

Application Note

Terminal Server G6

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Summary

As of firmware version v10.6 MICROSENS Generation 6 (G6) switches will comprise of an internal terminal server functionality. This feature expands G6 switches with the ability to integrate single serial devices into LAN infrastructures. With a G6 switch operating in server, client or virtual COM port mode it is possible to realize a wide variety of applications for converting LAN communication into serial data communication and vice versa.

This application note illustrates the configuration of MICROSENS switches as terminal server with documented examples.

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Graphical Conventions

| Graphical Element | Explanation |
|---|--|
|  | Work step(s) in the Web Manager (GUI) |
|  | Work step(s) in the Command Line Interface (CLI) |

1 Introduction

A terminal server basically works as a converter for conveying data from the switches serial port (RS-232 standard) to its LAN port (using the Telnet protocol, RFC 854) and vice versa. Thus it is possible to integrate serial devices (like scanners, printers, sensors etc.) into LAN infrastructures. For this reason this functionality is called "device server" as well.

1.1 Operation Modes

There are three operation modes possible:

Server mode:

For transferring data from a LAN participant (e. g. a PC) to a serial port device (e. g. a printer with RS-232 port) the switch operates in server mode. Besides, this mode is used for accessing a serial device with a console line interface over LAN (e. g. with PuTTY on a PC).

Client mode:

For tunneling data from a serial port device to another over LAN one switch has to operate in server mode, the remote switch has to operate in client mode.

COM port emulation mode:

In special environments it could be necessary to emulate a serial port on a physical IP port of a serial tunneling partner (i. e. for lack of a physical serial port). To process those special serial data packets wrapped in IP packets the MICROSENS switch has to operate in COM port mode.

Note:

For every serial device to be attached to the LAN a respective switch is needed. For a switch it is not possible to connect more than one serial device directly to its serial port.

1.2 Connector Pinouts

Note:

Depending on the MICROSENS Switch model the serial port is accessible through a mini-USB connector (i. e. MICROSENS G6 Micro Switch) or an RJ-45 connector (i. e. MICROSENS G6 Industrial Switch). To connect a serial device directly to the serial port of the respective switch it is necessary to use a RS-232 null-modem interface or a cable with cross-over pinout.

| G6 Micro Switch (microUSB) | | G6 Industrial Switch (RJ-45) | |
|----------------------------|--------|------------------------------|--------|
| Pin | Signal | Pin | Signal |
| 1 | n.n. | 1 | n.n. |
| 2 | TXD | 2 | DC+ |
| 3 | RXD | 3 | TXD |
| 4 | DC+ | 4 | GND |
| 5 | GND | 5 | GND |
| | | 6 | RXD |
| | | 7 | n.n. |
| | | 8 | n.n. |

Table 1: Connector Pinouts

2 Server Mode

2.1 Scenario

For accessing a serial device (e. g. printer, controller etc.) over LAN using a TCP/IP socket application the serial device has to be connected directly to the switches serial port over a null modem connection (i. e. cross over cable). Configured as device server in server mode the switch listens to incoming serial communication data on its Ethernet port and transmits it to its serial port. After the connection is established both the serial device and the PC can exchange further serial data.

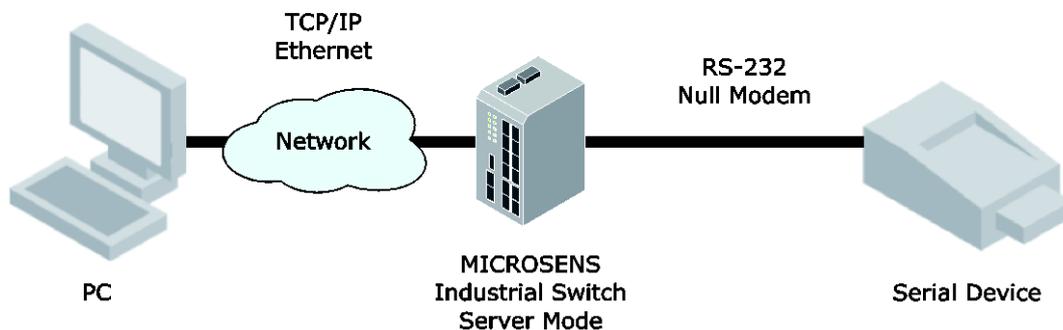


Figure 1: Server Mode Scenario

2.2 Configuration

2.2.1 Web Manager

Take the following steps to configure the switch for server mode using the Web Manager:

- Open the Web Manager.
- Select the **System** screen, then select the tab **Reboot & System**.
- In the section **System Configuration** select the entry "Terminal Server" in the drop-down list for **Serial Port** to activate the terminal server.

Note:

Changing the mode from terminal server to any other value during serial operation will stop the terminal server.

- Select the **Misc** screen, then select the tab **Terminal Server**.
- For **Mode** select "Server" from the drop-down list.
- For **TCP Port** enter the respective port.

Note:

The default value is "1000". This port number has to correspond to the respective application setting on the LAN device (i. e. PuTTY).

- For **Data Rate** select the respective rate from the drop-down list.

Note:

Please refer to the serial devices documentation to determine its baud rate.

2.2.2 CLI Commands

Take the following steps to configure the switch for server mode using the command line interface:

Enable the switches serial port for terminal server use:

- `Device.System.serial_port = TERMINAL_SERVER`

Note:

Changing the mode from terminal server to any other value during serial operation will stop the terminal server.

For configuring the terminal server parameters change to path

- `Management.Misc.terminal_server_config`

Configure the parameters as follows:

- `Management.Misc.terminal_server_config.mode = SERVER`
- `Management.Misc.terminal_server_config.tcp_port = <serial device TCP port>`

Note:

The default value is "1000". This port number has to correspond to the respective application setting on the LAN device (i. e. PuTTY).

- `Management.Misc.terminal_server_config.data_rate = <serial device baud rate>`

Note:

Please refer to the serial devices documentation to determine its baud rate.

Note:

For more information about configuring all serial parameters with CLI please refer to the "MICROSENS Product Manual FW G6", chapter "Misc Function" available from the Web Manager.

Now it is possible to access the serial device with every TCP based client like Telnet or Rlogin (command line) or PuTTY (GUI based).

Note:

For more information about configuring PuTTY for connecting the switch refer to section 5.

3 Client Mode

3.1 Scenario

For connecting two serial devices over LAN one switch has to be configured in server mode while another switch has to be configured in client mode. Both switches communicate over LAN with each other. Because the serial devices seem to communicate over LAN this concept is called "serial tunneling" as well.

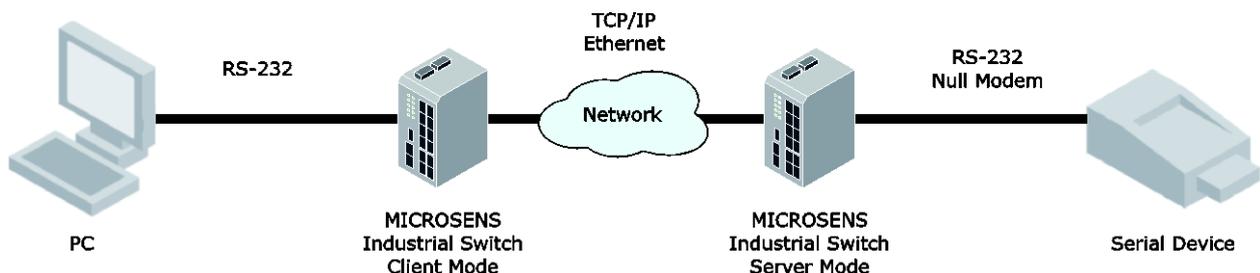


Figure 2: Client Mode Scenario

3.2 Configuration

For configuring the server mode please refer to the server mode example in section 2.2.

3.2.1 Web Manager

Take the following steps to configure the switch for client mode using the Web Manager:

- Open the Web Manager.
- Select the **System** screen, then select the tab **Reboot & System**.
- In the section **System Configuration** select the entry "Terminal Server" in the drop-down list for **Serial Port** to activate the terminal server.

Note:

Changing the mode from terminal server to any other value during serial operation will stop the terminal server.

- Select the **Misc** screen, then select the tab **Terminal Server**.
- For **Mode** select "Client" from the drop-down list.
- For **Remote IP** of the associated remote partner enter the respective IP address.
- For **Data Rate** select the respective rate from the drop-down list.

Note:

Please refer to the serial devices documentation to determine its baud rate.

3.2.2 CLI Commands

Take the following steps to configure the switch for client mode using the command line interface:

Enable the switches serial port for terminal server use:

- `Device.System.serial_port = TERMINAL_SERVER`

Note:

Changing the mode from terminal server to any other value during serial operation will stop the terminal server.

For configuring the terminal server parameters change to path

- `Management.Misc.terminal_server_config`

Configure the parameters as follows:

- `Management.Misc.terminal_server_config.mode = CLIENT`
- `Management.Misc.terminal_server_config.remote_ip = <IP address of switch working in server mode>`
- `Management.Misc.terminal_server_config.data_rate = <serial device baud rate>`

Note:

Please refer to the serial devices documentation to determine its baud rate.

Note:

For more information about configuring all serial parameters with CLI please refer to the "MICROSENS Product Manual FW G6", chapter "Misc Function" available from the Web Manager.

Now it is possible to access the serial device with every TCP based client like Telnet or Rlogin (command line) or PuTTY (GUI based).

Note:

For more information about configuring PuTTY for connecting the switch refer to section 5.

4 COM Port Mode

4.1 Scenario

If a serial tunneling partner doesn't have a physical serial interface (e. g. an application in need of a serial port used on a modern PC), it is possible to emulate a virtual serial port on an IP port on this device.

A special COM port driver maps the IP port of the PC to a virtual COM port emulating a serial connection. The driver envelops the serial data into IP packets and sends them through the devices physical IP interface. To cope with these IP packets by unpacking and forwarding the inside serial data packets to the serial port the switch has to operate in COM port mode.

Note:

In COM port mode the switch acts as TCP client because most COM port emulators run a TCP server.

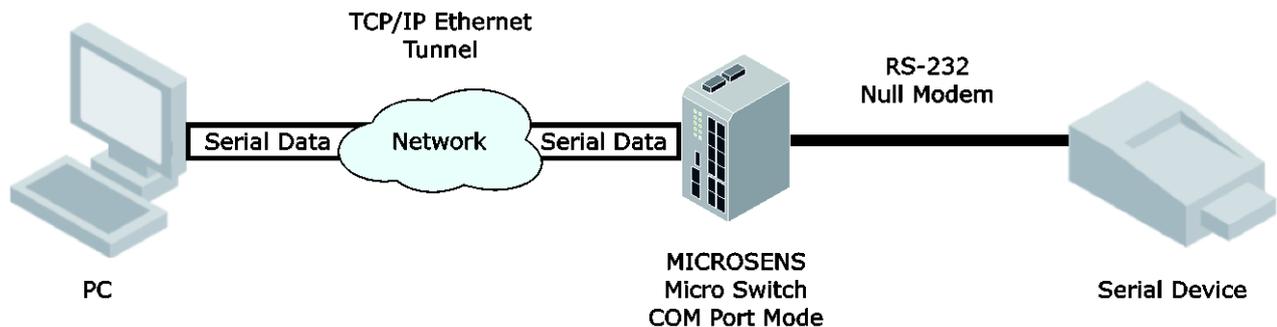


Figure 3: COM Port Mode Scenario

4.2 Configuration

4.2.1 Web Manager

Take the following steps to configure the switch for COM port mode using the Web Manager:

- Open the Web Manager.
- Select the **System** screen, then select the tab **Reboot & System**.
- In the section **System Configuration** select the entry "Terminal Server" in the drop-down list for **Serial Port** to activate the terminal server.

Note:

Changing the mode from terminal server to any other value during serial operation will stop the terminal server.

- Select the **Misc** screen, then select the tab **Terminal Server**.
- For **Mode** select "COM Port" from the drop-down list.

- For **TCP Port** enter the respective port.

Note:

The default value is "1000". This port number has to correspond to the respective application setting on the LAN device (i. e. PuTTY). Leaving it as default value probably won't work because this is not a standardized default value for virtual COM ports.

- For **Data Rate** select the respective rate from the drop-down list.

Note:

Please refer to the serial devices documentation to determine its baud rate.

4.2.2 CLI Commands

Take the following steps to configure the switch for COM port mode using the command line interface:

Enable the switches serial port for terminal server use:

- `Device.System.serial_port = TERMINAL_SERVER`

Note:

Changing the mode from terminal server to any other value during serial operation will stop the terminal server.

For configuring the terminal server parameters change to path

- `Management.Misc.terminal_server_config`

Configure the parameters as follows:

- `Management.Misc.terminal_server_config.mode = COM_PORT`
- `Management.Misc.terminal_server_config.tcp_port = <serial device TCP port>`

Note:

The default value is "1000". This port number has to correspond to the respective application setting on the LAN device. Leaving it as default value probably won't work because this is not a standardized default value for virtual COM ports.

- `Management.Misc.terminal_server_config.data_rate = <serial device baud rate>`

Note:

Please refer to the serial devices documentation to determine its baud rate.

Note:

For more information about configuring all serial parameters with CLI please refer to the "MICROSENS Product Manual FW G6", chapter "Misc Function" available from the Web Manager.

4.3 COM Port Driver

There are lots of possible applications for creating virtual serial ports, either open source, shareware or commercial.

For the correct installation and configuration of these applications please refer to the respective user documentation.

Note:

Some hardware manufacturers offer a proprietary COM port emulating software with their products. Normally these applications work with every other device too.

Bear in mind that sometimes it could be necessary to disable special software features which are used to optimize the applications interaction with the manufacturers hardware.

5 Configuration of PuTTY

Take the following steps to configure PuTTY for communicating with the serial device that is attached to the MICROSENS switch in server mode.

1. Open PuTTY on your PC.
2. Open the **Session** dialog, enable **Telnet** and enter the switches IP address and the TCP port used for serial communication.

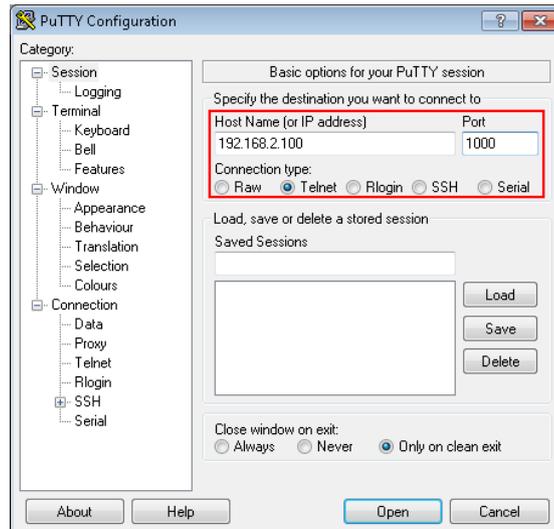


Figure 4: PuTTY Session Dialog

3. Open to the **Terminal** dialog and in the section **Line discipline options** change the setting to "Force off" for both local echo and local line editing.

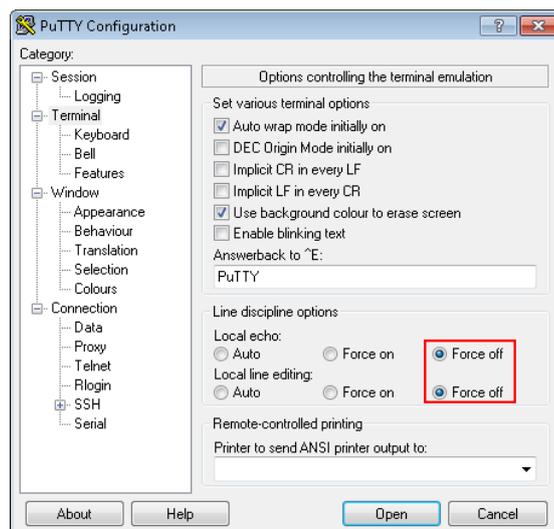


Figure 5: PuTTY Terminal Dialog

4. Click **Open** to start connecting the serial device.

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