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R040   WiFi – RS232 data converter

Summary   **R040 is a RS232 to WiFi 802.11b converter, also called „wireless terminal server". This converter is a successor of the previous type M020.**

Application
- **remote RS232 device to PC connection via a WiFi network**
- **bridge function – virtual RS232 channel in a WiFi network (between two R040)**
- **modem emulation - converters are connected using AT commands in a wireless network**

Function   The R040 module is able to connect a RS232 device to a PC over a wireless 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 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 WiFi connector provides two LEDs: Link and Network activity. Small antenna (cca. 3 dB) is included.

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 a 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 ± 10 %; 3 W
WiFi	IEEE 802.11b, 2.4 GHz, transmission speed up to 11 Mbps
	modulation: CCK (11/5 Mbps), DQPSK (2 Mbps), DBPSK (1 Mbps) output power: 16 dBm input sensitivity: -82 dBm at 11 Mbps
	2 LEDs (link, data)
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
1x LED	PWR
HW	NS7520 (RISC processor, 32-bit NET+ARM), 55 MHz, 4 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)
Conformity standards	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

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Schema

Terminals and connectors

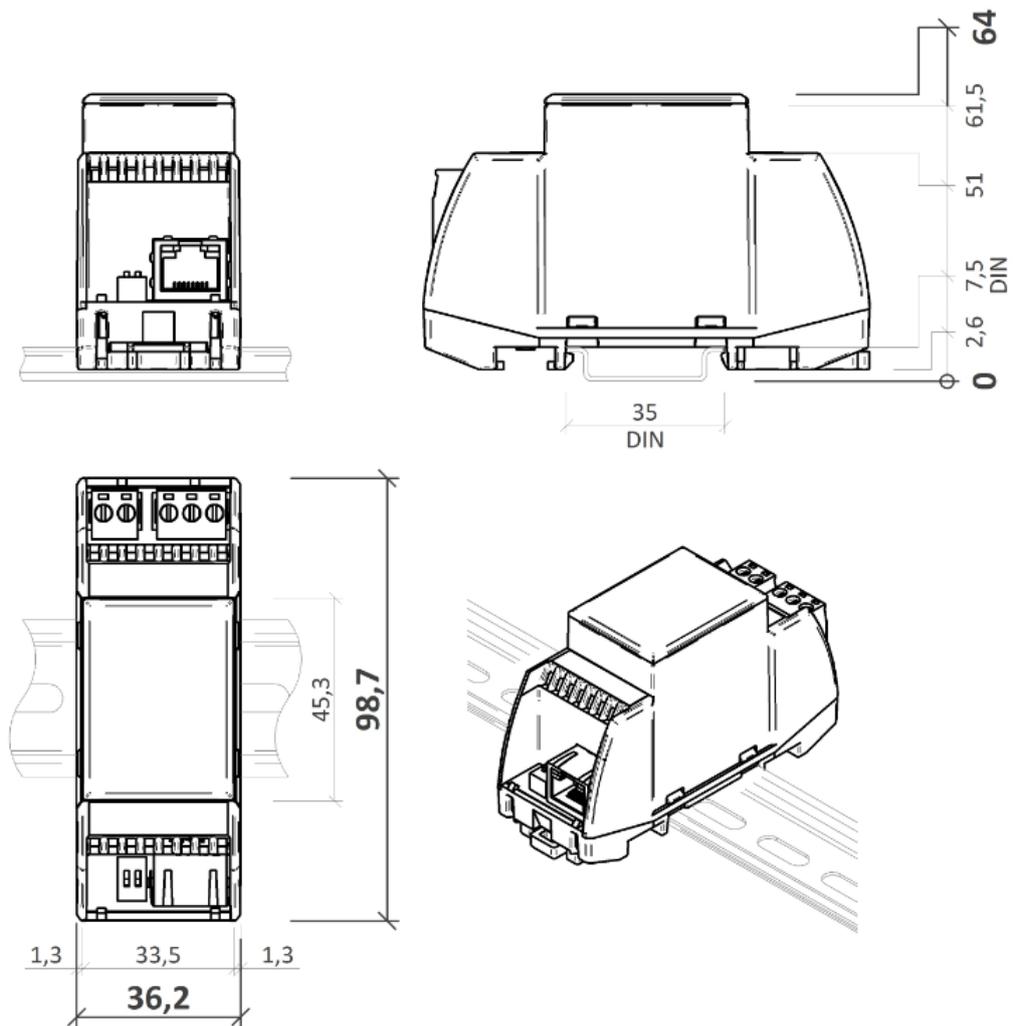|	
G	power
G0	power
WiFi	network interface (screw thread for antenna mounting)
COM	port COM - serial link RS232; CANNON 9 male (1- DCD, 2 - RXD, 3 - TXD, 4 - DTR, 5 - GND, 6 - DSR, 7 – RTS, 8 - CTS)

LED indication

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

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, the converter will be set to factory defaults.

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

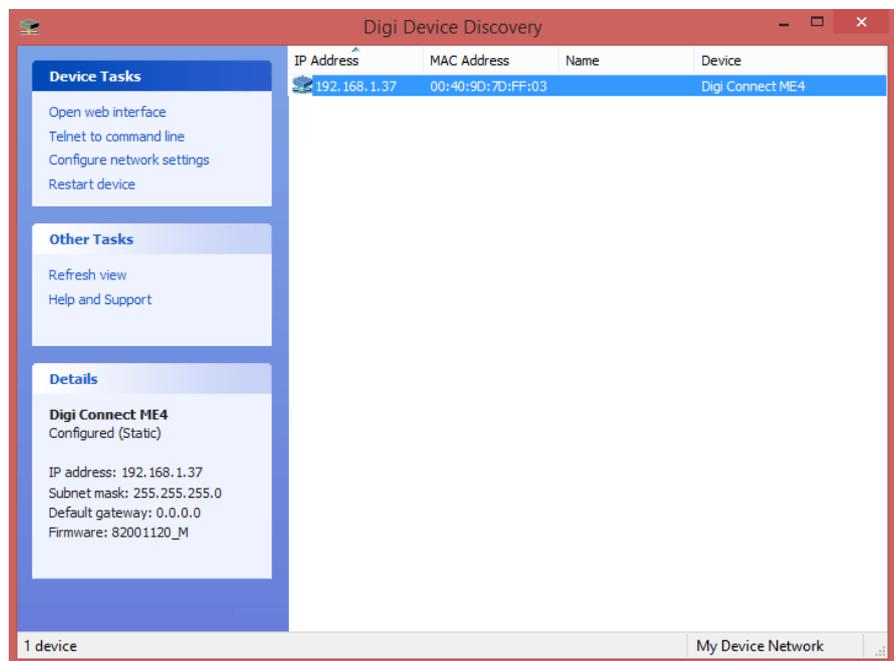Notice: Do not forget to note the new network and user settings after change!

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 item 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. The recent version is available at http://www.digi.com/products/embedded-systems/system-on-modules/digiconnectme#resources in Literature -> Integration Kits.

Connection to web interface and IP settings:

1. Place the converter in a WiFi network signal area which is open (not protected by login and password). It is recommended to ensure that there is not another open WiFi network signal. (For example it is possible to use a mobile WiFi hotspot and close the mobile with the device in a metal box.) 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. Connect your computer in the same WiFi network and set computer IP address in the converter network range (in case of default settings, for example 192.168.1.38; avoid duplicate IP). Enter converter IP address in the 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 , part Utilites.

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

5. In the Device Tasks dialogue set the new IP address (Configure network settings) or go directly to the web page (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 the "Apply" button.

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.

5. In the window there is the R040 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.

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-------------------------- Diagnostic Tests --------------------------
t) ->TFTP related choices.          h) ->Hardware tests.
m) Quick memory test (seconds).     M) Long memory test  (minutes).
U) Show VPD data.                   R) Set mfg test result
1) Erase NVRAM from flash.          2) Erase the BOOTPARM from flash.
3) Erase the OS from flash.         4) Put TFTP'd OS file into flash.
5) Run OS.                          v) Validate POST and EOS in flash.
----------------------------------------------------------------------

Enter choice (ESC to exit-Diagnostic Tests)[thmMVR12345v] :2

Erase 1 sector starting with sector 70 ... finished.


Enter choice (ESC to exit-Diagnostic Tests)[thmMVR12345v] :1

Erase 6 sectors starting with sector 64 ... finished.


Enter choice (ESC to exit-Diagnostic Tests)[thmMVR12345v] :
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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 brought to defaults. 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.
05/2018 – Change technical data.
08/2021 – Stylistic adjustments, change of logo. |