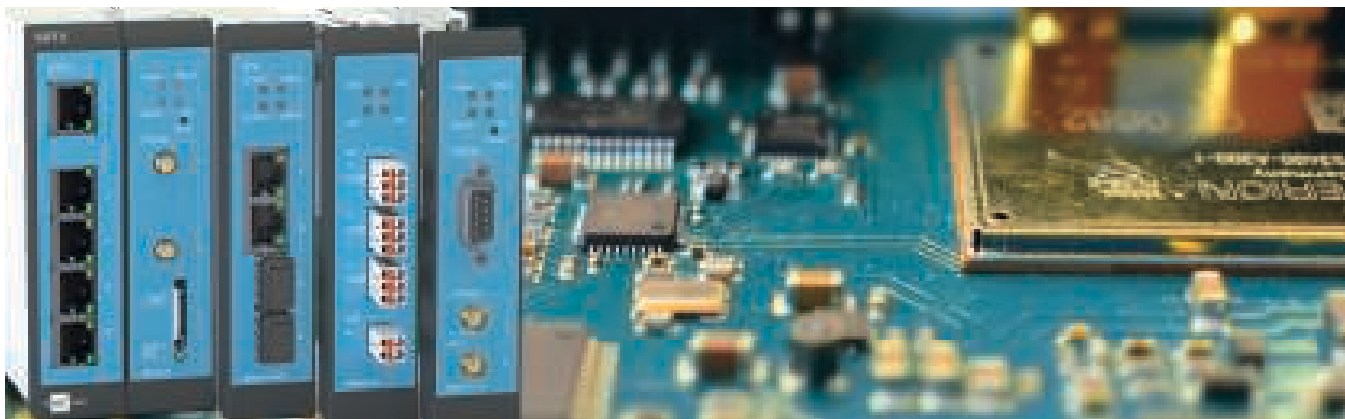# MRcards

Modular plug-in cards for MRX series routers

INSYS icom

The plug-in cards extend your high-performance MRX series routers by a wide range of functions. This allows you to adapt each MRX to the individual requirements of your applications.

The combinable plug-in cards eliminate the need for additional devices in your system. This reduces costs and space requirements in the control cabinet and also makes the installation and administration of your system more efficient, uniform and secure. MRcards may also provide hardware redundancy to ensure a fail-safe Internet connection. Combine DSL, mobile radio and fibre optics according to your requirements and implement your desired fallback options all in a single device.

With the plug-in cards you will also be ready for the future, because for technology upgrades, e.g. to 5G, you can enable your MRX cost-effectively and without time-consuming reconfiguration of the device.

We are constantly adding to our MRcard range, ensuring that your applications stay up to date with the latest technology. Choose your favourites from the following MRcards:

MRcard PL

- Cellular radio
- 2 digital inputs

MRcard PD

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

MRcard ES

- 4-port switch (10/100 MBit)

MRcard SI

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

MRcard PLS

- Cellular radio
- incl. US variant
- RS232
- 2 digital Inputs
- 1 digital output

MRcard Fiber

- 2x Gigabit SFP
- 2x Gigabit Ethernet (Switch)

MRcard WLAN

- WLAN Access Point and Client
- 2.4 GHz and 5 GHz

MRcard IO

- 3 analogue inputs
- 1 analogue output
- 4 digital inputs
- 4 digital outputs

MRcards
Technical Data

MRcard PL (Cellular radio)

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 / environmental conditions	
Voltage	Supplied via MRX, 2 further supply connections optional (redundancy) 12 ... 24 V DC (± 20%)
Power consumption	typical approx. 1.0 W, max. 5.0 W
Operating temperature	-30...+75 °C[1]
Certifications	CE

MRcard PD (VDSL/ADSL)

Wire-bound VDSL/ADSL communication	
DSL standards	MRcard PD-A (Annex A): ■ 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): ■ 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
Function	PPPoA
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 / environmental conditions	
Voltage	Supplied via MRX, 2 further supply connections optional (redundancy) 12 ... 24 V DC (± 20%)
Power consumption	approx. 5.0 W
Operating temperature	-25°C...+60°C [2]
Certifications	CE

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-up/down detection
Supply / environmental conditions	
Voltage	Supplied via MRX
Power consumption	typical approx. 1.0 W, max. 1.5 W
Operating temperature	-30...+75 °C
Certifications	CE, FCC Part 15 Class B, IC

1 Range +70...+75 °C: under restricted conditions (refer to: www.insys-icom.com/restricted)
2 Ranges -25 … 0°C and 55°C …. 60°C under restricted conditions (refer to: www.insys-icom.com/restricted)
 Note: range 55°C … 60°C only without further MRcards PD or PL

*   *Please check the availability of the LTE frequencies in the planned operating area. Above specified frequencies are currently used in Europe, Middle East, Africa and, to some extent, in the Asia-Pacific region and South America.*

www.insys-icom.com

MRcards
Technical Data

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)
USB 2.0	Prepared, USB 2.0 host, socket type A, output current max. 200 mA
Inputs / Outputs	
Digital inputs	2 digital inputs, monitorable status, high active, connection to 10 ... 24 V DC, as per EN 61131-2, type 1, push-in terminal connectors
Digital outputs	2x via terminals, potential-free change-over relay, switchable via action
Indications (LEDs)	Condition of digital inputs and outputs
Supply / environmental conditions	
Voltage	Supplied via MRX
Power consumption	typical approx. 1.0 W, max. 2.5 W
Operating temperature	-30...+75 °C
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

MRcard PLS (Cellular radio / serial)

Mobile communication	
Frequency bands (MRcard PLS)	4G/LTE*: 800, 900, 1.800, 2.100, 2.600 MHz; LTE Cat. 3 (DL: max. 100 Mbps, UL: max. 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
Frequency bands (MRcard PLS-US)	4G/LTE: 700, 850, 1.700/2.100 (AWS), 1.900 MHz; LTE Cat. 3 (DL: max. 100 Mbps, UL: max. 50 Mbps) 3G/UMTS/HSPA: 850, 1700/2100 (AWS), 1.900 MHz; UMTS, HSPA+ (DL: Cat. 24, UL: Cat. 6) 2G/GPRS/EDGE: 850, 900, 1.800, 1.900 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
Indications	Power, WAN (Internet connection), Signal (cellular radio), Info (configurable)
Serial interface	
RS232	1 x RS232 / D-Sub-9 (m)
Functions	Serial-Ethernet gateway (incoming and outgoing connections, Modbus TCP/RTU gateway, modem emulation, editable AT answer list, translation of phone numbers to IP addresses)
Inputs / Outputs	
Digital inputs	2 digital inputs, 1x contact input (active), 1x voltage-sensitive (passive, as per EN 61131-2, Type 1)
Digital outputs	1 open collector output
Supply / environmental conditions	
Voltage	Supplied via MRX, 2 further supply connections optional (redundancy) 12 ... 24 V DC (± 20%)
Power consumption	tbd
Operating temperature	-30...+75 °C [3]
Certifications	CE (MRcard PLS), FCC (MRcard PLS-US)

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1 Range +70...+75 °C: under restricted conditions (refer to: www.insys-icom.com/restricted)

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* *Please check the availability of the LTE frequencies in the planned operating area. Above specified frequencies are currently used in Europe, Middle East, Africa and, to some extent, in the Asia-Pacific region and South America.*

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MRcards

Technical Data

MRcard Fiber

SFP	
SFP ports	2x SFP cages
	for SFP transceiver module as per SFP-MSA, 1000BASE-X
	4x LEDs SFP Status and SFP Link (Activity)
Gigabit	
Gbit Ethernet ports	2x RJ45, 10/100/1000-Base-T, full/half duplex, Auto MDI/MDI-X, 1.5 kV isolation voltage
Configuration (planned)	Several IP networks, failover (redundancy) link up/down detection, if applicable RSTP (ring topology)
Supply / environmental conditions	
Voltage	Supplied via MRX
Power consumption	tbd
Operating temperature	-30...+70 °C (tbd)
Certifications (planned)	CE, if applicable FCC

MRcard IO

Inputs / Outputs	
Analogue inputs	3x on push-in terminal (3-pin), measuring range individually selectable: voltage 0 … 10 V / current 0 / 4 … 20 mA, accuracy (standard devices): ± 0.3 % to range value ± 100 ppm/K, isolated, also between the inputs
Analogue outputs	1x on push-in terminal (2-pin), mode selectable: voltage 0 … 10 V / current 0 / 4 … 20 mA, accuracy (standard devices): ± 0.3% to range ±100 ppm/K, resolution 12 bits
Digital inputs	4x on push-in terminal (5-pin), can be switched together: contact input (active) or voltage-sensitive (passive, level as per EN 61131, Type 1), galvanic isolation
Digital outputs	4x on push-in terminal (5-pin), relay normally open, load capacity max. 3 A per output, altogether max. 5 A
Indications	4x LEDs change of digital inputs, states of analogue inputs, change of digital outputs
Supply / environmental conditions	
Voltage	Supplied via MRX
Power consumption	tbd
Operating temperature	-30...+70 °C (tbd)
Certifications (planned)	CE, if applicable FCC

MRcard WLAN

| WIFI	
Standards	IEEE 802.11 b/g/n/ac
Frequency ranges, transmission power	2.4 GHz and 5 GHz, max. 100 mW
WLAN (Wi-Fi) modes	WLAN (Wi-Fi) Station (Client), WLAN Access Point with up to 10 stations simultaneously
Security	WPA/WPA2 (AES, TKIP), 802.1x (EAP: TLS, TTLS, PEAP)
Antenna connection	1x reverse SMA male
Supply / environmental conditions	
Voltage	Supplied via MRX
Power consumption	tbd
Operating temperature	-30...+70 °C (tbd)
Certifications (planned)	CE, if applicable FCC

MRcards

Order Numbers and Accessories

INSYS icom

Available Variants

Product description	Features	Order number
MRcard PL	Cellular radio (LTE/HSPA/UMTS/EDGE/GRPS), 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
MRcard PLS	cellular radio (LTE/HSPA/UMTS/EDGE/GPRS), RS232, 2 digital inputs, 1 digital output	10022163
MRcard PLS-US	cellular radio (LTE/HSPA/UMTS/EDGE/GPRS, US-frequencies, RS232, 2 digital inputs, 1 digital output	10022164
MRcard Fiber (Prototype)	2 SFP ports, 2-port Gigabit switch	10022271
MRcard IO (Prototype)	3 analog inputs, 1 analog outputs, 4 digital inputs, 4 digital outputs (relay)	10022272
MRcard WLAN (Prototype)	WLAN (Wi-Fi) Access Point or Station (Client), 2.4 GHz and 5 GHz	10022273

Suitable accessories

Product description	Description	Order number/Information
Magnetic Antenna 4G/3G/2G SMA	Height 72 mm, 3 m cable, SMA (m), protection class IP65	10019504
Outdoor Wall Antenna 4G/3G/2G SMA	Height 22 cm, mounting angle, 5m cable, SMA (m), protection class IP65	10020596
Magnetic/screw/adhesive Antenna 4G/3G/2G SMA	Height 38 mm, 5m cable, SMA (m)	10017462
Panel Antenna 4G/3G/2G MIMO SMA	MIMO antenna, height 8.4 cm, width 18.4 cm, 2x 2 m cable, SMA (m), protection class IP67	10020565
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)	10018607
Antenna Extension Cable 15 m SMA	Device connector: SMA (f), antenna connection: SMA (m)	10000735
icom Connectivity Suite – VPN	VPN Service for M2M Applications	insys-icom.com/iCS/VPN
icom Connectivity Suite – M2M SIM	Industrial SIM cards, multi-roaming, pooling, management portal	insys-icom.com/iCS/SIM
icom OAM	Central management of devices, configurations, certificates and update packages	insys-icom.com/en/OAM

INSYS OS
INSYS Sandbox

icom SmartBox
icom OS
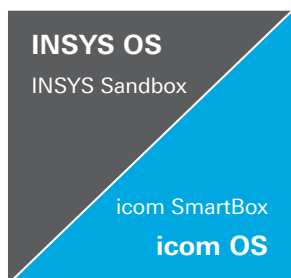
Migration from INSYS OS to icom OS: We would be glad to support you!

You are still using routers of the series MoRoS, EBW or IMON with INSYS OS operating system?

We stand by you with words and deeds for a migration to the MRX with our icom OS operating system: Request the detailed white paper, visit our trainings or use our services, whether for configuration adaptation or migration from Linux applications to the icom SmartBox.

Further information:
https://www.insys-icom.com/en/products/our-ecosystem/our-operating-system/#migration