

Modular Industrial Router **MRX**

Flexible.
Powerful.
Future-proof.



M2M Communication Technology that adjusts to your needs

Changing demands requires flexible solutions. Modularity is the answer to this challenge. The new MRX industrial router series provides you with the necessary scope for developing future- and investment-proof applications and adjust them if required. This results in an optimum cost/performance ratio and extended service life.

Like all routers of INSYS icom, this fully-modular platform is characterised by very high system stability, longevity and consistent user guidance. VPN, a stateful firewall and further IT security features are integrated. An integrated Linux programming environment: based on LXC technology allows execute programs and scripts on an MRX in the so-called icom SmartBox (edge computing).

The new MRX series is available in two basic variants, LAN and LTE, each in two housing widths. It can be tailored to the application using various plug-in cards (MRcards) that can also be developed customer-specific.

Highlights

- High performance for broadband networks and high VPN data rate
- Dynamic routing
- Dual APN: Traffic division across 2 APNs
- Several VPN tunnels can be used in parallel
- Stateful firewall also in VPN tunnel
- Segmentation in several local IP networks
- Flexible administration with profile manager
- Extended event-based control (e.g. profiles, connections, redundancy)
- Access control via user roles
- Integrated Linux environment for edge computing (icom SmartBox)
- PPPoE for external ADSL modem
- Quick start for icom Connectivity Suite – VPN

Housing Widths

- MRX3: 3 slots, 2 of them preallocated
- MRX5: 5 slots, 2 of them preallocated

Basic Variants

- MRX LTE: Base card + cellular card
- MRX DSL: Base card + DSL card
- MRX LAN: Base card + supply card



MRcard **ES**

- 4-port switch (10/100 MBit)



MRcard **PL**

- LTE
- UMTS/HSPA
- GPRS/EDGE
- 2 digital inputs



MRcard **PD**

- VDSL2
- ADSL2/2+
- 2 digital inputs
- 2 variants (-A, -B)



MRcard **SI**

- RS232
- RS485
- 2 digital inputs
- 2 switch outputs

Technical Data MRX (Basic Variants)

Mobile communication (only MRX LTE)

Frequency bands	4G/LTE*: 800, 900, 1.800, 2.100, 2.600 MHz; LTE Cat. 3 (DL: 100 Mbps, UL: 50 Mbps) 3G/UMTS/HSPA: 900, 1.800, 2.100 MHz; UMTS, HSPA+ (DL Cat. 24, UL Cat. 6) 2G/GPRS/EDGE: 900, 1.800 MHz; GPRS/EDGE Class 12
Antenna connection	2x SMA female (2G/3G/4G: Main, 3G: Rx Diversity, LTE: MIMO)
SIM	Slot for 1 Mini-SIM card (2FF), locked

Wire-bound VDSL/ADSL communication (only MRX DSL)

DSL standards	MRX DSL-A (Annex A): <ul style="list-style-type: none"> VDSL2 G.993.2 Profile 8a, 8b, 8c, 8d, 12a, 12b, 17a. 30a, VDSL2 Vectoring G.993.5 ADSL/ADSL2/ADSL2+ G.992.1 Annex A, G.992.3. Annex A/L/M, G.992.5 Annex A and M, T1.413 MRX DSL-B (Annex B): <ul style="list-style-type: none"> VDSL2 G.993.2 Profile 8a, 8b, 8c, 8d, 12a, 12b, 17a. 30a, VDSL2 Vectoring G.993.5 ADSL/ADSL2/ADSL2+ G.992.1 Annex B, G.992.3. Annex B, G.992.5 Annex B and J
DSL connection	RJ45 connector

Router

Function	Up to 5 IP networks local (LAN) or as WAN, VLAN incl. tags and trunk ports; own DHCP server per IP network, static routing, routing priority configurable; dynamic routing OSPF, BGP, RIP, RIPv2, RIPng; netfilters: DNAT, SNAT, IP/port forwarding, netmapping, IP filters (stateful firewall), DNS relay, dynDNS support, PPPoE for external DSL modem, dual APN: traffic division across 2 APNs - e.g. for separating payload and management data (only cellular radio)
Security	OpenVPN (client and server), IP filters (stateful firewall) also in VPN tunnel, several VPN tunnels in parallel possible, IPsec, GRE (incl. multi-port), DMVPN, PPTP server
Redundancy	WAN chains: several WAN accesses configurable (prioritised and event-controlled), WAN groups: parallel operation of WAN interfaces or VPNs, several OpenVPN servers, additional redundancy via further MRcards

Ethernet switch, interfaces

Ports	5 x RJ45, 10/100 MBit/s, Full/half duplex, Auto MDI-X, 1.5 kV isolation voltage
Function	Each port can be freely assigned to the IP networks, Link up/down detection, configuration port
Inputs	2 digital inputs, 1x low-active, 1x high-active (as per EN 61131-2, Type 1)
Events (selection)	Change: input, Ethernet port, WAN chain, profile, supply input, cellular field strength; timer expiry, firewall violation, login attempt detection, pulse sequence at digital input, counter
Event-controlled actions (selection)	E-mail messages, SMS, SNMP traps, MCIP, start timer, profile switching, connection switching, reset, log out/turn off modem, activate firmware, pulse sequence

Operation

Wizards	Configuration of connection incl. VPN, adding LAN networks, quick start of icom Connectivity Suite – VPN
Help	Web interface with inline help texts, online help, FAQ, exemplary profiles, plausibility check
Configuration	Web interface local and remote (http, https; with session management), Command line interface (CLI), Telnet, SSH, ASCII and binary file (also for backup), configuration management with switchable profiles (event-controlled)
Indications (LEDs)	Power, WAN (Internet connection), Info (configurable), Signal (with cellular radio), DSL (with DSL)
Authentication	Several users, different user roles and rights, RADIUS
Diagnosis	Comprehensive log files, support package, integrated help functions, Diagnosis tools: ping, tcpdump, traceroute, DNS lookup, AT commands
Firmware updates	Incremental, fail-safe, automated via update server (http, ftp, https, ftps)

Edge Computing

icom SmartBox	Linux programming environment: creation of LXC containers for programs and scripts (apps), ARMv7 CPU, 192 MB RAM, 2 GB flash memory
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Additional features	NTP client and server, buffered real-time clock
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Technical Data

MRX (Basic Variants) / MRcards

Supply		
Voltage	12 ... 24 V DC (± 20%), 2 supply connections with changeover detection	
Terminals	5-pin push-in terminal connectors (maintenance free), rigid/flexible conductors up to 2.5 mm ²	
Power consumption (basic variants without further MRcards)	MRX DSL: typical approx. 6.5 W, max. 8.0 W MRX LAN: typical approx. 2.0 W, max. 3.5 W (depending on data throughput amongst others) MRX LTE: typical approx. 2.5 W, max. 8.0 W	
Ambient conditions		
Dimensions (WxDxH)	MRX3: 82 x 88 x 117 mm	MRX5: 136 x 88 x 117 mm
Operating temperature MRX LAN, MRX LTE	-30...+70 °C, -30...+75 °C under restricted conditions (refer to www.insys-icom.com/restricted)	
Operating temperature MRX DSL	0...+50 °C 0...+55 °C basic variants or with additional MRcards ES and MRcards SI -25...+55 °C under restricted conditions (refer to www.insys-icom.de/restricted)	
Humidity	0...95% (non-condensing)	
Mounting / protection class	DIN rail mounting / housing: IP40, terminals: IP30	
Approvals & Standards		
Certifications	CE, MRX LAN additionally: FCC Part 15 Class B, IC	
EMC	Emission: EN 55032 Class B; Immunity: EN 61000-6-2, EN 55024	
Security	IEC/EN 60950, 62368	
Environmental conditions	Vibration/shock as per PLC standard EN 61131-2 and EN 60068-2-6, EN 60068-2-27; Temperature tests as per EN 60068-2-1, EN 60068-2-2, EN 60068-2-14, EN 60068-30	

MRcard ES (Ethernet Switch)

Ethernet switch	
Ports	4 x RJ45, 10/100 MBit/s, Full/half duplex, Auto MDI-X, 1.5 kV isolation voltage
Function	Each port can be freely assigned to the IP networks, Link loss detection
Supply	
Voltage	Supplied via MRX
Power consumption	typical approx. 1.0 W, max. 1.5 W
Certifications	CE, FCC Part 15 Class B, IC

MRcard PL (LTE)

Mobile communication	
Frequency bands	4G/LTE*: 800, 900, 1.800, 2.100, 2.600 MHz; LTE Cat. 3 (DL: 100 Mbps, UL: 50 Mbps) 3G/UMTS/HSPA: 900, 1.800, 2.100 MHz; UMTS, HSPA+ (DL Cat. 24, UL Cat. 6) 2G/GPRS/EDGE: 900/1.800 MHz; GPRS/EDGE Class 12
Antenna connection	2x SMA female (2G/3G/4G: Main, 3G: Rx Diversity, LTE: MIMO)
SIM	Slot for 1 Mini-SIM card (2FF), locked
Inputs	2 digital inputs for configurable actions, 1x low-active, 1x high-active (as per EN 61131-2, Type 1)
Indications (LEDs)	Power, WAN (Internet connection), Signal (cellular radio), Info (configurable)
Supply	
Voltage	Supplied via MRX, 2 further supply connections optional (redundancy) 12 ... 24 V DC ($\pm 20\%$)
Power consumption	typical approx. 1.0 W, max. 5.0 W
Certifications	CE, FCC Part 15 Class B, IC

Order Numbers, Accessories MRcards

MRcard PD (VDSL/ADSL)

Wire-bound VDSL/ADSL communication	
DSL standards	MRcard PD-A (Annex A): <ul style="list-style-type: none"> ■ VDSL2 G.993.2 Profile 8a, 8b, 8c, 8d, 12a, 12b, 17a, 30a, VDSL2 Vectoring G.993.5 ■ ADSL/ADSL2/ADSL2+ G.992.1 Annex A, G.992.3. Annex A/L/M, G.992.5 Annex A and M, T1.413 MRcard PD-B (Annex B): <ul style="list-style-type: none"> ■ VDSL2 G.993.2 Profile 8a, 8b, 8c, 8d, 12a, 12b, 17a, 30a, VDSL2 Vectoring G.993.5 ■ ADSL/ADSL2/ADSL2+ G.992.1 Annex B, G.992.3. Annex B, G.992.5 Annex B and J
DSL connection	RJ45 socket
Inputs	2 digital inputs for configurable actions, 1x low-active, 1x high-active (as per EN 61131-2, Type 1)
Indications (LEDs)	Power, WAN (Internet connection), Info (configurable), DSL
Supply	
Voltage	Supplied via MRX, 2 further supply connections optional (redundancy) 12 ... 24 V DC ($\pm 20\%$)
Power consumption	approx. 5.0 W
Certifications	CE

MRcard SI (serial)

Serial interface	
RS232 (Serial1)	1 x RS232 / D-Sub-9 (m)
RS485 (Serial2)	Terminal connector (D+, D-, GND), termination and bias via DIP switch
Functions	Serial-Ethernet gateway (incoming and outgoing connections, Modbus TCP/RTU gateway, modem emulation, editable AT answer list, phone number conversion to IP addresses), PPPoE for external ADSL modem
USB 2.0	Prepared, USB 2.0 host, socket type A, output current max. 200 mA
Inputs/Outputs	
Digital inputs	2x via terminals, activated by connection to GND, monitoring with event
digital outputs	2x via terminals, potential-free change-over relay, switchable via action
Indications (LEDs)	Condition of digital inputs and outputs
Supply	
Voltage	Supplied via MRX
Power consumption	typical approx. 1.0 W, max. 2.5 W
Terminals	Push-in terminal connectors (maintenance free), rigid/flexible conductors up to 2.5 mm ² Inputs/outputs: 2x 5-pin, RS485: 3-pin
Certifications	CE, FCC Part 15 Class B, IC

Order Numbers and Accessories

MRX

Product description	Features	Order number
MRX3 LAN	5 Ethernet ports, 2 inputs, 1 free MRcard slot	10016582
MRX5 LAN	5 Ethernet ports, 2 inputs, 3 free MRcard slots	10017036
MRX3 LTE	Cellular radio (LTE/HSPA/UMTS/EDGE/GPRS), 5 Ethernet ports, 2 inputs, 1 free MRcard slot	10016583
MRX5 LTE	Cellular radio (LTE/HSPA/UMTS/EDGE/GPRS), 5 Ethernet ports, 2 inputs, 3 free MRcard slots	10017037
MRX3 DSL	VDSL2, ADSL/2/2+, 2 inputs, 5 Ethernet ports, 1 free MRcard slot	Annex A: 10019436 Annex J/B: 10019437
MRX5 DSL	VDSL2, ADSL/2/2+, 2 inputs, 5 Ethernet ports, 3 free MRcard slots	Annex A: 10019786 Annex J/B: 10019787
MRcard PL	Cellular radio (LTE/HSPA/UMTS/EDGE/GPRS), 2 digital inputs	10017035
MRcard ES	4-port switch (10/100 Mbit)	10016584
MRcard PD	VDSL2, ADSL/2/2+, 2 digital inputs	Annex A: 10019434 Annex J/B: 10019435
MRcard SI	RS232, RS485, USB 2.0, 2 digital inputs, 2 switch outputs	10016585

Suitable accessories

Product description	Description	Order number/Information
Magnetic base antenna 4G/3G/2G SMA	Frequencies (MHz): 700, 800, 850, 900, 1800, 1900, 2100	10019504
Outside mounted antenna 4G/3G/2G SMA	Frequencies (MHz): 700, 800, 850, 900, 1800, 1900, 2100	10017467
Antenna extension cable 5 m SMA	Device connector: SMA (f), antenna connection: SMA (m)	10015193
Antenna extension cable 10 m SMA	Device connector: SMA (f), antenna connection: SMA (m)	10000742
Antenna extension cable 15 m SMA	Device connector: SMA (f), antenna connection: SMA (m)	10000735
Power supply unit	TDK Lambda DSP 10-24 AC/DC power supply unit for DIN rail	10014249
icom Connectivity Suite – VPN	VPN Service for M2M Applications	
icom Connectivity Suite – M2M SIM	Industrial SIM cards, multi-roaming, pooling, management portal	