

R025

Ethernet – RS232 data converter and Modbus RTU/TCP router



Summary

R025 is a 10/100 Mbit Ethernet to RS232 converter, also called “terminal server”. It is configurable as Modbus RTU/TCP router. This converter is a successor of the previous type M025.

Application

- remote Modbus RTU/RS232 device to SCADA Modbus TCP connection via an Ethernet network
- bridge function – virtual channel RS232 in an Ethernet network (between two R025)
- modem emulation - converters are connected using AT commands in an Ethernet network

Function

The R025 module contains all the features of the R020 module. It is able to connect a RS232 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 RS232 device. The COM port redirector runs under Microsoft Windows, UNIX and Linux. Maximum communication speed is 230400 bps.

The main difference between R020 and R025 is the **industrial automation** profile selection option for R025. This is the Modbus RTU/TCP router functionality. On the TCP side the module acts as slave (server) and sends the requests as master (client) to the serial line with Modbus RTU.

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.

A CANON 9M device connects through a nullmodem (“crossed”) serial cable with CANON 9F connector at both sides (“terminal-terminal” connection). A CANON 9F

device connects through a modem (“straight”) serial cable with CANON 9M and CANON 9F connectors. All RS232 signals except for RING (1- DCD, 2 - RXD, 3 - TXD, 4 - DTR, 5 - GND, 6 - DSR, 7 - RTS and 8 - CTS) are transmitted. Usually only RXD, TXD and GND are used.

The module is 36.2 mm wide and mounts on a standard DIN rail.

Technical data

Power	24 V AC/DC \pm 10 %; max. 1.5 W
Ethernet	1 \times Ethernet 10/100BaseT (automatic speed change) RJ45, 2 \times LED (link, data) integrated in the connector
RS232	CANNON 9 male; (1- DCD, 2 - RXD, 3 - TXD, 4 - DTR, 5 – GND, 6 - DSR, 7 - RTS a 8 - CTS) high speed 1200...230 400 bit/s
1 \times LED	PWR
HW	NS7520 (RISC processor, 32-bit NET+ARM), 55 MHz, 2 MB Flash, 8 MB 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

Schema



Terminals and connectors:

G	power
G0	power
Ethernet	network interface
COM	port COM - serial link RS232; CANNON 9 male (1- DCD, 2 - RXD, 3 - TXD, 4 - DTR, 5 - GND, 6 - DSR, 7 – RTS, 8 - CTS)

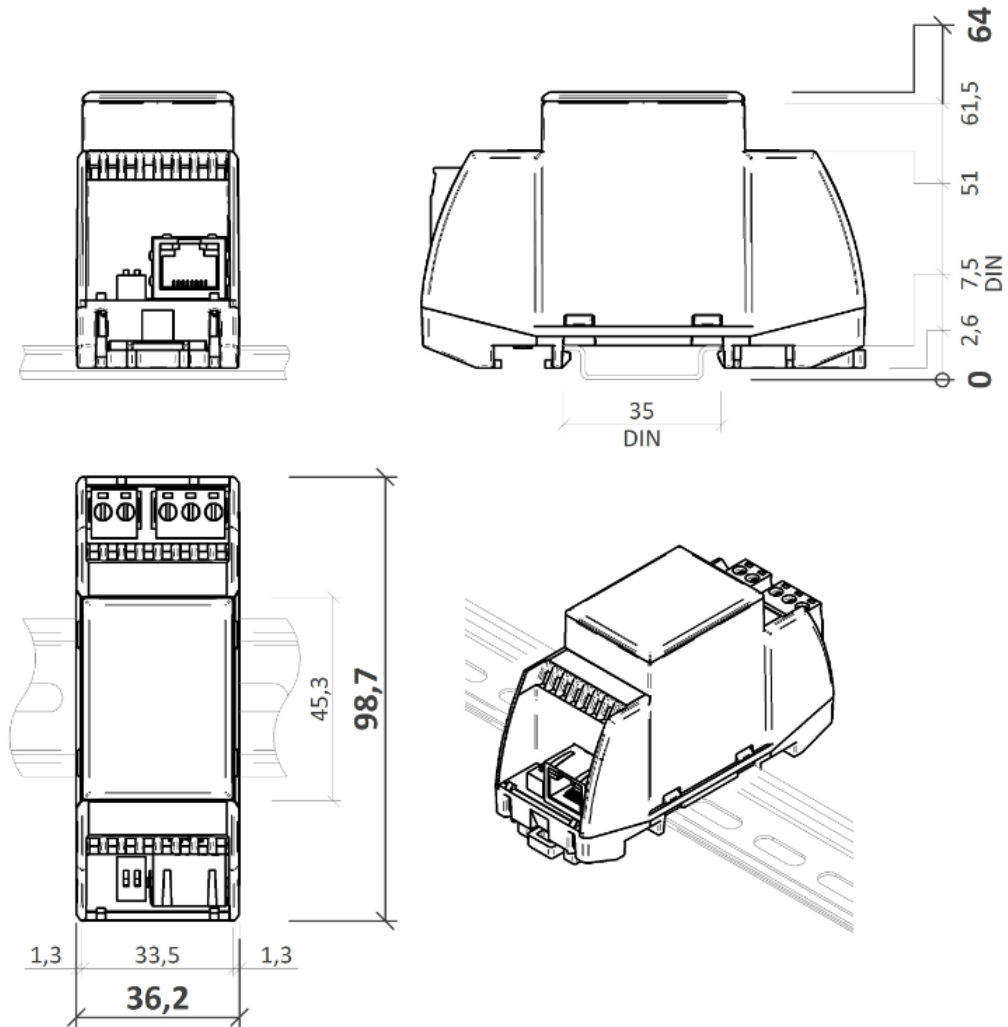
LED indication:

PWR	green LED – power (ON: power OK; OFF: no power applied, weak or damaged power supply, ...)
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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.
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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

For devices with PN4919 or higher:

User: root
Password: "code", the default password ("code") is written on the label on the side of the device.

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

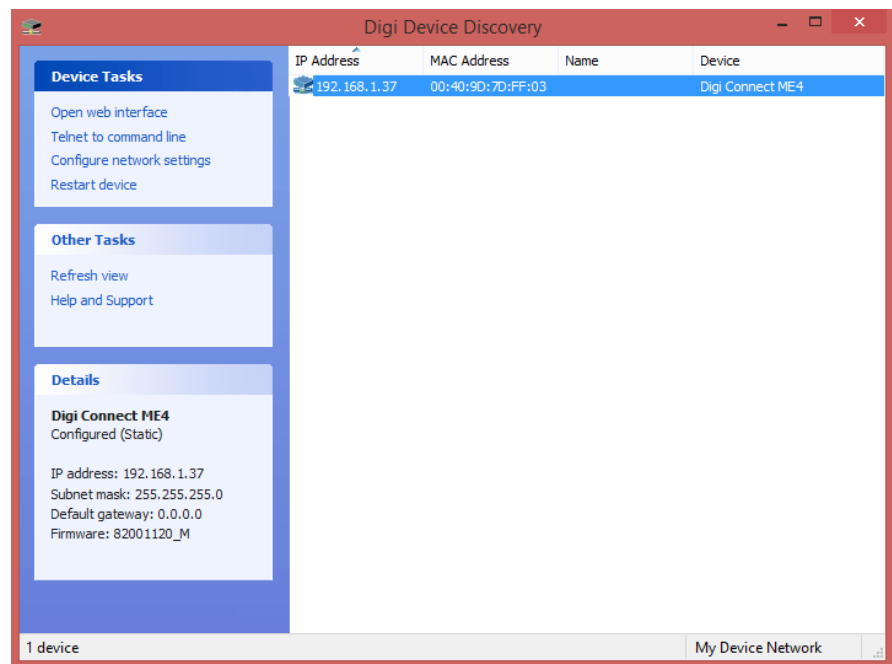
Settings

All parameters inclusive network configuration are available at a web interface on TCP port 80. 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.

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.
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 Utilities.
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).

Modbus router settings:

1. Connect to the converter through web interface.
2. In section "Configuration" select "Serial Ports" and click on "Port 1". Set serial port to profile "Industrial Automation" and "Apply" the changes.
3. The Modbus router listens at the default Modbus TCP port 502.
4. 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.

Virtual COM port on PC - installation:

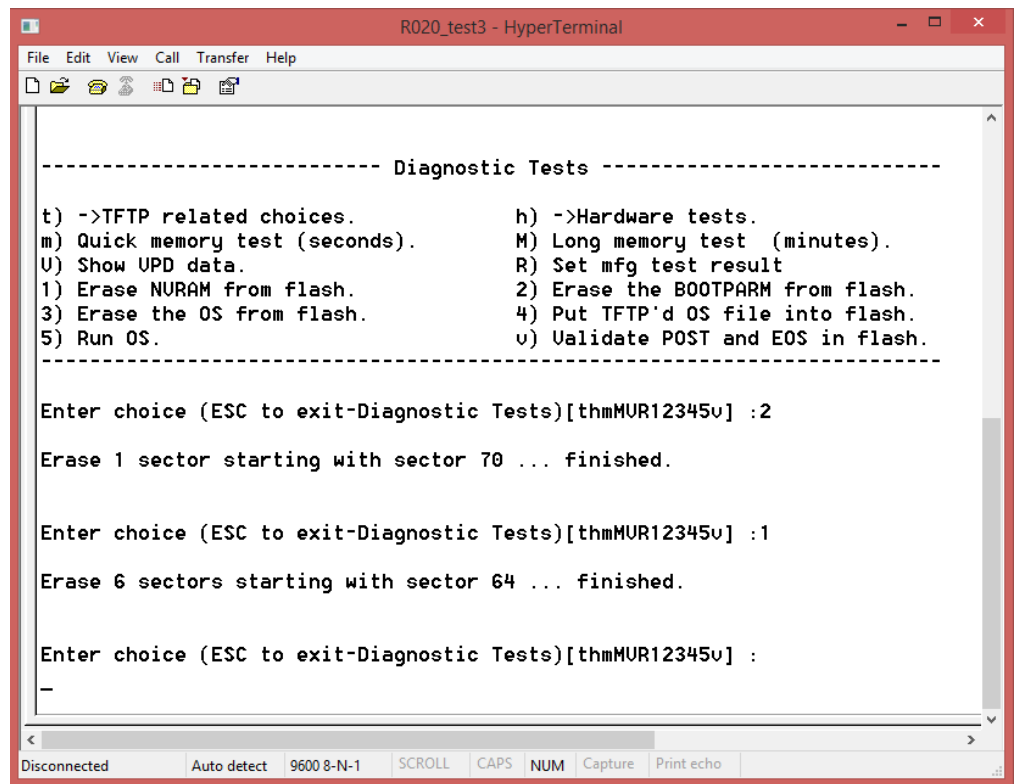
1. Download the actual drivers on:
<http://www.digi.com/support/productdetail?pid=2466&type=drivers>
in the Operating System Specific Drivers menu, choose your operating system and download the drivers.
2. Install the downloaded Digi RealPort software.
3. If the converter is in the same network, the 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 RS232 port, use a USB/RS232 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.

- In window there is the R025 menu. Press 2 (Erase the BOOTPARAM 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.



- Terminate the connection, switch off power and disconnect the INIT jumper.
- 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.
12/2020 – Added note about default password change.
08/2021 – Stylistic adjustments, change of logo.