R031 Ethernet – RS485 data converter

Summary

R031 is a 10/100 Mbit Ethernet to RS485 converter, also called "terminal server". This converter is a successor of the previous type M031.

Application

- **remote RS485 device to PC connection via an Ethernet network**
- **connection of domat I/O modules for data transmission and signal readout**
- **the usage depends on the communication protocol at the RS485; in some situations the Ethernet delays may not meet the timing requirements of the serial protocol driver**

Function

The R031 module is able to connect a RS485 device to a PC over an Ethernet network. The Digi RealPort Software creates a virtual COM port on the host PC. This virtual port enables any software to communicate with a remote RS485 device. The COM port redirector runs under Microsoft Windows, UNIX and Linux. Maximum communication speed is 115200 bps.

The module parameters and functions are configured over SNMP or secured web communication (HTTP / HTTPS protocols). Power presence is indicated by a green LED close to the serial connector. The Ethernet connector provides two LEDs: Link and Network activity. The network switches automatically between 10 and 100 Mbit/s.

To connect the RS485 bus there are 2 screw terminals. The RS485 data flow is indicated by LEDs: TxD (green) and RxD (red). The RS485 bus may be terminated by a pair of DIP switches (close to the RS485 terminals). Communication speed and

number of data bits are set by DIP switches (the right of the RS485 terminals). The RS485 bus is galvanically isolated (insulation voltage 1000 V).

The module is 36,2 mm wide and mounts on a standard DIN rail.

Technical data

Power	24 V AC/DC ± 10 %; max. 2 W
Ethernet	1x Ethernet 10/100BaseT (automatic speed change) RJ45, 2 LED (link, data) integrated in the connector
RS485	K+, K- galvanically insulated, insulating voltage 1 kV communication speed 300 ... 115 200 bit/s is set by combination of SW DIP1-3; bits are set by SW DIP4 maximal bus length 1200 m maximum number of modules depends on requested response time – up to 255 addresses
3x LED	TxD, RxD, PWR
HW	NS7520 (RISC processor, 32-bit NET+ARM), 55 MHz, 2 MB Flash, 8MB RAM
SW	Digi RealPort (creates a virtual COM port on the host PC) configuration via web interface
Housing	Polycarbonate box (certification UL94V0)
Dimensions	See below
Protection degree	IP20 (EN 60529)
Terminals	Screw terminals M3, maximum wire cross-section 2,5 mm^2 (recommended wire cross-section is 0,35-1,5 mm^2)
Ambient conditions	5 – 40 °C; 5 – 85 % relative humidity; non-condensing gases and chemically non-aggressive conditions (according EN 60721-3-3 climatic class 3K3)
Storage conditions	5 – 40 °C; 5 – 85 % relative humidity; non-condensing gases and chemically non-aggressive conditions (according EN 60721-3-1 climatic class 1K2)
Standards conformity	EMC EN 61000-6-2 ed.3:2005, EN 55022 ed.3:2010 EN 60950-1 ed.2:2006 + A11:2009 + A12:2011 + A1:2010 + A2:2014 EN 50581:2012
EU legislation	Council Directive 2006/95/EC, health and low voltage equipment safety Council Directive 2004/108/EC, electromagnetic compatibility Council Directive 2011/65/EC, certain hazardous substances in electrical and electronic equipment

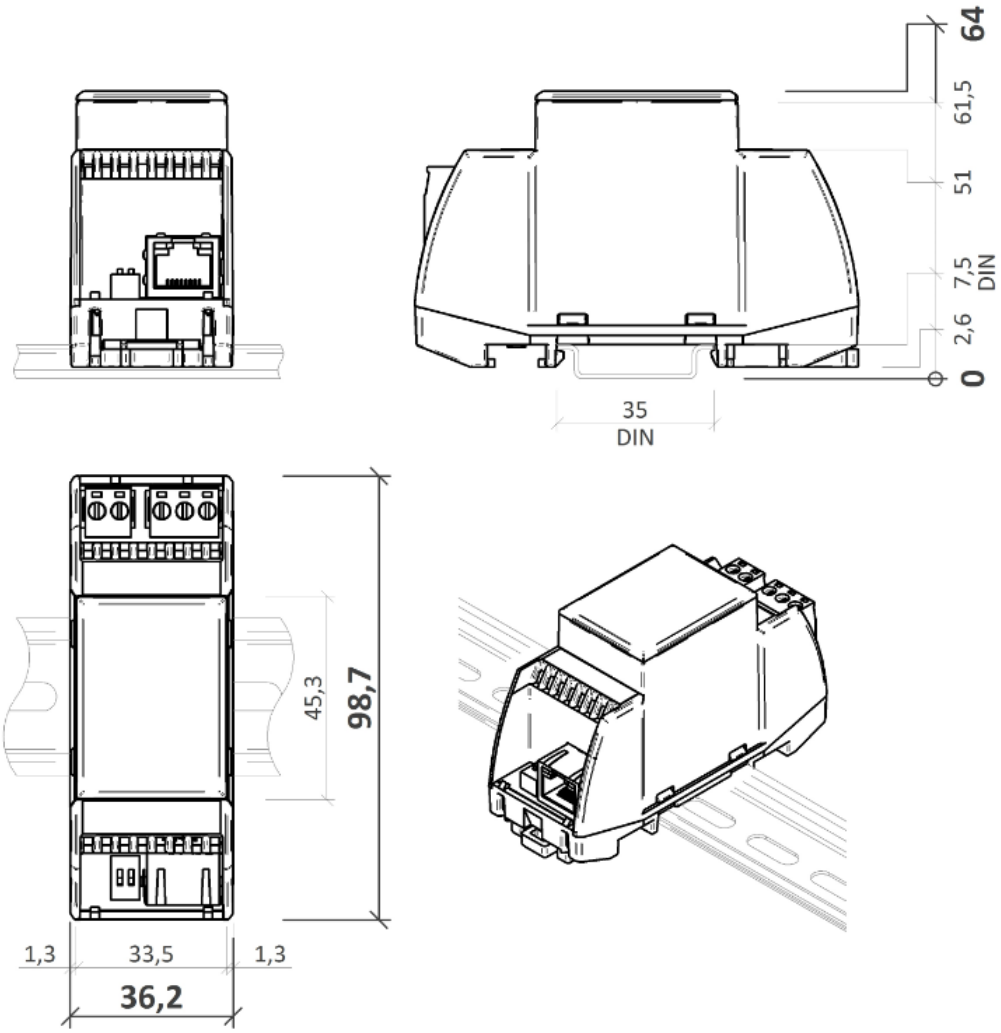
Schema

Terminals and connectors:	
G	power
G0	power
Ethernet	network interface
RS485	port COM - serial link RS485; terminals K+, K-
LED indication:	
TxD	green LED – RS485 transmitting data (flashing: transmitting data; OFF: no data traffic)
RxD	red LED – RS485 receiving data (flashing: transmitting data; OFF: no data traffic)
PWR	green LED – power (ON: power OK; OFF: no power applied, weak or damaged power supply, …)
Jumper:	
INIT	For INIT function activation, disconnect power terminal and plug in a jumper on the pins between power terminal and the outside part of the box. If jumper is plugged in at power-up, converter will be set to factory defaults.
DIP switches	
BUS END	(DIP1 and 2 the left of terminal RS485) both ON = bus end; the first and last devices on bus should have bus end ON
SW 1, 2, 3	communication speed RS485

	SW1	**SW2**	**SW3**
1 200 bps	OFF	OFF	OFF
2 400 bps	ON	OFF	OFF
4 800 bps	OFF	ON	OFF
9 600 bps (default)	**ON**	**ON**	**OFF**
19 200 bps	OFF	OFF	ON

	38 400 bps	ON	OFF	ON
	57 600 bps	OFF	ON	ON
	115 200 bps	ON	ON	ON
SW 4	Number of bits OFF 8 bits / ON 9 bits. If parity (Even/Odd) is used, it is necessary to switch ON DIP SW 4 (9 bits)!			

Dimensions



All dimensions are in *mm*.

Communication

Default network settings are:

IP address	192.168.1.37
subnet mask	255.255.255.0
default gateway	0.0.0.0

User: root
Password: dbps

Notice: Do not forget to note the new network and user settings after change!

Settings

All parameters inclusive network configuration are available at a web interface on TCP port 80. Default user is **root**, password is **dbps**. English help for each settings opinion is displayed after click on the „? Help“ button in the upper right corner.

Find the detailed description of all settings in the Digi Connect user guide. Actual version is available at http://www.digi.com/products/embedded-systems/system-on-modules/digiconnectme#resources in chapter Literature -> Integration Kits.

Communication speed and number of data bits are set by DIP switches. See Schema -> DIP switches.

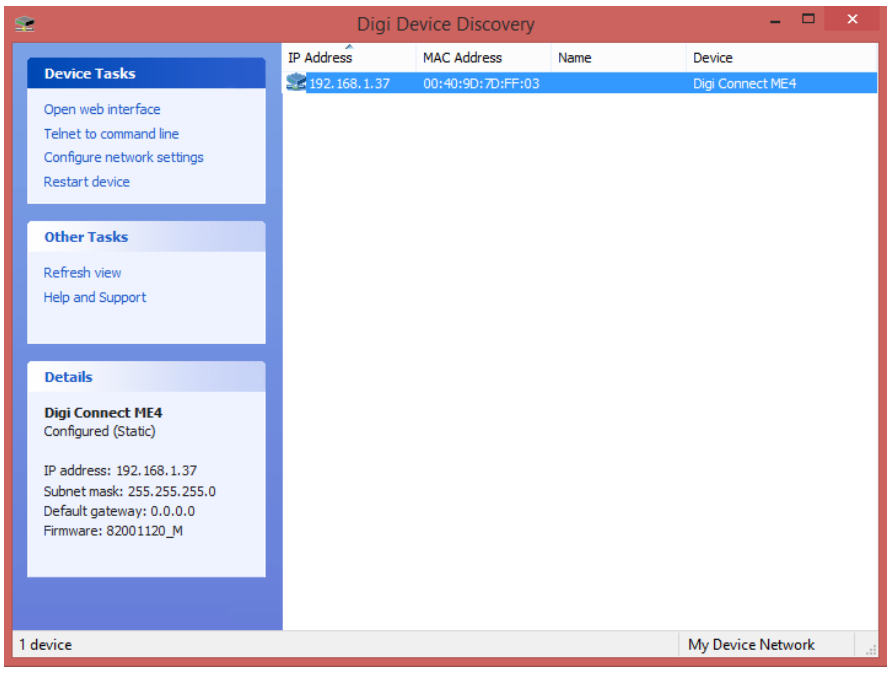
Connection to web interface and IP settings:

1. Use a RJ45 cable to connect converter to the web network. Connect converter to power supply (24 V DC/AC, terminals G and G0, any polarity). Please wait approximately 30 seconds for the converter to boot.

2. Fill converter IP address in web browser. Connect to the web interface. Default user is **root**, password **dbps**.

3. If you don´t know the IP address of the converter, choose your operating system and download program Device Discovery Utility at http://www.digi.com/products/embedded-systems/system-on-modules/digiconnectme#resources , chapter Utilites.

4. Start the Device Discovery Utility. In case of successful detection, you can see the converter IP address in the program window. If there are some problem with detection switch off the PC firewall please. The network card must be able to receive the broadcast answers.



5. In the Device Tasks dialogue set the new IP address (Configure network settings) or go directly to the web pages of the M020 (Open web interface).

6. If you can not log in, set the converter to factory defaults (see below).

Virtual COM port on PC - installation:

1. Download the actual drivers on:
   http://www.digi.com/support/productdetail?pid=2466&type=drivers
   in the Operating System Specific Drivers menu, choose your operating system and download the drivers.

2. Install the downloaded Digi RealPort software.

3. If the converter is in the same network, the program detects the device after installation. Otherwise, the IP settings must be configured properly.

4. Connect to the converter through web interface.

5. Under the title “Configuration” select “Serial Ports” and “Port1”. Set the profile “RealPort” and confirm the configuration by button “Apply”.

6. Do not change the advanced settings in the web interface unless you know what you are doing. False settings may result in communication trouble, timeouts etc.

Factory settings:

If the connection through web interface is not possible, bring the converter into Factory Default Settings:

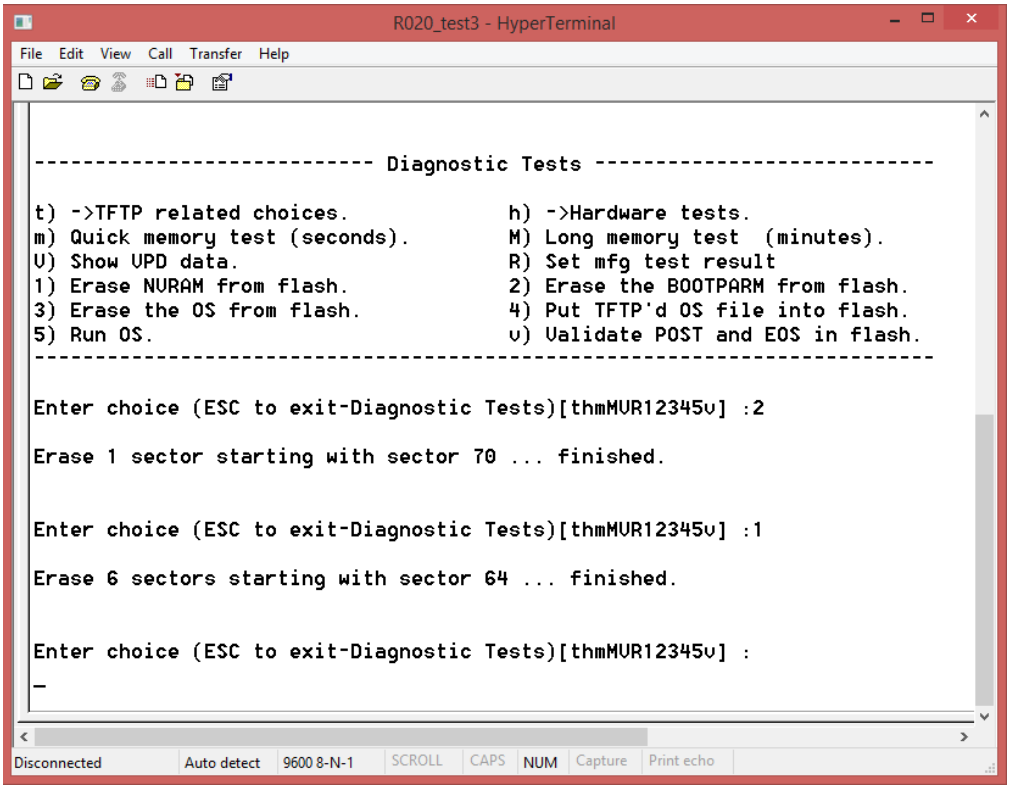
1. Disconnect power terminal and plug in a jumper on the pins between power terminal and the outside part of the box.

2. Connect converter and PC by a serial (nullmodem) cable. If the PC does not have a RS485 port, use a USB/RS485 converter.

3. Start a serial terminal software on the PC (e.g. Hyperterminal, TeraTerm) and select the COM port which connects to the converter. Communication parameters are 9600, 8 bits, N (none) parity, 1 stop bit. Data flow control None.

4. If the connection is established, switch on the converter power supply.

5. In window there is the R031 menu. Press 2 (Erase the BOOTPARM from flash) and wait for the “finished” message. Then press 1 (Erase the NVRAM from flash) and wait for the “finished” message. See screenshot below.



6. Terminate the connection, switch off power and disconnect the INIT jumper.

7. Connect the power supply. Approximately after one minute it is possible to detect the converter again. All the settings are default. The IP setting has DHCP set to ON. The converter will now ask for a new IP address from a DHCP server. If there is no DHCP server in the network, the device has address of 169.254.xxx.xxx. (Switch off the Windows firewall and detect device by the Device Discovery Utility.)

Changes in versions	04/2016 – First version of the datasheet.