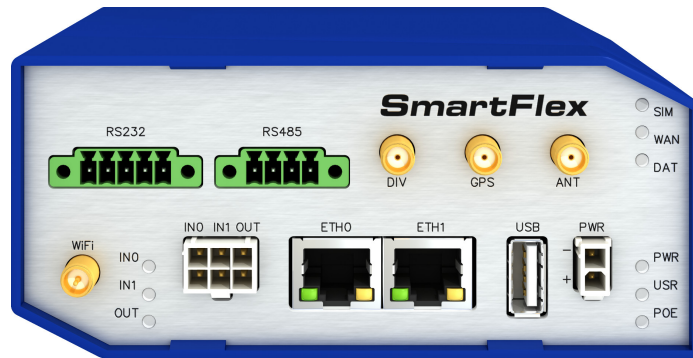


User module

Pinger

APPLICATION NOTE



ADVANTECH

Used symbols



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



Attention – Problems that can arise in specific situations.



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



Advantech B+B SmartWorx s.r.o., Sokolska 71, 562 04 Usti nad Orlici, Czech Republic.
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Contents

1	Description of User Module	1
2	Web Interface	2
2.1	Tools	3
2.2	Automatic Ping	4
2.2.1	Description of Settings	4
2.2.2	Sample Configuration	10
2.2.3	Status	12
3	Recommended Literature	13

List of Figures

1	Functional Schema of Pinger Module	1
2	Main Menu	2
3	Manual Ping	3
4	Traceroute	4
5	Configuration of Automatic Ping	5
6	Sample Configuration of Automatic Ping	11
7	Status	12

List of Tables

1	Parameters of Manual Ping	3
2	Parameters of Traceroute	4
3	Common Parameters for Automatic Ping Test	6
4	Parameters for Line Failing State	7
5	Parameters for Line Lost State	8

1. Description of User Module



User module *Pinger* is not included in the standard router firmware. Uploading of this user module is described in the Configuration manual [1, 2, 3].



The user module is v2 and v3 router platforms compatible.

This module allows manually or automatically verify functionality of connection between Smart Router and a device eventually of two devices.

Manual mode is designed for immediate connectivity testing of a device. Automatic mode is designed for long time testing of one or two devices. In this mode, automatic actions can be performed in case of a connectivity issue.

When testing, IP datagrams are being periodically sent to a device. A response from this device is expected to be received, see functional schema on figure 1. If a response from the device is received, the module displays latency and the statistical summary in conclusion.

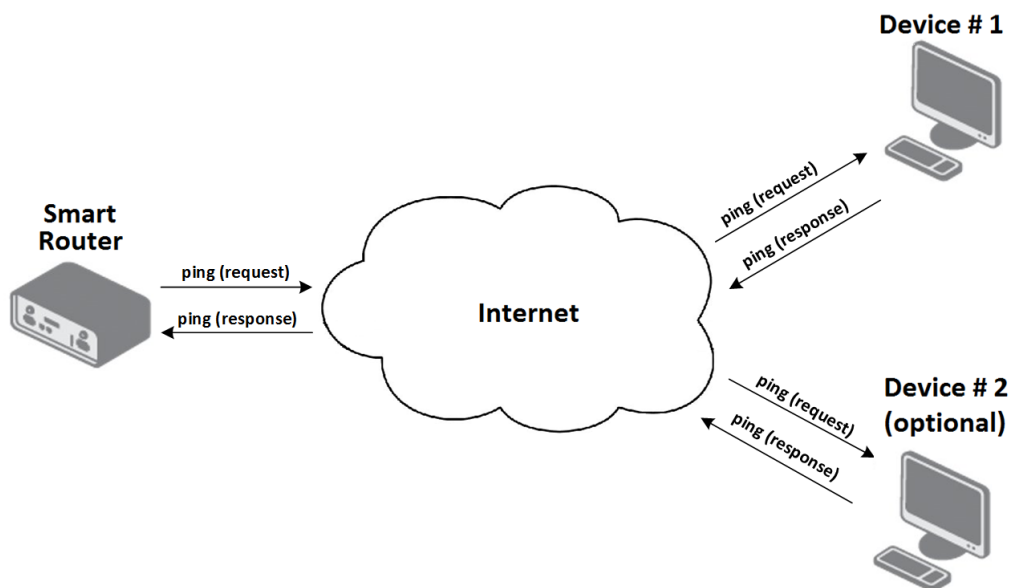


Figure 1: Functional Schema of Pinger Module



All addresses of devices and services, which can be set for manual or automatic mode, can be specified in IPv4, IPv6 format eventually also by domain name. This settings must correspond with other settings of the router, for details please see Configuration manual [1, 2, 3].

2. Web Interface

For configuration of the *Pinger* user module a web interface is available. It can be invoked by pressing the module name on the *User modules* page of the router's web interface.

Left part of the Pinger module web interface contains menu with sections *Tools*, *Automatic Ping* and *General*, see figure 2. General section contains only the *Return* item that switches the module's web interface back to the main interface of the router.

Pinger

Tools
Ping
Traceroute
Automatic Ping
Configuration
Status
General
Return

Figure 2: Main Menu

2.1 Tools

There is *Ping* page in the *Tools* section, see figure 3. Here you can manually check availability of a device with specified address (*Target Address*). It is also possible to set a number of requests to be sent (*Count*) and data size for testing (*Data size*). Description of these items is listed in table 1. The CLI command ping is invoked for this test and a test report has a form of ping command output.

Figure 3: Manual Ping

Item	Description
Target address	IP address of device to be tested .
Count	Number of requests to be sent (1 to 60).
Data Size*	Data load for sending packets (by default 56 B)

* - can be blank

Table 1: Parameters of Manual Ping

The second item in the *Tools* section is intended for *Traceroute*. This is a computer network diagnostic tool for displaying the route (path) and measuring transit delays of packets across on IP network. Configuration from allows you to specify target address and maximum number of hops. The CLI command `traceroute` is invoked for this test and a test report has a form of traceroute command output.

Figure 4: Traceroute

Položka	Význam
Target address	IP address of the target device to which you want to find the path.
Max hops	The maximum number of routers that a packet passes through from its source to its destination.

Table 2: Parameters of Traceroute

2.2 Automatic Ping

2.2.1 Description of Settings

Parameters of automatic ping test can be specified in the form on the *Configuration* page in *Automatic Ping* section, see figure 5. Parameters on this page can be grouped into four groups:

- Initial (common) settings
- Setting for *Line failing* state
- Setting for *Line lost* state
- Availability monitor setting

Automatic Ping			
<input type="checkbox"/> Enable Automatic Ping			
	Ping 1	Ping 2	
Address	<input type="text"/>	<input type="text"/>	
Interval	<input type="text" value="10"/>	<input type="text" value="10"/>	1..3600 s
Data size*	<input type="text" value="56"/>	<input type="text" value="56"/>	B
Router ID*	<input type="text"/>		
Start Time (HH:MM)*	<input type="text"/>		
Stop Time (HH:MM)*	<input type="text"/>		
Log all ping attempts to syslog	<input type="checkbox"/>		
<input type="checkbox"/> Line failing check by automatic ping			
If no response on last	<input type="text" value="10"/>	pings	
or on last	<input type="text"/>	seconds	
Log to system log	<input checked="" type="checkbox"/>		
Send SNMP trap*	<input type="text"/>		
Send e-mail*	<input type="text"/>		
	<input type="text"/>		
	<input type="text"/>		
<input type="checkbox"/> Line lost check by automatic ping			
If no response on last	<input type="text" value="20"/>	pings	
or on last	<input type="text"/>	seconds	
Log to system log	<input checked="" type="checkbox"/>		
Send SNMP trap*	<input type="text"/>		
Send e-mail*	<input type="text"/>		
	<input type="text"/>		
	<input type="text"/>		
Send SMS*	<input type="text"/>		
Restart mobile connection	<input type="checkbox"/>		
Reboot router	<input type="checkbox"/>		
* can be blank			
<input type="checkbox"/> Expose statistics about availability via SNMP			
<input type="button" value="Apply"/> Ping will start immediately or at Start Time if is set.			

Figure 5: Configuration of Automatic Ping

Automatic Ping test (*Enable Automatic Ping*) can be activated in the common group of parameters. Devices addresses (*Address*), time interval (*Interval*) and size of data to be sent (*Data size*) can be set for this test. These parameters can be set independently for one or two devices (parameters column *Ping 1* and *Ping 2*).

If parameters for both devices are specified, the test is executed by following scenario: The test starts running against the device specified in column *Ping 1* by default. If there is no response from this device, test is switched to the device specified in column *Ping 2*. The test remains on this device until no response appears. If so, the test is switched back to the first device again. Time interval, after which the request is sent to a device, matches the interval defined for the device that is going to be actually tested.

Next parameter, recommended to be set, is *Router ID*, which is used for router's identification. This identification is used in error messages sent by automatic ping test.

Parameters *Start Time* and *Stop time* can declare time interval for execution of automatic ping test. These two parameters are common for both, the device set in column *Ping1* and the device set in column *Ping 2*. If these parameters are not specified, the automatic ping test is running continuously.

Description of common group parameters is listed in table 3.

Item	Description
Enable Automatic Ping	Activation of automatic Ping test.
Ping 1	Columns with parameters for configuration of the first device.
Ping 2*	Columns with parameters for configuration of the second device.
Address	IP address of a device to be tested.
Interval	Interval between ping tests (maximum is 3600 seconds).
Data size*	Size of data to be sent (by default 56 B).
Router ID*	Router identification (used for error messages).
Start Time (HH:MM)*	Start time of automatic ping (24-hour format).
Stop Time (HH:MM)*	Stop time of automatic ping (24-hour format).

* - can be blank

Table 3: Common Parameters for Automatic Ping Test

Line failing state can be set in the next group of parameters. This state is evaluated if either the count of missing responses reach specified quantity or the time interval, when a response from tested device is missing, has passed.

If this state comes, next actions can be performed. These actions can be: logging into router's system log, sending of an SNMP message or sending of an e-mail. Description of *Line failing* parameters is listed in table 4.

Item	Description
Line failing check by automatic ping	Activate evaluation of line failing state, which will be evaluated based on setting of next two parameters.
If no response on last x pings	Count of missing responses for line failing state evaluation.
or on last x seconds	Time interval of missing responses for line failing state evaluation.
Log to system log	Activation of logging to router's system log.
Send SNMP trap*	SNMP server address where to send error message to.
Send e-mail*	E-mail address for error messages (up to three different address).

* - *can be blank*

Table 4: Parameters for Line Failing State



For functionality of e-mail and SMS messages sending, appropriate router configuration must be set, for details please see Configuration manual [1, 2, 3].

Line lost state can be set in the last group of parameters. This state is evaluated if either the count of missing responses reach specified quantity or the time interval, when responses from tested device is missing, has passed.

If this state comes, next actions can be performed. These actions can be: logging into router's system log, sending of a SNMP message, sending of an e-mail, sending of a SMS message, restarting of router's mobile interface or restarting of the router. Description of *Line lost* parameters is listed in table 5.

Item	Description
Line lost check by auto-automatic ping	Activate evaluation of line lost state, which will be evaluated based on setting of next two parameters.
If no response on last x pings	Count of missing responses for line lost state evaluation.
or on last x seconds	Time interval of missing responses for line lost state evaluation.
Log to system log	Activation of logging to router's system log.
Send SNMP trap*	SNMP server address where to send error message to.
Send e-mail*	E-mail address for error messages (up to three different addresses).
Send SMS*	Phone number for error message via SMS.
Restart mobile connection	Activation of mobile interface restart.
Reboot router	Activation of router restart.

* - can be blank

Table 5: Parameters for Line Lost State



If automatic ping test comes into one of two mentioned states, it stays in this state until a success response from the device is received.

Use the *Expose statistics about availability via SNMP* button if you wish to have router accessibility statistics in the SNMP tree. This statistics are also displayed on the *Status* page.

If the module is stopped, available statistics are discarded and are not exposed in SNMP. A next module start initializes new availability statistics counting as module don't know what's going on while it is down. If you upgrade module, it is stopped and started on background, but this don't break statistics.

If the ping interval is set to 61 seconds or more, the following warning will be displayed on the Pinger page (red): "Availability data will not be reliable. Set the interval to 60 seconds or shorter."

Test of automatic ping will be started immediately after pressing the *Apply* button. If the *Start Time* parameter is set, execution will be postponed to the specified time.



The private tree for Advantech routers is defined by MIB files accessible in the public repository here: <https://bitbucket.org/bbsmartworx/snmp-mib>. These files are up-to-date and determinant. They are readable by any SNMP MIB browser.



Before execution of automatic ping test by pressing on *Apply* button, make sure that automatic test is enabled (item *Enable Automatic Ping*), eventually if state of line failing is enabled (item *Line failing check by automatic ping*), eventually if state of line lost is enabled (item *Line lost check by automatic ping*).

2.2.2 Sample Configuration

On figure 6 is example of setting for automatic ping test. Assume, we want to test availability of device with IP address 192.168.0.10 and device with IP address 192.168.0.20. These addresses has to be entered into row *Address* in column *Ping 1* and *Ping 2* respectively. Availability will be checked every minute with data of size 56 B (i.e. *Ping Interval* is set to 60 and *Data size* stays on the default value).

For easy distinction in error messages sent from the router, identification of the router is set in *Router ID* item. In view of the fact that we are interested in the availability only between 8:00 and 12:00 o'clock (24-hour format), the *Start Time* item is set to 8:00 and the *Stop Time* to 12:00.

For enabling line failing state, *Line failing check by automatic ping* item is checked. This state will be evaluated if count of lost responses (consecutively followed) reach number 10 (*If no response on last x pings = 10*) or the last response was received five minutes ago (*or on last x seconds = 300*). If this state occur, following actions will be performed:

1. Error message will be logged into router's system log (item *Log to system log* enabled).
2. SNMP error message will be sent to address 192.168.0.1 (item *Send SNMP trap*).
3. Error message to *support@mail.com* e-mail address will be sent (item *Send e-mail*).

For enabling line lost state, *Line lost check by automatic ping* item is checked. This state will be evaluated if count of lost responses (consecutively followed) reach number 20 (*If no response on last x pings = 20*) or the last response was received ten minutes ago (*or on last x seconds = 600*). If this state occur, following actions will be performed:

1. Error message will be logged into router's system log (item *Log to system log* enabled).
2. SNMP error message will be sent to address 192.168.0.1 (item *Send SNMP trap*).
3. Error message to *support@mail.com* and *hotline@mail.com* e-mail addresses will be sent (item *Send e-mail*).
4. Error SMS message to phone number *123 456 789* will be sent (item *Send SMS*).
5. Restart of the router will be performed (item *Reboot router* enabled).

Automatic Ping			
<input checked="" type="checkbox"/> Enable Automatic Ping			
	Ping 1	Ping 2	
Address	192.168.0.10	192.168.0.20	
Interval	60	60	1..3600 s
Data size*	56	56	B
Router ID*	MainRouter		
Start Time (HH:MM)*	08:00		
Stop Time (HH:MM)*	12:00		
Log all ping attempts to syslog	<input type="checkbox"/>		
<input checked="" type="checkbox"/> Line failing check by automatic ping			
If no response on last	10	pings	
or on last	300	seconds	
Log to system log	<input checked="" type="checkbox"/>		
Send SNMP trap*	192.168.0.1		
Send e-mail*	support@mail.com		
<input checked="" type="checkbox"/> Line lost check by automatic ping			
If no response on last	20	pings	
or on last	600	seconds	
Log to system log	<input checked="" type="checkbox"/>		
Send SNMP trap*	192.168.0.1		
Send e-mail*	support@mail.com		
	hotline@mail.com		
Send SMS*	123 456 789		
Restart mobile connection	<input type="checkbox"/>		
Reboot router	<input checked="" type="checkbox"/>		
* can be blank			
<input type="checkbox"/> Expose statistics about availability via SNMP			
<input type="button" value="Apply"/> Ping will start immediately or at Start Time if is set.			

Figure 6: Sample Configuration of Automatic Ping

2.2.3 Status

On page *Status*, in section *Automatic Ping*, statistical information related to the automatic ping test can be reviewed, see figure 7. This page has two sections. The first of them is intended for automatic ping statistics and the second for availability statistics.

This example illustrates the situation in which 12 504 packets was transmitted. Relevant response was received for all of them, so none packet was lost. In addition, there are contents values for the minimum, maximum and average times at which individual responses were received. It is necessary to update the web interface page in the given web browser to update the listing on this page.

The second section contains availability information. It is possible to find the date and time when the ping monitoring was started (*Monitored from*) and the last check was done (*Last check*). There are also statistics indicating the total time of ping monitoring (*Total time*), how long the router is available (*Up time*) and how long the routers is connected to the network (*On-line time*).

Use the *Save details* button to save detailed reports. The file will include statistical data and other information about ping process. After reaching 10.000 pings statistics will no longer be monitored.

Statistics	
Pings	
Transmitted packets	: 12504
Received packets	: 12504 (100.0000 %)
Lost packets	: 0 (0.0000 %)
Min. response	: 0.2 ms
Max. response	: 3.9 ms
Average response	: 0.5 ms
Availability	
Monitored from	: 2017-12-05 15:19:02
Last check	: 2018-02-22 10:13:59
Total time	: 71 days, 18 hours, 54 minutes, 57 seconds
Up time	: 70 days, 4 hours, 4 minutes, 32 seconds (97.7602 %)
On-line time	: 4 days, 5 hours, 41 minutes, 46 seconds (5.9200 %)
<input type="button" value="Save details"/>	

Figure 7: Status

3. Recommended Literature

- [1] Advantech B+B SmartWorx: **v2 Routers Configuration Manual** (MAN-0021-EN)
- [2] Advantech B+B SmartWorx: **SmartFlex Configuration Manual** (MAN-0023-EN)
- [3] Advantech B+B SmartWorx: **SmartMotion Configuration Manual** (MAN-0024-EN)
- [4] Advantech B+B SmartWorx: **SmartStart Configuration Manual** (MAN-0022-EN)
- [5] Advantech B+B SmartWorx: **ICR-3200 Configuration Manual** (MAN-0042-EN)
- [6] Advantech B+B SmartWorx: **Application note SNMP Object Identifier**
(APP-0010-CZ)



Product related documents can be obtained on *Engineering Portal* at
<https://ep.advantech-bb.cz/> address.