# M!DGE – Cellular Router

# M!DGE2

- 4G / 3G / 2G
- Global connectivity
- Dual SIM
- 4× ETH, 1× COM, 1× USB
- 1× DO, 1× DI
- - 40 to +70 °C
- 12 – 24 VDC
- Expansion ready - mPCIe
- IPsec, OpenVPN, AES256
- Firewall, RADIUS

**M!DGE cellular routers,** specially designed for **SCADA & Telemetry** mission critical applications, are well suited to many different wireless applications like POS, ATM, Lottery and Security/Surveillance applications.

**M!DGE** is Linux OS based and has been designed with attention to detail, **performance, quality and reliability.** All relevant state-of-the-art concepts have been carefully implemented.

**M!DGE** is well proven within the market since 2012 in thousands of industrial installations in tens of countries worldwide providing **24/7 reliable service.**

**M!DGE2,** the 2nd generation of M!DGE with 2 SIM cards and 4 Ethernet ports, introduced in 2018, is the **top equipment** for SCADA communication if a cellular network is required.

**M!DGE** together with RACOM **RipEX radio modems** offers an unrivalled solution for combining Cellular and UHF/VHF licensed radio in a single **hybrid network.**

Both provide the same customized serial SCADA protocols on COM interfaces.

## IP behaviour

- **Switch** - switched or routed Ethernet ports
- **Terminal server** - two Serial-Ethernet converters
- **Subnets** - one additional IP alias on each Ethernet
- **VLAN** - 802.1Q – 5 VLANs to each Ethernet
- **NAPT** - masquerading, IP/Mask/Port translation supported
- **Tunnels** - IPsec, OpenVPN, GRE, PPTP
- **QoS** - prioritization from interfaces and/or applications
- **Static and dynamic routing** - Multipath routes, OSPF, BGP

## Security

- **Digitally signed FW**
- **Management** - https, ssh,
- **Role-based access control**
- **RADIUS** - authentication using remote RADIUS server
- **AES256** encryption
- **IPsec** - encrypted end-to-end tunnel
- **OpenVPN** – encrypted single server to multiple clients tunnel
- **Firewall** - Layer 2 – MAC, Layer 3 – IP, Layer 4 – TCP/UDP

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# Scalability

### Hardware
- **mPCIe slot** - for standard boards (GPS, 2nd LTE module…)
- **Proprietary slot** - COM/IO expansion board
  RS232/RS485 plus 1x DI, 1x DO

### Software
- **SDK** - Software Development Kit
- **LXC** - Linux Container

# Reliability

- **Heavy-duty industrial components**
- Industrial hardened design
- **Metal case**
- **- 40 to +70 °C**
- **VRRP** - Virtual Router Redundancy Protocol
- Fallback management
- Automatic connect recovery
- **3 year warranty**

# Diagnostics & Management

- **Web interface** or CLI via SSH
- **Monitoring** - save to file analysis of all Eth interfaces
- **Graphs** - Eth/WAN network traffic
- **SNMP v3** including Traps and Informs
- HW **Alarm input**, HW **Alarm output**
- SMS /E-mail Event notification
- **External flash disc** – aut. configuration, FW upgrade

# Hybrid networks

- Ready to be combined with RACOM RipEX radio modems within one hybrid network
- The same serial SCADA protocol FW drivers like in RipEX: **Modbus, IEC101, DNP3, PR2000, Comli, DF1, Profibus, Async Link, C24, Cactus, RP570, Slip, Siemens 3964(R)**
- TCP(UDP) protocols can be handled transparently or using Terminal server
- Embedded **Modbus RTU / Modbus TCP converter**

# Technical parameters

| Cellular Interface | |
|---|---|
| Frequency bands | 4G – LTE: B1(2100), B3(1800), B5(850), B7(2600), B8(900), B20(800), all bands with diversity<br>3G – WCDMA, HSPA, HSPA+: B1(2100), B2(1900), B5(850), B8(900), all bands with diversity<br>2G – GPRS, EDGE, GSM: 850, 900, 1800, 1900 |
| Data rates | up to 150 Mbps downlink / 50 Mbps uplink |
| SIM slot | 2× Micro SIM |
| **Electrical** | |
| Primary power | 12 – 24 VDC, +/- 20% |
| Power consumption | Average 7W (including max. 2.5W on USB port) |
| **Interfaces** | |
| Ethernet | 4× Ethernet 10/100 Base-T, Auto MDX, 2× RJ45, bridged or routed |
| COM | 1× RS232, 300 – 115 200 bps, screws, RxD, TxD, GND |
| USB | 1× USB host USB2.0 |
| Inputs/Outputs | 1× DI, 1× DO |
| Antenna | 2× SMA female - receive diversity |
| Expansion | COM / IO: RS232/RS485 pus 1× DI, 1× DO |
| **Environmental** | |
| IP Code (Ingress Protection) | IP40 |
| MTBF | > 220.000 hours (> 25 years) |
| Operating temperature | -40 to +70°C |
| Operating humidity | 5 to 95% non-condensing |
| Storage | - 40 to +85 °C (- 40 to +185 °F) / 5 to 95 % non-condensing |
| **Mechanical** | |
| Casing | Metal |
| Dimensions | 125 H × 45 W × 110 D mm (4.9 × 1.8 × 4.3 in) |
| Weight | 450 g (1.0 lbs) |
| Mounting | DIN rail, flat-bracket |

| Security | |
|---|---|
| Management | HTTP, HTTPS, SSH |
| Access accounts | 2 levels (User, Admin) |
| Encryption | Yes (AES256) with IPsec, OpenVPN |
| IPsec | Yes |
| Firewall | Layer 2 – MAC, Layer 3 – IP, Layer 4 – TCP/UDP, SMS filter |
| RADIUS | Yes |
| **SW** | |
| Fallback management | Yes |
| Connection supervision | Yes |
| Automatic connect recovery | Yes |
| SMS management | Yes |
| Software Development Kit | Full featured |
| Linux container | LXC |
| SMS / E-mail event notification | Yes / Yes |
| Routing | Static / Dynamic |
| BGP / OSPF | Yes / Yes |
| QoS | Yes |
| NAPT | Yes |
| User protocols on Ethernet | Yes |
| User protocols on COM | Modbus RTU, DNP3, IEC101, DF1, COMLI, C24, Cactus, ITT Flyght, RP570, Siemens 3964(R), UNI |
| Serial to IP convertors | Modbus RTU / Modbus TCP, Terminal server |
| VPN | OpenVPN, IPsec, PPTP, GRE |
| VRRP | Yes |
| NTP | Client / Server |
| SNMP | v1, v2c, v3 |
| Type Approval | CE, FCC - pending |