

# Serial Console and Terminal

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## General Information

### Summary

The Serial Console and Terminal are tools, used to communicate with devices and other systems that are interconnected via serial port. The serial terminal may be used to monitor and configure many devices - including modems, network devices (including MikroTik routers), and any device that can be connected to a serial (asynchronous) port.

### Specifications

Packages required: *system*

License required: *level1*

Home menu level: Command name: */system console, /system serial-terminal*

Standards and Technologies: *RS-232*

Hardware usage: *Not significant*

### Description

The Serial Console feature is for configuring direct-access configuration facilities (monitor/keyboard and serial port) that are mostly used for initial or recovery configuration.

If you do not plan to use a serial port for accessing another device or for data connection through a modem, you can configure it as a serial console. The first serial port is configured as a serial console, but you can choose to unconfigure it to free it for other applications. A free serial port can also be used to access other routers' (or other equipment, like switches) serial consoles from a MikroTik RouterOS router. A special null-modem cable is needed to connect two hosts (like, two PCs, or two routers; not modems). Note that a terminal emulation program (e.g., **HyperTerminal** on Windows or **minicom** on linux) is required to access the serial console from another computer.

Several customers have described situations where the Serial Terminal (managing side) feature would be useful:

- on a mountaintop, where a MikroTik wireless installation sits next to equipment (including switches and Cisco routers) that can not be managed in-band (by telnet through an IP network)
- monitoring weather-reporting equipment through a serial port
- connection to a high-speed microwave modem that needed to be monitored and managed by a serial connection

With the serial-terminal feature of the MikroTik, up to 132 (and, maybe, even more) devices can be monitored and controlled.

## Serial Console Configuration

### Description

A special null-modem cable should be used for connecting to the serial console from another computer. The Serial Console cabling diagram for DB9 connectors is as follows:

Router Side (DB9f)	Signal	Direction	Side (DB9f)
<b>1, 6</b>	<b>CD, DSR</b>	<b>IN</b>	<b>4</b>
<b>2</b>	<b>RxD</b>	<b>IN</b>	<b>3</b>
<b>3</b>	<b>TxD</b>	<b>OUT</b>	<b>2</b>
<b>4</b>	<b>DTR</b>	<b>OUT</b>	<b>1, 6</b>
<b>5</b>	<b>GND</b>	<b>-</b>	<b>5</b>
<b>7</b>	<b>RTS</b>	<b>OUT</b>	<b>8</b>
<b>8</b>	<b>CTS</b>	<b>IN</b>	<b>7</b>

Note that the above diagram will not work if the software is configured to do hardware flow control, but the hardware does not support it (e.g., some RouterBOARD models have reduced serial port functionality). If this is the case, either turn off the hardware flow control or use a null-modem cable with loopback, which will simulate the other device's handshake signals with its own. The diagram for such cable is as follows:

Router Side (DB9f)	Signal	Direction	Side (DB9f)
<b>1, 4, 6</b>	<b>CD, DTR, DSR</b>	<b>LOOP</b>	<b>1, 4, 6</b>
<b>2</b>	<b>RxD</b>	<b>IN</b>	<b>3</b>

<b>3</b>	<b>TxD</b>	<b>OUT</b>	<b>2</b>
<b>5</b>	<b>GND</b>	<b>-</b>	<b>5</b>
<b>7, 8</b>	<b>RTS, CTS</b>	<b>LOOP</b>	<b>7, 8</b>

Note that although it is recommended to have 5-wire cable for this connection, in many cases it is enough to have 3 wires (for unlooped signals only), leaving both loops to exist only inside the connectors. Other connection schemes exist as well.

## Configuring Console

Home menu level: */system console*

### Property Description

**enabled** (*yes | no*; default: **no**) - whether serial console is enabled or not

**free** (*read-only: flag*) - console is ready for use

**port** (*name*; default: **serial0**) - which port should the serial terminal listen to

**term** (*text*) - terminal type

**used** (*read-only: flag*) - console is in use

**vcno** (*read-only: integer*) - number of virtual console - [Alt]+[F1] represents '1', [Alt]+[F2] - '2', etc.

**wedged** (*read-only: flag*) - console is currently not available

### Example

To disable all virtual consoles (available through the direct connection with keyboard and monitor) except for the first one:

```
[admin@MikroTik] system console> print
Flags: X - disabled, W - wedged, U - used, F - free
#  PORT  VCNO  TERM
0  F serial0  MyConsole
1  U      1    linux
2  F      2    linux
3  F      3    linux
4  F      4    linux
5  F      5    linux
6  F      6    linux
7  F      7    linux
8  F      8    linux
[admin@MikroTik] system console> disable 2,3,4,5,6,7,8
[admin@MikroTik] system console> print
Flags: X - disabled, W - wedged, U - used, F - free
#  PORT  VCNO  TERM
0  F serial0  MyConsole
1  U      1    linux
2  X      2    linux
3  X      3    linux
4  X      4    linux
5  X      5    linux
6  X      6    linux
7  X      7    linux
8  X      8    linux
[admin@MikroTik] system console>
```

To check if the configuration of the serial port:

```
[admin@MikroTik] system serial-console> /port print detail
0 name=serial0 used-by=Serial Console baud-rate=9600 data-bits=8 parity=none
  stop-bits=1 flow-control=none

1 name=serial1 used-by="" baud-rate=9600 data-bits=8 parity=none stop-bits=1
  flow-control=none

[admin@MikroTik] system serial-console>
```

## Using Serial Terminal

Command name: */system serial-terminal*

### Description

The command is used to communicate with devices and other systems that are connected to the router via serial port.

All keyboard input is forwarded to the serial port and all data from the port is output to the connected device. After exiting with [Ctrl]+[Q], the control signals of the port are lowered. The speed and other parameters of serial port may be configured in the **/port** directory of router console. No terminal translation on printed data is performed. It is possible to get the terminal in an unusable state by outputting sequences of inappropriate control characters or random data. Do not connect to devices at an incorrect speed and avoid dumping binary data.

### Property Description

**port** (*name*) - port name to use

### Notes

The serial port to be used as a serial terminal needs to be free (e.g., there should not be any serial consoles, LCD or other configuration). Check the previous chapter to see how to disable serial console on a particular port. Use `/port print` command to see if some other application is still using the port.

[Ctrl]+[Q] and [Ctrl]+[X] have special meaning and are used to provide a possibility of exiting from nested serial-terminal sessions:

To send [Ctrl]+[X] to the serial port, press [Ctrl]+[X] [Ctrl]+[X]

To send [Ctrl]+[Q] to the serial port, press [Ctrl]+[X] [Ctrl]+[Q]

### Example

To connect to a device connected to the **serial1** port:

```
[admin@MikroTik] system> serial-terminal serial1

[Type Ctrl-Q to return to console]
[Ctrl-X is the prefix key]
```

## Console Screen

Home menu level: */system console screen*

## Description

This facility is created to change line number per screen if you have a monitor connected to router.

## Property Description

**line-count** (25 | 40 | 50) - number of lines on monitor

## Notes

This parameter is applied only to a monitor, connected to the router.

## Example

To set monitor's resolution from 80x25 to 80x40:

```
[admin@MikroTik] system console screen> set line-count=40
[admin@MikroTik] system console screen> print
    line-count: 40
[admin@MikroTik] system console screen>
```