-west position (in dddmm.mmmmmmmG format where <i>d</i> stands for degrees, <i>m</i> for minutes and <i>G</i> for geographical direction [E, W])
Altitude	Specifies the height above sea level of a location (in meters)
Satellites in view	Number of satellites that are directly visible for the router
Fix status	Indicates the availability of data and its quality. If no data is available, the value of this item is 0. A nonzero value indicates the presence of data.
Speed over ground	Current speed of the router relative to Earth's surface (in knots)
Course over ground	The actual course the router is moving along at the moment relative to Earth's surface (in degrees)
Date	Current date in ddmmyy format

Table 1: Location

There is a clickable item called *Show on map* at the bottom part of the window that displays an exact location of the Advantech router on the map server of Google company (Google Maps) in a new tab.



Figure 1: GPS Status – Location

2.2 System Log

In case of any problems it is possible to view the system log by pressing the *System Log* menu item. There are displayed detailed reports from individual applications running in the router. Using the *Save* button it is possible to save the system log to the computer.

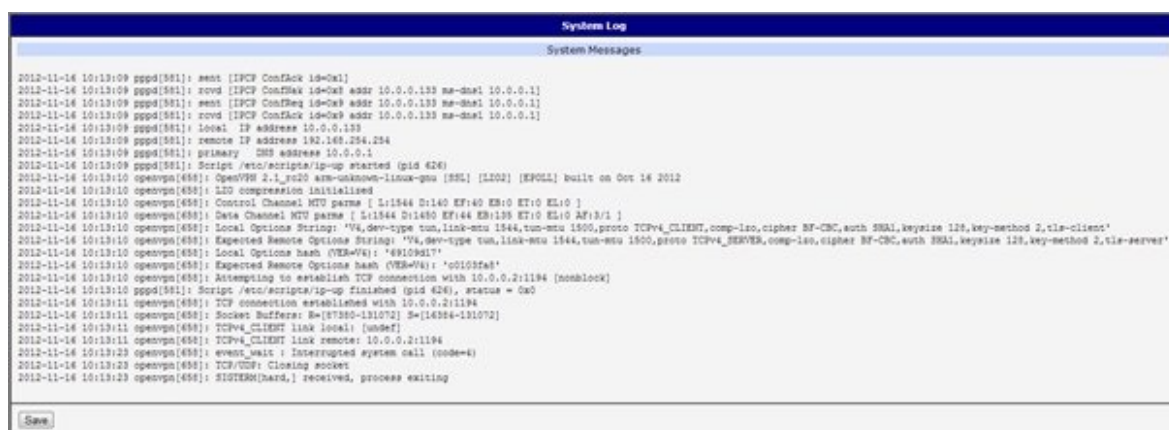


Figure 2: System Log



The System Log default size is 1000 lines. After completion of the 1000 lines it will be created a new file for storing system log. After completion of the 1000 lines in the second file, the first file will be deleted and then will be created a new one.

2.3 Global

After clicking the *Global* item in the configuration part of the menu, you can find a form that allows you to activate the GPS service by checking *Enable GPS service* item. In the next part of this form is an availability to choose the port that will be used for sending data from the GPS. You can select from the following options: *expansion port 1*, *expansion port 2*, *USB port* and pseudoterminal */dev/tty5*. Expansion port 1 and expansion port 2 are optional ports of the router. Data are stored in *raw NMEA* format.

The configuration form also allows router to forward raw NMEA output to a remote socket. In this case it is necessary to check the box in front of the "configuration line" and define the following information:

Item	Description
IP Address	IP address to which the raw NMEA output will be forwarded
Protocol	The protocol by which raw NMEA output will be sent
Port	Port on which the communication will be underway
Period	Forwarding period

Table 2: Forwarding data to a remote socket

At the bottom of the form, it can be enabled the automatic reset of GPS. It is performed every time when location data are not available within set number of minutes.

The last item configures router's identification. When switched on, the identification string \$GPRID, RouterIdentificationString is being sent in every NMEA batch. The RouterIdentificationString is the string configured in the GUI.

Global Configuration

☐ Enable GPS service

Forward raw NMEA output to:

☐ expansion port 1
 ☐ expansion port 2
 ☐ USB port
 ☐ pseudoterminal

 at fixed speed 9600,8,N,1

Forward raw NMEA output to remote socket:

IP Address	Protocol	Port	Period
☐	TCP ▾	10110	10 s
☐	TCP ▾	10110	10 s
☐	TCP ▾	10110	10 s
☐	TCP ▾	10110	10 s

☐ Enable GPS reset if location data are not available within min

☐ Send router identification

Figure 3: Global Configuration

2.4 GPSD

The GPSD form can be displayed by selecting the *GPSD* item in the configuration part of the menu. If the *Enable GPSD daemon* option is checked, the router automatically starts to listen on port specified below.

Item	Description
Inner port	Port in device dedicated for GPS
Listen port	TCP/IP port on which to listen for GPSD clients (default is 2947)

Table 3: GPSD Configuration

Figure 4: GPSD Configuration

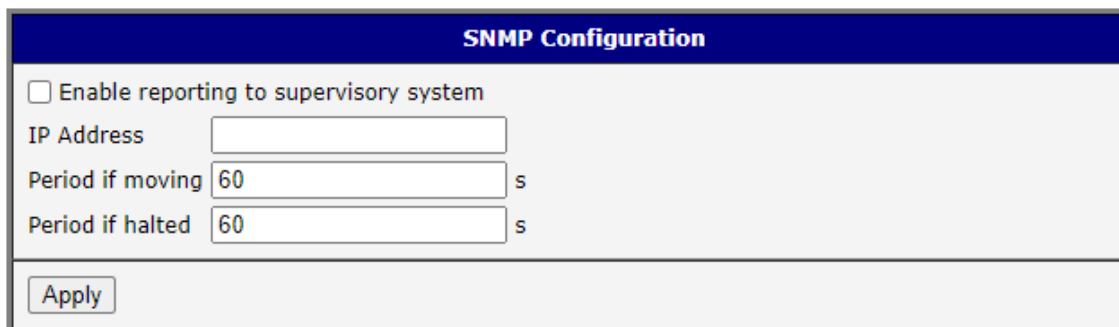
2.5 SNMP

The SNMP form can be displayed by selecting the *SNMP* item in the configuration part of the menu. If the *Enable reporting to supervisory system* option is checked, the router automatically sends messages to supervisory system at the specified periods.

Item	Description
IP Address	Destination IP address
Period if moving	Interval of sending messages to supervisory system (in seconds) while in motion
Period if halted	Interval of sending messages to supervisory system (in seconds) when not moving (velocity is 0)

Table 4: SNMP Configuration

For sending GPS messages is used the following range of OIDs. The importance of individual items is described in table [2.1 Location](#) on page [2](#).



SNMP Configuration

☐ Enable reporting to supervisory system

IP Address

Period if moving s

Period if halted s

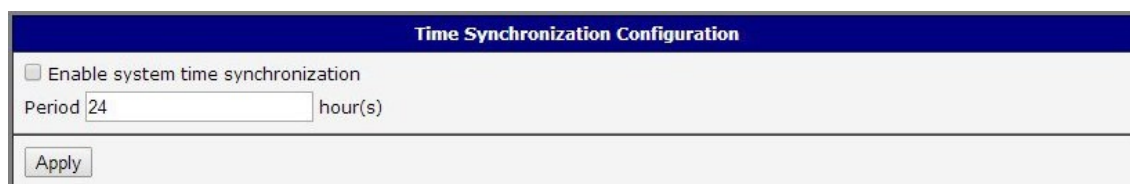
Figure 5: SNMP Configuration

OID	Designation
.1.3.6.1.4.1.30140.7.1.0	gpsTimeUTC
.1.3.6.1.4.1.30140.7.2.0	gpsLatitude
.1.3.6.1.4.1.30140.7.3.0	gpsLongitude
.1.3.6.1.4.1.30140.7.4.0	gpsAltitude
.1.3.6.1.4.1.30140.7.5.0	gpsSatellites
.1.3.6.1.4.1.30140.7.6.0	gpsFixStatus
.1.3.6.1.4.1.30140.7.7.0	gpsSpeedOverGround
.1.3.6.1.4.1.30140.7.8.0	gpsCourseOverGround
.1.3.6.1.4.1.30140.7.9.0	gpsDate

Table 5: GPS OID

2.6 Time synchronization

Form for synchronization of the system time can be invoked by pressing *Time Synchronization* item in the configuration part of the web interface menu. *Enable system time synchronization* check box is used to activate automatic time synchronization. Number of hours after which the synchronization is performed must be defined in the box below.



Time Synchronization Configuration

☐ Enable system time synchronization

Period hour(s)

Figure 6: Time synchronization

3. Licenses

Summarizes Open-Source Software (OSS) licenses used by this module.

GPS Licenses		
Project	License	More Information
gpsd	BSD	License

Figure 1: Licences

4. Related Documents

- [1] Advantech Czech: **v2 Routers Configuration Manual** (MAN-0021-EN)
- [2] Advantech Czech: **SmartFlex Configuration Manual** (MAN-0023-EN)
- [3] Advantech Czech: **SmartMotion Configuration Manual** (MAN-0024-EN)
- [4] Advantech Czech: **SmartStart Configuration Manual** (MAN-0022-EN)
- [5] Advantech Czech: **ICR-3200 Configuration Manual** (MAN-0042-EN)



Product-related documents can be obtained on *Engineering Portal* at icr.advantech.cz address.