

## ICR-1645

### 4G LTE Industrial Connectivity Gateway



#### Features

- Industrial ruggedized design
- LTE Cat.4 with 3G/2G fallback
- 2 × SIM for redundancy
- 5 × Ethernet 10/100/1000 Mbps
- Wide operational temperature range
- Optional wall-mount and DIN-rail kits
- Linux based OS & SW customization
- Optional 1 × WiFi 5, IEEE802.11ac (ICR-1645W)
- Optional GNSS receiver (ICR-1645G)

#### Introduction



Industrial connectivity gateway ICR-1645 series is designed for wireless communication to enable connection of IP devices and serial buses to a cellular network. Industrial M2M and IoT applications include kiosks, industrial PCs, HMIs, traffic controllers, meters, UPS systems, and much more. The peak downlink data rate for LTE Cat.4 is approximately 150 Mbps. Also in the uplink, LTE Cat.4 provides a peak data rate of 50 Mbps.

The ICR-1645 router is equipped with Five Gigabit Ethernet ports for 1xWAN + 4xLAN and optional digital I/O (1x DI, 1x DO) and Serial (1xRS232 + 1xRS485) connectivity. ICR-1645 can be optionally equipped with WiFi 5 or GNSS. The gateway supports VPN tunnel creation using various protocols to ensure safe communications. The gateway provides diagnostic functions which include automatic monitoring of the wireless and wired connections, automatic restart in case of connection losses, and a hardware watchdog that monitors the router status.

The connectivity gateway is based on ICR-OS operation system. Open Linux platform enable wide possibilities of programming customer SW applications in Python, C/C++. Router supports uploading of certain RouterApps (basic features only), that would extend standard firmware functionalities.



WebAccess/DMP

#### Order Codes

| Model no. - Order Codes                                                                            | Region | 5 × Gigabit Ethernet | 2 × SIM | 1 × RS232<br>1 × RS485<br>1 × DI, 1 × DO | GNSS | WiFi 5 1T1R |
|----------------------------------------------------------------------------------------------------|--------|----------------------|---------|------------------------------------------|------|-------------|
|  ICR-1645-EU-A  | EMEA   | ✓                    | ✓       | ✓                                        |      |             |
|  ICR-1645W-EU-A | EMEA   | ✓                    | ✓       | ✓                                        |      | ✓           |
|  ICR-1645G-EU-A | EMEA   | ✓                    | ✓       | ✓                                        | ✓    |             |
|  ICR-1645-CN-A  | China  | ✓                    | ✓       | ✓                                        |      |             |
|  ICR-1645W-CN-A | China  | ✓                    | ✓       | ✓                                        |      | ✓           |
|  ICR-1645G-CN-A | China  | ✓                    | ✓       | ✓                                        | ✓    |             |

\*- The router is compatible with cellular networks in the indicated region. The importer/operator needs to check locale legislation (standards, national Telecom approvals, etc.) and compare with standards available for the product if possible to operate the router in the target region legally.

### Specifications

| System                                     |                                                                                                                                                                                                                                                           |
|--------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CPU                                        | Cortex-A7 1.2GHz, ARMv7                                                                                                                                                                                                                                   |
| Memory                                     | RAM - 256 MB<br>NAND Flash - 512 MB<br>(60 MB for RouterApps, 26.7 MB for customer data)                                                                                                                                                                  |
| Watchdog                                   | HW Watchdog                                                                                                                                                                                                                                               |
| Interfaces                                 |                                                                                                                                                                                                                                                           |
| Ethernet                                   | 5× Ethernet, RJ45, 10/100/1000Mbps                                                                                                                                                                                                                        |
| Serial Lines<br>(Optional - ICR-1645 only) | 1× RS232 (Tx, Rx, GND, RTS, CTS)<br>1× RS485 (Data-, Data+, GND)<br>(10-pin terminal block with Digital I/O)                                                                                                                                              |
| I/O<br>(Optional - ICR-1645 only)          | 1× Digital Input (Dry contact)<br>1× Digital Output (Open Drain, 48 V / 100 mA)<br>(10-pin terminal block together with RS232,RS485)                                                                                                                      |
| Reset Button                               | Reboot ( < 4 s ) / Factory reset ( > 4 s )                                                                                                                                                                                                                |
| LED Indicators                             | PWR: green only, blinking while system is ready<br>SIG: green/orange/red for good/fair/poor signal<br>SIM: green/orange for SIM1/2<br>USR: user define for WiFi, serial, DI/O etc.<br>USR: user define for WiFi, serial, DI/O etc.<br>ETH0 & ETH1 on RJ45 |

| Environmental            |                                                                                                                     |
|--------------------------|---------------------------------------------------------------------------------------------------------------------|
| Power Supply             | 9 – 48 VDC (2-pin terminal block)                                                                                   |
| Consumption              | Without WiFi<br>Idle 2.7W / Average 3.7 W / Maximum 5.5 W<br>With WiFi<br>Idle 3.6W / Average 4.8 W / Maximum 6.8 W |
| Operating Temperature    | -30 to +75°C                                                                                                        |
| Storage Temperature      | -40 to +85°C                                                                                                        |
| Humidity                 | 5 to 95 %                                                                                                           |
| IP Cover                 | IP30                                                                                                                |
| Physical Characteristics |                                                                                                                     |
| Dimensions               | 116 × 39 × 113.5 mm (W × H × D)                                                                                     |
| Enclosure                | Metal Case with grounding screw                                                                                     |
| Mounting                 | Wallmount<br>Din-Rail (optional)                                                                                    |
| Weight                   | ICR-1645W: 468g (excluding accessories)<br>LTE Antenna: 25.2g<br>WiFi Antenna: 7.8g<br>Wall-mount bracket: 50g      |

| WiFi - optional (ICR-1645W) |                                         | GNSS - optional (ICR-1645G) |                                     |
|-----------------------------|-----------------------------------------|-----------------------------|-------------------------------------|
| Antenna                     | 1 × R-SMA connector                     | Antenna                     | 1× SMA connector                    |
| Standards                   | IEEE802.11 ac/a/b/g/n 2.4GHz / 5GHz     | Systems                     | GPS, GLONASS, BeiDou, Galileo, QZSS |
| Data Rate                   | Up to 433Mbps                           | Protocol                    | NMEA 0183                           |
| Security                    | WEP, TKIP, AES, WPA, WPA2, WPA3, 802.1X | Ac Time-to-First-Fix        | Warm start: 26 s, cold 35 s         |
| Modes                       | AP mode or STA mode                     |                             |                                     |

| Cellular Interface   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SIM Slots            | 2× SIM (Micro SIM – 3FF)                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Antennas             | 2× SMA Female (1× Main, 1× Diversity)                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| LTE Parameters       | <b>ICR-16xxx-EU:</b><br>LTE-FDD Bands: B1 (2100 MHz), B3 (1800 MHz), B7 (2600 MHz), B8 (900 MHz), B20 (800 MHz), B28A (700 MHz)<br>LTE-TDD Bands: B38 (2600 MHz), B40 (2300 MHz), B41 (2500 MHz)<br><b>ICR-16xxx-CN:</b><br>LTE-FDD Bands: B1 (2100 MHz), B3 (1800 MHz), B5 (850MHz), B8 (900 MHz)<br>LTE-TDD Bands: B34 (2000MHz), B38 (2600 MHz), B39 (1900MHz), B40 (2300 MHz), B41 (2500 MHz)<br>Transfer rate:<br>LTE-FDD: 150 Mbps (DL), 50 Mbps (UL)<br>LTE-TDD: 130 Mbps (DL), 30 Mbps (UL) |
| UMTS Parameters      | <b>ICR-16xxx-EU:</b><br>WCDMA: B1/B8<br>Transfer rate: 384 kbps (DL/UL)<br><b>ICR-16xxx-CN:</b><br>WCDMA Bands: B1/B8<br>Transfer rate: 384 kbps (DL/UL)<br>TD-SCDMA Bands: B34/B39<br>Transfer rate: 2.4 Mbps (DL), 2.2 Mbps (UL)                                                                                                                                                                                                                                                                  |
| EVDO/CDMA Parameters | <b>CR-16xxx-CN:</b> CDMA800<br>Transfer rate EVDO: 3.1 Mbps (DL), 1.8 Mbps (UL)                                                                                                                                                                                                                                                                                                                                                                                                                     |
| GSM Parameters       | Supported frequencies: EGSM900/ DCS1800<br>Transfer rate:<br>GPRS: 107 kbps (DL), 85.6 kbps (UL)<br>EDGE: 296 kbps (DL), 236.8 kbps (UL)                                                                                                                                                                                                                                                                                                                                                            |

| Software                          |                                                                                                                                                                                                                                                                                      |
|-----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Operating System                  | ICR-OS (Linux based)                                                                                                                                                                                                                                                                 |
| Application Development           | Open Linux, BASH, C                                                                                                                                                                                                                                                                  |
| Networking Features and Protocols | DHCP, NAT/PAT, SSH, VRRP, PPPoE, SNMP, SMTP, Dynamic DNS client, DNS proxy, VLAN, QoS, NTP Client/Server, Backup Routes, Port Forwarding, Host Port Routing, Ethernet Bridging, Load Balancing, IPv6 Dual Stack                                                                      |
| Industrial Protocols and IoT      | *Modbus TCP2RTU, Modbus to MQTT                                                                                                                                                                                                                                                      |
| Security                          | HTTPS, SSH, SFTP, DMZ, Firewall (IP Filtering, MAC address filtering, Inbound and outbound Port filtering)<br>VPN Tunneling – WireGuard, OpenVPN, IPsec with IKEv1 and IKEv2, GRE, L2TP, PPTP<br>Authentication – RADIUS, TACACS+, 2FA<br>Encryption – DES, 3DES, AES, RSA, MD5, SHA |
| Firmware Management               | Automatic firmware updates – server, locally via LAN or remotely via WAN<br>Over-the-Air cellular module firmware updates                                                                                                                                                            |
| Diagnostic/Log                    | Status – Signal strength, data usage, detailed long term statistics<br>One CLICK report – Current configuration, factory identification, routing table<br>Log – System log, reboot log, kernel log<br>Remote diagnostics (via SSH)                                                   |
| Event Engine                      | StartUp script & up/down script (own rules based on digital inputs, network parameters, data usage, timer, power)                                                                                                                                                                    |
| Configuration                     | Web server, SSH, four configuration switchable profiles, automatic configuration update from server, backup & restore configuration                                                                                                                                                  |
| Advanced Software Tools           | WebAccess/DMP – Remote device provisioning, monitoring & management platform                                                                                                                                                                                                         |

\*Functionality is available with installed Router App

| Standards & Regulations    |                                                                                                                                                |
|----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| Radio                      | EN 301 511, EN 301 908-1, EN 301 908-2, EN 301 908-13, EN 303 413, EN 301 893, EN 300 328                                                      |
| EMC                        | EN 301 489-1, EN 301 489-17, EN 301 489-19, EN 301 489-52, EN 61000-4-2, EN 61000-4-3, EN 61000-4-4, EN 61000-4-5, EN 61000-4-6, EN 61000-4-11 |
| Safety                     | EN 62368-1                                                                                                                                     |
| Cybersecurity              | EN 18031-1                                                                                                                                     |
| National                   | CE, UKCA                                                                                                                                       |
| Mechanical                 | EN 60529, EN 60068-2-27, EN 60068-2-64                                                                                                         |
| Climatic                   | EN 60068-2-1, EN 60068-2-2, EN 60068-2-14, EN 60068-2-30                                                                                       |
| Environmental              | REACH, RoHS3, WEEE                                                                                                                             |
| Cellular Module Approvals* | ICR-16XX-EU: GCF/ CE/ UKCA/ NCC/ RCM<br>ICR-16XX-CN: SRRC/ NAL/ CCC                                                                            |

\*- Approvals are valid for the integrated cellular module inside the router only. Cellular module approvals are not always applicable for the whole router – see “Standards and Regulations” chart for complete router approvals available.

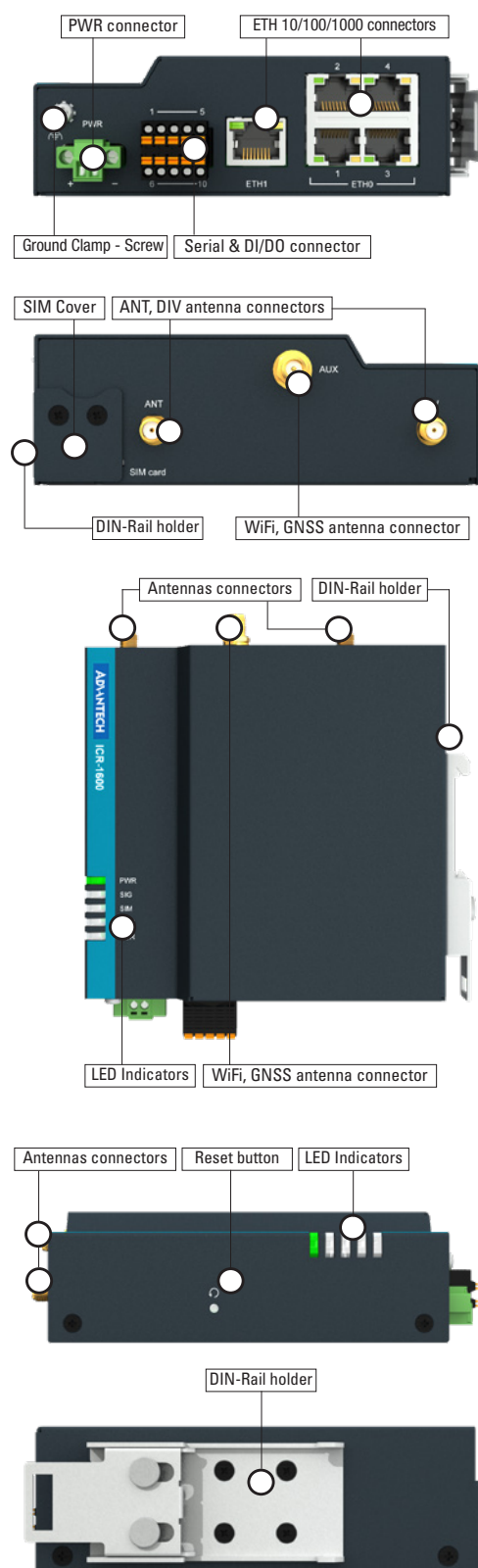
## Accessories

| Part Number       | Description                                                        | Included in the package |
|-------------------|--------------------------------------------------------------------|-------------------------|
| 1751000532-01     | 2x LTE antenna                                                     | ✓                       |
| 1751000533-01     | 1x WiFi antenna, 2.4 / 5GHz (for ICR-1645W only)                   |                         |
| 1652008574-01     | 10-pin Serial / IO connector (for ICR-164x only)                   |                         |
| 1652002024        | 2-pin Power connector                                              |                         |
| 1960115642N001    | Wall-mount bracket                                                 |                         |
| OPT1-DIN-ICR1X-00 | DIN-Rail brackets (30 mm)                                          | Optional                |
| OPT1-RPS-1212-EU  | Power supply, 12V/1A, 2-pin, UK plug                               | Optional                |
| OPT1-RPS-1212-UK  | Power supply, 12V/1A, 2-pin, UK plug                               | Optional                |
| OPT1-RPS-1212-US  | Power supply, 12V/1A, 2-pin, US plug                               | Optional                |
| OPT1-RPS-1212-AUS | Power supply, 12V/1A, 2-pin, AUS plug                              | Optional                |
| OPT1-ANT-GNS-20   | Active GNSS antenna, magnetic base, SMA-M (optional for ICR-16xxG) | Optional                |

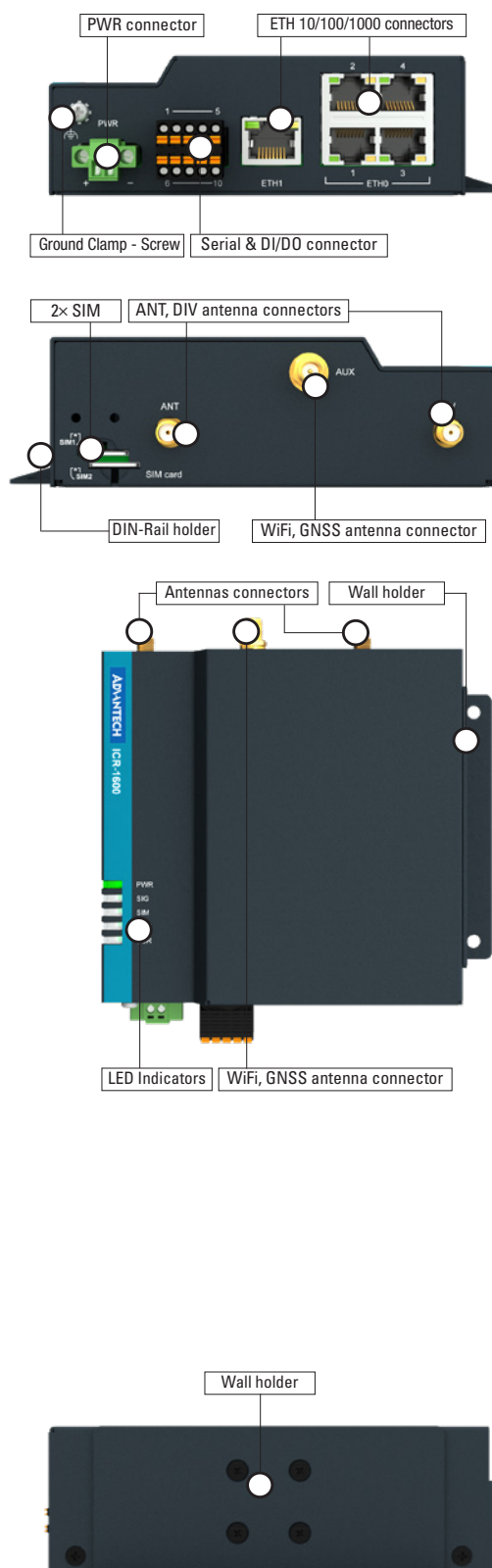
For more Antenna accessories visit [www.advantech.com](http://www.advantech.com)

### ICR-1645 Views

#### DIN mount

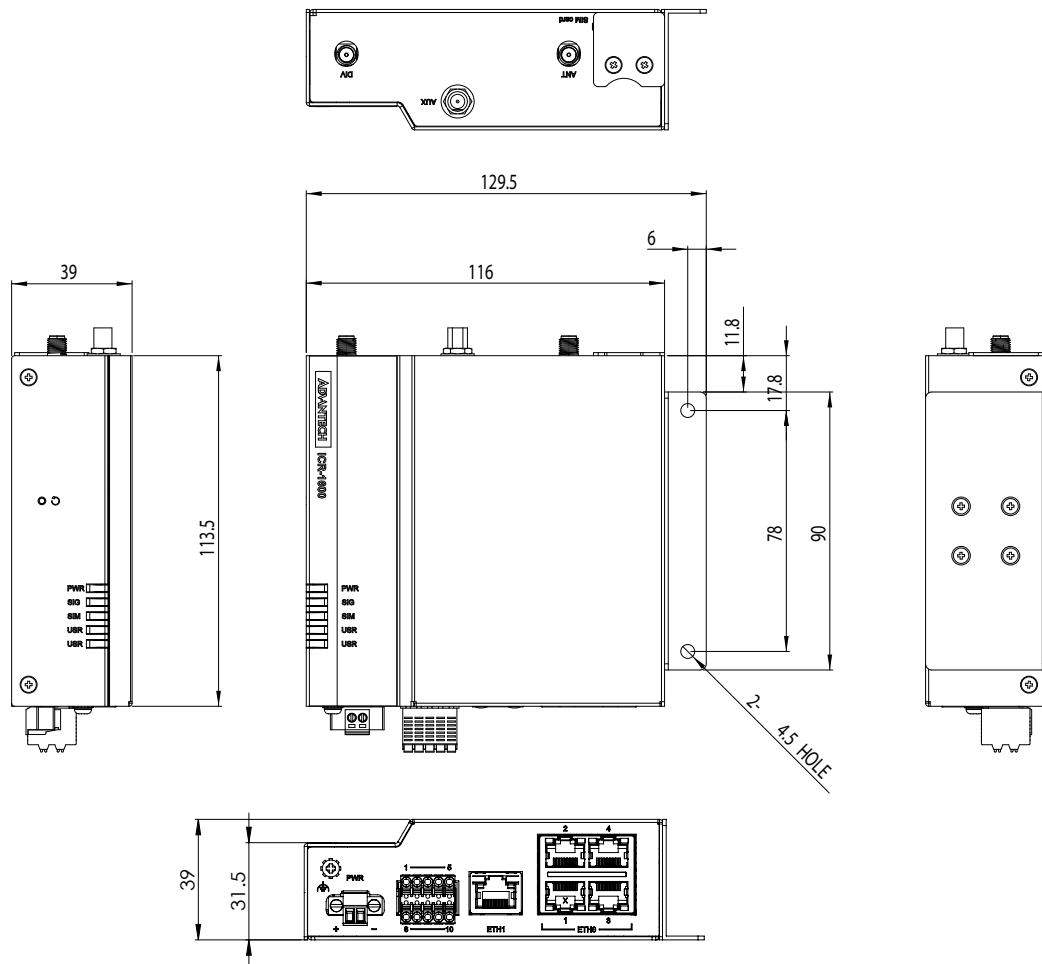


#### Wall mount



### ICR-1645 - Dimensions - Technical Drawing

#### Wall mount



#### DIN Mount

