

# MIRO MIROdul

## Compact cellular router



## MIRO – simply industrial

Compact. Easy. Secure.

The MIRO series from INSYS icom provides secure and stable routing in a very compact device for an attractive price. The cellular routers are suitable for secure Internet connections and remote maintenance, and impress with their high system stability, durability and ease of use.



### Highly compact design

Easy integration into automatic dispensing machines and digital signage solutions, also available as module



### Easy remote access & updates

Plug & play connection of VPN service and central device management



### Flexible mounting

Top-hat rail mounting for control cabinets/small distribution boards and wall mounting



### Ethernet and I/O

Up to two Ethernet connections and configurable digital input/output



### High level of IT security

Hardened operating system, extensive monitoring and security functions



### Professional router operating system

Extensive VPN and routing functions with easy usability

## Technical Data

| Cellular communication  |  |
|---|--|
| Frequency bands <sup>1</sup> , data rates<br>MIRO-L100 /-L200<br>& MIROdul-L100 /-L200      | 4G/LTE: 1 (2100 MHz), 3 (1800 MHz), 7 (2600 MHz), 8 (900 MHz), 20 (800 MHz), 28A (700 MHz)<br>LTE Cat 1 (DL: max. 10 Mbit/s, UL: max. 5 Mbit/s)<br>3G/UMTS/HSPA: 1 (2100 MHz), 8 (900 MHz) , HSDPA/HSUPA (DL: max. 42 Mbit/s, UL: max. 5.7 Mbit/s) <sup>3</sup><br>2G/GPRS/EDGE: 900, 1800 MHz, GPRS/EDGE Class 12 (DL: max. 296 kbit/s, UL: max. 237 kbit/s)  |
| Frequency bands, data rates<br>MIRO-L110 /-L210<br>& MIROdul-L110 /-L210<br>(North America) | 4G/LTE: 2 (1900 MHz), 4 (2100/1700 MHz AWS), 12 (700 MHz)<br>LTE Cat 1 (DL: max. 10 Mbit/s, UL: max. 5 Mbit/s)<br>3G/UMTS/HSPA: 2 (1900 MHz), 4 (2100/1700 MHz AWS), 5 (850 MHz)<br>HSDPA/HSUPA (DL: max 42 Mbit/s, UL: max 5.7 Mbit/s) <sup>3</sup>   |
| Frequency bands, data rates<br>MIRO-L230<br>(world wide frequency bands)                    | 4G/LTE: 1 (2100 MHz, 2 (1900 MHz), 3 (1800 MHz), 4 (2100/1700 MHz), 5 (850 MHz), 7 (2600 MHz), 8 (900 MHz), 12 (700 MHz), 13 (700 MHz), 18 (850 MHz), 19 (850 MHz), 20 (800 MHz), 25 (1900 MHz), 26 (850 MHz), 28 (700 MHz), 38 (2600 MHz), 39 (1900 MHz), 40 (2300 MHz), 41 (2500 MHz)<br>LTE Cat 4 (DL: max. 150 Mbit/s, UL: max. 50 Mbit/s) <sup>3</sup><br>3G/UMTS/HSPA: 1 (2100 MHz), 2 (1900 MHz), 4 (2100/1700 MHz AWS), 5 (850 MHz), 6 (800 MHz), 8 (900 MHz), 19 (800 MHz)<br>HSDPA/HSUPA (DL: max 42 Mbit/s, UL: max 5.7 Mbit/s) <sup>3</sup><br>2G/GPRS/EDGE: 850, 900, 1800, 1900 MHz, GPRS/EDGE Class 12 (DL: max. 296 kbit/s, UL: max. 237 kbit/s) |
| Antenna connection  | 1x SMA female  |
| SIM   | Slot for 1 Mini-SIM card (2FF), locked<br>Provider redundancy with multi-roaming SIM cards (see section "Suitable accessories")  |
| Cellular Status   | Signal field strength, RSSI, RSCP / Ec/No, RSRP / RSRQ, Cell-ID, Location-ID   |
| Hardware interfaces   |  |
| Ethernet ports  | MIRO-L1x0 / MIROdul-L1x0: 1x RJ45 shielded,<br>MIRO-L2x0 / MIROdul-L2x0: 2x RJ45 shielded,<br>10/100 Mbit/s, Full/half duplex, Auto MDI-X, 1.5 kV isolation voltage  |
| Ethernet function   | Assignment to IP network freely configurable per port, link-up/down detection  |
| I/Os  | 1 digital input or output, configurable: Input low active (contact input) or output open drain (24 V / 50 mA)  |
| Displays (LEDs)   | Power, WAN (Internet connection), Signal (cellular communication)  |
| Network   |  |
| Network functions   | 5 local IP networks, IP static/DHCP, TCP, UDP, IPv4, IPv6, NTP, DHCP, DNS, HTTP/S, ARP, SSH, 802.1Q VLAN incl. tags and trunk ports  |
| Service   | DHCP Server v4/v6 per IP network, DHCP relay, NTP server, DNS, DynDNS, IPv6 Router Advertiser  |
| Routing   | Static routing, routing priority, dynamic routing (OSPF, BGP, RIPv1, RIPv2, RIPvng)  |
| Connection check  | Periodic, ping/icmp, DNS request, link up/down   |
| DSL   | PPPoE for external DSL modems  |
| NAT/PAT   | SNAT/DNAT (masquerade, netmapping, port forwarding, IP forwarding) unlimited number of rules   |
| VPN   |  |
| icom Connectivity Suite   | Supports VPN service for remote maintenance, remote access and M2M-communication   |
| OpenVPN   | Client/server, several parallel tunnels, server with up to 20 clients, tls-auth/tls-crypt, dead peer detection (DPD)   |
| OpenVPN encryption  | Blowfish 128 Bit, DESX 192 Bit, DES 64 Bit, DES EDE 128 Bit, DES EDE3 192 Bit, AES 128-256 Bit, RC2 40-128 Bit, IDEA 128, CAST5 128 Bit, SHA1, SHA 224-512   |
| IPsec   | IKEv1, IKEv2 (automatic, fix), several parallel tunnels, pre-shared keys, certificates, tunnel mode, transport mode, dead peer detection (DPD)   |
| IPsec encryption  | DES EDE3 192 Bit, AES 128-256 CBC/GCM, SHA1, MD5, SHA 256-512,   |

## Technical Data

|                                     |  |
|-------------------------------------|--|
|                                     | DH-Group 1-31 (Diffie-Hellman 768 - 25519), ChaCha20-Poly1305  |
| GRE                                 | GRE via IPsec, point-to-point, multipoint  |
| PPTP                                | PPTP client/server; PAP/CHAP/MS CHAP/MS CHAP V2; MPPE 40-128   |
| Dynamic VPN                         | Dynamic multipoint VPN (GRE, IPsec, NHRP, EIGRP, OSPF, RIPv1/v2, BGP)  |
| <b>IT security</b>                  |  |
| Authentication                      | Pre-shared key, X.509 certificates, RADIUS, access rights (read, write, status)  |
| Firewall / netfilter                | IP filters (stateful firewall) also in VPN tunnel; packet filter: TCP, UDP, ICMP, ESP, AP, GRE;<br>MAC filter; pre-defined firewall rules can be activated   |
| Security                            | Bootimg signed firmware, HTTP/HTTPS attack prevention;<br>response upon events: configuration change, link up/down, restart, login attempt, netfilter violation, password hashing  |
| <b>Events &amp; Actions</b>         |  |
| Event & Action Handler              | Notification, alarming, diagnosis, attack detection, fault handling, operation and commissioning logic   |
| Events / alarms (selection)         | Change: digital input, Ethernet port, WAN chain, profile status, supply input (with MRX), cellular field strength; timer expired, firewall violation, login attempt detection, pulse sequence on digital input, counter, netfilter rule  |
| Event-triggered actions (selection) | Messages via e-mail, SMS (only LTE variants), SNMP traps, MCIP; switch profile, switch connection, change modem state, start timer, switch output or pulse sequence, activate firmware, reset  |
| <b>Monitoring and Management</b>    |  |
| Monitoring                          | SNMP traps and agent, configurable system logs, remote syslog, link up/down detection, netfilter violation   |
| Certificate management              | SCEP, CRL  |
| icom Router Management              | Supports central router management for FW updates, configuration management, connection monitoring, mass rollout, certificate management, available as public/private cloud (server) installation or onPremises  |
| <b>Administration</b>               |  |
| Configuration                       | Web Interface HTTP(S) with session management, command line interface (CLI), Telnet, SSH, configuration profiles as ASCII and binary file, ample configuration profiles event-triggered, REST API  |
| Diagnosis tools                     | Ping/icmp, tcpdump, traceroute, DNS lookup, AT commands, port mirroring  |
| FW update                           | Incremental, failsafe, update server (HTTP, FTP, HTTPS, FTPS), icom Router Management (WebSocket)  |
| System time                         | NTP client and server, buffered real time clock  |
| Help                                | Web interface: inline help, online help; example profiles, plausibility check, Configuration Guides  |
| <b>Supply</b>                       |  |
| Voltage                             | 12 ... 24 V DC ( $\pm 20\%$ 9,6-28,8 V), reverse-polarity protected  |
| Terminals                           | 3-pol. push-in terminal connectors, rigid/flexible conductors up to 1,5 mm <sup>2</sup>  |
| Power consumption                   | Typical approx. 1,5 W (variants -L1x0) / 1,8 W (variants -L2x0), max. 5,0 W  |
| <b>Ambient conditions</b>           |  |
| Dimensions                          | MIRO: 26 x 77 x 99 mm (W x D x H)<br>MIROdul: approx. 17 x 70 x 82 mm (W x D x H)  |
| Weight                              | MIRO-L1x0 /-L2x0: 94 g / 100 g<br>MIROdul-L1x0 /-L2x0: 42 g / 48 g   |
| Mounting                            | MIRO: DIN rail mounting, horizontal pitch (HP) on DIN rail:<br>Switch cabinet: 1.5 HP, depth on DIN rail 92 mm<br>Small distribution board: 4.5 HP, requires additional lateral DIN rail adapter set MIRO (accessory)<br>MIRO/MIRO dul: screw mounting via holes in the housing/module |
| Operating temperature               | -40 ... +75 °C <sup>2</sup>  |
| Humidity                            | 0 ... 95 % (non-condensing)  |
| IP rating                           | Housing: IP40  |

### Technical Data

#### Approvals & Standards

|                          |  |  |
|--------------------------|--|--|
| Certifications           | MIRO-L100:   | CE, UKCA   |
|                          | MIRO-L200:   | CE, UKCA, AT&T – SIM only  |
|                          | MIRO-L110/-L210:   | FCC part 15 class B, IC, PTCRB & IoT network certification, AT&T - NR-AM-DO  |
|                          | MIRO-L230:   | CE, UKCA, FCC part 15 class B, IC, PTCRB & IoT network certification, AT&T - NR-AM-DO, AT&T – SIM only, CCC/CQC, SRRC, NAL |
|                          | MIROdul -L1x0 /-L2x0:  | Approval takes place in the application, INSYS supports <sup>4</sup>   |
| EMC                      | Emission: EN 55032 class B, EN 61000-6-3; Immunity: EN 55035 (replaces EN 55024), EN 61000-6-2 |  |
| Safety                   | IEC/EN 62368-1   |  |
| Environmental conditions | Vibration/shock as per PLC standard DIN 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 60068-2-30              |  |
| Operating time           | MTBF > 1.000.000 h (25 °C), according to SN 29500 (according to IEC 61709)                     |  |

<sup>1</sup> Please check the availability of the Cellular communication 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.

<sup>2</sup> +70 ... +75 °C: extended temperature range

(refer to [www.insys-icom.com/en/extended-temperature-range/](http://www.insys-icom.com/en/extended-temperature-range/))

<sup>3</sup> These values concern the radio interface. Due to the 100 Mbit/s Ethernet interface and a single antenna solution, the achievable data rates are lower.

<sup>4</sup> The MIROdul variants are integration modules without housing and therefore without approval. Since the MIRO products with approvals are internally identical, reference can be made to the MIRO approvals when approving a MIROdul application. However, a differential assessment is necessary, which INSYS supports.

## Order Numbers and Accessories

### Available Variants

| Product description | Features   | Art. no. |
|---------------------|--|----------|
| MIRO-L100           | Cellular router, 1 Ethernet port, 1 dig. Input/Output (configurable)                                 | 10022846 |
| MIRO-L110           | Cellular router (North America variant), 1 Ethernet port, 1 dig. Input/Output (configurable)         | 10022847 |
| MIRO-L200           | Cellular router, 2 Ethernet ports, 1 dig. Input/Output (configurable)                                | 10023341 |
| MIRO-L210           | Cellular router (North America variant), 2 Ethernet ports, 1 dig. Input/Output (configurable)        | 10023342 |
| MIRO-L230           | Cellular router (worldwide frequencies), 2 Ethernet ports, 1 dig. Input/Output (configurable)        | 10024177 |
| MIROdul-L100        | Cellular router module, 1 Ethernet port, 1 dig. Input/Output (configurable)                          | 10023100 |
| MIROdul-L110        | Cellular router module (North America variant), 1 Ethernet port, 1 dig. Input/Output (configurable)  | 10023101 |
| MIROdul-L200        | Cellular router module, 2 Ethernet ports, 1 dig. Input/Output (configurable)                         | 10023343 |
| MIROdul-L210        | Cellular router module (North America variant), 2 Ethernet ports, 1 dig. Input/Output (configurable) | 10023344 |
| MIROdul-L230        | Cellular router module (worldwide frequencies), 2 Ethernet ports, 1 dig. Input/Output (configurable) | 10024706 |

### Suitable accessories

| Product description                     | Description  | Art. no. |
|---|--|----------|
| Magnetic Antenna 4G/3G/2G SMA           | Magnet mounting, height 72 mm, 3 m cable, SMA (m), IP rating IP65  | 10019504 |
| Outdoor Wall Antenna 4G/3G/2G SMA       | Wall mounting incl. bracket, height 220 mm, 5 m cable, SMA (m), IP rating IP65   | 10020596 |
| Allround Antenna 5G/L4G/3G/2G           | Screw or wall mounting, incl. steel angle, height 82 mm, 5 m cable, SMA (m), protection class IP67   | 10022961 |
| Roof mount antenna 4G/3G/2G SMA         | Screw mounting, height 15 mm, 3 m cable, SMA (m), ingress protection IP67  | 10022309 |
| 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 |
| Power supply 24V 15W                    | Power supply unit for DIN rail, wide-range input voltage ACDC protection against short circuit / overload / over voltage   | 10022848 |
| Wall power supply 24V 25W international | Power supply AC/DC with mains plug, suitable for desktop use, wide input, voltage range, protection against short circuit/overload/over voltage  | 10022849 |
| icom Connectivity Suite - VPN           | Supports VPN service for remote maintenance, remote access and M2M communication<br><a href="http://www.insys-icom.com/en/products/managed-services/vpn-service/">www.insys-icom.com/en/products/managed-services/vpn-service/</a> | various  |
| icom Connectivity Suite - M2M SIM       | Industrial SIM cards, multi-roaming, pooling, management portal<br><a href="http://www.insys-icom.com/en/products/managed-services/m2m-sim-service/">www.insys-icom.com/en/products/managed-services/m2m-sim-service/</a>          | various  |
| icom Router Management                  | Supports central router management for FW updates, configuration management, connection monitoring, container updates, mass rollout,   | various  |

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