
NETCON PDR 300 FOR SYSTEM NM

Next generation multipurpose radio modem



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FEATURES

Wide area coverage with multi-hop message routing

Network redundancy with parallel communications

Effective usage of radio bandwidth

Dual RS-232 and Ethernet ports

Exceptional receiver sensitivity

Memory card for configuration and log files

Wide temperature range

Forward error correction improves throughput over the air

Remote diagnostics

Flexibility through a single HW platform combined with various software options



Advanced digital radio for wide area communication

The basis of the System NM is a digital radio core where all remote units cooperate. The system consists of a centralised radio network concentrator, the NM-CCU (NM-Central Control Unit), and a number of radio substations called RNOs, integrated into remote switches, reclosers or circuit breakers.

EVENT DRIVEN COMMUNICATIONS

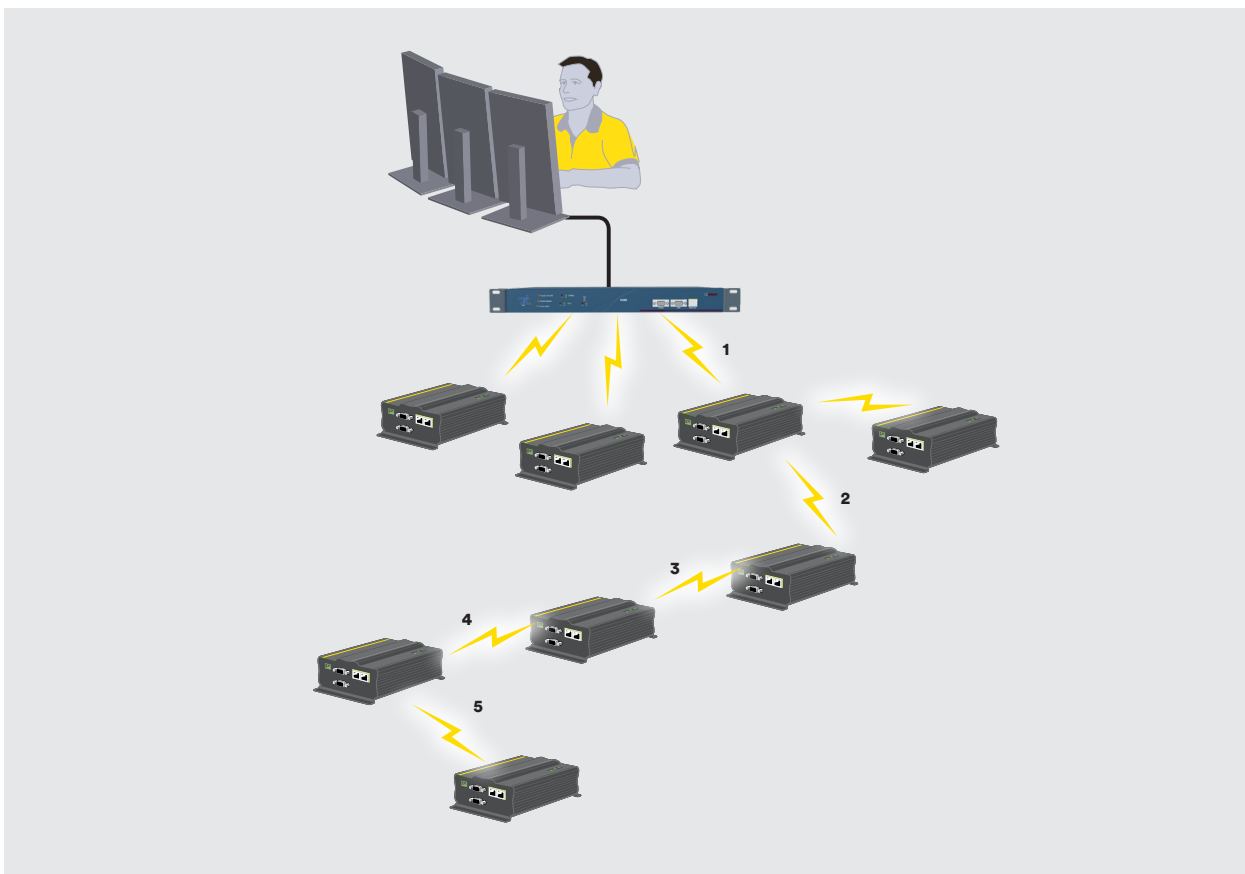
In a typical radio modem system, the master station continuously polls all the remote stations. The polling traffic generates a major overhead with a lot of idle poll and reply messages. System NM solves the overhead traffic issue by using event driven communications. The RTUs communicate with the central NM-CCU only when any status points have changed or a status update is requested

by the master. The number of idle polls is reduced to a minimum. The event driven functionality preserves precious radio bandwidth, making the communications more efficient and scalable.

BUILT-IN REPEATERS WITH REDUNDANCY

System NM radio units, RNOs/RNIs, can act as repeaters, passing messages to other radios. The repeating functionality greatly enhances the geographical coverage of System NM radio networks.

The RNI/RNO software option on the PDR 300 allows up to 5 hops, i.e. 6 radios in any one chain, giving the real wide-area coverage that can overcome the problems posed by difficult terrain.





The feasible distance between any two radios depends on:

- the data rate
- the frequency used
- the type of antennas
- the reliability required.

There are working PDR systems in the VHF spectrum communicating over distances of up to 50 km and in the UHF spectrum reaching up to 30 km.

Thanks to its outstanding receiver sensitivity and the repeating technology already mentioned, the PDR 300 can communicate over distances not achievable by other wireless devices.

Security & reliability

All PDR 300 radios carry unique radio IDs, which means that the wireless data radio system cannot be listened to or interfered with. The PDR 300 also features forward error correction with bit interleaving to bolster its immunity to interference. This enables it to recover data packets with up to 30% corruption.

Transceiver flexibility

The radio has a tuning range of up to 70 MHz. This gives users some leeway in the choice of the exact frequency to be employed and allows a very wide separation of duplex (separate Tx and Rx)



frequencies. The power output can be set anywhere between one milliwatt and 5 W. The signal strength can also be adjusted to suit noisy environments and the bandwidth can be configured to either 12.5 or 25 kHz.

Data rates

The PDR 300 has an over-the-air data rate of up to 19.2 kbps.

Versatile data interfaces

The PDR 300 has dual RS-232 ports and Ethernet ports. This allows a variety of connections to the central system and the slave devices along with the possibility to mix host systems.

Flexible set-up

Configuration is either via standard terminal software using a serial connection or through an SSH session over Ethernet. The interface has clear built-in menus.

The radios are all identical: there is no need to buy separate base stations, outstations and repeaters. Each PDR 300 can be configured to fit any application. This also reduces the need to store service spares.

Remote diagnostics

The PDR 300 enables the user to easily perform measurements on their wireless network bit error rate and also run a communication test of the whole system, including alternative communication paths.



SEVERAL SOFTWARE POSSIBILITIES

The PDR 300 is available with different software options, designed to optimize its functionality for different needs.

RNI 12: Pure System NM radio

The RNI 12 software communicates with Netcontrol's System NM devices. It speaks with a central System NM concentrator, the NM-CCU, which in turn connects to a SCADA system via a standard protocol such as DNP3 or IEC 60870-5-101.

The RNI 12 software supports event-triggered communication to maximise spectrum efficiency. Each RNI 12 radio can also act as a repeater forwarding messages to other units. Messages can pass through 4 other radios before reaching their destination.

A PDR 300 running RNI 12 is backward-compatible with the RNI 12 v2, RNI 12 and RNI 11 radios.

RNO 401: System NM with tunnelled DNP3

The RNO 401 software is used to create a protocol link between the NM-CCU and each RTU. The NM-CCU embeds messages from the SCADA into System NM messages and sends them to the addressed RTUs via any configured repeaters. At each outstation the RNO 401 software extracts the DNP3 messages and sends them to the RTU.

With this software the PDR 300 is compatible with the RNO 401 v2 radio.

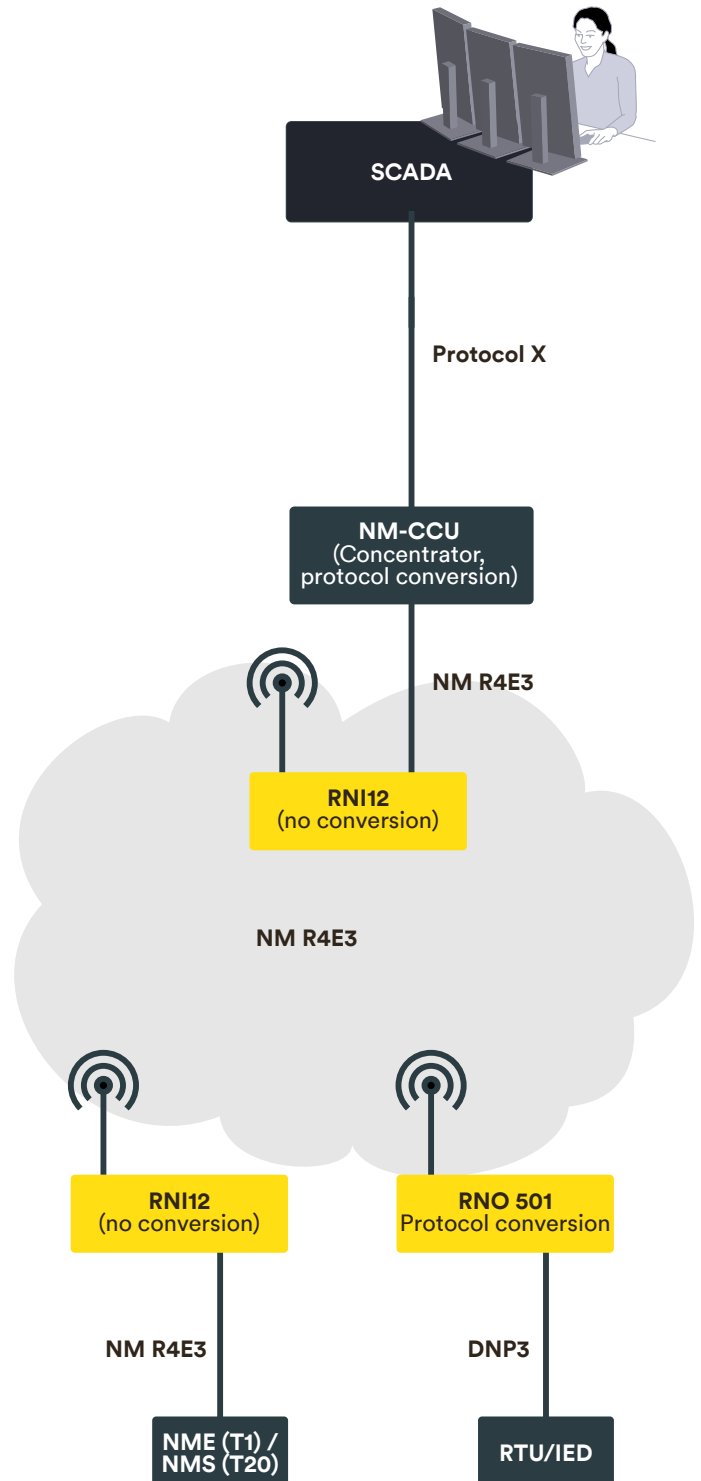
RNO 501: System NM/DNP3 radio

The RNO 501 software is designed for connecting a DNP3-protocol RTU/IED to a System NM network. The software communicates continually with the slave DNP3 device and then sends the messages to the NM-CCU using the more efficient System NM method, avoiding the lengthy DNP3 messages on the air. At the NM-CCU, the messages can be converted back to DNP3 or to another SCADA protocol, such as IEC 60870-5-101 or IEC 60870-5-104.

This software makes the PDR 300 backward-compatible with the RNO 501 v2 radio.

Other software options

The PDR 300 can also be delivered with software supporting Netcontrol's PDR 121 software. This is described in the general PDR 300 brochure.



Technical specifications

Radio transceiver

Data rates and channel spacing	1200/4800/9600 bps @ 12.5 kHz; 19200 bps @ 25 kHz
Frequency range options	UHF 400...470 MHz VHF 135...175 MHz
Operation modes	Half duplex, simplex
Modulation	4FSK, V.23
Forward error correction	Yes, with interleaving functionality (4FSK)
Repeating	Multi-repeating, up to 4 repeaters (6 radios) per path
Number of remote radios/master	300
Supported protocols	RNI 12: R3, ≥ R4 RNO 501: ≥ R4; DNP3 with IED
Tx power	Adjustable, 0.001...5.0 W
Radio receiver sensitivity	-100...-116 dBm @ BER < 10 ⁻⁶ depending on data rate, channel spacing and frequency
Compliance	Certified according to European Radio Equipment Directive (RED, 2014/53/EU)



Temperature requirements

Compliance with radio standards	-20...+55°C
Functional	-40...+75°C



Physical dimensions

Size	H51 × W192 × D114 mm
Weight	900 g

Power supply requirements

Voltage	Nominal 12...24 VDC (10.8...30.0 VDC)
Maximum current	1.4 A at 5 W Tx at 24 V



Connections

Main power supply	2-pole, female, 5.08 mm pitch; isolated from chassis
Antenna	BNC, female
Serial Ports	2 × RS-232 DB9 female, both wired as DCE (modem), isolated from chassis
Data rate	COM: 600...57600 bps CFG: 600...115200 bps
Flow control	RTS/CTS, DCD selectable depending on software
Ethernet ports	2 × 10/100Base-T
Ethernet port protocols	TCP/IP, UDP/IP
Configuration	Menu-based; from standard Windows terminal software via RS-232 or Ethernet (SSH) connection
LED Indicators	CPU, Configuration mode, System Detect, Carrier Detect, Radio Tx, Radio Rx, Configuration Tx, Configuration Rx, COM Tx, COM Rx



Advanced digital radio for wide area communication



NETCON PDR 300 FOR SYSTEM NM IN BRIEF

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- Remote diagnostics
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